

## RESISTANCE ZONING OF EXCHANGE SERVICES INCLUDING LONG SUBSCRIBER ROUTE DESIGN

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### 1. GENERAL

**1.01** This section describes assignment procedures for the administration of Long Subscriber Route Design. The procedures include assignment of appropriate range extenders, dial long line units, and voice repeaters based on resistance zone codes that meet 8.5 dB expected measured loss (EML) at 1000 Hz.

**1.02** This section replaces BSP Section 680-800-011, "Resistance Zoning of Exchange Services – Basic Services."

**1.03** Long Subscriber Route Design is a method of designing the outside plant network where the routes are long and the customer density is low. The premise of the design is that overall route systems can be developed using finer gauge cables (than under resistance design – maximum 1300 ohms) and applying electronic equipment to maintain satisfactory transmission, signaling, and supervision performance. The design provides for loops with conductor loop ranges up to 3600 ohms.

**1.04** It is intended that the Long Subscriber Route Design will be used to provide service in the nonurban or rural areas where the

average customer density will be less than about five customers per 1000 feet of total route length at the end of a 20-year forecast period.

**1.05** The introduction of Long Subscriber Route Design provides the Outside Plant Engineer with economical methods through the use of electronic plug-in devices to utilize finer gauge cables and to retain satisfactory transmission, supervision, and signaling requirements.

**1.06.** The primary function of this design provides system standards for rural areas where the overall cost of adding higher gauge cables for exceptionally long distances may prohibit plant expansion.

**1.07** This plan will extend telephone service to residence and non-key business customers with long loop characteristics (1300-3600 ohms) with service that functions properly. The design employs new 96V Dial Long Line equipment and 1A or 2A range extenders.

**1.08** Special designs other than Long Subscriber Route Design may have to be considered under the following conditions:

(a) **ANI for 2-Party Identification** – ANI can only be provided up to 1800 ohms where ANI Dial Long Line equipment is available. ANI can be provided up to 1600 ohms if the 2A range extender is used.

(b) **Transmitter Amplifiers** – Existing long routes designed prior to the availability of the 96V Dial Long Line equipment may include transmitter amplifiers. When a 500-type set or the equivalent is used, proper transmission will be ensured using the Long Subscriber Route Design. If transmitter amplifiers have been previously used, however, they must be removed on a programmed basis.

(c) **8-Party Coded Ringing** – Beyond 2800 ohms, 8-party coded ringing cannot be assigned.

**2. SUPERVISION AND SIGNALING RANGE CONSIDERATIONS**

**2.01** Supervision and signaling as it relates to exchange services can be illustrated by an analysis of a simple connection between two customers in the same central office area:

- (a) **Switchhook Supervision:** "A" lifts his handset and hears dial tone.
- (b) **Dial Pulsing Range:** "A" dials the telephone number of "B", establishing the connection by means of dial pulses through the central office to the customer's line "B".
- (c) **Ringng and Signaling Range:** The central office equipment sends out ringing current on line "B", causing the customer's bell to ring at "B".
- (d) **Ring-Trip Range:** When "B" lifts his handset, the ringing current is stopped.
- (e)  **Holding Range:** The connection is retained for conversation.

(f) **Switchhook Supervisory Range:** The connection is released when "A" restores his handset.

**Note:** Although other equipment may be superimposed on this connection, such as multikey systems, coin stations, switchboard trunks, etc., the basic control features in (a) through (f) are necessary for connection between two telephones.

**2.02** Supervision and signaling control of a circuit is directly affected by the type of service, the characteristics of the central office equipment, equipment at the customer's premises, and the resistance of the customer's line including the central office, outside cable and wire, and station wiring and equipment.

**2.03** In the overall job of providing satisfactory supervision and signaling, all these factors must be considered by the following engineering and operating groups:

- (a) The Central Office Equipment Engineers must be concerned with the characteristics of central office equipment and must provide information on resistance range of specific central offices with the requirements for extending ranges.
- (b) The Outside Plant Engineers who design outside plant must consider the resistance range of the central office equipment and must forecast equipment required to extend the ranges.
- (c) The Plant Assigners who make assignments of special equipment on service orders must provide satisfactory supervision and signaling assignments.

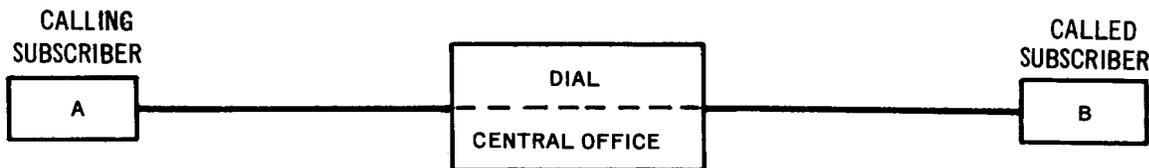


Fig. 1

(d) The Central Office Forces who maintain the central office equipment within specified limits in order to meet the general range requirements must also connect special equipment as assigned for specific services.

(e) The Plant Installation Forces who place equipment as specified on service orders must verify its functioning when the installation is completed.

(f) The Plant Maintenance Forces must ascertain that proper equipment is replaced when making maintenance replacements.

