"DIMENSION*" 2000 AND "DIMENSION" CUSTOM PBXs

SYSTEM DESCRIPTION

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1. GENERAL

1.01 This section describes the DIMENSION 2000 and the DIMENSION Custom PBXs (Fig. 1). All members of the DIMENSION PBX family exhibit a high degree of commonality relative to the following characteristics:

- Similar packaging
- Use of many of the same type circuit packs
- Stored program control and microdiagnostics
- Similar feature administration and operation.

1.02 This section is reissued for the following reasons:

(a) To provide current system information.

(b) To provide coverage for Issue 3, Feature Package (FP) 8 optional services, features, and hardware. Major additions include:

(1) Optional Services

- Applications Processor
- Data Switching Level 1 and Level 2
- Distributed Communications System (DCS)

(2) Features

- Message Center Service
- Directory Service
- Automatic Message Waiting
- Enhanced Uniform Call Distribution (EUCD)
- Call Coverage
- Five-Digit Dialing
- Leave-Word Calling

(3) Hardware

- Control carrier J58882AK
- Circuit packs LC147B, LC500 through LC505, LC507, LC509, LC510, LC515, LC566, LC567, LC568
- Minirecorder KS-21447-L12.

(c) Additions and changes to the following:

- Added Federal Communications Commission (FCC) Part 15 compliance information to Part 4
- Marked customer premises facility terminal (CPFT) equipment in Part 3 to "MD"
- Added packaged metallic facility terminal assembly (PMFTA) to Part 3.

Revision arrows are used to emphasize significant changes.

1.03 ***Warning: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation, it has not been tested for compliance with the***

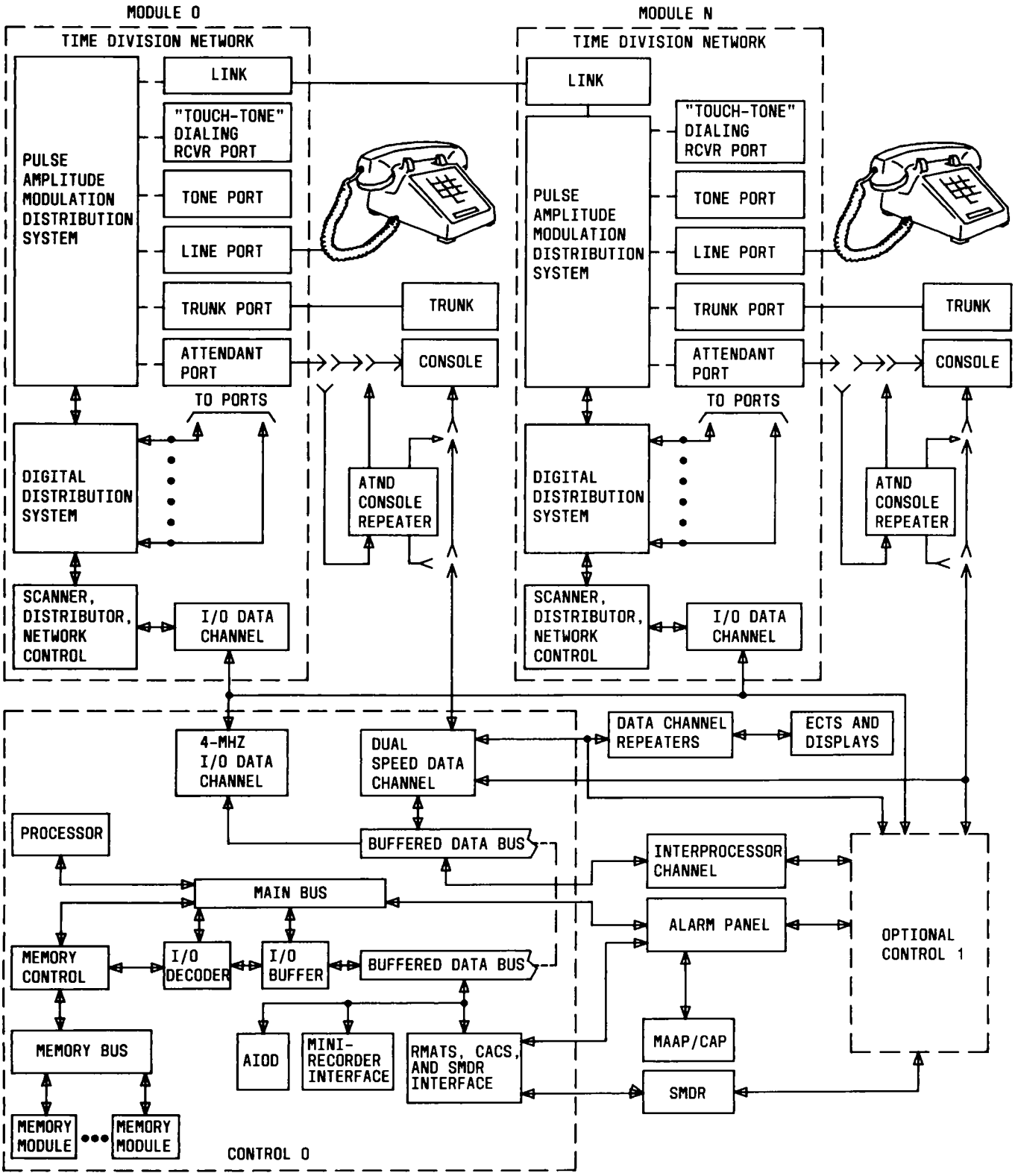


Fig. 1—DIMENSION 2000 or Custom PBX—Block Diagram

limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

1.04 This section includes coverage of FP7, FP8, FP9, FP11, and FP12. General, but yet descriptive, information is provided about the system hardware and hardware/software interaction.

1.05 The 554 Division of Bell System Practices covers the DIMENSION PBX product line and is structured so that related information is in the same layers as follows:

- Section 554-000-000 is an index of all Issue 1 or later sections.
- Layer 554-010-XXX contains sections common to more than one DIMENSION PBX system. It covers consoles, auxiliary circuits, DIMENSION PBX Electronic Custom Telephone Service (ECTS); the Remote Maintenance, Administration, and Traffic System (RMATS); the Peripheral Interface Circuit (PIC); Energy Communication Signaling Unit (ECSU); Station Message Detail Recording (SMDR); Customer Administration Center System (CACS); Customer Administration Panel (CAP); and Automatic Voice Network (AUTOVON).
- Sections 554-101-XXX and 554-102-XXX pertain to DIMENSION 100 and 400 PBX systems.
- Sections 554-105-XXX pertain to DIMENSION 600 (formerly 400E) PBX systems.
- Sections 554-106-XXX pertain to Energy Communications Service Adjunct (ECSA) System.
- Sections 554-111-XXX pertain to DIMENSION 2000 and Custom PBX systems.
- Sections 554-191-XXX contain feature documents.
- How-to-operate instructions for the DIMENSION PBX consoles are contained in 999-200-XXX sections.

1.06 The 554-1XX-XXX sections contain system descriptions, engineering planning, and general software descriptions of a tutorial nature. The Task Oriented Practices (TOP) for each system are numbered in the appropriate layers for each DIMENSION PBX system. Maintenance support is provided in a series of sections prepared for major system elements such as the Pulse Amplitude Modulation (PAM) network, scanner/distributor, central processor, etc. The sections are intended to convey operational theory to provide a background for troubleshooting complex problems. The Administration and Maintenance (A&M) manuals, listed in the 554-000-100 Index, are provided to serve as a guide for administering changes and maintaining the PBX. Sections 554-101-115, 554-105-115, and 554-111-115 contain descriptions and procedures for all field X-ray tests.

1.07 The DIMENSION 2000 PBX and DIMENSION Custom PBX are essentially the same system except for the increased capacities of the Custom PBX which requires an increase in the number of line and trunk records that require larger memory sizes. Both the DIMENSION 2000 PBX and the DIMENSION Custom PBX use the same circuit pack technology (but not necessarily all the same circuit packs) as the DIMENSION 100, 400, and 600 PBXs with modifications in the network and common control. The PAM network and time division switched buses contain 128 time slots per network module (Fig. 2). The processor in the DIMENSION 2000 and Custom PBX provides the capacity (throughput) to serve the traffic encountered with large line configurations.

1.08 The DIMENSION 2000 PBX can provide a nominal of 2000 lines depending upon the particular FP and PBX system configuration. The DIMENSION Custom PBX generally provides more than 2000 lines and usually consists of those memory configurations supporting the additional translation and call processing records. Table A lists the memory configurations and summarizes the system parameters, giving maximum available quantities per FP and memory configuration. Maximum capacities shown, in some cases, may not be achieved simultaneously due to system traffic, processor throughput, and overall system configuration limitations. The

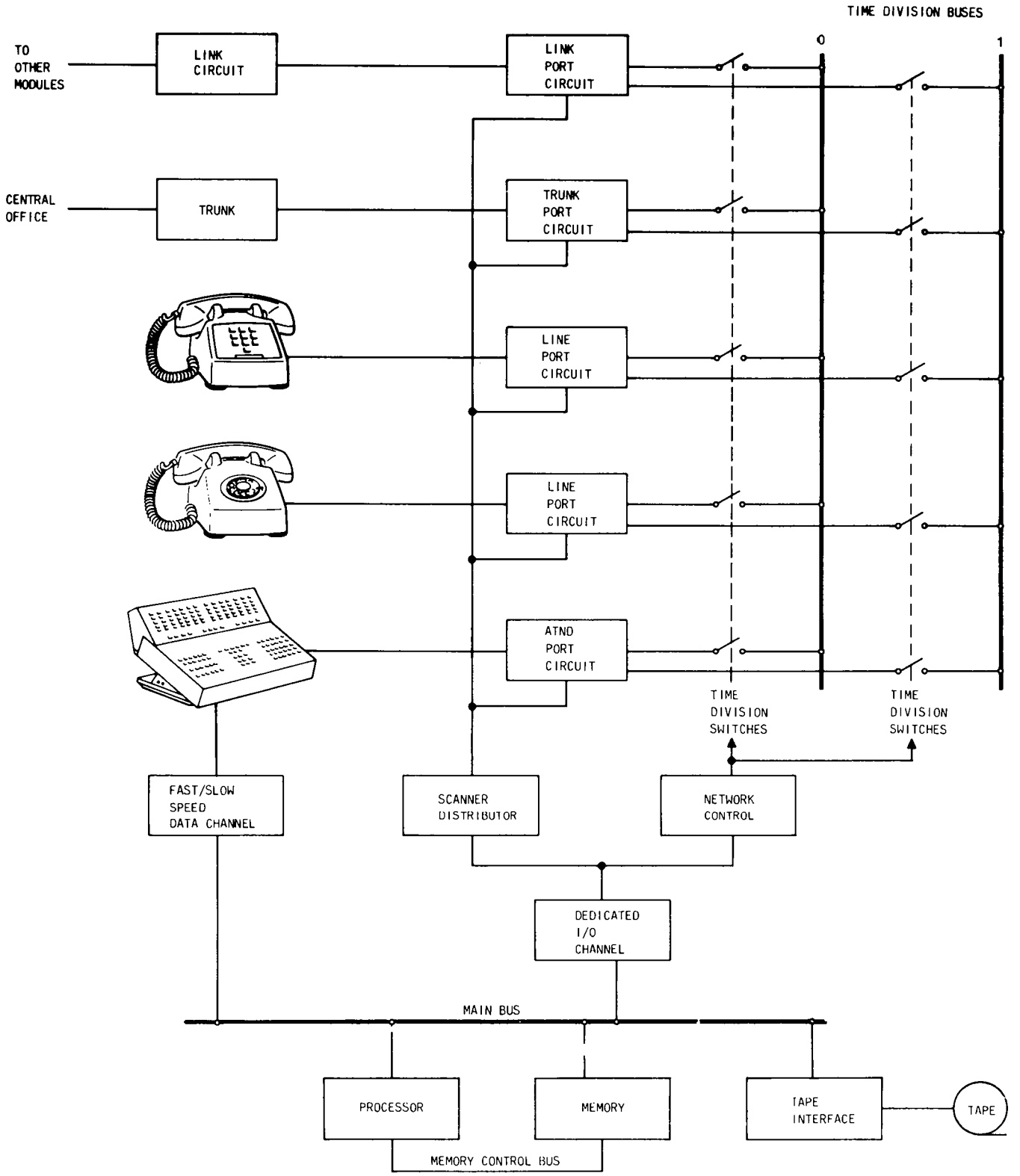


Fig. 2—DIMENSION 2000 or Custom PBX—Time Division Switching—Functional Block Diagram

maximum line and trunk capacities of a DIMENSION Custom PBX must be determined by an evaluation of the processor throughput. Processor throughput is not determined by line and trunk capacities alone, but additionally is a function of the type memory, memory configuration, network traffic including feature utilization and FP requirements.

1.09 A wide range of features and services is available in the DIMENSION PBX line. The features and services are engineered and tariffed into groups known as feature packages (FP). The five FPs available for the DIMENSION 2000 and Custom PBXs are as follows:

- ***FP7:*** Deluxe Intercity with Electronic Custom Telephone Service
- ***FP8:*** Deluxe Intercity with Electronic Custom Telephone Service, Tandem Switching, and Retail Service
- ***FP9:*** Hospitality Communications System (deluxe hotel/motel service)
- ***FP11:*** Hospital Communications Management System or Hospitality Communications System (deluxe hotel/motel service) with Electronic Custom Telephone Service
- ***FP12:*** Retail Service and Electronic Custom Telephone Service.

2. DESCRIPTION

2.01 The DIMENSION 2000 PBX system provides the capability to serve approximately 2000 lines, depending upon the particular FP and system configuration. Five memory configurations (Table A) have been developed which permit a wide range of flexibility in assigning lines, trunks, consoles, multibutton electronic telephone (MET) sets, etc.

2.02 All PBXs in the DIMENSION PBX product line use a time division switching arrangement. Design of the DIMENSION 2000 PBX and DIMENSION Custom PBX network and system control includes large capacities for lines, trunks, consoles, and random access memory (RAM). The required system network capacity has been attained by using pulse amplitude modulation (PAM) and time division switching on two independent 64-time-slot buses per network module.

2.03 Network module configurations maximize system reliability at minimum cost. A network module consists of a minimum of two module control cabinets, each with one module control carrier which contains the central amplifiers and control logic for one 64 time slot PAM bus. The dual (time division) bus system permits effective switching of traffic on 128 time slots per network module. Failure of one module control cabinet does not cause a loss of service to any station or trunk in the affected network module, but does reduce the traffic capabilities by approximately one-half.

2.04 Other critical circuits, such as the network clock and tone plants, are duplicated with each of the two duplicated circuits appearing in different equipment cabinets. Each network cabinet, module control or line control, is equipped with a maintenance circuit which monitors various critical circuits in the network and can be used by software to establish direct test calls through the PAM bus to check the transmission capability.

2.05 Network traffic capacity is a function of the number of modules as well as the amount of traffic flowing through link circuits (double switched traffic). The originating and terminating traffic capacity is usually less (per module) for multimodule systems since some traffic is routed through link circuits which use a time slot in each module per busy link. Proper traffic engineering is necessary in order to minimize intermodule linking. Traffic measurement programs permit network analysis and provide indication of improper line, trunk, or link assignments.

2.06 Functional operation of the PBX is under the control of the central processor. The processor controls all system activities by executing programmed instructions read from main memory. A high-level instruction is read from RAM main memory, and the processor executes a series of microinstructions in response to decoding each high-level instruction. Since the common control (processor) is physically located in a cabinet(s) separate from the network cabinets, the processor communicates with each module over a separate serial input/output network data channel.

2.07 The processor issues maintenance, distribution, and scan commands via the serial data channel and module control circuits. Upon direct commands from the processor, the scanner/distributor scans for changes in port status and assigns time slots to network control circuits. Each port

TABLE A

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS (NOTE)

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

See note and footnotes at end of table.

TABLE A (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS (NOTE)

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

See note and footnotes at end of table.

TABLE A (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS (NOTE)

ITEM		FEATURE PACKAGE	MAXIMUM PER MEMORY CONFIGURATION				
			B	C	D	E	F
System (Contd)	Station Line Records	7	712	1072	2360	3952	7184
		8 & 12	—	1032	2320	—	6552
		9	712	1072	2360	3952	—
		11	—	—	2640	—	—
	Speed Calling Numbers	7	800	1000	2000	3000	5120
		8 & 12	—	1000	2000	—	5120
		11	—	—	2000	—	—
	Calling Number Display	7	14	42	42	42	104
		8 & 12	—	6	6	—	6
		9	9	11	13	15	—
		11	—	—	13	—	—
	Long Distance Billing Journal Printers	9	9	15	21	31	—
		11	—	—	15	—	—
	Assignable Software Input/ Output Data Channels (J58882AC/AJ/AK Carriers) FP8, Issue 3 only	7	46/34/NA	46/34/NA	46/34/NA	46/34/NA	74/62/NA
		8 & 12	—	46/34/NA	46/34/NA	—	74/62/58
		9	46/34/NA	46/34/NA	46/34/NA	46/34/NA	—
		11	—	—	NA/34/NA	—	—
	Peripheral Interface Circuits	9	12	18	24	34	—
		11	—	—	18	—	—
	Remote Access Trunks	7	6	12	12	20	30
		8 & 12	—	30	45	—	45
		11	—	—	45	—	—
	Release Link Trunks (Outgoing)	8 & 12	—	16	16	—	16
		11	—	—	16	—	—
	Release Link Trunks (Incoming)	8 & 12	—	110	110	—	110
		11	—	—	110	—	—

See note and footnotes at end of table.

TABLE A (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS (NOTE)

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

See note and footnotes at end of table.

TABLE A (Contd)

"DIMENSION" 2000 AND CUSTOM PBX SYSTEM PARAMETERS (NOTE)

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

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

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

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

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

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

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

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

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

TABLE B

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
ADVANCED PRIVATE LINE TERMINATION (APLT)	1	1		1	1	
ALPHANUMERIC DISPLAY FOR ATND POSITION	1	1	1	1	1	X
ATTENDANT CONFERENCE	1	1	1	1	1	X
ATTENDANT CONSOLE	1	1	1	1	1	X
ATTENDANT CONTROL OF TRUNK GROUP ACCESS	1	1	1	1	1	
ADSS/BLF*	1	1	1	1	1	X
- WITH EXTENDED DSS	1	1	1	1	1	X
ATTENDANT LOCKOUT	1	1	1	1	1	
ATTENDANT RELEASE LOOP		1		1	1	
ATTENDANT TRANSFER - ALL CALLS	1	1	1	1	1	
AUTHORIZATION CODE		1				
AUTOMATIC ALTERNATE ROUTING (AAR)		1				
AUTOMATIC CALL DISTRIBUTION (ACD)		2				X
- WITH PERFORMANCE REPORTING OPTION 500 (PRO 500)		2				
AUTOMATIC CALLBACK - CALLING	1	1		1	1	
AUTOMATIC CIRCUIT ASSURANCE (ACA)		1				X
AUTOMATIC IDENTIFIED OUTWARD DIALING (AIOD)	1	1	1	1	1	X
AUTOMATIC MESSAGE WAITING		3				X
AUTOMATIC OVERFLOW TO DIRECT DISTANCE DIALING (DDD)		1				
AUTOMATIC ROUTE SELECTION (ARS)	1			1	1	X
AUTOMATIC ROUTE SELECTION - DELUXE		-				
- WITH TIME OF DAY ROUTING		1				
- CLOCKED MANUAL OVERRIDE		1				
- CONTROLLED ALTERNATE FACILITIES RESTRICTION LEVELS		1				
- SPLIT ROUTING OF 0 AND 01X CALLS		1				
AUTOMATIC STATION RESTRICTION			1	1		
AUTOMATIC VOICE NETWORK (AUTOVON) ACCESS	1	1		1	1	X
AUTOMATIC WAKEUP SERVICE			1	1		X
BED STATUS AND SELECTION			1	1		
BUSY LAMP FIELD	1	1	1	1	1	X
BUSY VERIFICATION OF STATION LINES	1	1	1	1	1	
CALL COVERAGE		3				
CALL FORWARDING	-	-	-	-	-	
- ALL CALLS	1	1	1	1	1	
- ALL CALLS OVERRIDE	1				1	
- ALL CALLS - REMOTE			3			
- BUSY AND DON'T ANSWER	1	1		1	1	
- DON'T ANSWER	1	1		1	1	

* FOR SYSTEMS HAVING MORE THAN 1800 LINES, EXTENDED DSS CAN BE PROVIDED AS AN OPTION.

TABLE B (CONTD)

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
CALL HOLD	1	1	1	1	1	
CALL PARK	1	1	1	1	1	
CALL PICKUP	1	1	1	1	1	
CALL WAITING	–	–	–	–	–	
– ATTENDANT CALL	1	1	1	1	1	
– ORIGINATING CALL WAITING	1	1	1	1	1	
– TERMINATING CALL WAITING	1	1	1	1	1	
CALLING NUMBER DISPLAY TO ATTENDANT	1	1	1	1	1	X
CALLING NUMBER DISPLAY TO STATION	1	1	1	1	1	X
CENTRALIZED ATTENDANT SERVICE (CAS)		–		–	–	
– COMBINED PBX/ATND CONCENTRATOR		1		1	1	X
– W/SEPARATE ATTENDANT CONCENTRATOR		1		1	1	X
– W/FORCE ADMINISTRATION DATA SYSTEM (FADS)		1		1	1	
CLASS-OF-SERVICE DISPLAY TO ATTENDANT	1	1	1	1	1	X
CODE CALLING ACCESS	–	–	–	–	–	
- 3A	1	1	1	1	1	X
- CHIME PAGING		1		1	1	X
CODE RESTRICTION	1	1	1	1	1	
COMMON CONTROL SWITCHING ARRANGEMENT ACCESS	1	1		1	1	X
COMMUNICATION INTERFACE FOR PROPERTY MANAGEMENT SYSTEM			1	1		
- CALLING NUMBER DISPLAY			1	1		
- ROOM/BED CHANGE/SWAP			1	1		
- WITH DATA ENTRY BY TELEPHONE				1		
CONTROLLED OUTWARD RESTRICTION	1	1	1	1	1	
CONTROLLED STATION-TO-STATION RESTRICTION	1	1	1	1	1	
CONTROLLED TERMINATION RESTRICTION	1	1	1	1	1	
CONTROLLED TOTAL RESTRICTION	1	1	1	1	1	
CUSTOM INTERCOM	1	1		1	1	
CUSTOMER ADMINISTRATION CENTER SYSTEM (CACS)		1			1	X
CUSTOMER ADMINISTRATION PANEL (CAP)	1	1	1	1	1	X
DATA COMMUNICATION ACCESS	1	1	1	1	1	X
- WITH DID CAPABILITY		1		1	1	
DATA PRIVACY	1	1	1	1	1	
DATA RESTRICTION	1	1	1	1	1	

TABLE B (CONTD)

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
DATA SWITCHING	–	–	–	–	–	
LEVEL 1	1	1	1	1	1	X
LEVEL 2		3				X
DELUXE QUEUING		1				X
DIAL ACCESS TO ATND	1	1	1	1	1	
"DIMENSION" PBX ELECTRONIC CUSTOM TELEPHONE SERVICE (TABLE C)	1	1		1	1	X
DIRECT DEPARTMENT CALLING (DDC)		1		1	1	X
DIRECT INWARD DIALING (DID)	1	1	1	1	1	
DIRECT OUTWARD DIALING (DOD)	1	1	1	1	1	
DIRECT TRUNK GROUP SELECTION	1	1	1	1	1	
DIRECTORY SERVICE		3				X
DISTINCTIVE RINGING	1	1	1	1	1	
DISTRIBUTED COMMUNICATIONS SYSTEM (DCS)		3				X
EMERGENCY ACCESS TO ATTENDANT				1		
ENERGY COMMUNICATIONS SERVICE (ECS)			1	1		X
ENHANCED UNIFORM CALL DISTRIBUTION (EUCD)		3				
EXECUTIVE OVERRIDE	1	1		1	1	
EXTENDED MEMORY HOLDOVER			1	1		
FACILITIES ADMINISTRATION AND CONTROL		1				
FACILITIES ASSURANCE REPORTS		1				
FACILITIES RESTRICTION LEVEL		1		1	1	
FIVE DIGIT DIALING		3				
FLEXIBLE NUMBERING OF STATIONS	1	1	1	1	1	X
FLEXIBLE NUMBERING OF STATIONS-MIXED NUMBERING			1	1		
FORCE ADMINISTRATION DATA SYSTEM (FADS)		1		1	1	
FOREIGN EXCHANGE CENTRAL OFFICE ACCESS	1	1	1	1	1	X
- WITH VOICE SWITCHED GAIN (VSG)		1		1	1	
FULLY RESTRICTED STATION	1	1	1	1	1	
HOT LINE SERVICE			1	1		
HOTEL/MOTEL OR HOSPITAL CONSOLE/TERMINAL			1	1		X
IN-DIALING THROUGH MAIN		1				X
INCOMING CALL IDENTIFICATION	1	1	1	1	1	X
INTER-PBX CALL TRANSFER		1				X
INTER-PBX COORDINATED STATION NUMBERING		1				
INTERCEPT TREATMENT	–	–	–	–	–	
- ATTENDANT	1	1	1	1	1	
- TONE	1	1	1	1	1	
- RECORDED ANNOUNCEMENT	1	1		1	1	X

TABLE B (CONTD)

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
INTERFACE FOR LONG DISTANCE BILLING			1	1		
INTERFACE TO NCOSS – LOCAL STORAGE UNIT (LSU)		1				X
INTERPOSITION CALLING AND TRANSFER	1	1	1	1	1	
INWARD RESTRICTION	1	1	1	1	1	
JOURNAL PRINTERS			1	1		X
LEAVE WORD CALLING		3				
LINE LOCKOUT WITH WARNING	1	1	1	1	1	
LISTED DIRECTORY NUMBER SERVICE	1	1	1	1	1	
– WITH VOICE SWITCHED GAIN		1		1	1	X
LOCAL CALL BILLING			1	1		X
LOUDSPEAKER PAGING	–	–	–	–	–	
– BASIC	1	1	1	1	1	X
– DELUXE	1	1	1	1	1	X
– WITH TIE TRUNK ACCESS ALLOWED		1			1	
MAIN/SATELLITE		1				X
MAIN/TRIBUTARY		1				X
MALICIOUS CALL TRACE		2				
MANUAL ORIGINATING LINE SERVICE			1	1		
MANUAL TERMINATING LINE SERVICE	1	1	1	1	1	
MESSAGE CENTER SERVICE		3				X
MESSAGE WAITING SERVICE			1	1		X
MISCELLANEOUS TRUNK RESTRICTION	1	1	1	1	1	
MULTIPLE LDN (DID & NON-DID)	1	1	1	1	1	
MUSIC ON HOLD ACCESS	1	1	1	1	1	
NIGHT CONSOLE POSITION	1	1	1	1	1	X
NIGHT STATION SERVICE	–	–	–	–	–	
- FIXED SERVICE	1	1	1	1	1	
- FULL SERVICE	1	1		1	1	
OFF-PREMISES STATIONS	1	1	1	1	1	X
OFF-PREMISES STATIONS WITH CALL CONTROL	1	1	1	1	1	X
ORIGINATION RESTRICTION	1	1	1	1	1	
OUTGOING TRUNK QUEUING	1					
OUTWARD RESTRICTION	1	1	1	1	1	
POWER FAILURE TRANSFER	1	1	1	1	1	X
PRIVACY AND LOCKOUT	1	1	1	1	1	

TABLE B (CONTD)

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
RADIO PAGING ACCESS	1	1	1	1	1	
RECALL DIAL TONE	1	1	1	1	1	
RECORDED TELEPHONE DICTATION ACCESS	1	1	1	1	1	X
REMOTE ACCESS TO PBX SERVICES						
- WITH AUTHORIZATION CODES		1				X
- WITH TIME OUT TO ATTENDANT		1				X
- WITH VOICE SWITCHED GAIN		1		1	1	X
RESERVE POWER	1	1	1	1	1	X
ROOM STATUS AND SELECTION	-	-	-	-	-	
- ROOM CHANGE/SWAP			1	1		
- UP/DOWN ROOM SEARCH			1	1		
ROTARY DIAL CALLING	1	1	1	1	1	
ROUTE ADVANCE	1	1	1	1	1	
SERIAL CALL	1	1	1	1	1	
SINGLE DIGIT DIALING			1	1		
SPEED CALLING	1	1		1	1	
SPLIT ACCESS TO OUTGOING TRUNKS			1	1		
SPLITTING - ONE-WAY AUTO/MANUAL	1	1	1	1	1	
STATION HUNTING	-	-	-	-	-	
- CIRCULAR	1	1	1	1	1	
- TERMINAL	1	1	1	1	1	
STATION MESSAGE DETAIL RECORDING (SMDR)	1	1		1	1	X
STATION NUMBER STEERING		1		1	1	
STATION REARRANGEMENT AND CHANGE	1	1	1	1	1	
STATION-TO-STATION CALLING	1	1	1	1	1	
STRAIGHTFORWARD OUTWARD COMPLETION	1	1	1	1	1	
SWITCHED LOOP OPERATION	1	1	1	1	1	
TANDEM TIE TRUNK SWITCHING	1	1		1	1	X
TERMINATION RESTRICTION	1	1	1	1	1	
THREEWAY CONFERENCE TRANSFER	1	1	1	1	1	
- WITH TRUNK-TO-TRUNK TRANSFER		1		1	1	
THROUGH DIALING	1	1	1	1	1	
TIE TRUNK ACCESS	1	1	1	1	1	X
TIME OF DAY SYNCHRONIZATION		1	1	1	1	X
TIMED RECALL ON OUTGOING CALLS	1	1		1	1	

TABLE B (CONTD)

FEATURES AVAILABLE IN "DIMENSION" 2000 AND CUSTOM PBXs

FEATURES	FEATURE PACKAGE NO.					HARDWARE CONSIDERATIONS
	7	8	9	11	12	
TIMED REMINDER	1	1	1	1	1	
- WITH AUDIBLE SIGNAL	1	1	1	1	1	
TOLL RESTRICTION	-	-	-	-	-	
- BATTERY REVERSAL	1	1	1	1	1	
- 0/1	1	1	1	1	1	
- WITH TOLL RESTRICTION FOR TIE TRUNK	1	1	1	1	1	
TOLL TERMINAL ACCESS			1	1		X
"TOUCH-TONE" CALLING	1	1	1	1	1	
"TOUCH-TONE" DIALING SENDERIZED OPERATION	1	1		1	1	
"TOUCH-TONE" DIALING TO DIAL PULSE CONVERSION	1	1	1	1	1	
TRAFFIC DATA TO CUSTOMER		1		1	1	X
TRAVELING CLASS MARK		1				
TRUNK ANSWER FROM ANY STATION (TAAS)	1	1	1	1	1	X
TRUNK GROUP BUSY INDICATORS ON ATTENDANT POSITION	1	1	1	1	1	
TRUNK GROUP WARNING INDICATORS ON ATTENDANT POSITION	1	1	1	1	1	
TRUNK IDENTIFICATION BY ATTENDANT		1		1	1	
TRUNK-TO-TRUNK CONNECTIONS	1	1	1	1	1	
TRUNK VERIFICATION BY CUSTOMER	1	1		1	1	
TRUNK VERIFICATION BY STATION		1		1	1	
TWO-PARTY HOLD ON CONSOLE	1	1	1	1	1	
UNIFORM CALL DISTRIBUTION (UCD)		1		1	1	X
- WITH FORCE ADMINISTRATION DATA SYSTEM (FADS)		1		1	1	
UNIFORM NUMBERING PLAN		1				
UNINTERRUPTIBLE POWER SERVICE (UPS)	1	1	1	1	1	X
VISUALLY IMPAIRED ATTENDANT SERVICE	1	1			1	
WATS ACCESS	1	1	1	1	1	
WIDE FREQUENCY TOLERANT POWER PLANT	1	1	1	1	1	X

circuit (line, trunk, link, attendant interface, etc) contains a time slot memory (shift register) for each of the time division switches within the network module (Fig. 2).

2.08 ⧫Time division switching in the PBX involves sampling voice or data (enhanced FP8) signals at the port circuits and distributing the amplified signals (within assigned time slots) to ports.⧫ The sampled signals charge an input capacitor at each port circuit which holds the energy level for the sampling period. Smoothing of the sampled signals is provided by filters in the port circuits. Sampling at fixed time intervals permits sequential transmission of 64 simultaneous samples over a single network bus. The sampling rate is approximately 16,000 Hz or once every 64 microseconds for a sample width of approximately 600 nanoseconds. ⧫Data transmission at speeds up to 9600 bps is possible via the network.⧫

2.09 The call processing operations and features provided by the system are controlled by the program loaded into the main memory (RAM). The particular program provided with each system is de-

TABLE C

"DIMENSION" PBX ELECTRONIC CUSTOM TELEPHONE SERVICE (ECTS) FEATURES FEATURE PACKAGE 7, 8, 11, 12

FEATURE
Custom Calling Features
Automatic Callback - Calling
Call Forwarding - All Calls
Call Forwarding - All Calls - Override
Call Forwarding - Busy and Don't Answer
Call Hold
Call Pickup
Call Waiting Services
Executive Override
Last Extension Called
Key Service Features
Abbreviated and Delayed Ringing
Automatic Intercom
Bridged Call
Common Audible Ringing
Dial Intercom
Exclusive Hold
Hold
Idle Line Preference
I-Hold
Incoming Call Preference
I-Use Indication
Last Line Preference
Line Ringing
Line Status Indication
Manual Exclusion
Manual Intercom
Manual Signaling
Music On Hold Access
No Line Preference
PBX Line Access
Personal Central Office Line
Preselection
Prime Line Preference
Priority Hold
Recall Button
Ringing Line Preference
Ringing Transfer
Station Busy Indication
Station Direct Station Selection (DSS)
Station Message Waiting
Station Ringer Cutoff
Uninterruptable Power Service

termined at the factory to provide the required features. A tape cartridge is prepared for each system which contains the generic program (feature package) and the translation data for the system. The minirecorder, which contains the tape cartridge, is used for (1) initializing (reloading) main memory with the generic program and translation data and (2) maintaining and loading off-line administration, maintenance and traffic programs.

2.10 The program tape includes translation data such as class-of-service information, numbering plan, hunting, trunk grouping, and all similar customer information which is provided via a tape cartridge from the factory and may be changed by manual entry through the Maintenance and Administration Panel (MAAP), Customer Administration Panel (CAP), Remote Maintenance, Administration and Traffic System (RMATS), and Customer Administration Center System (CACS). Factory translations are generated from DIMENSION PBX Ordering Form E-8124, which is an input for detailed customer requirements. If Ordering Form E-8124 is used for an information only order, the Job Summary, Summary of Materials, and applicable records, are supplied. If Form E-8124 is used for an equipment order, one assembled and tested PBX is furnished along with certain peripheral units and appropriate documentation. The Installation Notes specify the units shipped, their frame locations, factory options equipped, and cable running lists for cabinet interconnections.

2.11 Selection of equipment not covered by Ordering Form E-8124, such as planning for future growth or feature additions and associated traffic implications on the PBX, is covered in Section 554-111-006. For additional information, refer to Part 11, System Conversion and Expansion.

2.12 A second processor (back-up duplicate common control) may be optionally provided for those systems requiring additional reliability. Both common controls have separate network module input/output (I/O) channels. A duplication control circuit determines which processor is on-line (functional) and forces the alternate processor off-line. Therefore, a single processor provides all the required control functions in either a duplicated or nonduplicated system. The network modules transmit on both processor I/O channels; however, the off-line processor is executing programmed maintenance routines and does not monitor its I/O channels.

2.13 Certain detected hardware faults within the on-line processor, its main memory, or associated I/O channels may force a processor switch. A processor switch involves the on-line processor transferring its call processing records via the interprocessor data channel to the alternate common control, a soft switch. Most hardware faults within the on-line processor inhibit proper transfer of the call processing records and force the alternate pro-

cessor to reconstruct the needed records by interrogating the network resulting in a hard switch. During a hard switch, service to certain network transitions (off-hook to on-hook) may be delayed approximately 200 ms, depending upon network size and the particular feature package. Automatic switching between on-line and off-line processors occurs at 26-hour intervals (providing that there are no hardware faults within the two processors and interprocessor data channel) in accordance with a programmed periodic exercise of both common controls.

3. FEATURES AND SERVICES

3.01 ▶A brief description of features and services, including major hardware items available with DIMENSION 2000/Custom PBXs, is provided in alphabetical order in this Part. A detailed description is provided for the more complex features and services. Additional feature information, if needed, is available in specific feature documents (FDs), Sections 554-191-XXX. Feature Documents Reference Guide, Section 554-191-100, provides an alphabetical listing of the features and a numerical index for the individual FDs.

3.02 Table B provides an alphabetical listing of the features, the associated feature package (FP) numbers, the issue of the program generic software that introduced the feature and indicates those features requiring hardware considerations or engineering.

3.03 Table C provides a listing of all Electronic Custom Telephone Service (ECTS) features. Descriptions and related information on the ECTS features are available in specific FDs as listed in the FD Reference Guide, Section 554-191-100.

INCREMENTAL MARKETING OF FP8 FEATURES

3.04 Currently FP8 is marketed in three distinct increments. They are comprised of dot issues of Issue 1, 2 and 3. All of the features currently marketed in the Issue 1 FP8 software base are shown in Table B with a "1" under the FP8 column. Likewise, new features released with Issues 2 and 3, are also shown on Table B with a 2 or 3 respectively in the FP8 column. As shown in Table B, Automatic Call Distribution (ACD) and Malicious Call Trace were released with Issue 2 of the program generic software. The Issue 2 software includes all features released with FP8, Issue 1, with the exception of Uniform Call Distribution (UCD) including the Force Administration Data System (FADS). Issue 3 of FP8 does not include Direct Department Calling, UCD/FADS and ACD features. It does include Enhanced Uniform Call Distribution (EUCD) which provides the function of ACD but does not include the Performance Reporting Option 150 or 500. The new Issue 3 software of FP8 will reside on either of two software bases. One of the bases is the current Issue 1 of FP8 which is referred to as Electronic Tandem Switching (ETS). The second base is comprised of what is now FP12, Issue 1. The base is referred to as Deluxe Voice. Current planning calls for a controlled release of the new Issue 3 software and hardware and the subsequent rating of FP8 and FP12 Issue 1 software to "A&M" only.

3.05 Three new optional service offerings are introduced in Issue 3:

- Applications Processor (AP) including Message Center/Directory Service
- Data Switching Level 1 and Level 2
- Distributed Communications System (DCS).

The Issue 3 software may be provided with or without the optional services. The Deluxe Voice software base will be available with the AP and/or Data Switching service offerings. It will not be available with DCS. The ETS software base will be available with any combination of the three service offerings.

3.06 Issue 3 of FP8 includes several new features not available with FP8/FP12 Issue 1. These features are:

(a) Automatic Message Waiting

(b) Call Coverage

(c) Enhanced Uniform Call Distribution

(d) Five-Digit Dialing

(e) Leave-Word Calling.

3.07 The Issue 3 software includes additional capabilities for several Issue 1, FP8/FP12 features. It also includes additions to the software base not included in Issue 1. The additional feature capabilities are:

(a) ARS Deluxe

- Number of 6-digit tables expanded from 32 to 64

- Conversion of 10-digit ARS Deluxe to 7-digit Automatic Alternate Routing (AAR)

(b) Automatic overflow to Direct Distance Dialing (DDD)

- Allows subnet trunking to systems with stations numbered with a zero thousands digits

(c) Call Forwarding All Calls—Remote

- Provides the capability for stations to call forward to a number outside the PBX

(d) Speed Calling

- Adds expanded speed calling for IDDD numbers.

Descriptions of these additional capabilities are included with the feature descriptions provided in this Part.

3.08 The quantity of trunk groups is increased with the Issue 3 software base from the previous limit of 99 to a limit of 255. This increases the number of off-premises stations and foreign exchange (FX) groups available to trunking. The increase supports the addition of the Data Switching feature, the use of a single trunk group for each recorded announcement and off premises station, and the need by large systems for more FX lines.

3.09 Feature Package 8 systems which are now in operation with Issue 1 or 2 software can be upgraded to Issue 3 by application of the following new equipment:

- J58882AK Control Carrier

- KS21447, L12 Minirecorder

- Data Switching Circuit Packs LC566, 567, 568 (required for Data Switching feature only).

When the FP8, Issue 3 DCS or AP service options are provided, the J58882AK carrier must be equipped with the optional data communication interface unit (DCIU). Translations resident on the original minirecorder tape must be transferred to a list 12 minirecorder compatible tape by the factory. Refer to Part 4, Physical Arrangements, for a description of the new equipment.◀

ADVANCED PRIVATE LINE TERMINATION (APLT)

3.10 This feature provides access to and termination from private switched networks. The private network may be a Common Control Switching Arrangement (CCSA) or Enhanced Private Switched Communications Service (EPSCS) network. The APLT provides for network Inward Dialing, Direct Outward Dialing to the network, and other features similar to those provided on the public exchange network. The APLT trunks can tandem through the DIMENSION PBX without attendant assistance if the network has the Tandem Tie Trunk Switching feature. If off-net access is provided by the network, selected station lines can be denied off-net access.

ALPHANUMERIC DISPLAY FOR ATTENDANT POSITION

3.11 A visual display device is provided on the attendant position to display up to four digits, letters, or symbols as designated for the attendant display features. The display features include Calling Number Display to Attendant, Class-of-Service Display to Attendant, and Incoming Call Identification. ▶An 8-digit display is provided as part of the hotel/motel or hospital console/terminal and when Five-Digit Dialing (FP8, Issue 3) is used with either an ETN or DCS configuration.◀

APPLICATIONS PROCESSOR (AP)

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

(a) Directory Service

(b) Message Center Service including:

- Call Coverage

- Leave-Word Calling

- Automatic Message Waiting.

3.13 A brief description of each of the features is provided alphabetically under each feature

name in this Part. Detailed descriptions and additional information on the features are provided in specific feature documents as listed in the Feature Document Reference Guide, Section 554-191-100.

3.14 A PBX equipped for AP features is shown in Fig. 3. The configuration consists of an AP with its associated terminals and printers, the PBX equipped with an enhanced FP8, and station and terminal equipment. Analog station sets which may include models 500, 2500, and/or multibutton electronic telephone (MET) sets are required at the PBX. The analog sets provided to subscribers with the Automatic Message Waiting feature must be equipped with message waiting lamps.

3.15 The AP interfaces with the DIMENSION PBX via the data communications interface unit (DCIU). The DCIU is a carrier-mounted special purpose, high-speed data link capable of operating at speeds up to 19.2 kilobits per second (kbs). The AP to DIMENSION DCIU interface is provided by Electronic Industries Association (EIA) RS 449 compatible ports. Since the DIMENSION PBX and the AP do not share a common equipment ground, a pair of local area data sets (LADS) is required at each end of the interface. The LADS units also extend the distance between the DIMENSION PBX and AP from 61 meters (200 feet) to 122 meters (400 feet). Since the LADS require an EIA RS232 interface, an adaptor is required for EIA RS449 to RS232 conversion as shown on Fig. 3. Transmit and receive tip and ring pairs provide the interface between the LADS.

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

3.17 In a DIMENSION 2000 PBX equipped with duplicated common control, the DCIU is also duplicated though the DCIU links are not. Figure 24 shows a DIMENSION 2000 PBX with duplicated common control and DCIUs. The DCIUs share common link circuits.

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

3.19 For additional information on the AP, refer to Section 582-220-100, AP System Description.◀

ATTENDANT CONFERENCE

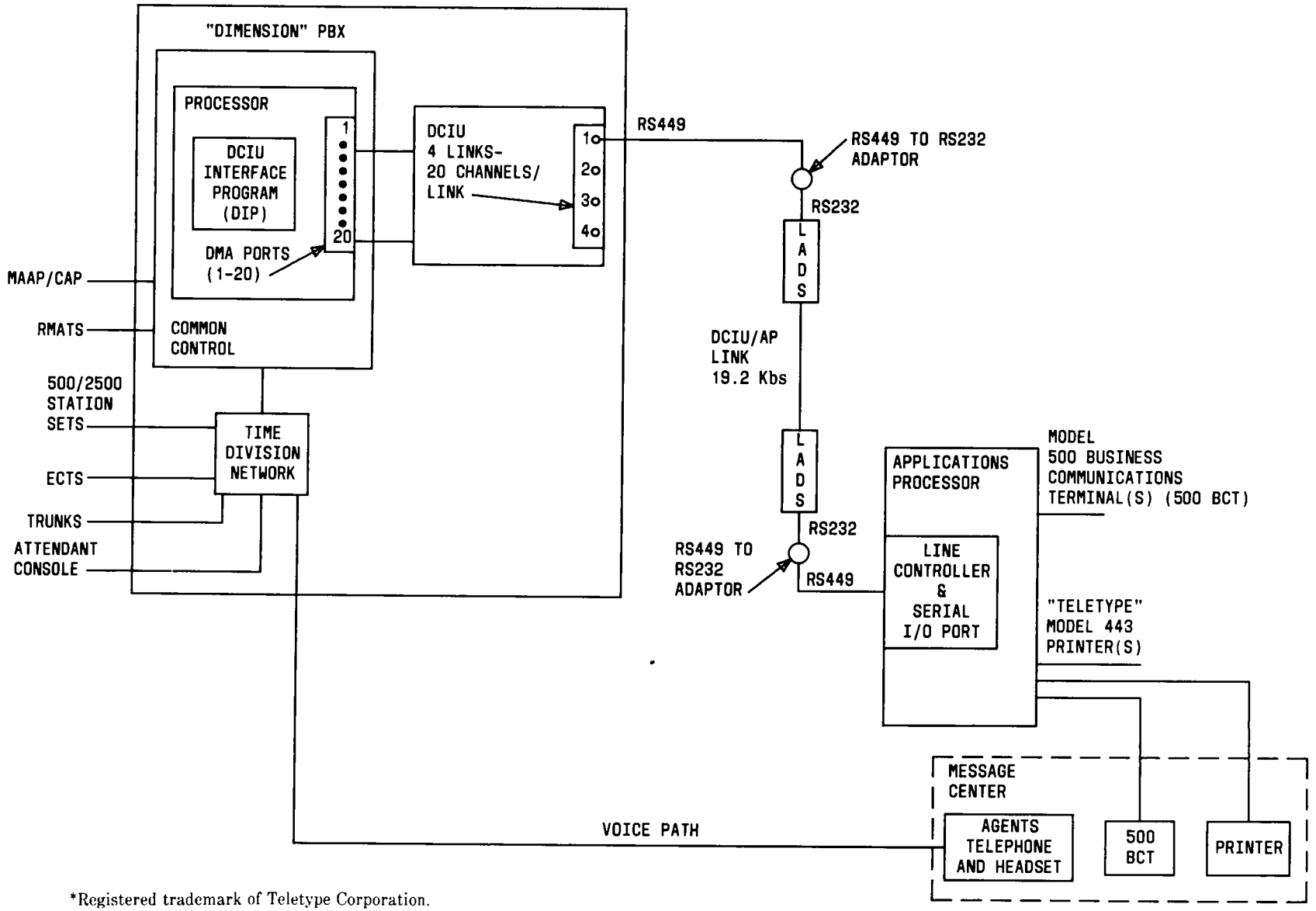
3.20 An attendant can establish a multiparty conference connection of up to six conferees in addition to the attendant. ▶No more than two trunks should be added to a conference. The conference circuit is accessed by using a direct trunk group select key. The Attendant Conference may be accessed and initiated from any attendant position. If at least one party on a conference call is a station, the attendant may release from the circuit. The attendant can be recalled by a station when required.◀

ATTENDANT CONSOLE

3.21 The Attendant Console functions as a desktop position from which the attendant handles assistance calls by means of nonlocking keys. Keys are provided for each of the control functions and for the loops which appear on the position. All calls placed by the attendant to trunks and to station lines are made using the TOUCH-TONE* telephone dial provided or via Attendant Direct Station Selection (ADSS) and Direct Trunk Group Selection features when available.

3.22 The Attendant Console is completely electronic, using light-emitting diodes (LEDs) for indicator lamps and nonlocking keys for control and loops. The console is designed for switched loop operation and can be provided with Attendant Direct Station Selection and Busy Lamp Fields (ADSS/BLF) or with a Busy Lamp Field only. A 4- or 8-character alphanumeric field or six indicator lamps can be provided for incoming call identification. Two sizes of the Attendant Console can be provided and are similar in feature capability. Figure 4 shows a small Attendant Console. The large Attendant Console provides additional control and trunk group select keys. Function of the control keys may be pro-

*Trademark of AT&T.



*Registered trademark of Teletype Corporation.

Fig. 3—Typical DIMENSION 2000 or Custom PBX Applications Processor Configuration

grammed via the MAAP on a per feature package basis. When three or more consoles are assigned to a given LC366 slot, an LC366B must be used.

3.23 The dimensions of the Attendant Console without the ADSS/BLF are 406 mm (16 inches) wide, 229 mm (9 inches) deep, 76 mm (3 inches) high in front, and 147 mm (5.8 inches) high at the rear. The Attendant Console with an ADSS/BLF measures 279 mm (11 inches) deep and 229 mm (9 inches) high at the rear. The Attendant Console is mounted on a 203- by 381-mm (8- by 15-inch) baseplate. The K1A handset or a headset is recommended for use by the attendant, but not both simultaneously.

3.24 The console is equipped with a 2438-mm (8-foot) long, 12-pair mounting cord that is connected to a B12A (12-pair) or B25A (25-pair) distribution cable from the PBX. The mounting cord is equipped with a 50-pin KS-16689, List 1 connector, and the mating connector terminates the 12- or 25-pair distribution cable.

3.25 The range of the 12-pair cable is 213m (700 feet) and the range of the 25-pair cable is 305m (1,000 feet). This range can be extended to 3353m (11,000 feet) with Attendant Console repeaters. If a particular installation requires that a stub-ended console cable be used, an A25B cable should be used and cut down in the normal manner on the cross-connect field.

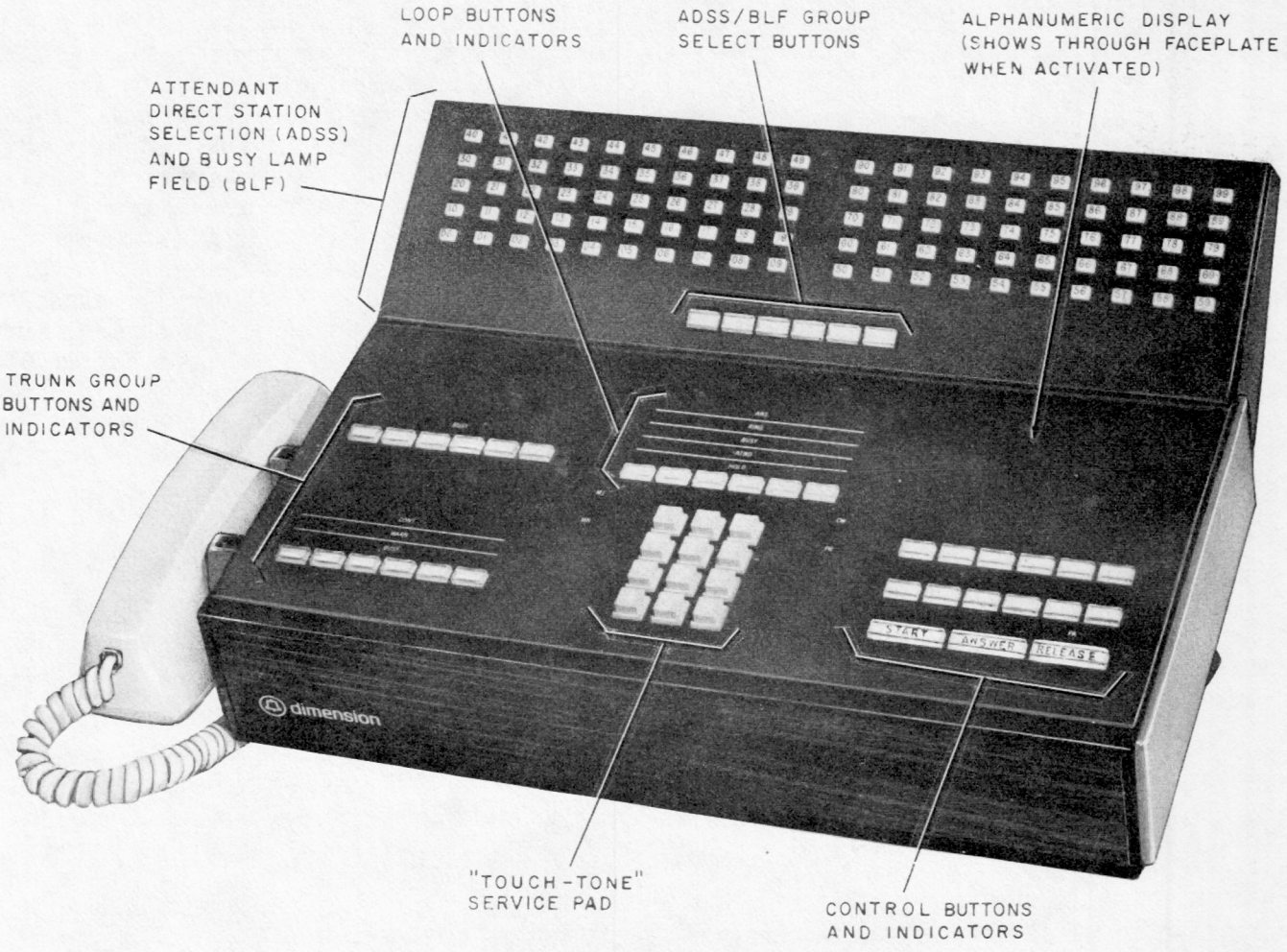


Fig. 4—DIMENSION PBX—Attendant Console With ADSS/BLF Option

If the Attendant Console is located in a building other than the one in which the PBX is located, Attendant Console repeaters must be used.

3.26 For more detailed information on the Attendant Console, refer to Section 554-010-100.

ATTENDANT CONSOLE REPEATER

3.27 ⧫The Attendant Console Repeater unit (Fig. 5) provides lightning protection and range extension for the Attendant Console low-speed data channel. The Attendant Console Repeater can be used in two configurations:

- The Attendant Console Repeater is used without range extension when the Attendant Console is located in a building different than the PBX and the distance is 300m (1000 feet) or less.

- The Attendant Console Repeater is used with range extension when the Attendant Console is located more than 300m (1000 feet) from the PBX.

3.28 The repeater circuitry is housed in a modified key service unit approximately 240 mm (9-1/2 inches) wide by 430 mm (17 inches) long. This unit can be wall-mounted and must be connected to a 120-Vac 60-Hz outlet. A power cord (Lists A through D) is available in lengths from 610 mm (2 feet) to 3658 mm (12 feet). Each repeater unit can accommodate one Attendant Console Repeater.

3.29 Application of the Attendant Console Repeater is shown in Fig. 6. Two repeaters are used in series to connect the PBX to an Attendant Console located in a separate building approximately 900m (3,000 feet) away. Four attendant console repeaters can be used in series to extend the distance between the PBX and Attendant Console to 3300m (11,000 feet).

3.30 For more detailed information regarding the Attendant Console Repeater, refer to Sections 554-010-100, 554-010-101, 554-010-104, and 554-105-101.⧫

ATTENDANT CONTROL OF TRUNK GROUP ACCESS

3.31 An attendant can restrict Dial Access by all station lines to Central Office (CO), Foreign Exchange (FX), Wide Area Telecommunications Service (WATS), and/or tie trunk groups by dialing a code followed by the Trunk Group Access code (or operation of a direct trunk group selection key when provided). Calls to groups so restricted are routed to the attendant for subsequent completion or manual queuing. ⧫When this feature is activated, access to a trunk group is restricted only if the controlled access code is dialed. Trunk groups appearing in more than one route advance sequence are accessible via a dial access code even if the other access codes are controlled. With DCS (FP8, Issue 3), trunk group selection keys can be assigned to trunk groups on other PBXs in the DCS.⧫

ATTENDANT DIRECT STATION SELECTION (ADSS) WITH BUSY LAMP FIELD (BLF)

3.32 This feature allows an attendant at a console to place or complete calls to stations within the PBX or to other PBXs in a main/satellite complex (FP8) by pressing a nonlocking pushbutton key associated with the desired station line. A visual indication of the busy or idle condition of the stations, with the exception of non-PBX stations, is provided via a Light-Emitting Diode (LED) lamp associated with each numbered pushbutton. The Direct Station Selection (DSS) keys and lamps are provided for only 100 station lines. When more than one hundreds group capability is desired, up to 18 group select keys are provided to allow preselection of the desired 100-line group. The average feature capacity console can be equipped with either 0 or 6 group select keys. The large feature capacity console can be equipped with 0, 6, or 18 group select keys.

3.33 ⧫***With Extended DSS:*** When more than 18 hundreds groups are desired, extended DSS is provided to allow preselection of the desired thousands and hundreds group.⧫

ATTENDANT LOCKOUT

3.34 The attendant is denied the ability to reenter an established connection held on an attendant position, unless recalled by a station user. The Two-Party Hold on Console feature is required for operation of this feature.

