DMS-1* DIGITAL MULTIPLEX SYSTEM

CONTROL CONCENTRATOR TERMINAL, J7208A

REMOTE CONCENTRATOR TERMINAL, J7209A AND J7209B

POWER BAY, J7209C

EQUIPMENT APPLICATION AND ORDERING GUIDELINES

CONTENTS PAGE

1. GENERAL

Scope

1.01 The specifications in this section, together with the information in the supplementary sources of information listed in Parts 6 through 8, cover the engineering and ordering guidelines for a DMS-1 Digital Multiplex System.

1.02 *Reason for Reissue:* to add new and revised information.

System Equipment

1.03 A DMS-1 system consists of:

(a) a Control Concentrator Terminal (CCT) installed in a class 5 Central Office (CO);

(b) one to four Remote Concentrator Terminals (RCT) installed in huts or cabinets near concentrations of subscribers to be serviced;

(c) one, two, or three DS1-level (1.544 Mb/s) digital transmission lines interconnecting the CCT and RCT.

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System Functions

1.04 A DMS-1 system has the following basic functions:

(a) terminate up to 256 subscriber lines and provide connections for the subscriber lines to the CO switching equipment;

(b) provide access for any of the subscriber lines on a first-come first-served basis to any unused digital channel on the DS1 line(s);

(c) transmit both voice-frequency and supervision signals between the subscriber line terminations and the CO switching equipment;

(d) provide optional plug-in circuit packs for:

- intra-RCT transmission on 24 local links
- traffic measurement
- reorder tone return to calling parties on ringing lines when all digital channels are busy
- priority/dedicated lines
- digital line protection switching, bypass, and loopback features
- subscriber line testing
- back-up ring generator, system controller, and B-word generator
- LD-1 line terminations; LD-1 order wire; and LD-1 line fault locate from the CCT and RCT bays.

2. PACKAGING

2.01 The J7208A CCT (Fig. 1) and the J7209A RCT (Fig. 2) are both available in several configurations, each of which consists of an initial bay and an extension bay. The J7209C Power Bay is also available in three configurations (Fig. 3).

2.02 For cabinet-mounted RCT, J7209B RCT cabinets are available. The cabinets include space for optional rectifiers and back-up battery supplies. Layout of the RCT cabinet is shown in Fig. 4. The weight of a fully-equipped RCT cabinet is 2000 lbs.

3. POWER

3.01 The CCT bays are powered from the office 48-V battery supply.

3.02 The RCT bays are powered as follows:

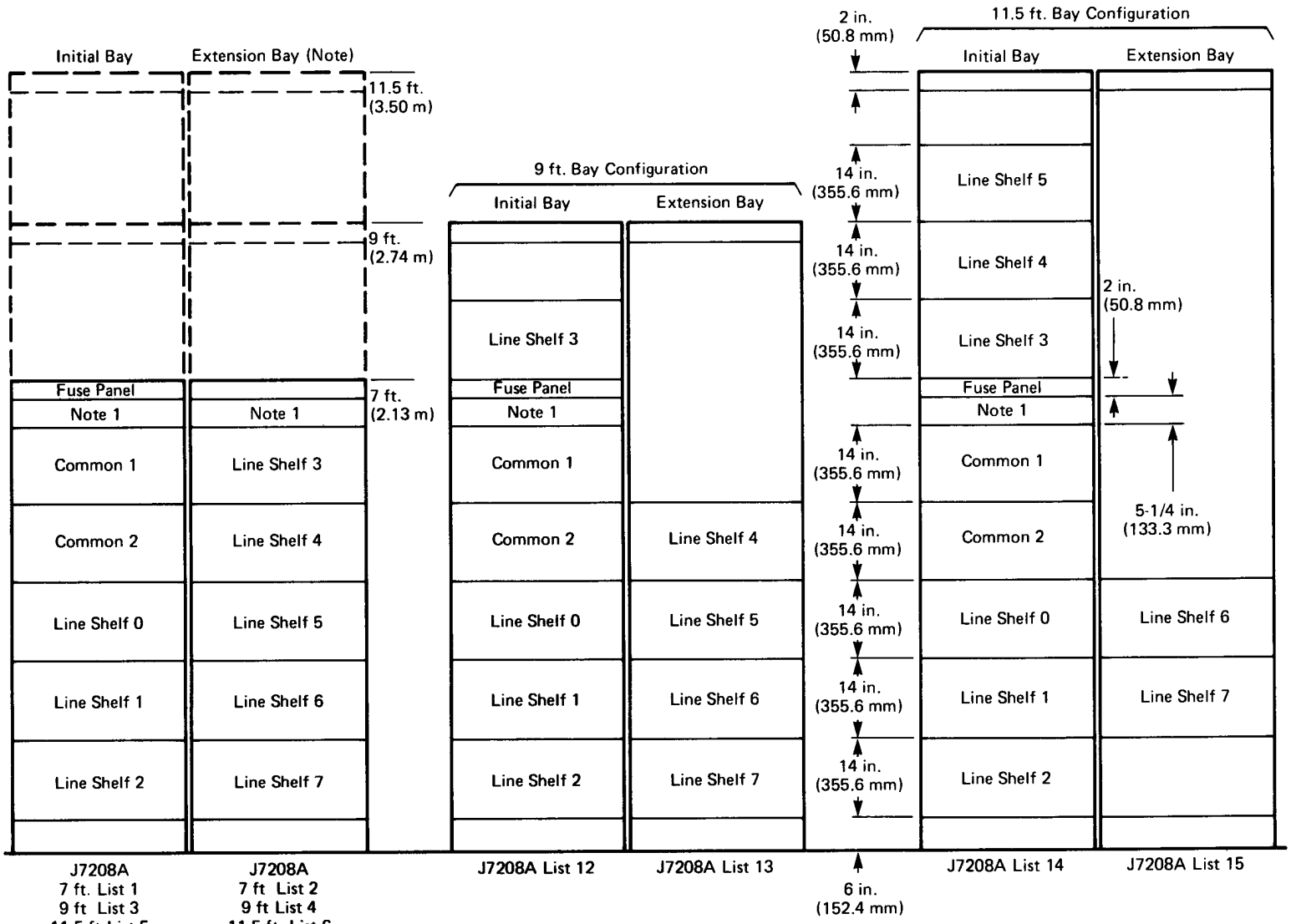
(a) *Hut-Installed RCT.* By J7209C power bays, or from any other 48-V dc source which meets the power source requirements specified in 363-2011-180. Each J7209C power bay equipped with one J2357E rectifier, can power up to two fully equipped RCT. The rectifier operates with an efficiency of 80 percent and has a power factor of 0.7 at maximum loading (25 A at 55-V dc output). The rectifier requires approximately 2450 VA of continuous power when fully loaded. Generally, following a period of emergency back-up power, a rectifier will operate at full capacity for the time it takes to continuously meet the RCT needs and to charge the batteries.

(b) *Cabinet-Installed RCT.* By a 115/230 V, 60-Hz source. The RCT cabinets include an optional rectifier and optional back-up battery set to supply the required 48 V dc for the RCT electronic circuits and subscriber lines.

3.03 Typical current requirements and fuse sizes for several capacities are shown in Table A.

Batteries

3.04 Globe Union Model 12200, gelled-electrolyte batteries are available, as an option, for backup power for the RCT. Each battery has a capacity of 20 ampere-hours at 12 V. A battery set consists of four batteries connected in series to provide 48 V dc. Table B lists the number of battery sets required for different system capacities and backup times.



Notes:

1. This space reserved for either an Order-wire and Fault-locate shelf, or a Star Protection shelf.
2. Extension bay can be either on the right side or left side of the initial bay.

Fig. 1(a) — CCT Bay Configurations — Steel-Duct Types

Notes:

1. This space reserved for either an Order-wire and Fault-locate shelf, or a Star Protection shelf.
2. Extension bay can be either on the right side or left side of the initial bay.