**3. APPLICATION OF LONG SUBSCRIBER ROUTE DESIGN TO AN EXCHANGE AREA**

**3.01** In order that supervision, signaling, and transmission limitations will not conflict with the assignment of service orders, and also to provide a practical means for exchange of information between Plant Engineers and Assigners, a system of "resistance zoning" is employed.

**3.02** The meanings of the various terms that are used in conjunction with resistance zoning are shown in Fig. 2 and are described below.

*Note 1: Conductor loop range* is the maximum length (in ohm resistance) of cable and/or aerial wire conductors which will provide satisfactory supervision and sig-

nalng, assuming (a) an ordinary exchange line terminated in a station set with no auxiliary features; (b) an allowance is made for central office resistance in the line circuit and average resistance for drop wire, inside wire, and station equipment; (c) an allowance is made for variations in resistance of cable conductors due to temperature. *Customer loop range* is the total resistance capability of a central office, including the complete customer's line (central office, outside plant, and station).

*Note 2: Conductor resistance limit* is the point in any cable at which the conductor loop range is reached.

*Note 3: Resistance limits* are points beyond which various types of exchange services will require special treatment to meet supervision, signaling, and transmission requirements. (The conductor resistance limit is one of these points.)

*Note 4: Resistance zones* are geographical areas bounded by resistance limits.

*Note 5: Resistance zone codes* are arbitrary codes which are applied to cable terminals to designate the resistance zone in which the terminal is located.

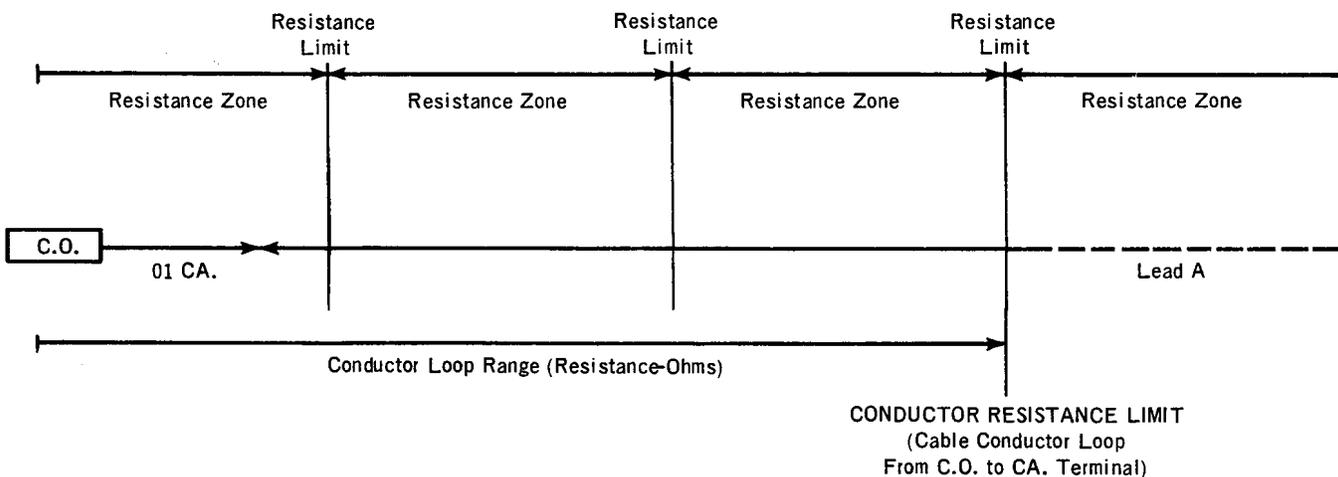


Fig. 2

TABLE

RESISTANCE ZONE (OHMS)	RESISTANCE ZONE CODE
1300	13
1600	16
1800	18
2800	28
3600	36

**Note:** Where a resistance zone is required for PBXs between the central office and the low-resistance limit of Zone 13, letter designations will be given to these zones, and Range Tables will be used to assign facilities.

**3.03 Coordinating group:** The Outside Plant Engineer will form a District coordinating group for the purpose of identifying Inter-departmental responsibilities connected with successful implementation of the Long Subscriber Route Design concept within a central office area. The group shall be formed after completion of a feasibility study of an economical long route and should remain intact until subscriber service in the long route is properly installed and successfully administered.

**3.04 Engineering Responsibilities:**

(a) The engineer must obtain the Long Subscriber Route Design Data Sheets (Parts 1 and 2) which show the existing forecast lines in each zone. It will be necessary to consolidate the equipment requirements by years and by type of service (coin, one-party, 2-party, 4-party, or multiparty), using the Outside Plant Forecast, data sheets, and Long Subscriber Route Design Schematic. Existing equipment, if any, on the route must also be listed on Part 1 of the data sheet.

(b) The Outside Plant Engineer must prepare a letter listing the increase in the number of customer lines for each year and the type of service that will be required in each zone for the Engineering Group(s) responsible for:

- (1) Ascertaining the exact type of equipment required, including test gear.
- (2) Ordering the equipment.

Copies of this correspondence should go to the District Plant Manager and to the Engineering Group(s) involved. A sample letter has been included (see Fig. 3).