ATTENDANT RELEASE LOOP

3.35 This feature permits an incoming trunk call extended to an unanswered station to be held

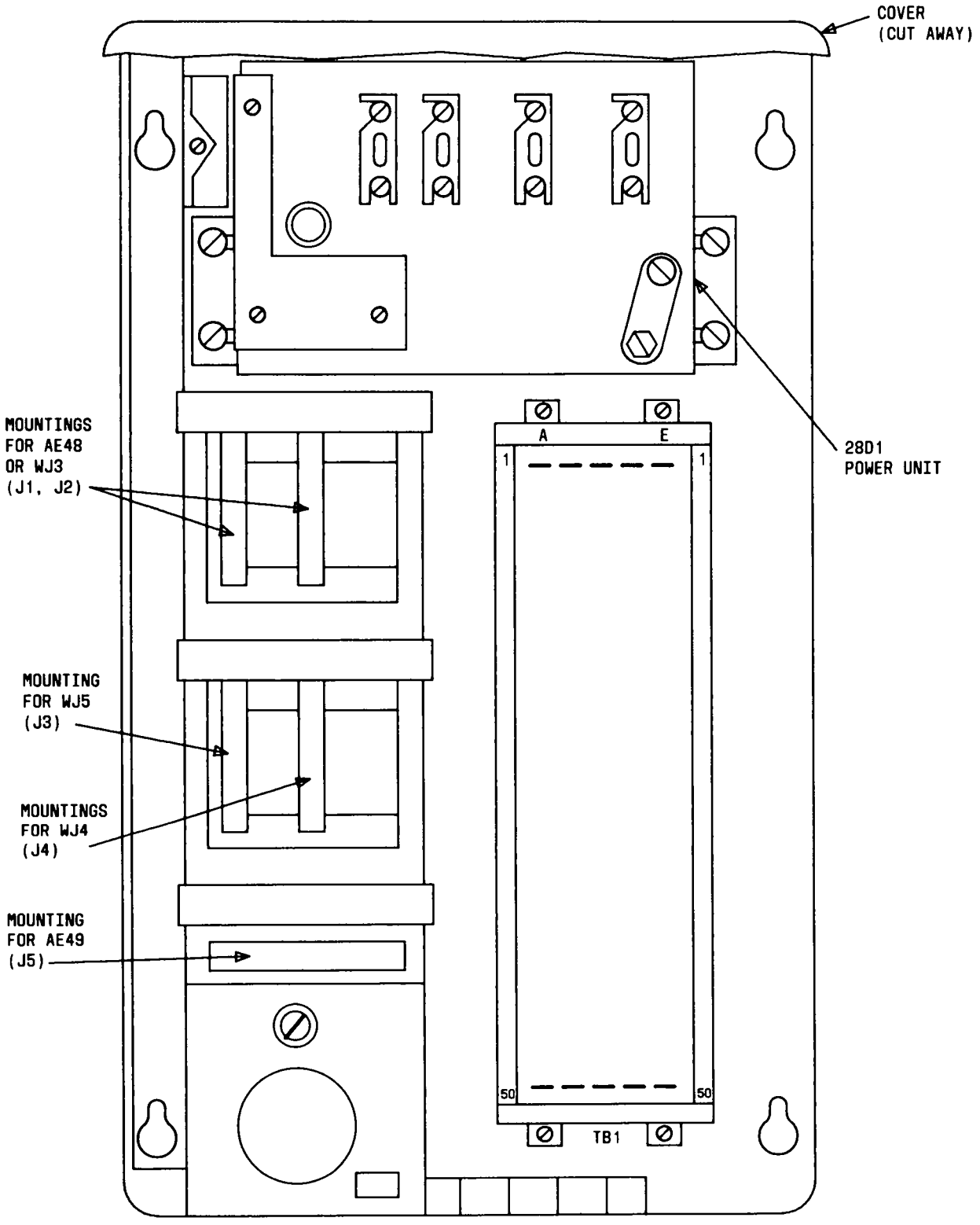
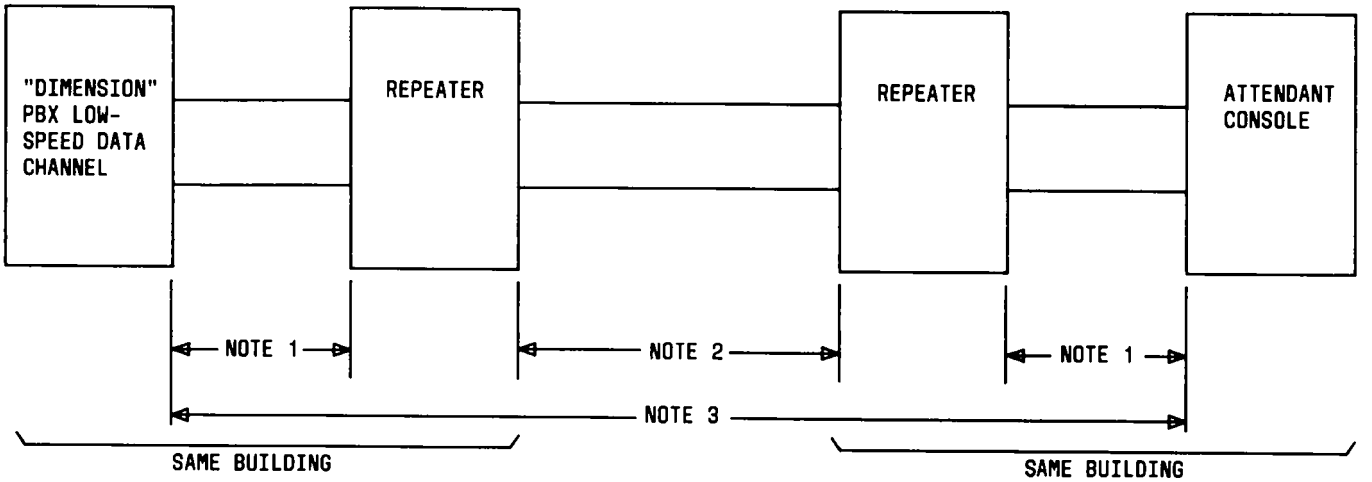


Fig. 5—Attendant Console Repeater



NOTES:
1. MAXIMUM DISTANCE FROM PBX TO REPEATER OR ATTENDANT CONSOLE TO REPEATER IS 300m (1000 FEET).
2. MAXIMUM DISTANCE BETWEEN REPEATERS IS 900m (3000 FEET). UP TO FOUR REPEATERS CAN BE USED IN SERIES.
3. MAXIMUM DISTANCE BETWEEN PBX AND ATTENDANT CONSOLE WITHOUT RANGE EXTENSION IS 300m (1000 FEET).

Fig. 6—Attendant Console Repeater Arrangement

off-loop whenever the station is ringing or whenever attendant call waiting is provided for the call. This feature is effected by the attendant pressing the RELEASE key during ringing or after receipt of confirmation tone. A call unanswered within an administrable 0- to 98-second interval is placed in the attendant queue along with other waiting calls. The call, when served, is routed to an available console which may be different from the original console. These redirected calls are identified by an appropriate flashing RING or BUSY lamp on the applicable console.

ATTENDANT TRANSFER—ALL CALLS

3.36 A station user participating in any 2-party connection can call (recall) an attendant so that the attendant may transfer the call or provide other assistance as desired. A flash during any established call results in the return of recall dial tone to the initiating station and hold of the other party. The station user then dials the access code (usually 0) to call the attendant. If the call had been held on the console loop or if the initiating station is a manual originating line, the flash results in immediate attendant recall.

AUTHORIZATION CODES

3.37 The Authorization Code feature used on Automatic Route Selection—Deluxe (ARS—Deluxe) and Automatic Alternate Routing (AAR) calls allows the user to dial a code which overrides the default Facility Restriction Level (FRL) associated with the originating local station, tie trunk, or Attendant Console whenever the default FRL is insufficient to allow the call to continue. The system requests the authorization code by returning recall dial tone to the user. After authorization code dialing, the authorization code translates to a new FRL which is used to route the call. Alternatively, certain incoming trunk groups can be administered to always require an authorization code, regardless of the value of the associated default FRL. The authorization code is recorded in the Station Message Detail Recording (SMDR) record of the call. Up to 9000 authorization codes per switch may be provided.

3.38 Formerly, all "0" calls were routed over the same ARS-Deluxe pattern. A split routing enhancement allows local operator calls ("0") and international calls ("01X") to route on different patterns. Formerly, an authorization code was never requested on "0" calls. An Authorization Code en-

hancement now allows an authorization code to be requested on "0" and "01X" calls if required, or if a higher FRL is needed to complete the call.

3.39 When all the digits have been dialed for a call requiring an authorization code, recall dial tone is returned to the user, who then dials an authorization code and waits 10 seconds for timeout, or dials a "#" to cancel the timeout period. Dial "0" and "01X" calls will be treated as any other call with respect to the Authorization Code feature. The FRL of the authorization code will be used to route the call. If alternate FRLs are in effect, they will be used.

3.40 Another enhancement involves Authorization Codes and Remote Access. An authorization code may be required in place of a barrier code on a remote access call. If an authorization code is required for remote access, an authorization code will not be requested for "0" and "01X" purposes. An authorization code will never be requested more than once. The FRL, or alternate FRL, of the authorization code will be used to route the call.

AUTOMATIC ALTERNATE ROUTING (AAR)

3.41 This feature provides automatic routing of on-network calls over a maximum of four alternate trunk groups. Facilities are selected in descending order of desirability for placing a particular call. The AAR also provides a convenient means of placing International Direct Distance Dialing (IDDD) calls by allowing the assignment of on-net numbers to specific foreign country locations. ⧫The AAR access code plus a uniform 4- to 7-digit number results in the call being routed over the AAR route list. The objective of AAR is to make effective use of idle private network trunks.⧫

3.42 TOUCH-TONE telephone senders (LC12) must be provided for AAR subnet trunking calls even if the trunks are dial pulsed. The LC12 contains the TOUCH-TONE telephone senders and the precise dial tone detectors. The subnet program uses the detection of precise dial tone to cancel the programmed delays before sending, in order to prevent the degradation of the traffic handling capabilities of the PBX.

AUTOMATIC CALLBACK—CALLING

3.43 A station user calling a busy station line can be automatically connected to the called station when the station becomes idle. The non-Electronic Custom Telephone Service (non-ECTS) station user precedes the called number with an activation code and hangs up. When both are idle, the activating station is rung and, upon answer, the called station is rung. The activating station may originate or receive other calls while the feature is active. If the callback sequence is not successful within 20 to 40 minutes, the request is deactivated.

3.44 An ECTS station user can activate Automatic Callback—Calling by pressing the assigned button or dialing the automatic callback code upon hearing a busy signal or the special audible ring signal on calling another station. The automatic callback status lamp lights steadily, confirmation tone is heard, and the station hangs up to activate the feature.

3.45 ⧫With DCS (FP8, Issue 3), a station user can activate the Automatic Callback feature toward a station on another PBX in the DCS.⧫

AUTOMATIC CALL DISTRIBUTION (ACD)

3.46 ⧫This feature released with FP8, Issue 2, permits incoming Direct Inward Dialing (DID), Central Office (CO), Foreign Exchange (FX), Tie Trunk, and Wide Area Telecommunications Service (WATS) calls as well as local station and attendant calls to be terminated directly to the most idle of a prearranged group of answering positions (referred to as a split). The answering positions appear as normal stations to the PBX and can function in the normal manner to originate and receive calls directly.

3.47 Each agent in a split uses a station set that can be either a standard telephone set or a 10-button Electronic Custom Telephone Service (ECTS) set. Two levels of supervision are provided: split supervision and system supervision. An optional 106B agent status display is available for the split supervisor's use. The unit provides status displays for up to 20 agents and is driven by the ECTS controller. Optional CRTs driven by the Management Information System (MIS) PRO 150 or 500 can also be provided. The system supervisor utilizes both the MIS CRT displays and an associated line printer for traffic reports.

3.48 The basic operation for an outside call to an ACD system is as follows:

(1) A caller dials a Listed Directory Number (LDN) and the call is completed to a trunk

group through the serving CO. The call is identified as an incoming call to an ACD trunk group and is designated to be handled by a particular ACD split or group of answering positions.

(2) The call is placed in a queue and, if no agent is available in the split, a delay message can be presented to the incoming caller. After a user-specified delay of from 2 to 30 seconds, an optional second delay message or music can be sent to the caller.

(3) The user specifies the number of calls to be held in queue at any given time. When this threshold is exceeded, supervision is alerted. Calls can then be channeled to alternate splits within the system or sent to another ACD location.

(4) When an agent becomes available, a short beep (zip tone) and optional city-of-origin announcement is sent to the agent before the call is connected.

(5) The agent, once connected to the caller, and after completing the call can answer another waiting call, or remove the answering position from the queue through one of the function buttons on the ECTS set.

3.49 The ACD agent using either feature buttons or dial access codes (DACs) can configure the answering position in the following work modes:

- ***AUTO-IN:*** Allows an agent to receive a new ACD call immediately upon disconnecting from a previous call assuming a call is waiting.
- ***AFTER CALL WORK:*** Allows an agent to complete any call-related paper work or follow-up procedures following a call disconnect from the manual-in mode.
- ***AUX-WORK:*** Used for agent's break from work - such as lunch or coffee breaks, etc. The answering position can still receive or originate non-ACD calls.
- ***MANUAL IN:*** Allows an agent to receive a single ACD call. Used when the agent anticipates after call work.
- ***STAFFED:*** Indicates to the system that the answering position is ready to receive calls.

Positions equipped with headsets become staffed when the headset is plugged-in and do not require a STAFF button on the ECTS set.

3.50 A split supervisor position is the same as an agent answering position but with additional functions that are used for supervisory duties. The additional functions may be provided with DACs, additional buttons on an ECTS set (ie, 20-button set), or by using a 10-button ECTS set equipped with direct station select buttons.

3.51 A typical ACD with MIS equipment configuration is shown in Fig. 7. The 106B display unit (Fig. 8) provides real-time ACD agent status. The unit displays five different states for each of 20 different agent positions (ie, extension numbers 2001 to 2020). The states are: staffed, ACD call, after call work, aux work, and non-ACD.

3.52 The ACD split supervisor/agent answering positions can use either straight-line sets or ECTS sets. The mode of agent work positions equipped with ECTS sets can be changed using DACs or feature buttons. Associated light-emitting diodes (LEDs) on the ECTS sets provide a visual indication of which mode the set is currently in. Only DACs can be used to change the mode on straight line sets. Plug-in head sets can be used with either type of set to provide hands-free operation.

3.53 The 30A8-50 system status indicator provides queue warning lamps, indicating queue length beyond a user-defined level. The 13A Recorded Announcement System provides announcements and stores digitized speech in magnetic bubble memory. The system provides variable announcements which are adjustable in 3-second intervals to a maximum of 24 seconds. The announcement system is mounted in an auxiliary cabinet.

3.54 The peripheral interface circuit (PIC) is used to drive the MIS. It converts signals from the LC366 to a standard EIA RS232 format.

Performance Reporting Options (PRO) 150/500

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

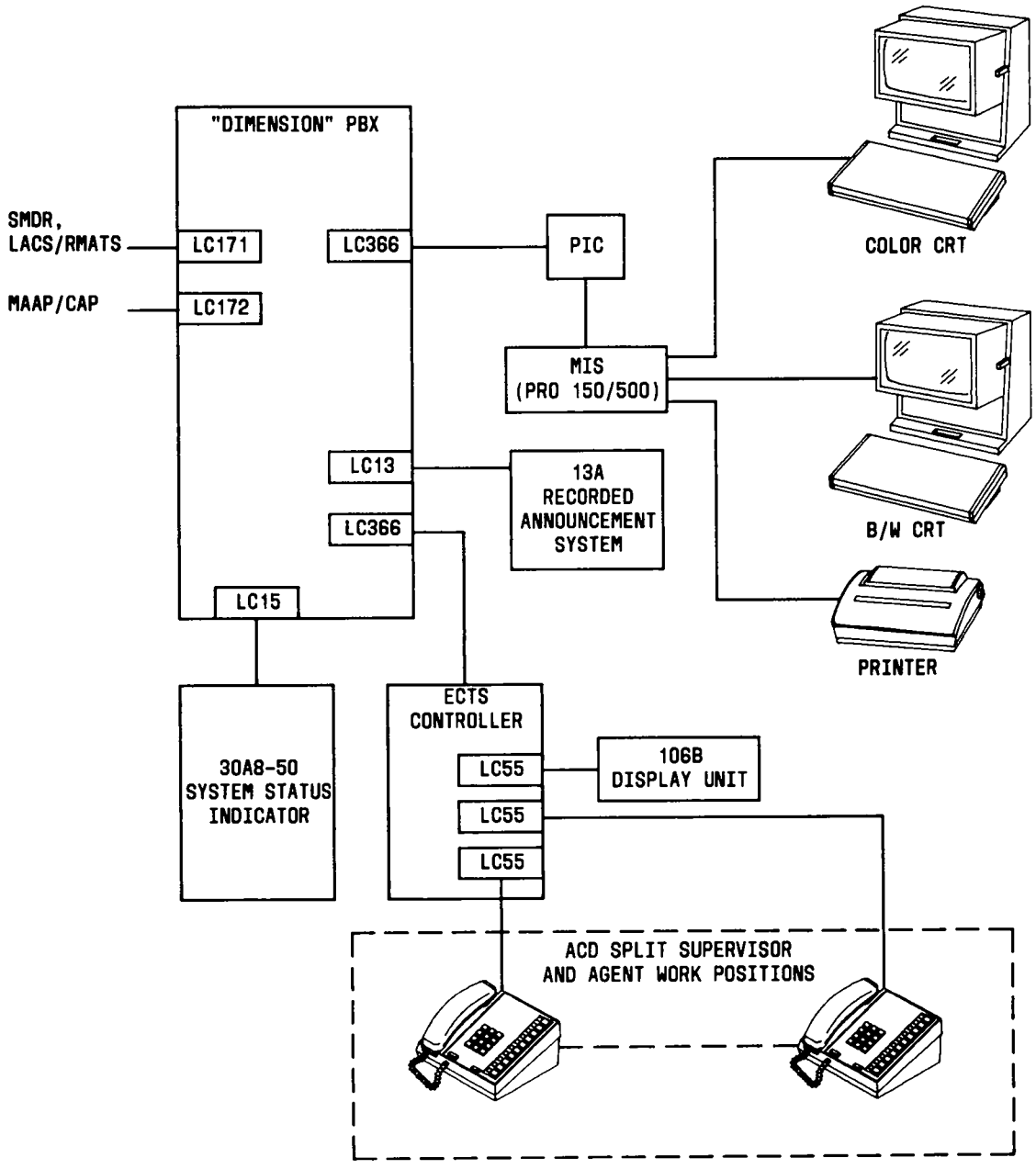


Fig. 7—Typical ACD With MIS Equipment Configuration

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

*Trademark of Digital Equipment Corp.

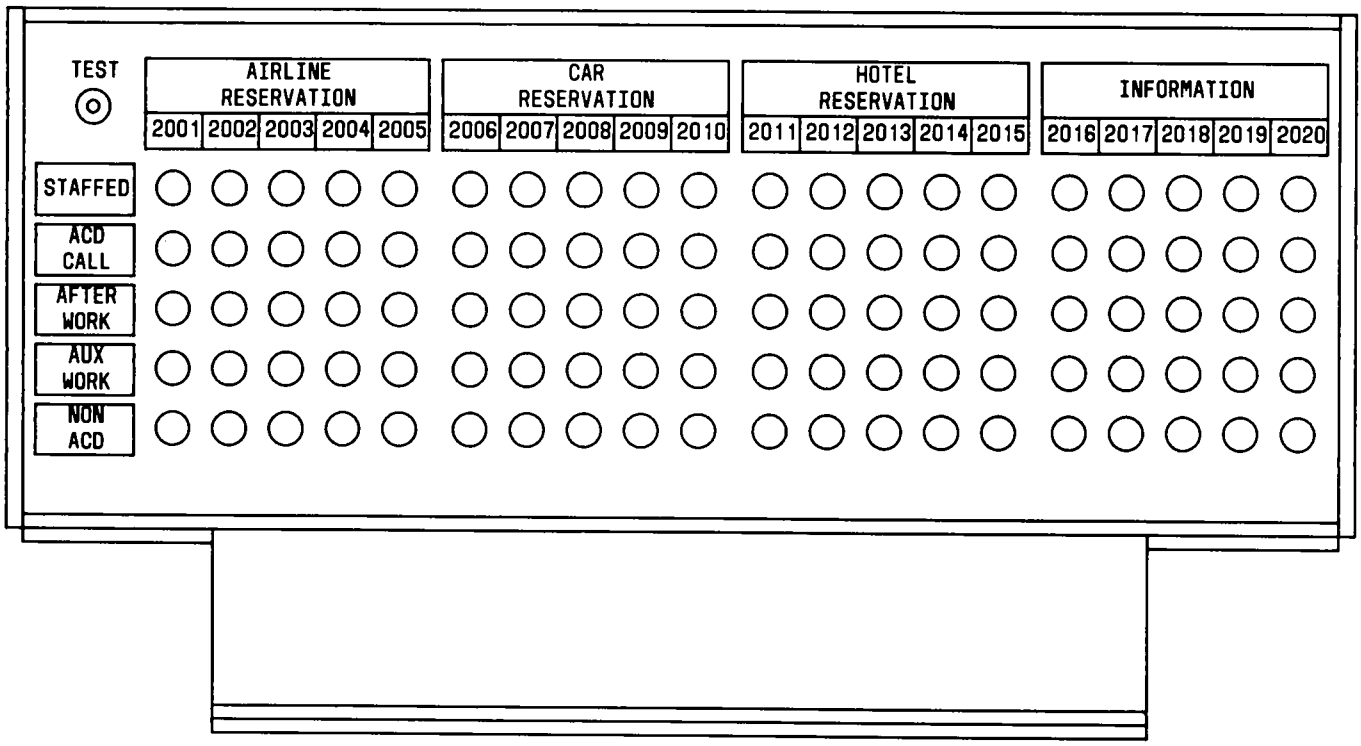


Fig. 8—▶Typical 106B1A Display Unit◀

3.56 The PRO 150 is intended for customers with small ACD applications, and substantial administrative (PBX) requirements. The PRO 500 is intended to serve larger ACD applications such as those with 100 or more agent positions. The PRO 150/500 is available only with Issue 2 of FP8.◀

AUTOMATIC CIRCUIT ASSURANCE (ACA)

3.57 This feature assists the customer in identifying possible trunk malfunctions. The PBX maintains a record of the performance of individual trunks relative to short holding time calls and long holding time calls. A significant increase in the number of short calls, or one long call of several hours duration, may indicate a trunk failure. When a possible failure is detected, a referral call is initiated to the PBX attendant. The attendant may test the trunk in question by using the Trunk Verification by Customer feature. Trunks may also be tested by using the Trunk Verification by Station feature.

3.58 ▶When the Attendant Console is placed in night service, all timing of calls will continue and all subsequent calls will be timed normally. No referrals will be sent to an attendant in night service, but a record of the referral is made in the audit trail. The referral value which was previously fixed at 24 is now administrable by trunk groups, using the CAP or by the telephone company. When the short call counter for a trunk reaches the referral value asigned for its trunk group, a referral is generated.

3.59 With DCS (FP8, Issue 3), this feature will create referral calls from trunks in other PBXs in the DCS.◀

AUTOMATIC IDENTIFIED OUTWARD DIALING (AIOD)

3.60 Automatic Number Identification (ANI) of station lines is provided on outgoing calls in conjunction with Automatic Message Accounting (AMA) facilities at the serving central office. This permits individual station billing on toll calls and the equivalent on Common Control Switching Arrangement (CCSA) calls. A limit of two central offices can be connected to receive AIOD information (one for CO calls and the other for CCSA calls). The system

may be arranged for one of five types of individual billing numbers:

(a) ***Individual Station Billing:*** Toll calls placed by stations are billed to an individual station.

(b) ***Auxiliary Station Billing:*** Toll calls placed by a group of stations or by remote access trunks may be billed to an auxiliary billing number.

(c) ***Auxiliary Trunk Billing:*** Toll calls placed by tie trunks may be billed to an auxiliary billing number.

(d) ***Attendant Billing:*** Attendant originated or completed AIOD calls are billed to the listed directory number (LDN).

(e) ***Failure Billing:*** Automatic number identification failures are billed to the LDN.

AUTOMATIC MESSAGE WAITING (AMW)

3.61 ▶The AMW feature provides an automatic lamp indication on the subscriber's telephone which, when lighted, indicates that a message(s) has been left in the Message Center for the subscriber. The messages are the result of the Leave-Word Calling feature or Message Center initiated messages. When all messages have been delivered to the subscriber and marked "delivered" in the Message Center data base, the AMW lamp will extinguish.

3.62 Hardware required to support the feature includes multibutton telephone (MET) sets equipped with an AMW lamp; non-MET sets such as hotel/motel type 500Y or 2500Y sets equipped with neon lamps; line circuits (LC03) which switch interrupted lamp lighting voltage (+90V, 60 ipm) to the station lines equipped with hotel/motel type sets; and network buffer circuits (LC41) which provide the +90V, 60 ipm message waiting power for the hotel/motel sets.◀

AUTOMATIC OVERFLOW TO DIRECT DISTANCE DIALING (DDD)

3.63 This feature provides optional routing of private network calls via off-net facilities from a point on the network where all on-net (tie trunk) routes are busy or none are provided. Off-net facilities available include WATS, FX, and/or CO trunk groups. The PBX selects the most preferred available route and code-converts the on-net destination code to either an LDN for attendant-seeking calls or to the DID number (where appropriate) for calls to a station. Off-net routes are listed in the AAR pattern. If no on-net routes are provided to a given destination, up to four off-net routes may be assigned.

3.64 ▶***Subnet Trunking to Systems with Zero Thousands Digits:*** Issue 3 of FP8 insures that calls destined for centrex station numbers beginning with "0" in the thousands digit be correctly routed to the stations rather than being routed to the centrex location attendant. Previously the "0" immediately following the RNX for the centrex location was recognized as the code for the attendant at that RNX. In order to reach the centrex location attendant from another location on the network, the user must dial RNX-0111 or RNX- (last four numbers of LDN). A centrex station will not be numbered 0111.◀

AUTOMATIC ROUTE SELECTION (ARS)

3.65 This feature provides automatic routing of outgoing calls over an alternate customer facility based on the DDD number. The station user dials the ARS access code followed by a DDD number. The PBX routes the call over the first available trunk facility (such as WATS, off-net CCSA, or FX) checking in a customer-specified order. Any number translation necessary to route the call is performed. Overflow routing to the toll facilities is optional. If a non-toll ARS access code is dialed, the routing will not include toll facilities. The ARS incorporates the functions of and replaces the Code Restriction and Route Advance features for routes included in the ARS route patterns.

AUTOMATIC ROUTE SELECTION—DELUXE

3.66 This feature provides automatic routing of outgoing calls over alternate customer facilities based on the call destination. The station user or PBX attendant dials a facilities access code (eg, "level 8") followed by a DDD number. The PBX routes the call over the first available trunk facility (such as CO, WATS, FX, or other similar facility equipped to accept a DDD-like number) checking in a customer-specified order. The DDD overflow may be included as a final route. Alternate routes may also include tie trunks to a distant PBX equipped with an ARS-Deluxe-like capability. When such routing is used,

the Facility Restriction Level (FRL) associated with the call is transmitted to the distant PBX as a traveling class mark. The feature provides all number translation and supervision necessary to route the call. This includes the capability to route calls off-net via a main PBX. Incoming tie trunks from subtending locations (ie, main, satellite, or tributary PBXs) may be arranged to have automatic access to ARS. This permits station users at these PBXs to dial just a single access code to use the ARS feature at the PBX.

A. With Time-of-Day Routing

3.67 The selection of first choice and alternate routes for off-network calls may vary depending on which of up to three plans are selected. Each plan may have up to 64 patterns. Each pattern may have up to 10 preferences. This permits the customer to take advantage of variations in long distance calling rates or traffic patterns as a function of time and weekday. Both automatic and manual controls of ARS routing pattern selections are provided.

B. Clocked Manual Override

3.68 This feature permits the customer to program a future time and day to interrupt the time-of-day routing and to use a customer designated ARS plan until a later (customer programmed) day and time reinstates normal time-of-day routing. The customer controls this feature through the use of the Customer Administration Center System (CACS) or the Customer Administration Panel (CAP). In addition, this feature can be administered by the Maintenance and Administration Panel (MAAP).

C. Controlled Alternate Facility Restriction Levels

3.69 Facility Restriction Levels associated with stations and attendants, incoming tie trunks, remote access trunks, and Authorization Codes may be upgraded or downgraded in accordance with the predetermined alternative set of FRLs. The FRLs are controlled from either the Attendant Console, the CACS, MAAP, or the CAP.

D. Split Routing of 0 and 01X Calls

3.70 Formerly, all "0" calls were routed over the same ARS-Deluxe pattern. A split routing enhancement provided in Issue 3 of FP8 allows local operator calls ("0") and international calls ("01X") to route on different patterns. This allows International Direct Distance Dialing (IDDD) calls to be routed over FX trunks in locations where the local central office is not capable of providing IDDD. Dial "0" and "01X" calls will be treated as any other call with respect to the Authorization Code feature. The FRL of the Authorization Code will be used to route the call. If alternate FRLs are in effect, they will be used.

E. Number of 6-Digit Tables Expanded to 64

3.71 ▶Issue 3 of FP8 increases the number of 6-digit translation tables from 32 to 64. At a customer's option, 6-digit translation can be used to route calls within a numbering plan area via different routing patterns, depending on the office code (NXX).

F. Conversion of 10-Digit ARS Deluxe to 7-Digit AAR

3.72 Issue 3 of FP8 provides for the screening of selected 10-digit DDD calls originating at a DIMENSION PBX with FP8. At a customer's option, calls to each number or range of numbers will:

- Continue via ARS-deluxe
- Be converted into a 7-digit AAR number and be routed via AAR
- Be blocked and sent to intercept.◀

AUTOMATIC STATION RESTRICTION

3.73 This feature prevents unauthorized (and unaccountable) phone calls from vacant hotel guest rooms/hospital beds by automatically activating Controlled Outward Restriction when the guest/patient is checked out of the hotel/hospital and deactivating the restriction when a guest/patient is checked in. Activation and deactivation are automatically performed when the guest/patient is checked out or checked in via the console/terminal. The Controlled Outward Restriction can be overridden, and other controlled restrictions can be activated/deactivated via the console/terminal.

AUTOMATIC VOICE NETWORK (AUTOVON) ACCESS

3.74 This feature allows interconnection of a DIMENSION 2000 or Custom PBX to a 4-wire AUTOVON switching center via AUTOVON access lines. The hardware arrangement uses specially designed AUTOVON trunk-type circuits. The interface arrangements have been designed to work with any feature package which includes CCSA capabilities.

3.75 The Attendant Console functions needed for AUTOVON have been incorporated in an adjunct console to the DIMENSION PBX console (Fig. 9). This new combination will permit an attendant to handle both regular and AUTOVON traffic. The selector console adjunct has a capacity of 30, 60, or 90 trunk buttons. Additional buttons near the lower keys of the console adjunct provide the four TOUCH-TONE dialing precedence-level signals required for outgoing precedence calls. This arrrangement permits the retention of 12-button TOUCH-TONE dialing in the standard DIMENSION PBX console. A data-link connection between each selector console adjunct and corresponding control circuits in the basic AUTOVON equipment carrier provides the means for completion of all AUTOVON calls requiring attendant handling and for driving the status lamp indicators.

This feature can only be used with the 02-system DIMENSION PBX Attendant Console.

For more detailed information regarding the AUTOVON access arrangement, refer to Section 554-010-135.

AUTOMATIC VOICE SWITCHED GAIN CONTROLLED AMPLIFIER

3.76 An Automatic Voice Switched Gain Controlled Amplifier is provided which meets registration specifications and can be used in outgoing calls if a trunk group is so equipped.

3.77 Software automatically turns on the amplifiers when a remote access incoming call is routed to the Electronic Tandem Network (ETN). The amplifiers may also be optioned (strap or switch on circuit pack) "on" so that they can be used in a special outgoing-only trunk group. In this way, calls from the ETN routed to the public message network use the special trunk group, while calls generated locally use a different trunk group not provided with the voice-switched gain trunks. The outgoing case does not permit software control.

AUTOMATIC WAKEUP SERVICE

3.78 This feature records a hotel/motel or hospital guest's request for a wakeup call entered by the attendant or front desk clerk via the console/terminal. The call is automatically placed at the requested time with an internal fixed or optionally with an external flexible wakeup announcement when the guest answers. A record is made on an op-

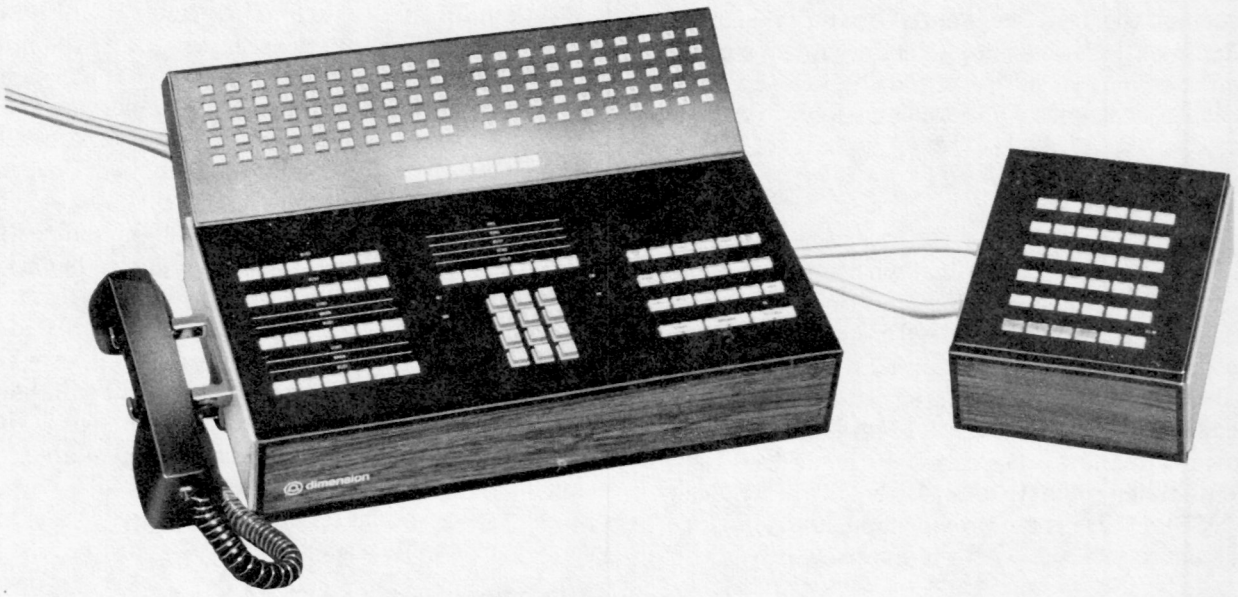


Fig. 9—DIMENSION PBX Attendant Console with 21A Selector Console

tional audit trail printer whether or not the guest answers. As an option, the hotel/hospital personnel can be alerted if the guest or patient does not answer after two retries.

3.79 In addition, a digital display of the time-of-day in 24-hour time appears on the console/terminal at all times when the console/terminal is not being used for hotel/motel or hospital functions. This display provides a constant indication of the setting of the system's internal clock which is used for wakeup, status changes, report generation, and Energy Communications Service restriction. ⧫Automatic Wakeup Service is available as either a fixed message using an LC190 voice announcement circuit pack or a changeable message announcement using an H-9040 recorder/announcer.⧫

BED STATUS AND SELECTION

3.80 ⧫This feature provides the capability to store and display the occupancy and cleaning status and the type number of each patient bed facilitating bedkeeping management, maid locating, and bed selection. Also, communications between the front desk and the bedkeeper are speeded up via real-time maid activity and discharge audit printouts to indicate which beds need cleaning next. The occupancy status is changed automatically by discharging or admitting the patient on the console/terminal. Cleaning status is normally changed by the maid or inspector dialing from the bed telephone. Capability is provided on an optional basis to detect occupied/vacant status discrepancies via the maid dialing separate clean—looks occupied and clean—looks vacant codes.⧫

BUSY LAMP FIELD (BLF)

3.81 The attendant is provided with visual indication of the busy or idle condition of station lines via a light-emitting diode (LED) lamp associated with each station line. Lamps are provided for only 100 station lines. When more than one hundreds group capability is desired, up to 18 group select keys are provided to allow preselection of the desired 100-line group. When the Attendant Direct Station Selection (ADSS) feature is not provided, pushbutton DSS keys are not associated with the lamps.

3.82 When FP9/FP11 is used in a hotel/motel or hospital installation, an attendant or station console/terminal can be provided with DSS/BLF, or extended DSS/BLF. The BLF only is not available. When the console/terminal is in the hotel/motel or hospital mode, the DSS field serves as a room number entry and the BLF serves as a ready room display of the selected hundreds group. When the console is in the telephone mode, the DSS field serves as a means of selecting a station line to be called and the BLF serves as a busy/idle line status of the selected hundreds group.

BUSY VERIFICATION OF STATION LINES

3.83 The attendant can establish a talking connection to an apparently busy station line to determine if the station line is in working order. Prior to connection of the attendant to a busy line, a 2-second burst of tone is applied to alert the talking parties of the attendant's presence, and a 1/2-second burst of tone is reapplied every 15 seconds until attendant disconnects. An idle station line is rung normally when busy verification is attempted.

CALL COVERAGE

3.84 ⧫The Call Coverage feature automatically redirects calls to alternate answering stations for assigned screening of calls and message taking. In the executive/secretary application, for example, the executive's incoming calls are redirected to the secretary if the executive's line is busy, or if the executive chooses not to receive incoming calls.

3.85 Call Coverage service provides integrated call-handling features for the principal (the executive), the covering user (the secretary), and the internal caller. Externally originated calls to the principal will also be redirected to the covering user or attendant. Call Coverage service is based on a system of assigned coverage criteria for the principal. Coverage criteria, such as "line busy" or "don't answer", are the conditions under which the system redirects a call to the principal's assigned coverage. When a call is placed to the principal, the system determines whether assigned coverage criteria are fulfilled. If they are, the Call Coverage service determines which coverage point (line or group of lines) is available to answer the call. Any ringing to the principal is then stopped and the call is redirected to the available covering user. An end point in an assigned Call Coverage path can be a Message Center. Message Center service is provided in Issue 3 of FP8.⧫

CALL FORWARDING—ALL CALLS

3.86 This feature allows all calls destined for a station to be routed to another station (or to the

attendant) designated during activation regardless of the busy or idle state of the called station. This feature can be activated or canceled by the station user from an idle station (or busy state if Call Hold is in the same feature generic) or by the attendant. The activating station may be used to originate calls while activated. All stations can use this feature simultaneously.

3.87 An Electronic Custom Telephone Service (ECTS) station user can activate Call Forwarding—All Calls by going off-hook, pressing the assigned button, and then dialing the number of the station which is to receive the calls. When activated, the status lamp lights. Deactivation is accomplished by going off-hook on the line and pressing the CALL FWD ALL button.

CALL FORWARDING—ALL CALLS—OVERRIDE

3.88 This capability (available in FP8 and FP12) allows the station (station B) to which calls have been forwarded to either call the forwarding station (station A) or to transfer a call to the forwarding station. For example, the station (B) receiving the forwarded calls from a forwarding station (A) can transfer important calls back to the forwarding station (A). The above example assumes that station A has its Call Forwarding—All Calls directed to station B.

CALL FORWARDING—BUSY AND DON'T ANSWER

3.89 This feature allows calls destined for a station to be routed to another station (or to the attendant) designated during activation whenever the called station is either busy or does not answer. This feature can be activated or canceled by the station user from an idle station (or busy state if Call Hold is available) or by the attendant. The don't answer interval is variable per system and is based on the number of ring cycles desired before transfer. The activating station may be used to originate calls while activated. All PBX stations can use this feature simultaneously.

3.90 An ECTS station user can activate Call Forwarding—Busy and Don't Answer by going off-hook, pressing the assigned button, and dialing the number of the station which is to receive the calls. When activated, the status lamp lights. Deactivation is accomplished by going off-hook on the line and pressing the CALL FWD BY/DA button.

CALL FORWARDING—DON'T ANSWER

3.91 This feature allows calls destined for a station to be routed to a designated location (attendant or another station) whenever the called station does not answer. This feature can be activated or deactivated by the station user or attendant. The don't answer interval is variable and is based on the number of ring cycles desired before transfer. The activating station may be used to originate calls while activated. All stations can use this feature simultaneously.

3.92 ▶An ECTS station user can activate Call Forwarding—Don't Answer by pressing the assigned button after going off-hook and dialing the number of the station which is to receive the calls. When activated, the status lamp lights. Deactivation is accomplished by going off-hook on the line and pressing the CALL FWD DA button.◀

CALL FORWARDING — ALL CALLS — REMOTE

3.93 ▶This feature, provided in Issue 3 of FP8, enhances the Call Forwarding feature to include the capability for stations to call forward their calls to numbers outside the PBX. The dialed number must contain only an access code and seven digits. The software will not permit forwarding to a number that is a toll call. Calls may be directed to central office trunk groups, tie trunks, AAR, or ARS. This function is provided as a class-of-service option so that it can be provided to a select group of users.◀

CALL HOLD

3.94 A station user can hold any call in progress by momentarily pressing the switchhook (flashing) and then dialing a hold code. The station user is now free to do any of the following without the risk of causing a Threeway Conference Transfer:

- Originate another call on the user's line
- Activate a service
- Return to another call that had been held via Call Hold.

3.95 If the station user does not dial any further digits after the hold code, muting of the station set and removal of dial tone will occur after about 6 seconds. The call will remain on hold until the

controlling station user either hangs up, causing the station to ring with the held call, or flashes and redials the hold code to return to the original call. Only one call per station line may be held at a time. The held call ***cannot*** be added to the other call.

3.96 ⧫If a previous call has been placed on hold, dialing the Call Hold code automatically places the existing call on hold and returns the control station to the previous call. The control station may alternate between two parties using the Call Hold code, holding one while speaking with the other, but all three parties may not be placed on the same talking connection. A station may hold only one call at a time. If the controlling station completes one conversation and hangs up, it is rung back with the held call.⧫

3.97 An ECTS station user can activate Call Hold by pressing the CALL HOLD button while busy on a call, causing the CALL HOLD status lamp to wink. The user returns to the held call by pressing the CALL HOLD button. Disconnecting from the line causes the line to ring back with the held call.

CALL PARK

3.98 This feature provides a station user with the ability to place a call on hold without tying up the holding line. The call is transferred to a vacant port and then can be picked up by any PBX line by dialing the appropriate code.

CALL PICKUP

3.99 A non-ECTS station user can answer any call directed to another station line within the user's same preset pickup group by dialing a pickup code from an idle or busy station. If more than one station line in the pickup group is ringing, the individual call to be answered is selected by the system.

3.100 An ECTS station user can activate Call Pickup by pressing the assigned button when a station line within the same pickup group is ringing. When a line in the pickup group is ringing, the call pickup status lamp flashes. If activated while busy, the present call is automatically placed on Call Hold.

CALL WAITING

3.101 This feature allows a call to a busy station line to be held waiting while a tone signal is directed towards the busy station user. (Only the called station user hears this tone.) The called station user may connect to this waiting call by hanging up, whereby the station is rung and connected to the call upon answer. Alternatively, the non-ECTS station user may flash and dial an answer-hold code to hold the original call and answer the waiting call. Distinctive Call Waiting tone signals are provided to indicate the source of the call. One burst is used for station-to-station calls, two bursts are used for attendant and outside calls, and three bursts are used for Originating Call Waiting calls. Call Waiting is denied and busy tone is returned if the called station is not in a 2-party talking state, if a call is already waiting, or if the called station has activated a conflicting feature.

3.102 An ECTS station user can activate Originating Call Waiting by pressing the assigned button upon hearing a busy tone when calling another station. The associated status lamp lights steadily, and the 3-burst priority Call Waiting tone is applied towards the busy station. A busy ECTS station user, upon hearing any Call Waiting tone, can answer the waiting call by pressing the CALL WAIT ANS button. If the original call is not terminated prior to the button depression, it is automatically placed on Call Hold.

A. Attendant Call Waiting (Replaces Attendant Camp-On)

3.103 All calls the attendant completes to a busy station are held waiting. A 2-burst tone signal is directed towards the busy station user when the attendant leaves the connection. Subsequent tone signals are applied each time the attendant leaves the waiting connection after verifying the caller's desire to wait.

B. Originating Call Waiting

3.104 The originating class of service enables the station user to direct a 3-burst priority Call Waiting tone signal toward any other busy station or a 3-burst distinctive ringing signal to an idle station.

C. Terminating Call Waiting

3.105 The terminating class of service provides the station user with Call Waiting service with distinctive tone signals on any call attempting to terminate on the user station when the user is busy on another call.

CALLS WAITING

3.106 When a call is waiting to be answered by the attendant and the attendant position is in use or busied out, the CW (Call Waiting) or PR (Priority) lamp (depending on the calling party) is illuminated. If the attendant console is of the 01C type or later or an 02-system console, when one or more calls are waiting, a 20-ms burst of 1.95 kHz tone is generated at the console once every 800 milliseconds. When the number of calls waiting to be serviced exceeds the established calls waiting level (1 through 99), the CW lamp flashes.

CALLING NUMBER DISPLAY TO ATTENDANT

3.107 This feature provides the attendant with a visual display of the station number of any PBX station seeking attendant assistance. The number is displayed on the alphanumeric display.

3.108 ⧫With DCS (FP8, Issue 3), the calling number of a station at one of the other PBXs in the DCS is displayed.⧫

CALLING NUMBER DISPLAY TO STATION

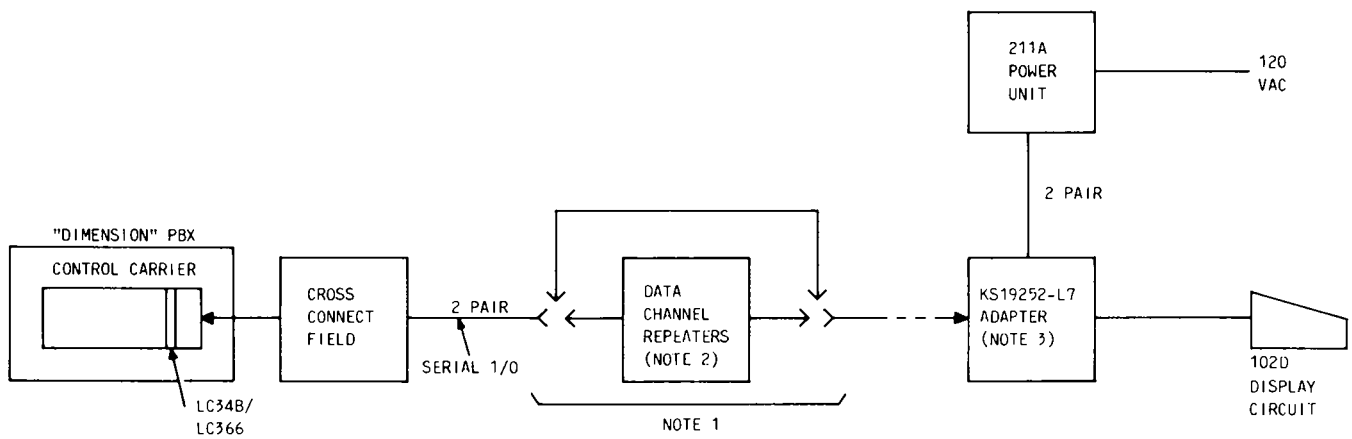
3.109 Equipment is provided at the called station to display the number of the calling station within the PBX and display the station (room) number of the caller. One display set is required with each 1A2 keyset. Each display has four digits.

3.110 ⧫A block diagram of the Calling Number Display to Station arrangement is shown in Fig. 10. A maximum number of six display units can be provided. The following is a description of the equipment required for this feature.

(a) ***102D1-A Display Circuit (Fig. 11):*** This unit is a terminal device capable of displaying up to four digits. It enables the user to determine the calling party number. This unit can be either desk- or wall-mounted and is available in black, white, or ivory with either a teak or walnut faceplate.

(b) ***211A Power Unit (Fig. 12):*** This unit supplies 5 Vdc to the 102D1-A. It can be wall-mounted and is available in avocado, blue, gold, orange, red, teak, or walnut faceplates.

(c) ***KS-19252, List 7 Adapter:*** This unit is used to interconnect the PBX serial data link from the cross-connect field to the 211A power unit and the display circuits.⧫



NOTES:

1. MAXIMUM DISTANCE BETWEEN PBX AND DISPLAY UNIT.
   WITHOUT DATA CHANNEL REPEATERS – 300m (1000 FEET)
   WITH DATA CHANNEL REPEATERS – 3300m (11,000 FEET)
2. DATA CHANNEL REPEATERS MUST BE LOCATED IN THE SAME BUILDING AND WITHIN 300m (1000 FEET) OF THE PBX AND DISPLAY CIRCUIT
3. DISPLAY UNITS MUST BE CONNECTED DIRECTLY TO ADAPTER USING MOUNTING CORDS, WITH NO EXTENSION CORDS.

Fig. 10—Calling Number Display to Station Arrangement

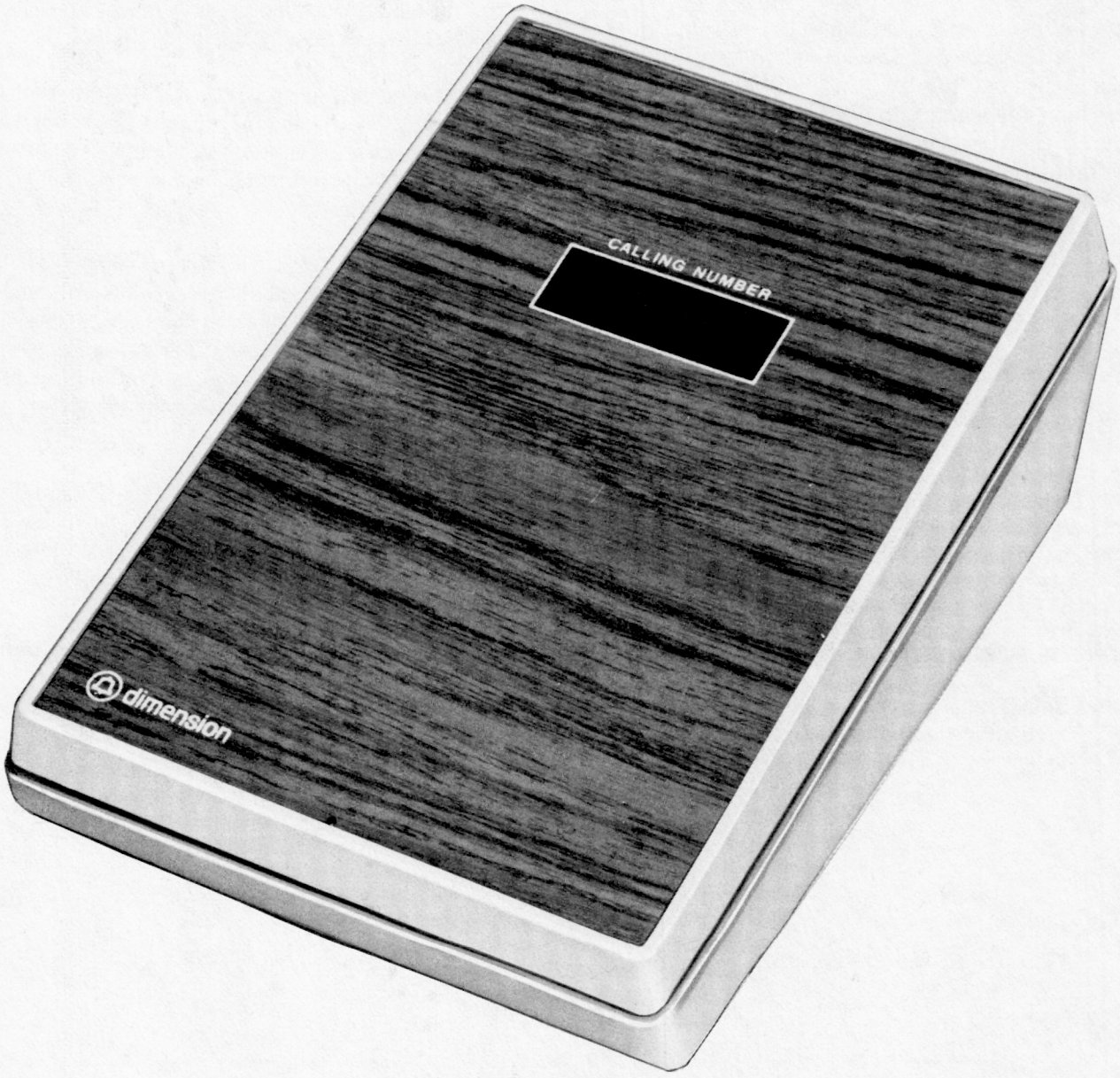


Fig. 11—102D1-A Display Unit

CENTRALIZED ATTENDANT SERVICE (CAS)

3.111 ▶Two optional features are available for PBXs equipped with CAS. They are:

- Combined PBX/Attendant Concentration
- Separate Attendant Concentrator.

A. CAS With Combined PBX/Attendant Concentration

3.112 This feature (Fig. 13) permits multilocation PBX customers served by separate PBXs to concentrate the attendant positions at a single location, called the **main** location. The other locations (typically without attendants) are called **branch** locations. The branch locations are connected to the main location via release link trunks (RLTs), which pro-

Fig. 12—211A Power Unit

vide short holding time connections for CAS calls. Attendant-seeking calls at a branch location are routed to a main location attendant over an RLT. The attendant extends the call back over the same RLT to the branch location and releases the RLT. The RLT is now available for a new CAS call. Main location attendant-seeking calls are routed to a main location attendant in the same manner as a stand-alone PBX attendant-seeking call. Within a DIMENSION PBX at the main location, main PBX attendant traffic and RLT traffic from the branch PBXs is served by the same attendant incoming call queue.

3.113 This feature eliminates the need for call distribution equipment associated with the

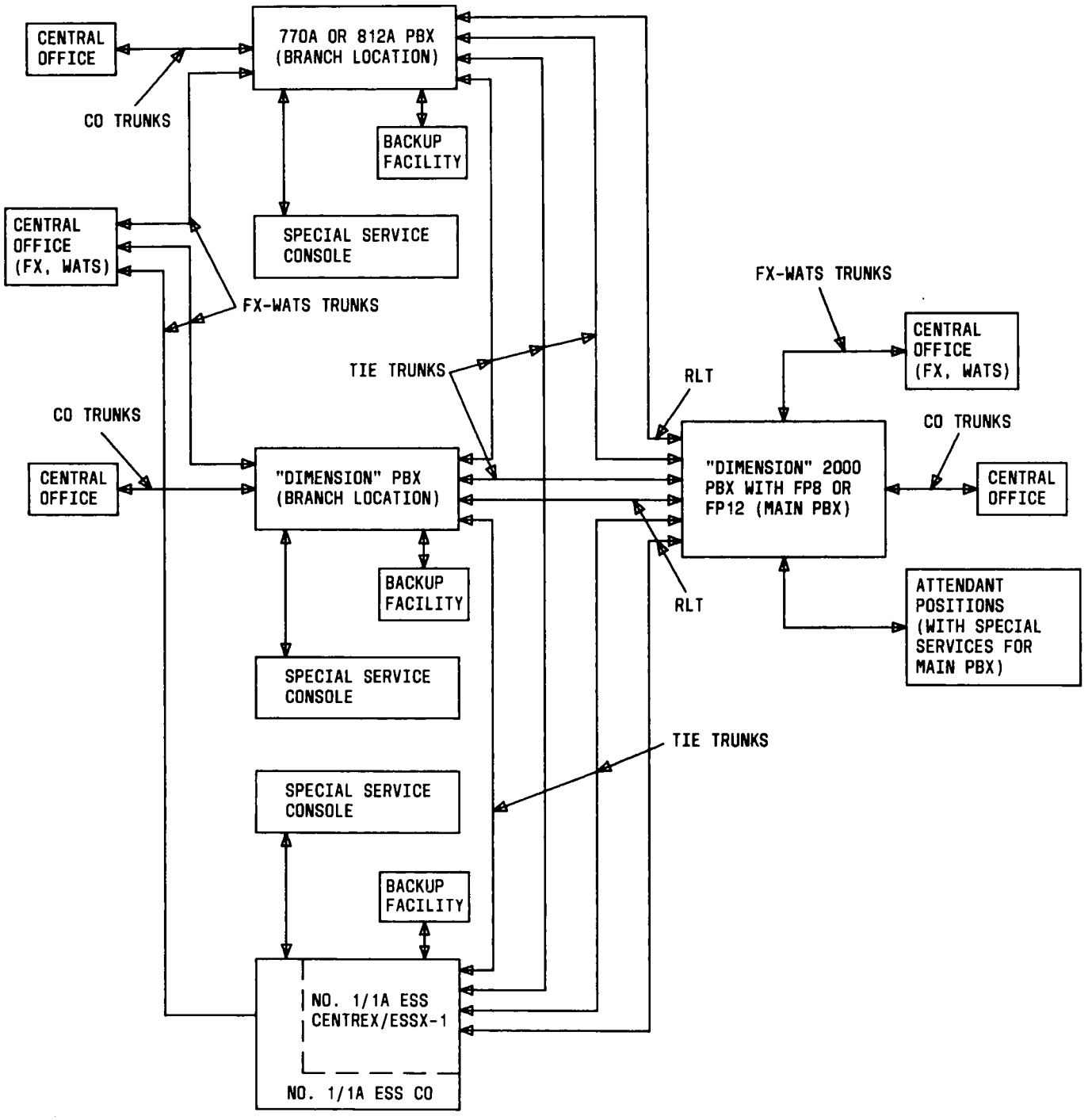


Fig. 13—Centralized Attendant Service With DIMENSION 2000 PBX Providing Combined PBX/Attendant Concentration

DIMENSION PBX CAS with separate attendant concentration feature. For additional descriptive information on CAS refer to Section 981-012-100.

B. CAS With Separate Attendant Concentrator

3.114 This feature (Fig. 14) permits multilocation PBX customers (branch locations) served by separate switching vehicles to concentrate attendant positions at a single location (main location). Incoming Listed Directory Number (LDN) calls come into each PBX directly from the central office and are switched to the centralized attendant positions over RLTs. These trunks can be viewed as short holding time connections from the unattended PBX locations to the centralized answering point. Incoming LDN calls received over RLTs are always routed back over the same RLT. Once the attendant releases the call, the trunks are made available for other calls.◀

3.115 ***CAS Backup Options:*** Two backup RLT answering options are available for each branch PBX location. These options are used when a console is placed in the night console mode or when there is a failure at the main location or failure of RLTs.

(a) ***Backup Telephone Option:*** The backup telephone service option may be supplied by the 2514BM nonkey telephone sets (Fig. 15). From 1 to 16 backup nonkey telephones (one for each RLT) may be used. These telephone sets are equipped with a plug-in handset/headset and a turnkey which controls the on-hook/off-hook status of the telephone set. These arrangements permit the attendant to listen to CAS information tones immediately after going off-hook.

(b) ***Trunk Answer From Any Station (TAAS) Option:*** With TAAS activated, all RLT calls are processed by the TAAS feature. The answering station extends the call to the desired station or trunk by use of Threeway Conference Transfer. Any backup station may be used to transfer the RLTs to CAS or backup mode. If only the TAAS backup mode is required, any station at the PBX may be designated as a CAS mode control set (either a TOUCH-TONE telephone dial or a rotary dial).

3.116 ***CAS With Force Administration Data System (FADS):*** The FADS provides for display of attendant-related traffic information at the company location if the company location has CAS which allows you to concentrate attendant positions at a single (main) location. The FADS terminal allows a display of attendant-related traffic items at any time. The information may be used to determine the number of calls handled by each attendant, the length of each call, the average time spent processing each call, and the waiting time for calls in queue. Maximum efficiency can be maintained by using the information to determine if the number of RLTs is adequate or inadequate. The FADS terminal has a 3-digit and 4-digit display field and a TOUCH-TONE telephone type keyboard. A printer may be used to obtain hard-copy output.

CENTRALIZED STATION MESSAGE DETAIL RECORDING (CSMDR)

3.117 The CSMDR system provides for the centralized collection of traffic data from remotely located DIMENSION 2000/Custom PBXs within a customer's network. Traffic data at each remote location is collected and stored via a 94A local storage unit for later periodic polling by the central polling unit. When the remote locations are polled, the traffic is transmitted to the central polling unit and made available in the form of a magnetic tape output or an interface to a computer port.

CLASS OF SERVICE (COS)

3.118 A Class of Service is a group of features and restrictions assigned to a working station line. Each working station line must be assigned a COS, and more than one station line can be assigned to the same COS. Combinations of features and restrictions in a COS are activated by using the Maintenance and Administration Panel (MAAP), Customer Administration Panel (CAP), Remote Maintenance, Administration, and Traffic System (RMATS), or Customer Administration Center System (CACS) to provide each customer the required flexibility. Some features interact and cannot be activated in the same COS. For example, Call Forwarding—Don't Answer and Call Forwarding—Busy and Don't Answer cannot be activated in the same COS. The DIMENSION 2000 or Custom PBX can have a maximum of 63 different classes of service assigned.