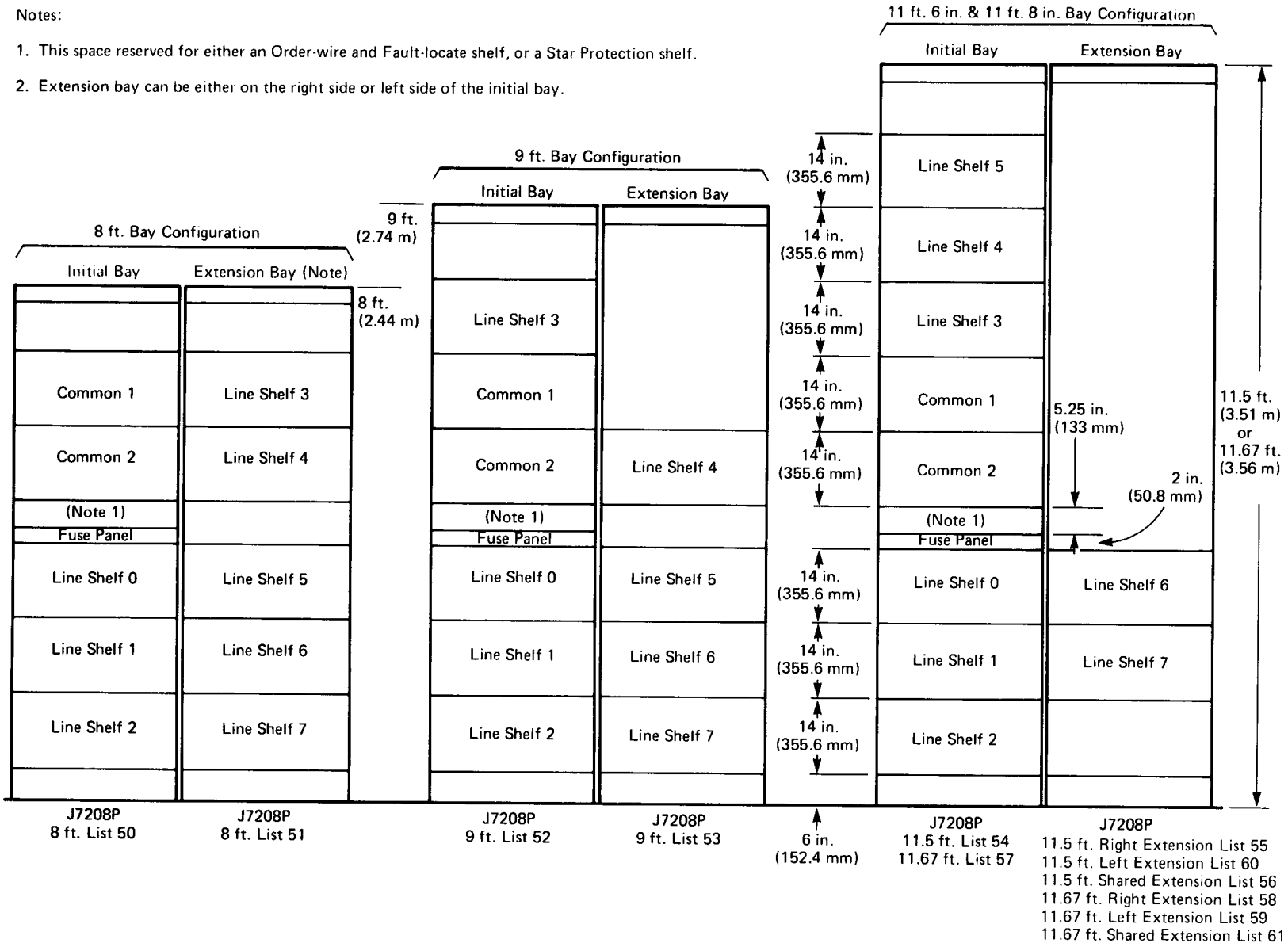
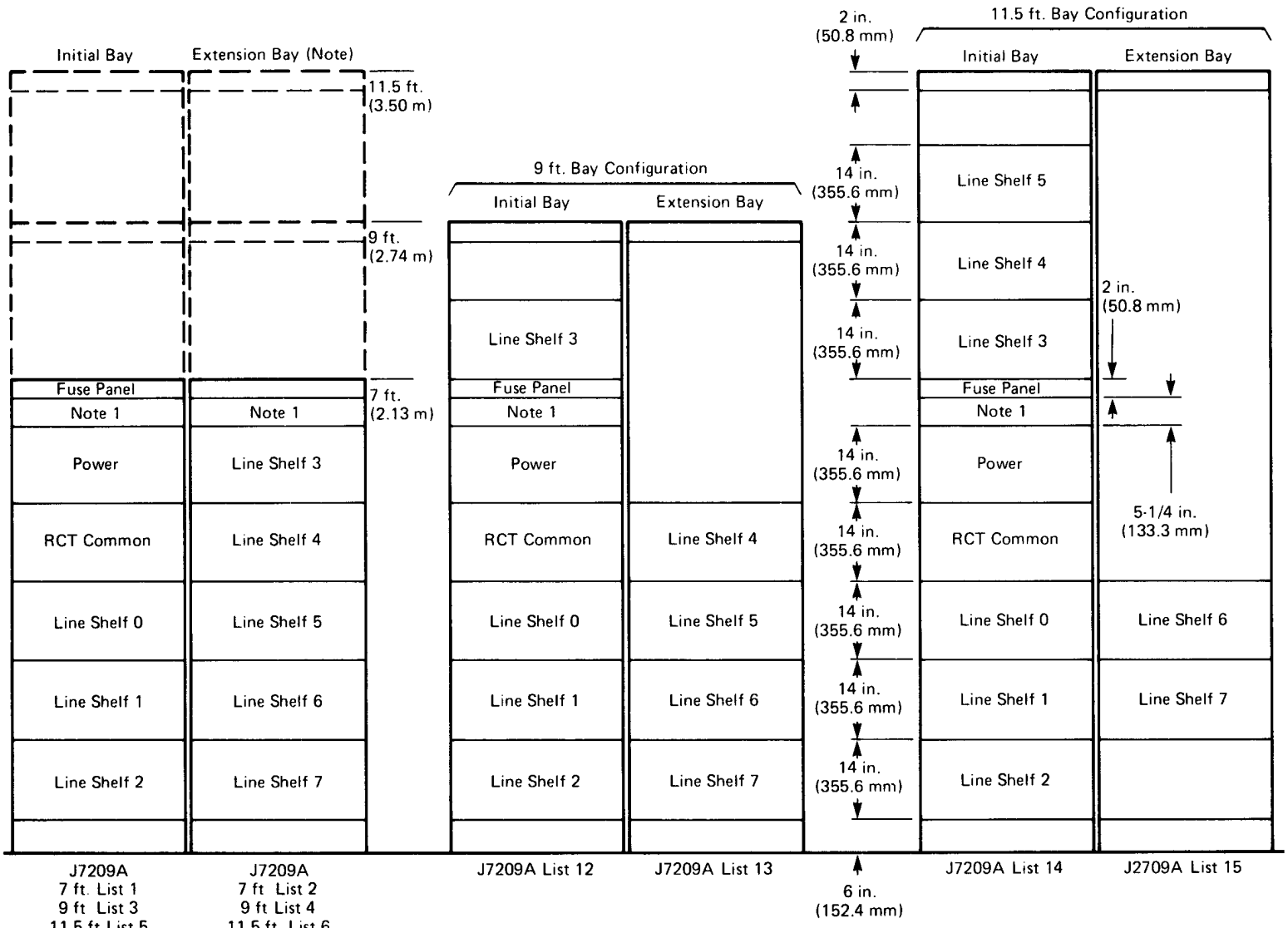


Fig. 1(b) — CCT Bay Configurations — Aluminum-Channel Types



Notes:

1. This space reserved for either an Order-wire and Fault-locate shelf, or a Star Protection shelf.
2. Extension bay can be either on the right side or left side of the initial bay.

Fig. 2(a) — RCT Bay Configurations — Steel-Duct Types

Notes:

1. This space reserved for either an Order-wire and Fault-locate shelf, or a Star Protection shelf.
2. Extension bay can be either on the right side or left side of the initial bay.