(c) The Engineering Group(s) receiving his request for equipment should provide feedback to the Outside Plant Engineer and to the District Plant Manager and/or his equivalent by any convenient means that will give the details of the disposition of the request. The engineering group responsible for the electronic equipment installation will code existing and proposed electronic equipment with the common language transmission equipment codes applicable to the central office involved and will arrange for the stenciling of the distributing frame terminal strip associated with dial long line circuits with the correct assignment code designation. (See Fig. 4.) Upon receipt of this information, the Outside Plant Engineer should originate a local coordinating meeting to ensure that the job will be properly scheduled.

(d) The Central Office Equipment Engineer must ensure that the Assignment Office is provided with transmission equipment instructions (Fig. 8) for the central office involved.

(e) The Outside Plant Engineer is the coordinator for ensuring that all equipment will be available when the cable job is ready for service.

(f) The Outside Plant Engineer will then provide the Assignment Office with the administrative position level for plug-in equipment mountings and a 60-day forecast of plug-in units.

(g) Plant Assignment Supervisors will submit requests to the Plug-In Coordinator for each 60-day requirement of plug-in equipment after the initial request by the Outside Plant Engineer in order that an administrative unit level of plug-in units will be indicated in the Miscellaneous Central Office Facilities Record so as to allow for sufficient time to order and receive each 60-day requirement.

(h) The Outside Plant Engineer will clearly identify resistance zone boundaries on work prints and will precisely define any subsequent changes in a route for assignment center personnel to administer terminals within each zone. He will further indicate the preferred count (PC) for each terminal.

(i) The Outside Plant Engineer will indicate proper line build-out (LBO) settings where E6 repeaters are to be used. When remote E6 repeaters are to be placed, detailed information relating to location and cross-connecting terminations must be indicated in sufficient detail to allow preparation of the cross-connecting terminal records. The Outside Plant Engineer must designate a cable pair to be used for power supply to each group of six (6) E6 repeater units and will request that the six repeaters involved be set and placed in the fixture at the time that the power pair is connected. On initial installations, repeaters will be placed in the fixture by the Construction forces but will not be plugged in. The Central Office Forces will set repeater levels for all units in order that Installation Forces can plug in preset units as required on all future service installations.

**3.05** The Common Language Transmission Equipment Identification Code will be assigned to each existing and to each new dial long line or range extender by the Equipment Engineer. The basic or abbreviated code as indicated in BSP Section 395-200-000 will be assigned.

**3.06** Where the same equipment mounting is capable of accepting more than one type of plug-in unit, separate allocations of slot numbers must be made for each type of equipment.

**Example:** Mounting DLM01 will accept both DLS01 and DLS02 plug-in units. If 40 mounting slots are committed for exchange use and 20 are required for each type of plug-in unit, Plant Assignment will assign these units as DLS01, 1 through 20, and DLS02, 21 through 40.

**3.07** The resistance zones set up for a particular Long Subscriber Route Design will be applied in the form of RZ (resistance zone) codes at cable terminals. The general plan for applying RZ boundaries to cable terminals will be as follows:

RZ 13 – Terminals located between the resistance where coin service requires DL and 1300 ohms, for example:

Step-By-Step Co	885 to 1300 ohms
#5XB Co	1200 to 1300 ohms

RZ 16 – Terminals located between 1301 ohms to 1600 ohms will require 1A or 2A range extender equipment or surplus 48V DL for basic services. Coin service requires 48V DL.

RZ 18 – Terminals located between 1601 ohms and 1800 ohms require E6 repeaters and 48V DL in CO for basic services.

RZ 28 – Terminals located between 1801 ohms and 2800 ohms require E6 repeaters and 96V DL.

RZ 36 – Terminals located between 2801 ohms and 3600 ohms require 96V DL in the CO and remote E6 repeaters.

(See Fig. 6 for configuration of Zones 16 through 36.)

#### 4. ASSIGNMENT RECORDS

**4.01 Exchange Customer Cable Record:** The RZ code and preferred count (PC), as they apply to various terminals, will be entered in the appropriate column of the ECCR. Where a remote E6 repeater location is indicated on engineering drawings, the physical location of the remote E6 interconnecting terminal will be reflected on the ECCR in the Terminal column space as well as the IN and OUT Binding Post information. When a plug-in E6 repeater is initially assigned, the group and slot number will be indicated in the Terminal column. Where

Long Route Equipment Requirements

To: Appropriate Level 3

From: District Engineer

In conjunction with a need for additional cable facilities in the northern part of the Belltone Exchange, we are preparing Outside Plant Estimate 861433 with a required completion date for service in 15 months time. This estimate will provide cable relief and extensions on Route 101. A cost analysis has revealed that substantial savings may be made through the use of Long Route Design. On this route, several thousand feet of cable may be 22-gauge instead of 19-gauge as long as the required dial long lines, repeaters, and range extenders are made available.

Following is a forecast of the required electronic equipment which will provide for initial requirements plus forecast growth on this route. We do not foresee another major Long Route Design job in this exchange during the next 5 years.