CLASS-OF-SERVICE DISPLAY TO ATTENDANT

3.119 This feature provides the attendant with an alphabetic or numeric code display repre-

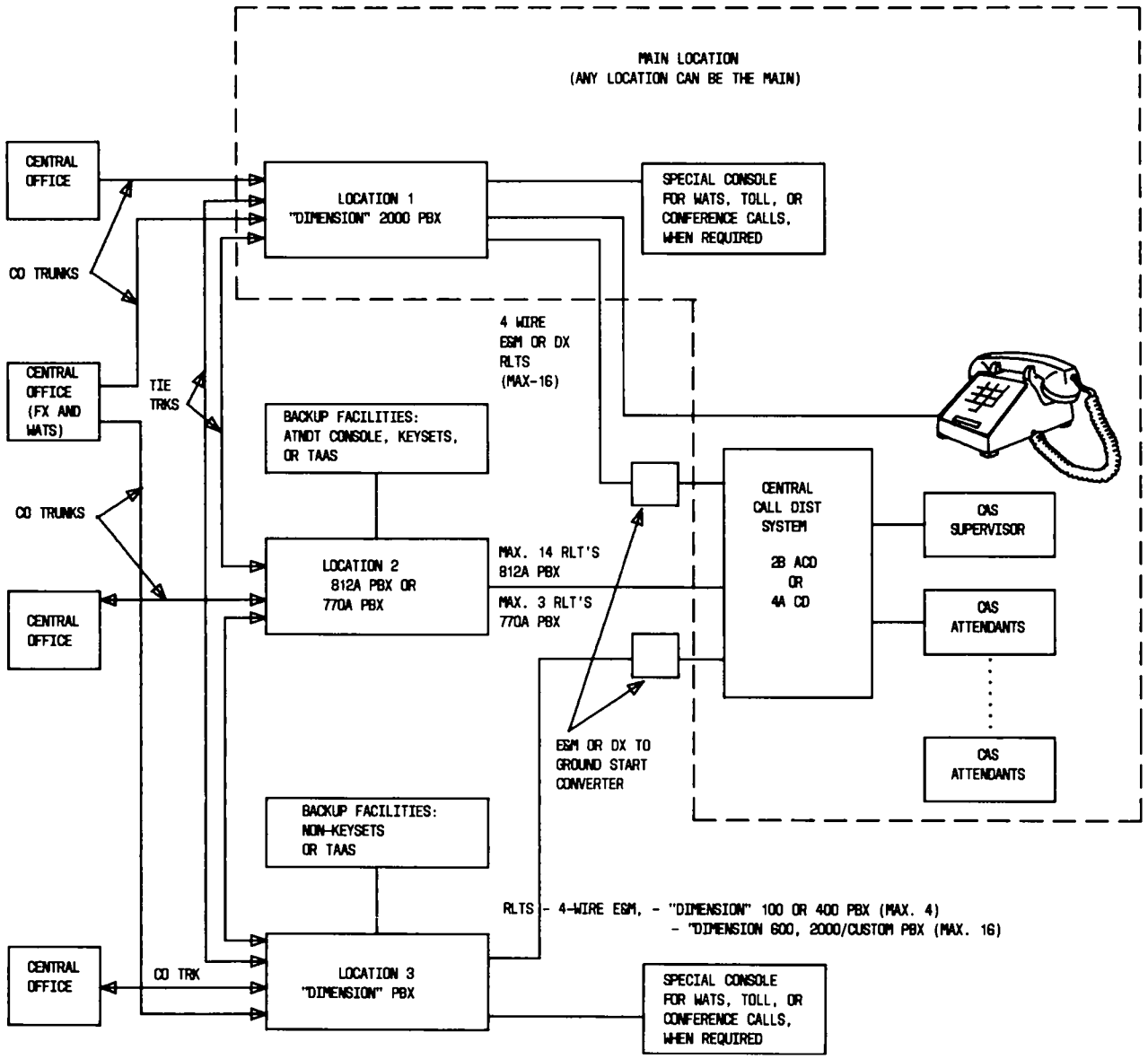


Fig. 14—Centralized Attendant Service (CAS) Arrangement With Separate Attendant Concentrator

senting the Class of Service of the calling PBX station connected to the attendant. The information is displayed on the alphanumeric display when the Class-of-Service key is pressed.

3.120 With DCS (FP8, Issue 3), the Class of Service of a station at one of the other PBXs in the DCS is displayed.

CODE CALLING ACCESS

3.121 Attendants, station users, and the tie trunks can dial an access code and a 2- or 3-digit called party code to activate a signal which corresponds to the called party code. The called party, by dialing an answering code from any station within the PBX, may be connected to the calling party.

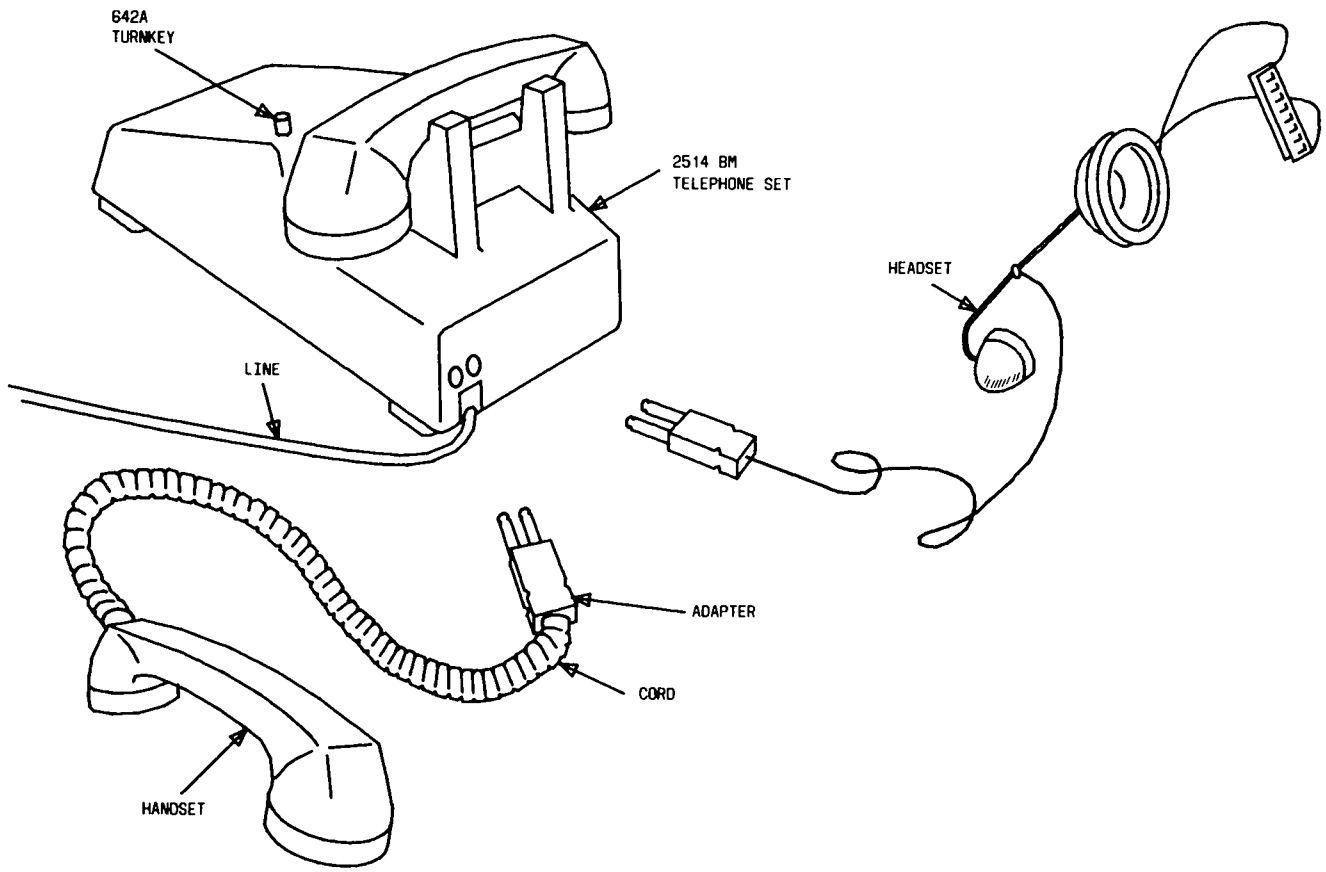


Fig. 15—CAS Backup Telephone Service Equipment

A. 3A Code Call Access

3.122 The 3A code call unit is a relay-selector device which permits a PBX station or attendant to reach a party on the premises served by the PBX. A maximum of two incoming ports and two answer ports (LC08s) may be connected.

B. Chime Paging

3.123 Electronic Chime Paging requires the use of an LC17B tone plant (tone plant C) and the 89A control unit which connects to customer-provided equipment.

CODE RESTRICTION

3.124 This feature denies selected station lines completion of dialed outgoing exchange network calls to selected office and area codes. The restricted calls are routed to intercept tone. Three levels of restriction permit authorized station lines the ability to complete outgoing central office (CO) or foreign exchange (FX) calls to specified area or office codes within an area. The calls allowed are a function of the particular trunk group dialed.

COMMON CONTROL SWITCHING ARRANGEMENT (CCSA) ACCESS

3.125 This feature provides access to the CCSA network for Network Inward Dialing, Direct Outward Dialing to the network, and other features similar to those provided on the exchange network. Advanced Private Line Termination trunks cannot tandem through the system without attendant assistance. If off-net access is provided by the network, selected station lines can be denied off-net access. The CCSA termination is denied to a station when DID restriction is applied.

COMMUNICATION INTERFACE FOR PROPERTY MANAGEMENT SYSTEM (CIPMS)

3.126 The CIPMS feature provides an interface that allows the DIMENSION PBX equipped with FP9/FP11 to function with a customer-owned Property Management System (PMS). The PMS provides the customer with front office and back office management control of features. Information concerning maid-dialed cleaning status changes, calling number display information, control of restriction, local call message units, and message waiting is passed to the PMS provided the AMS has been designated to handle these functions. The PBX receives check-in and checkout, control of restriction and message waiting data, as necessary, depending on which functions are performed in the Property Management System and which are performed by the DIMENSION PBX.

A. Calling Number Display

3.127 The Calling Number Display function provides for Calling Number Display information to be passed to the PMS computer. Both the calling station number and the called station number of the Calling Number Display unit or the called Attendant Console will be transmitted over the CIPMS link to the PMS. The PMS can then access the guest directory and display the caller's name, location, and other personal facts to the called service telephone or attendant via a PMS-provided cathode-ray tube (CRT), printer, or other suitable device.

B. Room/Bed Change/Swap

3.128 This function provides a room/bed swap and change message from the PMS to the PBX over the CIPMS data link to transfer telephone call charges, automatic wakeup information, message waiting details, and controlled restriction data to the new room.

3.129 The PMS consists of customer-selected input/output (I/O) peripheral equipment. This equipment is vendor-supplied. The electrical interface requirement must match those of the peripheral interface circuit (PIC). The CIPMS equipment may consist of a passive terminal or an active terminal. The passive terminal performs I/O only. The active terminal (minicomputer or programmable calculator with an I/O port) receives input data and performs calculations in regard to room charges, telephone charges, etc. Figure 16 is an example of CIPMS hospital/lodging interface configuration.

C. With Data Entry by Telephone

3.130 ▶This feature provides the capability to collect data from station consoles or station telephone sets and transmit the data via the Communication Interface for Property Management System (CIPMS) data link to a customer's property management system computer. A user dials the dial access code for the data entry feature and receives second dial tone. The user then proceeds to dial the appropriate additional data digits, terminating the data input with the TOUCH-TONE calling button.◀

CONTROLLED OUTWARD RESTRICTION

3.131 An attendant can control the restriction of direct-dialed outgoing exchange network calls (local CO and toll calls in hospital/lodging applications) from selected station lines or groups of lines. When activated, the restricted calls are routed to intercept tone.

CONTROLLED STATION-TO-STATION RESTRICTION

3.132 An attendant can prevent selected station lines or groups of lines from receiving station-to-station calls. When activated, the restricted calls are routed to intercept tone.

CONTROLLED TERMINATION RESTRICTION

3.133 An attendant can prevent selected station lines or groups of lines from receiving any calls. This feature is a form of "do-not disturb" service. ▶When activated, restricted DID, ETN (electronic tandem network), and CCSA calls are routed to the attendant, to an announcement, or to intercept tone, depending on the option selected. All other restricted calls are routed to intercept tone.◀

CONTROLLED TOTAL RESTRICTION

3.134 An attendant can prevent selected station lines or groups of lines from originating and receiving any calls. This feature is used to temporarily disconnect station lines.

CUSTOM INTERCOM

3.135 This feature allows station users to dial 2- (up to 10 in a group) or 3-digit (up to 30 in a

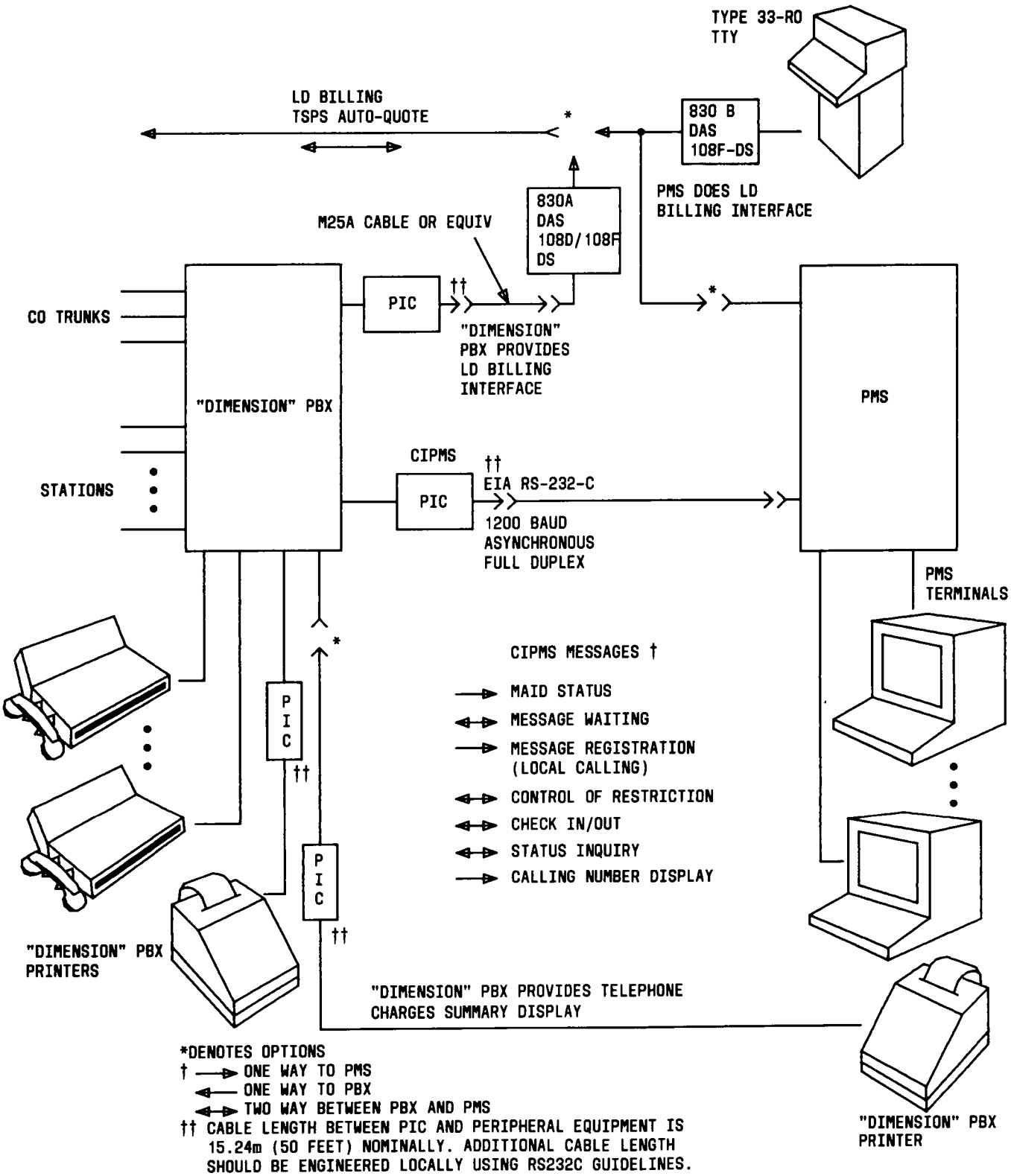


Fig. 16—Hotel/Motel or Hospital Communication Interface for Property Management System (CIPMS) Equipment Layout

group) codes to reach frequently called PBX stations. Three-burst distinctive ringing is provided to nonbusy called stations, and originating call waiting treatment is provided when a busy station is called. The intercom numbers within a custom intercom group are changeable by a designated station line and/or the MAAP, CAP, CACS, and RMATS.

CUSTOMER ADMINISTRATION CENTER SYSTEM (CACS)

3.136 This feature permits the customer to administer station and electronic tandem switching features and to obtain traffic measurements and recent circuit assurance data from one or more FP8 switching locations. An interactive user terminal provides inputs/outputs. The following features may optionally be provided: Station Rearrangement and Change, Facilities Administration and Control, Traffic Data to Customer, and Facilities Assurance Reports. Figure 17 depicts the CACS equipment configuration. Refer to Section 554-010-140 for detailed information on CACS.

CUSTOMER ADMINISTRATION PANEL (CAP)

3.137 This feature provides the PBX customer the ability to change station user features (ie, line extension number, network class of service, etc) and control tandem switching features (FP8). This panel is a simplified alternative to the CACS.

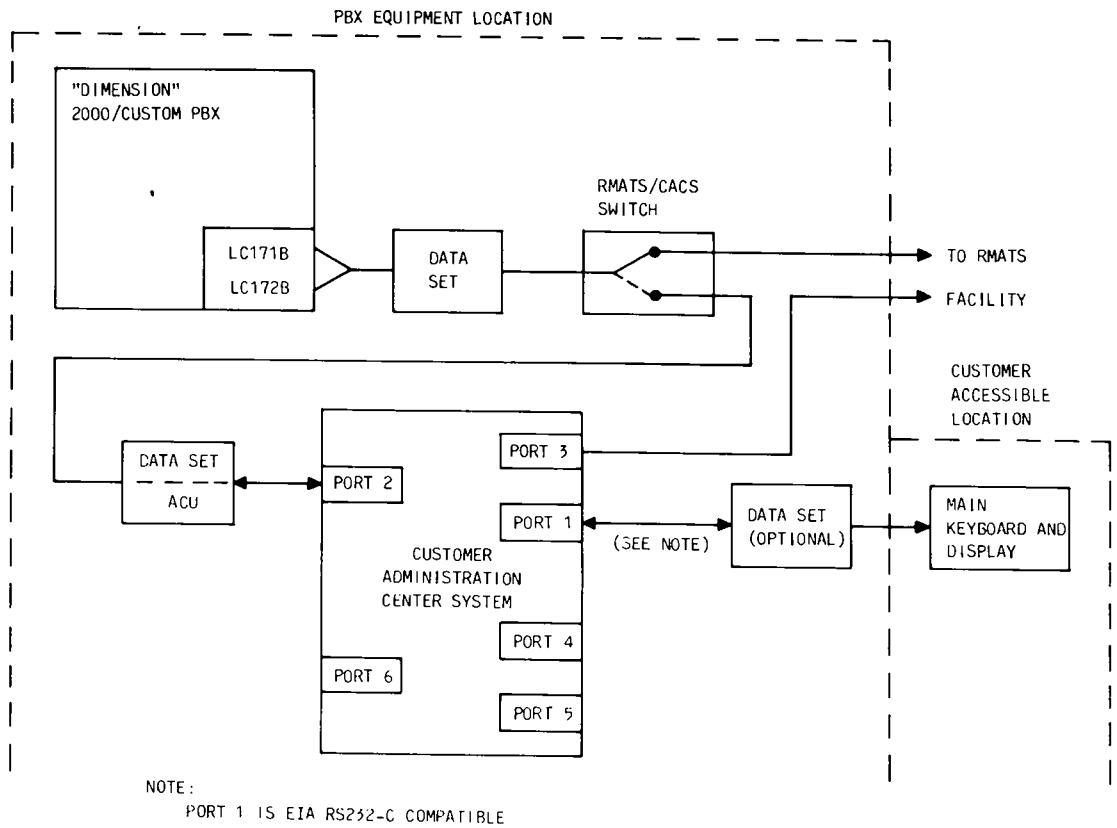


Fig. 17—Typical CACS Equipment Configuration

3.138 The CAP is intended for application to all DIMENSION 2000/Custom PBX feature packages as a cost reduction and as an alternative to craft personnel initiating MAAP or RMATS changes. The CAP restricts the customer to only those MAAP procedures of customer concern. Input data is by button pushes and output is by light-emitting diode (LED) displays, the same as on the MAAP. The CAP is to be located on customer premises; however, it must be located within a distance of 305 cable meters (1,000 cable feet) of the PBX. Figure 18 depicts the CAP to DIMENSION PBX equipment configuration. Refer to Section 554-010-141 for detailed information on CAP.

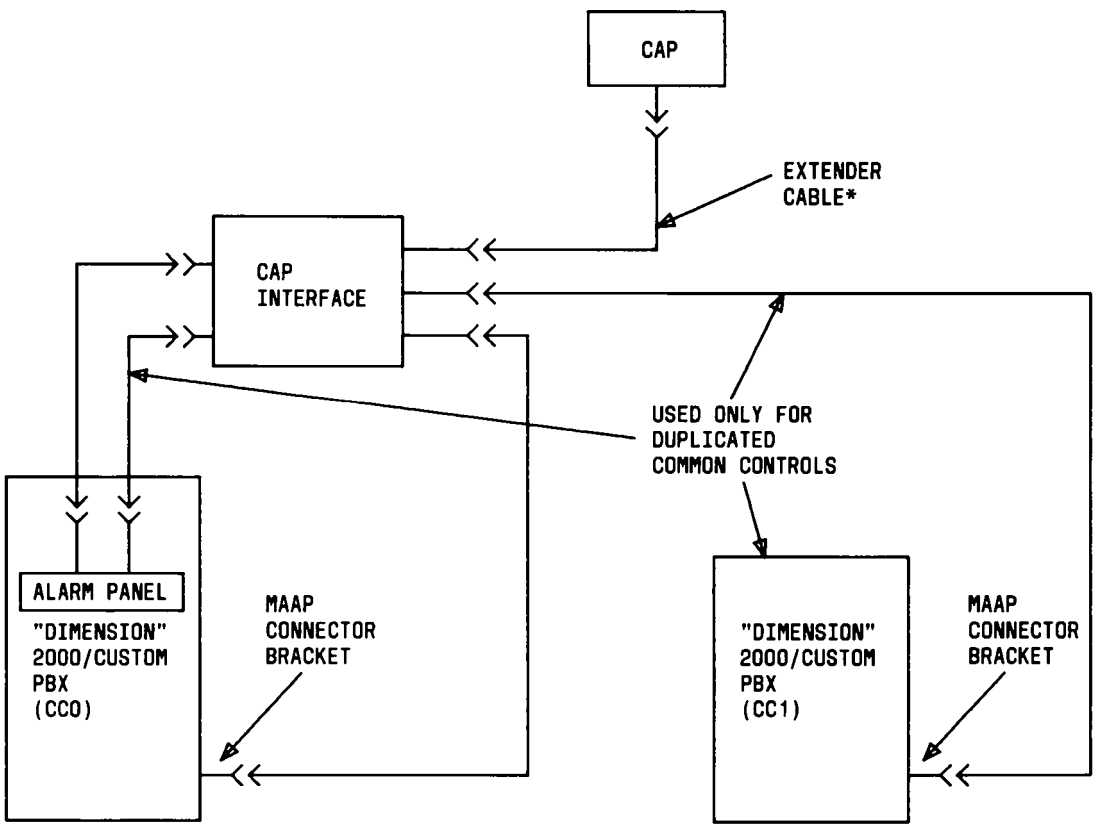
CUSTOMER PREMISES FACILITY TERMINAL (CPFT) EQUIPMENT ▶(MD)◀

3.139 The CPFT is provided in a carrier which contains the metallic facility terminal (MFT) circuit packs. The MFT family of voice frequency repeater/signal range extension units replaces earlier E6, V4, and DLL units in the central offices. For DIMENSION PBXs, the CPFT/MFT installation furnishes transmission and signaling equalization and gain to lines and trunks as required—ie, CO, FX, tie trunks, WATS, and private services.

3.140 The CPFT equipment can be installed in a separate auxiliary cabinet. The auxiliary cabinet requires a power supply and fuse panel in addition to the required auxiliary equipment. Panels are 584 mm (23 inches) wide. (See Section 332-610-100 for details.)

CUSTOMER PREMISES TRAFFIC MEASUREMENTS

3.141 On customer premises (non-RMATS), traffic polling may be performed with an Alston



* EXTENDER CABLE LENGTH FROM CAP VIA CAP INTERFACE TO "DIMENSION" PBX SHALL NOT EXCEED 305 METERS (1000 FT)

Fig. 18—▶Customer Administration Panel (CAP) Configuration◀

820-type count monitor scanner, or equivalent. Detailed traffic measurement is accomplished by extracting usage (CCS [hundred call-seconds]) and peg count data via software and the count monitor scanner. The scanner can be polled from a remote location, or it can be connected locally to a teletypewriter for traffic reports. After the scanner is connected to the high-speed data channel, the MAAP and traffic procedures are used to prepare the study. The PBX may dump summarized or raw traffic data concerning the MAAP selected network upon receipt of a break character. Any terminal (such as TTY) may send the break character and receive the data. Line feed and spacing control is provided by the PBX.

DATA CHANNEL REPEATER

3.142 The Data Channel Repeater (Fig. 19) provides range extension and/or lightning protection for DIMENSION PBX low-speed data channels and various remote devices required for system operation. It can be used with electronic telephone controllers and calling number displays. The repeater connects in series with the data channel to repeat data pulses.

3.143 The repeater circuit is designed to operate in unexposed environments without additional protection or in exposed environments with lightning protection. The circuitry is packaged in a modified key service unit (KSU) approximately 241 mm (9-1/2 inches) wide by 432 mm (17 inches) long. Each repeater can accommodate two Data Channel Repeater circuits. The unit can be wall-mounted and must be connected to a 120 Vac 60-Hz outlet. A power cord (Lists A through D) is available in lengths from 610 mm (2 feet) to 3658 mm (12 feet). For more detailed information, refer to Section 554-111-101.

3.144 Figure 20 depicts a typical application for data channel repeaters. A minimum of one and a maximum of four Data Channel Repeaters may be installed per individual data link. See Section 554-010-101 for detailed information.

DATA COMMUNICATION ACCESS

3.145 This feature provides access to a customer's computer equipment by DIMENSION PBX users via a trunk-type connection to Data Communication Access ports on the PBX. Computer access is available to station users and attendants at the work facility where the PBX and computer are located, to remote users via the remote access to PBX services, off-premises stations, and off-premises stations with call control features, and to users of the Electronic Tandem System (FP8), dial repeating tie trunks (FP8 and other feature packages), and DID trunks (when station number to dial access code conversion is provided).

3.146 ⧫The Data Communications Access feature uses the LC-361 loop signaling interface circuit which functions as a Data Communications Access Port (DCAP) to provide an interface between the PBX and customer-provided computer equipment. Figure 21 illustrates the use of the DCAPs.

3.147 ***With DID Capability:*** The DID capability is available only when the Station Number Steering feature is provided. Station Number Steering directs DID to a DCAP group, based on the station number within the DID dialing plan. The office code (NXX) is the same for stations and any DCAP group using Station Number Steering.⧫

DATA PRIVACY

3.148 Activation of this feature by a station user prohibits other calls from employing various overriding features to gain access to the station user line and consequently disturbing any data transmission which might be occurring. When the station user goes on-hook, the restriction is automatically canceled.

DATA RESTRICTION

3.149 This administered feature prohibits other individuals, including the attendant, the ability to employ various overriding or alerting features to gain access to or superimpose tones onto a busy station. Disturbance to any transmission in progress is therefore prevented. Overriding or alerting features include Call Waiting, Executive Override, Busy Verification, Trunk Verification, and Timed Recall on Outgoing Calls. This feature is in effect for all calls once it is assigned to a station or trunk.

DATA SWITCHING

3.150 ⧫This feature provided in FP8, Issue 3, allows the switching of synchronous and asynchronous data from and to data terminals and computer-type equipment via DIMENSION PBX at speeds up

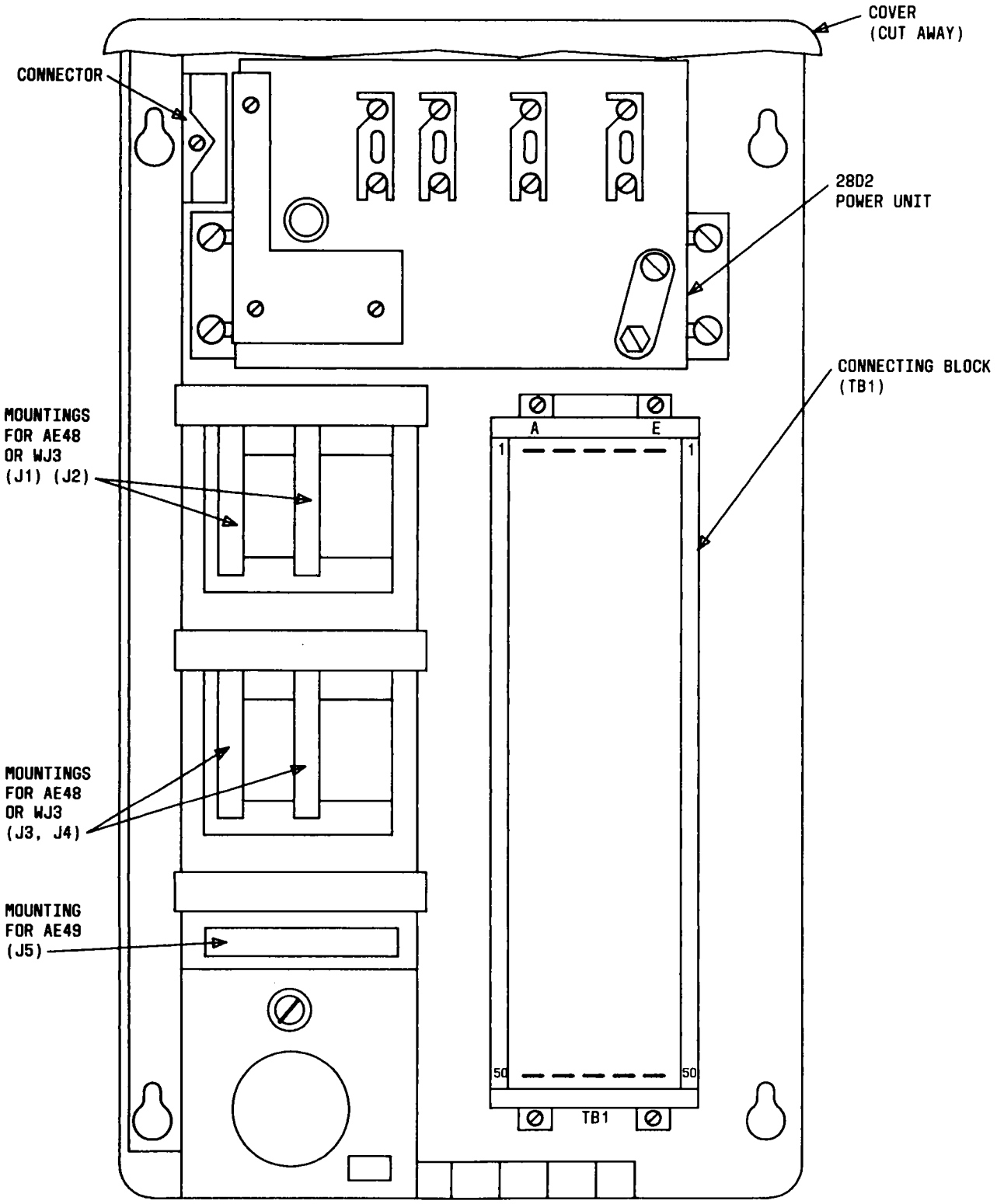


Fig. 19—Data Channel Repeater

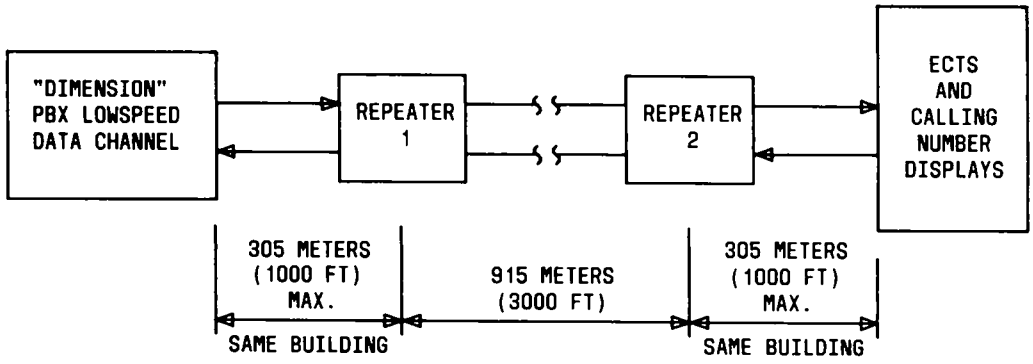


Fig. 20—Data Channel Repeater—PBX Application (2-Repeater Installation)

to 9600 bps. The data is in a digital format from the terminal, through the PBX and to the computer. Data information can remain digital end-to-end. Voice conversations remain analog, end-to-end.

3.151 Two versions of Data Switching are available: Data Switching Level 1 and Data Switching Level 2. Level 1 is implemented with only new hardware and requires no new DIMENSION PBX software. Existing software translation changes via the Maintenance and Administration Panel interface are required for Level 1 Data Switching implementation. Two new hardware devices are required to provided Data Switching Level 1. The data interface (DI) (LC 566) replaces modems and is attached directly to terminals or computer ports. The data port (DP) circuit pack (LC 567) is internal to the PBX and replaces either an LC02 line circuit or an LC 361 trunk circuit. Level 2 requires a software modification in addition to hardware including DI, DP and voice/data link (VDL) (LC 568) circuit packs. The voice/data link is required only when data is to be switched between modules of a DIMENSION 2000 PBX. The VDL replaces existing voice link circuits, (LC100s) and is capable of switching either voice or data.

A. Level 1 Data Switching

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

(a) ***On-Premises Modemless Data Switching:*** full or half duplex, either synchronous or asynchronous, at speeds up to 9600 bps.

(b) ***Terminal Dialing:*** Data "call setup" to a host computer or other terminal from a data terminal keyboard or ASCII asynchronous terminals. This capability is called terminal dialing and provides the ability to originate a data call from a terminal, using keyboard key operations to generate on/off hooks and digits for dialing. Visual call progress messages such as incoming call, dialed number is ringing, etc, are displayed or printed at the terminal.

(c) ***Computer Port Access:*** Permits the user to access computer ports on either the line or trunk side of the PBX.

(d) ***Call Setup Using A Station Set:*** Data "call setup" by using a station and the Threeway Conference Transfer feature to connect a terminal to a host computer or another terminal.

(e) ***RS-366 Dialing:*** Electronic Industries Association (EIA) RS-366 interface for automatic calling unit dialing. This function provides computer port call originations for host computers and eliminates the need for an automatic calling unit.

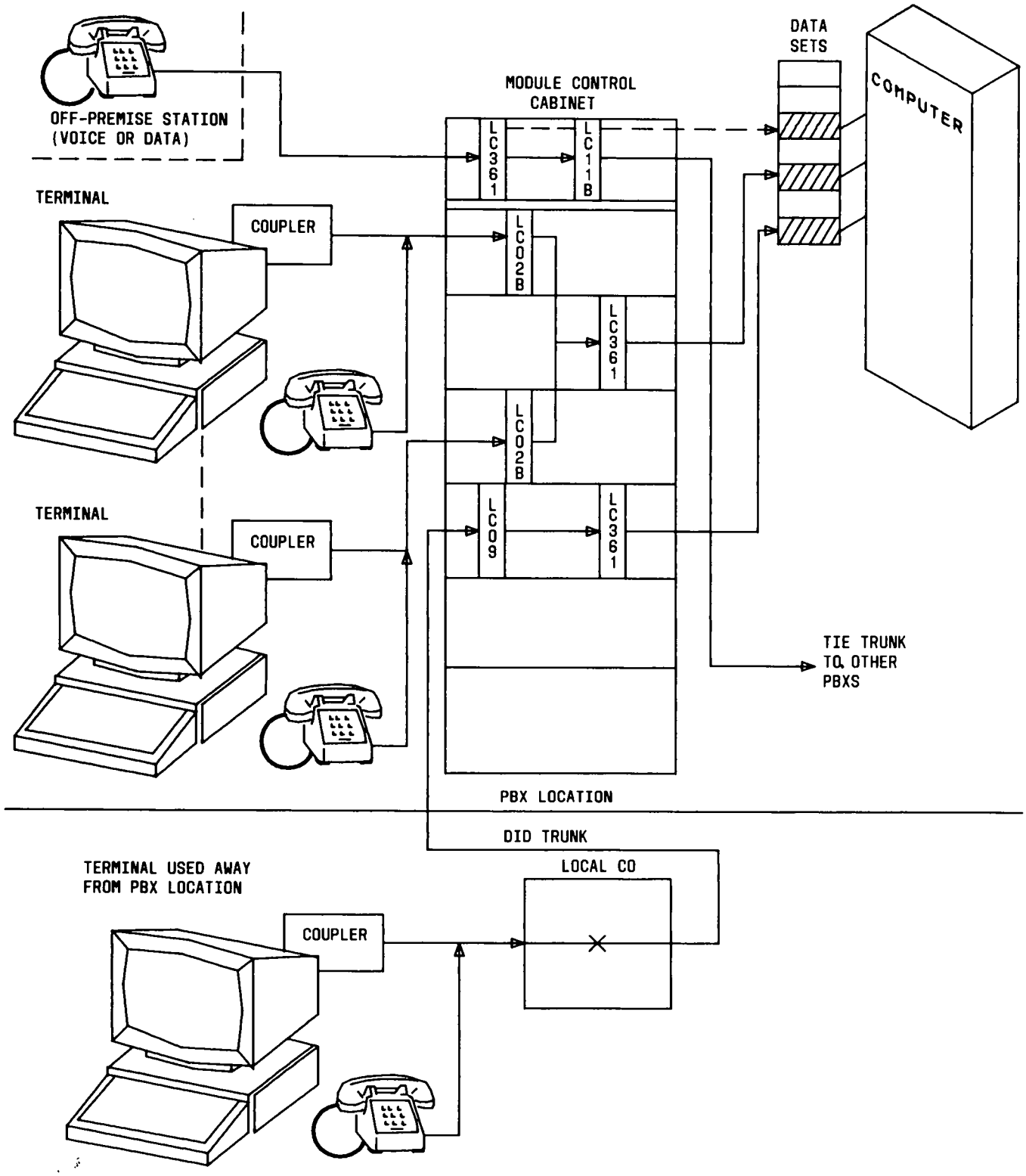


Fig. 21—Loop Signaling Interface for Data Communication Access and Off-Premises Stations

(f) ***Off Premises Access Using Private-Line Modems:*** This provides a user with access from a terminal that is on the line or trunk side of the PBX to a Digital Data Service (DDS) unit or a private-line modem.

3.153 ***Data Interface (DI):*** The DI is a locally powered unit requiring 110-volt ac input (approximately 15 watts). The DI is designed for three mounting arrangements:

(a) ***J58893A:*** A single stand-alone unit for use at a terminal or modem. The DI can be desk-mounted like a data set.

(b) ***J58892A L1, L2:*** A multiple-mount unit that houses up to eight DIs.

(c) ***J58892AA L1, L2:*** A rack-mounted arrangement that houses up to eight DIs. The rack mount is designed for DIMENSION PBX auxiliary cabinets or DATAPHONE* data communication terminal cabinets.

The DI contains a number of option switches which are used to control data speed and format. It also contains buttons and indicators which are used during call setup and maintenance functions.

3.154 The DI as shown in Fig. 22 provides a standard EIA RS-232C interface to customer-provided data equipment such as terminals, host computers, and voice band modems. The DI interface to the DP in the PBX over a DIMENSION PBX data link (DDL) is a 4-wire, bipolar, fully synchronous digital communications link consisting of two tip and ring pairs. The DI provides four major functions:

(a) End-to-end control

(b) Data handling

(c) Clocks and timing generation

(d) DIMENSION PBX data link (DDL) interface.

3.155 ***Data Port (DP):*** The DP as shown in Fig. 22 is a carrier-mounted circuit pack which provides the interface between the DIMENSION PBX data link to the DI. The DP can be used on either the line or trunk side of the PBX and replaces line or loop signaling trunk circuit packs LC02B and LC361, respectively, as required. The DP appears to the DIMENSION PBX software as the circuit it replaces, thus no software changes are required for a single module PBX, equipped for Level 1 Switching.

*Trademark of AT&T.

B. Level 2 Data Switching

3.156 This feature includes all hardware and functions provided by Level 1 Data Switching plus the following additional features:

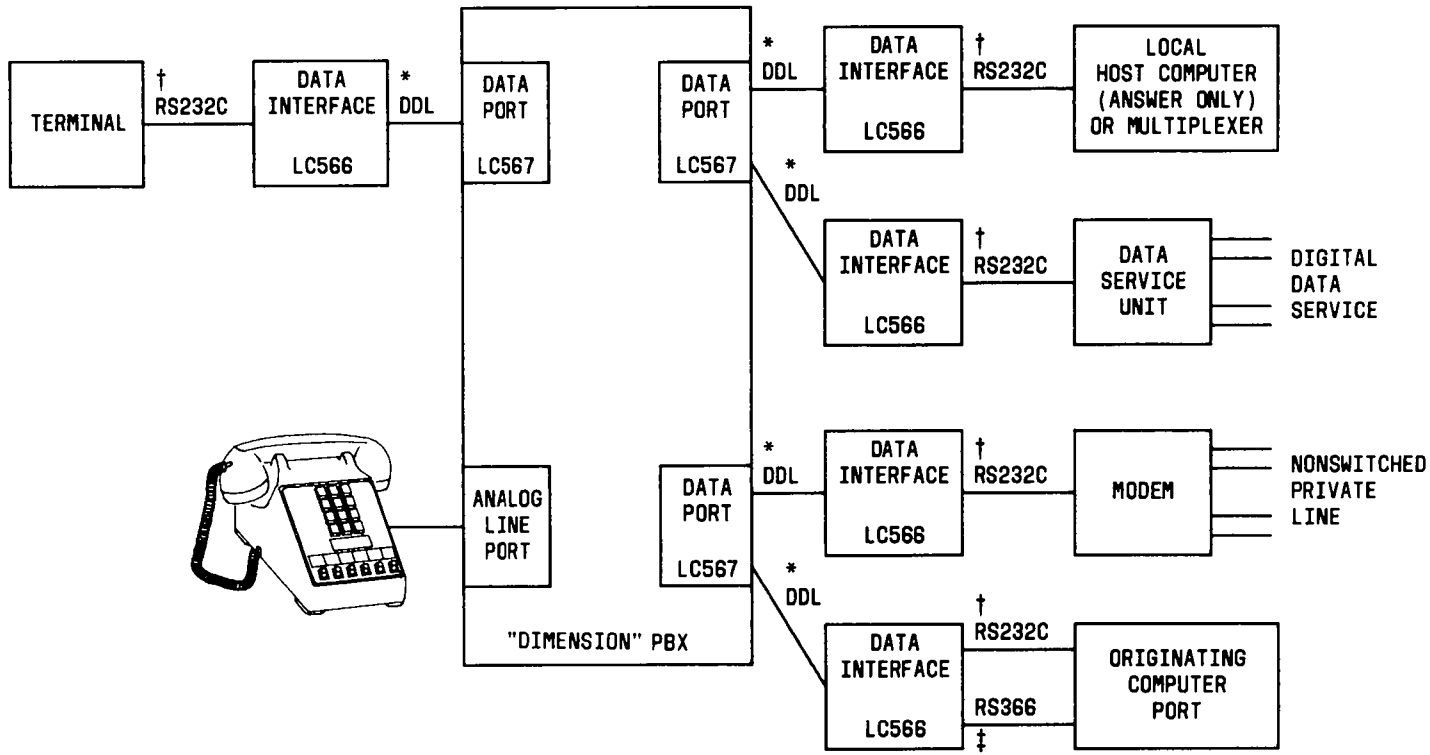
(a) ***Multimodule Data Switching:*** Data switching between the different modules of a multimodule DIMENSION 2000 PBX.

(b) ***Associated Set Dialing:*** Allows a user to make data calls using an analog station set. Associated set dialing has two types of data-call setup:

- ***Associated Data Port Mode:*** In this mode, an association between a data port and analog line is assigned in translations. A data call is set up when a user dials a termination address such as a data port, analog line, or trunk (when using modem pooling) and then generates a switchhook flash and hangs up. When the user hangs up, the call is automatically transferred to the associated data port.

- ***Non-Associated Data Port:*** In this mode, when the called party (host computer) answers, the user generates a switchhook flash that results in a second dial tone. A second data port may then be dialed. When the second data port answers, the user hangs up to transfer the call. This mode allows the user of an asssociated set to make data connections for terminals not associated in translations with the user's telephone. The mode of operation is similar to the Threeway Conference Transfer feature except that answer tone is provided by software when the called port answers.

(c) ***Modem Pooling:*** Allows the selection of a specific type of modem without requiring that modems be dedicated to each terminal. Modems are modulator/demodulator devices which provide an interface with terminals and convert digital signals to audio tones for data transmission over the voice network. Modems also convert received tones to digital signals for use by data processing equipment. For DIMENSION PBXs equipped for Data Switching, the modem is replaced by the DI



* "DIMENSION" PBX DATA LINK (DDL) - FOUR WIRE FULL DUPLEX DIGITAL COMMUNICATIONS LINK

† ELECTRONIC INDUSTRIES ASSOCIATION (EIA) RS-232C COMPATABLE INTERFACE

‡ EIA RS366 COMPATABLE INTERFACE FOR AUTOMATIC CALLING UNIT DIALING (IE COMPUTER PORT CALL ORGINATION)

Fig. 22—Example DIMENSION PBX Single-Module Level 1 Data Switching Configuration

for all local data switching. When DIs are used for local data switching, a DI to modem connection must be provided before going out over the public network. This is accomplished by switching the call through a modem pool. Significant software additions provided by Issue 3 of FP8 supports the selection of the proper modem pool, the proper "call setup," and switching in of the modem at the proper time.

(d) ***Data Verification by Station:*** Provides diagnostic capabilities to verify the status (busy or idle) of modem pool members. It eliminates the need for service calls to determine the working condition of a modem pool member.

(e) ***Enhanced Uniform Call Distribution (EUCD):*** Provides the same functions as Uniform Call Distribution except that the hunting pattern is either sequential or next idle station in the hunting sequence. The EUCD determines which port of an on-premises computer or terminal group is selected on a dial-up basis.

For additional feature information on associated set dialing, modem pooling, and data verification by station, refer to Data Switching Level 2 Feature Document 554-191-279. Enhanced Uniform Call Distribution is covered in Feature Document 554-191-121.

3.157 ***Voice/Data Link:*** As shown in Fig. 23, the voice/data link (LC568) makes possible the switching of voice or data between PBX modules using the same link circuit. Separate circuit functions within the voice/data link circuit under control of the DIMENSION PBX software provides the capability to handle either voice or data. When Level 2 Data Switching is provided between DIMENSION PBX modules, all link circuits between the modules requiring data switching must be voice/data link circuits.◀

DELUXE QUEUING

3.158 This feature permits station calls, tie trunk calls, remote access calls, off-premises extension (OPX) calls, attendant calls, or attendant-assisted calls to be placed in a queue whenever all trunks for completing a particular call are busy. The queue may be a ringback queue (RBQ), in which case the calling party goes on-hook and is called back when a trunk becomes available, or an off-hook queue (OHQ), in which case the calling party remains off-hook and is connected to a trunk when it becomes available. Attendant and attendant waiting calls only use OHQ. In all cases, the nonpriority queue is only served when the priority queue is empty. There are four types of Deluxe Queuing arrangements. These are various combinations of RBQ and OHQ with one or two queues. The types are designated I through IV and are defined as follows:

(a) ***Type I:*** All OHQ for tandem, main, satellite, and tributary locations. All calls, including remote access and attendant calls, use a single off-hook queue.

(b) ***Type II:*** Ringback queue for tandem, main, and satellite locations. No queuing for tributary locations. All tandem attendant calls and tandem remote access calls use a priority off-hook queue. All other calls use a nonpriority ringback queue.

(c) ***Type III:*** The same as Type I; however, two off-hook queues are used. Calls from main, satellite, and tributary locations, as well as remote access, OPX, and attendant calls use a priority off-hook queue. Tandem stations use a nonpriority off-hook queue.

(d) ***Type IV:*** Mixed queuing with RBQ for tandem stations and OHQ for all other calls. The OHQ calls use a priority queue, and RBQ calls use a nonpriority queue.

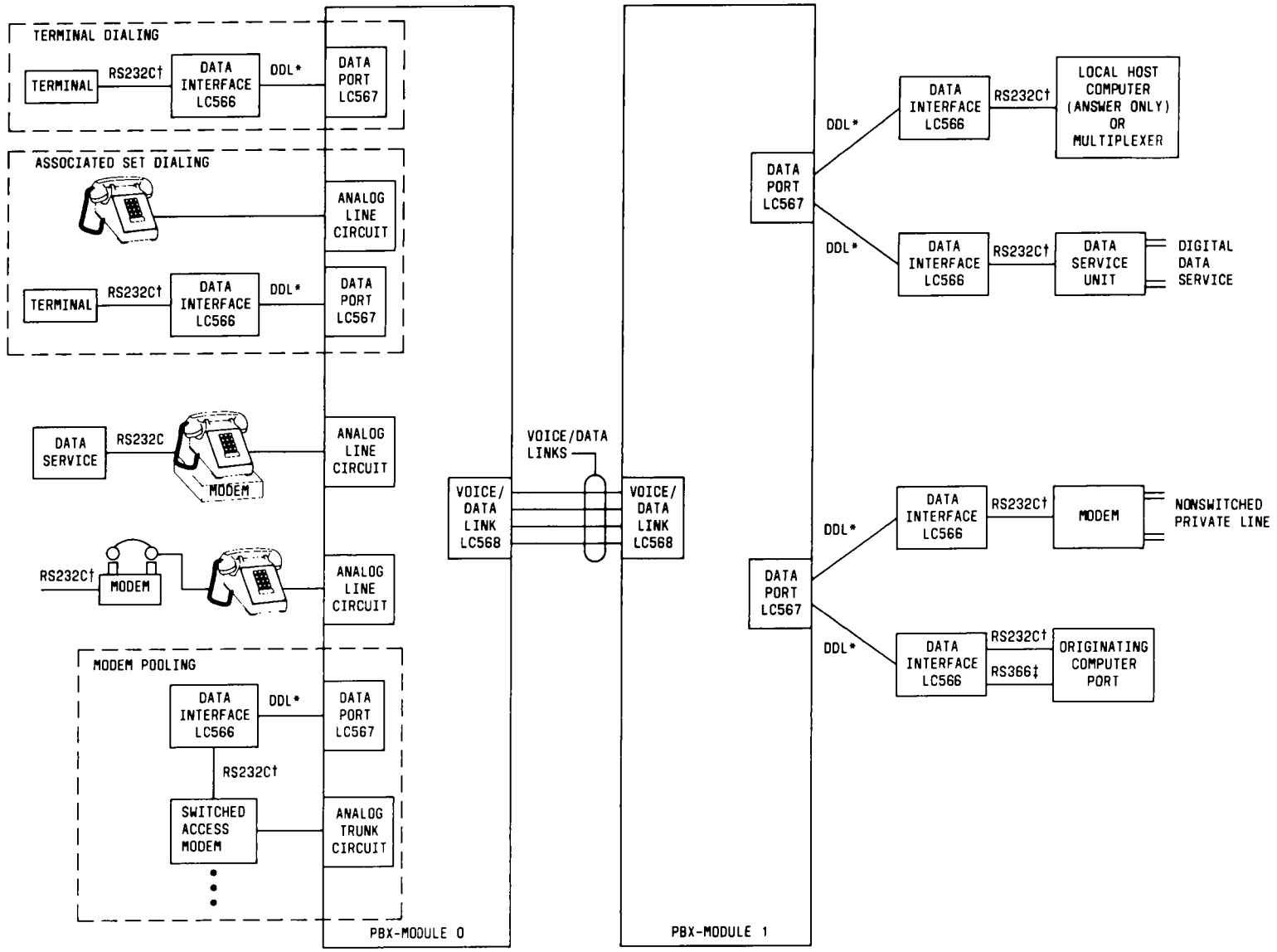
DIAL ACCESS TO ATTENDANT

3.159 This feature allows station users or dial repeating tie trunks within the switching system to reach the attendant by dialing a code, usually but not necessarily, a single digit 0. The attendant may complete these calls to trunk facilities or station lines.

"DIMENSION" PBX ELECTRONIC CUSTOM TELEPHONE SERVICE (ECTS)

3.160 The ECTS is designed to provide improved key telephone features and simplified access to custom calling PBX features (Table C). Some of the main characteristics are:

- A multibutton electronic telephone (MET) set (2990 through 2999 series) which can be used for single or multiline service.



* "DIMENSION" DATA LINK (DDL) - FOUR WIRE FULL DUPLEX DIGITAL COMMUNICATIONS LINK.
† ELECTRONIC INDUSTRIES ASSOCIATION (EIA) RS232C COMPATABLE INTERFACE.
‡ EIA RS366 COMPATABLE INTERFACE FOR COMPUTER PORT CALL ORIGINATION.

Fig. 23—DIMENSION PBX Multimodule Level 2 Data Switching Configuration

- Nonlocking pushbuttons and light-emitting diode (LED) indicators on the MET set to provide line or feature access and status.

- Administration of features and maintenance routines which are controlled by software programs. Interface with the PBX is via the Maintenance and Administration Panel (MAAP). The Customer Administration Panel (CAP) and the Customer Administration Center System (CACS) provide the customer with the capability to make station rearrangements and changes.

- All network and bridging connections are accomplished in the PBX under software control.

- No switching functions are required in the telephone set.

- An electronic telephone controller may be optionally located within the PBX cabinets or in a remote position to provide the most economical plan.

- A test line is assigned to a steering port in each controller. Tip and ring assignments for these test lines are given in the customer ordering document.

3.161 A MET set can be arranged for single-line service or multiline (key-type) service. Conventional nonkey telephone sets (500 through 2800 series) can be used to pick up PBX lines which appear on an electronic key telephone set.

3.162 The MET sets are controlled by an electronic telephone controller available in 2-line capacity sizes. A basic controller (J58879KA) serves a maximum of 63 MET sets. A supplemental controller (J58879KB) provides line capacity for 63 additional MET sets or a maximum of 126 per controller group. The maximum number of controllers is feature package and memory configuration dependent (Table A).

3.163 The basic and supplemental controllers are contained in circuit pack carriers which can be mounted in a vacant carrier position in the module control, line, or auxiliary DIMENSION PBX cabinets, or on a separate controller cabinet (Fig. 24). The supplemental carrier is powered by the basic carrier and must be mounted directly above the basic carrier. A maximum of two ECTS controllers is permitted per module.

3.164 For more detailed information regarding DIMENSION PBX Electronic Custom Telephone Service, refer to Section 554-010-110.

DIRECT DEPARTMENT CALLING (DDC)

3.165 This feature provides an economical alternative to Direct Inward Dialing (DID) service for selected high call-volume departments behind a PBX. Each DDC group terminates one or more non-DID Listed Directory Number (LDN) type trunk groups to a designated station which is normally in a hunting group. Calls to this station are queued if the station and all other members of the hunting group are busy. A total of up to 30 DDC and Uniform Call Distribution (UCD) groups are possible per DIMENSION 2000/Custom PBX. The maximum number of DDC groups is 30 minus the number of UCD groups. ⧫For systems equipped with Issue 3 of FP8, the function of the DDC feature is replaced by the Enhanced Uniform Call Distribution feature.⧫

DIRECT INWARD DIALING (DID)

3.166 An incoming call from the exchange network (not FX or WATS) can reach a specific station line without attendant assistance. The DID service can be provided for some station lines, and the non-DID (LDN only) service can be provided for other station lines on the same PBX. The DID calls to DID-restricted station lines are routed to the attendant or recorded announcement depending on the option selected. The listed directory number can be dialed to receive attendant assistance.

DIRECT OUTWARD DIALING (DOD)

3.167 A PBX station user can gain access to the exchange network without the assistance of the attendant by dialing an access code and receiving a second dial tone. The user may then proceed to dial the desired exchange network number.

DIRECT TRUNK GROUP SELECTION

3.168 The attendant active on a switched loop has direct access to an idle outgoing trunk in a given trunk group by pressing the key associated with the desired trunk group.