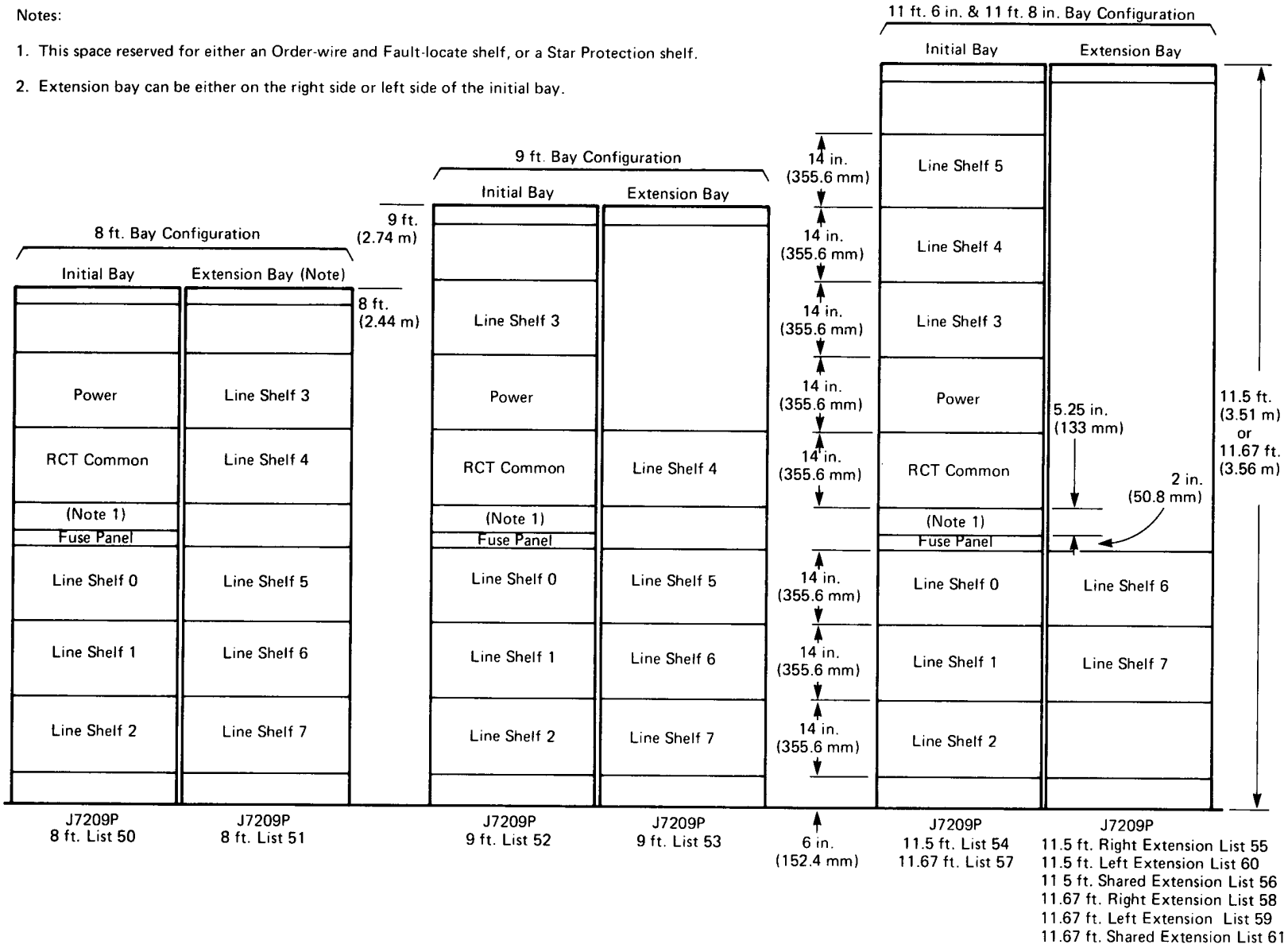


Fig. 2(b) — RCT Bay Configurations — Aluminum-Channel Types

TABLE A
CURRENT AND FUSE REQUIREMENTS

	CCT BAY (Note 6)			RCT BAY (Note 6)			RCT CABINET		
NO. OF LINES	I (Note 1) (A)	POWER (W)	FUSE (A)	I (Notes 1, 2) (A)	POWER (W)	FUSE (A)	I (Notes 3, 4, 5) (A)	POWER (W)	FUSE (Note 4) (A)
32	7	350	15	9	450	15	3.5	550	5
128	9	450	15	11	550	15	4.0	650	5
256	11	550	15	13	650	15	5.0	800	7.5

Notes:

1. Current in amperes at 48 V dc, with all options and three QPP437A repeater/line power packs installed.
2. Current with 20 percent of subscriber lines off-hook. Each line draws 50-mA current.
3. Current in amperes at 230 V, 60 Hz, and 80-percent efficiency and 70-percent power factor. At 115 V, assume twice the current and twice the fuse rating.
4. Add 6.5 A at 115 V, or 3.5 A at 230 V, if heaters are installed in the cabinet.
5. Current for dual cabinet RCT: For two 128 line cabinets, the current for 128 lines must be doubled.
6. Where power is applied from a source that does not provide individual fusing for the DMS-1 feeder, a separate 15 A fuse must be provided between the power distribution point and the DMS-1 bay.

TABLE B
GELLED-ELECTROLYTE BATTERY REQUIREMENTS (Sets of 4)

	NUMBER OF BATTERY SETS REQUIRED				
NO. OF LINES	2-HOUR BACKUP	4-HOUR BACKUP	6-HOUR BACKUP	8-HOUR BACKUP	10-HOUR BACKUP
32	2	3	4	5	6
128	3	3	5	6	8
256	3	4	6	8	10

Note: Backup times are for new batteries and 20°C operation. Derate as follows:

By 15 percent for 0°C operation;
By an additional one percent per °C below 0°C;
By 50 percent after five years of use.

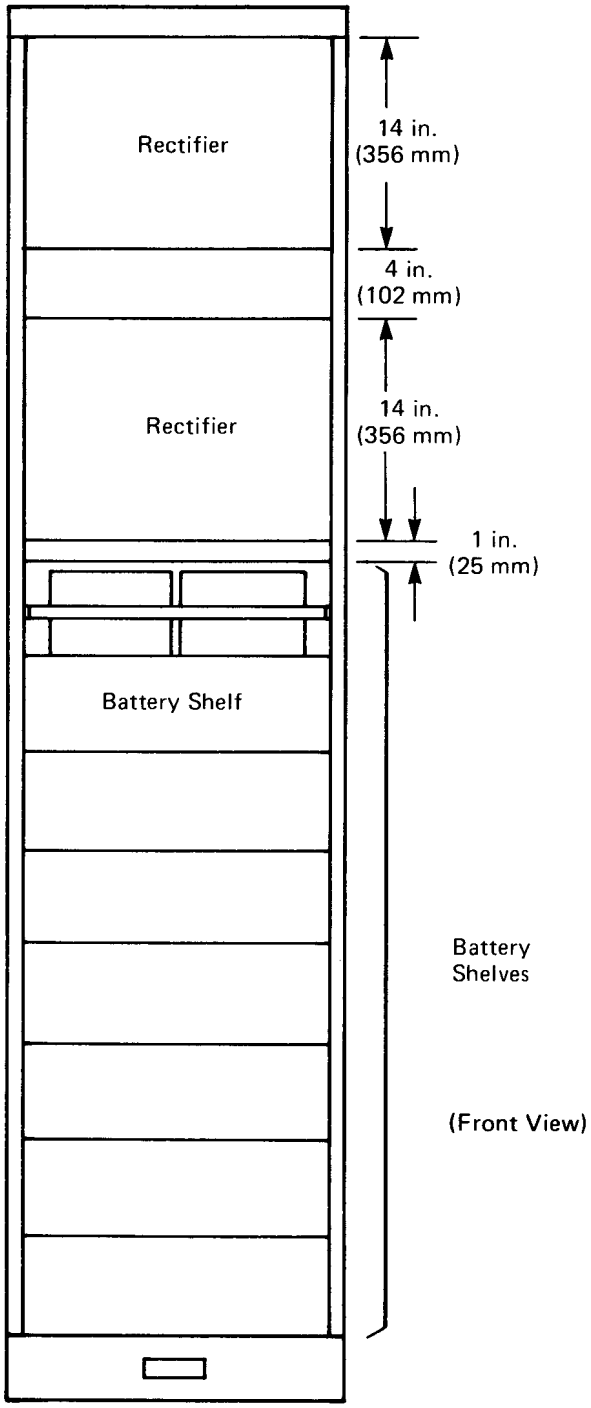


Fig. 3 – Power Bay Layout

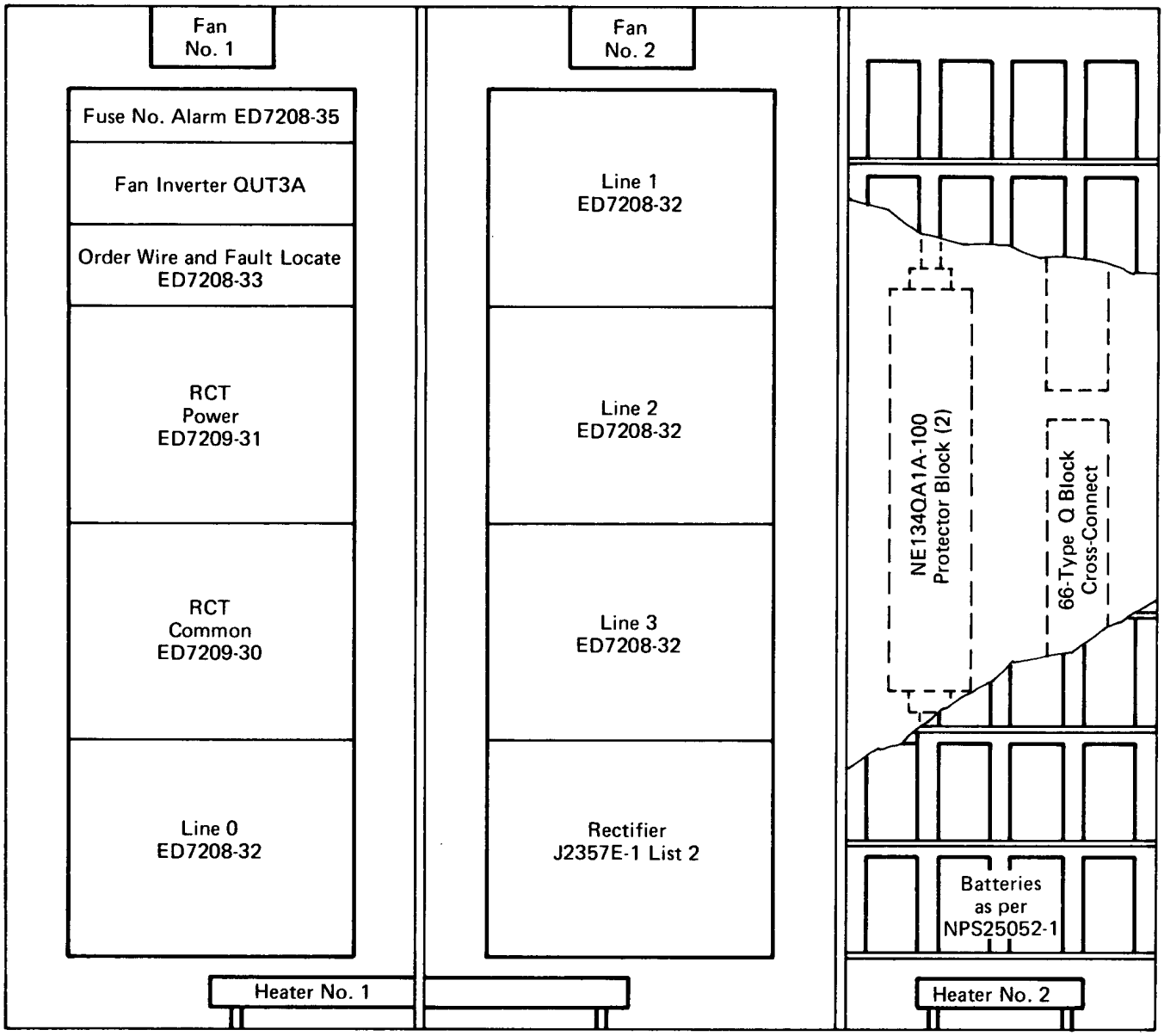


Fig. 4 — RCT Cabinet Layout

4. SUBSCRIBER CONNECTION REQUIREMENTS

4.01 Subscriber line connections between the DMS-1 bays and the line distribution frames are made with ED7208-51 connectorized cables. The cables are factory-assembled with 32-pair connectors at one end for connection to the line shelves on the DMS-1 bays. The pairs at the other end of the cable are either soldered or wire-wrapped to the distribution frame blocks. The cables are ordered to length as required. One cable is required for each line shelf.

