

**ZONE 16 SERVICE FEATURES**  
**NO. 2 ELECTRONIC SWITCHING SYSTEM**

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**NOTICE**

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**TABLES**

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**FEATURE DEFINITION AND DESCRIPTION****1. DEFINITION**

**1.01** Zone 16 service is a subscriber long route design plan that permits extending the conductor loop resistance of the subscriber lines to 1600 ohms, as described in the subscriber long route design plan (refer to Section 902-215-120). In the No. 2 Electronic Switching System (ESS), this service is provided by increasing the supervisory range of the ringing circuit and the customer dial pulse receiver, and a redesign of the station ringer test circuit, the customer dial pulse receiver test circuit, and the ring control test circuit.

**2. DESCRIPTION**

**2.01** Zone 16 service is offered as part of the subscriber long route design plan, as defined in Section 902-215-120. It allows central offices to serve customer loops out to 1600 ohms without any supplemental range extension equipment.

**2.02** Changes to two service circuits and three test circuits will allow No. 2 ESS to offer zone 16 service on a standard basis without the need for any per-line circuitry. It is possible to use any network line terminal on any nonrange-extended concentrator for zone 16 lines.

**2.03** No. 2 ESS zone 16 service can be provided for the following types of lines:

- (a) 1-party
- (b) 2-party
- (c) 4-party
- (d) 8-party

Because of the high signaling resistance of coin sets, this service cannot be provided for coin lines.

**2.04** When loops between 1300 and 1600 ohms are served, the restrictions as to subscriber density should be followed as outlined in Section 902-215-121.

**2.05** The customer dial pulse receiver (SD-2H177-01) has been modified to provide a current boost to nonrange-extended as well as range-extended lines. This guarantees that sufficient current (20

mA) is supplied to a TOUCH-TONE® pad on a 1600-ohm loop even under low battery conditions when it is connected to a customer dial pulse receiver. Problems due to low feed current may occur if customer-to-customer in-band signaling, via the TOUCH-TONE pad, is attempted during a talking connection on a long loop under low battery conditions (42.75 volts is minimum No. 2 ESS battery). Normally, this is not a problem in offices with an automatic startup reserve generator.

**2.06** The customer dial pulse receiver test circuit (SD-2H133-01) has been modified to allow testing of the changed SD-2H177-01 circuit. The modified SD-2H133-01 circuit is able to test both old and new versions of the SD-2H177-01 circuit and the SD-2H114-01 (A&M only) circuit.

**2.07** A new ringing circuit for coded, superimposed, reverting and off-hook and on-hook ring back (SD-2H126-02) replaces SD-2H126-01 which is rated A&M only. The new circuit performs superimposed ring tripping out to the 3000 ohms loop resistance and, therefore, allows 4- and 8-party zone 16 service to be provided. This extended tripping range is achieved by the use of an electronic ring trip circuit. The SD-2H126-02 circuit has been designed so that the system program can detect that ring tripping has occurred even though the off-hook condition, which resulted in tripping, has disappeared. This prevents a condition where an off-hook hit trips the ring trip circuit but is not detected by the program.

**2.08** The test circuit for ringing and coin control circuits (SD-2H135-01) has been modified in order to allow the new electronic ring trip circuit in the SD-2H126-02 circuit to be tested.

**2.09** The station ringer test circuit (SD-2H129-02) contains the same modifications put into the SD-2H177-01 circuit which generates a current boost on nonrange-extended lines in order to allow proper operation of TOUCH-TONE pads on long loops.

**2.10** The following schematic drawing issues contain the changes just described.

SD	Issue
SD-2H126-02	1
SD-2H129-02	3B

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SD	Issue
SD-2H133-01	6B
SD-2H135-01	5AC
SD-2H177-01	3B

**2.11** No change in the basic call processing program is required to implement No. 2 ESS zone 16 service. Four existing circuits have been modified and one new circuit issued in order to allow system operation out to 1600 ohms loop resistance. These changes are standard in all new No. 2 ESS offices. Additional diagnostic tests will be provided in the EF-1 program to allow more complete automatic testing of the new circuit, SD-2H126-02.