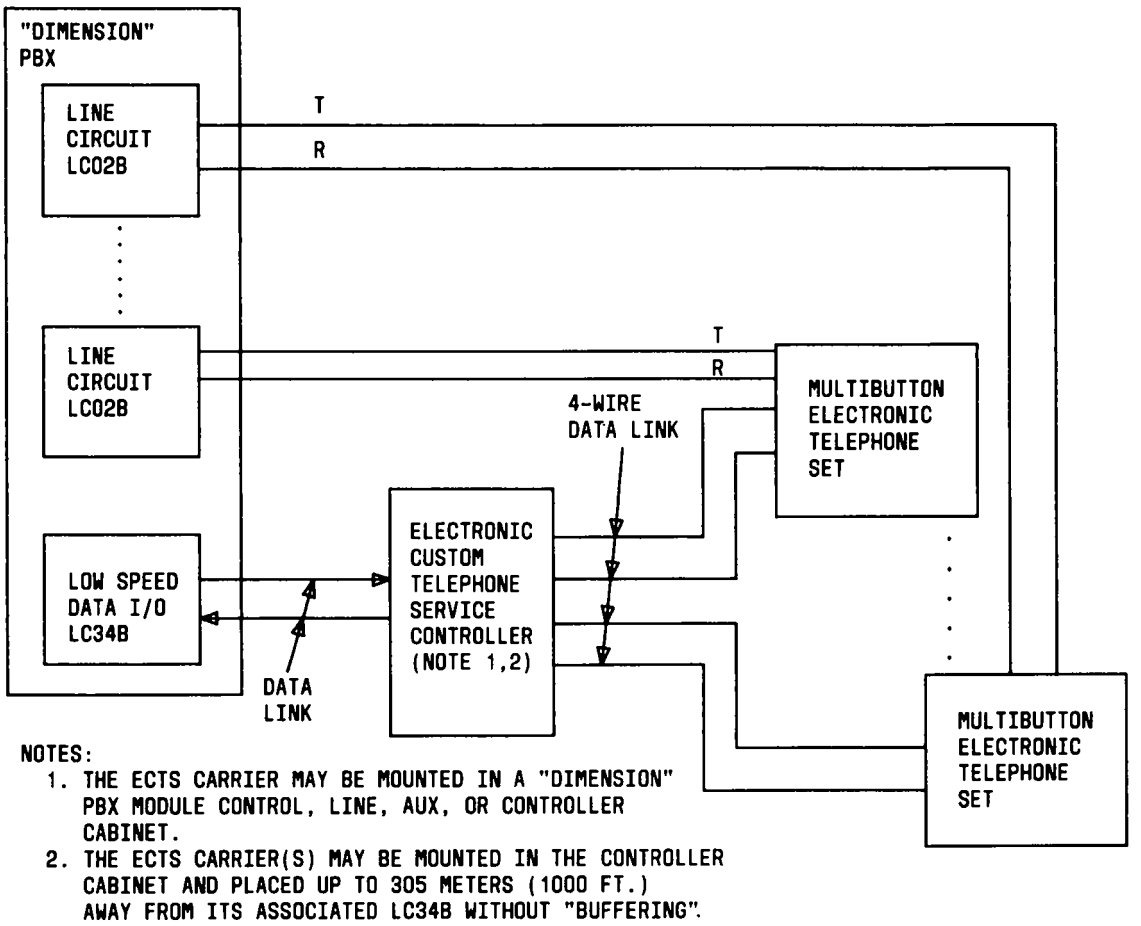


Fig. 24—DIMENSION PBX ECTS Configuration

DIRECTORY SERVICE

3.169 This feature, which is provided in Issue 3 of FP8 via the Applications Processor (AP), automates access to information about station users. It is essentially a computerized "white pages directory." Listings on a video terminal may be accessed or created, via an AP terminal interface, by an attendant, a message center agent, or a terminal user. Directory output under control of system administration may be sent to a printer or tape. Either the complete Directory or only specified sections can be printed in order of name, extension, or organization. Directory searches can be based on an extension, room, location, organization, or a partial or full spelling of the principal's name.

3.170 Directory information includes name of station user (principal), position, extension, organization number, location, room number, and immediate supervisor. Other Directory items can be defined by the customer within ten additional fields.

DISTINCTIVE RINGING

3.171 Unique patterns of station ringing (using existing station sets) are provided to permit the station user to distinguish between various types of calls. Three patterns are available:

- One-burst (normal) ringing indicates station-to-station call.
- Two-burst ringing indicates attendant call or outside call.
- Three-burst ringing indicates either Automatic Callback, Originating Call Waiting,

Outgoing Trunk Queuing Callback, or Custom Intercom call.

DISTRIBUTED COMMUNICATIONS SYSTEM (DCS)

3.172 ▶The DCS provides new feature capabilities to the PBXs, equipped with FP8, Issue 3. The DCS provides customers with the capability to have feature transparency between multiple DIMENSION PBX switches. Feature transparency is the ability to activate, administer, and utilize a feature between two or more PBX switches, and have the feature operate as if it were in the same switch. The switches can be located on the same premises, a campus arrangement, or in different locations distributed throughout a metropolitan area. In addition, customers that require more capacity than can be provided with a single PBX can now be provided with a system comprised of several PBXs that have feature transparency between them. This then enables customers to separate and control their systems, basically, as a single entity.

3.173 ***Transparent Features:*** Each PBX equipped with DCS has available all of the features presently offered with FP8. In addition, DCS provides some degree of feature transparency between the PBXs for the following FP8 features:

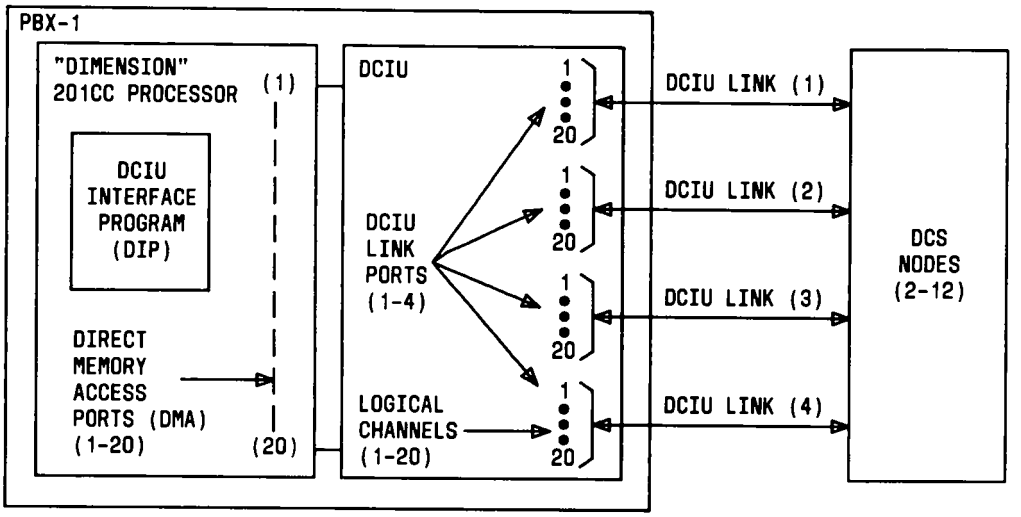
- Alphanumeric Display for Attendant Position
- Attendant Control of Trunk Group Access
- Automatic Callback Calling
- Automatic Circuit Assurance
- Busy Verification of Station Lines
- Call Forwarding — All Calls, Busy and Don't Answer, Don't Answer
- Call Waiting — Attendant, Originating, Terminating
- Calling Number Display to Attendant
- Centralized Attendant Service with Combined PBX/Attendant Concentrator
- Class-of-Service Display to Attendant
- Direct Trunk Group Selection
- Distinctive Ringing
- ECTS Direct Station Selection (DSS)
- ECTS Last Extension Called
- Five-Digit Dialing
- Inter-PBX Call Transfer
- Station-to-Station Calling
- Threeway Conference Transfer
- Trunk Group Busy Indicators on Attendant Position
- Trunk Group Warning Indicators on Attendant Position
- Trunk Verification by Customer

3.174 ***Data Communications Interface Unit (DCIU):*** Feature transparency is made possible between PBXs by the addition of a DCIU and an associated DCIU interface program (DIP) to each PBX. The DCIU makes possible the transfer of information between PBX processors. As shown on Fig. 25, the DCIU interfaces with the local PBX processor via one of 20 direct memory access (DMA) ports under control of the DIP. The DIP translates DCIU instructions, generates and formats a DCS message with the appropriate feature or call information, and transmits the message by a DMA port to the DCIU.

3.175 Once the appropriate call or feature message reaches the DCIU, the DCIU determines which PBX (ie, DCS node) the message is destined for, assigns the proper DCIU link and selects one of 20 logical channels within the link over which the message is to be transmitted. The links connect the various DCS nodes and are capable of handling information at speeds up to 19.2 Kb/s, depending on distances involved and traffic on the link.

3.176 If duplicate common control is to be provided in a PBX equipped for DCS, the DCIU is also duplicated. When the DCIU is duplicated the links between nodes are not. Figure 26 shows a duplicate DIMENSION PBX common control and duplicate DCIUs sharing common link circuits.

3.177 Typical connecting arrangements for DCIUs are shown in Fig. 27. A data modem or a local



NOTE: NO MORE THAN FOUR DCIU LINKS ARE ASSIGNED EACH NODE AND NO MORE THAN TWELVE PBXs MAY BE ASSIGNED A DCS

Fig. 25—Distributed Communication System/DCIU Interfaces

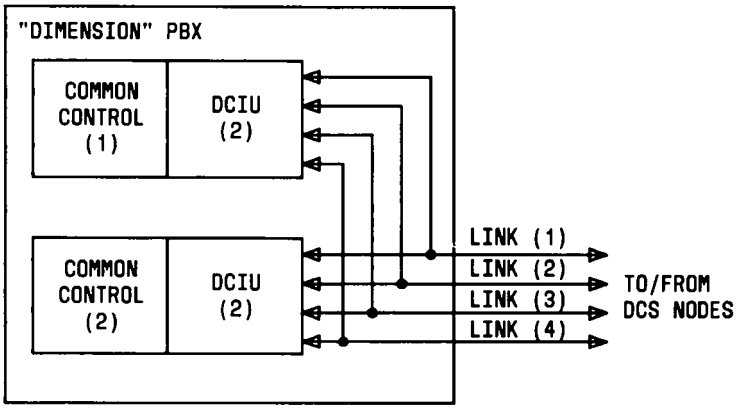
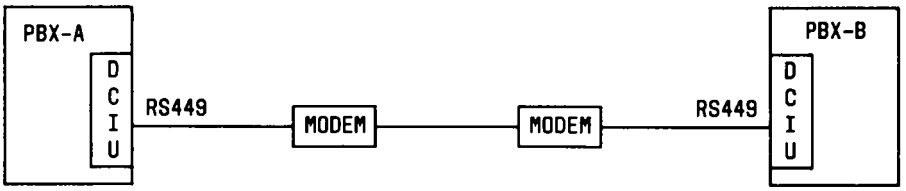


Fig. 26—DIMENSION PBX with Duplicate Common Control and Duplicate DCIUs

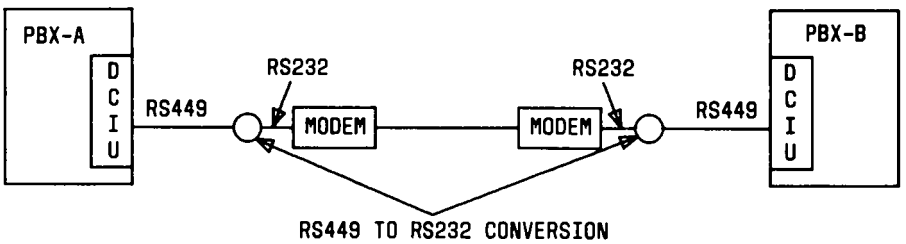
area data set (LADS) that supports the required baud rate (ie, 2.4 Kbs to 9.6 Kb/s) and provides protection is required on each end of the interface.

3.178 ***DCS Architecture:*** A DCS is comprised of various PBXs connected together via DCIUs and associated links to provide feature transparency between the PBXs. Systems A, B, C, and D (Fig. 28) make up a DCS and are referred to as cluster nodes. Communications between two DCIUs via an intermediate DCIU is referred to as a hop (ie, PBX-A to PBX-C via intermediate DCIU located in PBX-B).

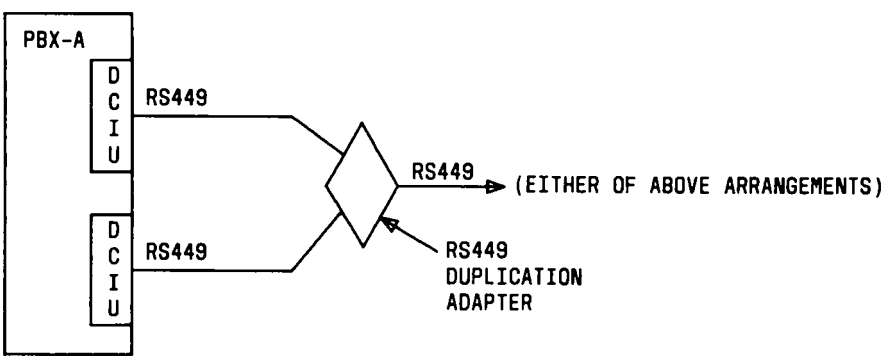
3.179 An example of a DCS electronic tandem network (ETN) configuration is shown in Fig. 29. Systems A, B and C make up a DCS and Systems F, G and H make up another DCS. Feature transparency ***does not*** exist between the two DCSs. Tie trunks are required between DCS nodes to pass digit, signaling, and voice transmission. In the DCS configuration of DCS nodes F, G and H, tie trunks are not needed between satellites G and H because communications between these locations is routed via main PBX F.



A - CONNECTING ARRANGEMENT WITH EIA RS449 COMPATIBLE MODEMS



B - CONNECTING ARRANGEMENT WITH EIA RS232 COMPATIBLE MODEMS



C - CONNECTING ARRANGEMENT FOR DUPLICATED DCIUs

Fig. 27—DCIU Connecting Arrangements

3.180 Assignments of DCIU links at each DCS node are made in such a manner that all nodes can be physically connected with no more than one hop required to reach any combination of nodes. No more than four DCIU links are assigned to each node. Large DCS multiple PBX switch complexes may require the use of a 5-digit dialing plan. See "Five-Digit Dialing", this Part, for a description of the plan.

3.181 There is currently no method for administering or maintaining all DCS cluster nodes using the same connection. All nodes must be administered and maintained as separate PBXs using a separate dial-up connection from RMATS and CACS for each PBX.

3.182 When a feature is accessed to a distant DCS cluster node that requires the passing of the Class of Service (COS) assignment, the COS in both the sending and receiving DCS cluster nodes must be the same.

3.183 Like COS assignments, each trunk group (TG) that is associated with a DCIU link must be numbered exactly the same on both ends of the circuit (ie, TG 20, trunk 4 must be TG 20, trunk 4 on both ends of the circuit).

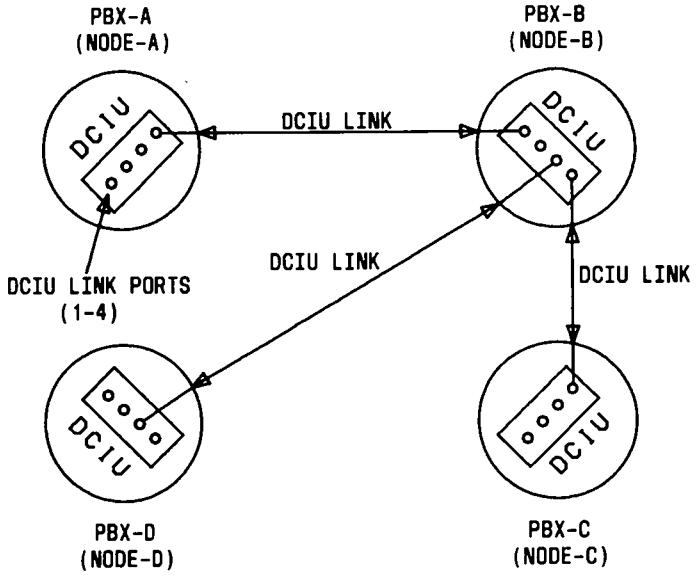
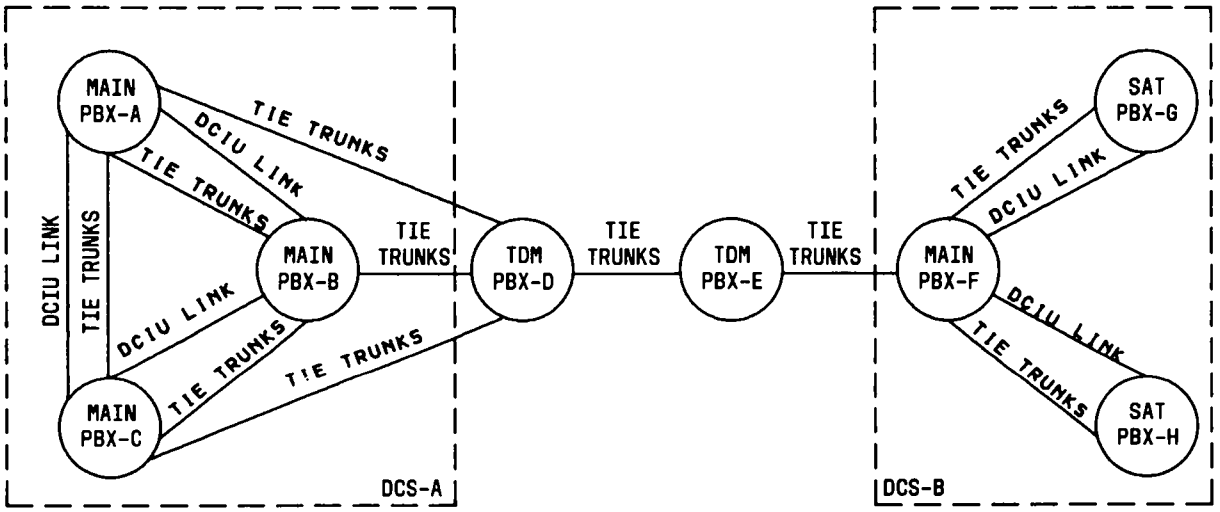


Fig. 28—DCS DCIU Link Configuration



NOTE: FEATURE TRANSPARENCY DOES NOT EXIST BETWEEN DCS-A AND DCS-B

Fig. 29—DCS Electronic Tandem Network Configuration

ELECTRONIC TANDEM NETWORK (ETN)

3.184 Electronic Tandem Networks are composed of:

- Tandem switches interconnected by intertandem tie trunks
- Main switches which home on tandem switches via access lines
- Satellite and tributory switches which home on main switches via tie lines.

Figure 30 is an example of a 3-node ETN. DIMENSION PBXs equipped with FP8 may be used as tandem, main, satellite or tributary switches in an ETN. An ETN configuration provides a means for uniform dialing (ie, Uniform Numbering Plan feature) from any station on the network.

EMERGENCY ACCESS TO ATTENDANT

3.185 This feature provides priority handling of emergency calls from stations to attendant. Emergency Access can be effected by dialing a 1- or 2-digit code from any station and/or by assigning Emergency Access to manual originating lines. A station user is connected to a vacant attendant loop. The priority call waiting lamp is lit, a special SOS audible tone is sounded, and EMRG is displayed at the idle console. If all loops are busy, the call is placed in an emergency priority queue and the priority lamps and SOS tones are activated at all consoles. When a position becomes idle, the emergency indications continue only at the idle console until the call is answered.

ENERGY COMMUNICATIONS SERVICE (ECS)

3.186 This feature allows the DIMENSION PBX to control energy consuming devices throughout a hospital or lodging complex. Audio signals are sent over the telephone wiring to control power unit consumption in the hotel/motel or hospital facility. This feature is designed to use existing telephone wiring whenever possible. A separate interface unit

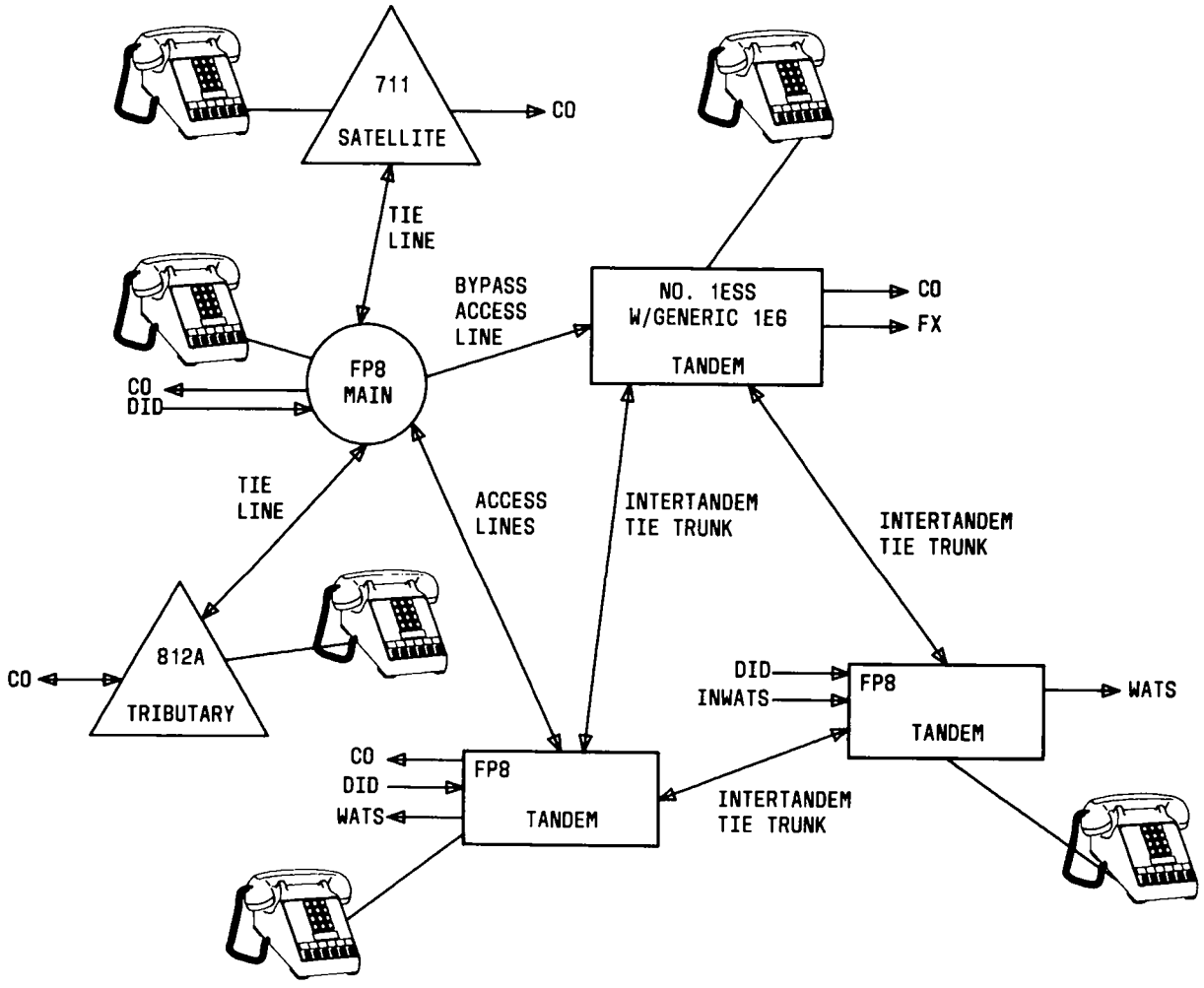


Fig. 30—Example of a 3-Node Electronic Tandem Network

is required for each power unit controlled. The control modes include:

- Guest room load/vacant room control
- Guest room load/load cycling control
- Individual load/time-of-day control
- Individual load/load cycling control
- Peak demand load shedding
- Energy consumption and demand monitoring.

3.187 The following enhancements have been incorporated into this feature:

- ***8-Day Clock:*** Allows the ECS operator to create a schedule for setting up load usage on a daily basis. This enhancement includes an eighth day to be used for scheduling holiday load usage.
- ***Generic Wording:*** When the generic wording option is ordered, all occurrences of non-generic nomenclature will be replaced with new terminology. The primary change will be to use the word "station" to replace all occurrences of the words "guest room" (Hospitality) or "patient room" (Hospital).
- ***Individual Power Meter Reporting:*** Individual power meter reporting will give the ECS operator a display of the current demand (updated every minute) for each of the individual meters. This display will be added to the screen for the base procedure.
- ***Energy Control Alarm Printing:*** Alarm printing will give the ECS operator the capability to print a list of the alarms at any time. The memory used to store ECS alarms will hold 42 alarms in memory. If the number of alarms in memory ever reaches 35, a list will be printed automatically, and then the printed alarms will be cleared from memory.

3.188 Further technical information and detailed application notes helpful for system implementation are available in Section 554-010-103.

ENERGY COMMUNICATIONS SERVICE ADJUNCT (ECSA)

3.189 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.

3.190 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 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.

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

3.192 Additional information concerning the ECSA can be found in System Description Section 554-106-100 and Preinstallation and Planning Section 554-106-101.

ENHANCED PRIVATE SWITCHED COMMUNICATIONS SERVICE (EPSCS)

3.193 ▮This service provides the private switching network that interfaces with the Advance Private Line Termination (APLT) feature in the PBX. The APLT trunks may be served by a common control switching arrangement (CCSA); however, APLT would not be provided the enhanced services

of EPSCS. Trunks from the EPSCS switching network can tandem through the PBX without assistance from the attendant (if the network has the Tandem Tie Trunk Switching feature). When off-net access is provided by the network, selected station lines can be denied off-net access.◀

ENHANCED UNIFORM CALL DISTRIBUTION (EUCD)

3.194 ▶This feature, provided in Issue 3 of FP8, replaces the function of Uniform Call Distribution (UCD) and Direct Department Calling (DDC) feature provided in Issue 1 of FP8/FP12. It is equivalent to the Automatic Call Distribution feature in FP8, Issue 2, except that the Performance Reporting Option 150/500 is not available. This feature permits incoming Direct Inward Dialed (DID), central office (CO), foreign exchange (FX), tie trunk, and 800 Service calls as well as local station and attendant extended calls to be terminated directly to the next idle of a prearranged group of answering positions (referred to as a split). The answering positions appear as normal stations to the PBX and can function in the normal manner to originate and receive calls directly. The Force Administration Data System (FADS) display that was provided with UCD is not compatible with Issue 3 of FP8.◀

EXECUTIVE OVERRIDE

3.195 The station user can enter an existing 2-party busy station connection. Before the add-on is established, a nominal 4-second burst of tone is applied to advise all parties involved.

3.196 An ECTS station user can activate Executive Override by pressing the assigned button upon hearing a busy signal when calling another station. The status lamp remains illuminated until one of the original parties hangs up.

EXTENDED MEMORY HOLDOVER

3.197 This is an optional hardware arrangement provided with FP9/FP11. It replaces the standard 90-second holdover battery associated with each J87432D power supply with a hotel/motel or hospital battery cabinet containing low-maintenance lead-acid batteries and charging units. Eight hours of memory holdover are provided by this arrangement. (System holdover is not provided by this arrangement.) This option is highly desirable in FP9/FP11 systems using the billing or room status features since a loss of the information stored in the PBX control memory would require significant effort to restore.

FACILITIES ADMINISTRATION AND CONTROL

3.198 This feature is provided in connection with the CACS and CAP. The customer can administer the assignment of parameters which determine user calling privileges, such as Facility Restriction Levels and Authorization Codes. Manual control (override) of time-of-day routing is provided. Activation and deactivation of trunk group queues are also provided.

FACILITIES ASSURANCE REPORTS

3.199 This feature is provided in connection with the CACS. The customer can obtain an audit trail of the referrals generated by Automatic Circuit Assurance features. The audit trail indicates the identity of the trunk circuit, time of referral, nature of the referral (ie, short holding time failure or long holding time failure) and whether a test was performed by the PBX attendant in response to the referral.

FACILITY RESTRICTION LEVEL (FRL)

3.200 An FRL is a parameter associated with each authorization code, station line, incoming tie trunk group, remote access trunk, and attendant console positions (as a group). The FRL is used to determine if a call attempt is permitted as well as which routes are to be used or denied in the process of routing calls via Automatic Alternate Routing (AAR), Automatic Route Selection (ARS), or Automatic Route Selection—Deluxe (ARS—deluxe). There are up to eight levels of calling privileges to be specified by the customer. When the FRL of the calling party is transmitted over an intertandem tie trunk to a distant PBX, it is called traveling class mark (TCM).

FIVE-DIGIT DIALING

3.201 ▶This feature provides a means for stations to call other stations in the same PBX in or a different PBX using five digits without dialing an access code or pausing for dial tone between digits. The Five-Digit Dialing plan can be used to accommodate large multiple PBX switch complexes such as a Distributed Communication System (DCS) or an ETS network. Small PBX configurations can still use a 4-

digit plan; however 4-digit and 5-digit dial plans cannot be intermixed. The 5-digit call processing capability in a DCS environment, for example, will allow a station user to acccess any other station on any switch in the DCS. No dial access codes or intervening dial tones are required. To the station user, the calling procedures are the same as those on a single system.

2.02 When Five-Digit Dialing is used in a DCS, the first two digits of a 5-digit number must uniquely identify a single PBX within the DCS cluster. The digit "0" may not be used as the first or second digit for station numbers. In addition, the first digit of a 5-digit number series must be the same for all stations in a given DCS cluster node.

3.203 Attendant Consoles, capable of displaying the Five-Digit Dialing codes are required to support configurations using Five-Digit Dialing.◀

FLEXIBLE NUMBERING OF STATIONS

3.204 Station numbers can be assigned to lines at the time of installation in accordance with a customer-desired numbering plan and can be reassigned while in service to permit personnel moves without requiring number changes. Station number assignments can begin with any digit except *, #, and 0 but must be fixed in length at two, three, or four digits in the same installation. The same first digit cannot be used for both station numbers and trunk or feature access codes. Moreover, the same first digit can be used for trunk access and feature access codes where all codes starting with that first digit always have the same number of digits (two or three).

FLEXIBLE NUMBERING OF STATIONS—MIXED NUMBERING

3.205 Station numbers can be assigned to lines at the time of installation in accordance with a customer-desired numbering plan and can be reassigned while in service to permit personnel moves without requiring number changes. Station number assignments can begin with any digit except *, #, or 0 and can vary in length from one to four digits within the same installation. Conflicts that result from the use of the same first digit for different length station numbers can be resolved with time-out, an end-of-dialing code (with TOUCH-TONE dialing), or by use of a prefix digit for multidigit station numbers. To avoid time-out, a different prefix code can be used for different length station number series. The same first digit can be used for trunk and feature access codes. Mixed numbering allows mixing of station and trunk feature codes using the same first digit and also the same number of digits (unassigned codes). The numbering plan capabilities have been expanded to allow the use of digit 8 or 9 as the first digit in the station numbering plan. These initial digits can continue to be used as single-digit trunk access codes and/or feature access codes. This change eliminates the need for prefix dialing on station-to-station calls by providing time-out capability. The feature provides 4-digit hotel/motel numbering plan capability.

3.206 The following improvements have been incorporated in this feature since its introduction in DIMENSION PBX systems:

- Any digit assigned as a single-digit trunk access code may also be used for assignment as the first digit of multidigit room station numbers (eg, digit 8 or 9). Time-out or end-of-dialing code is required after the first digit in order to resolve trunk access codes and station numbers.

- Unassigned 2- or 3-digit numbers in a station numbering series can be used as trunk access or feature access codes. A dial 0 may be assigned as the attendant access code and dial 0X or 0XX as feature or trunk access codes.

- All lines which receive Direct Inward Dialing (DID) calls can be fixed at 3- or 4-digit numbering plans in an installation. These lines may also be accessed by single- or 2-digit numbers for internal dialing.

Note: These additional capabilities are required for hotel/motel installations having more than seven floors to eliminate the need for an access code when using room-to-room dialing.

FORCE ADMINISTRATION DATA SYSTEM (FADS)

3.207 The FADS feature provides for display of Centralized Attendant Service (CAS) and/or Uniform Call Distribution (UCD) traffic data. Access to the data is via one or more FADS display terminals. Each terminal consists of two light-emitting

diode (LED) display fields and a TOUCH-TONE telephone dial pad. Only one terminal is allowed for CAS traffic studies while a maximum of 12 terminals may be provided for UCD group traffic studies (one terminal per group). Optionally, a printer can be provided with each terminal to obtain a hard-copy printout of the traffic data. ◗FADS is not available in FP8, Issue 2 or 3. It is available in Issue 1.◖

3.208 The FADS hardware arrangement is used to display CAS force administration data for integrated (main PBX) attendant concentration applications. Force administration data is made available at a main location by both visual and printed displays. Each FADS (one per system) requires one dedicated low-speed data channel and consists of four hardware items as follows:

- 211A power unit
- KS-19252, List 7 adapter
- ADDMASTER* 9042-2 printer (optional)
- 102F1-A inquiry display unit (CAS applications only)
- 102G1-A inquiry display unit (UCD applications only).

3.209 Figure 31 depicts the 102F1-A display unit.

FOREIGN EXCHANGE (FX) CENTRAL OFFICE (CO) ACCESS

3.210 This feature provides access to a distant CO via FX trunks. All incoming calls to the PBX (from the FX CO area) are placed to the listed FX directory number and are answered by the attendant similar to Listed Directory Number (LDN) service. Outgoing calls are made on an attendant-handled basis via direct or dial access and/or on a dial basis by stations (through use of a trunk access code).

3.211 ◗***With Voice Switched Gain (VSG):*** The VSG provides a means of inserting gain in the transmission path when end-to-end loss significantly degrades transmission quality. The VSG may be provided on incoming attendant completing trunks when the incoming call is extended to an outgoing trunk. The VSG is never used on an outgoing call via a foreign exchange (FX) trunk.◖

*Registered trademark of Addmaster Corp.

FULLY RESTRICTED STATION

3.212 Selected station lines are denied the ability to place or receive any but station-to-station calls. The DID calls are routed to the attendant or an announcement. Common Control Switching Arrangement (CCSA) and Electronic Tandem Network (ETN) calls are routed to the attendant, to an announcement, or to intercept tone, depending on the option selected. All other restricted calls are routed to intercept tone.

HOSPITAL/LODGING NOMENCLATURE

3.213 This ordering option allows the use of FP9 or FP11 for either hotel or hospital applications on a system basis. The appropriate console designations, alphanumeric display wording, and printout wording are provided for the intended application.

HOT-LINE SERVICE

3.214 This feature allows a station user on the PBX system to place a call to a preassigned called number automatically when the station user goes off-hook. The hot-line station can receive calls normally. Hot-line calls can be directed to stations, exchange trunks, Advanced Private Line Termination (APLT) trunks, and internal miscellaneous trunks such as Loudspeaker Paging. A maximum of 30 lines can have this service. Up to 14 digits can be automatically dialed. Trunk signaling (eg, wink-start), if required, is automatically handled.

HOTEL/MOTEL OR HOSPITAL CONSOLE/TERMINAL

3.215 The PBX system Attendant Console, modified to include an additional 4-digit alphanumeric field and additional feature keys, is provided as input/output terminals to access and control various hotel/motel or hospital management features. The features accessed and controlled include: Automatic Wakeup Service, Controlled Restriction, Interface for Long Distance Billing, Message Waiting, Local Call Billing, and Room Status. The Attendant Console/Terminal also provides all of the normal Attendant Console functions. In smaller installations, the Attendant Console/Terminal can serve both as the PBX attendant console and as the front desk terminal. In larger installations, separate Attendant Console/Terminals for the PBX attendant and station console/terminals for the front desk (including separate cashier and front office manager) may be provided.

Fig. 31—FADS Display Unit (102F1-A) for CAS Applications

INDIALING THROUGH MAIN

3.216 The Indialing Through Main feature is a feature of the main/satellite configuration. Calls destined for a satellite PBX on a Direct Inward Dialing (DID) or Network Inward Dialing (NID) basis are automatically switched by the main over a tie trunk to the called satellite PBX. The satellite PBX completes the call to the appropriate station.

INCOMING CALL IDENTIFICATION (ICI)

3.217 An attendant at a switched loop console position can visually identify the type of service or trunk group associated with a call directed to that position. The visual indication can be provided via indicator lamps or via the alphanumeric display feature. When provided via indicator lamps, up to six incoming call indicators can be provided on the console. ▶When provided via the alphanumeric display, up to 30 ICI indications (per PBX in a DCS) can be provided in a 4-position field. With a DCS (FP8, Issue

3), calls to the attendant from another PBX in the DCS will display the ICI assigned to the trunk group in the other PBX.

INTER-PBX CALL TRANSFER

3.218 The Inter-PBX Call Transfer feature is a feature of the main/satellite configuration. An incoming CO call to a main PBX or a satellite PBX may be put in a Threeway Conference mode. In addition, an incoming CO call to a main PBX may be transferred over a tie trunk to a satellite PBX station, and an incoming CO call to a satellite PBX may be transferred over a tie trunk to a main PBX station. The transfer of calls to trunks is permitted when disconnect supervision can be guaranteed. Otherwise, such connections must be limited to Threeway Conference. The conference/transfer operation may be under attendant control or station dial control, depending on options within the main/satellite switching systems.

INTER-PBX COORDINATED STATION NUMBERING

3.219 This is a feature of main/satellite configurations and, in certain instances, may be provided with main/tributary configurations. Stations at the main and satellite may dial each other without intervening dial tone. The dialing plan for an inter-PBX call is the same as for an intra-PBX (station-to-station) call. In a switching arrangement where the main PBX provides access lines to a private network, such as APLT, stations at the satellite or tributary may access that network by dialing a single access code. This requires that the satellite or tributary be a DIMENSION FP8 PBX.

INTERCEPT TREATMENT

3.220 Calls which cannot be completed are routed to an appropriate audible signal, recorded announcement, or to the attendant depending on the type of call. These treatments are as follows:

A. Attendant Intercept

3.221 Certain calls that cannot be completed are routed to the attendant position for further treatment. Direct inward dialed calls so routed are given normal charging treatment.

B. Intercept Tone

3.222 This treatment provides a continuous tone alternating between a low pitch (440 Hz) and a high pitch (620 Hz) indicating that a restricted or unassigned code has been dialed or that a special service has been denied.

C. Recorded Announcement Intercept

3.223 Intercepted calls are routed to a recorded message which indicates the reason the call was intercepted. This intercept treatment is provided as an alternative to attendant intercept for DID, ETN, and APLT trunk calls only as a system option. Only one message can be given. No answer supervision is provided for this type of intercept treatment.

INTERFACE FOR LONG DISTANCE BILLING

3.224 This feature allows selected long distance billing information transmitted to the hotel via Traffic Service Position System (TSPS) Auto-Quote data channel to be stored in the DIMENSION PBX memory. This information can be displayed on the console/terminal or printed on demand and on checkout giving up-to-the-minute billing on calls placed by the guests. Taxes (federal, state, and local) are automatically calculated. The TSPS message number and the total calculated dollar amount are stored and displayed for each guest call to allow posting the charge and to serve as a tracer to the original TSPS message.

3.225 To accumulate system totals of all long distance calls, charges are also stored in memory and can be provided or cleared on demand. One total includes all TSPS/HOBIC (hotel billing information center) charges; the other total includes all taxes and intrastate surcharges as billed to the guests.

INTERFACE TO NETWORK CONTROL OPERATIONS SUPPORT SYSTEM (NCOSS)—LOCAL STORAGE UNIT (LSU)

3.226 This feature provides a connection with an LSU which is accessed by the NCOSS and/or the Centralized Station Message Detail Recording (CSMDR) system. The LSU stores SMDR data which is polled periodically by a central unit. The LSU is used on a temporary basis while private network studies are being conducted with NCOSS. The LSU is used on a permanent basis with CSMDR.

INTERPOSITION CALLING AND TRANSFER

3.227 An attendant at one attendant position of a multiposition attendant team can call an at-

tendant at another position of the same team for consultation. The attendant can also transfer a call to another attendant position of the same team for special handling. This is used where certain positions are equipped, or at least assigned, to handle certain kinds of calls (such as conference, WATS access, or internal directory assistance). As an option, access codes to allow station dial access to individual positions can be provided.

INWARD RESTRICTION

3.228 Selected station lines are prevented from receiving incoming exchange network calls, ETN calls, and APLT calls, either DID or attendant-completed. Attendant-completed calls are routed to intercept tone. The DID calls are routed to the attendant or to a recorded announcement.

JOURNAL PRINTERS

3.229 This feature provides hard-copy paper printers for audit trail and demand printing functions associated with the hospital/lodging management features. The feature applications using printers are:

(a) Audit Trail

- Long distance billing TSPS message
- Local call billing audit
- Wakeup activity audit
- Maid status
- Needs cleaning audit
- Energy communications restriction
- Emergency access.

(b) Demand

- Billing for front desk/cashier
- Housekeeper printer
- Room status for front desk/cashier
- Energy communications reports
- Property Management System (PMS) audit printer.

LEAVE-WORD CALLING (LWC)

3.230 ▶The LWC feature allows a caller to leave a predefined "canned" message for the called party. By using a feature button on a multibutton electronic telephone (MET) set, or by dialing an access code (non-MET set) the LWC feature creates a message containing the calling party identification, date, time, and a message to call the calling party. The message is created and stored in the Message Center data base without the participation of a covering station user. The subscriber for whom the message is intended then retrieves messages by calling the Message Center directly. Leave-Word Calling messages may be cancelled by the caller before they are retrieved. Leave-Word Calling requires the Message Center Service feature since both features use the same data base. If more than one message is sent from a given caller, a count will be maintained and only the last message will be stored. These messages are integrated with Message Center messages so that any access to the Message Center will retrieve all the messages, including the LWC messages.

3.231 Whenever a LWC or Message Center message is waiting, the message waiting indicator on the station set lights as a result of the Automatic Message Waiting feature. This indicates messages are available in the Message Center for the subscriber.◀

LINE LOCKOUT WITH WARNING

3.232 This feature provides 10 seconds of warning tone and then holds the line out of service when a station line remains off-hook for longer than 10 seconds without dialing or after the last digit dialed during call origination. The hold out-of-service condition does not tie up switching facilities or call processing time; therefore, it is released when the station goes on-hook.

LISTED DIRECTORY NUMBER (LDN) SERVICE

3.233 Incoming exchange network calls to the PBX via the assigned listed local telephone directory number are directed to the attendant. The attendant may complete these calls to station lines within the system or certain trunk facilities. When Direct Inward Dialing is not provided, all incoming exchange network calls must be made on an LDN basis. Listed numbers are provided for CO trunks (DID and non-DID), Advanced Private Line Termination (APLT), and tie trunk calls.

LOCAL CALL BILLING

3.234 This feature computes the dollar amount for local calls placed by guests based on the total message units stored for each guest room/bed telephone via the local call billing rate parameter. This billing information integrated with the long distance charge information can be displayed or printed on demand and on checkout. Accumulative system (house) totals of local call message units, calls, and dollars of posted charges may be provided to facilitate accounting.

3.235 A printout can be obtained from a shared or dedicated journal printer. In either case, if an overload should occur, the load may be shared by a designated alternate printer.

LOUDSPEAKER PAGING

3.236 ***Basic:*** This feature allows the attendant direct access and station users dial access to paging equipment for the purpose of voice paging. The paging amplifiers and speakers may be either customer owned or telephone company provided. 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's complex. Dial access to all-zone paging is included when multizone paging is provided. Direct access (console key) to all-zone paging is optional.

3.237 ***Deluxe:*** This feature allows the attendant direct access and both attendant and station users dial access to paging equipment for the purpose of voice paging. The paging amplifiers and speakers may be either customer-owned or telephone company provided. 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 and/or all zones within a customer's complex. Page answer capability is provided to allow the paged party to be connected to the calling party by dialing an answer code from any station within the PBX. Priority paging is provided to permit attendants and/or designated stations to dial access a paging zone or answer-back channel and preempt any station user connected to that zone or channel. Stations assigned with Threeway Conference Transfer may also access paging while on any 2-party call. The second party can be added on or transferred to the page answer party but not to the paging input.

3.238 ***With Tie Trunk Access Allowed:*** Tie Trunk Access to paging and answer-back equipment is a feature enhancement. The paging party at the remote PBX dials the Tie Trunk Access code to access the DIMENSION PBX. Upon receiving DIMENSION PBX dial tone, the paging party accesses and uses Loudspeaker Paging in exactly the same way as a paging party at the DIMENSION PBX, except that the DIMENSION PBX does not recognize a flash over a tie trunk to release the paging equipment after making the announcement.

MAIN/SATELLITE

3.239 The Main/Satellite feature allows multilocation PBX customers to concentrate their attendant positions at one location referred to as the main. Other unattended locations equipped only with dial switching equipment are referred to as satellites. A minimum of one and a maximum of three Listed Directory Numbers (LDNs) may be provided per complex, and all central office (CO) calls are routed through the main (with or without Direct Inward Dialing).

3.240 A DIMENSION PBX FP8 system may function simultaneously as a main PBX (in a Main/Satellite complex) and a tandem PBX (within an electronic tandem network).

MAIN/TRIBUTARY

3.241 The Main/Tributory function permits a multilocation customer to consolidate Tie Trunk Access facilities (eg, APLT) at a single location designated the ***main.*** A tributary is a PBX which reaches a tandem on an Electronic Tandem Network (ETN) by going through a main (main/tributary). It is attended and may or may not have a coordinated numbering plan with the main. For ETN calls, a separate RNX is assigned to tributaries while satellites share an RNX with the main.

MALICIOUS CALL TRACE

3.242 This feature allows a user to trace a call originating within the PBX system or be-

yond. The feature is to be used when a call is determined to be malicious (ie, obscene, a bomb threat, etc).

3.243 After the feature has been activated from an ECTS set, a 500/2500 set, or an Attendant Console, all facilities associated with the call are locked up except for the called station. Pertinent information about the connection is placed into a queue to be displayed to the attendant upon request. The attendant controls the feature, gathers the needed information, and deactivates the feature.◀

MANUAL ORIGINATING LINE SERVICE

3.244 These station lines are arranged to automatically route to the attendant position for completion when the station user goes off-hook for service. Dial tone is not provided to these lines, and all originating connections are made by the attendant. Terminating connections can be dialed directly to a manual line.

MANUAL TERMINATING LINE SERVICE

3.245 Calls to these station lines require completion by the attendant. Nonattendant-handled calls to these lines are routed to intercept tone. Common Control Switching Arrangement (CCSA) and ETN calls are routed to the attendant, to an announcement, or to intercept tone, depending on the option selected. The DID calls are routed to the attendant or to a recorded announcement. Originating calls are dialed in the normal manner.

MESSAGE CENTER SERVICE

3.246 ▶This feature which is provided by Issue 3 of FP8 allows a pool of agents, or operators, at a Message Center to provide a video terminal based answering service for subscribing station users. All Message Center calls are channeled to the agent pool through a designated Enhanced Uniform Call Distribution (EUCD) queue. When a call is not answered immediately by an agent, the call awaits distribution in the EUCD queue. The caller hears a recorded announcement and optional background music until the agent answers.

3.247 Agents in the Message Center can retrieve messages as well as answer calls. Agents answering calls can identify the subscriber to the caller, inform callers of any messages that subscribers have left for them, and retain messages callers leave for subscribers by entering them at the video terminal, and subsequently saving them on the Message Center data base.

3.248 A message-waiting lamp lights at the subscriber's telephone when there is a message. Subscribers may call the Message Center directly to retrieve messages. The agent can add, delete, or change any message the subscriber designates for incoming callers. The agent can also step through the subscriber's messages sequentially and read, retain, or delete them. Each message displayed on the agent's terminal will be one of two types: those activated by callers through the Leave-Word Calling feature, or those entered by Message Center agents at a terminal.◀

MESSAGE WAITING SERVICE

3.249 This feature provides the ability to light a lamp remotely (from a central location) on a station set served by the PBX to indicate that a message is waiting for the station user. The lamp can be activated from the hotel/motel or hospital console/terminal via the ADSS/busy lamp field.

> ***Note:*** 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 registerd under the Private Line Service provisions of the FCC Rules (Part 68).

MISCELLANEOUS TRUNK RESTRICTION

3.250 Preselected station lines (and dial repeating tie trunks) are denied access to preselected miscellaneous trunk groups that may include FX, WATS, APLT, tie trunk, and auxiliary trunks. Restricted call attempts are given intercept tone.

MULTIPLE LISTED DIRECTORY NUMBERS

3.251 More than one CO Listed Directory Number (LDN) can be associated with an installation. Each LDN can be assigned a unique incoming call indication on the console. With non-DID service, a separate trunk group is required for each LDN on which a unique Incoming Call Identification (ICI) is desired.

MUSIC-ON-HOLD ACCESS

3.252 This feature provides customer-furnished music or other audible indication to the held

party during the hold interval. The held call condition can be the result of attendant Hold, Call Hold, or Threeway Conference Transfer hold, or the hold associated with other similar features.

NIGHT CONSOLE POSITION

3.253 This feature provides an alternate attendant position which can be used at night in lieu of the regular attendant position(s) to answer all calls directed to the attendant. This position provides all of the regular attendant functions.

NIGHT STATION SERVICE

3.254 ***Fixed Service:*** Arrangements are provided to route calls, normally directed to the attendant, to a preselected common station line within the system when Night Station Service is activated. In addition, incoming calls from specific non-DID exchange network trunks can be arranged to route to specific station lines. The routings are provided on a fixed basis by the telephone company at the time of order or via the Maintenance and Administration Panel (MAAP). Trunk Answer From Any Station, when included in the feature generic, may also be provided for night calls not assigned to or that cannot be answered by night stations.

3.255 ***Full Service:*** Arrangements are provided to route calls, normally directed to the attendant, to a preselected common station line within the system when Night Station Service is activated. In addition, incoming calls from specific non-DID exchange network trunks can be arranged to route to specific station lines. The routings can be assigned on a flexible basis by the attendant and remain in effect night-to-night until changed. A default common night station is assigned by the telephone company at the time of order or via the MAAP which is used in the event of a power failure that causes loss of memory. Trunk Answer From Any Station answering capability is provided for night calls not assigned to, or that cannot be answered by, night stations. When in Night Station Service, all stations have Threeway Conference Transfer capability for transferring calls to other stations and Call Waiting Service (if provided with the feature package) for night calls.

OFF-PREMISES STATIONS (OPS)

3.256 This feature provides service between the PBX and a PBX station where the station is located some distance from the PBX premises.

3.257 ***With Call Control:*** This feature provides access to the PBX by special off-premises extensions. Station Message Detail Recording (SMDR) can be provided on all calls to and from these stations. Transmission level for a call to another station on the same PBX is approximately 5 dB higher on these stations than on regular off-premises stations. The PBX features available to users of the special off-premises extension are those features available to incoming dial repeating tie trunk users.

3.258 Off-premises stations with call control may be of the TOUCH-TONE dialing type or of the rotary dialing type. Station groups with call control have a unique location code (RNX) where R can be any digit from 2 through 9 less any reserved digits, N can be any digit from 2 through 9, and X can be any digit from 0 through 9. Stations within the unique RNX code are not permitted the usual on-network station features—ie, Call Forwarding, Speed Calling, etc. Each group consumes one Automatic Alternate Routing (AAR) pattern and one trunk group. The group(s) may require authorization codes on originating calls as well as terminating calls. The SMDR records may be obtained on both originating and terminating calls. The signal level at the special OPS interface circuit (LC361) is 5 dB greater than that for an LC02, thus allowing longer loop lengths without the application of repeaters.

ORIGINATION RESTRICTION

3.259 A station line with this restriction cannot be used to originate calls at any time. Attempted origination is given line lockout with warning tone (10 seconds of intercept tone) treatment. Terminating calls, however, are completed normally to this station line.

OUTGOING TRUNK QUEUING

3.260 This feature provides a means to station users of dialing a busy outgoing trunk group, to be automatically placed in a queue, and to be called back when a trunk in the group is available. If the trunk group is part of a route advance group, the route advance sequence is checked before queuing is activated. A particular limit on the number of stations that can be waiting in queue for each group can be set for a particular customer. Any request received after that limit is reached causes the station user to hear reorder tone.

OUTWARD RESTRICTION

3.261 Preselected station lines within the PBX are denied the ability to access the exchange network without the assistance of the attendant. Restricted calls are routed to intercept tone.

PACKAGED METALLIC FACILITY TERMINAL ASSEMBLY (PMFTA)

3.362 ▶The PMFTA is a circuit pack mounting assembly designed for small groups of metallic facility terminal (MFT) plug-ins. The PMFTA is a self-contained arrangement including an associated power supply and interface terminal connectors. In order to meet FCC requirements, MFT equipment should be physically located separately from the PBX and electrically located on the network side of the RJ21X registration jack. Additional information on the PMFTA is available in Section 332-610-101.◀

PERIPHERAL INTERFACE CIRCUIT (PIC)

3.263 The PIC (Fig. 32) is a general purpose, programmable interface unit. It may be used in FP9 or FP11 hotel/motel or hospital installations as the Communication Interface for Property Management System (CIPMS), as the interface to printers, with the Energy Communications Service cathode-ray tube (CRT), and with Traffic Service Position System (TSPS) data sets.

3.264 The PIC is a unit consisting of a controller which converts bipolar signals from the PBX into the Electronic Industries Association (EIA) RS-232C compatible form for use with an I/O peripheral. Physically, the unit contains an internal regulated power supply, an LC34-/LC366-type 4-wire data channel, two 25-pin EIA serial data connectors (both male and female), and a microprocessor-controlled interface board. All are mounted in a modified 4800-type data set equipment housing.

3.265 The PIC connects to an LC34-/LC366-type circuit pack which is located in the common control cabinet of the PBX. It receives/transmits serial 17-bit words in bipolar signal format. Each PIC has two EIA I/O connectors. The PIC has an internal baud rate generator which controls the rate at which data is transferred between peripheral equipment and the PIC. The transfer of data is in the full-duplex mode, asynchronous, and in ASCII (American Standard Code for Information Interchange) code. The customer may select one of the following baud rates to match his peripheral (Property Management System):

- 9600
- 2400
- 1200
- 300
- 110.

3.266 Additional information on the PIC is available in Section 554-010-102.

POWER FAILURE TRANSFER

3.267 This feature provides service to and/or from the exchange network (non-FX and WATS) for a limited number of prearranged stations during a power failure at a PBX customer location when reserve power is not provided or if battery reserve is provided when the reserve depletes. Incoming service is not available for Direct Inward Dialing. The power failure transfer stations must be equipped with a ground-start button to originate calls when in power failure mode and equipped with a rotary dial when the central office accepts only rotary pulsing.

3.268 The use of one or more 609A emergency transfer panels is required, each of which provides for transfer of ten trunks. When a power failure occurs, each central office trunk is connected directly to the predesignated station line, bypassing the PBX network, and removing all restrictions and system features. This feature is enabled also as an emergency transfer under certain major alarm conditions such as processor failure.

3.269 The Electronic Custom Telephone Service (ECTS) stations can also be arranged to act as power failure transfer stations with the addition of an auxiliary ringer adjunct to the station tip and ring for incoming calls.

PRIVACY AND LOCKOUT

3.270 Privacy automatically splits the connection whenever an attendant would otherwise be bridged on a call with more than one facility (eg, with both a calling and a called party). Attendant Lockout

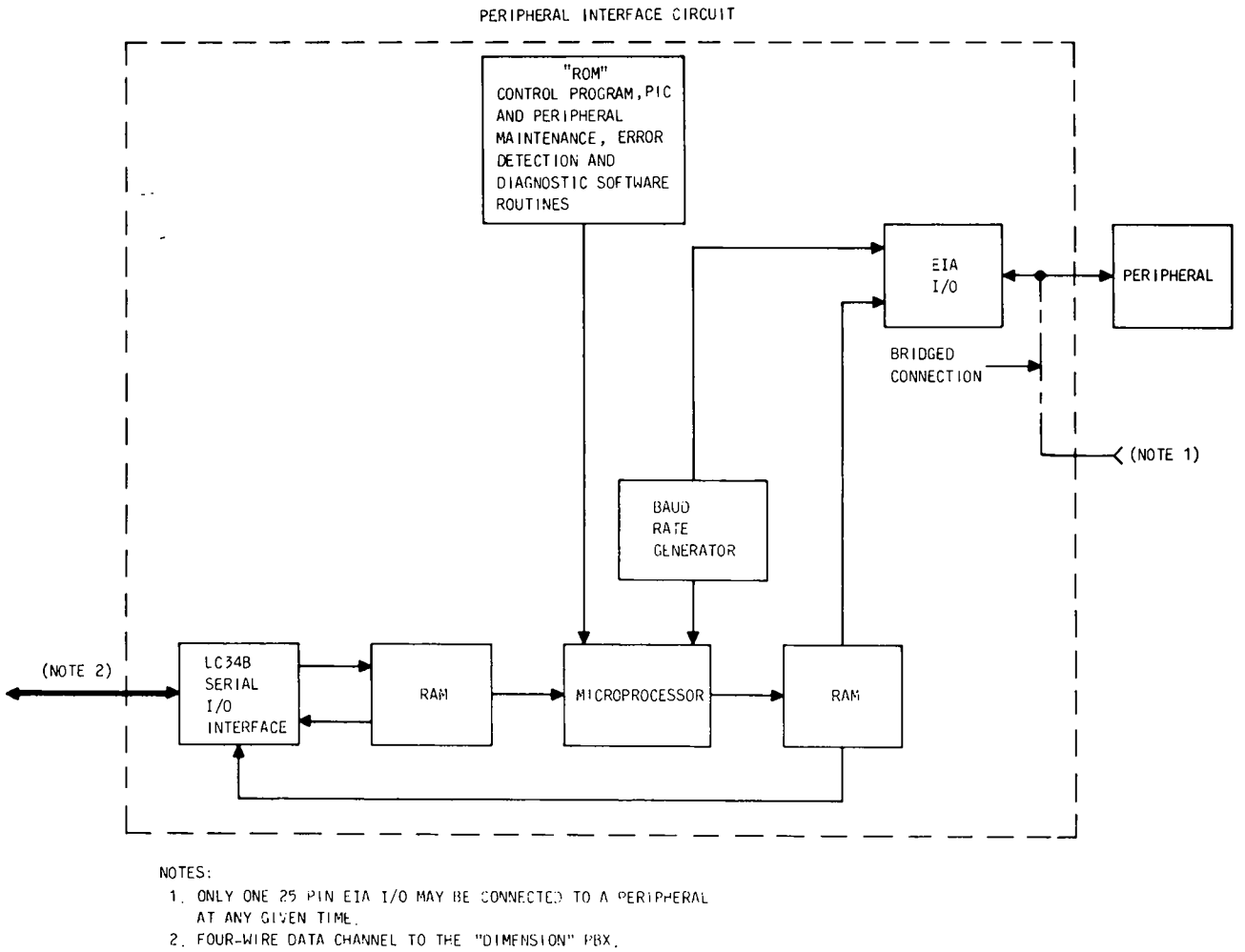


Fig. 32—Peripheral Interface Circuit (PIC)—Functional Block Diagram

denies an attendant the ability to reenter an established connection held on the console position, unless recalled by a station. When privacy is provided, the Attendant Lockout feature is also provided.

RADIO PAGING ACCESS

3.271 This feature provides attendant and station users dial access to customer-owned radio paging equipment to selectively tone-alert or voice-page individuals carrying pocket radio receivers.

3.272 Two originating ports and two answer-back ports (two LC08D circuit packs or four dial CO trunk circuits) may be provided per radio paging unit. The maximum number of paging ports is limited by the number of dedicated trunks (LC08D circuits) and the number of alternate paging dial access codes. If the radio paging equipment is found busy, audible reorder tone is returned to the originating party.

RECALL DIAL TONE

3.273 This feature provides a means of indicating to the station user that the switchhook has been successfully used to generate a flash to request a service feature during an established call instead of having caused a reorigination to occur. The result of a successful use of the switchhook flash is three bursts of dial tone followed by steady dial tone. The result of a reorigination is steady dial tone. Dialing is not registered during the interrupted portion of Recall Dial Tone.

RECORDED ANNOUNCEMENT UNIT

3.274 The 13A announcement unit provides eight announcements (channels) per carrier, and stores digitized speech in magnetic bubble memory. The unit provides for fixed 12-second announcements or variable announcements which are adjustable in 3-second intervals to maximums of 12 or 24 seconds. The network interface is an LC13 auxiliary trunk, and the announcement unit mounts in an auxiliary cabinet.

RECORDED TELEPHONE DICTATION ACCESS

3.275 This feature permits access to and control of customer-owned dictating equipment by station users within the system. The start and stop functions of customer-owned telephone dictating equipment may be voice-controlled or dial-controlled. The record, playback, etc, functions are dial-controlled.