LINE REQUIREMENTS

ZONE	EQUIPMENT	AT CUTOVER PARTIES				5 YEARS PARTIES				10 YEARS PARTIES				15 YEARS PARTIES			
		COIN	1	2	MPTY	COIN	1	2	MPTY	COIN	1	2	MPTY	COIN	1	2	MPTY
13	Coin DL	1	-	-	-	2	-	-	-	2	-	-	-	2	-	-	-
16	Range Extender	-	1	1	1	-	1	3	1	-	3	3	1	-	5	4	0
	Coin DL	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-
18	48V or 96V DL in CO.	-	-	1	1	-	-	2	2	-	1	3	1	-	3	3	1
	Coin DL	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-
	E6 Repeater in CO.	1	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-
28	96V DL in CO.	-	-	1	4	-	-	3	4	-	2	5	3	-	4	7	2
	E6 Repeater in CO.	-	-	1	4	-	-	3	4	-	2	5	3	-	4	7	2
36	96V DL in CO.	-	-	-	3	-	-	1	3	-	-	3	3	-	2	4	2
	E6 Remote Repeater	-	-	-	3	-	-	1	3	-	-	3	3	-	2	4	2

Would you please determine the exact equipment required, prepare the work order for the first installation and advise of pertinent details such as job number, ordering information, programmed completion date, etc., so that we may ensure coordination between the provision of outside plant and electronic equipment. Please include a Transmission Equipment List indicating the SD Number, 8 Digit Common Language Code, Unit Terminals and Mounting Slots. A Transmission Equipment Instruction sheet must be included indicating the application of electronic equipment by the Common Language Abbreviated Code for the various classes of service and zones for this central office.

District Engineer

Fig. 3  
Sample Letter From Outside Plant Engineer  
to Appropriate Level 3

Central Office \_\_\_\_\_ Beltone \_\_\_\_\_

Date 8-1-70 \_\_\_\_\_  
Work Order \_\_\_\_\_

	SD Number	Common Language 8 Digit Code	Abbreviated Code	Unit Terminals	Mounting Slots
DIAL LONG LINE	SD 96589	DLS0100A	DLS01	1-10	1-41
	SD 96590	DLS0200A	DLS02	42-53	42-64
	SD 96588	DLSI000L	DLSI	1-20	SAME
	SD 32053	DLCS 222A	DLCS	1-10	HARD WIRED
	SD 1C247	DLXR* 200A	DLXR	1-20	SAME
E6 REPEATERS CO	-		VRE6	1-20	1-50
E6 REPEATERS REMOTE	-		RVRE6	A1-A6	A1-A6+B1-B6

1. 8 digit code as indicated in Bell System Practice 725-200-000 for the options required for use in the central office involved \*8 digit code not available as of 8/1/70. Proposed B.S.P. 795-201-146 and 795-201-148 will provide these codes.
  2. The abbreviated code to be used by plant assignment when assigning electronics to service orders.
  3. Actual number of units provided.
  4. Total number of plug in mounting slots provided for each type unit.
- The miscellaneous central office facilities records will be prepared by the assignment center from the information indicated on this list.

**Fig. 4**  
Transmission Equipment Instructions  
Long Subscriber Route Design

SECTION 680-800-010

Central Office            Beltone           

Date 8-1-70

RANGE IN OHMS TYPE OF SERVICE	885-1300	1301-1600	1601-1800	1801-2800	2801-3600			
	13	16	18	28	36			
COIN	DLCS →		DLCS VRE6	SEE NOTE (1) →				
INDIVIDUAL		DLXR	DLS01 → VRE6 →		DLS01 RVRE6			
2-PARTY		DLXR	DLSI VRE6	DLS02 VRE6	DLS02 RVRE6			
4-PARTY		DLXR	DLS02 → VRE6 →		DLS02 RVRE6			
MULTI-PARTY		DLXR	DLS02 → VRE6 →		SEE NOTE (1)			

Notes:

(1) Refer to engineer

Fig. 5

Transmission Equipment Instructions  
Long Subscriber Route Design

cable pairs are cross-connected IN and OUT, without the use of repeaters, a dash (–) will be placed in the Terminal column. (See Fig. 7.)

**4.02** If a customer's circuit requires the use of the Exchange Wire Record, the RZ code will also be indicated on this work sheet. (See Fig. 8.)

**4.03 *Dedicated Plant Assignment Card (DPAC):*** Resistance zone code(s) will be reflected on the DPAC as illustrated in Fig. 9.

**4.04 *Miscellaneous Central Office Facilities – Central Office Facilities Record Form E-4052:*** Records of long line equipment of various types, including voice repeaters located in the central office, or in the field, will be shown on Form E-4052. These records will reflect the Common Language Code designation and numbering sequence as indicated by the Central Office Equipment Engineer in his response to the Outside Plant Engineer's request for additional equipment and inventory of existing available equipment. E6 repeater settings, as indicated by the Outside Plant Engineer, will be noted in the Instruction space on this form and the assignment code as shown for each setting. E6 Assignment Code and Zone will be indicated in the "Remarks" column (Figs. 10-10b).

**4.05** The Miscellaneous Central Office Facilities Record for remote E6 repeater locations will show physical and geographical locations of units. The Terminal column will reflect E6 repeaters by shelf and slot designation. Remote housing configuration is such that two groups (A and B) will each contain six E6 repeaters (A-1 to A-6 and B-1 to B-6). (See Fig. 11.)

*Note:* The description, use, and ordering information of Form E-4052 are covered in BSP Section 680-120-010.