Control Concentrator Terminal Connections

4.02 The DMS-1 system terminating resistance for cables from the switching equipment to the CCT is 760 ohms. The maximum resistance of the connecting cable is therefore the difference between the maximum loop resistance allowed for the switching equipment and 760 ohms.

Subscriber Line Design

4.03 *Supervision.* Subscriber lines connected to the RCT may be designed by using either standard resistance or uniguage design techniques. The maximum loop resistance for reliable loop supervision (off-hook detection, ring-trip, Automatic Number Identification [ANI] and coin detection) is:

(a) 1900 ohm with nominal operating conditions (e.g., talk battery of 54 V, temperature of 24°C, and power induction of 1 V rms, 60 Hz). See 363-2011-214 for nominal operating voltages using the J7209C power bay.

(b) 1300 ohms at worst-case conditions (e.g., talk battery of 44 V, temperature of −40°C or +60°C, and power induction of 30 V rms, 60 Hz).

4.04 With frequency selective ringing, ringers tuned to the third harmonic of a ringing frequency should not be used.

4.05 Simultaneous ringing of both tip and ring conductors is not possible.

4.06 *Transmission.* When determining the allowable subscriber loop transmission loss, the design must include the DMS-1 line-to-line transmission loss of 2±0.5 dB.

5. OPTIONS

5.01 Refer to Tables E and I for the options listed in 5.01 through 5.10.

5.02 *Local Link Option.* The local-link option provides an increase in the system traffic capacity by transferring intra-RCT traffic onto internal channels after the initial connection has been established through the CO switching equipment. Channels between the CCT and RCT are then freed for traffic elsewhere in the network. On coin lines, local link is inhibited by the system controller.

5.03 *Reorder Tone Option.* When the reorder tone option is installed, terminating calls that cannot be provided with a channel (all channels busy) will have ringing tripped and reorder tone returned on the line for up to 12 to 24 seconds for a full system. The B versions of the office line circuit packs must be installed for this option.

5.04 *Protection Switching Option.* The protection switching option provides:

(a) 1-for-1 protection switching for a single digroup system;

(b) 1-for-2 protection switching for a dual digroup system;

(c) 1-for-n protection switching for systems with collocated CCT and RCT.

(d) *RCT Bypass:* manually from the CCT, or automatically when both +5 V supplies fail at the RCT;

(e) digital line loop-back at the output of the RCT immediately preceding the location of the line failure;

(f) manual and automatic control of the protection switching, bypass and loopback functions, if LD-1 lines are used in the system;

(g) fail-safe operation (1-for-n only), allowing removal of one of the protection switching circuit packs without failing the system.

5.05 *System Controller.* System features are added by installing the appropriate circuit packs and the correct code of system controller circuit pack. The system controller circuit pack codes, and the features are listed in Table F. The backup system control option provides standby system controller and B-word circuit packs. The backup circuit packs are automatically switched into service when failure occurs in the working circuit packs.

5.06 *Traffic Measurements Option.* Traffic statistics are measured and displayed on an optional set of counters. Signals are provided to drive remote NE-14 type counters, or equivalent.

5.07 *Repeater Option.* When no digital line span rack is available in an office, terminal repeaters can be mounted on the CCT and RCT bays to terminate the digital line. Both powering and nonpowering repeaters are available. See 363-2011-151 for digital line engineering requirements.

5.08 *Subscriber Line Testing Option.* Tests of the subscriber lines can be carried out directly from the CCT, or from a remote test desk via a subscriber line test extension.

5.09 *Ringing Option.* Frequency-selective, ac/dc, and superimposed ringing can be supplied to the lines from the RCT by installing the ringing sources required.

Note: The use of ringers that are tuned to the third harmonic of another ringing frequency in use on the same loop is not recommended as bell tapping may result.

5.10 *Backup Ring Generator Option.* The backup ring generator is switched onto the ring bus if the initial ring generator fails. The back-up ring generator is powered and monitored for loss of output at all times.

5.11 *Dual Cabinet Option.* An extension cabinet can be added back-to-back to the initial cabinet to expand the number of subscriber lines from 128 through 256. Only one set of common equipment is required with the added line shelves in the extension cabinet. The extension cabinet is connected to the initial cabinet common equipment through an interconnecting duct between the two cabinets.

6. DRAWINGS

6.01 The following drawings can be ordered by referring to the prefix and base number (e.g., J7209A) and requesting the current dash (-) number and latest issue.

SD7208-01	DMS-1 Control Concentrator Terminal Schematic
SD7209-01	DMS-1 Remote Concentrator Terminal Schematic
SD7210-01	DMS-1 Circuit Pack Schematics
J7208A	DMS-1 Control Concentrator Terminal Specification
J7208F	DMS-1 Control Concentrator Terminal Circuit Packs
J7208P	DMS-1 Control Concentrator Terminal Specification (Aluminum Channel Type)
J7209A	DMS-1 Remote Concentrator Terminal Bays Specification
J7209B	DMS-1 Remote Concentrator Terminal Cabinet Specification
J7209C	DMS-1 Power Bay Specification
J7209F	DMS-1 Remote Concentrator Terminal Circuit Packs
J7209P	DMS-1 Remote Concentrator Terminal Specification (Aluminum Channel Type)
ED7208-51	VF Cables.

7. SUPPLEMENTARY INFORMATION

7.01 The following documents contain supplementary information on the DMS-1 system:

169-2191-200	J2357E Rectifier
363-2011-100	DMS-1 System Description
363-2011-151	DMS-1 DS1 Span Engineering
368-2011-100	LD-1 Digital Repeatered Line – General Description
640-2131-200	J7209B RCT Cabinet.

8. EQUIPMENT ORDERING

8.01 The following equipment specification drawings contain detailed ordering information for the CCT, RCT, and power bays, and the RCT cabinets.

J7208A – DMS-1 Control Concentrator Terminal Bays

List 1 – Framework, assembly, wiring, and common equipment required to provide one 7-foot CCT bay e/w two common shelves. (See Note 2 and 3.)

List 2 – Framework, assembly, and wiring required in addition to List 1 to provide one 7-foot CCT extension bay. (See Note 2 and 3.)

List 3 – (same as List 1 for 9-foot bay) (3 line shelves).

List 4 – (same as List 2 for 9-foot bay) (5 line shelves).

List 5 – (same as List 1 for 11.5-foot bay) (3 line shelves).

List 6 – (same as List 2 for 11.5-foot bay) (5 line shelves).

List 7 – Assembly, wiring and equipment required in addition to Lists 1, 2, 3, 4, 5, or 6 to provide one line shelf (maximum three per Lists 1, 3, and 5; and five per Lists 2, 4, and 6). (See Note 1.)

List 8 – Unassigned.

List 9 – Assembly, wiring, and equipment required in addition to Lists 1, 3, or 5 to provide one order-wire and fault-locate shelf for the LD-1 digital line.

List 10 – Unassigned.

List 11 – Wiring and equipment required in addition to List 7 to provide one jackfield (maximum of one per List 7). (See Note 6.)

List 12 – Framework, assembly, wiring, and common equipment required to provide one 9-foot CCT bay e/w two common shelves (four line shelves). (See Notes 2 and 4.)

List 13 – Framework, assembly, wiring, and common equipment required to provide one 9-foot CCT extension bay (four line shelves). (See Notes 2 and 4.)

List 14 – Framework, assembly, wiring and common equipment required to provide one 11.5-foot CCT bay e/w two common shelves (6 line shelves). (See Notes 2 and 4.)

List 15 – Framework, assembly, wiring, and common equipment required to provide one 11.5-foot CCT extension bay (two line shelves). (See Notes 2 and 4.)

List 16 – Wiring and equipment required in addition to Lists 1, 3, 5, 12, and 14 to provide one digital signal attenuator when the distance between DMS-1 repeaters and the nearest DS1 line or terminal repeater is less that 1500 feet.

List 17 – Framework, assembly, wiring, and common equipment required to provide on 7-foot CCT bay equipped with circuit packs to provide eight universal office line cards with reorder tone, power and signal buffering (32 lines) and circuit packs to provide single digroup operation with reorder tone (Note 2).