REMOTE ACCESS TO PBX SERVICES

3.276 This feature allows a user outside the DIMENSION PBX to access the PBX services via an exchange network or leased facilities connection. The user dials a preestablished number which establishes a connection to the PBX via the Message Telecommunications System (MTS), Foreign Exchange (FX), or 800 Service (Inward Wide Area Telecommunications Service). The user may then be required to dial a 4-digit barrier code, authorization code, or nothing, to access the PBX services. The user can then place any call as if the user were at a PBX station. This service can be arranged for Full, Outward, or Toll Restriction and/or can be denied access to miscellaneous trunk groups. All signaling is done using TOUCH-TONE dialing, and the barrier code (if used) is readily changed at the Attendant Console. The Authorization Codes (if used) can be changed by administrative procedures. Dedicated full-time or shared night-service-only trunk facilities can be used for providing this service.

A. With Time-Out to Attendant

3.277 When a call is received on a remote access trunk and dialing does not start within 10 seconds, the call is routed to an attendant or to a night station. This enables callers without a TOUCH-TONE telephone who know the remote access code to use the feature since the attendant or night station user can perform subsequent dialing (via TOUCH-TONE telephone).

B. With Authorization Codes

3.278 After the desired destination number is dialed, the PBX may request the user to dial an authorization code (optional), if one was not dialed to gain access to the system. If the user has an authorization code, that code defines the user's calling privileges.

3.279 If the Authorization Code feature is activated and the Remote Access Authorization Code is also enabled, the dialed digits input by the remote access user is an authorization code instead of a barrier code.

3.280 When a need for an FRL is determined, the value corresponding to the Authorization Code will be used without prompting for the code a second time.

3.281 If the Authorization Code is found to be invalid or if the FRL is not sufficient to complete an Automatic Alternate Routing (AAR) or Automatic Route Selection (ARS) call, intercept tone will be returned to the user.

3.282 The authorization code dialed will be written in the Station Message Detail Recording (SMDR) record.

3.283 If the Remote Access Authorization Code is not enabled, the attendant has the capability to modify the barrier code from the console. If authorization codes are used, the attendant loses this control capability.

3.284 When the Remote Access Authorization code is activated, the authorization code will always be entered regardless of the call destination.

C. With Voice Switched Gain

3.285 On direct-dialed remote access to PBX service calls to outgoing trunks, the voice switched gain amplifier in the PBX will automatically amplify the incoming signal by 15 dB if the incoming signal level is greater than −43 dB and less than −30 dB. Signals above that level are amplified to −15 dBm until a −15 dBm input level is reached, at which time the amplifier will be removed from the

circuit (no gain). Signals above −15 dBm should be passed without amplification or loss.

REMOTE MAINTENANCE, ADMINISTRATION, AND TRAFFIC SYSTEM (RMATS)

3.286 The RMATS is a telephone company system which provides the capability to remotely administer most features and restrictions on DIMENSION PBXs equipped with an RMATS interface. Through proper use of RMATS, most trouble conditions can be analyzed, verified, and corrective action taken.

3.287 The RMATS is a software-oriented system and is standard to all feature packages. It is primarily used to determine if a detailed traffic study is required. Traffic studies and structures may be flexibly administered in the PBX and automatically polled by the RMATS central facility. The RMATS dials the PBX via the Direct Distance Dialing (DDD) network (Fig. 33) and sends it a unique security access code. Accessed PBXs may be polled daily or at hourly intervals. Data collected from the PBX is summarized and made available in a variety of reports at the central facility. Raw data may be made available for external processing if desired.

3.288 Section 554-010-130 contains detailed information on RMATS interface operations and PBX wiring arrangements.

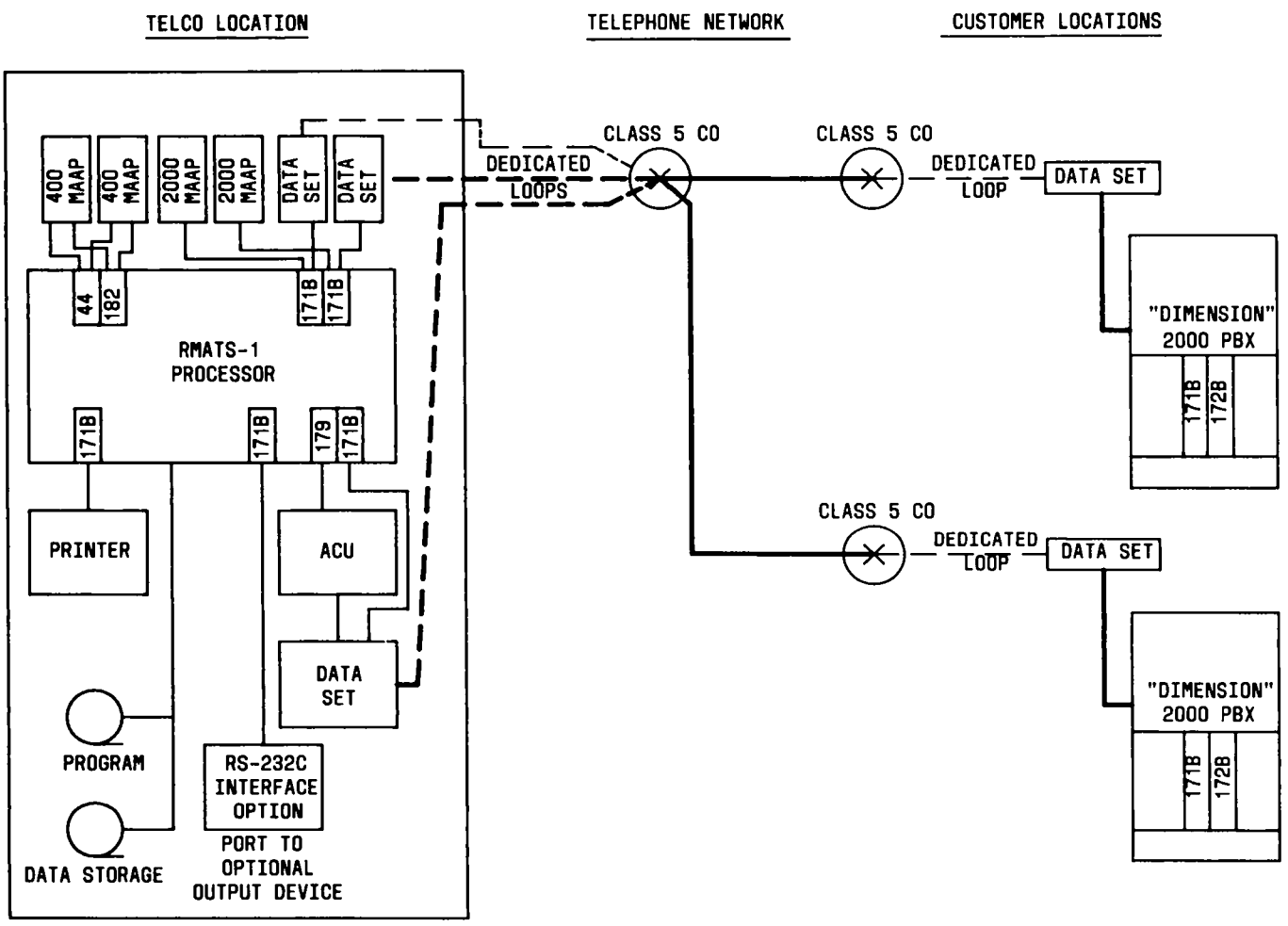


Fig. 33—RMATS—DIMENSION 2000 or Custom PBX—Hardware Interface

RESERVE POWER

3.289 This feature provides an alternate independent source of power to maintain PBX service for a limited time (normally 8 busy hours) during a power failure to the customer premises.

ROOM STATUS AND SELECTION

3.290 This feature provides the capability to store and display the occupancy and cleaning status and the type number of each guest room, facilitating housekeeping management, maid locating, and room selection. Also, communications between the front desk and the housekeeper is speeded up via real-time maid activity and checkout audit printouts to indicate which rooms need cleaning next. The occupancy status is changed automatically by changing status of the guest (ie, checking in or checking out of the room or changing rooms) on the console/terminal. Cleaning status is normally changed by the maid or inspector dialing from the room telephone. Capability on an optional basis is provided to detect occupied/vacant status discrepancies via maid dialing separate "clean—looks occupied" and "clean—looks vacant" codes.

A. Room Change/Swap

3.291 This arrangement provides a procedure, which is available from the console/terminal, that allows changing or swapping of rooms with the associated stored data, such as telephone charges, automatic wakeup messages, message waiting information, and assigned controlled restrictions. The room change procedure involves transfer from an occupied room, not in an audit mode, to a vacant room in a ready state. Room swap requires that both rooms be occupied and not in audit before swapping occurs. Alphanumeric displays on the console provide necessary information to the attendant for performing transfers. Rooms in audit are displayed as "AUDT" at the console/terminal if transfer of a room under audit is attempted and the change or swap is not executed.

B. Up/Down Room Search

3.292 The room search can be performed in either an ascending or descending direction when the lodging check-in or hospital admittance function is activated at the console/terminal. The direction of search can be changed at any time by the customer using a console/terminal procedure.

ROTARY DIAL CALLING

3.293 Dialing information from standard rotary dial station equipment is accepted. At a calling station, this feature utilizes a rotary device to generate dc pulses, representing either the address of the called facility or an instruction to a dial-controlled device. TOUCH-TONE dialing signals from station lines with rotary dial class of service are not accepted.

ROUTE ADVANCE

3.294 This feature routes outgoing calls over alternate facilities when the first choice trunk group is busy. The station user selects the first choice route by dialing the corresponding access code and the equipment automatically advances to alternate trunk groups. The digits following the access code must be identical for any of the trunk groups selected. The alternate groups may also be accessed by other codes. Up to ten route advance groups may be provided, each containing a maximum of five trunk groups.

SERIAL CALL

3.295 An attendant can complete an incoming trunk call to two or more station lines in succession without requiring the called station user(s) to recall the attendant. This feature is implemented through the use of the Two-Party Hold on Console feature.

SINGLE-DIGIT DIALING

3.296 This feature permits a station user to reach any of a preselected group of stations by dialing single-digit codes. Time-out is available in cases where the single digit used conflicts with the normal numbering plan.

SPEED CALLING

3.297 Station users can dial 2- or 3-digit codes to reach frequently called PBX stations or outside telephone numbers except International Direct Distance Dialing (IDDD) and tie trunk calls. These frequently called numbers and the associated entry numbers represent a list. Individual lists can be changed by the station line to which that list is assigned. Group lists are changeable via a designated station line within each group. Individual or group

lists can be changed via the MAAP, CAP, CACS, or RMATS.

3.298 ***Expanded Speed Calling For IDDD Numbers:*** The number of digits that can be entered into a speed calling entry list has been increased in Issue 3 of FP8 to accommodate up to 16-digit IDDD numbers. Previously, in Issue 1 of FP8, the maximum was 12 digits plus a dial access code (up to 3 digits). As a result, IDDD numbers could not be called using the Speed Calling feature. With Issue 3 of FP8, the dial access code (up to 3 digits), plus the IDDD numbers (011+3-digit country code + 10 digits) may be entered into a Speed Calling list and IDDD numbers can be called using the Speed Calling feature.

SPLIT ACCESS TO OUTGOING TRUNKS

3.299 Two separate trunk groups are provided for Direct Outward Dialing which can be accessed by dialing the same trunk access code. For example, administrative stations could be connected to a flat rate trunk group with guest stations connected to a measured rate trunk group.

SPLITTING—ONE-WAY AUTO/MANUAL

3.300 This feature allows an attendant to consult privately with one party on a call without the other party hearing. The split (allowing private consultation with the called party) goes into effect automatically when the attendant starts to complete a call, but the attendant can take positive action to unsplit or to reinstate a split condition.

STATION HUNTING

3.301 A call is routed to an idle station line in a prearranged group when the called station line is busy. Station lines cannot be in more than one hunting group; however, more than one station line may hunt to the same line. The number of hunting groups is unlimited. The size of each hunting group is limited to 30 station lines per group. The hunting sequence over the prearranged group can be accomplished as follows:

A. Circular Hunting

3.302 The hunt starts with the called station line and always proceeds in a prearranged order to test all lines in the group once, completing the call to the first idle station line. The station numbers may be in consecutive or nonconsecutive order.

B. Terminal Hunting

3.303 The hunt always starts with the called station line and ends with the last station line in the prearranged group, completing the call to the first idle station line encountered. Unless the first station line is called, only a portion of the group is tested. The prearranged hunting sequence can be either consecutive (station numbers are in ascending numerical sequence) or nonconsecutive.

STATION MESSAGE DETAIL RECORDING (SMDR)

3.304 This feature provides a record of the PBX station (or attendant) identity, call ending time, duration, and the trunk group used for outgoing and/or incoming calls. The call duration is measured from the establishment of the connection in the customer system to the time when the station goes on-hook. The type of SMDR equipment just described is called TYPE I. The other type, called TYPE II, provides additional record capability. The customer's Authorization Code, Facility Restriction Level, and Automatic Route Selection pattern in effect may be recorded to verify traffic flow and determine individual customer costs.

3.305 The SMDR feature provides the following service records and data fields:

- All outgoing calls (central office, tie trunks, Advanced Private Line termination [APLT], and Wide Area Telecommunications Service [WATS])
- Incoming WATS, APLT, DID, or tie trunks
- Type of call (access code)
- Calling station number
- Called number
- Time the call was completed
- Date (month and day) the call was made
- Duration of the call
- Indication of attendant-handled calls
- Ineffective call attempts (Automatic Route Selection [ARS] and Automatic Alternate Routing [AAR] only)

- ARS plan switch (plan 1, 2, 3), FP8
- Account code, if dialed
- Time in queue (FP8)
- Authorization Codes (FP8 and FP12) if dialed
- Facility Restriction Level (FP8 and FP12).

3.306 All SMDR machines receive data from the PBX via a high-speed data channel. The SMDR consists of logic circuit packs and a 207B power supply mounted in an LC-type carrier. The number of circuit packs varies depending on which SMDR (direct output or 9-track magnetic tape) is provided.

3.307 The SMDR hardware is provided in the direct output version, the COMM-STOR II version, or the 9-track magnetic tape version. The latter version is the recommended configuration. ▮If SMDR is used with Five-Digit Dialing (FP8, Issue 3), or if the incoming or outgoing trunk circuit number is required SMDR data, a Local Storage Unit (LSU) which accepts and stores message detail records must be provided. A direct output option on the LSU allows the LSU to interface with COMM-STOR II.◀

A. Direct Output Version

3.308 The direct output version provides Station Message Detail Recording using a printer, paper tape punch, COMM-STOR II, or customer-provided terminal or storage device. The amount of output information from SMDR is proportional to customer traffic, number of stations within the PBX, and the number of trunks to be monitored.

Because of the voluminous amount of output information possible from the direct output version of SMDR, exercise care when selecting the type of terminal to be used.

B. COMM-STOR II Version

3.309 The COMM-STOR II unit (Fig. 34), when used with SMDR, is a totally dedicated system, which interfaces with the DIMENSION PBX to record the call records generated by the PBX SMDR direct output system. In addition, the COMM-STOR II unit is capable of generating reports that summarize toll use and toll charges (by station or by department) and trunk usage data.

3.310 The reports may be used by the customer in allocating costs and evaluating toll facilities. They also aid in identifying abuse to the customer's network.

3.311 The operator communicates with the COMM-STOR II unit via a terminal (43 teleprinter, DATASPEED* 40/2 terminal or equivalent). The system displays a message on the terminal, to which the operator responds. The operator may be instructed to perform a particular action or enter information in response to a question. Frequently, a list of operations appears from which the operator must choose one to perform. Through the interaction of terminal displays and operator responses, the operator can perform all the necessary procedures.

3.312 Reports are displayed on a cathode-ray tube (CRT) and/or printed for hard copy retention, depending on the option chosen by the customer.

*Registered trademark of AT&T Co.

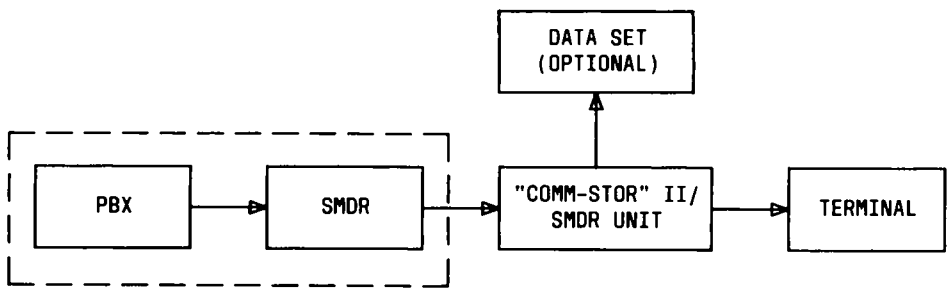


Fig. 34—Block Diagram of SMDR With COMM-STOR II Unit

C. 9-Track Magnetic Tape Version

3.313 For systems requiring a capacity greater than the direct output for storing the recorded calling information, the 9-track magnetic tape version may be used (Fig. 35). The tape may be changed, as required, depending on customer requirements (traffic capacity or monitoring of calls). The 9-track system is equipped with a Kennedy 9217 tape formatter used to write data on a standard 9-track magnetic tape. When output information is required by the customer in the form of a hard copy for visual inspection, the 9-track magnetic tape requires machine processing (software decoding). The output from the magnetic tape may be grouped as required by the customer, ie, grouped by type of calls, account numbers, specific dates, etc. This feature provides a record of trunk calls which may be used to tally costs, allocate charges, analyze calling patterns, and effect implementation of controls and/or restrictions. The 9-track magnetic tape SMDR uses the same receiving circuitry as the direct output version and provides greater record storage capacity. Twelve circuit packs in a large special-purpose cabinet comprise the 9-track magnetic tape system.

3.314 For more detailed information regarding SMDR, refer to Sections 554-010-122 and 554-010-123.

STATION NUMBER STEERING

3.315 ▶This feature allows conversion of a station number, which is part of the station numbering plan for the PBX, to a dial access code. When the station number is dialed, it is converted into a trunk or feature dial access code. Station numbers such as these are referred to as station-to-trunk numbers which are accessed by trunks, stations, and attendants. This feature provides the following:

(a) Dialed station numbers can yield dial access codes to access main/satellite (M/S) stations on a multidigit steering basis.

(b) Dialed station numbers can yield dial access codes to LC361 circuit packs for off-premises extensions (OPX).

(c) Dialed station numbers can yield dial access codes for the PBX attendants or centralized attendant service (CAS) attendants.

(d) Speed calling access is available to OPX, data communications access ports, CAS attendants, PBX attendants, and to M/S stations.

Station features and the station class of service do not apply to the dialed station number because the dialed number is not recognized as a station.◀

STATION REARRANGEMENT AND CHANGE

3.316 This feature is provided in connection with the Customer Administration Center System (CACS) and the Customer Administration Panel (CAP). The customer can administer the class-of-service assignments for individual PBX lines and make changes in the hunting and pickup group assignments. The capability to administer button assignments and signaling options on DIMENSION PBX ECTS sets is also included.

STATION-TO-STATION CALLING

3.317 The station user can directly dial other stations within the same system without the assistance of the attendant. The number of digits required depends on the numbering plan engineered for the customer.

STRAIGHTFORWARD OUTWARD COMPLETION

3.318 An attendant can place an outgoing call for a station user who reached the attendant via dial 0, or intercept, or an attendant-originated call without requiring the station user to hang up. The attendant may dial the called number for the station user or, with through dialing, allow the station user to complete the dialing.

SWITCHED LOOP OPERATION

3.319 The attendant position is arranged so that each call requiring attendant assistance is automatically switched to one of a limited number of idle loops (call access points) on an available attendant position. Normally, a call is automatically released from the attendant position when the call is answered by the called station (released loop operation). Incoming calls are queued (retained in a waiting state) in the order of their arrival when all attendant positions are busy. To distribute the call load evenly to each attendant, each queued call is automatically switched to the first available attendant position. A console lamp indication (CW) is given to the attendant when calls are waiting to be served.

SYSTEM STATUS INDICATOR (SSI)

3.320 The system status indicator(s) may be used to monitor the traffic status, queue thresh-

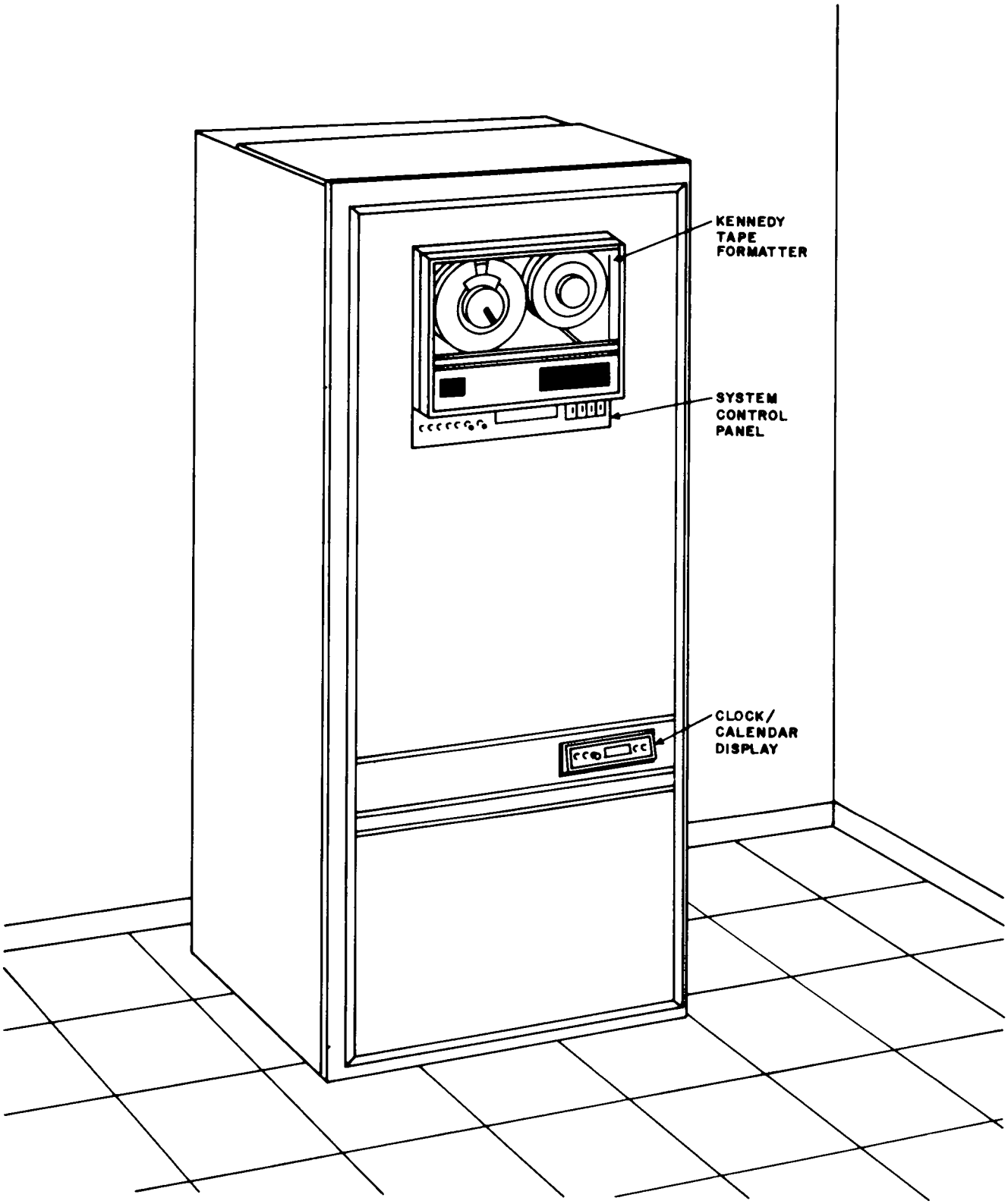


Fig. 35—Station Message Detail Recording (SMDR)—9-Track Magnetic Tape System

old, and warning thresholds on release link and incoming trunks and Uniform Call Distribution/Direct Department Calling (UCD/DDC) groups. Each SSI contains eight lamps. Lamp indications are controlled from the contact interface B circuit pack, LC15. The quantity of SSI displays used is dependent upon the type of hardware configuration. System status indicators may be used with the Centralized Attendant Service (CAS) feature (CAS-branch and CAS-main) or the UCD/DDC feature. Figure 36 shows the faceplate labeling for the 30A8 SSIs used with the CAS-branch feature. Table D lists the lamp status functions for CAS branch usage. The lamp status has different meanings for CAS main and UCD/DDC group monitoring. Refer to Section 981-012-100 for further details.

TANDEM TIE TRUNK SWITCHING

3.321 A service arrangement that allows tie trunk to tie trunk, tie trunk to CCSA, and tie trunk to exchange network connections through the switching system dialed directly by the distant PBX station user. Tandem connections can be restricted on a trunk group basis. Restricted calls are routed to intercept tone.

TERMINATION RESTRICTION

3.322 ◗Station lines with this restriction cannot receive calls at any time except when night service is in effect and an incoming trunk is assigned to the restricted station line.◖ Calls can be originated normally from this station. The DID calls are routed to the attendant or to an announcement, depending on the option selected. The CCSA calls are routed to the attendant, to an announcement, or to intercept tone, depending on the option selected. All other terminating calls are routed to intercept tone.

THREEWAY CONFERENCE TRANSFER

3.323 A non-ECTS station user can, by flashing while on any 2-party call, effect a Threeway Conference Transfer. After flashing, the station dials the third party (which can be a trunk) for private consultation while the second party is held in soft hold. By flashing a second time, a Threeway Conference is effected. Subsequently, a transfer is accomplished when the flashing party goes on-hook. Where two trunks are involved in a conference, all the conferees are released from the connection when the controlling station goes on-hook, if the trunks cannot guarantee disconnect supervision. In addition, the controlling non-ECTS station can drop the third party by flashing during the Threeway Conference.

3.324 An ECTS station user can activate Threeway Conference Transfer via use of the RECALL button in lieu of using the switchhook.

3.325 ***With Trunk-to-Trunk Transfer:*** This option allows a station to transfer an incoming trunk to an outgoing trunk when the incoming trunk disconnect supervision can be guaranteed. The trunk-to-trunk transfer option is basically intended for use on a where-it-will-work basis with CAS to allow station transfer of an incoming CO call over a tie trunk to a station at another PBX in the CAS complex. The option will allow any station with the Threeway Conference Transfer class of service to transfer any incoming trunk call to any outgoing trunk call. Transfer of an outgoing trunk call to another outgoing trunk call will still be denied by dropping both trunk connections when the controlling station hangs up unless one of the trunks has guaranteed disconnect administered. In a DCS (FP8, Issue 3) configuration, an attempt is made to reconfigure a tie trunk from outgoing to incoming before the call is torn down. At the other DCS PBX, the tie trunk is changed from incoming to outgoing and the call disconnect is then controlled by that PBX.◖

THROUGH DIALING

3.326 At the discretion of the attendant, station users can complete dialing after the attendant selects the trunk facility on attendant-handled outgoing calls.

TIE TRUNK ACCESS

3.327 This feature provides access to dedicated 1-way or 2-way circuits between this PBX and another PBX.

TIME-OF-DAY SYNCHRONIZATION

3.328 This feature provides improved software clock accuracy which is important in feature package (FP) 8 applications for switching alternate routing plans at precise times. Also, the feature is used for timing customer and telephone company traffic studies (FP8, FP11, and FP12). The feature is also important in FP9/FP11 applications where Automatic Wakeup Service and billing-related features

NOTE:
"DIMENSION" 2000 PBX USES UP TO THREE SSI's, DEPENDING ON THE NUMBER OF RLT CIRCUITS. SSI–3 DOES NOT USE THE LAST FOUR (LOWER) LAMPS.

Fig. 36—CAS 30A8 System Status Indicator—CAS Branch

TABLE D

SYSTEM STATUS INDICATOR LAMP FUNCTIONS

LAMP	LAMP CONDITION	SYSTEM STATUS
RLT ( )	Dark	Idle RLT
	Steadily lighted	Busy RLT or associated backup station handling CAS call
	Wink	Maintenance busy
CONTROL	Steady	Normal operation
	Blinking	Backup mode or TAAS mode
OVERLOAD	Dark	No overload
	Steadily lighted	Queue threshold exceeded
MAJOR	Dark	Normal operation
	Steadily lighted	Major alarm
MINOR	Dark	Normal operation
	Steadily lighted	Minor alarm

are used. It provides accuracy to within 1 minute per month and the time display appears on the hotel/motel or hospital console/terminal. The time-of-day clock has an optional battery backup which keeps the clock running in the event of a power failure. Each common control requires the associated LC144 and a separate battery backup.

TIMED RECALL ON OUTGOING CALLS

3.329 With this feature, outgoing trunk calls from selected stations are automatically transferred to the attendant after a timed interval, between 1 and 31 minutes, assigned for the trunk group. A warning tone is sent to the calling party 30 seconds before the transfer takes place.

TIMED REMINDER

3.330 The attendant is automatically alerted after 30 seconds when a call on the console is waiting on a busy station line (Attendant Call Waiting), or the called party has not answered, or the incoming call is held on the console. This signal is retired when the loop is reseized by the attendant and reactivated 30 seconds after the attendant releases from the connection and the call is still waiting, unanswered, or held.

3.331 ***With Audible Signal:*** The audible signal functions as an attendant altering signal in addition to the console faceplate flashing indicators. The audible signal consists of a 1.95 kHz tone which cycles 400 ms on, 1200 ms off, when activated.

TOLL RESTRICTION

3.332 This is a limited form of Code Restriction which permits station users to access the local central office and to dial local service area calls but prevents completion of toll calls or calls to the toll operator without the assistance of the attendant. Restricted toll calls are given intercept tone. This feature is provided on a per-station basis and is available in two mutually exclusive forms:

A. Battery Reversal

3.333 A battery reversal signal from the central office on an outgoing call will route the toll-restricted calling station to intercept tone.

B. 0/1 (With Limited 3-Digit)

3.334 ▶This form of Toll Restriction is based on screening at the PBX rather than at the central office. Toll restricted (0/1) stations are routed to intercept tone if the first or second digit dialed following the trunk access code is a 0 or a 1 and the office or area code is not in the allowed call list (which has a maximum capacity of ten 3-digit codes).◀

TOLL TERMINAL ACCESS

3.335 A station user or attendant can dial a toll operator directly or access a uniquely identified trunk group to a Traffic Service Position System (TSPS) with a single-digit access code. Toll operator callback over the toll terminal is not provided. The initial digit used for this feature need not be unique (can also be used for station line numbers in the same installation if time-out is used).

"TOUCH-TONE" CALLING

3.336 Dial information from standard TOUCH-TONE calling station equipment is accepted. At a calling station, this feature utilizes pushbutton-operated audible tones, a series of which represent either the address of a called facility or an instruction to a dial-controlled device. Rotary dialing station instruments can be used on station lines with TOUCH-TONE calling class of service for testing purposes. Address information is accepted from either TOUCH-TONE dialing or rotary dialing instruments during the same call.

"TOUCH-TONE" DIALING TO DIAL PULSE CONVERSION

3.337 TOUCH-TONE dialing signals are converted to dial pulse signals when the distant end associated with outgoing trunk calls is not equipped to receive TOUCH-TONE dialing signals or when transmission loss prevents reliable TOUCH-TONE dialing signals. External dial pulse conversion equipment is not required for this feature.

"TOUCH-TONE" DIALING SENDERIZED OPERATION

3.338 TOUCH-TONE dialing senderized operation can be provided on trunk groups administered for TOUCH-TONE dialing outgoing class of service. The TOUCH-TONE dialing sender receives and repeats dialing signals as TOUCH-TONE dialing signals over the selected trunk. TOUCH-TONE dialing senderized operation can be provided on Speed Calling, Automatic Route Selection, Automatic Route Selection—Deluxe, and Automatic Alternate Routing calls.

3.339 When TOUCH-TONE dialing senderized operation is required, TOUCH-TONE dialing sender circuit packs (LC12) must be installed. The quantity of circuit packs required is determined by the traffic load.

TRAFFIC DATA TO CUSTOMER

3.340 This feature is provided in connection with the Customer Administration Center System (CACS) and the Customer Administration Panel (CAP). A CAP provides the customer with the capability to read each traffic register. With the CACS, the customer may automatically poll switching locations on a daily or hourly basis to obtain traffic measurements, including peg counts, usage and overflow data. Summary reports, exception reports, and complete traffic register outputs may be obtained. The status of time-of-day routing is included in the traffic data.

3.341 The customer can now reassign traffic registers to collect traffic data required for the maintenance of the system.

3.342 The reassignment of traffic registers by the customer provides flexibility in identifying the originator of calls in the SMDR, improving transmission on calls between the public message network and the customer's private network, and allowing the customer to select traffic data to be collected.

TRAFFIC MEASUREMENT

3.343 ▮Traffic studies and structures may be flexibly administered in the PBX and automatically polled by the Remote Maintenance, Administration, and Traffic System (RMATS) central facility. Optionally, the system can be polled using existing polling equipment such as an Alston scanner. Measurements are accumulated hourly and may be polled hourly or daily.

3.344 Information is stored in registers which are updated hourly as peak values occur. Trunk group activity measurements may be obtained which will be time coincident with certain peak values studied. Time coincident studies of traffic item studies and related peak register may also be flexibly assigned. Trunk group combinations, Outgoing Trunk Queuing (OTQ) activity, and Automatic Route Selection (ARS) studies may be assigned as required.

3.345 The traffic values are stored in a dedicated memory area which is outputted to RMATS on a polling schedule prescribed in the RMATS central facility.

3.346 The RMATS facility can be arranged to automatically poll on a daily or hourly interval. The RMATS dials the PBX via the DDD network, sends the PBX unique security access code, and receives and records data stored in the PBX. All traffic study values in the PBX are zero after polling. In the case of polling with an Alston scanner, a system MAAP procedure is used to eliminate the requirement for a security code before data transmission.◀

TRAVELING CLASS MARK (TCM)

3.347 When Automatic Route Selection (ARS)—Deluxe or Uniform Numbering/Automatic Alternate Routing (UN/AAR) chooses a tie trunk to a tandem PBX or centrex, the TCM is sent over the tie trunk. The TCM is then used by the distant tandem to determine the best available facility consistent with the user's calling privileges. The TCM represents the Facility Restriction Level to be used based on the station, trunk, or attendant originating the call or the Authorization Code, if dialed.

TRUNK ANSWER FROM ANY STATION (TAAS)

3.348 Incoming calls, normally directed to the attendant, activate a common alerting signal on the customer's premises when night service is activated and night stations are not assigned or are all busy. These calls may then be answered by any station user in the system who dials a special code from any nonrestricted station.

TRUNK GROUP BUSY INDICATORS ON ATTENDANT POSITION

3.349 The attendant(s) is provided with a visual indication when all trunks in a group are busy. Up to 24 busy indicators can be provided.

TRUNK GROUP WARNING INDICATORS ON ATTENDANT POSITION

3.350 The attendant(s) is provided with a visual indication when a preset number of trunks in a group are busy. This number can be specified via the Maintenance and Administration Panel. Up to 12 warning indicators can be provided.

TRUNK IDENTIFICATION BY ATTENDANT

3.351 This feature gives the attendant the ability to identify a specific trunk being used on any incoming or outgoing call. While connected with a trunk, the attendant presses the TRK ID key. This causes the alphanumeric display to show the dial access code of the trunk group in use. A second depression of the TRK ID key causes the index number of the trunk to be displayed. A third depression of the TRK ID key returns the initial display and the entire procedure can be repeated.

TRUNK-TO-TRUNK CONNECTIONS

3.352 This feature allows an incoming or outgoing trunk call to be extended via the attendant to another outgoing trunk. Trunk-to-trunk connections can be effected among the following types of trunks: CO, FX, WATS, APLT network, and tie trunks. Disconnect supervision can be automatic in some cases; but, in others, the attendant must monitor the connection and manually disconnect after use.

TRUNK VERIFICATION BY CUSTOMER

3.353 This feature provides attendant access to individual trunks of a particular trunk group for making test calls to verify supervision and transmission. Where a busy trunk is encountered, a bridged connection with a warning tone to the busy parties is provided to verify use. The tone is only a warning that bridging is taking place. The attendant dials a test access code followed by the normal trunk group access code (or operation of the direct trunk group select key) followed by the specific number of the trunk to be tested. A dial code must be assigned to incoming trunk groups to allow attendant access for testing. This same dial code is used to establish night connections on incoming trunks. One-way incoming trunks cannot be tested while they are idle.

3.354 Trunk Verification by Customer (attendant) may also be used on the following trunks:

- Loudspeaker paging trunks
- Recorded telephone dictation trunks
- Release link trunks
- Recorded announcement trunks.

3.355 ▶In a DCS (FP8, Issue 3) configuration, trunks or other PBXs in the DCS can be verified by an attendant not associated with that PBX. A direct trunk group select key must be assigned for transparent operation of this feature.◀

TRUNK VERIFICATION BY STATION (TVS)

3.356 This feature permits a designated station, a remote maintenance station, or a backup control station associated with a Centralized Attendant Service Release Link Trunk (CAS RLT) to access individual trunks terminating on the PBX for the purpose of making test calls to verify supervision and transmission. To test incoming (busy) trunks or where any busy trunk is encountered, an optional bridged connection with a warning tone to the busy parties is provided to inform the users. If a defective trunk is found, a code can be dialed from the designated station line or control station to put the trunk in a maintenance busy state until repaired. Any dial repeating tie trunk can also be used to remotely test trunks on a PBX, but is limited only to those trunks to which it can normally be connected. However, the busy trunk override option is not provided nor can the tie trunk put another trunk in a maintenance busy state. This feature also permits testing of outgoing RLT trunks in a CAS installation.

TWO-PARTY HOLD ON CONSOLE

3.357 This feature allows an attendant to hold a call on the console with both a calling and a called station or trunk facility (or two called facilities) connected. Two-party Hold is required for the operation of the Attendant Lockout, Serial Call, and Trunk-to-Trunk Connections features.

UNIFORM CALL DISTRIBUTION (UCD)

3.358 ▶This feature permits incoming central office (CO) calls, foreign exchange (FX) calls, tie trunk calls, and 800 Service calls to be directed to a queue associated with a group of selected stations and processed from the queue to the station via a circular hunting pattern. Hunting starts at the next idle station in the hunting sequence following the last station to receive a call in the group. Each UCD station is typically a nonkey (standard) telephone set which can also be used in a normal manner to make and receive calls directly.

3.359 This feature (available on FP8, Issue 1; not available on Issue 2 or 3 of FP8) permits calls to be terminated on the most idle of a prearranged group of stations without attendant assistance. Each UCD station is typically a nonkey (standard) telephone set which can also be used in a normal manner to make and receive calls directly.◀

3.360 ***With Force Adminstration Data System (FADS):*** The FADS information may be used by the customer to determine the number of calls handled by each station, the length of calls, the average time spent processing each call, and the average waiting time for calls placed in the UCD queue. This allows the customer to determine whether more or less stations are needed to adequately handle the traffic load. If a large number of calls are being placed in queue, more member stations may be added. Conversely, if few calls are being queued, the number of stations may be reduced.

3.361 The number of calls handled by each station or trunk group can be analyzed to determine if the telephone system is arranged in the most efficient manner to handle the hourly and/or daily traffic.

3.362 The FADS terminal has a 3-digit and a 4-digit display field and a TOUCH-TONE telephone type keyboard. A printer is used to obtain hard-copy output.

UNIFORM NUMBERING

3.363 This feature permits station users at a DIMENSION PBX or main PBX to place calls over tie trunks using a uniform dialing plan. The user dials the Automatic Alternate Routing access code, followed by a uniform 4-, 5-, 6-, or 7-digit number which uniquely identifies each station. The uniform number consists of a 2- or 3-digit location code and a 2-, 3-, or 4-digit station code. Station users at tributary PBXs use the same plan with the exception of an additional access code. The feature provides the number translations and supervision necessary to route the call. When the same access code is followed by a 10-digit Direct Distance Dialing (DDD) number, the call is automatically routed via the Automatic Route Selection—Deluxe feature.

UNINTERRUPTIBLE POWER SERVICE (UPS)

3.364 This feature provides power for DIMENSION PBX cabinets during relatively short-term commercial power interruptions. This allows all PBX functions dependent on the cabinet power supply to continue without interruption for several minutes. Nominal holdover has been designed primarily for those customers who provide supplemental power sources, such as engine alternators, that can be expected to take over local power loads within seconds or, at most, a few minutes. For customers without such back-up arrangements, nominal

holdover prevents loss of PBX service for perhaps 95 percent of all power interruptions, depending on local experience. The duration of the power holdover is dependent on the load on the cabinet power supply. The following paragraphs provide a description of the major UPS categories.

3.365 ***Nominal holdover*** provides power for PBX cabinets and peripherals during relatively short-term commerical power interruptions. This allows all PBX functions to continue without interruption for several minutes. Nominal holdover has been designed primarily for those customers who provide supplemental power sources, such as engine-alternators that can be expected to take over local power loads within seconds or, at most, a few minutes. For customers without such backup arrangements, nominal holdover prevents loss of PBX service for perhaps 95 percent of all power interruptions, depending on local experience. The duration of the power holdover is dependent on the load on the cabinet power supply.

3.366 ***Extended holdover*** provides power holdover up to approximately 8 hours for PBX cabinets by the use of a separately housed battery plant and charging unit, such as a 131A battery reserve power plant. The UPS power supplies contain an inverter, thereby eliminating the need for the external unit as required in other reserve power arrangements. However, a cabinet-mounted dc filter is required in the battery feed to the UPS power supply.

3.367 ***Standard UPS*** provides power holdover to PBX cabinets (providing PBX functions) during commerical power disruptions. The hardware for standard UPS is completely self-contained and is installed in PBX cabinets in place of the normal power supply unit. This eliminates the need for extra cabinets holding rectifiers, inverters, and banks of batteries. Standard UPS can accommodate either nominal or extended holdover arrangements. During a commercial power interruption, the nominal holdover arrangement provides electrical power through a UPS rectifier/converter power supply. The power originates from a UPS battery pack which has been charged from commerical power by a UPS battery charger. A full recharge after a power interruption should occur within 24 hours. The extended holdover arrangement uses the UPS rectifier/converter power supply, but uses a locally engineered battery reserve type power plant and charger such as a 131A or equivalent. A dc line filter is also required in the feeder pairs from the reserve type power plant.

3.368 Further detailed information on UPS is available in Section 554-111-101.

VISUALLY IMPAIRED ATTENDANT SERVICE

3.369 Visually Impaired Attendant Service capability is achieved by augmenting the normal visual signals provided on a standard attendant position with special tactile devices and/or audible signals which enable a visually impaired person to operate the position. This service is provided using a light-sensitive probe (990A light sensor), a grooved console faceplate (6A guide), and additional audible tones which identify the type of call. DIMENSION PBX consoles allow plugging an audible tone adjunct (2A translator) directly into the console. The audible signals identify the type of incoming call and new tones indicate Calls Waiting and Timed Reminders.

3.370 Figure 37 shows the Visually Impaired Attendant Service apparatus. Figure 38 depicts the Visually Impaired Attendant Service coded ring rates.

3.371 The 2A translator performs the following two functions.

(a) It monitors the six incoming call indicator positions on the Attendant Console and produces a logic output that controls audible ringing. In this way, six different audible ring codes are generated that identify which of the six incoming call indicators are active. If the console is alphanumeric, the ICI information appears in the alphanumeric display field. The six coded call indicators are as follows:

- Listed Directory Number call
- Internal Call to Attendant
- Attendant Recall
- Customer Options (tie trunks, etc)
- Customer Options (WATS, etc)
- Other than 1 through 5.

(b) It senses the light-sensitive probe output when the probe is placed over an illuminated console LED and injects a tone onto the console headset.

This feature can only be provided with the 02-system console.

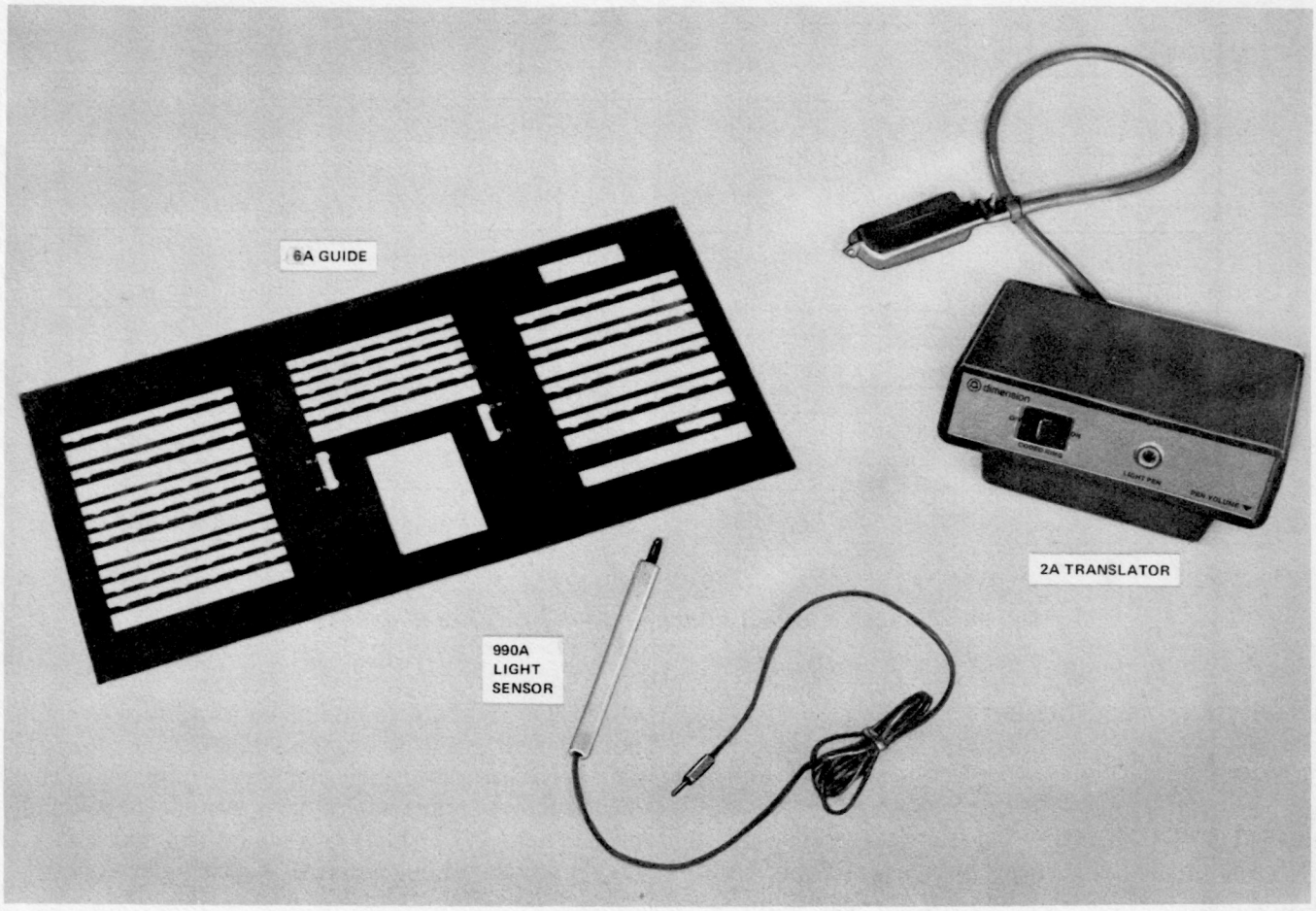


Fig. 37—Visually Impaired Attendant Service—Apparatus

WIDE AREA TELECOMMUNICATIONS SERVICE (WATS) ACCESS

3.372 This service provides access to or from a WATS serving office. All incoming calls to the PBX are placed to the assigned 800 Service (INWATS) number and are answered by the PBX attendant similar to LDN service. The OUTWATS calls to the various geographic areas are made on an attendant-handled basis via direct trunk group selection, when provided, or dial access and/or on a direct dial basis by stations.

WIDE FREQUENCY TOLERANT POWER PLANT

3.373 The DIMENSION PBX power supplies are capable of functioning under conditions of wide input frequency tolerance (57 Hz to 63 Hz) with input voltage variations from a minimum of 105 volts to a maximum of 129 volts. Additionally, if frequency variations are held to 60 ±0.3 Hz, the input voltage can deviate from a minimum of 99 volts to a maximum of 129 volts. This feature permits operation with customer-provided emergency power generating equipment.

3.374 The PBX power plant facilities are provided that operate from ac energy sources which are not as closely regulated as commercial ac power. The wide tolerance power plant continues to function properly with average frequency deviations of up to ±3 Hz or voltage variations of −15 percent to +10 percent as long as both of the conditions do not occur simultaneously. This feature permits operation with customer-provided emergency power generating equipment.

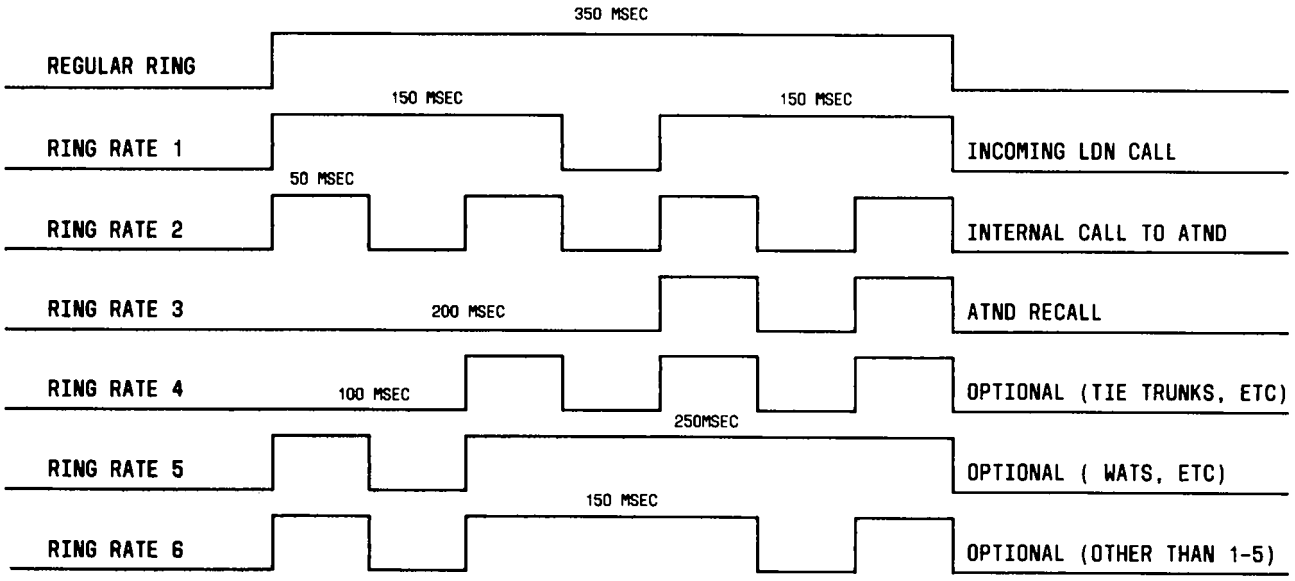


Fig. 38—Visually Impaired Attendant Service—Coded Ring Rates

4. PHYSICAL ARRANGEMENTS

CABINETS

4.01 The DIMENSION 2000 and Custom PBX equipment is housed in cabinets measuring approximately 1765 mm (69-1/2 inches) high by 800 mm (31-1/2 inches) wide by 610 mm (24 inches) deep. The cabinets fit through standard door openings (2134 mm [7 feet] by 914 mm [3 feet]) crated and mounted on a 178-mm (7-inch) high dolly. Each cabinet consists of a basic framework with side and front panels hinged for easy access. Carriers are mounted on the cabinet framework and the location of the carriers varies in accordance with customer requirements. The cabinets are shipped fully equipped from the factory. The cabinets are pushed onto floor-mounted rails via rollers and installed. A cabinet lock is supplied which utilizes the 216B 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. The side panels are provided in a neutral (beige) color. Some cabinet front doors have storage space on the inside for documentation shipped with the system.

4.02 A DIMENSION 2000 or Custom PBX system consists of various arrangements of three basic cabinets: common control (J58882A or J58882E), module control (J58882B), line cabinet (J58882C), and hotel/motel or hospital battery cabinet (J58882D). Auxiliary cabinets (J58879F) may be ordered as required for peripheral equipment. The basic cabinet arrangements form system control and system network modules. System control may consist of one or two common control cabinets per system.

4.03 The system network may consist of from 1 to 15 network modules, depending upon the number of lines, trunks, and traffic requirements. A network module consists of two module control cabinets and up to three line cabinets. Trunks and links may appear only in the module control cabinets. Lines may appear in the module control or line cabinets; however, lines may only appear in four (maximum) cabinets per module.

A. Common Control Cabinet (J58882A or J58882E)

4.04 The DIMENSION 2000 and Custom PBXs may be configured with single or duplicated common controls. The actual equipment contained within the common control cabinet is dependent upon the customer's immediate requirements and the long-term anticipated growth requirements; however, the following main items may be used:

- Basic control carrier(s)
- J87460D, J87432D, or J87432DD-type power supply

- KS-21447 minirecorder(s)
- Growth control carrier(s)
- AC distribution and fan assembly.

4.05 The basic control carrier contains the central processor, main memory circuit packs, network channels, and data channels. A single cabinet arrangement depicting a duplicated common control system is shown in Fig. 39. This arrangement furnishes two basic control carriers and two power supplies (the second a duplicate of the first) in the same cabinet.

4.06 If the PBX requires more memory slots than is available in the basic control carrier, either one or two growth control carriers may be installed. Each growth control carrier provides data channels and network channels in addition to slots for main memory. Since both common controls and the growth control carrier(s) cannot be physically located within a single cabinet, an additional control cabinet must be used where duplication of common controls is desired. Figure 40 depicts a cabinet arrangement for a

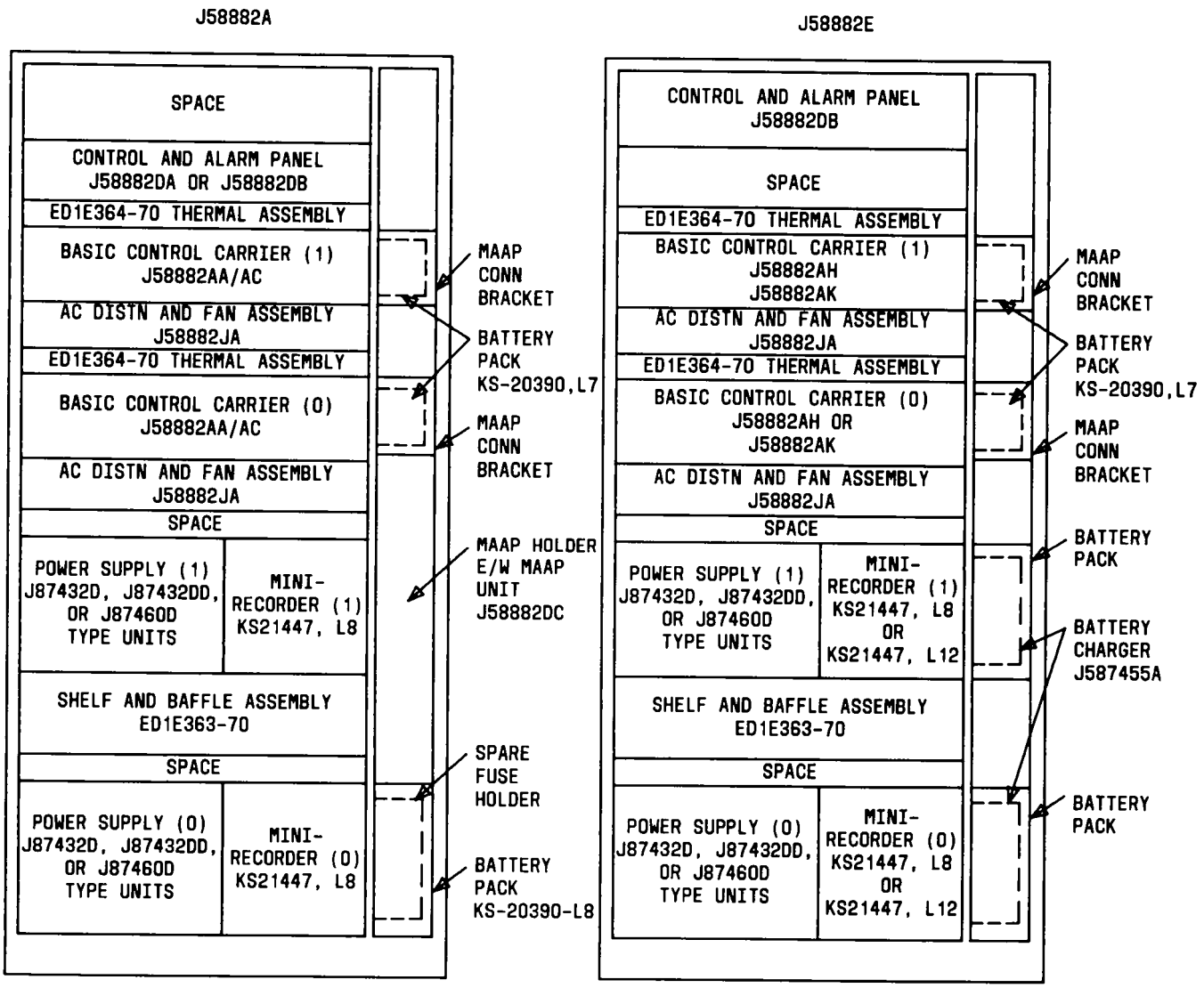
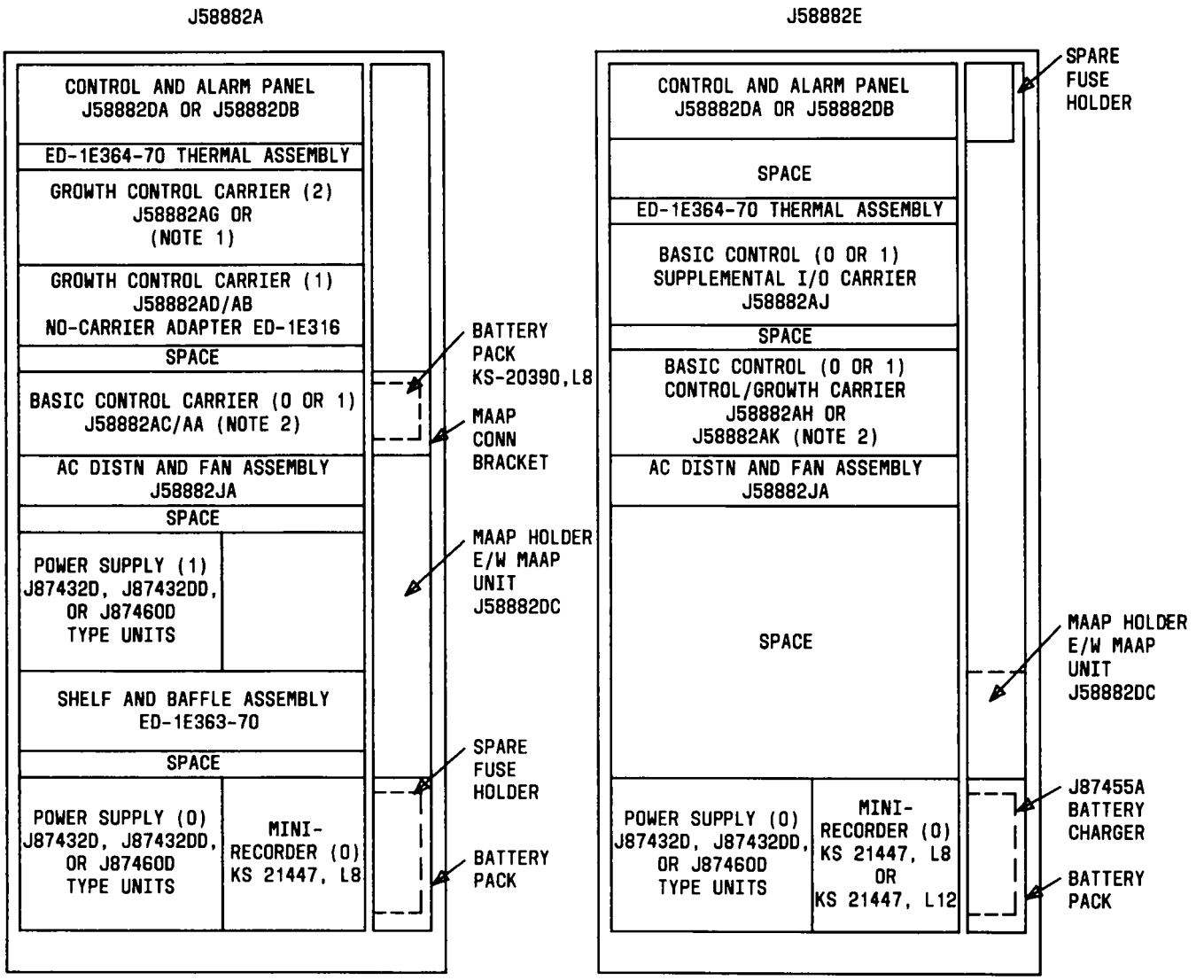


Fig. 39—Common Control Cabinet—J58882A or J58882E (Duplicated Control)

nonduplicated or duplicated common control. Note that each cabinet contains a common control and additional growth control carrier(s), as required.