**4.06 *Resistance Zone Key Record:*** The Resistance Zone Key Record is designed for use in the local assignment center for reference to the proper assignment of electronic equipment. It is prepared at the assignment center from information provided on the central office

supervision chart and engineering work prints. The information to be recorded on the RZ Key Record will include:

- (a) Resistance Zone Codes which apply in a particular central office.
- (b) The meaning of each RZ code translated into a method for satisfying supervision, signaling, and transmission requirements by reference to range tables providing specific central office line equipment and for use of electronic equipment.
- (c) An illustrative arrangement of Resistance Zone Codes applying to a central office area translated into a Resistance Zone Key Record as shown in Fig. 13.

*Note:* The form for this record is printed on the Exchange Customer Cable Record Forms E-4009-1-VR and E-4010-1-VR. (Ordering information is covered in BSP Section 680-201-010.)

**4.07 *Form E-6037 Long Subscriber Route Design Voice Repeater Index:*** The assignment center will prepare a Form E-6037 and forward a copy to the central office involved. This Index will be prepared from information provided by the Outside Plant Engineer on the construction drawings, and will include LBO settings and clearly identify the assignment code for each setting required for E6 use in the serving zones 18 and 28. It shall also contain the same information relative to the remote units serving zone 36. The Central Office Force will refer to this index when interpreting the assignment code setting for E6 repeaters shown on the service order (Fig. 13). Gain Unit Gain Settings will be made by the Central Office Force as per BSP Section 332-310-510. A copy of Form E-6037 will be filed in the Miscellaneous Central Office Facilities book.

**4.08 *Maintenance of Resistance Zone Information on Assignment Records:***

- (a) Changes in resistance zone limits due to outside plant rearrangements are transmitted by the Plant Engineer to the assigner