List 18 – Framework, assembly, wiring, and common equipment required to provide one 9-foot CCT bay equipped with circuit packs to provide eight universal office line cards with reorder tone, power and signal buffering (32 lines) and circuit packs to provide single digroup operation with reorder tone (Note 2).

List 19 – Framework, assembly, wiring, and common equipment required to provide one 11.5-foot CCT bay equipped with circuit packs to provide eight universal office line cards with reorder tone, power and signal buffering (32 lines) and circuit packs to provide single digroup operation with reorder tone (Note 2).

List 20 – Assembly, wiring, and equipment required in addition to Lists 1, 3, 5, 12, 14, 17, 18, or 19 to provide subscriber line test extension.

List 21 — Assembly, wiring, and equipment required in addition to Lists 7, 17, 18, or 19 to provide subscriber line test extension.

List 22 — Assembly, wiring, and equipment required in addition to Lists 1, 3, 5, 12, 14, 17, 18, 19 to provide fail-safe.

Note 1: For ordering connectorized cables to interconnect line shelves to common shelves, refer to J7208A. For ordering connectorized cables to connect the CCT bays to the distribution frame refer to ED7208-51. The length must be specified on the order.

Note 2: The circuit packs for the CCT bays are not included in J7208A and must be ordered separately. Refer to J7208F.

Note 3: These lists provide space for three line shelves on the initial bays and five line shelves on the extension bays for 7-, 9-, and 11.5-foot bay heights.

Note 4: These lists provide the maximum number of line shelves on 9 foot (4 line shelves) and 11.5 foot (6 line shelves) initial bays, and the remainder on the extension bay (9 foot, 4 line shelves; 11.5 foot, 2 line shelves).

Note 5: Patch cords for connecting test equipment to the subscriber and digital line jacks, are ordered by specifying the type and the quantity of the patch cords required (Table L). A minimum of two patch cords of P3Q1- and P3Q3-type are required to perform system tests.

Note 6: Two versions of the jackfield are available:

(a) ED7208-34,G3 equipped with line and equipment drop jacks with grounded sleeves;

(b) ED7208-34,G5 equipped with line drop monitor jacks with isolated sleeve leads.

J7208F — DMS-1 CCT Circuit Packs

List 1 — Circuit packs required to provide single digroup operation for common shelves, lines 0 through 127. (Notes 1, 2, and 3.)

Lists 2 — Circuit packs required in addition to List 1, 6, 8 to provide dual digroup operation, lines 0 through 127. (Notes 1, 2, and 3.)

Lists 3 — Circuit packs required in addition to List 1, 6, 8 to provide operation for lines 128 through 255 (one per digroup). (Notes 1 and 2.)

List 4 — Unassigned.

List 5 — Circuit packs required to provide power and signal buffering for the line shelf (one per line shelf). (Notes 1 and 2.)

List 6 — Circuit packs required to provide single digroup operation for common shelves, lines 0 through 127 (Notes 1, 2, and 3).

List 7 — Circuit packs required to provide power and signal buffering for a line shelf (one List 7 per line shelf). (Notes 1, 2, 3.)

List 8 — Circuit packs required to provide single digroup operation for common shelves, lines 0 through 127 (Notes 1, 2, and 3).

Note 1: Table C summarizes the digroup-associated circuit packs supplied with Lists 1 through 3, 6, 8, and the line-associated circuit packs supplied with Lists 5 and 7.

Note 2: Line circuit packs are ordered from Table D as required. A maximum of eight line circuit packs may be located on any line shelf. There are four line circuits per circuit pack except on coin circuit packs which have only two lines. The line circuit pack restrictions are:

- a maximum of two coin circuit packs in any line shelf shroud positions 0 and 1, or consecutive positions starting with an even-numbered slot;
- superimposed ringing and FSR circuit packs are not permitted together on the same RCT;
- FSR and universal circuit packs are not permitted together on the same system, with the subscriber line text extension option in use, and the line sparing feature of SLTE selected.

Note 3: Optional circuit packs for the CCT must be ordered by circuit pack code from Table E.

J7208P — DMS-1 Control Concentrator Terminal Bays (Aluminum Channel Type)

List 50 — Framework, assembly, wiring and common equipment required to provide one 8-foot CCT bay equipped with two common shelves, three line shelves, one order wire and fault-locate shelf, three jackfields, one office fail-safe assembly, and one fuse panel (Notes 1, 2, and 3).

List 51 — Framework, assembly and common equipment required in addition to List 50 to provide one 8-foot CCT extension bay equipped with five line shelves, and five jackfields (Notes 1 and 2).

List 52 — Framework, assembly, wiring and common equipment required to provide one 9-foot CCT bay equipped with two common shelves, four line shelves, one order wire and fault-locate shelf, four jackfields, one office fail-safe assembly, and one fuse panel (Notes 1, 2, and 3).

List 53 — Framework, assembly and common equipment required in addition to List 52 to provide one 9-foot CCT extension bay equipped with four line shelves, and four jackfields (Notes 1 and 2).

List 54 — Framework, assembly, wiring and common equipment to provide one 11-foot 6-inch CCT bay equipped with two common shelves, six line shelves, one order wire and fault-locate shelf, six jackfields, one office fail-safe assembly, and one fuse panel (Notes 1, 2, and 3).

List 55 — Framework, assembly, and common equipment required in addition to List 54 to provide one right-hand extension bay equipped with two line shelves, two jackfields (Notes 1 and 2).

List 56 — Framework, assembly, and common equipment required in addition to List 54 to provide one 11-foot 6-inch CCT shared extension bay equipped with four line shelves, four jackfields (Notes 1 and 2).

List 57 — Framework, assembly, wiring and common equipment required to provide an 11-foot 8-inch CCT bay equipped with two common shelves, six line shelves, one order wire and fault-locate shelf, six jackfields, one office fail-safe assembly, and one fuse panel (Notes 1, 2, and 3).

List 58 — Framework, assembly, and common equipment required in addition to List 57 to provide one right-hand extension bay equipped with two line shelves, two jackfields (Notes 1 and 2).

List 59 — Framework, assembly, and common equipment required in addition to List 57 to provide one 11-foot 8-inch CCT shared extension bay equipped with four line shelves, four jackfields (Notes 1 and 2).

List 60 — Framework, assembly, and common equipment required in addition to List 54 to provide one left-hand 11-foot 6-inch CCT extension bay equipped with two line shelves, two jackfields (Notes 1 and 2).

List 61 — Framework, assembly, and common equipment required in addition to List 57 to provide one left-hand 11-foot 8-inch CCT extension bay equipped with two line shelves, and two jackfields (Notes 1 and 2).

Note 1: These lists also provide bay and office cabling (vf only 24 AWG) and connectorized flat cable.

Note 2: The circuit packs for the CCT bays are not included in J7208P and must be ordered separately. Refer to J7208F.

Note 3: Patch cords for connecting test equipment to the subscriber and digital line jacks, are ordered by specifying the type and the quantity of the patch cords required (Table L). A minimum of two patch cords of P3Q1 and P3Q3 types are required to perform system tests.

TABLE C
CCT CIRCUIT PACKS INCLUDED IN LISTS

LIST	QTY PER LIST	CODE AND DESIGNATION	RATING
5	1	QPP412A Buffer	CA
1,2,3,6,8	1	QPP413A Driver	
1,2,6,8	1	QPP418A Address Control Office	
1,2,6,8	1	QPP419A Digroup	
1,6,8	1	QPP421A Alarm – Office	
1,6	1	QPP425A System Test	
1	1	QPP431A System Controller	A&M
1,6,8	1	QPP432A B Word	
5,7	1	QPP439A Line Power Converter	
1,2,6,8	1	QPC85B 5/12-V Converter	
6,8	1	QPP431B System Controller	
7	1	QPP496A Buffer	
8	1	QPP450A Test Control	

TABLE D
CCT LINE SHELF CIRCUIT PACKS ORDERING SUMMARY

CODE AND DESIGNATION	QUANTITY
QPP406A, B Single Party – Office	As required
QPP408A, B Universal – Office	As required
QPP410A, B Universal Coin – Office	Maximum 2 per shelf
QPP411A Priority/Dedicated	As required
QPP441A, B Frequency Selective – Office	As required
QPP441C, D Frequency Selective – Office	As required (Note 3)
QPP443A, B Postpay Coin – Office	As required
QPP446A, B Superimposed – Office	As required

Notes:

1. QPP411A is used with QPP405A installed at the RCT.

2. A maximum of eight line circuit packs can be located on one line shelf. There are four line circuits per circuit pack except for coin cards which have two lines only. The line circuit pack restrictions are:

   - a maximum of two coin circuit packs in any line shelf shroud positions 0 and 1;
   - superimposed ringing and FSR circuit packs are not permitted together on the same line shelf;
   - FSR and universal circuit packs are not permitted together on the same line shelf with the subscriber option, and the line sparing feature of SLTE selected.

3. QPP441C, D, in addition to performing the functions of QPP441A, B, allow operation with switching machines equipped with Automatic Electric SATT type ANI equipment.