B. Module Control Cabinet (J58882B)

4.07 The module control cabinet may contain carriers for the line (electronic or straight lines), trunk, and link circuits (Fig. 41). Module control and line group control carriers are also provided. The equipment arrangement in this cabinet is due to carrier cabling requirements. Two module control cabinets are required in each module. The number of lines, trunks, and link carriers varies according to customer order and traffic requirements. A maximum of two link carriers per module control cabinet may be provided (if required).



NOTES:
1. SECOND GROWTH CONTROL CARRIER J58882AG APPLIES TO MEMORY SIZE F WITH LC28_ CIRCUIT PACKS, OR SYSTEM NETWORK OR DATA CHANNEL REQUIREMENTS.
2. DUPLICATION OF COMMON CONTROL REQUIRES TWO CABINETS.

Fig. 40—Common Control Cabinet—J58882A or J58882E

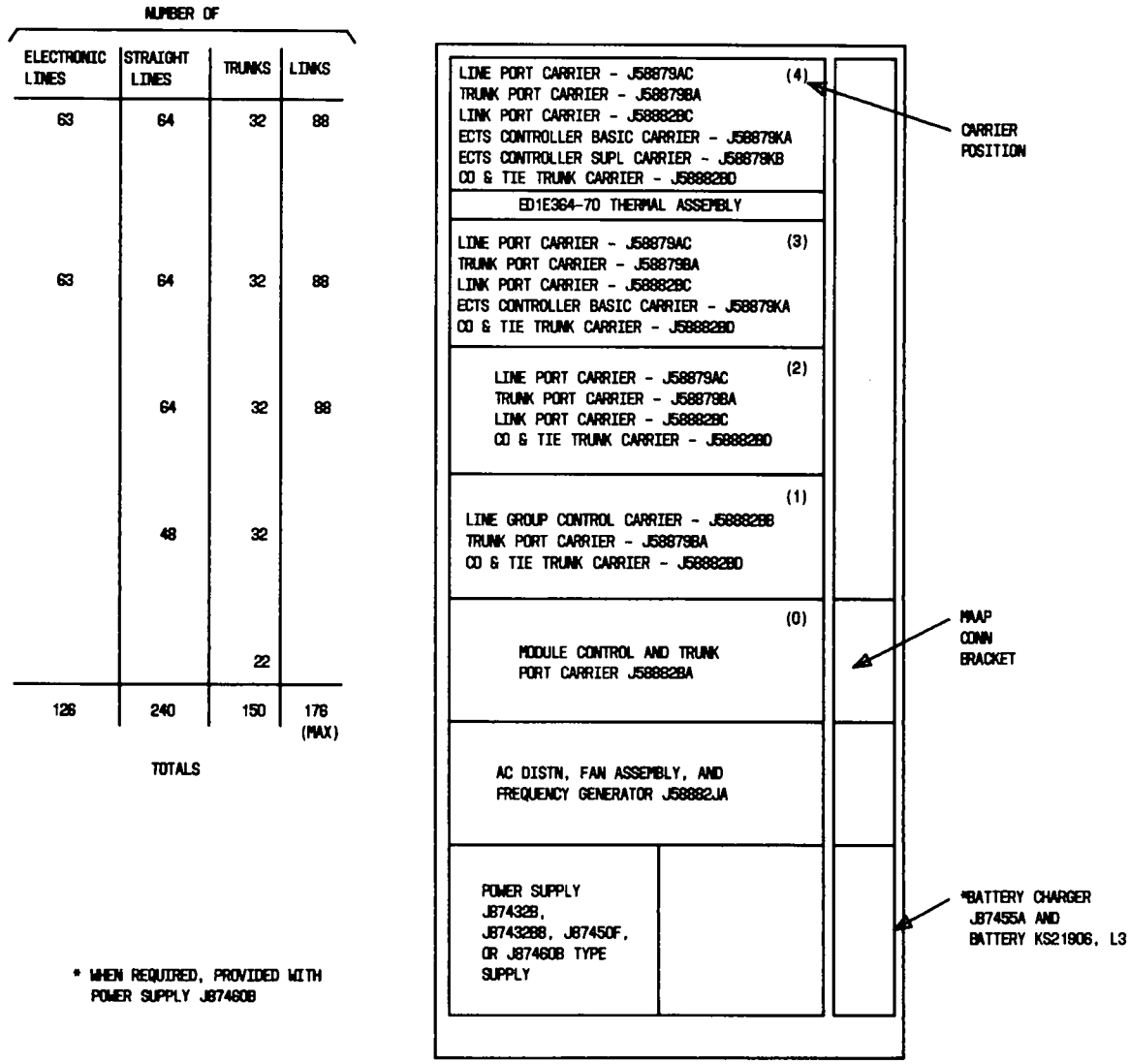


Fig. 41—Module Control Cabinet—J58882B

C. Line Cabinet (J58882C)

4.08 The line cabinet (Fig. 42) contains all arrangements of line port carriers and/or circuit pack carriers for Electronic Custom Telephone Service (ECTS). The line port carriers provide line circuits for the PBX stations and the multibutton electronic telephone (MET) sets. The ECTS carriers (basic and supplemental) furnish the electronic telephone controller for the MET sets. The line group control carrier contains tone supplies, a scanner/distributor, group and carrier pulse amplitude modulation (PAM) amplifiers, and may optionally provide the interface circuitry for a maximum of four attendant consoles. The number of line cabinets in a module may vary, depending on customer traffic requirements, with a maximum of three line cabinets per module. If lines appear in both module control cabinets, only two line cabinets are permitted. A test line is assigned to slot 09, circuit 0 in the first carrier, equipped with a tone plant in each module. This is a normal line with no ECTS capability.

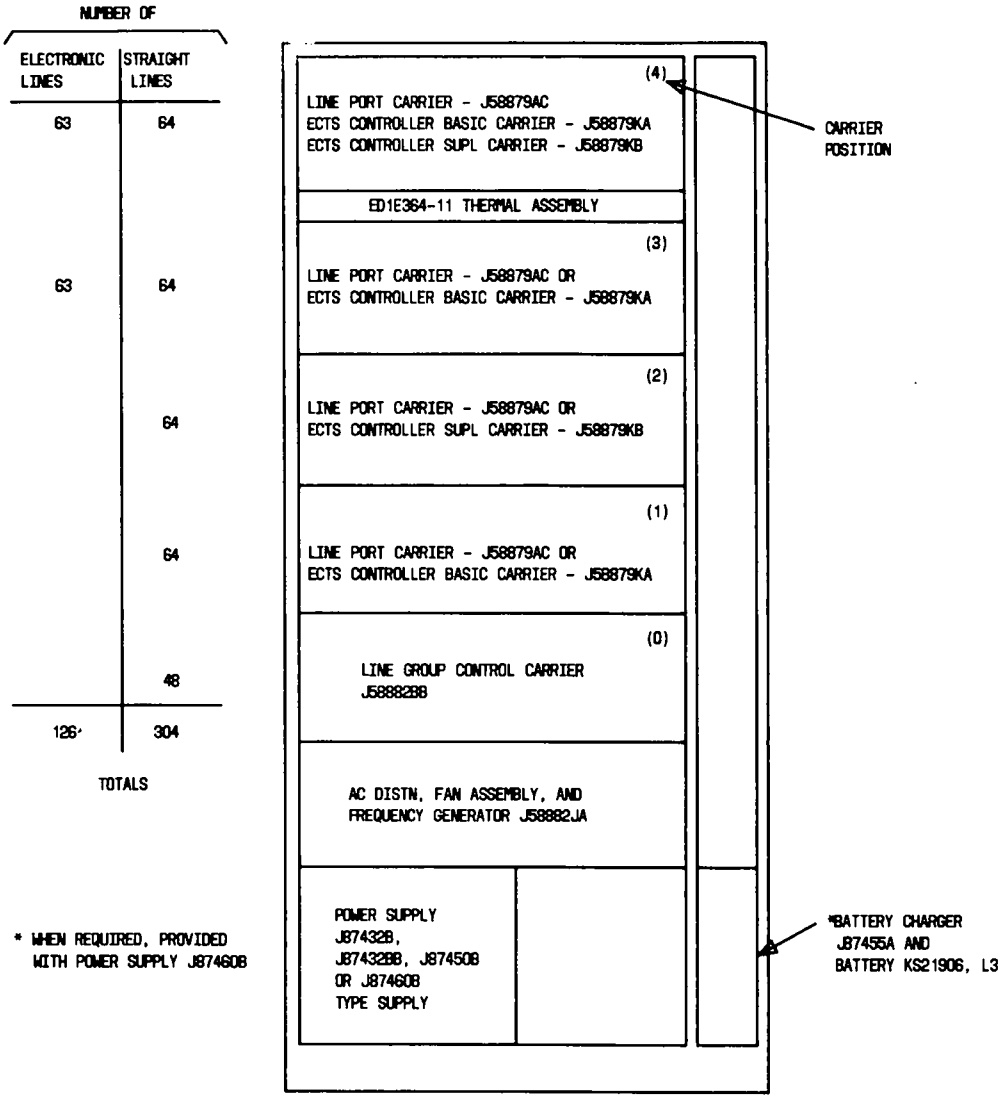


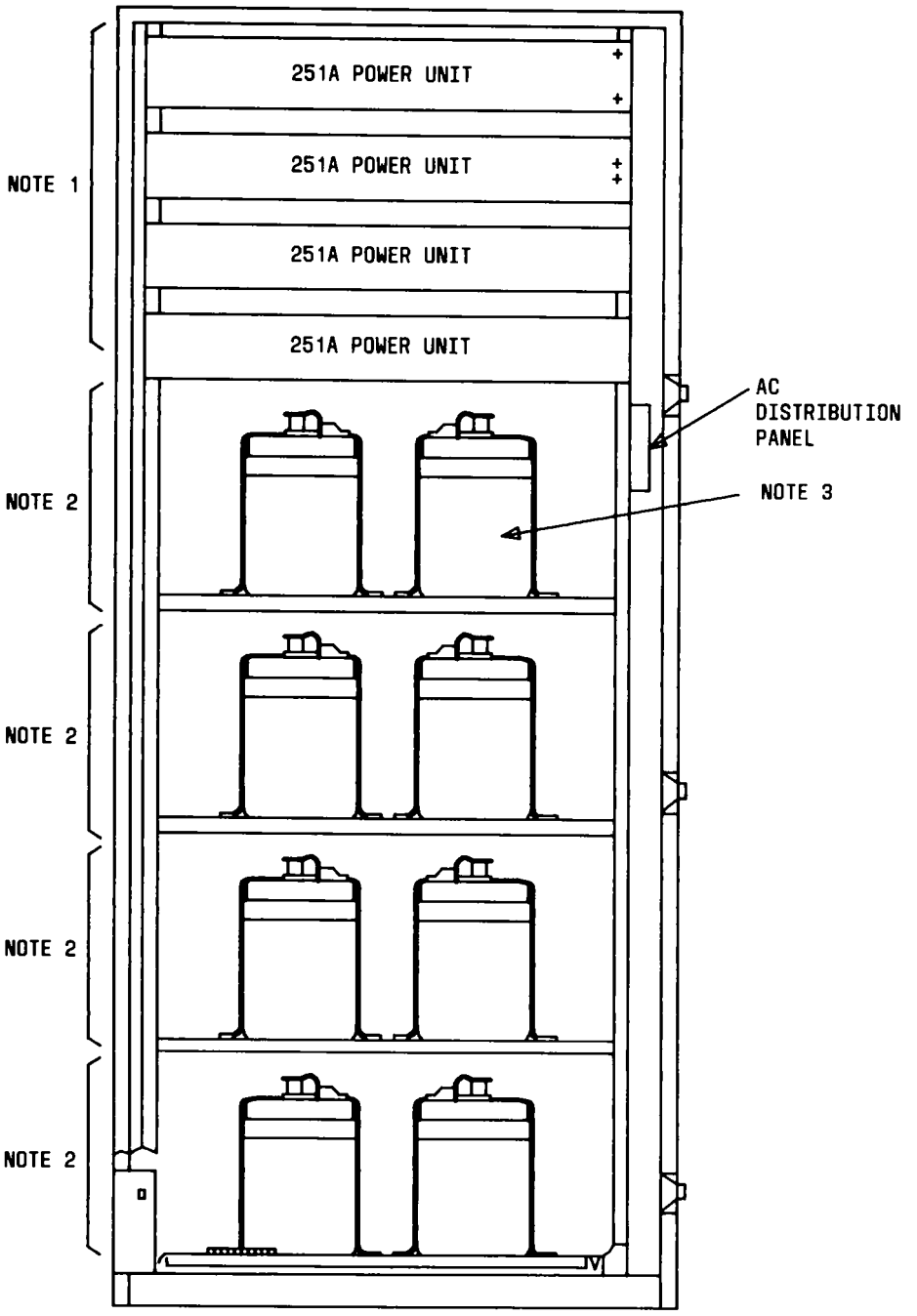
Fig. 42—Line Cabinet—J58882C

D. Hotel/Motel or Hospital Battery Cabinet (J58882D)

4.09 Feature packages 9 and 11 provide an optional hardware arrangement where an external battery storage supply may be used for long-term memory holdover when a power failure occurs. These low maintenance lead acid batteries and 251A power units are contained in a J58882D cabinet (Fig. 43) and replace the standard 90-second holdover rechargeable battery pack. The extended memory holdover option is highly desirable in systems where billing and room status information is maintained in main memory.

E. Auxiliary Cabinet (J58879F)

4.10 System auxiliary equipment can be installed in a separate auxiliary cabinet (Fig. 44). The auxiliary cabinet can be equipped with units such as ECTS controller, and supplemental carriers, telephone dictation, recorded announcement, etc, as shown in Table E. Panels may be either 584 mm or 660 mm (23 or 26 inches) wide. An ac power distribution unit, a power supply, fan assembly, and fuse panel can be provided, depending upon local requirements.



NOTES:
1. ONE 251A POWER UNIT PER J58882D, LIST 2 SHELF
2. J58882D,L2 SHELF
3. "DELCO"-1200 BATTERIES

Fig. 43—Hotel/Motel or Hospital—Extended Memory Holdover Cabinet

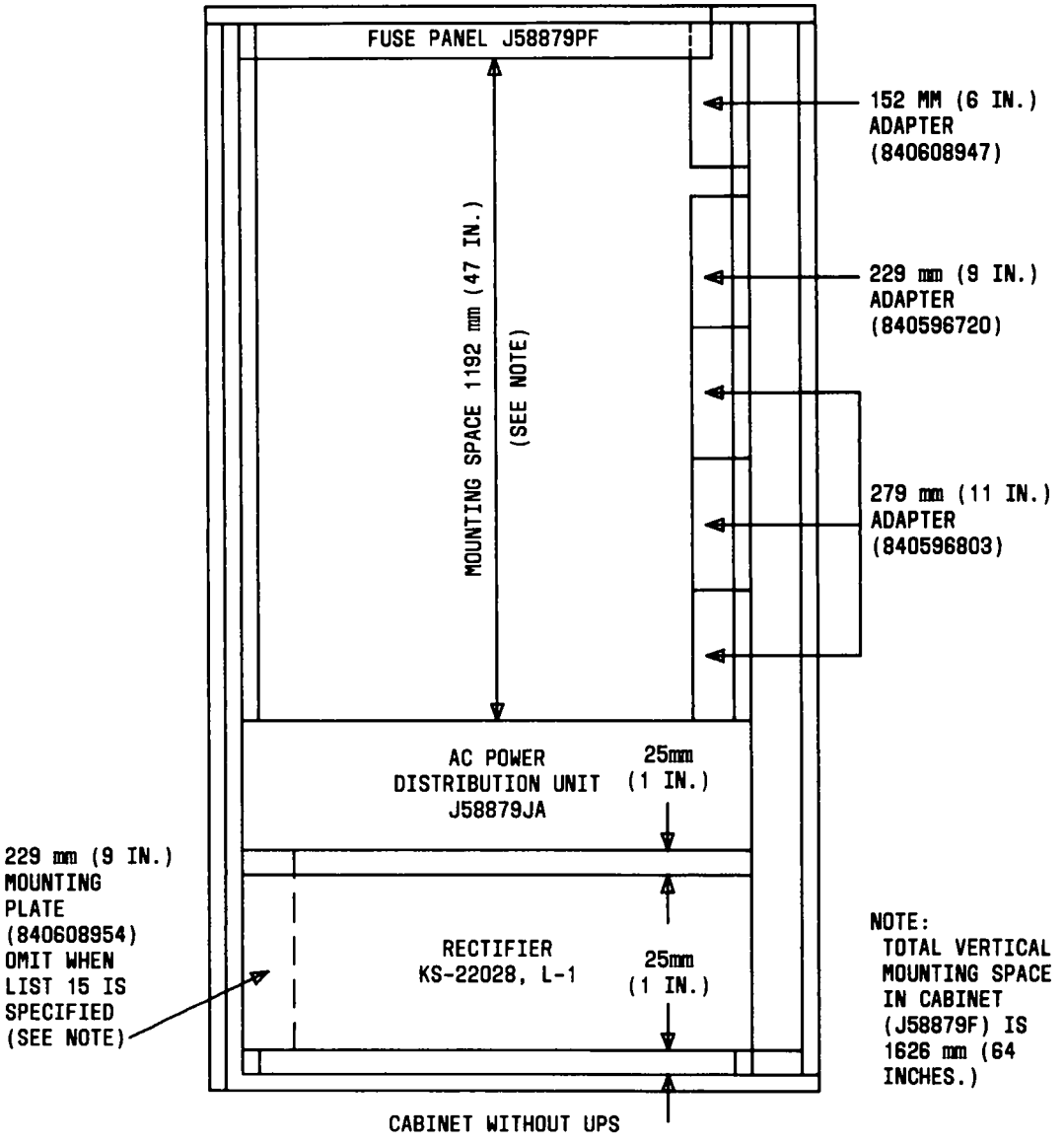


Fig. 44—Auxiliary Cabinet—J58879F

CIRCUIT PACK CARRIERS

4.11 Carriers designed to hold the circuit packs are 241 mm (9-1/2 inches) in height and mount on 622-mm (24-1/2 inch) mounting centers. Each carrier is limited to hold only certain types of circuit packs. A backplane wiring panel provides the circuit pack interconnections. A fuse panel or circuit breaker panel is provided at the left of the carrier, and a connector bracket is provided, depending on the needs of the carrier. All loose wiring and cabling from the backplane to the fuses and connectors are furnished with the carrier unit.

A. Common Control Carrier

4.12 The common control carriers consist of the basic control carrier and growth control carrier(s). The basic control carrier contains the processor, main memory, memory control, data channels, network channels, and various other interface circuits. Tables F, G, and H depict the basic common control carrier with identifying circuit pack locations, circuit type, code numbers, and maximum quantities. The J58882AH-1 carrier (standard) uses the 64K-word memory and high density data channel circuit packs. This carrier configuration makes it practical to engineer a PBX with duplicate common

TABLE E

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

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

TABLE E (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
1 (Contd)	Auxiliary Cabinet, J58879F-2, List 19 (MD)	Equipment required in addition to Lists 1 and 2 to a -48 Vdc power supply. 203 mm (8-inch) vertical mounting space.
	J58879F-2, List 20	Equipment required in addition to List 16, 17 and 25, 24 to provide a frequency generator
	J58879F-2, List 21	Wiring and equipment required in addition to List 20 to provide one Frequency Interrupter Unit
	J58879F-2, List 22	Apparatus to provide a wall outlet and associated mounting hardware.
	J58879F-2, List 23 (MD)	Equipment required in addition to List 16 when this cabinet is used in a multi-cabinet PBX line up.
	J58879F-2, List 24 (MD)	Equipment required in addition to List 16 to provide AC power distribution with EMI filter.
	J58879F-2, List 25	Framework, assembly, wiring and equipment for one basic cabinet with five carrier positions. Provides mounting space for ECTS carriers (J58879KA & J58879KB) and electromechanical equipment where required.
	J58879F-2, List 26	Equipment required in addition to List 25 when this cabinet is used in a multicabinet line up, or to provide an alternate method of providing earthquake bracing in other applications.
2	Recorded Announcement Unit, H-400-107, Lists 1 & 6, KS-16765	Requires J58879F, List 2, for 254 mm (10-inch) vertical mounting space.
	Recorded Announcement Unit, H-400-107, List 1	Same as KS-16765, Lists 2, 7, and 8, to include hardware for connectorization.
3	Recorded Announcement Amplifier, List 4	Required in addition to List 1 when KS-20449, List 1, amplifier is required.
4	Recorded Telephone Dictation Trunk Unit, J58827E-1, Lists 1 & 7	Assembly, wiring, and equipment for one recorded telephone dictation trunk unit. Provides a means of recording announcements and transmitting them to one or more trunks simultaneously.
5	Trunk Level Interconnecting Unit, J53050F-1, Lists 1 & 3	Assembly, wiring, and equipment for one automatic trunk level interconnecting circuit. Provides trunk level access to customer-provided equipment such as radio paging, dial dictation, etc.
6	Interface Unit, J58824CD-1, Lists 7, 9, 12, 15, 16, & 17	Assembly, wiring and equipment for one applique unit. Required when TOUCH-TONE service signals are converted to dc signals on a 2-of-7 lead basis using type G1 receivers or Type A3 TOUCH-TONE telephone receivers.
7*	J99380A-1, Lists 1 & 4, CPFT Assembly Hardware (MD)	Assembly, wiring, and equipment for one shelf assembly equipped to acommodate up to 12 MFT transmission type plug-in units.
	CPFT Mounting Panel, J99380B-1, List 1 (MD)	Assembly, wiring, and common equipment required for one apparatus mounting panel equipped to accept up to twelve 837-type units.
8*	CPFT Shelf Assembly, J99390C-1, List 1 (MD)	Assembly, wiring, and equipment required to install one shelf assembly to accommodate up to 14 KTU-type circuits.
	CPFT Double-Depth Shelf Frame, J99380D-1, List 1 (MD)	Assembly and wiring for one hinged double-depth frame assembly suitable for mounting J99380A, B, C, and E shelf assemblies.

* See footnote at end of table.

TABLE E (Contd)

AUXILIARY CABINET AND COMMON EQUIPMENT SUMMARY

ITEM NO.	EQUIPMENT	DESCRIPTION
8* (Contd)	CPFT Shelf Assembly J99380E-1, Lists 1 & 4 (MD)	Assembly, wiring, and equipment for one double module shelf assembly suitable for mounting up to a maximum of 12 MFT, LSE, or signal type plug in units.
9	Type A3 TOUCH-TONE Calling Receiver Shelf, J99289A-1, 1, 2, 6, G, H	Provides mounting space for two J99289B-1 receiver units.
10	Type A3 TOUCH-TONE Calling Receiver, J99289C-1, List 1, C 5A	Provides a connectorized cable to connect to the TOUCH-TONE calling receiver and interface trunk unit.
11	Type G1 TOUCH-TONE Calling Receiver J59204CA-1, List 1	Provides mounting space for up to two sets of G1 receivers. Each G1 receiver consists of HJ16, HJ17, and AE46 circuits.
12	Input AMP HJ16	Input amplifier and channel detector for the G1 receiver.
	Channel Filter HJ17	Channel filter for G1 receiver.
13	Basic Electronic Telephone Controller Carrier, J58879KA, List 1	Assembly, wiring, and equipment for the basic ECTS carrier.
14	Supplemental Electronic Telephone Controller Carrier, J58879KB, List 1	Assembly, wiring, and equipment for the supplemental ECTS carrier.
15	Auxiliary Cabinet, J58879PH-1, List 12	Equipment required in addition to List 1 to provide one auxiliary circuit filter unit.
16	Radio Paging Dial Pulse Conversion, J58847Y, List 4	Assembly, wiring, and equipment for one link and electronic dial unit with fusing from KS-19642, List 6, rectifier. Required with TOUCH-TONE telephone systems which interconnect to rotary dial paging equipment.
17†	44V4A Repeater, J98615AH, List 2, 2A	Voice repeater equipped for 48-volt operation. Requires 50 mm (2-inch) vertical mounting space.
	44V4B Repeater, J98615AH, List 3, 3B	Data repeater equipped for 48-volt operation. Requires 50 mm (2-inch) vertical mounting space.
18†	24V4C Repeater, J98615BJ, List 2	Two-wire to four-wire repeater requiring 48 volts power.
	24V4D Repeater, J98615BL, List 2	48-Volt operated 2-wire to 4-wire repeater with loop-around repeater in the event of a power failure.
19	H-9040, Group 1	Four-phase recorder announcer for wake-up service.
	H-9040, Group 2	Equipment required in addition to Group 1 for remote record option.
	H-9040, Group 3	Equipment required in addition to Group 1 to provide tape recorder option.
	H-9040, Group 4	Equipment required in addition to Group 1 to provide battery backup for recorder/announcer.
20	13A Recorded Announcement Unit, J1C121A-1, List 1	8-Channel completely electronic digital recorder.

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

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

controls physically located in the same cabinet (Fig. 39) except for the very largest of systems.

4.13 ▶The new J58882AK-1 carrier configuration (required for Issue 3 of FP8) consists of a new common control processor, 256K-word random access memory circuit packs (4 - maximum), Data Communications Interface Unit (DCIU) and minirecorder tape cartridge interface circuits. The carrier also contains associated common control and interface circuits. The carrier replaces the J58882AH-1 carrier when the DCIU function is to be provided in support of the Distributed Communications System (DCS) and/or Applications Processor (AP). The J58882AK-1 carrier not equipped with a DCIU may be used as the control carrier which replaces the J58882AH-1 carrier for single-switch customers not requiring DCS or AP functions.◀

4.14 The function of each growth control carrier is to provide additional carrier slots for main memory, network channels, and/or dual-speed data channels. A maximum of 28 additional dual-speed data channels may be provided per growth control carrier. The processor communicates with each network module over the serial 4-MHz network channels. Tables I and J show the circuit packs and slot locations for the growth control carriers. ▶The J58882AJ control carrier can only be used with the J58882AH or J58882AK basic control carrier. ◀

B. Module Control and Trunk Port Carrier

4.15 A module control and trunk port carrier configuration with optional circuit pack positions, identifying names, code numbers, and maximum quantities is given in Table K. Trunk circuit packs are located only in the module control cabinets. Two module control carriers are always provided per module, one per module control cabinet. Each module control carrier provides a maximum of 22 trunk circuits.

C. Trunk Port Carrier

4.16 A trunk port carrier configuration with optional circuit pack positions, identifying names, code numbers, and maximum quantities is given in Table L. Each module can contain up to eight trunk port carriers, and each carrier has a maximum capacity of 32 trunks of the types shown.

D. Central Office (CO) and Tie Trunk Port Carrier

4.17 Table M depicts a CO and tie trunk port carrier with identifying circuit pack locations, circuit type, code numbers, and maximum quantities. Each module can physically contain a maximum of eight tie trunk carriers or eight trunk port carriers, or a combination of both. The use of line circuits, CO, remote access, and Direct Inward Dialing (DID) trunks further limits the maximum number of tie trunks on a per module basis. Additionally, both the power consumption and heat dissipation levels per cabinet must be kept within limits. Refer to ED-1E301-01 for additional descriptive information.

E. Line Group Control Carrier

4.18 A line group control carrier configuration with circuit pack positions, identifying names, code numbers, and maximum quantities is given in Table N. The line group control carrier provides the group network and network control circuitry plus service for a maximum of 48 lines and is required in any cabinet that contains lines. The maximum number of lines is reduced if attendant, tone, or data port circuits are required. The maximum number of these carriers per module is four.

F. Line Port Carrier

4.19 A line port carrier configuration with circuit pack positions, identifying names, code numbers, and maximum quantities is given in Table O. Each line port carrier provides slots for a maximum of 64 line circuits. ▶Data port circuits in support of the Data Switching feature may also be used in this carrier. Up to 15 line port carriers can be used per module.◀

G. Link Carrier

4.20 A link carrier configuration with circuit pack positions, identifying names, code numbers, and maximum quantities is given in Table P. A maximum of two link carriers per module control cabinet and four per module is allowed. The number of link circuits required is dependent on intermodule traffic. Each link carrier has a maximum capacity of 88 links.

H. Basic and Supplemental Controller Carriers

4.21 Circuit pack positions, identifying names, code numbers, and maximum quantities for the ECTS carriers are given in Tables Q and R. The basic carrier contains the controller power supply (207A). The basic controller carrier provides control

TABLE F

BASIC CONTROL CARRIER CONFIGURATION — J58882AA (MD) OR J58882AC (A&M) (NOTE 1)

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. PER CP CARR	SLOT POSITION IN CARRIER (NOTE 2)																			
TYPE	CODE			00	01-16	17	18	19	20,21	22	23	24	25	26	27	28	29	30	31	32-38	39	40	41
RAM Data Buffer	LC35	1	1	X																			
RAM Bus Termination	LC135B*																						
RAM 8K – Word	LC28B LC28C*	1	16		X																		
RAM 16K – Word	LC128B*																						
RAM Data Control	LC36, LC136*	1	1			X																	
RAM Address and Timing Control (8K)	L37, LC137*	1	1				X																
RAM Address and Timing Control (16K)	LC138*																						
Alarm	LC147	1	1					X															
201CC Processor†	LC143 LC455B/ LC455C	1	1						X														
Extended Microstore	LC142	1	1							X													
I/O and Memory Decode	LC133B	1	1									X											
I/O Buffer	LC132	1	1										X										
I/O Buffer & Terminations	LC134B*																						
Cartridge Transport Interface A	LC29C	1	1											X									
Cartridge Transport Interface B	LC30C	1	1												X								
Duplicate Control and I/O Link	LC146	1	1													X							
ANI Transmitter	LC31C	1	1														X						
Data Transfer‡	LC172B	1	1															X					
Data Control‡	LC171B	1	1																X				
Dual Speed Serial Data Channel§	LC34B (MD)	2	9															X	X	X			
4-MHz Channel Control	LC130	1	1																		X		
4-Mhz Subchannel	LC131	16	1																			X	
Time-of-Day Clock¶	LC144	1	1																	X			

Note 1: The J58882AC carrier applies to DIMENSION 2000/Custom PBX high-speed memory only. The carrier is rated A&M and has been replaced by J58882AH carrier.

Note 2: Slot position 23 is reserved for manufacturing test.

* Applies to DIMENSION 2000/Custom high-speed memory only.

† When the LC455B or LC455C is used instead of LC143, circuit pack LC142 must be removed. The LC455C is required in systems with memory sizes greater than 512K words.

‡ Optional – LC171B and L172B provided with RMATS and CACS and/or SMDR.

§ FP8 PBXs may be configured for the NCOSS LSU (slot 33, circuit 0) by converting to the J58882A-1, List 1, H carrier.

¶ The time-of-day clock may be used in slot 32 only.

TABLE G

CONTROL GROWTH CARRIER CONFIGURATION—J58882AH-1

CIRCUIT PACK TYPE	CODE	NO OF CKTS PER CP	MAX CP PER CARR	SLOT POSITION IN CARRIER (SEE NOTE) 00	01	02	03	04	05	06	07	08	09	10	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31 35	32 36	33 37	34 38	39	40	19	20 24	21 25	22 26	23 27	34	35	36	37	38	39
RAM BUS TERMINATIONS	LC135C	1	1	X																																									
RAM 64K-WORD	LC346	1	8		X	X	X	X	X	X	X	X																																	
RAM DATA BUFFER	LC136	1	1												X																														
RAM ADDRESS AND TIMING CONTROL	LC454	1	1													X																													
ALARM	LC147	1	1														X																												
201CC PROCESSOR*	LC143/ LC455B/ LC455C	1	1															X																											
EXTENDED MICROSTORE	LC142	1	1																	X																									
I/O AND MEMORY DECODE	LC133B	1	1																			X																							
I/O BUFFER†	LC132	1	1																																X										
I/O BUFFER AND TERMINATIONS	LC134B	1	2																				X												X										
MINI-RECORDER INTERFACE A	LC29B	1	1																					X																					
MINI-RECORDER INTERFACE B	LC30C	1	1																						X																				
DUPLICATE CONTROL AND I/O LINK	LC146	1	1																							X																			
ANI TRANSMITTER CKT	LC31C	1	1																								X																		
DATA TRANSFER‡	LC172B	1	1																									X																	
DATA CONTROL‡	LC171B	1	1																										X																
HIGH DENSITY DUAL SPEED SERIAL DATA CHANNEL	LC366/ LC366B	4	9																									X	X	X	X	X				X	X	X	X						
TIME OF DAY CLOCK	LC144	1	1																											X															
4-MHZ CHANNEL CONTROL	LC130	1	3																														X							X			X		
4-MHZ SUBCHANNEL	LC131	16	5																															X							X	X		X	X

NOTE: SLOT POSITIONS 9 AND 10 ARE NOT USED. SLOT POSITION 23 IS RESERVED FOR MANUFACTURING TEST.

* WHEN LC455 IS USED, LC142 IS NOT REQUIRED AND SLOT 22 SHOULD BE LEFT VACANT. LC455C MUST BE USED IN SYSTEMS WITH MEMORY SIZES GREATER THAN 512K WORDS

† USE ONLY WHEN THE GROWTH CONTROL CARRIER IS PROVIDED.

‡ OPTIONAL - LC171B AND LC172B ARE REQUIRED WITH RMATS AND CACS AND/OR SMDR.

TABLE H

CONTROL CARRIER CONFIGURATION J58882AK-1

CIRCUIT PACK (NOTES 1-4)		NO OF CKTS PER CP	MAX CP PER CARR	SLOT POSITION IN CARRIER																																							
TYPE	CODE			00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
DCIU DEBUG	LC507	1	1	X																																							
DCIU I/O	LC505	1	2		X	X																																					
DCIU MEMORY	LC504	1	1				X																																				
DCIU PROCESSOR	LC503	1	1					X																																			
DCIU CONT. REG.	LC502	1	1						X																																		
DCIU DATA BUFFER	LC501	1	1							X																																	
256K RAM	LC500	1	4								X	X	X	X																													
RAM DATA BUFFER	LC136B	1	1												X																												
RAM ADDRESS & TIMING	LC454B	1	1													X																											
ALARM CKT	LC147B	1	1														X																										
PROCESSOR	LC515	1	1															X	X																								
SWAT INTERFACE	LC301	1	1																	X																							
I/O & MEMORY DECODE	LC133B	1	1																		X																						
I/O & BUFFER TERM.	LC134B	1	2																			X															X						
MINIRECORD INT. A	LC509	1	1																				X																				
MINIRECORD INT. B	LC510	1	1																					X																			
DUPLICATE CONTR. & I/O	LC146	1	1																						X																		
ANI DATA REG.	LC31C	1	1																							X																	
DATA TRANSFER	LC172B	1	1																								X																
DATA CONTROL	LC171B	1	1																									X															
TIME OF DAY CLOCK	LC144B	1	1																										X														
QUAD DATA CHANNEL	LC366	4	4																						X	X	X			X	X	X	X	X									
I/O BUFFER	LC132B	1	1																																		X						
4-MHZ CHANNEL CONTROL	LC130	1	3																																X			X			X		
4-MHZ SUBCHANNEL	LC131	16	5																																	X			X	X		X	X

NOTES:

1. LC132B (Slot 33) required when the growth control carrier J58882AJ is used, otherwise use LC134B (Slot 33).
2. LC171B and LC172B (Slots 24 and 23) optional circuit packs required with CACS, RMATS, and/or SMDR.
3. LC301 and LC507 (Slots 16 and 00) are test circuit packs, remove LC301 from carrier when not in use.
4. LC515 (Slots 14 and 15) is made up of two circuit packs (LC513 and LC514) wired together.

TABLE I

GROWTH CONTROL CARRIER CONFIGURATION—J58882AB, J58882AD, OR J58882AG

CIRCUIT PACK (NOTES 1, 2, 3)		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER												
TYPE	CODE			00	01-16	17	18		19	20-33	34	35	36	37	38	39
RAM Data Buffer	LC35	1	1	X				S P A C E								
RAM Bus Termination	LC135B															
RAM (8K or 16K Words)	LC28-Type, LC128-Type	1	16		X											
RAM Data Control	LC36, LC136	1	1			X										
RAM Address and Timing Control	LC37, LC137, LC138	1	1				X									
I/O Buffer	LC132	1	1						X							
I/O Buffer & Terminations	LC134B															
Dual Speed Serial Data Channel	LC34B	2	14							X						
4-MHz Channel Control	LC130	1	2								X			X		
4-MHz Subchannel	LC131	16	4									X	X		X	X

Note 1: Circuit packs LC28B, LC35, LC36, and LC37 are used only with the J58882AB growth control carrier.

Note 2: The 16K-word memory circuit pack (LC128/LC128B) and the LC138 circuit pack (RAM address and timing control) are only used in the J58882AD growth control carrier.

Note 3: The I/O buffer (LC132) is only used with the J58882AB carrier or in the J58882AD carrier when used as part of a three control carrier configuration.

TABLE J

GROWTH CONTROL CARRIER CONFIGURATION—J58882AJ-1

CIRCUIT PACK		NO OF CKTS PER CP	MAX CP PER CARR	SLOT POSITION IN CARRIER								
TYPE	CODE				19	20 21	22 23	24 25	26 27	28 29	30 31	32 33
I/O BUFFER AND TERMINATIONS	LC134B	1	1		X							
HIGH DENSITY DUAL SPEED SERIAL DATA CHANNEL	LC366	4	7			X	X	X	X	X	X	X

for a maximum of 63 multibutton electronic telephone (MET) sets. Additional 63 MET sets can be furnished by a supplemental controller carrier. The supplemental controller carrier is always mounted above the basic controller carrier.

4.22 Drawing ED-1E316-70, group 3, provides an optional "no-carrier" adapter to be used in an empty carrier position below an equipped carrier position. The option provides a chimney for improved cooling.

FEDERAL COMMUNICATIONS COMMISSION (FCC) REGISTRATION REQUIREMENTS

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

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

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

4.26 To comply with regulations developed to ensure network protection from lightning surges and other induced voltages, a 66M3-50R connecting block(s) or a 25-pair cable(s) with an RJ21X jack(s) provided by outside plant should be mounted in close proximity of the cross-connect field. A connectorized A25D cable shall be terminated on the cross-connect field and connected to the 66M3-50R connecting block. For installations without controlled access, the cable should not be more than 7.6m (25 feet) long, but a registered 7.6-m (25-foot) extender cable may be added to extend the distance between the cross-connect field and connecting block. No length restrictions are imposed on cabling in PBX equipment rooms with controlled access.

4.27 A functional block diagram of the network interface for FCC registration requirements is illustrated in Fig. 45. The only leads which are to be wired through the connecting block are tip and ring leads for central office type services (ie, CO trunks, FX, and WATS trunks). Therefore, with the DIMENSION 2000 PBX, only tip and ring leads from circuit packs LC08-type (dial CO trunk circuit) and LC09-type (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

TABLE K

MODULE CONTROL AND TRUNK PORT CARRIER CONFIGURATION—J58882BA

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. PER CP CARR	SLOT POSITION IN CARRIER																														
TYPE	CODE			00	01	02	03	04	05	06*	07*	08*	09	10*	11	12*	13	14	15*	16	17*	18	19*	20	21*	22	23*	24	25*	26	27	28	29	30	31
CARRIER PAM AMPLIFIER	LC101	1	1						X																									
GROUP PAM AMPLIFIER	LC102	1	2				X	X																										
CENTRAL L/T PAM AMPLIFIER	LC103/ LC103B	1	1		X																													
LINK CENTRAL PAM AMPLIFIER	LC104	1	1			X																												
MAINTENANCE	LC105	1	1	X																														
DIGITAL NETWORK BUFFER	LC49C	1	1															X																
NETWORK CLOCK	LC121B	1	1																											X				
NETWORK CONTROL	LC122	1	1																												X			
NETWORK I/O SUBCHANNEL INTERFACE	LC123	1	1																													X		
NETWORK I/O DATA CONVERTER	LC124	1	1																															X
SCANNER/DISTRIBUTOR	LC46	1	1																													X		
REMOTE ACCESS CO TRUNK	LC07	1	11							X	X	X		X		X			X		X		X		X		X							
"TOUCH-TONE" DIALING SENDER	LC12	2	8							X	X	X		X		X			X		X		X											
CONTACT INTERFACE	LC15	8	11							X	X	X		X		X			X		X		X											
CO TRUNK	LC08D	2	11							X	X	X		X		X			X		X		X		X		X							
DID TRUNK	LC09D	2	11							X	X	X		X		X			X		X		X		X		X							
LOOP START EXCHANGE LINE	LC28S	2	11							X	X	X		X		X			X		X		X		X		X							
2-WIRE TIE TRUNK	LC28D	2	8							X	X	X		X		X			X		X		X		X		X							
TIE TRUNK	LC11B	2	8							X	X	X		X		X			X		X		X											
LOOP SIG INTERFACE TRUNK	LC36I	2	8							X	X	X		X		X			X		X		X											
ANI DATA TRANSMITTER	LC32B	1	1																						X									
AUX TRK INTERFACE	LC13B	2	8							X	X	X		X		X			X		X		X											
"TOUCH-TONE" DIALING REGISTER AND RECEIVER †	LC10C/ LC10D	1	11							X	X	X		X		X			X		X		X		X		X							
"TOUCH-TONE" DIALING REGISTER	LC10B	1	8									X		X		X			X		X		X		X		X							
"TOUCH-TONE" DIALING RECEIVER	LC54B	1	8										X		X		X			X		X		X		X		X						
ATND CONFERENCE	LC06B	1	2							X	X	X		X		X			X		X		X											
MESSAGE REGISTER INTERFACE	LC16B	8	8							X	X	X		X		X			X		X		X											
VOICE ANNOUNCEMENT	LC19D	1	1							X	X	X		X		X			X		X		X		X		X							
DATA PORT	LC56I	2	8							X	X	X		X		X			X		X		X											

* OPTIONAL CIRCUIT PACKS.

† THE NUMBER OF LC10C/LC10D CIRCUIT PACKS NEEDED DEPENDS UPON THE NUMBER OF "TOUCH-TONE" DIALING STATIONS AND TRAFFIC LOAD. AN LC10C/LC10D MAY OCCUPY ANY TRUNK PORT CIRCUIT SLOT POSITION. THE LC10C/LC10D CIRCUIT PACK MAY REPLACE AN EXISTING LC10B; HOWEVER, IT IS RECOMMENDED THAT THE ACCOMPANYING LC54B BE REMOVED.

TABLE L

TRUNK PORT CARRIER CONFIGURATION – J58879BA

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER																
TYPE	CODE			01	02*	03*	04*	05*	06*	07*	08*	09*	10	11*	12*	13*	14*	15*	16*	17*	18*
CARRIER BUFFER AMP	LC101	1	1	X																
DIGITAL NETWORK BUFFER	LC49C	1	1										X							
2-WAY CO TRUNK	LC08D	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
DIRECT-IN-DIAL TRUNK	LC09D	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
TIE TRUNK	LC11B	2	8		X	X	X	X	X	X	X	X									
LOOP SIGNALING INTERFACE TRUNK	LC361	2	8		X	X	X	X	X	X	X	X									
"TOUCH-TONE" DIALING RCVR AND REG †	LC10C/ LC10D	1	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
"TOUCH-TONE" DIALING REGISTER	LC10B	1	4											X		X		X		X	
"TOUCH-TONE" DIALING RECEIVER	LC54B	1	4												X		X		X		X
AUX TRUNK INTERFACE	LC13B	2	8		X	X	X	X	X	X	X	X									
ATTENDANT CONFERENCE	LC06B	1	2		X	X	X	X	X	X	X	X									
REMOTE ACCESS CO TRUNK	LC07	1	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
"TOUCH-TONE" DIALING SENDER	LC12	2	8		X	X	X	X	X	X	X	X									
CONTACT INTERFACE	LC15	2	8		X	X	X	X	X	X	X	X									
MESSAGE REGISTER INTERFACE	LC16B	8	8		X	X	X	X	X	X	X	X									
DATA PORT	LC567	2	8		X	X	X	X	X	X	X	X									

* OPTIONAL CIRCUIT PACKS.

† THE NUMBER OF LC10C/LC10D CIRCUIT PACKS NEEDED DEPENDS UPON THE NUMBER OF "TOUCH-TONE" DIALING STATIONS AND TRAFFIC LOAD. AN LC10C/LC10D MAY OCCUPY ANY TRUNK PORT CIRCUIT SLOT POSITION. THE LC10C/LC10D CIRCUIT PACK MAY REPLACE AND EXISTING LC10B; HOWEVER, IT IS RECOMMENDED THAT THE ACCOMPANYING LC54B BE REMOVED.

♦TABLE M♦
CO AND TIE TRUNK PORT CARRIER – J58882BD

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER																
TYPE	CODE			01	02*	03*	04*	05*	06*	07*	08*	09*	10	11*	12*	13*	14*	15*	16*	17*	18*
Carrier Buffer AMP	LC101	1	1	X																
Digital Network Buffer	LC49C	1	1										X							
2-Way CO Trunk	LC08D	1	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Tie Trunk	LC11B	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
2-Wire Tie Trunk	LC280	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Loop Start Exchange Line	LC285	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Loop Signaling Interface Trunk	LC361	2	16		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Data Port†	LC567	2	16		X				X						X			X			

* Optional circuit packs

† When LC567 is mounted in slot 02,06, 11, or 15 the adjacent slot 03, 07, 12, 16 respectively must be unequipped.

green field from which the A25D connector cable originates and plugs into the 66M3-50R connecting block.

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

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

4.29 To comply with FCC technical requirements, the maximum allowed loop resistance to be used serving LC02-type and LC03-type, excluding terminal equipment, shall be less than 950 ohms. This applies to all FCC registered terminal equipment. It is required that the LC02B, LC03C, LC09D, and LC49C or LC41B vintage circuit packs be used in order to conform to the FCC criteria. Circuit packs with earlier vintage codes cannot be substituted in registered DIMENSION 2000 PBXs. The grandfathered PBXs are not restricted by vintage of circuit pack codes. Only registered station sets, registered terminal equipment, equipment registered in conjunction with the DIMENSION PBX, or private line services may be connected to the LC02B and LC03B.

4.30 Systems shipping on or after October 1, 1983, must comply with FCC Rules (Part 15) pertaining to radio frequency interference (RFI). Controlled introduction of compliant systems will be made in advance of this date. The compliant systems will incorporate the following to become more resistant to RFI:

- Shielded cabinets
- Cables having drain wire shields with spade lug connectors which attach to mating connector field on the back of the cabinets.
- RFI gasket on mating surfaces of cabinet panels which can be removed
- Conductive paints on cabinet surfaces which permanently mate
- Fasteners which hold the doors in place
- Triaxial 4 MHZ cable between cabinets.

4.31 DIMENSION 2000 PBXs have a registration label affixed on the basic cabinet or the control carrier. Grandfathered PBXs do not have the registration label.♦

♦TABLE N♦

LINE GROUP CONTROL CARRIER CONFIGURATION — J58882BB

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. PER CP CARR	SLOT POSITION IN CARRIER (NOTE)																				
TYPE	CODE			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
Carrier PAM AMP	LC101	1	1				X																		
Group PAM AMP	LC102	1	2		X	X																			
Maintenance	LC105	1	1	X																					
Digital Network Buffer	LC49C	1	1											X											
Scanner Distributor*	LC46	1	1																				X		
Network Control*	LC122	1	1																			X			
Network I/O Subchannel Interface*	LC123	1	1																					X	
Network I/O Data Converter*	LC124	1	1																						X
Tone A†	LC04	1	1					X																	
Tone B†	LC05B	1	1						X																
Tones Circuits	LC204	1	1					X																	
Attendant Interface	LC45B	2	2							X	X														
Line Circuit	LC02B	4	12					X		X	X	X	X		X	X	X	X	X	X	X				
Message Waiting	LC03C	4	12					X		X	X	X	X		X	X	X	X	X	X	X				
Signal Distribution	LC41B	1	1											X											
Tone Plant C‡	LC17B	1	1										X												
Transmission Test Line§	LC145	2	1												X	X	X	X	X	X	X				

Note: Optional circuit packs in slots 05, 07, 08, 12, 13, 14, 15, 16, 17, and 18.

* Not required when carrier is located in module control cabinet.

† Both LC04 and LC05B circuit packs are required to provide tones.

‡ FP8, FP11, and FP12 only.

§ Only one LC145 per DIMENSION PBX.

◗TABLE O◖

LINE PORT CARRIER CONFIGURATION — J58879AC

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER				
TYPE	CODE (NOTES 1 & 2)			00	01	02-09	10	11-18
Carrier PAM AMP	LC101	1	1		×			
Digital Network Buffer	LC49C	1	1				×	
Line Circuit	LC02B	4	16			×		×
Message Wating Line Circuit	LC03C	4	16			×		×
Signal Distribution Circuit	LC41B	1	1				×	
Data Port	LC567	2	16			×		×

Note 1: An LC41B and LC03Cs are used instead of LC49C and LC02Bs when the Message Waiting feature is used.

Note 2: An LC567 replaces and LC02B where required when Data Switching feature (FP8) is provided.

TABLE P

LINK CARRIER CONFIGURATION—J58882BC

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER										
TYPE	CODE			00	01	02	03	04-08	09	10-15	16	17-21	22	23-28
Carrier PAM AMP	LC101	1	2				×				×			
Group PAM AMP	LC102	1	2		×	×								
Digital Network Buffer	LC49C	1	2						×				×	
Link Circuit*	LC100	4	22					×		×		×		×
Voice/Data Link*	LC568	4	22					×		×		×		×

* LC568s replace LC100s when Data Switching Level 2 (FP8) is provided.

TABLE Q

ECTS BASIC CONTROLLER CARRIER CONFIGURATION—J58879KA

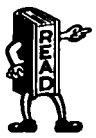
CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER (SEE NOTE)												
TYPE	CODE			00	01	02	03	04	05	06	07	08	09	10	11	12
Steering Circuits	LC55	8	8	X	X	X	X	X	X	X	X					
Transmitter/Receiver	LC56	1	1									X				
Memory I/O	LC57	1	1										X			
Station Activity Buffer	LC58	1	1											X		
Fault Control	LC59	1	1												X	
Data Interface	LC60	1	1													X

Note: A 207A power supply is provided in left side of carrier.

TABLE R

ECTS SUPPLEMENTAL CONTROLLER CARRIER CONFIGURATION—J58879KB

CIRCUIT PACK		NO. OF CKTS PER CP	MAX. CP PER CARR	SLOT POSITION IN CARRIER							
TYPE	CODE			13	14	15	16	17	18	19	20
Steering Circuits	LC55	8	8	X	X	X	X	X	X	X	X

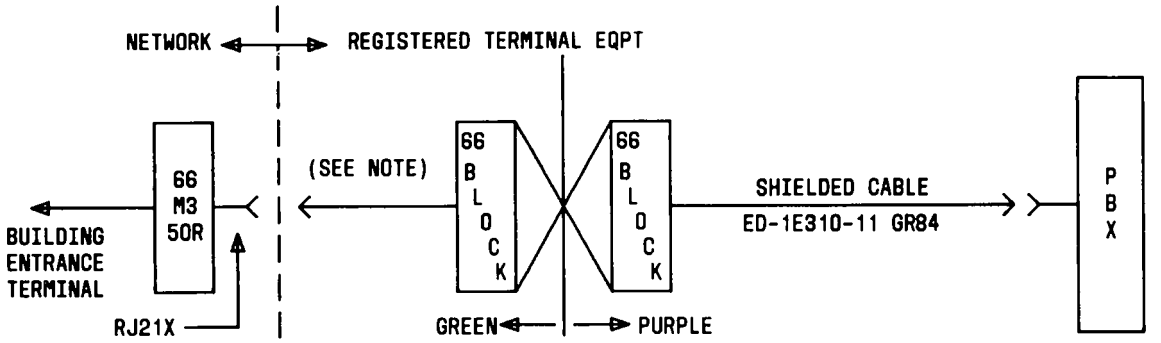


In order to meet FCC requirements of physical and electrical separation of network channel terminating equipment (NCTE) from customer terminals, all CPFT arrangements which permit mounting and use of metallic facility terminal (MFT) equipment within DIMENSION PBX arrangements are rated "MD." Therefore, MFT equipment should no longer be mounted in an auxiliary cabinet but should be physically located separately from the PBX and electrically located on the NETWORK side of the RJ21X registration jack.

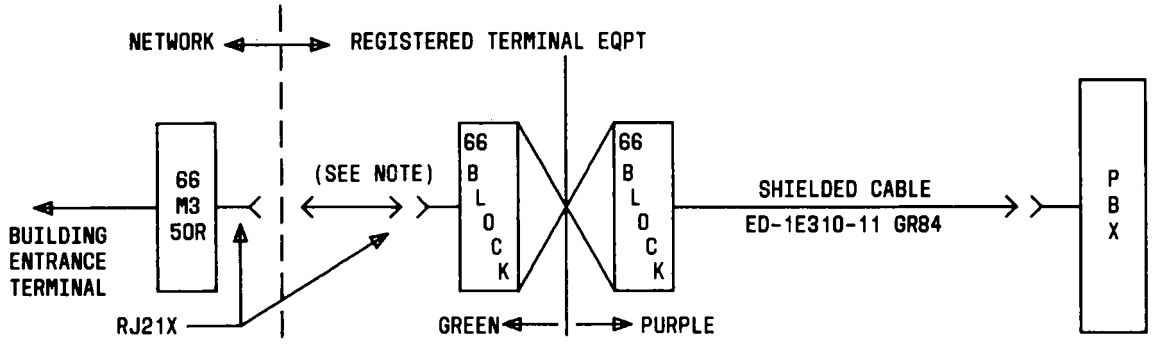
CIRCUIT PACK DESCRIPTION

A circuit pack is always replaced with a circuit pack having either the same or later alpha suffix as printed on the carrier designation strip. That is, an LC02 cannot be used if the designation strip specifies LC02B. The LC02B or later alpha-suffixed circuit packs are suitable replacements.