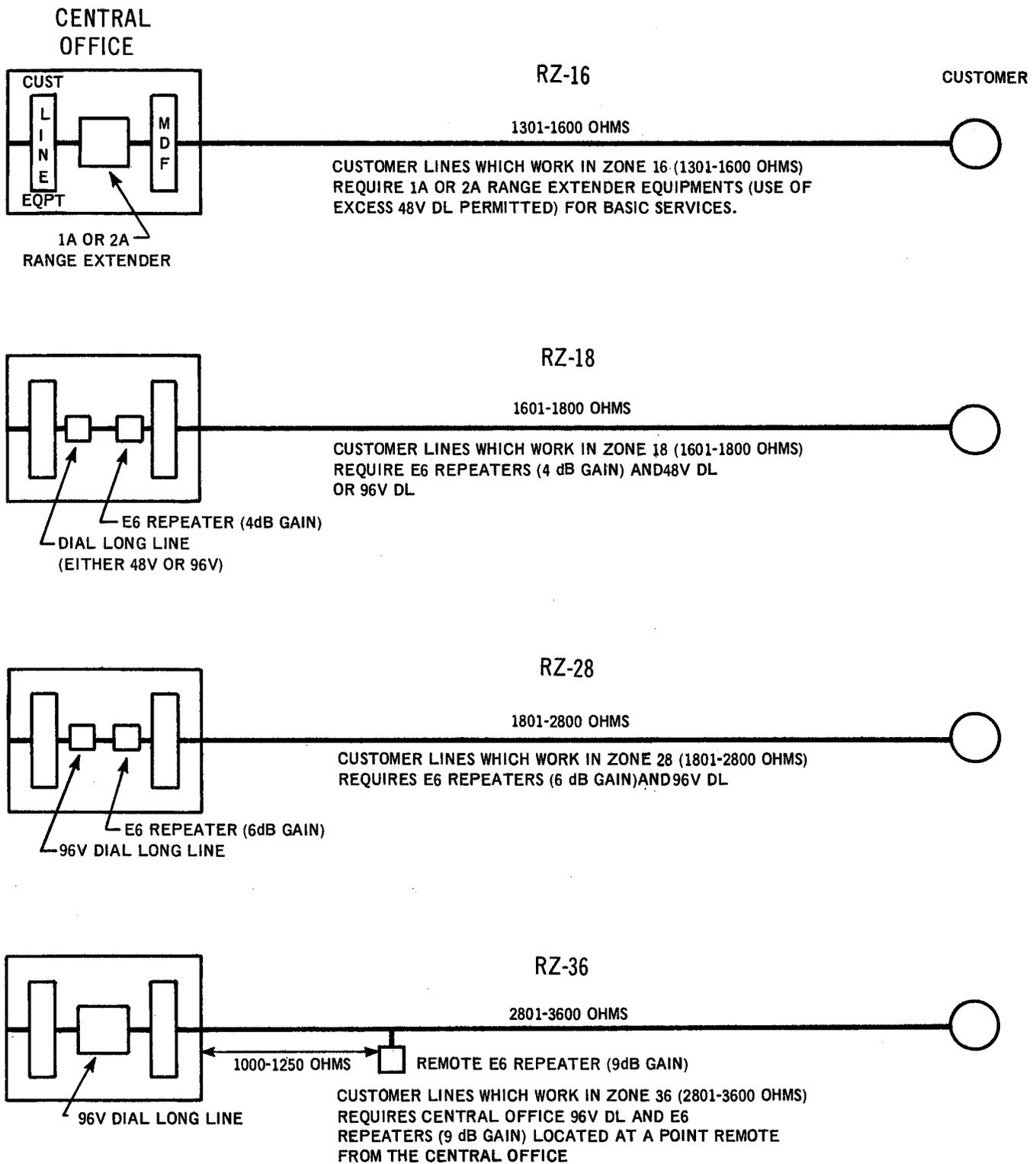


Fig. 6

General Loop  
Configuration of Zones 16 Through 36

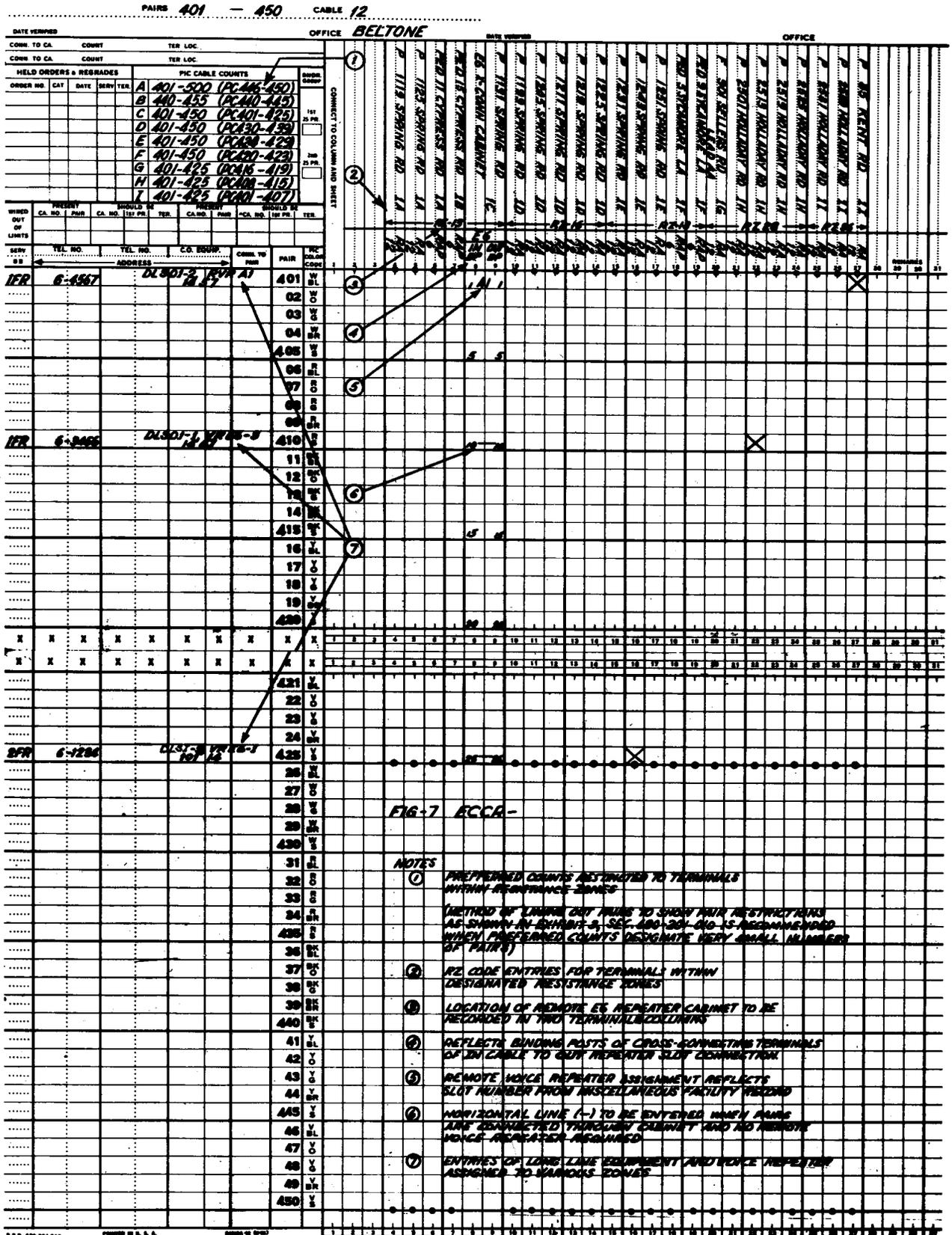


Fig. 7

SECTION 680-800-010

LEAD **AA**  
FRONT FRONT BACK BACK FRONT

DATE VERIFIED **8-10-70** EXCHANGE **BEL**  
B S P M24 63 PRINTED IN U.S.A.

WIRE ROUTE MEASUREMENT	STREET OR ROAD	SIZE CROSSARM	TYPE WIRE REQUIRED	POLE NUMBER	CONNECTS TO SPUR NUMBER	REMARKS	CONNECTS TO SPUR NUMBER	BOUNDARIES TZ - RZ - PROTECTION TAX DISTRICT - MAP NUMBER CITY - COUNTY - ETC.			
						CROSSARMS CARRYING ONLY TOLL WIRES					
107	SEAFORTH RD.	10P	109	50	AA3	*EXCEPTION TO RZ BOUNDARY - COPPER CKT. ON PINS 3-4 IS RZ36 TO END	AA4	RZ28			
				49							
106				48							
				47							
100				46							
99				45							
19	SEAFORTH RD.	10P	109	8	AA2	104	AA1	RZ18			
				7							
15				6							
				5							
				4							
7				3							
				2							
	1										
JUNCTION POLE LOCATION						TRANSMISSION ZONE					
0						SELLERS RD. A/35					
CONNECTS TO LEAD NUMBER						CROSSARM			RESISTANCE ZONE		
PIN POSITION OR CIRCUIT NUMBER						1-2	3-4	5-6		7-8	9-10
BINDING POST						2	7	5	1	6	MAP NUMBER
CABLE NUMBER						PAIR → 321	315	326	312	310	
TELEPHONE NO. OR BUNCH BLOCK NO											TAX DISTRICT
PANEL & JACK OR DIAL EQUIV											
CLASS SERVICE						4FR	4FR	B	4FR	4FR	