TABLE E
CCT OPTION CIRCUIT PACKS ORDERING SUMMARY

OPTION	CODE AND DESIGNATION	QTY	NOTES	RATING
Local Links	QPP415A Local Lock QPP416A Local Link Detector	1 1	1, 3	
Reorder Tone	QPP427A Reorder Tone *Note:* Requires B version of office line circuit packs.	1		
Protection Switching for the LD-1 Digital Line	QPP429A Prot Switch-Office QPP499A 1-For-N Prot Switch-Office	1 1	3, 4	
Backup System Control	QPP431A System Controller QPP432A B-Word QPP431B System Controller	1 1 1	1, 5	A&M
Traffic Measurements	QPP434A Traffic QPP434B Traffic	1 1	1, 6	
Repeaters with line Power Supply	QPP437A Repeater/Line Power	–	2, 3	
Repeaters without Line Power Supply	QPP436A Repeater	–	2, 3	
Subscriber Line Testing	QPP424A Line Test-Office	1	3	
Digroup	QPP419B Digroup	1	3, 7	
System Test	QPP425B System Test	1	8	
Subscriber Line Test Extension	QPP448A Test Access-Office	1	3	

Notes:

1. When these circuit packs are installed on a single digroup system (J7208F List 1, 6, 8) an additional QPC85 5/12-V Converter must also be installed to power the circuit packs.
2. The QPP436A Repeater is required when the digital line(s) is terminated on the CCT but is powered separately. The QPP437A Repeater/Line Power is required when the digital line(s) is powered from the CCT. The required quantity, in each case, is one per digital line equipped.

Table Continued

TABLE E Continued
CCT OPTION CIRCUIT PACKS ORDERING SUMMARY

3. Requires corresponding RCT circuit pack. See Table J.
4. Can only be used with QPP436 or QPP437.
5. When ordering back-up system control, order QPP431B and QPP432A.
6. QPP434B does not have local traffic read-out.
7. Use QPP419B in systems which interface with switching machines having a line-release time of less than 100 ms. Use two circuit packs in a 2-digroup DMS-1 system.
8. QPP425B is the same as QPP425A except that the LOOP OFF, LOOP REM, and SELF TEST buttons on the faceplate are momentary-action types; i.e., they must be held IN for operation.

TABLE F
SYSTEM CONTROLLER CIRCUIT PACKS

CODE	FEATURE	RATING
QPP431A1	For basic operating system with local link and traffic options.	A&M
QPP431A2	Same as QPP431A1 plus local link search option (0 channels or 36 channels).	A&M
QPP431A3	Same as QPP431A2 plus modifications for compatibility with protection switching.	A&M
QPP431A4 QPP431B4	Same as QPP431A3 plus modifications in the local link operation.	A&M STANDARD
QPP431A5 QPP431B5	Same as QPP431A4 plus protection switching (with QPP428 and QPP429).	A&M A&M
QPP431A6 QPP431B6	Same as QPP431A5 plus subscriber line testing (with QPP423 and QPP424).	STANDARD STANDARD
QPP431A7 QPP431B7	Same as QPP431A6 plus semi-postpay coin telephone (with QPP442 and QPP443).	STANDARD
QPP431A8 QPP431B8	Same as QPP431A7 plug universal coin (QPP410 and QPP409) and buffer (QPP496).	STANDARD
QPP431C	Same as QPP431B8 plus superimposed ringing (QPP445, QPP446, QPP435), 1-for-n protection switching line audit (supervisory and vf, QPP450), and subscriber line test extension (SLTE).	STANDARD

TABLE G
OPTIONAL ORDER WIRE AND FAULT-LOCATE CIRCUIT PACKS
ORDERING SUMMARY

CODE AND DESIGNATION		QUANTITY	
		1-CABLE OPERATION	2-CABLE DIVERSITY OPERATION
QPP300-Type	Fault-Locate Filter	1	2
QPP301C	Fault-Locate Access	1	1
QPP302A	Span Order Wire Term	1	2
QPP303A	Telephone Set	1	1

J7209A – DMS-1 RCT Bays

List 1 – Framework, assembly, wiring and common equipment required to provide one 7-foot RCT bay e/w one power shelf for ac/dc ringing and one common shelf (see Note 2).

List 2 – Framework, assembly, and wiring required in addition to List 1 to provide one 7-foot RCT extension bay (see Notes 2 and 5).

List 3 – (same as List 1 for 9-foot bay).

List 4 – (same as List 2 for 9-foot bay).

List 5 – (same as List 1 for 11.5-foot bay).

List 6 – (same as List 2 for 11.5-foot bay).

List 7 – Assembly, wiring, and equipment required in addition to Lists 1, 2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 17, 18, 19, or 20 to provide one line shelf. Maximum bay holding capacity is as follows:

MAXIMUM CAPACITY	PER EACH LIST
3 List 7	1, 3, 5, 16, 17, 18
5 List 7	2, 4, or 6
4 List 7	12, 13, 19
6 List 7	14, 20
2 List 7	15

List 8 – Wiring and equipment required in addition to List 7 to provide one jackfield and talk battery filter (maximum one per each List 7) (see Note 5).

List 9 – Assembly, wiring, and equipment required in addition to Lists 1, 3, or 5 to provide one order wire and fault location shelf for the LD-1 digital line.

List 10 – Wiring and equipment required in addition to List 7 to provide one talk battery filter (maximum one per List 7).

List 11 – Wiring and equipment required in addition to List 7 to provide one jackfield (see Note 5).

List 12 – Framework, assembly, wiring and common equipment required to provide one 9-foot RCT bay e/w one common shelf and one power shelf for ac/dc ringing (see Notes 2 and 4) (four line shelves).

List 13 – Framework, assembly, wiring, and common equipment required to provide one 9-foot RCT extension bay (see Notes 2 and 4) (four line shelves).

List 14 – Framework, assembly, wiring, and common equipment required to provide one 11.5-foot RCT bay e/w one power shelf for ac/dc ringing and one common shelf (see Notes 2 and 4) (six line shelves).

List 15 – Framework, assembly, wiring, and common equipment required to provide one 11.5-foot RCT extension bay (see Notes 2 and 4) (two line shelves).

List 16 —(same as List 1, but e/w one power shelf for either ac/dc or frequency-selective ringing, or both).

List 17 —(same as List 3, but e/w one power shelf for either ac/dc or frequency-selective ringing, or both).

List 18 —(same as List 5, but e/w one power shelf for either ac/dc or frequency-selective ringing, or both).

List 19 —(same as List 12, but e/w one power shelf for either ac/dc or frequency-selective ringing, or both).

List 20 —(same as List 14, but e/w one power shelf for either ac/dc or frequency-selective ringing, or both).

List 21 —Wiring and equipment required in addition to Lists 1, 3, 5, 12, 14, 19, or 20 to provide one digital signal attenuator, when the distance between DMS-1 repeaters and the nearest DS1 line or terminal repeater is less than 1500 feet.

List 22 —Framework, assembly, wiring, and common equipment to provide one 7-foot RCT bay e/w common and FSR power shelves; one line shelf e/w circuit packs to provide eight universal remote line cards, power, and signal buffer buffering (32 lines); and circuit packs to provide single-digroup operation for ac/dc ringing (Note 2).

List 23 —Framework, assembly, wiring, and common equipment to provide one 9-foot RCT bay e/w common and FSR power shelves; one line shelf e/w circuit packs to provide eight universal remote line cards, power and signal buffering (32 lines); and circuit packs to provide single-digroup operation for ac/dc ringing (Note 2).

List 24 —Framework, assembly, wiring, and common equipment to provide one 11.5-foot RCT bay e/w common and FSR power shelves; one line shelf e/w circuit packs to provide eight universal remote line cards, power and signal buffering (32 lines); and circuit packs to provide single-digroup operation for ac/dc ringing (Note 2).

List 25 —Assembly, wiring, and equipment required in addition to Lists 1, 3, 5, 12, 14, 16, 17, 18, 19, 20, 22, 23, and 24 to provide SLTE (Note 2).

List 26 —Assembly, wiring, and equipment required in addition to Lists 7, 22, 23, and 24 to provide SLTE (Note 2).

List 27 —Assembly, wiring, and equipment required in addition to Lists 1, 3, 5, 12, 14 to provide a fail-safe feature.

List 28 —Assembly, wiring, and equipment required in addition to Lists 16, 17, 18, 19, 20, 22, 23, 24 to provide a fail-safe feature.

List 29 —Assembly, wiring, and equipment required in addition to Lists 16, 17, 18, 19, 20, 22, 23, 24 to provide superimposed ringing.

Note 1: For ordering connectorized cables to connect line and common shelves, refer to J7209A. For ordering connectorized cables to connect the RCT bays to the distribution frame refer to equipment drawing ED7208-51. The cable lengths must be specified in the order.

Note 2: Circuit packs for the RCT are not included in J7209A, and must be ordered separately from J7209F.

Note 3: These lists provide three line shelves in the initial bay and five line shelves on the extension bay for 7-, 9-, and 11.5-foot bay heights.

Note 4: These lists provide space for the maximum number of line shelves on the initial bay, and the rest of the line shelves on the extension bay, for 9- and 11.5-foot bay heights.