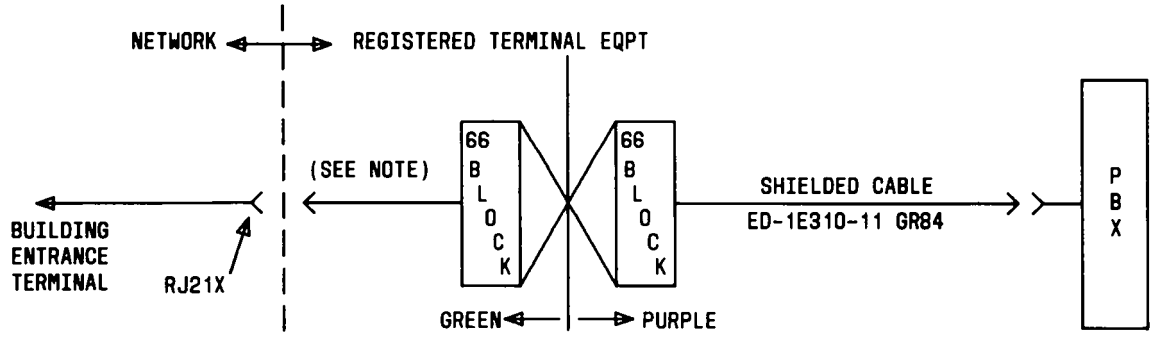
4.32 Circuit packs are 203 mm by 292 mm (8 inches by 11-1/2 inches). Each pack is equipped with an identification faceplate containing a color-coded label. The circuit packs have been separated according to function to simplify maintenance and repair. In addition, the circuit pack faceplates have test points to allow interrogation of internal circuit states for fault diagnosis. The following is a list of circuit



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



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



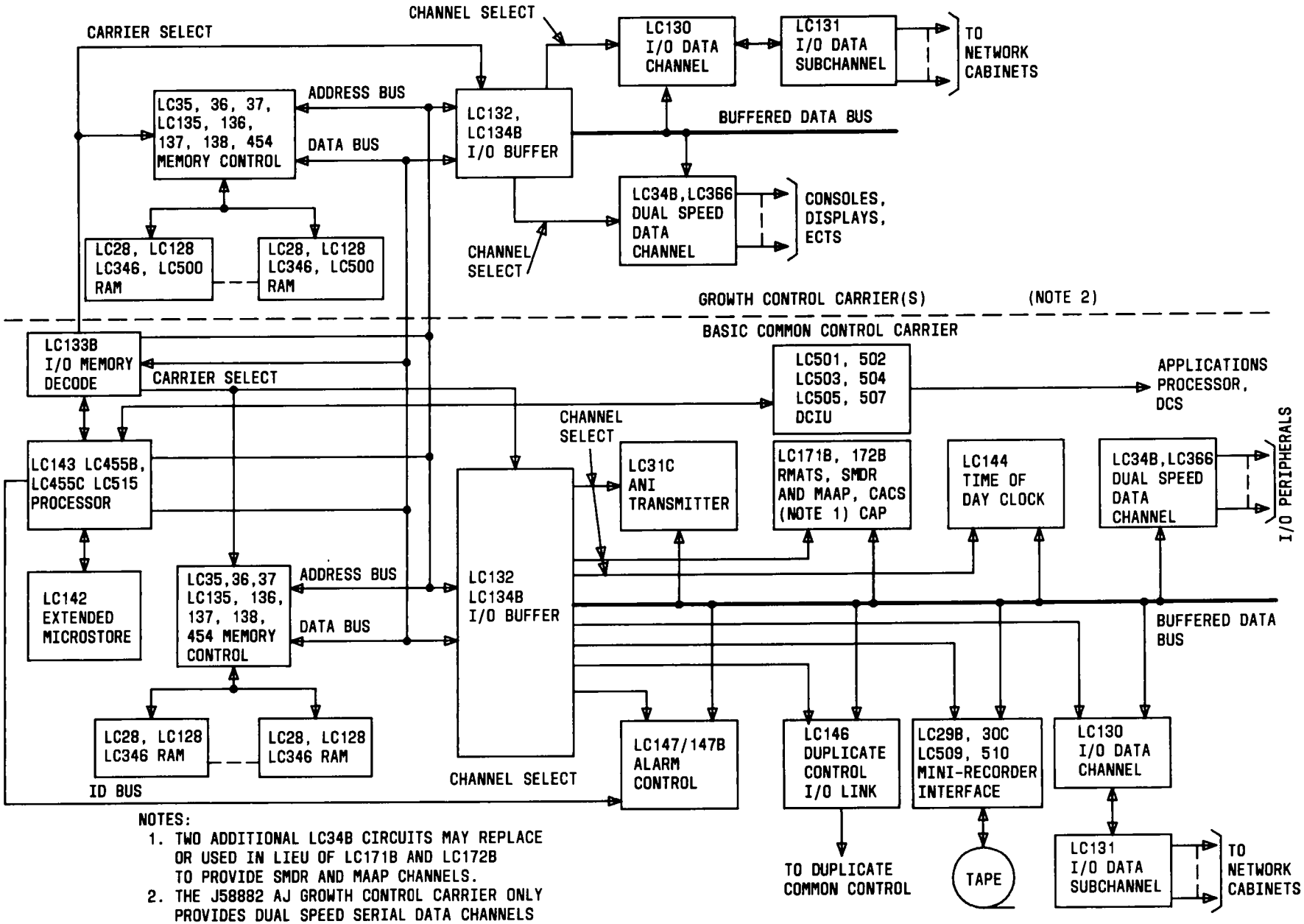
C. WITH MINIATURE RIBBON CONNECTOR ENDED CABLE

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

Fig. 45—Typical FCC Registered Equipment Interconnections

packs and their function. ⧫Refer to Fig. 46 for a functional block diagram of the DIMENSION 2000/ Custom PBX common control and network control circuit pack configurations.⧫

- ***LC02B—Line Circuit:*** The LC02B is the interface to stations within the PBX. It receives loop signaling from the station sets to detect on- and off-hook status and rotary dial pulses. It alerts the station by sending 20-Hz ringing. Each LC02B provides four separate line circuits. The tip and ring is not cut through the time division switch and so cannot achieve dc continuity.
- ***LC03C—Message Waiting Line Circuit:*** The LC03C functions in the same manner as the LC02B but, in addition, can interface with a station message waiting lamp and with the energy communication signaling unit (ECSU). Each LC03C provides four separate line circuits.
- ***LC04—Tone Plant A:*** The LC04 provides 350-Hz and 440-Hz tones. It works in conjunction with the LC05B to provide eight distinct tones. The tones generated by the LC04 and LC05B are used in their normal state, combined, modulated, and are steadily maintained or interrupted at precise rates. Two LC04s are required for each network module. The LC204 is intended to replace an existing LC04; however, it is a requirement that the accompanying LC05B be removed to ensure system integrity.
- ***LC05B—Tone Plant B:*** The LC05B provides 480-Hz and 620-Hz tones. It works in conjunction with the LC04 to provide eight distinct tones. The tones generated by the LC04 and LC05B are used in their normal state, combined, modulated, and are steadily maintained or interrupted at precise rates. Two LC05s are required for each network module.
- ***LC06B—Attendant Conference Circuit:*** The LC06B enables the attendant to establish a conference of up to six parties. This circuit can accommodate a maximum of six stations or four stations and two trunks. A separate time slot and conference port is required for each conferenced party. Attendant conference circuits cannot be bridged together. Each LC06B contains one 6-port conference circuit.
- ***LC07—Remote Access CO Trunk:*** Each LC07 permits off-network stations to "remotely" access special trunks (ie, WATS). The LC07 permits automatic voice controlled (switched directionally) gain. One CO trunk circuit is contained per circuit pack.
- ***LC08D—Dual CO Trunk Circuit:*** The LC08D provides all CO, FX, and WATS ground-start trunk interfaces to a central office. This circuit employs standard ground-start signaling and can be used in 1-way incoming, 1-way outgoing, or 2-way modes. Each LC08D detects a CO battery reversal for toll diversion purposes. Each LC08D contains two separate trunk circuits. The circuit packs may be located in the trunk port carrier, module control and trunk carrier, and tie trunk port carrier.
- ***LC09D—Direct Inward Dialing (DID) Trunk Circuit:*** The LC09D provides the DID trunk interface to a central office. It detects a low resistance loop closure (high-low signaling) as an incoming seizure and provides a reversal of battery and ground on the tip and ring leads as an off-hook indication from the PBX. Each LC09D contains two separate trunk circuits. The LC09D provides circuits compatible with hardware digit collection. The circuit packs may be located in the trunk carrier and in the module control and trunk carrier.
- ***LC10B—TOUCH-TONE Dialing Register:*** The LC10B is paired with an LC54B to process TOUCH-TONE dialing. The register circuit interfaces the receiver to the time division network and converts the 2-out-of-7 output from the receiver to a binary-coded decimal (BCD) signal. Each LC10B provides one register circuit. One circuit (LC10B and LC54B) occupies the slots for two trunk circuit packs in the trunk carrier but only one slot in the module control and trunk carrier.
- ***LC10C—TOUCH-TONE Dialing Receiver and Register:*** Each LC10C provides one TOUCH-TONE telephone receiver and one TOUCH-TONE telephone register. The receiver is connected to the time division network and controlled by a time slot clock. TOUCH-TONE calling multifrequency sig-



NOTES:
1. TWO ADDITIONAL LC34B CIRCUITS MAY REPLACE OR USED IN LIEU OF LC171B AND LC172B TO PROVIDE SMDR AND MAAP CHANNELS.
2. THE J58882 AJ GROWTH CONTROL CARRIER ONLY PROVIDES DUAL SPEED SERIAL DATA CHANNELS

Fig. 46—DIMENSION 2000/Custom PBX Common Control and Network Control Circuit Pack Configurations (Sheet 1 of 2)

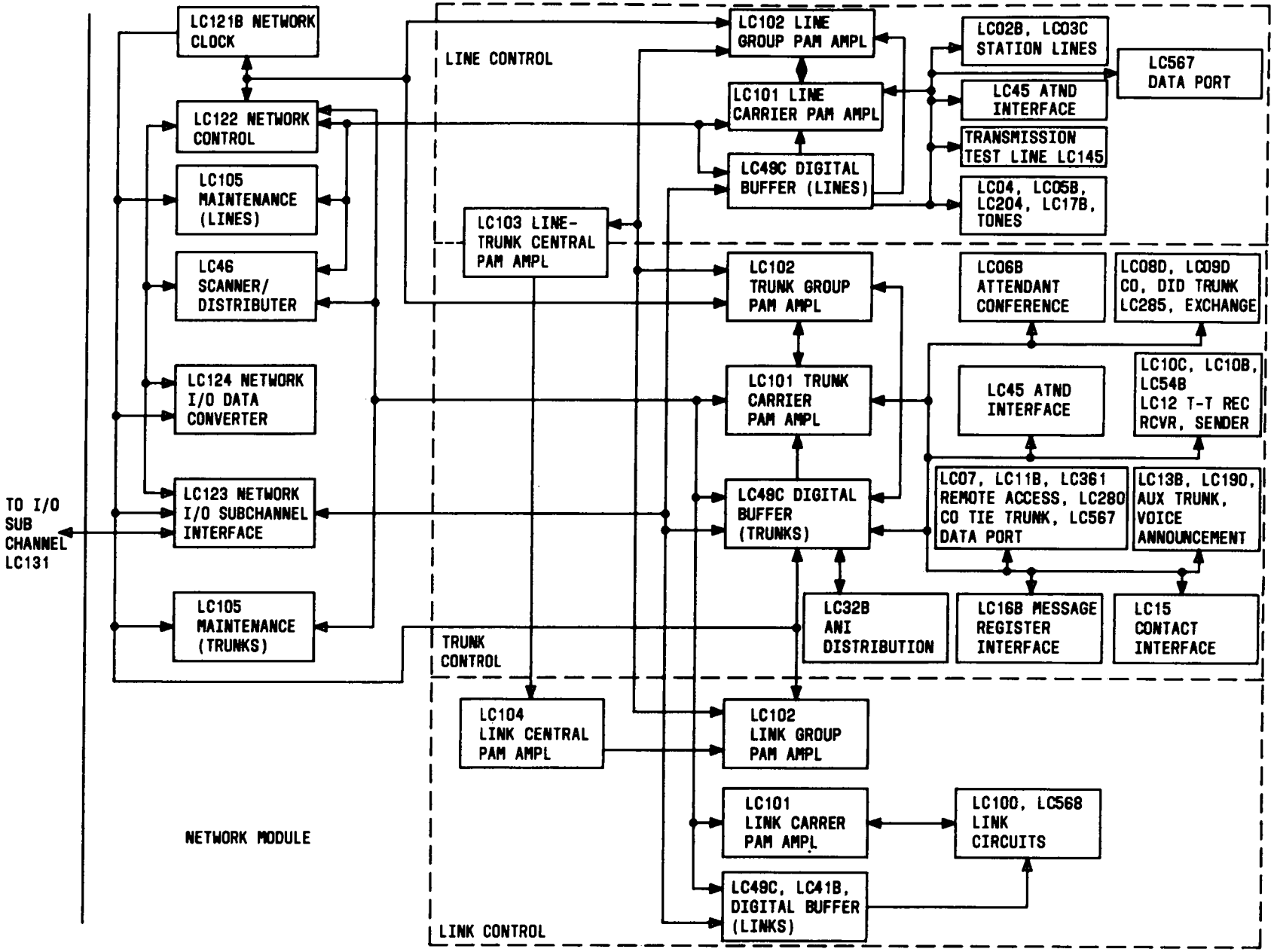


Fig. 46—DIMENSION 2000/Custom PBX Common Control and Network Control Circuit Pack Configurations (Sheet 2 of 2)

nals (2-out-of-7) are converted into a 4-bit BCD signal. The LC10C may occupy any trunk port circuit pack slot position. The LC10C may replace an existing LC10B; however, it is recommended that the accompanying LC54B be removed to enhance system reliability.

- ***LC10D TOUCH-TONE Dialing Receiver and Register:*** Performs the same function as LC10C and has increased resistance to noise spikes generated in the SMDR application.

- ***LC11B—Tie Trunk Circuit:*** The LC11B tie trunk circuit is normally used to provide Common Control Switching Arrangement (CCSA) access and tie trunk service. It may be used for certain DID applications and as a Release Link Trunk (RLT) for Centralized Attendant Service (CAS) applications. The LC11B is also compatible with Automatic Voice Network (AUTOVON) Service. This circuit can be optioned on the circuit pack for standard duplex (DX) or E and M signaling. Two independent trunk interfaces are provided on one circuit pack, and the signaling method of one does not affect the signaling method of the other. Each trunk circuit in the LC11B has 2-dB switchable gain that may be software controlled.

- ***LC12—TOUCH-TONE Dialing Sender:*** This circuit pack (CP) contains two trunk-type circuits which function independently as a TOUCH-TONE telephone generator and as a dial-tone receiver (ie, detector). The TOUCH-TONE dialing senders (2 per CP) are software controlled and, when enabled, generate TOUCH-TONE dialing signals of a 76-millisecond duration for digit outpulsing and maintenance. Dial-tone detection is accomplished by a precision 350-Hz dial-tone detector (2 per CP).

- ***LC13B—Auxiliary Trunk Interface Circuit:*** Each LC13B contains two separate circuits. The LC13B may be used to provide a trunk-type interface to the following hardware units: loudspeaker paging coupler, music-on-hold coupler, recorded announcement machine, recorded telephone dictation trunk, automatic trunk level interconnecting unit, and AUDICHRON* external announcement machine for Automatic Wakeup Service.

- ***LC15—Contact Interface B:*** Each LC15 contains eight circuits. The LC15 is used to drive the CAS system status indicator and trunk status indicator lamps for both CAS and Uniform Call Distribution/Direct Department Calling (UCD/DDC). It also drives the ACD system status indicator.

- ***LC16B—Message Register Interface (FP9):*** The LC16B detects M lead signals from the central office. These signals increment the message unit total for the line which is connected to the associated trunk. Either a single wire with ground return or balanced metallic lines may be used. Additionally, the LC16B is required for interfacing to the energy usage sensors in implementing the Energy Communications Feature. Each LC16B contains eight station message register circuits.

- ***LC17B—Tone Plant C:*** This circuit pack generates tones for inter-PBX signaling in CAS applications and Code Calling Access (Chime Paging). Although only one LC17B is required per network module at a branch PBX location containing RLTs or backup stations, two LC17Bs are normally specified for backup purposes. An LC17B provides call-type identification to the CAS attendant(s) on outgoing release link trunk (RLT) calls. An alternate clock source input (25 ms) is provided for use with a dual processor to prevent the code calling access tone from being seized when in use and to change the code calling access tone from 880 Hz to 892 Hz. The following four tones are provided: 440 Hz and 480 Hz—LDN, INWATS, FX, and CAS; 480 Hz—immediate audible ring—CAS; 440 Hz—CAS; and 892 Hz—Code Calling Access.

LC28B(MD)—Random Access Memory (RAM) (8K): The LC28B is located in the basic control carrier and growth control carrier. The LC28B is designed with an increased drive capability in order to be compatible with the DIMENSION 2000 PBX. Each LC28B contains storage for 8192 words.

- ***LC28C—RAM (8K):*** The LC28C is designed to provide additional real-time capa-

*Registered trademark of the Audichron Company.

bility (faster access speed) for the DIMENSION 2000 PBX. It performs the same functions as the LC28B and is compatible with the DIMENSION 2000 and Custom PBX systems.

- ***LC29B—Minirecorder Interface A:*** The LC29B contains the interface circuits between the processor, data bus, and tape transport interface B. The LC29B is designed to accept increased speed and four tracks in the DIMENSION 2000 PBX. One LC29B is required for each tape transport.

- ***LC30C—Minirecorder Interface B:*** The LC30C controls the operation of the tape transport. The LC30C is designed to accept increased speed and four tracks in the DIMENSION 2000 PBX. One LC30C is required for each tape transport.

- ***LC31C—Automatic Number Identification (ANI) Data Register Circuit:*** The LC31C provides the ANI control and register circuits. It stores the identity of the calling station until it is transmitted to the central office. It is designed to drive the increased number of circuits in the DIMENSION 2000 PBX. One LC31C is required for each processor.

- ***LC32B—ANI Data Transmitter Circuit:*** The LC32B controls the transmission of ANI information to the central office. Both channels on each LC32B must be associated with the same type office (CO, FX, WATS, etc). Each LC32B provides two data channels. The LC32B is designed to drive the increased number of circuits in the DIMENSION 2000 PBX.

- ***LC34B ◗(MD)◖—Dual-Speed Serial Data Channel:*** The LC34B provides two dual-speed data channels (slow 185 kb/s, fast 833 kb/s) used to convert and transmit data between the processor and peripheral units. The LC34B can be used as an optional substitution for the LC366 dual-speed data channel.

- ***LC35—RAM (4K) Data Buffer Circuit:*** The LC35 is one of three circuit packs that provide memory control for the RAM. It functions as a memory bus termination and, in conjunction with the LC36, as a bit-swap circuit. One LC35 is required per system for the Remote Maintenance, Administration, and Traffic System (RMATS). One LC35 is required in each basic and growth control carrier (replaced by LC135B) for DIMENSION 2000 PBX.

- ***LC36—RAM Control:*** The LC36 is one of three circuit packs that provide the memory control for the RAM. It functions as a memory data buffer and, in conjunction with the LC35, as a bit-swap circuit. One LC36 is required per system for RMATS. One LC36 is required in each basic and growth control carrier (replaced by LC136) for DIMENSION 2000 PBX.

- ***LC37—RAM (4K) Address and Timing Control Circuit:*** The LC37 is one of three circuit packs that provide the memory control for the RAM. It refreshes memory and provides a timing circuit that controls the internal timing of the memory. One LC37 is required per system for RMATS. One LC37 is required in each basic and growth control carrier (replaced by LC137) for DIMENSION 2000 PBX.

- ***LC41B—Signal Distribution Circuit:*** The LC41B performs the functions of the LC49C and replaces the LC49C in the line carrier when stations are equipped for Message Waiting or when the Energy Communications Service feature is implemented. It monitors lamp status. One LC41B is required per line carrier.

- ***LC45—Attendant Interface:*** The LC45 connects the Attendant Console voice path to the time division bus. Each LC45 contains two separate 4-wire transmission circuits.

- ***LC45B—Attendant Interface:*** The LC45B is introduced to reduce transmission noise in the Attendant Console circuit and is used when the Attendant Console is equipped with a 478B plug not containing a shunt resistor. An LC45 must be used when the Attendant Console is equipped with a 478A plug containing a shunt resistor.

- ***LC46—Scanner/Distributor:*** The LC46 interrogates the port circuits and reports

status to the processor. In addition, it distributes control data to port circuits. This data controls the ring relay in the line ports and various trunk port relays. It is also used in conjunction with the network control during network tasks, and decodes carrier addresses and buffer board port address bits to the LC49C. One LC46 is required per module control and trunk port carrier and line group control carrier (except when located in module control cabinet).

- ***LC49C—Digital Network Buffer:*** The LC49C provides buffer gating and an audit selector for the network control, board and port selection decoders for the scanner/distributor, port reset logic, and common ringing application and trip circuits for the line circuits. The LC49C is designed to reduce noise to an acceptable level when used with the printed backplane trunk carrier. One LC49C is required for each line, trunk, line group control, and module control and trunk carrier. Two LC49Cs are required for each link carrier.

- ***LC54B—TOUCH-TONE Dialing Receiver:*** The LC54B is paired with a TOUCH-TONE telephone register (LC10B) to process TOUCH-TONE dialing. It converts the TOUCH-TONE dialing signals to a 2-out-of-7 code.

- ***LC55 through LC60:*** For a description of the ECTS control circuit packs, refer to Section 554-010-110 Electronic Custom Telephone Service, System Description.

- ***LC100—Link Circuit:*** The LC100 provides the necessary conversion circuits to permit intermodule connections. Each LC100 contains four circuits and is located in the link carrier.

- ***LC101—Carrier Buffer Amplifier:*** The LC101 serves as a common amplifier for all input and output pulse amplitude modulation (PAM) signals in the line, trunk, and link carriers. It also directs each time slot to the bus to which it is assigned during the call and provides a digital interface for some of the control signals. One LC101 is required for each line group control carrier, line port carrier, module control and trunk port carrier, and the trunk port carrier. Two are located in the link carrier.

- ***LC102—Group PAM Amplifier:*** The LC102 amplifies all input and output signals within a common group (line, trunk, or link group). Two LC102s are required for each module control and trunk carrier, line group control carrier, and each module containing links must contain one LC102 per bus (two maximum per module).

- ***LC103—Central Line/Trunk PAM Amplifier:*** The LC103 sums all PAM signals within a network module. Each of the two amplifiers in a module serves one of the two PAM buses. Input signals from all line, trunk, and link groups are amplified and provided as outputs to all line and trunk groups connected to the same bus. One LC103 is required for each module control and trunk port carrier.

- ***LC103B—Central Line/Trunk PAM Amplifier:*** The LC103B is created from an LC103 and is used instead of the LC103 in order to solve a noise problem.

- ***LC104—Link Central PAM Amplifier:*** The LC104 amplifies the PAM signals being transmitted from line or trunk group amplifiers. Input signals from all line and trunk groups associated with a particular bus are amplified and provided as outputs to link group amplifiers connected to the same bus. One LC104 is required for each module control and trunk port carrier.

- ***LC105—Network Maintenance Circuit Pack:*** The LC105 performs PAM continuity and gain tests. It also monitors power, clock status, fuses, and temperature. One LC105 is required for each module control and trunk port carrier and line group control carrier (when located in a line cabinet).

- ***LC121B—Network Clock:*** The LC121B provides all functional timing for circuits in each network module and a 25-ms clock for the LC05B circuit pack. One LC121B is required for each module control and trunk port carrier. Each LC121B contains a dual in-

line package (DIP) switch which provides for optional control, allowing the network clock to be locked on-line. Normally, the switch section identified as 2 should be set in the operate position, allowing software control.

- ***LC122—Network Control:*** The LC122 establishes, removes, and audits network connections in response to commands from the processor. One LC122 is required for each module control and trunk port carrier and line group control carrier (when located in a line cabinet).

- ***LC123—Network Input/Output (I/O) Subchannel Interface:*** The LC123 receives and transmits data in a serial format from the common control subchannels. It provides a dedicated data channel between the processor and each network frame. One LC123 is required for each module control and trunk port carrier and line group control carrier (when located in a line cabinet).

- ***LC124—Network I/O Data Circuit:*** The LC124 receives serial data from the LC123 and converts the data to a parallel format to be used by the scanner/distributor and network control. Information is passed through it from the processor providing instructions to the scanner/distributor and network control.

- ***LC128/LC128B—RAM (16K):*** Each LC128-type circuit pack is designed to provide 16K words of read/write memory, twice the quantity of an LC28C. Use of LC128-type circuit packs does not change the main memory access time in comparison to LC28Cs, but does allow each control carrier to contain up to 256K words. An LC138 RAM address and timing circuit pack is required when LC128/LC128Bs are used.

- ***LC130—4-MHz Channel Control:*** The LC130 controls all communication between the processor and network module PAM buses. Each 4-MHz channel control may transmit and receive data (in bipolar format) from a maximum of two LC131 4-MHz subchannels.

- ***LC131—4-MHz Subchannel Circuit:*** Each LC131 receives address and I/O data from an associated LC130. The LC131 provides a maximum of 16 subchannels which are dedicated for communication with the network cabinets. Each network cabinet contains a module control and trunk port carrier or a line group control carrier which interconnects via an LC123 to the 4-MHz subchannels.

- ***LC132—I/O Buffer:*** The LC132 functions as an I/O buffer to the processor main address and data buses. One LC132 is required for each common control carrier which contains 1.5 μs cycle time memory and for the first growth control carrier in a system utilizing three control carriers, each containing 0.75 μs cycle time memory.

- ***LC133B—I/O Memory Control:*** The LC133B provides the processor control of data passed from memory to the input/output buffers (LC132 or LC134). One LC133B is required in each basic control carrier. Each LC133B contains an option strap which designates 8K-word or 16K-word addressing. The LC133B contains an option strap which designates 64K-word addressing.

- ***LC134B—I/O Buffer and Terminations:*** The LC134B performs the same function as an LC132. Each LC134B contains pull-up resistors (address terminations). The LC134Bs are always used in the terminating (top and bottom) common control carriers (basic, first growth, or second growth) where 0.75 μs cycle time memory is used.

- ***LC135C—RAM Bus Termination:*** The LC135C provides terminations for the memory address, data, and control buses. One LC135C is required in each basic and growth control carrier.

- ***LC136—RAM Data Control:*** The LC136 functions as a memory data buffer and as a bit-swap circuit. One LC136 is required in each basic and growth control carrier.

- ***LC137—RAM Address and Timing Control:*** The LC137 refreshes memory and provides a timing circuit that controls internal timing of the memory. One LC137 is required for each basic and growth control carrier when equipped with LC28Cs.

- ***LC138—RAM Address and Timing Control:*** The LC138 provides refresh and other timing signals required to maintain and control the read/write operations. One LC138 is required for each basic and growth control carrier(s) that is equipped with LC128s.

- ***LC142—Extended Microstore:*** The LC142 provides 24 read only memories (ROMs) totaling 3K words of additional microstore memory for the processor. One LC142 is required for each basic control carrier.

- ***LC143—201CC Processor:*** The LC143 is a microprogrammable processor made up of two separate printed circuit boards (LC140 and LC141) mounted together and electrically connected through two special interboard connectors. It controls data flow between the main memory and I/O devices via a 1-way address bus and a 2-way data bus and performs arithmetic and logic operations on this data. It also provides logic to generate system interrupts and boot-strap loading of the main memory. The 1K of read only memory (ROM) that stores the microcontrol programs generates signals for the processor, clock generator, and controls decoding circuits for generating timing and control signals for the processor. One LC143 is required for each basic control carrier.

- ***LC144—Time-of-Day Clock:*** The LC144 provides hardware clock synchronization for the DIMENSION 2000 or Custom PBX. This clock synchronization is optional equipment; however, it is recommended for FP8, FP9, FP11, and FP12 applications where an accurate 24-hour clock is essential for customer billing, network plan synchronization, or traffic data collection.

- ***LC145—Transmission Test Line Circuit:*** This circuit pack provides an automatic facility for the transmission testing of trunks from the central office. One LC145 is required per system to provide the feature. The circuit pack may be located in one of slots 12 through 18 of the line group control carrier. Each LC145 contains two ports (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.

- ***LC146—Duplicate Control and Interprocessor Channel Circuit:*** The LC146 provides circuitry to determine status of the processors in a duplicated common control system and a data channel between the two processors. One LC146 is required for each basic control in a duplicated common control system.

- ***LC147—Alarm Circuit:*** The LC147 interfaces with the processor alarm panel, duplication control, fuse and breaker alarm bus, and overtemperature sensors. One LC147 is required for each basic control carrier.

- ***LC147B—Alarm Circuit:*** The initial use of the LC147B is in the J58882AK control carrier. The CP is used to activate the major or minor alarm LEDs on the alarm panel. One LC147B is required for each J58882AK control carrier.

- ***LC171B—Data Control:*** The LC171B provides a data channel for the Remote Maintenance, Administration, and Traffic System (RMATS) and the Customer Administration Center System (CACS). The LC171B provides a second high-speed data channel (used for Station Message Detail Recording) with a 1200-baud option for a high-speed printer and a printer cutoff lead. One LC171B is required for each basic control carrier when associated with the RMATS system. One LC171B is required for each data set and for each output device.

- ***LC172B—Data Transfer:*** The LC172B provides an I/O data channel for interfacing to the Maintenance and Administration Panel (MAAP) and the Customer Administration Panel (CAP). Each LC172B also provides for switched processor control (via RMATS) in duplicated common control PBXs.

- ***LC190—Voice Announcement Circuit:*** The LC190 is a DIMENSION PBX trunk-type circuit pack which provides a prerecorded

nonalterable 2-second message source optionally as part of the automatic wakeup service.

- ***LC204—Tones Circuit:*** The LC204 provides 350-Hz, 440-Hz, 480-Hz, and 620-Hz tones. The tones generated by the LC204 are used in their normal state, combined, modulated, and are steadily maintained or interrupted at precise rates to provide eight distinct tones. The LC204 combines the functions of the LC04 and LC05B into a single circuit pack, but is not a direct replacement because backplane wiring changes are required.

- ***LC280—Two-Wire Tie Trunk:*** The LC280 provides two separate 2-wire, 2-way dial repeating tie trunk circuits for interconnecting two PBXs over metallic facilities with loop supervision. Loop supervision is of the high-low reverse battery type.

- ***LC285—Loop-Start Exchange Line:*** The LC285 trunk circuit interconnects the PBX to CO-, FX-, and WATS-type facilities utilizing 2-wire, 1-way incoming or 1-way outgoing transmission modes. Each LC285 contains two separate trunk circuits which use ring-in and loop-out signaling. The circuit packs may be located in the trunk port carrier and module control and trunk port carrier.

- ***LC301—SWAT Interface:*** The LC301 is a test circuit pack (CP) and is not part of the list structure. The CP is used for maintenance and test purposes only. It must be removed from its carrier when not in use.

- ***LC346—RAM (64K Word):*** The LC346 circuit pack provides 64K words of main memory per circuit pack.

- ***LC361—Loop Signaling Interface Trunk:*** Each LC361 contains two independent (trunk type) full-duplex serial data ports for Data Communication Access. Since the data ports are of the trunk type (assigned as trunks), they connect to the trunk side of the PAM bus, are assigned as trunks, and retain trunk features. Loop signaling is provided. Ringing current is of the nondistinctive type, 20-Hz ringdown signaling. It also provides off-premises extension capability with call monitoring (SMDR) and transmission level compensation.

- ***LC366/LC366B—Dual Speed Serial Data Channel:*** The LC366/LC366B provide one dual speed data channel which can be optioned for either slow speed (185 kbs) or fast speed (833 kbs) and three fixed slow-speed data channels. The data channels convert and transmit data bits synchronously between the processor and peripheral unit(s). Each LC366/LC366B must be optioned for the particular PBX. All systems configured with three or more Attendant Consoles assigned to an LC366 should use an LC366B.

- ***LC454—RAM Address and Timing Control:*** The LC454 provides refresh and other timing signals required to maintain and control the read/write operations. One LC454 is required for each basic and growth control carrier(s) that is equipped with LC346 memory boards.

- ***LC455B—201CC Processor:*** The LC455B is a microprogrammable processor made up of two separate printed circuit boards (LC140 and LC462) mounted together and electrically connected through two special interboard connectors. It controls data flow between the main memory and I/O devices via a 1-way address bus and a 2-way data bus and performs arithmetic and logic operations on this data. It also provides logic to generate system interrupts and bootstrap loading of the main memory. The read only memory (ROM) that stores the microcontrol programs generates signals for the processor, clock generator, and controls decoding circuits for generating timing and control signals for the processor.

- ***LC455C—201CC PROCESSOR:*** The LC455C performs the same functions as a LC455B but with changes to the Programmable Read Only Memory (PROM) microcoding. The LC455C is made up of two printed circuit boards (LC140 and LC462B). The LC462B replaces the LC462 which is one of two CPs which make up the LC455B. The LC462B is the same as a LC462 except for

PROM microcoding changes. The changes improve microdiagnostic testing and provide the capability to display a 4-digit memory CP number when a failure is found during microdiagnostic testing. The 4-digit display is required in systems with memory sizes greater than 512K words. The LC455C must be used instead of a LC455B where memory size is greater than 512K words. The LC455C can also be used in systems with smaller memory sizes.◀

- ▶***LC500—256K RAM:*** Each LC500 contains 256K of RAM. A maximum of four LC500s are used in slots 07 through 10 of the control carrier.

- ***LC501—DCIU Data Buffer:*** The LC501 circuits buffer the data to and from the 201CC memory and perform parity checks on the data. One LC501 is required and it is located in slot 06 of a carrier equipped with DCIU.

- ***LC502—DCIU Control Registers:*** Five registers on the LC502 control the interface between the DCIU and the 201CC processor. One LC502 is required, and it is located in slot 05 of a carrier equipped with DCIU.

- ***LC503—DCIU Processor:*** The LC503 contains the processing logic for the DCIU. One LC503 is required, and it is located in slot 04 of a carrier equipped with DCIU.

- ***LC504—DCIU Memory:*** The LC504 contains memory for the DCIU. It contains 32 kb of ROM and 128 kb of RAM. Only one LC504 is required, and it is located in slot 03 of a carrier equipped with DCIU.

- ***LC505—DCIU I/O:*** The LC505 contains the physical DCIU links. Each LC505 contains two ports. One or two LC505s are required per carrier. The LC505 is located in slots 01 and 02.

- ***LC507—DCIU Debugs:*** The LC507 is used as a hardware test tool for laboratory aid and as a troubleshooting and monitoring tool for DCIU operations in the field. One LC507 is required, and it is located in slot 00 of a carrier equipped with DCIU. The LC507 must be removed from the carrier when not in use.

- ***LC509 and LC510—Minirecorder Tape Cartridge Interface:*** The LC509 and LC510 minirecorder interface controls the operation of the minirecorder and transports data between the minirecorder and the 201CC processor. One LC509 and one LC510 are required in a carrier equipped with DCIU. The LC509 is located in slot 19 and the LC510 is located in slot 20.

- ***LC515—Common Control Processor:*** The LC515 performs all common-control functions for the DIMENSION PBX. It is contained on two separate circuit packs (LC513 and LC514) that are mounted together to form a single unit electrically connected by two interboard connectors. The LC515 is located in slots 14 and 15 of a J58882AK carrier.

- ***LC566—Data Interface (DI):*** The LC566 provides a standard EIA RS232C interface between the DIMENSION PBX and customer-provided computer and data terminals equipment. It also provides an EIA RS366 interface for computer port call originations. The DI is required to support FP8, Issue 1, Data Switching Level 1 and Level 2, and is capable of operating at speeds up to 9600 bps. The LC566 contains one circuit per CP.

- ***LC567—Data Port (DP):*** The LC567 provides the DIMENSION PBX interface to the data interface (LC566). Each LC567 contains two data port circuits. The LC567 replaces line circuit packs (CP) (LC02) and loop signaling interface trunk CPs (LC361) where data interface to the line and/or trunk side of the PBX is required. The DP is required to support FP8, Issue 3, Data Switching Level 1 and Level 2 and is capable of operating at speeds up to 9600 bps. The LC567 contains two circuits per CP.

- ***LC568—Voice/Data Link:*** The LC568 provides separate circuit functions for handling voice or data over the same link circuit between PBX modules. The mode (ie, voice or data) is controlled by FP8, Issue 3, Data Switching Level 2 software. All link circuits between PBX modules switching voice and data must be LC568s. The LC568 contains four circuits per CP.◀

MINIRECORDER AND TAPE CARTRIDGE

4.33 The KS-21447, List 8, minirecorder is mounted in the lower right half of the common control cabinet (Fig. 39 and 40). The minirecorder houses the 6.4-mm (1/4-inch) 4-track (two tracks read-only and two tracks read/write) program tape cartridge provided with the system. This cartridge is used to initialize the memory at the time of installation, after subsequent power failures, or when memory is lost for any reason.

4.34 ▶A new KS-21447, List 12 minirecorder replaces the List 8 model when the PBX is equipped with an Issue 3 FP8. It performs all List 8 functions and provides an additional 610m (200 feet) of tape handling capacity. The additional tape is used primarily for FP8 Applications Processor/ Distributed Communications System program coding requirements in the PBX.◀

FAN ASSEMBLY

4.35 The fan assembly consists of three blowers. It is optional equipment on a per cabinet basis. The fan assembly, when provided, is located in the lower part of the equipment cabinets (Fig. 39, 40, 41, and 42). Requirements for this assembly and the associated filters are specified in Part 5. The fans are controlled by thermal assemblies (ED-1E364-70) in the equipment cabinets.

MAINTENANCE AND ADMINISTRATION PANEL (MAAP)

4.36 The MAAP (Fig. 47) provides a means for craft personnel to alter translations (eg, class of service, line assignments), incorporate patches to the system customer premises change notices (CPCNs), initiate traffic measurement, and page-in maintenance programs used to isolate faults. The MAAP has a 12-button TOUCH-TONE telephone dialing pad, four rows of control keys, a 25-digit operational display, a 3-digit procedure display, and indicators for alarm and operational status. A 2-digit error code display is provided to indicate an incorrect entry.

4.37 The MAAP operations use a series of procedures to accomplish the designed functions. Each procedure is accessed by dialing an associated 3-digit code from 000 to 999. A request to access a particular procedure causes an associated off-line software program to be read from the tape cartridge into a designated memory block, referred to as the paging buffer. Once this read operation is completed, the WAIT lamp on the MAAP is extinguished and the procedure is available for use. Operation of the MAAP and tape cartridge in any mode does not interrupt customer service.

4.38 The MAAP plugs into a connector adjacent to the basic carrier in the common control cabinet or into a connector adjacent to the module control and trunk port carrier in the module control cabinet. The MAAP is stored in the control cabinet or the module control cabinet when J87460 type power supplies are used (Fig. 39). The MAAP is connected via a 25-pair (2400-mm [8-foot]) extension cable. The MAAP must be removed from storage and connected each time it is used.

ALARM PANEL

4.39 An alarm panel is provided in the common control cabinet. This alarm panel, in conjunction with the MAAP and off-line programs, is designed for rapid troubleshooting of multiple alarms. The alarm panel contains alarm indicators, fault indicators, and controls used to determine system status or to perform microdiagnostics for maintenance purposes. The major (MJ) or minor (MN) alarm indicator lamps light when one or more faults exist. The alarm panel is partitioned into sections for the common control and the PBX system as:

- ALARM
- CONTROL
- PROCESSOR/MEMORY
- MAAP PROCEDURE
- SYSTEM CONTROL
- EMERGENCY TRANSFER.

4.40 The TEST SELECT switch of subsection PROCESSOR/MEMORY provides access to the microdiagnostic tests (0 through 9). The CONTROL subsection contains the GUARD indicator lamp and the GO/HALT switch to control the processor. Emergency transfer may occur during a major alarm and can be overridden by setting the EMERGENCY TRANSFER switch to the INHIB position. The MAAP PROCEDURE subsection is divided into two parts, CONTROL and NETWORK.

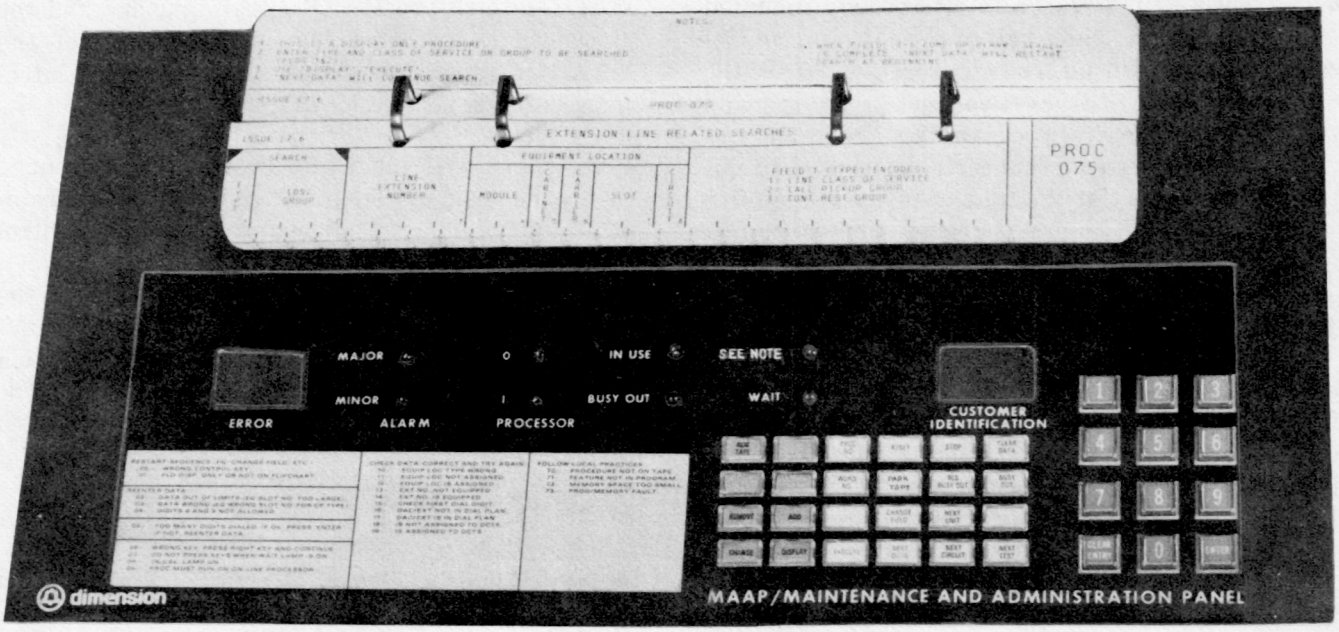


Fig. 47—Maintenance and Administration Panel (MAAP)

4.41 Two types of alarm panels, duplicated or nonduplicated, may be provided (Fig. 48). The alarm panel is furnished in accordance with the type of common control—single or duplicate common control.

AUTOMATIC VOICE NETWORK (AUTOVON) ACCESS ARRANGEMENT

4.42 This arrangement allows interconnection of a DIMENSION 2000 or Custom PBX to a 4-wire AUTOVON switching center via AUTOVON access lines.

4.43 These arrangements require no software changes in the DIMENSION 2000 or Custom PBX. The interface arrangements have been designed to work with FP7, FP8, FP11, and FP12 which include Common Control Switching Arrangement (CCSA) capabilities. The hardware design uses standard DIMENSION PBX circuit pack technology in the J59216BA, BB, and BC circuit pack carriers. These carriers are used in place of existing trunk carriers, thereby reducing total trunk and line capacity in some system configurations. The AUTOVON carriers are limited to one module in a DIMENSION 2000 PBX. Use is made of existing power supplies and service circuits.

4.44 The console functions needed for AUTOVON have been incorporated into the DIMENSION PBX console adjunct. This combination permits an attendant to handle both regular and AUTOVON traffic. The selector console adjunct has a capacity of 30, 60, or 90 trunk buttons. Additional buttons on the bottom of the console adjunct provide the four TOUCH-TONE dialing precedence level signals required for outgoing precedence calls. This arrangement permits the retention of the 12-button TOUCH-TONE telephone dial in the standard PBX console. A data link connection between each selector console adjunct and corresponding control circuits in the basic AUTOVON equipment carrier provides the means for completion of all AUTOVON calls requiring attendant handling and for driving the status lamp indicators.

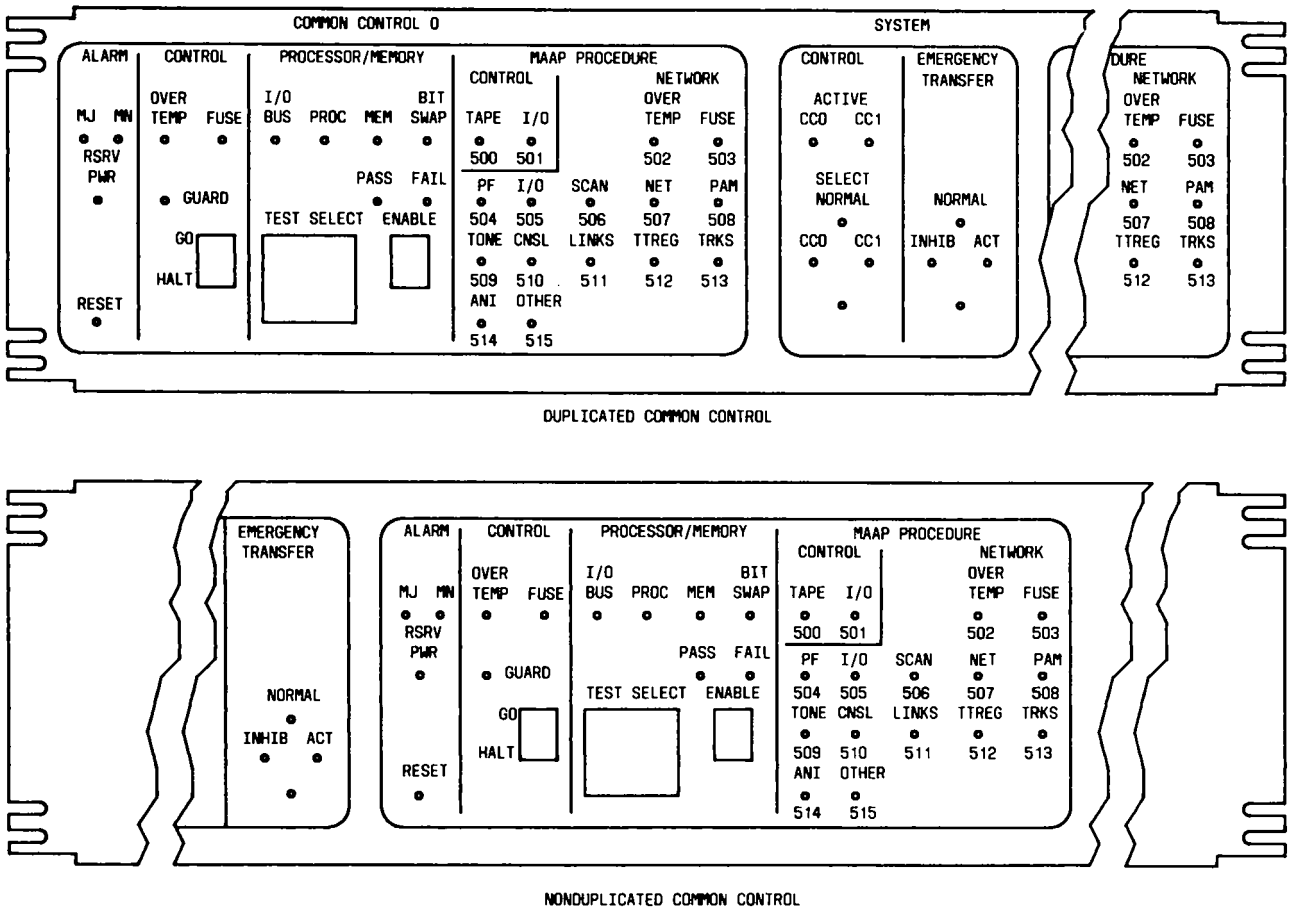


Fig. 48—DIMENSION 2000 and Custom PBXs—Duplicated and Nonduplicated Common Control Alarm Panels

4.45 For more detailed information regarding AUTOVON, refer to Section 554-010-135.

5. ENVIRONMENTAL REQUIREMENTS

5.01 Exposure to extreme temperatures and humidity may degrade telephone service and create long-term damaging effects on the system equipment.

5.02 The equipment is designed to operate at ambient temperatures from 0° to 49°C (32° to 120°F) and at 10 to 95 percent relative humidity conditions. These extreme limits should not be regarded as desirable working conditions for minimum maintenance and do not include power or battery equipment. It is recommended that an ambient temperature in the range of 14° to 35°C (40° to 95°F) with relative humidity in the range of 20 to 60 percent be maintained for equipment locations. See ED-1E301-01.

5.03 When excessive room temperature and high contaminant levels are anticipated, cooling fans and a filter assembly are required to be installed in the system equipment.

5.04 The PBX system should always be shipped in factory-provided crates. The packing material used for shipping from Western Electric is adequate for upright or lay-down (on side) shipment. However, upright shipment is preferred. If cabinets are shipped on side, installation personnel should carefully raise the cabinets to upright position before unpacking. The preferred modes of transportation are truck, rail, and air, respectively.

5.05 Minimum floor plans for multimodule systems are given in Part 7. In all cases, the mini-

mum requirements specified in commercial floor loading codes must be met. Normally, the total weight of an equipment cabinet should not exceed 363 kg (800 pounds). Approximately 1.39 square meters (15 square feet) of maintenance area should be provided per cabinet.

5.06 All systems must be located in areas where adequate illumination is provided for maintenance and where noise levels do not exceed the levels specified in the Occupational Safety and Health Act (OSHA).

5.07 Dedicated feeder cables from the main power entrance to the PBX should be provided to prevent electrical noise and inadvertent removal of power from the system. In areas where excessive electromagnetic fields exist, special shielding, grounding, trunk line filtering, etc, must be provided. (Refer to ED-1E403 or the video tape presentation "EMI and the DIMENSION PBX" for further information.) Cabinets have an option for earthquake protection mounting.

5.08 Refer to Section 554-111-101 for detailed additional environmental requirements.

6. POWER

6.01 Commercial power for the PBX cabinets is provided by nominal 120 volts at 60 Hz. The cabinets (power supply) are connected to an ac module outlet box. Each outlet box can support a maximum of six cabinets (assuming one connection per cabinet). The outlet boxes are connected to an associated ac protector cabinet via feeder cables. The customer must provide the main ac distribution panel (panel boards) and the feeder cables. Feeder cables should be distributed as shown in Fig. 49 with each feeder cable providing service to a maximum of two module ac outlet boxes.

6.02 A minimum of one utility outlet is required per module. The utility outlets are mounted adjacent to or beneath the module ac outlet boxes. Utility outlets are powered via separate feeders and are used to supply power for peripheral equipment (ie, test equipment, data sets, printers, and other appliances). The ac distribution panel provides 20-amp Fusetrons for each utility feeder and 35-amp Fusetrons (nonreserve only) for each module feeder.

6.03 Each DIMENSION PBX cabinet is equipped with at least one power supply. The power supplies may be either of the nonreserve type (ie, J87432B or J87432D) or of the reserve type (ie, J87432BB, J87432DD, J87460B, or J87460D). All cabinet power supplies will operate under wide voltage variations (105 to 129 volts) and wide frequency variations (57 to 63 Hz), provided both extremes do not occur simultaneously. A minimum input voltage of 99 volts will suffice, provided that the line frequency is maintained within 60 ±0.3 Hz. These limits provide for continued proper operation during commercial power brownouts.

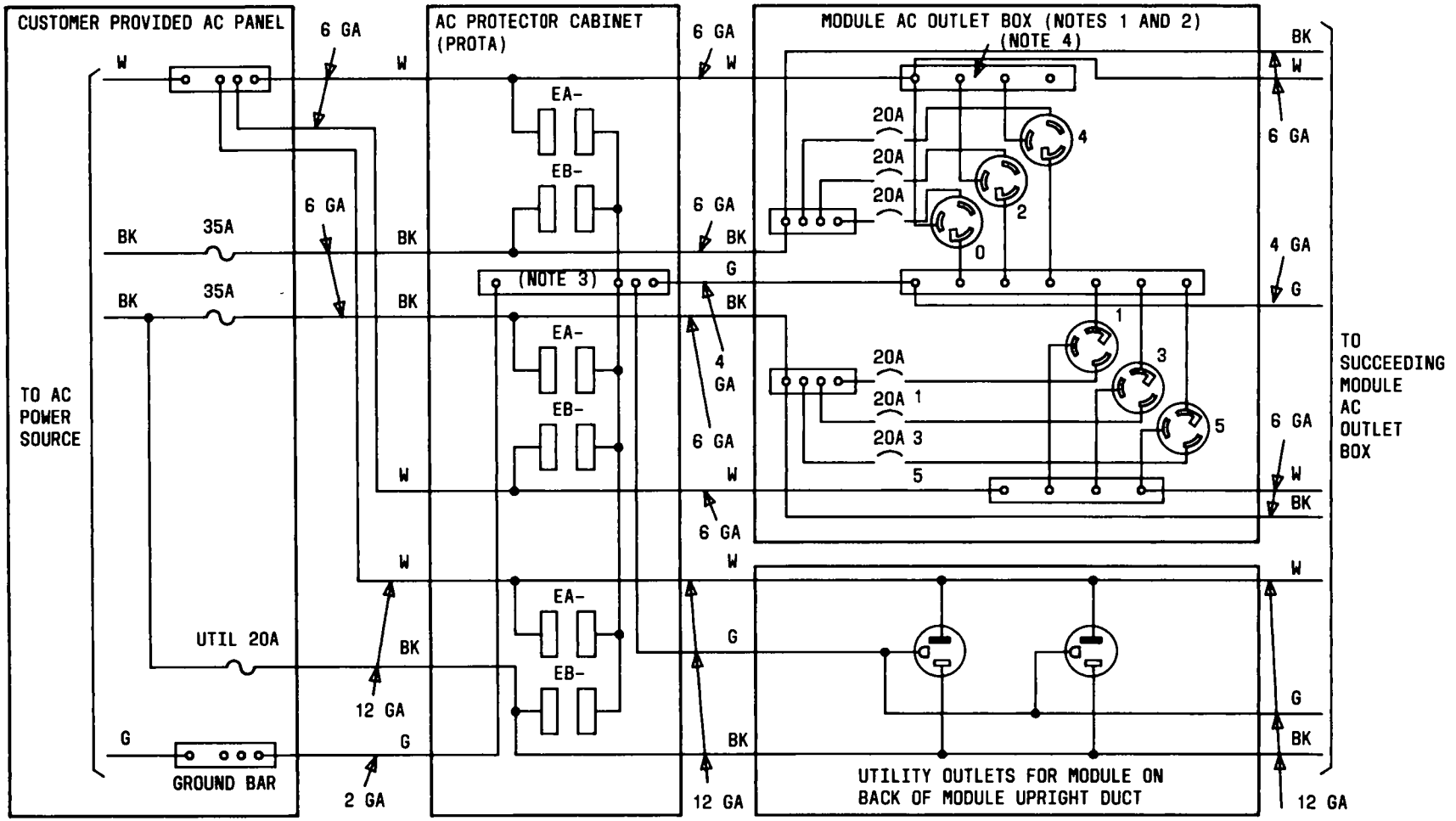
RESERVE POWER SYSTEM

6.04 The PBX may be configured with a reserve power system for increased system reliability. Reserve power can be engineered with either a long-term holdover capacity (in hours) or a nominal holdover capacity (in minutes). Reserve power can be provided with or without the use of a dc-to-ac inverter. The standard equipment connection for reserve power, which is of the long-term capacity utilizing inverter(s), is shown in Fig. 50. This arrangement requires that the J87432DD and J87432BB power supplies be used in the common control and network module cabinet, respectively.

6.05 The standard reserve power equipment consists of the a "100-type" power plant (charging unit), battery plant, and inverters. The function of the power plant is to provide charging current to the battery plant as well as direct current to the inverter(s). The power plant derives its input power from the customer-provided ac panel. The ac distribution panel provides 50-amp Fusetrons (reserve power only) for the feeders connecting the power plant. ▶The power plant requires 3-phase 60 Hz at 208, 240, or 480 volts, depending on the 100-type power plant used. Information concerning the specific 100-type power plant to be locally engineered can be found in Section 790-100-654.◀

6.06 Two inverters may be specified for the reserve power system. They are the Lorain DEPENDAC* 2 kilovolt-ampere (kVA) and 5 kVA inverters. The choice of inverter rating and quantity used depend upon the PBX load, duplication requirements, and the system power-up strategy. All inverters are of the continuous-duty type with internal provisions for automatically switching to ac bypass operation in case of inverter failure.

*Registered trademark of Reliance Electric Company.



NOTES:

1. IN NON-RESERVE SYSTEMS, THE MODULE AC FEEDERS SERVE THE MODULE OUTLET BOXES WITH THE FOLLOWING PATTERN:
2. THE NUMBER OF MODULE FEEDER CABLES IN A NON-RESERVE SYSTEM IS BASED ON THE NUMBER OF MODULE AC OUTLET BOXES AS FOLLOWS:

NO. OF MODULE AC OUTLET BOXES	1	2	3	4	5	6
NO. OF FEEDER CABLES	2	2	4	4	6	6

3. SINGLE POINT GROUND
4. NEUTRAL BAR

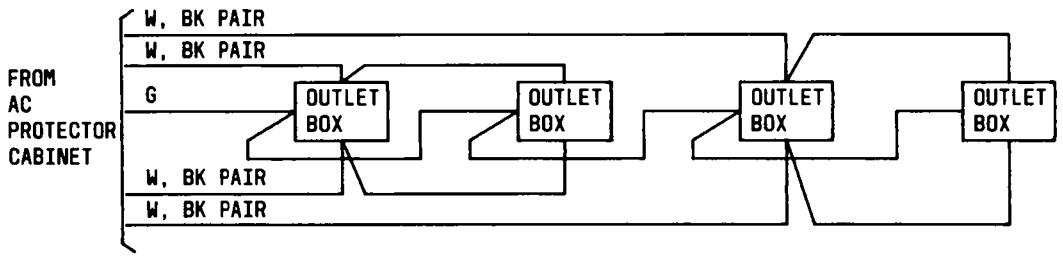
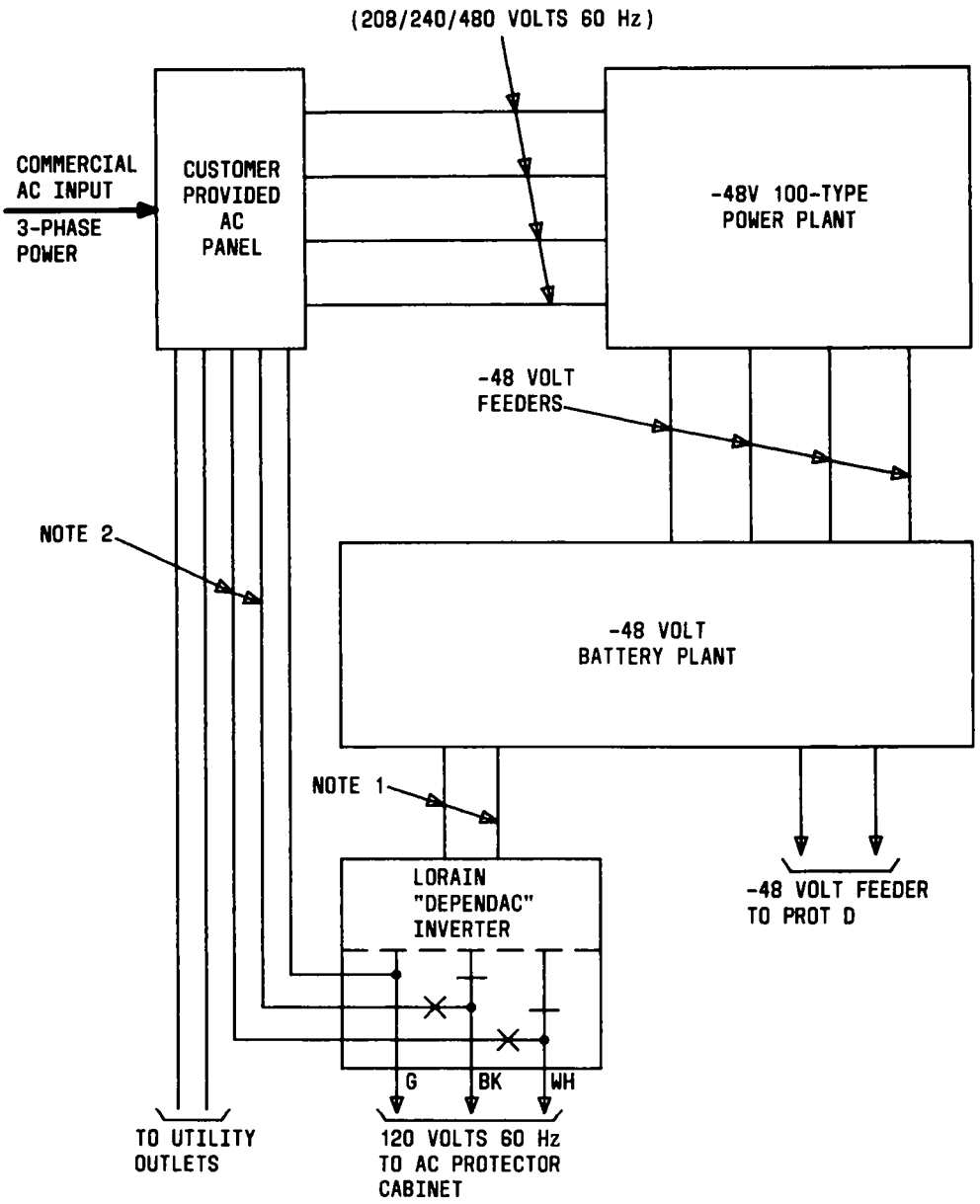


Fig. 49—Typical AC Power Requirements and Distribution



NOTES:
1. MAXIMUM DISTANCE BETWEEN THE BATTERY PLANT AND INVERTERS IS 100 FT.
2. 120 VOLT AC BYPASS FEEDERS.