Fig. 8

Exchange Wire Record

C.O. AREA				EXCH.			ROUTE OR BLOCK	TZ	TAX DIST				
HOUSE OR BLDG. NO.	TEL. NO.	SERV.	PTY OR RC	CENTRAL OFFICE EQUIPMENT	ESS JM PR LOC	LI	OTHER INFORMATION	CABLE NO PAIR	SOP	TERMINAL LOCATION	BP OR COLOR		
1199								12-430		P-1199 SPRING			
1200								↓		↓	RD.		
1201													
1202													
~~~~~													
1295								12-430		P-1225 SPRING			
1296								↓		↓	RD.		
							STREET	FROM	TO	SOP NO			
							SPRING RD	1199	1296	1 2			
							STREET	FROM	TO	SOP NO			
							SPRING RD.	1300	END	1 2			
INCLUDE ADDITIONAL DATA AS APPROPRIATE IN OTHER INFORMATION COL.							ROUTE OR BLOCK	TZ	TAX DIST				
* PARTIES BRIDGED IN FIELD													
HOUSE OR BLDG. NO.	TEL. NO.	SERV.	PTY OR RC	CENTRAL OFFICE EQUIPMENT	ESS JM PR LOC	LI	OTHER INFORMATION	CABLE NO PAIR	SOP	TERMINAL LOCATION	BP OR COLOR		
1300							RZ 18	12-424		P-1231 SPRING			
1301							↓	↓		↓	RD		
1302													
~~~~~													
							RZ 28						
N.N.							BET. SCARTH & SELLERS RDS.	12-416 LEADAA		F 901 SELLERS RD			
N.N.							W. OF SELLERS RD.	12-416 LEADAA		↓			

Fig. 9

DPAC – Resistance Zone Codes

(TOP) – Illustrates RZ Code When All Terminals Are in Same Resistance Zone

(BOTTOM) – Illustrates RZ Codes When Terminals Are Located in Different Resistance Zones on Same DPAC

## SECTION 680-800-010

by means of notations on construction work prints, by zoning maps, or by memoranda.

(b) Changes in RZ Codes at cable terminals will require consideration of all services working from those terminals, following the same procedure as would be used for an original installation.

(c) Addition or removal of long line equipment is reported by type, number, and frame location to the assignment center concerned.

### 5. ASSIGNMENT PROCEDURES

**5.01** It is the assigner's responsibility to ensure satisfactory functioning of basic service through proper use of assignment records and procedures associated with Resistance Zoning. Basic Service is defined as residence and business lines terminated at 500-type or equivalent telephone sets with no associated key, lamp, or amplifier fixtures. Methods commonly used for extending ranges by specific assignments are:

#### (a) Step-by-Step Dial Offices

(1) In step-by-step offices when only part of the equipment is arranged for 1300-ohm conductor loop assignment, it will be necessary for Traffic Assignment to furnish Plant Assignment with a list of available equipments for long routes. An example of this arrangement is an office having line switch and line finder equipment, in which case the line equipment using line finders will have greater range capabilities for supervision and signaling.

(2) Assignment of electronic equipment.

#### (b) Crossbar Offices

(1) Assignment of electronic equipment.

**Note:** In central office buildings equipped with both panel and crossbar offices, Long Subscriber Route Design customers must be assigned to crossbar line equipment.

**5.02 Service Order Assignment:** The assigner will determine the proper serving terminal for the customer location indicated on the service order, will note the RZ, and will assign a cable pair designed to serve this terminal. The assigner will refer to the Resistance Zone Key Record for the cable complement involved to determine the proper equipment required to ensure satisfactory supervision, signaling, and transmission. The assigner will then refer to the available line equipment or Miscellaneous Central Office Equipment Record to assign equipment indicated on the Resistance Zone Key Record for the particular zone and type of service. The Miscellaneous Central Office Facilities Record (Form E-4052) for long line equipments and central office E6 repeaters will be noted as shown in BSP Section 680-120-010. DL and E6 repeater assignment codes will be indicated on the Service Order, including E6 repeater setting codes (Fig. 14). Where remote E6 repeaters are required, the assigner will assign the next available repeater slot and will note the date assigned, setting and working service, and cable pair on the Miscellaneous Central Office Facilities Equipment Record (Form E-4052). The remote E6 repeater terminal designation will be noted on the ECCR as shown in Fig. 7, Notes 1 to 6. The service order will instruct the installer to make the connection and to plug in the repeater.

