

FEATURE DOCUMENT
EXTENDED RANGE
NO. 3 ELECTRONIC SWITCHING SYSTEM

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11. SOFTWARE ENGINEERING	4	1. DEFINITION	
12. COMPATIBILITY	4	1.01 The Extended Range feature allows customers who are in an area in which development is scattered, nonurban, and beyond the normal operating range of a central office, to have telephone service comparable to that of urban areas. The distance a customer can be located from the central office is generally limited by the distance voice and signaling can be transmitted and received using standard switching machine circuits. To extend	
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NOTICE

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SECTION 233-190-115

this distance, zone 15 service and range extension are used.

1.02 The No. 3 Electronic Switching System (ESS) zone 15 service allows customers to be located farther (1500-ohm conductor loop resistance) from the central office than normally allowed (1300-ohm conductor loop resistance) without the use of special equipment. Beyond this distance, range extension equipment with gain is required. This is provided on an individual line basis and uses common systems equipment.

1.03 The Extended Range (zone 15) feature is standard with all versions of the No. 3 ESS. Zone 15 service is always provided.

2. DESCRIPTION

2.01 The Extended Range feature is compatible with the modified Resistance Design Rules, and modified Long Route Design plans which are used to serve customers with conductor loop resistances of 1300 ohms to 2800 ohms. In No. 3 ESS, two methods are used to accomplish this.

- When lines have conductor loop resistances of 1300 to 1500 ohms per line, zone 15 service is provided directly from the No. 3 ESS (Fig. 1) and accommodates modified Resistance Design Rules.
- When lines have conductor loop resistances of 1500 to 2800 ohms, per-line range extension equipment with gain is used (Long Route Design).

Long Route Design (LRD) is applicable to individual, 2-party, or multiparty residential and business lines.

Note: Under previous Long Route Design (LRD) rules, Range Extension with Gain (REG) was required only for loops over 1600 ohms. However, recent transmission studies have indicated that most application restrictions (eg, minimum route lengths) can be removed. A REG is now required on all loops with over 1500-ohm conductor loop resistance. A new zone, RZ15 (1300-1500 ohms), has been established and RZ16 (1300-1600 ohms) will be retained only for administration of existing zone 16 designs. All loops between 1300 and 1500 ohms, as all LRD loops, require standard H88 loading. If loops are to be designed to

the 1500-ohm limit, those beyond 15,000 feet must be loaded. Refer to Section 902-215-120 for more information on LRD.

2.02 Zone 15 service is an inherent feature of the No. 3 ESS and is automatically provided on all noncoin lines in the office. Coin lines cannot be served by No. 3 ESS zone 15 service because the maximum loop resistance for coin telephones with No. 3 ESS is 1300 ohms. The standard range for ringing and signaling of a No. 3 ESS office is 1500 ohms. This is done by providing sensitive line attending ferroids and by keeping up the line supervisory voltage at the junctors and customer dial pulse receivers (CDPR) by using voltage boost arrangements.

2.03 To extend the dc signaling range of No. 3 ESS lines to 1500 ohms without special per-line treatment, the line supervisory voltage supplied when the customer is off-hook is kept at a minimum of 53.5 volts. A battery boost circuit (two per network frame) is used to provide a variable voltage (1 to 13 volts) to boost the talk battery on the network frame under all expected -48 volt battery conditions.

2.04 Each battery boost circuit provides battery boost to 16 junctor circuits and two CDPRs in each network frame. This guarantees that sufficient current (20 mA) is available to allow proper operation of TOUCH-TONE® telephones over a 1500-ohm loop under low battery conditions.