Note 5: The jackfield mounts in the line shelf and is connectorized for connection between the subscriber line connector and the ED7208-51 connectorized cable. The talk battery filter is required if the office battery noise exceeds 20 dBrnC. It is not required with the J7209C-1 power bay. Four versions are available as follows:

(a) ED7208-34,G1 equipped with line and equipment drop jacks with grounded sleeves (with talk-battery filter);

(b) ED7208-34,G3 equipped with line and equipment drop jacks with grounded sleeves (without talk-battery filter);

(c) ED7208-34,G4 equipped with line drop monitor jacks with isolated sleeves (with talk-battery filter);

(d) ED7208-34,G5 equipped with line drop monitor jacks with isolated sleeves (without talk-battery filter).

Note 6: Patch cords for connecting test equipment to the subscriber and digital line jacks are ordered by specifying the type and the quantity of the patch cords required. A minimum of two patch cords of P3Q1- and P3Q3-type are required to perform system tests.

J7209B – DMS-1 RCT Cabinet

List 1 – Assembly and hardware required to provide one RCT cabinet 78 inches high by 92 inches wide by 20 inches deep, e/w ac wiring (provision for mounting RCT equipment).

List 2 – Assembly, wiring, and equipment required in addition to Lists 1, 23, 24, or 25 to provide one RCT common shelf, RCT power shelf for ac/dc ringing, and fuse and power distribution panel.

List 3 – Assembly, wiring, and apparatus required in addition to Lists 1, 23, 24, or 25 to provide one set of four batteries (maximum 8 per List 1).

List 4 – Apparatus required in addition to List 1 to provide one ventilation package e/w two 110 V fans, thermostat, and wiring.

List 5 – Apparatus required in addition to List 1 to provide one heating package e/w two 110 V heaters, thermostat, and wiring.

List 6 – Apparatus required in addition to Lists 1, 22, 23, 24, or 25 to provide for cross-connect blocks to facilitate for 200-pair vf cable.

List 7 – Appartus required in addition to Lists 1, 22, 23, 24, or 25 to provide two protector blocks to facilitate for 200-pair vf cable.

List 8 – Apparatus required in addition to List 7 to provide two gas tubes for each cable pair (maximum 200 per List 7).

List 9 – Assembly, wiring, and equipment required in addition to Lists 1, 23, 24, or 25 to provide one rectifier.

List 10 – Assembly, wiring, and equipment required in addition to Lists 1, 22, 23, 24, or 25 to provide one line shelf (maximum four per Lists 1, 22, 23, 24, or 25). (See Notes 1, 2, and 3.)

List 11 – Wiring and equipment required in addition to List 10 to provide one jackfield and talk battery filter (maximum one per each List 10).

List 12 – Assembly, wiring, and equipment required in addition to Lists 1, 23, 24, or 25 to provide one order wire and fault-locate shelf.

List 13 – Wiring and equipment required in addition to List 10 to provide one talk battery filter (maximum one per each List 10).

List 14 – Unassigned.

List 15 – Apparatus required in addition to List 4 to provide one inverter for dc powering of fans.

List 16 – Unassigned.

List 17 – Assembly and equipment required in addition to List 10 to provide one jackfield (see Note 4). (One List 17 for each List 10.)

List 18 – Unassigned.

List 19 – Assembly, wiring, and equipment required in addition to Lists 1, 23, 24, or 25 to provide one RCT common shelf, RCT power shelf-FSR for ac/dc or frequency-selective ringing, or both, and fuse and power distribution panel.

List 20 – Apparatus required in addition to List 2 to provide one digital line signal attenuator when the distance between the DMS-1 repeaters and the DS1 line or terminal repeater is less than 1500 feet.

List 21 – Assembly, wiring and equipment required in addition to Lists 1, 23, 24, or 25 to provide one RCT common shelf, RCT power shelf-FSR for ac/dc or frequency-selective ringing, or both, and fuse and power distribtuion only (for initial cabinet of dual cabinet installation when List 22 is required).

List 22 – Assembly and hardware required in addition to Lists 1, 23, 24, or 25 to provide an RCT extension cabinet for back-to-back dual cabinet installations (ac wiring, a 500-watt heater, and provision for mounting RCT equipment is provided).

List 23 – Assembly and hardware required to provide one RCT cabinet 78 inches high by 92 inches wide by 20 inches deep, e/w ac wiring (provision for mounting RCT equipment) plus one ventilation package e/w two 110 V fans, thermostats and wiring.

List 24 – Assembly and hardware required to provide one RCT cabinet 78 inches high by 92 inches wide by 20 inches deep, e/w wiring (provision for mounting RCT equipment) plus one heating package e/w two 110 V heaters, thermostats, and wiring.

List 25 – Assembly and hardware required to provide one RCT cabinet 78 inches high by 92 inches wide by 20 inches deep, e/w wiring (provision for mounting RCT equipment), plus one ventilation package e/w two 110 V fans, thermostats, and wiring and one heating package e/w two 110 V heaters, thermostats, and wiring.

List 26 – Assembly, wiring, and equipment required in addition to Lists 2, 19, 21 to provide SLTE.

List 27 – Assembly, wiring, and equipment required in addition to List 10 to provide SLTE.

List 28 – Assembly, wiring, and equipment required in addition to List 19 to provide a fail-safe feature.

List 29 – Assembly, wiring, and equipment required in addition to Lists 19 or 21 to provide a fail-safe feature.

List 30 – Assembly, wiring, and equipment required in addition to Lists 19 or 21 to provide superimposed ringing.

Note 1: To order connectorized cables for interconnecting line shelves to the common shelf refer to ED7208-50.

Note 2: To order connectorized cables for connecting line shelves to the distribution frame or for cross-connecting refer to ED7208-51. Specify cable lengths on order.

Note 3: Line shelves shall be equipped in the locations and in the order shown in Fig. 4.

Note 4: A jackfield is mounted on a line shelf and is connectorized for insertion between the subscriber line connector and the ED7208-51 connectorized cable. Two versions of the jackfield, both with talk-battery filters, are available as follows:

(a) ED7208-34,G3 equipped with line and equipment drop jacks with grounded sleeves;

(b) ED7208-34,G5 equipped with line drop and monitor jacks with isolated sleeves.

J7209C – DMS-1 Power Bay

List 1 – Framework, assembly, wiring and common equipment required to provide one 7-foot power bay equipped with one rectifier.

List 2 – (same as List 1 for 9 feet).

List 3 – (same as List 1 for 11.5 feet).

List 4 – Assembly and wiring required in addition to Lists 1, 2, or 3 to provide one battery shelf (maximum ten per Lists 1, 2, or 3).

List 5 – One set of four batteries (maximum one per List 4).

List 6 – Assembly, wiring and equipment required in addition to Lists 1, 2, or 3, to provide one back-up rectifier (see Note).

Note: Order two additional wire assemblies with List 6 as follows:

	QTY	IDENTIFICATION NUMBER
When List 6 is used with List 1	1 1	P0563991 P0563992
When List 6 is used with List 2	1 1	P0566155 P0566156
When List 6 is used with List 3	1 1	P0566157 P0566158

J7209F – DMS-1 RCT Circuit Packs

List 1 – Circuit packs required to provide single digroup operation for the common and power shelves for lines 0 through 127.

List 2 – Circuit packs required in addition to List 1 to provide dual digroup operation for lines 0 through 127.

List 3 – Circuit packs required in addition to List 1 to provide operation for lines 128 through 255 (one per digroup).

List 4 – Unassigned.

List 5 – Circuit packs required to provide power and signal buffering for the line shelf (one per line shelf).

List 6 – Circuit packs required to provide single-digroup operation for common and power shelves (ac/dc ringing) for lines 0 through 127 (20 Hz).

List 7 – Circuit packs required to provide single-digroup operation for common and power shelves (frequency-selective ringing) for lines 0 through 127.

List 8 – Circuit packs required to provide single-digroup operation for common and power shelves (frequency selective and ac/dc ringing) for lines 0 through 127 (20 Hz).

List 9 – Circuit packs required to provide single-digroup operation for common and power shelves (ac/dc ringing) for lines 0 through 127 (25 Hz).

List 10 – Circuit packs required to provide single-digroup operation for common and power shelves (frequency-selective and ac/dc ringing) for lines 0 through 127 (25 Hz).

List 11 – Circuit packs required to provide single-digroup operation for common and power shelves (ac/dc ringing) for lines 0 through 127 (25 Hz).

List 12 – Circuit packs required to provide single-digroup operation for common and power shelves (frequency-selective and ac/dc ringing) for lines 0 through 127 (25 Hz).

List 13 – Circuit packs required to provide power and signal buffering for a line shelf (1 per line shelf).

List 14 – Circuit packs required to provide single-digroup operation for common and power shelves (frequency-selective ringing only) for lines 0 through 127.

List 15 – Circuit packs required to provide digroup operation for common and power shelves (superimposed ringing) for lines 0 through 127.

Note: Table H summarizes the digroup-associated circuit packs supplied with Lists 1 through 3, and the line associated circuit packs supplied with List 5.

J7209P – DMS-1 RCT Bays (Aluminum Channel Type)

List 50 – Framework, assembly, wiring and common equipment required to provide one 8-foot RCT bay equipped with two common shelves, three line shelves, one order wire and fault-locate shelf, one office fail-safe assembly, one fuse panel, three jackfields and talk battery filters (Notes 1, 2, 3, and 4).