### 6. ORDERING INFORMATION

**6.01** Form E-6037, Long Subscriber Route Design Voice Repeater Index, is provided in packages of 25. The forms should be ordered in multiples of the package unit from your local W. E. Co. Distributing House as follows:

(Quantity) Form E-6037





MISCELLANEOUS CENTRAL OFFICE FACILITIES

TYPE VR E6 TERMINALS 1-50

DATE VERIFIED \_\_\_\_\_ OFFICE BELTONE TOTAL TERMINALS 1-50

WIRING LIST \_\_\_\_\_ ISSUE \_\_\_\_\_ BAY LOCATION \_\_\_\_\_ FRAME LOCATION \_\_\_\_\_

DWG. NO. \_\_\_\_\_ ISSUE \_\_\_\_\_ FIG. \_\_\_\_\_ APP \_\_\_\_\_ WIRING \_\_\_\_\_

INSTRUCTIONS:

**LBO SETTING CODE DESIGNATION REQUIRED, OBTAIN FROM RESISTANCE ZONE KEY RECORD OR LONG SUBSCRIBER ROUTE VR INDEX**

\* REQUEST ADDITIONAL 60 DAY SUPPLY OF REPEATERS (7)  
 \*\* NOTIFY OUTSIDE PLANT ENGINEER SPARE MOUNTING LEVEL REACHED

TERM'S	CA	PR	WORKING SERVICE REF.	REMARKS	TERM'S	WORKING SERVICE REF.	REMARKS
1	12	425	6-1234	A 18			
2	12	426	<del>6-2346</del> DISC 11/11/68	A 28			
3	12	410	6-3456	A 28			
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

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1. Assignment repeater LBO setting code in use or last used
2. Resistance zone in use or last used  
 Assigners should try to reassign repeaters to the code & zone indicated, this will reduce the central office time required to administer repeaters.
3. Administrative unit level
4. Administrative mounting slot level
5. Designates last mounting slot is the line above

Fig. 10-B

Miscellaneous Central  
 Office Facilities Record -  
 Central Office E6 Repeaters



<b>CA 12 - 401-450</b>		<b>RESISTANCE ZONE KEY RECORD</b>					<b>BELTONE</b> <small>CENTRAL OFFICE</small>		
<b>TABLE A</b>	RZ →	<b>13</b>	<b>16</b>	<b>18</b>	<b>28</b>	<b>36</b>			
	TYPE SERVICE	REFERENCE NUMBERS (TABLE B)							
	<b>PBX</b>			<b>SEE</b>	<b>NOTE</b>	<b>1</b>			
	<b>COIN</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>SEE</b>	<b>NOTE</b>	<b>1</b>		
	<b>INDIVIDUAL</b>		<b>2</b>	<b>4</b>	<b>4</b>	<b>7</b>			
	<b>2 PARTY ANI</b>		<b>2</b>	<b>5</b>	<b>*6</b>	<b>*8</b>			
	<b>4 PARTY</b>		<b>2</b>	<b>6</b>	<b>6</b>	<b>8</b>			
	<b>B PARTY</b>		<b>2</b>	<b>6</b>	<b>6</b>	<b>SEE</b>	<b>NOTE</b>	<b>1</b>	
<b>TABLE B</b>	REFERENCE NO	ASSIGNMENT REQUIREMENT							
	<b>1</b>	<b>DLCS</b>							
	<b>2</b>	<b>DLXR</b>							
	<b>3</b>	<b>DLCS PLUS VRE6A</b>							
	<b>4</b>	<b>DLSO1 PLUS VRE6A</b>							
	<b>5</b>	<b>DLSI PLUS VRE6A</b>							
	<b>6</b>	<b>DLSO2 PLUS VRE6A</b>							
	<b>7</b>	<b>DLSO1 PLUS RVRE6B P1131 SPRING RD</b>							
<b>8</b>	<b>DLSO2 PLUS RVRE6B P1131 SPRING RD</b>								
<b>NOTES</b>									
<b>1 REFER TO OUTSIDE PLANT ENGINEER</b>									
<b>* 2 PARTY ANI CAN NOT BE PROVIDED BEYOND ZONE 18</b>									

Fig. 12

Resistance Zone Key Record



**Assignment in Zone 16**

Asgm  
IOE 14-20, DLXR-4/FI 12-439, P1199 Spring Rd. 2/RZ 16

Type DLXR (2A Range Extender) #4 Assigned in Zone 16

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**Assignment in Zone 18**

Asgm  
IOE 101-14, DLSI -9, VRE 6A-1/FI 12-425, P1251 Spring Rd, 2/RZ 18

Type DLSI (96V Dial Long Line for Two Party ANI Service) #9 and E6 Repeater Setting "A" Located in Central Office Assigned in Zone 18.

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**Assignment in Zone 28**

Asgm  
IOE 14-47, DLSO1-1, VRE6A-3/FI 12-410, P2513 Holladay Rd, 1/RZ 28

Type DLSI (96V Dial Long Line for Two Party ANI Service) #9 and E6 Repeater Setting "A" #1 Located in Central Office Assigned in Zone 1B.

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**Assignment in Zone 36**

Asgm  
IOE 14-57, DLSO1-2/FI 12-401, P35 Kent Rd, 7  
/F2 RVRE6B-A1, P1131 Spring Rd, 1-A1, A1-1 PXJ /RZ 36

Type DLSO1 #2 and Remote E6 Voice Repeater Setting B # A1 Located at P1131 Spring Rd. in Cable Binding Post 1 to be Connected to IN Repeater Binding Post 1A, OUT Repeater Binding Post A1 to be Connected to OUT Cable Binding Post 1

**Fig. 14**

USO Service Order Assignment