Fig. 50—Typical Arrangement for Reserve Power

UNINTERRUPTIBLE POWER SERVICE (UPS)

6.07 Reserve power without using the dc-to-ac inverters (optional arrangement) can also be provided with the nominal holdover capacity. This arrangement provides uninterruptible power on a per cabinet basis and requires use of the J87460B/D power supply(s) and 124A ringing generator. The uninterruptible equipment configurations are shown in Fig. 51.

6.08 Nominal holdover capacity is provided with the addition of a J87455A battery charger and KS-21906, List 3, battery pack instead of the 111A power plant and −48 volt battery plant. The battery pack is rated at a 5-ampere hour capacity (when fully charged). The actual holdover time is equipment and traffic dependent. A fully charged battery pack will power a PBX cabinet from 5 to 30 minutes. The batteries recharge in 24 hours.

6.09 The extended holdover capacity is provided by a battery plant rather than the nominal holdover hardware (Fig. 51). Refer to Section 554-111-101 for details regarding the desired capacity of the battery plant and the installation arrangements.

EMERGENCY CENTRAL OFFICE (CO) CONNECTIONS

6.10 If there are certain PBX failures or commercial and reserve power failures, all stations would normally be inoperative. However, in the DIMENSION PBX, automatic operation of transfer relays in the 609-type emergency transfer panels bridge preassigned stations directly across CO trunks. A ground-start key (551A) is required at each of the assigned stations to enable the caller to obtain CO dial tone. A CO connection is established by going off-hook at any of these stations and pressing the start key momentarily. If Listed Directory Number trunks are used for this transfer service, incoming calls go to the emergency stations.

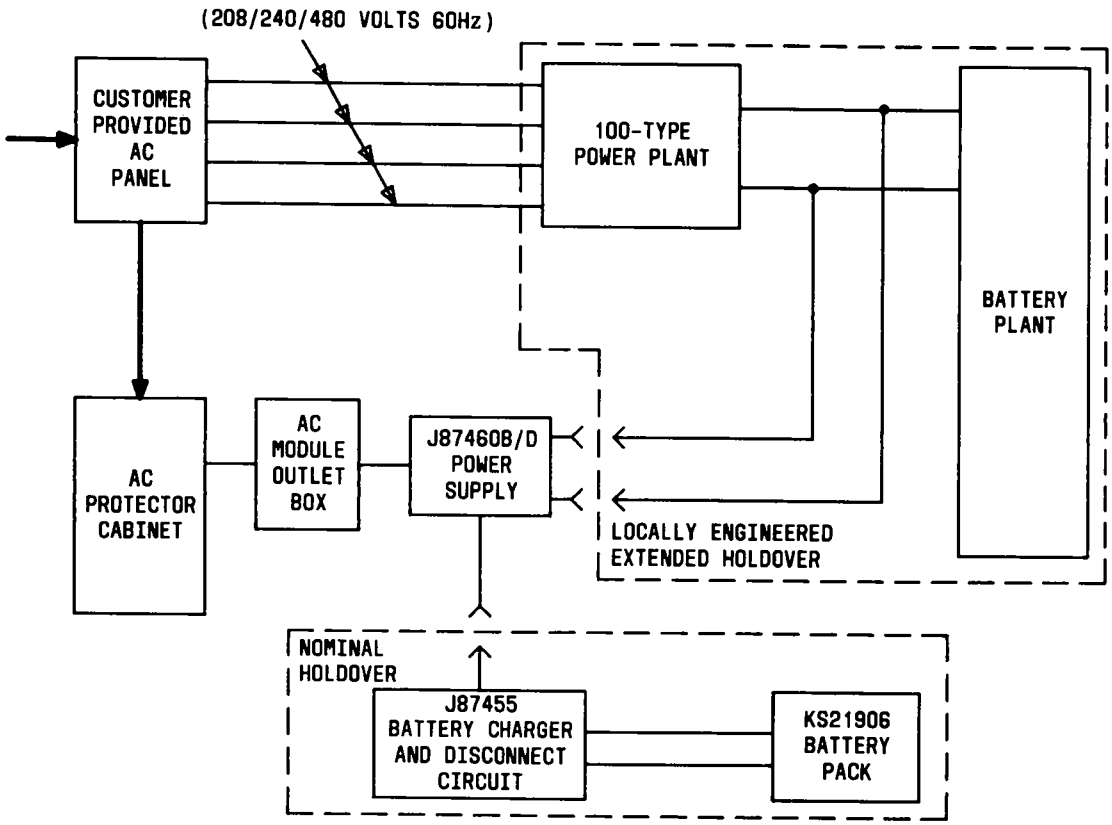


Fig. 51—Uninterruptible Reserve Power Arrangement

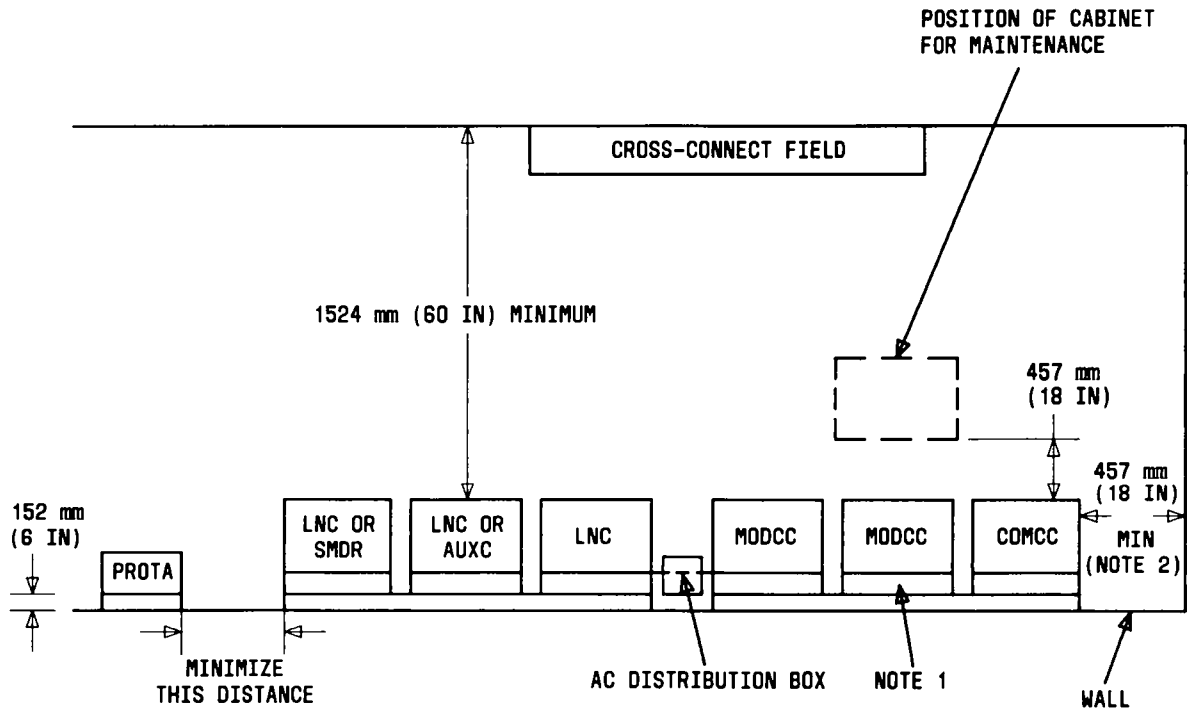
7. FLOOR PLANS

7.01 The PBX network floor plan takes into consideration the physical arrangements including cabinet layout, maximum allowable cable lengths between particular cabinets, and floor loading. The weight of a cabinet varies, depending upon the number of equipped carriers and the number of plug-in circuit packs provided per carrier. Maximum weight of a fully equipped cabinet is approximately 363 kg (800 pounds). 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. This area includes aisles and open areas associated with the cabinets. The average floor load must not exceed the rated floor loading of the building.

7.02 The cabinet layout is critical because of cabling, grounding, and power distribution requirements. Cabinets are arranged with a rear cable trough, vertical cable ducts, and horizontal cable ducts to facilitate cabinet interconnections. A floor area of approximately 0.5 square meter (5.3 square feet) is required per cabinet. The recommended minimum aisle space is 914 mm (36 inches) for cabinet lineups or 1524 mm (60 inches) when placed against a wall. Figure 52 depicts a typical cabinet arrangement for a single module configuration.

7.03 Additional minimum requirements for cabinet configurations are listed as follows:

(a) When in lineups, minimum cabinet clearance in the rear is 508 mm (21 inches) between cable ducts or 76 mm (3 inches) without rear aisle.



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

Fig. 52—Typical Floor Plan—DIMENSION 2000 PBX (Single-Module)

(b) All cabinets in a module must be adjacent or not further apart than the width of a vertical cable duct.

(c) Module control cabinets in the same module must be placed adjacent to each other or separated by only a vertical cable duct.

(d) A vertical cable duct must be placed next to or between the two module control cabinets of a multiple module arrangement with overhead ducts.

(e) When network modules are mounted adjacent to a wall, module ac distribution boxes should be mounted on an AC module box bracket or on 19-mm (0.75 inch) plywood. Duplex ac outlets may be configured for back-to-back cabinet arrangements.

(f) The ac module distribution box contains six ac power outlets. This is adequate for six cabinets assuming that each cabinet has one power cable.

(g) Cable length within a module must be less than 7.6m (25 feet).

(h) The 4-MHz network data channels are limited to a maximum of 45.7m (150 feet) in length.

(i) There is a lead length restriction of 22.9m (75 feet) between the automatic number identification circuit (ANI CKT) located in the common control cabinet and the module control and trunk carrier, which is located in the module control cabinet.

(j) If two common control cabinets are used, they must be placed next to each other.

(k) The auxiliary cabinet must be job engineered. Floor loading may be determined by adding equipment unit weights to the basic cabinet weight of 113.4 kg (250 pounds).

(l) The hotel/motel battery cabinet must be placed adjacent to a common control cabinet.

(m) The Customer Administration Center System (CACS) cabinet is located for the use of the customer, usually away from the PBX.

7.04 Floor plan arrangements may vary from installation to installation, depending on whether existing equipment rooms are used and the amount of planned growth that is designed into the system. Figure 53 shows a typical floor plan for a DIMENSION 2000 PBX which could be located within an equipment room with limited floor space.

7.05 Figure 54 shows a typical floor plan for a 7-module DIMENSION Custom PBX. This floor plan configuration depicts back-to-back aisles and overhead ducts.

7.06 The floor plan should identify equipment cabinets with a numeric labeling convention. Equipment cabinets should be labeled left to right (beginning with the module cabinets and continuing with the line cabinets) from the first aisle to the last aisle. The numbering convention consists of three digits with the two leftmost digits identifying the module number (00 through 14). The right digit identifies the cabinet number (Fig. 55). These floor plans are not exhaustive nor all inclusive. They are intended only to serve as a guide in planning for a system. For additional details, refer to ED-1E394-01.

CABLING

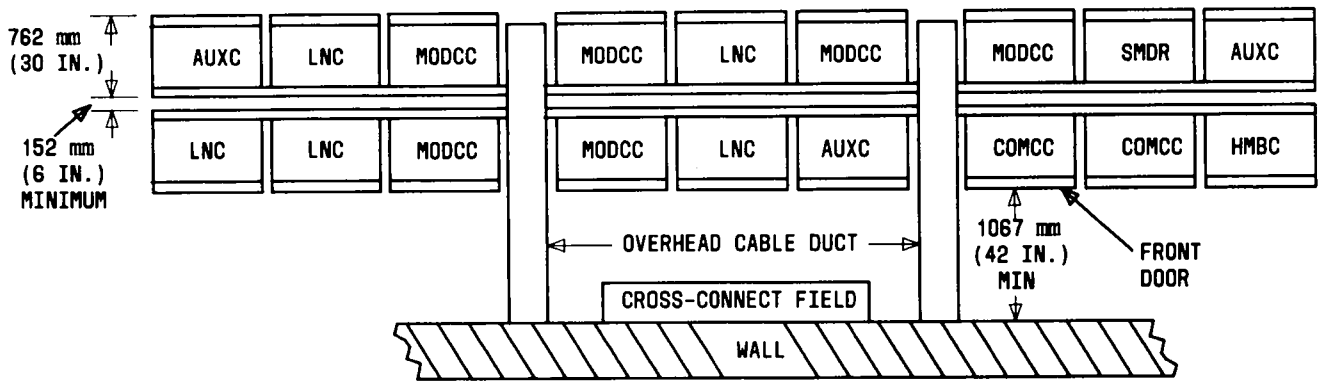
7.07 The cabling plan must take the following into consideration:

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

7.08 Cabling makes use of standard A25-type cables. Standard cables are used for stations, trunks, links, consoles, etc, terminated at the cross-connect field. Special cables (ribbon and triaxial) are used for carrier-to-carrier interconnections and the 4-MHz network data channels.

CROSS-CONNECT FIELD

7.09 Figure 56 is a typical colored backboard arrangement. The cross-connect field may use standard colored backboards and 66-type connecting blocks. Because of the amount of cross-connections required, the cross-connect field must be locally engineered. In order to meet FCC registration requirements, the cross-connect field must be either located in a room with restricted access or contain a protective cover to assure there is adequate protection from power wiring and grounding surfaces.



LEGEND:
AUXC = AUXILIARY CABINET
LNC = LINE CABINET
MODCC = MODULE CONTROL CABINET
COMCC = COMMON CONTROL CABINET
HMBC = HOTEL/MOTEL BATTERY CABINET
SMDR = STATION MESSAGE DETAIL RECORDER

Fig. 53—Typical Floor Plan—DIMENSION 2000 PBX—Limited Floor Space

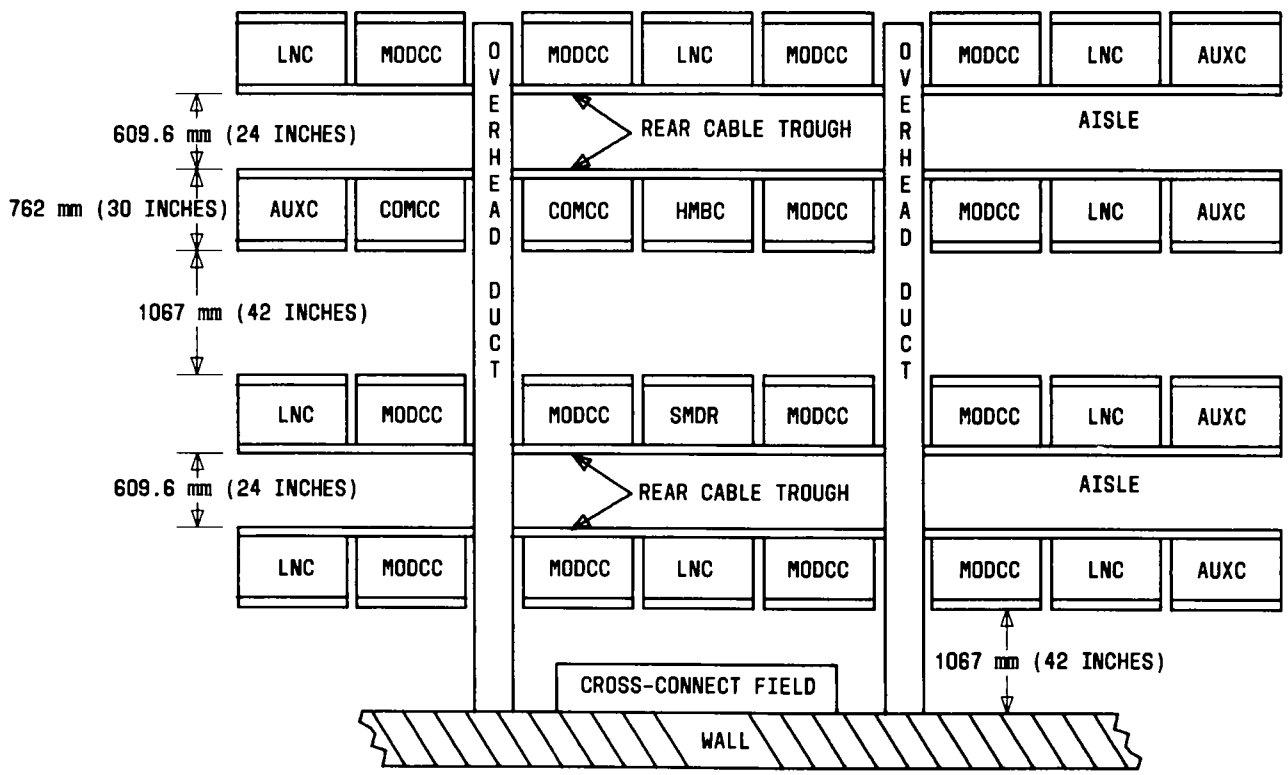


Fig. 54—Typical High Density Floor Plan—DIMENSION Custom PBX (7-Module)

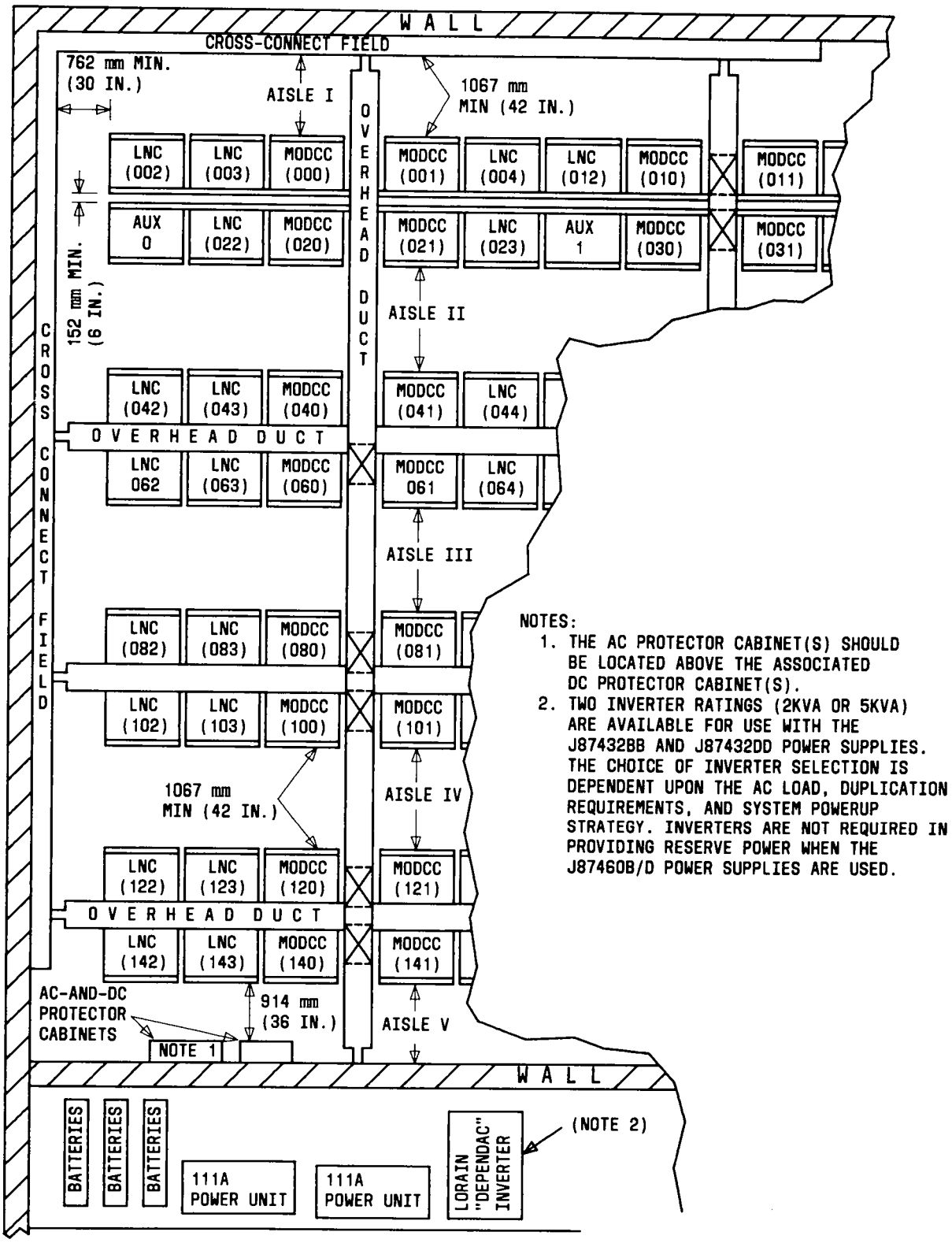


Fig. 55—Typical Floor Plan With Reserve Power

MISC, LINKS ATTENDANT CONSOLE TRAFFIC MEASUREMENT	PROTECTION	YELLOW (MISC)	PURPLE (STATIONS) (TRUNKS)	RED (KEY) AND (ECTS)
			JUMPERS	
		GREEN (FEEDER)	BLUE (HOUSE)	BLUE (HOUSE)

BACKBOARD COLOR	CIRCUITS OR EQUIPMENT TERMINATED
GREEN	CO TRUNK CIRCUITS
BLUE	STATION LINE CIRCUITS
RED	KEY AND ECTS EQUIPMENT
YELLOW	MISCELLANEOUS CIRCUITS AND EQUIPMENT
PURPLE	PBX CIRCUITS AND EQUIPMENT

Fig. 56—Cross-Connect Field Color Arrangement

7.10 Figure 57 is a typical example illustrating the use of standard colored backboards and 66-type connecting blocks. This cross-connect field is typical for a 3-module system as shown in Fig. 53. Circuits without jumper runs to the main cross-connect field may be separated, as required. The link circuits are cross-connected to other link circuits, depending on the customer intermodule calling pattern.

7.11 Consideration should be given to future growth for space availability and circuit numbering sequence when designing the cross-connect field.

7.12 When the system capacity exceeds practical wall space, distributing frames should be considered. Distributing frames are locally engineered.

PROTECTION REQUIREMENTS

7.13 Protection is required on all exposed cable pairs. The station protectors should be located as near the building entrance as possible. The protector ground lug should be connected to the single point ground terminal via a coupled bonding conductor and to an approved ground. Refer to Section 554-111-101 for information on exposure, protection, and grounding.

8. TRAFFIC

8.01 To ensure proper levels of service to the customer, detailed traffic engineering is required. Sufficient hardware (lines, trunks, links, TOUCH-TONE telephone originating registers, etc) and software quantities (dial pulse originating registers, line tables, trunk tables, etc) must be provided and properly assigned to the various network modules.

8.02 Hardware and software quantities that are not required to provide the desired level of service increase customer costs and reduce the processor's throughput.

8.03 The DIMENSION 2000/Custom PBX provides a group of traffic measurements that are maintained all of the time for system historical and system warning purposes. Additionally, selected off-line traffic algorithms may be paged-in under control

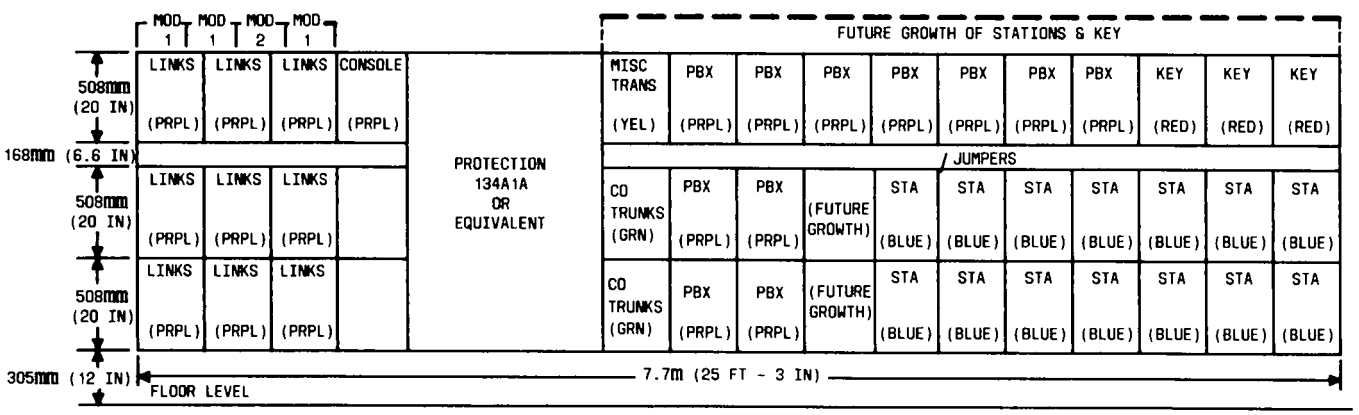


Fig. 57—Typical Cross-Connect Field—2000-Line Capacity

of an input/output (I/O) device (MAAP, RMATS, or CACS). Both raw data and peg counts may be obtained for the selected networks. The following is a list of traffic-sensitive items that should be considered for traffic engineering and traffic measurements:

- Network module linking
- Lines
- Trunks
- Attendant consoles
- Originating registers
- Ringing blocking
- Processor throughput.

8.04 ▶Each network module has a traffic capacity of 3564 CCS (hundred call seconds) (3672 CCS total module capacity, minus 108 CCS for maintenance) or 3492 CCS if Energy Communications Service (ECS) feature is provided (3672 CCS minus 108 CCS for maintenance and 72 CCS for ECS).◀ The DIMENSION 2000 or Custom PBX network modules each provide 128 time slots. Some PBX configurations may require more than one module for serving customer lines. Multimodule systems are interconnected by link circuits. The traffic capacity per module is reduced by link traffic which requires the use of two time slots, one on the originating end and one on the terminating end, to complete a call. Overall system network capacity is a function of the number of modules as well as the amount of link traffic. Due to link traffic, the CCS rating increases at a nonlinear rate with the addition of network modules.

8.05 In order to maximize efficiency of the network modules, those line-to-line and line-to-trunk groups which have a high commonality of interest should be located within the same module, thus reducing link traffic. The software outgoing trunk selection algorithm attempts to select a trunk within the same module as the dialing station before overflowing through a link to access a trunk in another module.

8.06 It is recommended that the line and trunk circuits be uniformly distributed among all network modules. On an installed and operational DIMENSION PBX, traffic measurement programs allow monitoring of traffic levels within each module. If too high traffic flow is detected within any module, load balancing may be required. The following items require hardware and or software consideration when load balancing is required:

- Lines (stations)
- Trunks
- Links
- TOUCH-TONE telephone and originating registers.

8.07 The quantity and type of trunks (DID, DOD, FX, WATS) required is traffic dependent and a function of the duration and rate of new call starts. Attendant conference and auxiliary interface circuits should also be physically located within the network so as to minimize link traffic.

RINGING BLOCKING

8.08 The system network uses centralized ring-trip detectors for detecting an off-hook condition during line ringing. Station lines are segmented into 32 lines per ring group. Each group can accommodate no more than four lines ringing simultaneously. Reorder tone is returned to the calling party when calls are blocked due to failure to match ringing. Detailed traffic programs are provided to detect when a ring blocking condition arises.

ORIGINATING REGISTERS

8.09 There are two types of digit collection—rotary dialing and TOUCH-TONE dialing. Rotary-dialed digit collection is a function which is performed in software. The number of dial pulse originating registers is a function of stations and memory size.

8.10 The number of TOUCH-TONE dialing receiver and register circuits required is determined on the same basis as rotary-dialed digit registers. However, fewer TOUCH-TONE dialing receiver and register circuits are required per system because of the shorter holding time for TOUCH-TONE dialing. A typical network module would normally contain less than 48 TOUCH-TONE dialing receiver and register circuits. In order to con-

serve processor real-time, it is necessary to administer the number of software register records required. The TOUCH-TONE dialing receiver and register circuits are engineered so that there is a single register pool for the entire system, but the receivers/registers are then uniformly distributed among each network module. Whenever a given module has all TOUCH-TONE telephone receivers busy, a dial tone request overflows through a link circuit to seize a TOUCH-TONE dialing receiver and register circuits in another module.

PROCESSOR THROUGHPUT

8.11 The processor handles all call stimuli presented to the system network. One processor (the on-line common control) provides total system control even with the duplicate configuration. The average processor occupancy is a measure of the real-time available to handle call stimuli (on-hook, off-hook, etc). Processor occupancy essentially consists of two elements: (1) fixed overhead, which is largely determined by the physical quantity of lines and trunks to be scanned, and (2) the amount of call processing, which is a function of the total system traffic level. For a given processor occupancy, a smaller system has fewer overhead requirements and a greater capacity to process calls (higher calling rate capacity).

9. DESCRIPTION OF OPERATION

9.01 The DIMENSION 2000 and Custom PBXs use a 16-bit microprogrammed general-purpose processor (LC143/LC455B/LC515). Error detection, diagnostics, and recovery routines (microdiagnostics) are a built-in part of the processor. The processor has a boot-strap loader program which resides in a read only memory and is used to control loading of the tape cartridge via a minirecorder. Each PBX system has a program tape which contains call processing routines (generic program) and unique translation information. Translations include flexible assignment entries such as class of service, hunting, and line number-to-equipment location number. Both generic and translation data are loaded into the random access memory (main memory).

9.02 Once a DIMENSION PBX is installed and initialized, the tape remains functionally inactive until called upon due to an actual long-term power failure, periodic translation updates, or until certain off-line maintenance routines are paged in. Certain periodic tasks are performed by the PBX on a timely basis. At approximately 23-hour intervals, the tape is retensioned on the cartridge. When a memory reload is required for any reason, the tape is loaded into main memory and any existing programs and call processing data are overwritten. Loading of the tape takes approximately 2 minutes, depending upon the feature package and physical line requirements.

9.03 The generic and translation portion of main memory can be modified by writing program patches into main memory by using the maintenance and administration panel (MAAP). The modified generic and/or translations, which are contained in main memory, can then be read onto the tape cartridge for a permanent record of the change(s).

MAIN MEMORY AND MEMORY CONTROL

9.04 The main memory and its associated control circuits are contained in the basic control, first growth control, and second growth control carrier(s) when required. ▶Main memory may consist of 8K-word (LC28B [MD], LC28C), 16K-word (LC128), 64K-word, circuit packs (LC346) or 256K-word (LC500). The type of memory control circuits used is determined by whether 8K-word, 16K-word, 64K-word, or 256K-word circuit packs are used.◀ Size of the main memory configuration is determined primarily by the feature package and quantity of trunks and lines to be scanned.

9.05 Main memory provides storage capability for generic call processing and translation data, on-line maintenance programs, and status records. The processor communicates with main memory via the address, data, and control buses. A word may be written into memory when the processor places an address on the address bus, the data word to be written on the data bus, and then generates a write command. After the data word has been written into the addressed memory location, the memory control signals the processor that the write function has been completed. After the tape is loaded, both the generic program and equipment translations are contained in a write-protect area of memory. Subsequent write commands to an address within the write-protect area are inhibited.

9.06 The semiconductor integrated circuits which make up the memory are of the dynamic na-

ture and must be periodically refreshed. Memory control contains refresh timing circuitry and a refresh address counter which allocates control of the memory to either the processor request mode or the memory refresh mode. A rechargeable battery pack is provided as standard equipment, allowing for a minimum of 90-second backup power during power failures. The extended memory holdover allows for up to 8 hours of holdover voltage.

CALL PROCESSING AND NETWORK CONTROL

9.07 A system control program sequences the PBX through call processing and other related feature package requirements. Call processing is under control of the generic program. The generic program is executed by the processor and it determines the status of peripheral circuits and reacts to changes in port status.

9.08 The generic program maintains records of all call states (port connections) in main memory. Communication between the processor and network modules is via dedicated network data channels. These data channels allow the on-line processor to monitor on-hook/off-hook status of each line (or trunk) port by issuing commands to the scanner distributor. On command, the scanner, in conjunction with the pulse amplitude modulation (PAM) network, interrogates each port circuit and returns the current status to the processor. The generic program, in performing call processing, compares the current port status with that obtained from a previous scan command in order to validate changes and check for class-of-service restrictions, etc. If the prior state of an off-hook line was idle (validation confirmed), and if the station is allowed origination, the processor executes the series of instructions which result in the off-hook line receiving dial tone on condition that all paths are not blocked. The processor (generic program) searches for an idle time slot (64 available talking paths on each of two time division buses per network module) and, if available, marks the time slot in a memory record associated with the off-hook busy line. The processor (generic program) then searches for an idle originating register. When an originating register is selected, the processor marks the register busy (in memory) and creates a connection between the off-hook line port and the register. A tone supply is added to the time slot and provides dial tone to the station. Once digit reception is initiated, the tone supply is removed.

9.09 The processor (generic program) issues commands to the scanner/distributor within each network module in assigning time slots. The scanner/distributor addresses and enables each port circuit while the network control provides each port circuit with timing signals necessary to define the time slots. In defining a time slot, the network control writes (marks) a bit in the shift register (time slot memory) busy for each active port. The shift register maintains a record of each assigned time slot. The shift register now contains a ***1*** (for each assigned time slot) which is recirculated by a clock and detected at the output stage once each cycle. When detected, the ***1*** causes the time division switch to close for the respective time slot, completing a path between all assigned ports. The switched connections (time slots) are repeated frequently enough to provide quality voice transmission between ports assigned to the same time slot on the same bus within the same network module. Sampling rate is approximately 16,000 Hz or once every 64 microseconds (μs) for an interval of 600 nanoseconds (ns).

9.10 The time division buses are the multiplexing or common point for all voice, data (enhanced FP8) and tone communication circuits. When the processor (generic program) issues a scan or distribute command, the addressed scanner/distributor decodes the circuit pack address (port equipment number). For scanning, decoding is done only to the circuit pack level. Therefore, once the carrier and circuit packs have been selected, port status is returned to the processor via the network data channels.

9.11 ▮The system network (Fig. 58) consists of carrier, group, and central summing amplifier interconnected by cables. Both line-to-line and line-to-trunk calls within the same module are routed through line circuits and onto the PAM bus, through a carrier buffer amplifier, a group PAM amplifier, a central line trunk PAM amplifier, a group PAM amplifier, a carrier buffer amplifier, and a line/trunk circuit. Each input carrier buffer amplifier may be switched to one of two group PAM amplifiers during 1 of 64 time slots.▮

Note: Each carrier output may appear in 128 time slots, 64 on each bus.

9.12 Intermodule switched connections are provided via 4-wire audio links. Each module control contains central summing amplifiers which are used to link calls. Two link circuits (one in each network module) are required in order to connect an intermodule call. Routing for an intermodule call

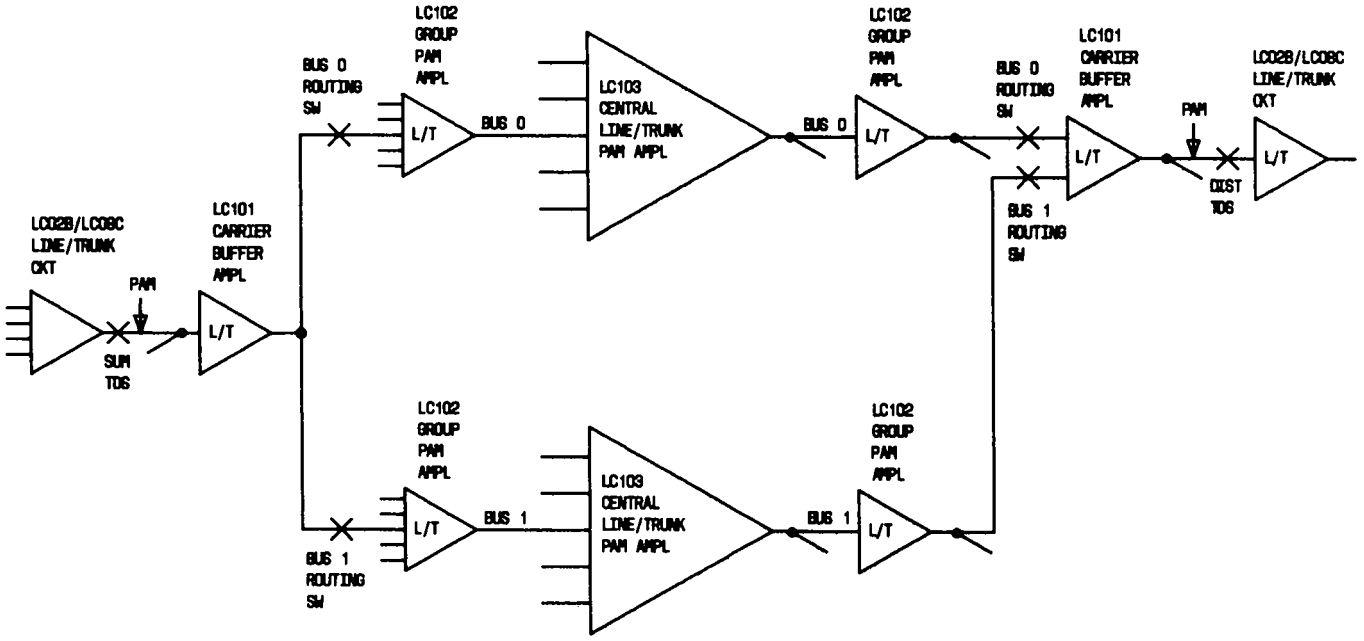


Fig. 58—Network Path for Intermodule Calling—2-Bus System

requires a change from analog to PAM signals twice in the connection path (Fig. 59). The bus routing switches must be closed at the same time that the port circuits are connected to the SUM and distribution buses in a given module, but are independent with each module.

9.13 Because of transmission gain requirements, link-to-link paths are not permitted. There are no physical paths available to permit these connections. Central PAM amplifiers are contained in the module control and trunk port carrier. The control carriers (line, module, or link) contain group PAM amplifiers. Carrier buffer amplifiers appear in all carriers (line, trunk, link, and control).

9.14 Figure 46 depicts the functional circuit pack interconnections within the PBX common control and network control.

TONES

9.15 The tone supplies are located in the line group control carrier(s). The LC204 or the LC04 and LC05B circuit packs (always used as a pair) are required to provide the necessary tones.

9.16 Call progress tones are generated from four single frequency oscillators. These oscillator signals are mixed and modulated, providing the steady or interrupted rates (Fig. 60) necessary to generate the 13 distinct tones. These tones are described below and in paragraph 9.17.

(a) ***Dial tone (DT):*** A 350-Hz and 440-Hz steady dial tone.

(b) ***Confirmation tone (CT):*** A 350-Hz and 440-Hz tone at 300 ipm (interruptions per minute) for three bursts.

(c) ***Recall dial tone (RDT):*** A 350-Hz and 440-Hz tone at 300 ipm for three bursts, then steady dial tone.

(d) ***Miscellaneous tone (MT):*** A 440-Hz steady tone.

(1) Warning tone: On for 1 to 2 seconds repeated every 15 seconds in some applications. Included are:

(a) Trunk Verification by Customer

(b) Busy Verification of Station Lines

(c) Timed Recall on Outgoing Calls

(d) Executive Override Automatic Route Selection, measured rate route-selected.

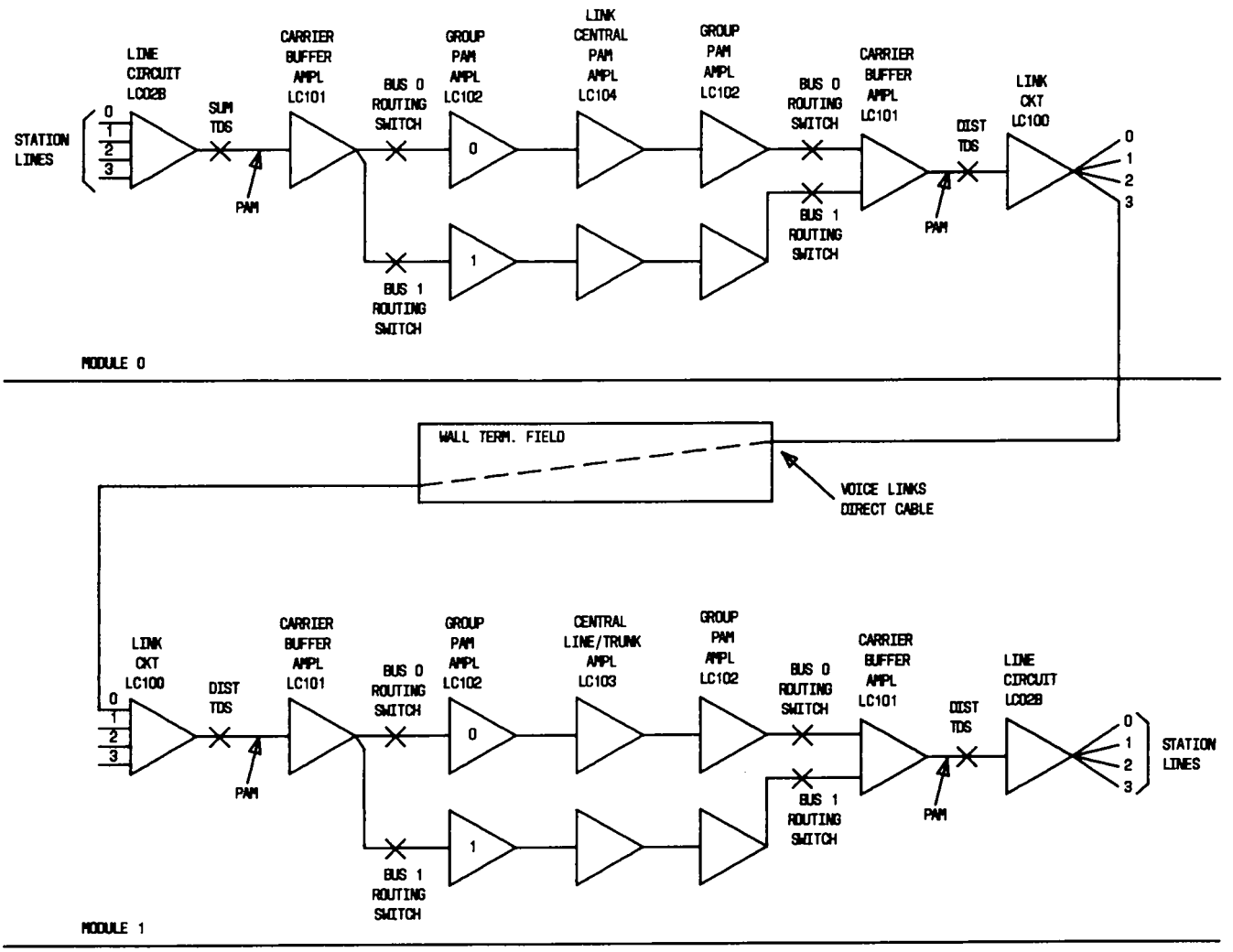


Fig. 59—One-Way Path for Intermodule Station-to-Station Calling

(2) Call Waiting tone: One, two, or three bursts of tone on for 0.2 second and off for 0.2 second. Included are:

(a) Attendant Call Waiting

(b) Originating Call Waiting

(c) Terminating Call Waiting.

(e) ***Intercept tone (ICPT):*** A 620-Hz tone, on for 0.2 second; and 480 Hz, on for 0.2 second. This tone indicates an undefined dial code or an illegal feature activation attempt.

(f) ***Reorder tone (RT):*** A 480-Hz and 620-Hz tone, on for 0.3 second, off for 0.2 second at 120 ipm. The tone indicates a temporary blockage due to traffic overload.

(g) ***Busy tone (BT):*** A 480-Hz and 620-Hz tone at 60 ipm. This tone indicates that the designation station or circuit is busy.

(h) ***Audible ringback tone (ART):*** A 440-Hz and 480-Hz tone, on for 0.8 second, off for 3.2 seconds. This tone indicates that the destination station is being rung or the call is queued for the attendant.

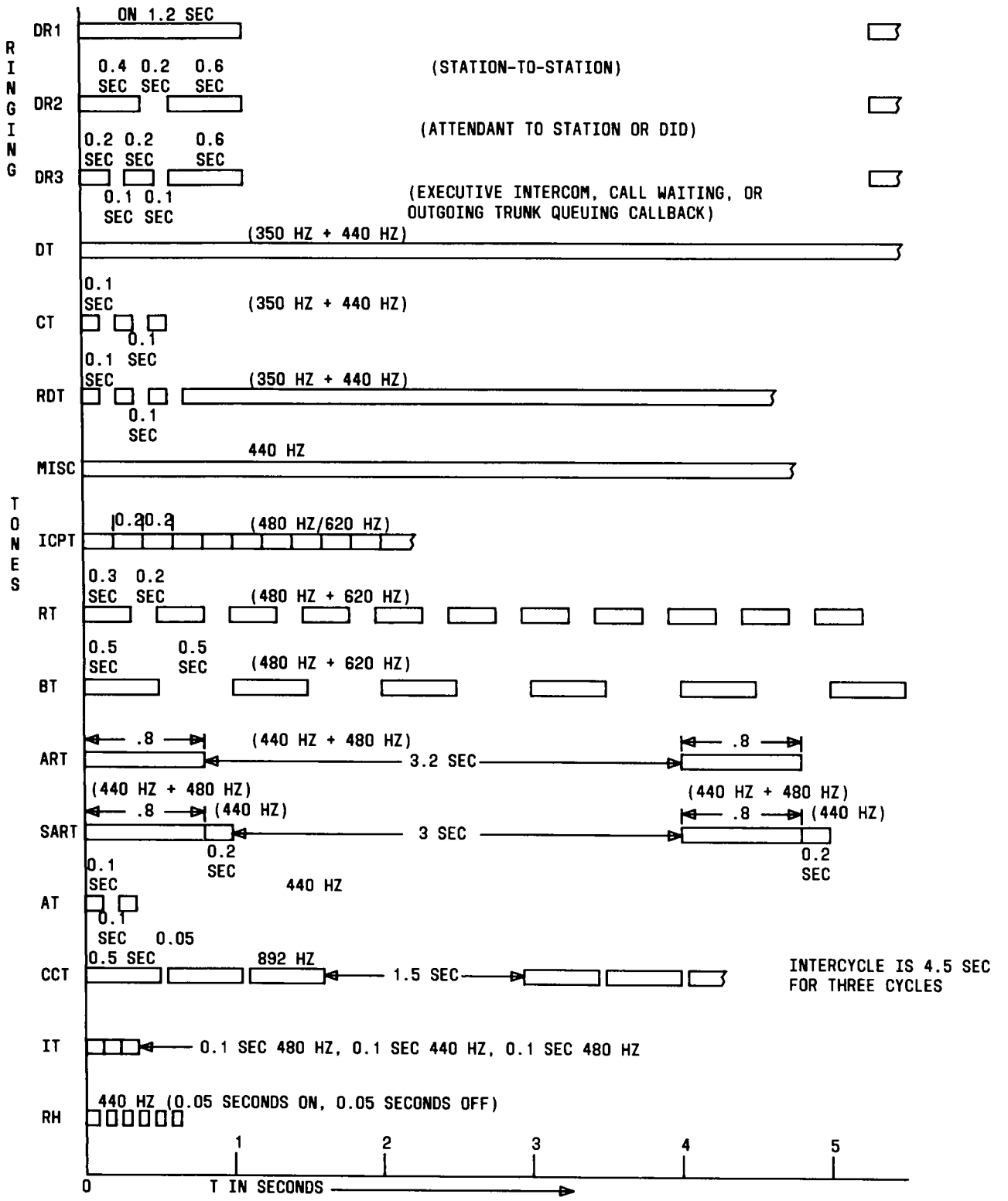


Fig. 60—Tones and Distinctive Ringing Patterns

(i) ***Special audible ringback tone (SART):*** A 440-Hz and 480-Hz tone, on for 0.8 second; followed by 440 Hz, on for 0.2 second, off for 3 seconds. This tone indicates that Call Waiting is active on the called station.

9.17 The following tones shown on Fig. 60 are generated by the LC17B circuit pack for the Centralized Attendant Service (CAS) feature and for Code Calling Access (Chime Paging).

(j) ***Attendant transfer (AT):*** A 440-Hz tone, on for 0.1 second, off for 0.1 second, on for 0.1 second.

(k) ***Code calling tone (CCT):*** A 892-Hz tone—pulse timing, 0.5 second—interpulse intervals, 0.05 second—interdigital, 1.5 seconds—intercycle, 4.5 seconds—for three full cycles.

(l) ***Information tone (IT):*** A 480-Hz tone, on for 0.1 second; 440 Hz, on for 0.1 second; 480 Hz, on for 0.1 second.

(m) ***Remote hold (RH):*** Four to six bursts of 440 Hz, on for 0.05 second, off for 0.05 second.

9.18 Time division switching permits the selected tone to be applied to the selected port. Several network ports can be connected to the same tone port in different time slots. Tone samples are placed on the time division bus by similar sampling switches used in other port circuits.

10. MAINTENANCE PLAN

A. General

10.01 The DIMENSION PBXs are designed and manufactured to provide long-term, trouble-free service. However, it is the responsibility of the operating company to develop a routine maintenance plan. This maintenance plan should include replacement of the air filters, holdover battery, time-of-day clock backup battery, inspection and cleaning of the minirecorder tape head, etc. The frequency of performing items in the maintenance plan is variable, depending upon the physical environment and amount of dust particles in the PBX equipment room.

10.02 The PBX design and development considerations place high emphasis on the ease of equipment maintainability. The circuits are packaged on replaceable circuit packs. The components on a circuit pack are not replaceable in the field. The long-term maintenance goals (based on full usage of the provided maintenance aids) are as follows:

- Isolation of at least 95 percent of all troubles encountered by craft personnel
- Isolation and repair time (an average of 1 hour or less after arrival on premises)
- Correction of at least 90 percent of circuit pack failures with the first circuit pack replacement.

10.03 The ability to isolate faults to a single replaceable circuit pack minimizes troubleshooting and replacement costs. Automatic fault detection, fault reporting, and fault isolation aids are provided as an integral part of the system. The maintenance plan calls for using these aids in isolating faults in conjunction with circuit pack substitution. It is estimated that less than 5 percent of the problems are either software-associated or of the multifault nature. The isolation and correction of multiple fault alarms may require service personnel who have extensive training or experience.

B. Maintenance Philosophy

10.04 Trouble reports may indicate that an alarm exists, accompanied by a customer complaint. After analyzing the report, maintenance personnel should perform the following routine procedures to restore the system to operational status.

(1) Verify trouble report with attendant.

(2) Observe the fault indicators and follow alarm procedures until all indicators and alarms are cleared.

(3) Make test calls.

(4) Follow nonalarm troubleshooting procedures until all nonalarm troubles are cleared.

10.05 Certain indications may require the use of one of several maintenance displays or programmed diagnostic procedures via the Maintenance and Administration Panel (MAAP). The results of these diagnostic procedures are displayed on the

MAAP. Corrective action is usually simple circuit pack replacement. However, circuit pack replacement is never used as a trial-and-error method. Should use of the MAAP fail to isolate the problem, the logic probe provides additional means of locating faults.

C. Alarms

10.06 Both hardware detection and software diagnostic routines function with the built-in maintenance circuitry to monitor critical functions within the PBX. Major and/or minor alarms are generated when a fault condition(s) is detected by software or hardware. Alarms are indicated by light-emitting diodes (LEDs) located on the alarm panel and on the Attendant Console.

10.07 A major alarm generally indicates a failure which removes a significant number of stations from service or removes a basic feature from several stations. A minor alarm generally indicates a failure which affects a limited number of stations or trunks. Both major and minor alarms are normally indicated by one or more fault indicator lights which help to isolate a particular fault. The alarms are designated and grouped to provide a quick reference (index) to specific MAAP procedures used in evaluating faults and restoring the system to an operating condition.

D. Maintenance Aids, Tools, and Test Sets

10.08 Certain maintenance aids are built into the system. A listing of these items and a description of each follows:

(a) ***Maintenance and Administration Panel (MAAP):*** The MAAP is used for maintenance, diagnostic troubleshooting, and the administration of system and station feature requirements.

(b) ***Alarm Panel:*** This panel contains both major and minor, network, and common control alarms. System initialization can also be accomplished from this panel. The fault indicators are grouped into subsections as follows:

- ALARM
- CONTROL
- PROCESSOR/MEMORY
- MAAP PROCEDURE.

(c) ***Troubleshooting Aids:*** These aids are listed below:

- The ac and dc power fusing
- Test point on circuit packs
- Busy/idle indicators—LEDs on-line and trunk circuit packs
- Other circuit pack LEDs
- Diagnostic tapes (X-ray program packages) used to check out the system.

10.09 The following tools and test sets are recommended for maintenance.

(a) ***Digital Multimeter (KS-20599, List 4):*** This tool is used for measurement of system voltages requiring greater accuracy than the standard volt-ohm-milliammeter (VOM) (KS-14510) can provide. Equivalent digital multimeter is Data Precision Model 175.

(b) ***Automatic Number Identification (ANI) Test Set J59204AJ:*** This test set is used to troubleshoot the automatic number identification circuitry. The test set verifies the proper signal being sent to the serving central office.

(c) ***Carrying Cases:*** Carrying cases are used for protection and shipment of magnetic tapes and circuit packs.

(d) ***Transmission Test Set (Type 4AN):*** This test set is used to provide the interface between the standard hand test set and the tip and ring access points on circuit packs in order to test the transmission capabilities of the line circuits.

(e) ***Hewlett Packard Model 10525T Logic Probe Equipped With Option H05 or Equivalent:*** The logic probe is used to detect absence or presence of system timing pulses. The logic probe can be ordered with the system.

E. X-Ray Program Package

10.10 The X-ray tape consists of a series of diagnostic programs used to exercise the system.

Programs are run at the time of installation prior to any other system tests. The X-ray tape is loaded into the system in place of the system feature package tape. After initialization, the X-ray tape runs continuously unless a system failure is detected. If this occurs, a fault code is displayed on the alarm panel or MAAP. No special hardware or test equipment is required. For further information regarding X ray, refer to Section 554-111-115.

F. Auxiliary Circuits

10.11 Interface circuits enable the processor to maintain communication with the network and peripherals. The minirecorder interface provides the connection to the minirecorder, allowing off-line maintenance procedures to be called up via the MAAP. The MAAP interfaces with the PBX via a dual-speed data channel (low-speed option). A data channel located in slot 30 (circuit 0) of the basic control carrier is dedicated for MAAP use.

10.12 Dual-speed data channels also interface with Attendant Consoles; both Attendant Console and data channel repeaters; displays; Electronic Custom Telephone Service (ECTS) controllers; Remote Maintenance, Administration, and Traffic System (RMATS); Station Message Detail Recording (SMDR) equipment, etc. The data channel located in slot 31 (circuit 1) of the basic control carrier is dedicated for SMDR use.

10.13 When the RMATS or the Customer Administration Center System (CACS) is provided, the data channels for basic carrier slots 30 and 31 are provided by circuit packs LC172B and LC171B, respectively. Circuit pack LC172B provides the control for selecting the system processor and the data channel for the MAAP and the Customer Administration Panel operations. Circuit pack LC171B provides the data channels for SMDR and RMATS operation.

10.14 The ANI circuit packs, LC31C and LC32B, are located in the control carrier and module control and trunk carrier, respectively. The two circuit packs are designated ***ANI data register circuit*** and ***ANI data transmitter circuit*** and are furnished only when the customer requires identification, translation, and transmission of calling party numbers to the associated central office. This station and trunk number identification occurs during each outgoing call.

11. SYSTEM CONVERSION AND EXPANSION

11.01 Conversion of a DIMENSION 2000 PBX to a DIMENSION Custom PBX, or switching from one feature package to another feature package, or expanding an existing PBX system requires careful and detailed planning. This planning usually includes both software and hardware (equipment) considerations. Additionally, depending on the type memory (low-speed) and memory configuration, the existing memory and memory control circuit packs may require replacing with circuit packs for high-speed memory. Refer to Section 554-111-101, the Administration and Maintenance Manual, and the DIMENSION PBX System Expansion and Conversion Manual (554-000-100 Index) for additional detailed information.

12. REFERENCES

12.01 The following sections are associated with the PBX Systems and, when available, may be used for additional information.

SECTION	TITLE
034-362-301	Minirecorder—KS-21447, L8 and L2—Description, Operation, and Trouble-Locating Procedures
332-610-100	Customer Premises Facility Terminal Equipment—General Description
461-100-101	Terminating and Cross Connecting on Customer Premises—General Plan
463-210-101	24A-Type Line Status Indicator—Identification and Installation
463-332-130	89A Control Unit
554-000-000	DIMENSION PBX Numerical Index (Refer to this index for TOP Documents)
554-000-100	DIMENSION PBX Miscellaneous Documentation Index
554-010-100	DIMENSION PBX Attendant Console—General Description
554-010-101	DIMENSION Type PBX—Input/Output, Interface and Auxiliary

SECTION	TITLE
	Circuits—Maintenance Support Information
554-010-102	DIMENSION PBX 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
554-010-130	DIMENSION PBX — Remote Maintenance, Administration, and Traffic System (RMATS) — Description and Operation
554-010-135	DIMENSION 400 and 2000/ Custom PBX—AUTOVON Service
554-010-140	DIMENSION PBX Customer Administration Center System
554-010-141	DIMENSION PBX Customer Administration Panel—General Description
◗554-010-155	DIMENSION PBX Data Switching◖
◗554-010-160	DIMENSION PBX Applications Processor Administration◖
554-111-101	DIMENSION 2000 and Custom PBX—Preinstallation and Planning Information
554-111-105	DIMENSION 2000 and Custom PBXs—Call Processing and General Software Description
554-111-106	DIMENSION 2000 and Custom PBXs—Scanner/Distributor and Network Control—Maintenance Support Information
554-111-107	DIMENSION 2000 and Custom PBXs—PAM Network and Port Circuits—Maintenance Support Information
554-111-108	DIMENSION 2000 and Custom PBXs—Central Processor— Maintenance Support Information
554-111-115	X-Ray Program Package—Operating Procedure—DIMENSION 2000 and Custom PBXs
554-191-100	DIMENSION PBX Feature Document Reference Guide
809-002-100	PBX Equipment Space Requirements
876-300-100	Electrical Protection — Station and Customer Premises Equipment
981-012-100	Centralized Attendant Service—General Descriptive Information

12.02 The following J drawings, schematic diagrams (SDs), and associated circuit descriptions (CDs) are applicable and may be referred to when required.

DRAWING	TITLE
◗J58882	DIMENSION 2000 PBX, Equipment Design Requirements (Iss 5)
SD-1E449-01	Station Message Detail Recording (Iss 17D)
SD-1E450-01	Electronic Telephone Controller (Iss 10D)
SD-1E466-01	Attendant Electronic Console Repeater Circuit (Iss 3D)
SD-1E467-01	Peripheral Interface Circuit (Iss 6D)
SD-1E480-01	System Circuit CSS201L (Iss 12D)

DRAWING	TITLE
SD-1E481-01	AC and DC Distribution (Iss 7D)
SD-1E482-01	Maintenance and Administration Panels (MAAP and CAP) (Iss 6D)
SD-1E483-01	AC Distribution, Fan Assembly and Frequency Generator Circuit (Iss 18B)
SD-69910-01	Attendant Electronic Console (Iss 10B)
SD-97736-01	KS-21447 Minirecorder (Iss 2B).