List 51 – Framework, assembly and common equipment required in addition to List 50 to provide one 8-foot RCT extension bay equipped with five line shelves, five jackfields and talk battery filters (Notes 1, 2, and 4).

List 52 —Framework, assembly, wiring and common equipment required to provide one 9-foot RCT bay equipped with two common shelves, four line shelves, one order wire and fault-locate shelf, one office fail-safe assembly, one fuse panel, four jackfields and talk battery filters (Notes 1, 2, 3, and 4).

List 53 —Framework, assembly and common equipment required in addition to List 52 to provide one 9-foot RCT extension bay equipped with four line shelves, four jackfields and talk battery filters (Notes 1 , 2, and 4).

List 54 —Framework, assembly, wiring and common equipment required to provide one 11-foot 6-inch RCT bay equipped with two common shelves, six line shelves, one order wire and fault-locate shelf, one office fail-safe assembly, one fuse panel, six jackfields and talk battery filters (Notes 1, 2, 3, and 4).

List 55 —Framework, assembly, and common equipment required in addition to List 54 to provide one right-hand 11-foot 6-inch RCT extension bay equipped with two line shelves, two jackfields and talk battery filters (Notes 1, 2, and 4).

List 56 —Framework, assembly and common equipment required in addition to List 54 to provide one 11-foot 6-inch RCT shared extension bay equipped with four line shelves, four jackfields and talk battery filters (Notes 1 , 2, and 4).

List 57 —Framework, assembly, wiring and common equipment required to provide one 11-foot 8-inch RCT bay equipped with two common shelves, six line shelves, one order wire and fault-locate shelf, one office fail-safe assembly, one fuse panel, six jackfield and talk battery filters (Notes 1, 2, 3, and 4).

List 58 —Framework, assembly and common equipment required in addition to List 57 to provide one right-hand 11-foot 8-inch RCT extension bay equipped with two line shelves, two jackfields and talk battery filters (Notes 1 , 2, and 4).

List 59 —Framework, assembly and common equipment required in addition to List 57 to provide one 11-foot 8-inch RCT shared extension bay equipped with four line shelves, four jackfields and talk battery filters (Notes 1 , 2, and 4).

List 60 —Framework, assembly and common equipment required in addition to List 54 to provide one left-hand 11-foot 6-inch RCT extension bay equipped with two line shelves, two jackfields and talk battery filters (Notes 1 , 2, and 4).

List 61 —Framework, assembly and common equipment required in addition to List 57 to provide one left-hand 11-foot 8-inch RCT extension bay equipped with two line shelves, two jackfields and talk battery filters (Notes 1, 2, and 4).

Note 1: These lists also provide bay and office cabling (vf only 24 AWG), and connectorized flat cable.

Note 2: The circuit packs for the RCT bays are not included in J7208P and must be ordered separately. For this refer to J7209F.

Note 3: Patch cords for connecting test equipment to the subscriber and digital line jacks, are ordered by specifying the type and quantity of the patch cords required (Table L). A minimum of two patch cords of P3Q1 and P3Q3 type are required to perform system tests.

Note 4: Lists 50 through 61 provide frequency-selective ringing. To provide superimposed ringing, a List 20, must be added with Lists 50, 52 54 or 57.

TABLE H
RCT CIRCUIT PACKS INCLUDED IN LISTS

LIST	QTY PER LIST	CODE AND DESIGNATION	
5	1	QPP412A Buffer	CA
1,2,3,6 to 12,14,15	1	QPP413A Driver	
1,2,6 to 12,14,15	1	QPP417A Address Control-Remote	
1,2,6 to 12,14,15	1	QPP419A Digroup	
1,6 to 12,14,15	1	QPP420A Alarm-Remote	
5,13	1	QPP439A Line Power Converter	
1,2,6 to 12,14,15	1	QPC85B 5/12-V Converter	
1	1	QPP422A Ring Distribution	A&M
6 to 12	1	QPP422B Ring Distribution	
15	2	QPP422B Ring Distribution	
7,8,10,12,14	1	QPP430A 300-V Converter	
15	1	QPP435A Positive Ring Generator	
13	1	QPP496A Buffer	
1,6,8,15	1	QPP426A Ring Generator 20 Hz	
9,10	1	QPP426B Ring Generator 25 Hz	
11,12	1	QPP426C Ring Generator 30 Hz	

TABLE I
OPTIONAL RCT LINE SHELF CIRCUIT PACKS
ORDERING SUMMARY

CODE AND DESIGNATION	QUANTITY
QPP405A Single Party – Remote	As required
QPP407A, B Universal – Remote	As required
QPP409A Universal Coin – Remote	As required
QPP440A, B Frequency-Selective – Remote	As required
QPP442A Postpay Coin – Remote	As required
QPP445A Superimposed – Remote	As required

Note: A maximum of eight line circuit packs can be located on one line shelf. There are four line circuits per circuit pack except for coin cards which have two lines only. The line circuit pack restrictions are:

- a maximum of two coin circuit packs in any line shelf shroud positions 0 and 1;
- superimposed ringing and FSR circuit packs are not permitted together on the same RCT;
- FSR and universal circuit packs are not permitted together on the same system with the subscriber line test extension option in use, and the line sparing feature of SLTE selected.

TABLE J
RCT OPTION CIRCUIT PACKS – ORDERING SUMMARY

OPTION	CODE AND DESIGNATION	QTY	NOTES
Local Links	QPP414A Local Switch	1	2
20-Hz Ring Generator	QPP426A Ring Generator		5, 7
25-Hz Ring Generator	QPP426B Ring Generator		5, 7
30-Hz Ring Generator	QPP426C Ring Generator		5, 7
Frequency-Selective Ringing Source	QPP430A 300-V Converter		5
Superimposed Ringing	QPP435A Pos Ring Generator		5, 8
Ringing Distribution	QPP422B Ring Distribution		5
Protection Switching for the LD-1 Digital Line	QPP428A Protection Switch-Remote QPP498 Protection Switch-Remote	1 1	2, 3 2, 4
Repeater without Line Powering	QPP436A Repeater	–	1
Repeater with Line Powering	QPP437A Repeater	–	1
Subscriber Line Testing	QPP423A Line Test-Remote	1	2
Subscriber Line Test Extension (SLTE)	QPP447A Test Access-Remote	1	2
Digroup	QPP419B Digroup	1	2, 6

Notes:

1. The QPP436A or QPP437A repeaters are required when the digital line(s) are terminated on the RCT. Quantity required is one per digital line equipped at the last RCT, and two per line at intermediate RCT.
2. Requires the corresponding circuit pack installed at the CCT (see Table E).
3. QPP428A must be used with QPP436A or QPP437A.
4. QPP498A must be used with QPP436A or QPP437A.

Table Continued

TABLE J Continued
RCT OPTION CIRCUIT PACKS – ORDERING SUMMARY

5. RINGING SOURCE	QTY AND TYPE REQUIRED	ADDITIONAL CIRCUIT PACK REQUIRED AS BACKUP RINGING SOURCES	NOTES
ac/dc Ringing	1-QPP426 1-QPP422	QPP426	7
Frequency-Selective Ringing	1-QPP430A	QPP430A	9
Superimposed Ringing	1-QPP435A 2-QPP422B 1-QPP426A	QPP435A QPP426A	9

6. Use QPP419B in DMS-1 systems which interface with switching machines having a line-release time of less than 100 ms; e.g., Northern Telecom SF-1. In a 2-digroup system, use two QPP419B.

7. For 20-Hz ringing, use QPP426A; for 25 Hz ringing use QPP426B; for 30-Hz ringing use QPP426C.

8. For superimposed ringing, both QPP426A and QPP435A, and their associated ringing distribution circuit packs, are required.

9. See drawing J7209F, Table L, for details and backplane compatability.

TABLE K
RCT ORDER WIRE AND FAULT LOCATE CIRCUIT PACKS
ORDERING SUMMARY

	QUANTITY			
	LAST, OR ONLY RCT		INTERMEDIATE RCT	
	1-CABLE OPERATION	2-CABLE DIVERSITY OPERATION	1-CABLE OPERATION	2-CABLE DIVERSITY OPERATION
QPP300-Type Fault-Locate Filter	1	2	2	4 (Note 1)
QPP301C Fault-Locate Access	1	1	1	1
QPP301D Fault-Locate Terminal	1	1	0	0 (Note 3)
QPP302A Span Order-Wire Term	1	2	1	2 (Note 2)
QPP303A Telephone Set	1	1	1	1
QPP304A Bridging Circuit	1	2	1	2 (Note 2)

Notes:

1. At intermediate RCT, the additional QPP300 circuit packs are required to fault-locate the return line repeaters.
2. See 363-2011-151 for order-wire engineering information.
3. A QPP301C may be used in place of a QPP301D if fault-locate access is required at the RCT.

TABLE L
PATCH CORDS

TYPE	LENGTH (ft)	COLOR	APPARATUS CODE
Single Patch Cord (bantam-to-bantam)	6	Slate	P3Q1A
		Red	P3Q1E
		Green	P3Q1H
	10	Slate	P3Q1B
		Red	P3Q1F
		Green	P3Q1J
	15	Slate	P3Q1C
		Red	P3Q1G
		Green	P3Q1K
Bantam Single to NE-310	6	Slate	P3Q3A
	10	Slate	P3Q3B
	15	Slate	P3Q3C