2.05 No change in basic call processing is required for zone 15 service or LRD.

3. FEATURE FLOW DIAGRAM

3.01 The Extended Range feature does not require a flow diagram.

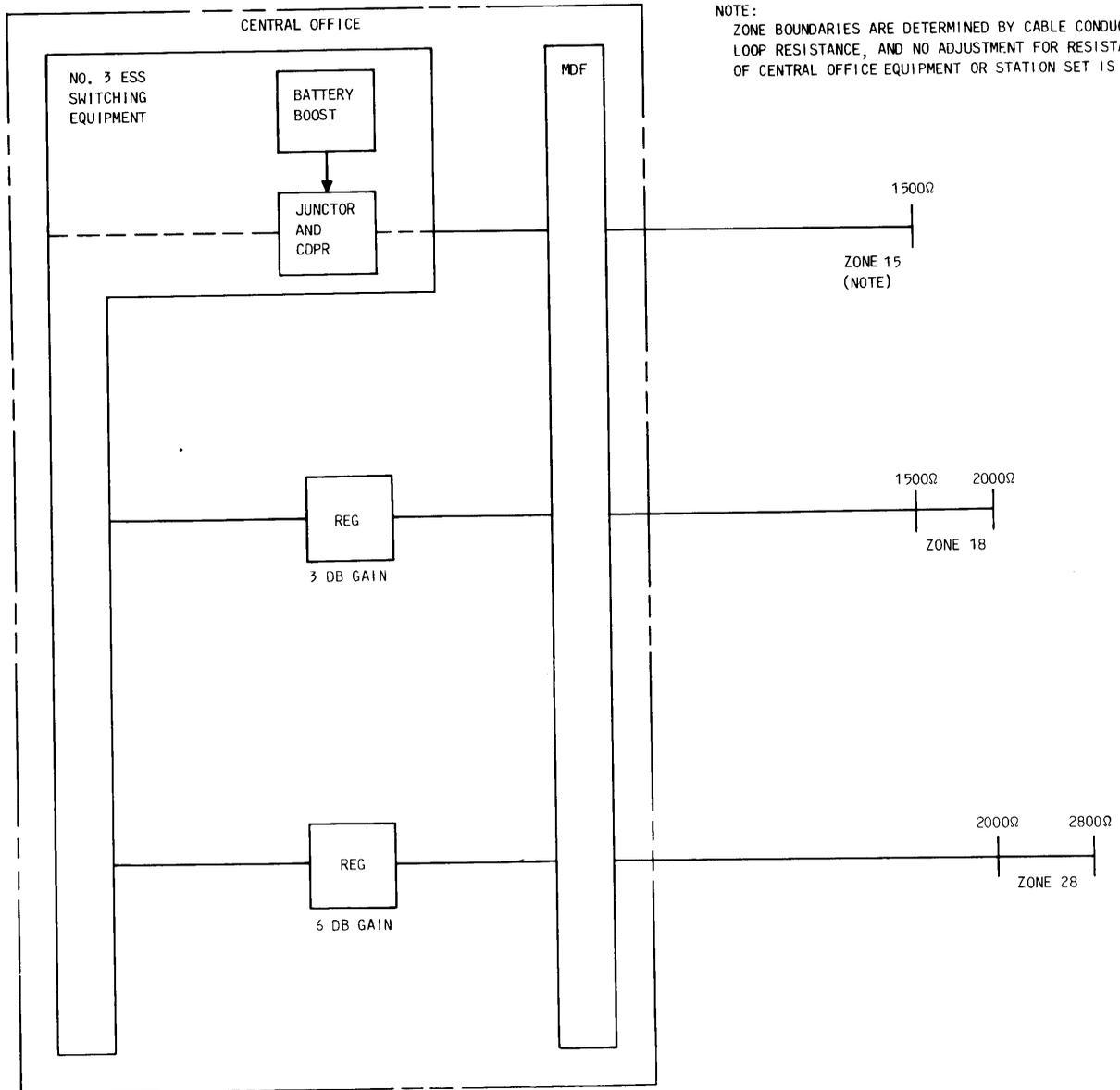
4. INTERACTIONS

4.01 The Extended Range feature does not interact with any other feature.

ATTRIBUTES

5. STATION/SYSTEM

5.01 Zone 15 service is provided on an office basis for all noncoin lines in every No. 3 ESS.



NOTE:
ZONE BOUNDARIES ARE DETERMINED BY CABLE CONDUCTOR LOOP RESISTANCE, AND NO ADJUSTMENT FOR RESISTANCE OF CENTRAL OFFICE EQUIPMENT OR STATION SET IS NEEDED.

Fig. 1—Circuit Configuration

5.02 Beyond 1500 ohms, per-line range extension is provided under LRD.

resistance for coin telephones with the No. 3 ESS is 1300 ohms.

6. LIMITATIONS

6.01 Zone 15 service is limited to lines with conductor loop resistance of no more than 1500 ohms. Coin lines cannot be served by No. 3 ESS zone 15 service, because the maximum loop

7. RESTRICTION CAPABILITY

7.01 Refer to Section 902-215-120 for restrictions that apply to LRD.

8. COST DATA

8.01 There is no software cost for this feature.

INCORPORATION INTO SYSTEM

9. PLANNING

9.01 Refer to Section 902-215-120 for planning requirements for LRD.

10. HARDWARE ENGINEERING

10.01 No special equipment is required for zone 15 service.

10.02 The following hardware items are common to all No. 3 ESS offices and are used to provide zone 15 service.

- Customer Dial Pulse Receiver (CDPR)—SD-3H410
- Junctor Unit—SD-3H200
- Battery Boost Converter—SD-82250
- Station Ringer Test Line—FB521 and FB522 (part of SD-3H520).

10.03 Refer to Section 500-114-100 for hardware requirements for various ringing conditions.

11. SOFTWARE ENGINEERING

11.01 Not applicable.

12. COMPATIBILITY

12.01 The Extended Range (zone 15) feature is compatible with all other No. 3 ESS features.

13. OFFICE DATA

13.01 No changes are required to office data for this feature.

14. GROWTH/RETROFIT PROCEDURES

14.01 Zone 15 service is available in all No. 3 ESS offices and is included in each switching network frame. Lines requiring LRD can be added on a per-line basis as needed.

15. TESTING

15.01 Test may be performed on a line that has zone 15 service by using the trunk and line test panel (TLTP). Refer to Section 233-135-105 for TLTP operating and testing methods.

ADMINISTRATION

16. MEASUREMENTS

16.01 Not applicable.

17. RECORD KEEPING

17.01 No record keeping is required for this feature.

18. CHARGING

18.01 There are no charging requirements for this feature.

AVAILABILITY

19. NEW INSTALLATIONS

19.01 This feature does not require any program change and is available with all system programs.

20. GROWTH/RETROFIT

20.01 See Parts 9, 14, and 19 of this feature document.

SUPPLEMENTARY INFORMATION

21. GLOSSARY

21.01 The following list identifies terms used in this section.

- Long Route Design (LRD)—Rules used to design customer loop beyond 1300 ohms.
- Trunk and Test Line Panel (TLTP)—The equipment unit of the No. 3 ESS used for making normal transmission and operational test on trunks and lines.

22. REASONS FOR REISSUE

22.01 Not applicable.

23. REFERENCES

23.01 The following documents may be referred to for supplementary information pertaining to the Extended Range feature.

- Section 500-114-100—Ringing Limitations

- Section 902-215-120—Design Rules, Engineering, and Transmission Considerations Subscriber Long Route Design Outside Plant Engineering-Facility Planning
- IL80-01-360—Unified Loop Design
- IL80-06-376—8A Range Extender (Coin REG)