### 3. FEATURE FLOW DIAGRAM

**3.01** Not applicable.

### ATTRIBUTES

### 4. INTERACTIONS

**4.01** Refer to Part 2 for a description of interactions.

**4.02** No. 2 ESS unigauge range extension can also be used to serve customers beyond 1300 ohms. The feature allows customers to be served out to 2500 ohms and eliminates the zone 16 subscriber density requirements by providing audio gain in order to improve transmission quality. Unigauge range extension requires that 26 gauge cable be provided adjacent to the central office (minimum lengths are given in Section 902-315-300) in order to insure repeater stability.

### 5. STATION/SYSTEM

**5.01** This feature is provided on a per-system basis.

### 6. LIMITATIONS

**6.01** The density of zone 16 customers should be limited as is stated in Section 902-215-121 in order to avoid having a concentration of long, high loss loops with an accompanying degradation in overall office transmission performance. Customer-to-customer in-band signaling using a TOUCH-TONE pad may not work properly on long loops under low battery conditions due to insufficient line feed current.

### 7. RESTRICTION CAPABILITY

**7.01** Any nonrange-extended line terminal, except coin, can be provided with zone 16 service.

### 8. COST DATA

**8.01** There is virtually no difference in cost between the old and new versions of the circuits changed to provide zone 16 service (SD-2H126, SD-2H129, SD-2H133, SD-2H135, and SD-2H177).

**8.02** There also is no change in space requirements.

### INCORPORATION INTO SYSTEM

### 9. PLANNING

**9.01** The long route design sections (Section 902-215-120 through 125) should be consulted on how to engineer the outside plant for zone 16 service. In offices which do not have the zone 16 changes, the hardware changes specified in HARDWARE ENGINEERING should be made before zone 16 service is introduced.

### 10. HARDWARE ENGINEERING

**10.01** The zone 16 modifications to the SD-2H129-02 (included in Issue 3B), SD-2H133-01 (included in Issue 6B), SD-2H135-01 (included in Issue 5AC), and SD-2H177-01 (included in Issue 3B) circuits have been made on a standard basis for all new No. 2 ESS offices. In addition, the SD-2H126-02 circuit replaces the SD-2H126-01 circuit which will be rated A&M only.

**10.02** In existing offices that want to provide zone 16 service, field changes should be made to the SD-2H129-02, SD-2H133-01, SD-2H135-01, and SD-2H177-01 circuits to bring them up to the correct circuit issue; and the SD-2H126-02 circuit should replace the SD-2H126-01.

**10.03** The SD-2H135-01 circuit has been modified to allow testing of the new electronic ring trip circuit in the SD-2H126-02 circuit. This modification involves changing the resistor values used during the superimposed ring trip test. Option X of the SD-2H135-01 circuit, which is rated AT&T Co Standard, allows testing of the SD-2H126-02 circuit. Option Y of the SD-2H135-01 circuit, which is rated A&M only, allows testing of the SD-2H126-01 circuit.

**10.04** In offices which use the extended feature (EF-1) generic program, the SD-2H135-01 circuit has been modified (to Issue 5AC), and the SD-2H126-02 circuit has replaced the SD-2H126-01. This allows EF-1 program diagnostic testing to be standard for all offices.

**10.05** The circuit drawings for zone 16 service have been issued. This feature was generally available the fourth quarter of 1973. For a summary of hardware information, refer to Table A.

**TABLE A**  
**HARDWARE INFORMATION SUMMARY**

NOMENCLATURE	J SPEC AND SD NO.	SIZE
Ringing circuit for coded superimposed reverting and rural ringing off-hook and on-hook ring back	J2H018DB-1 (SD-2H126-02, Issue 1, replacing SD-2H126-01, J2H018DM)	1 per 2" MTG PLT
Station ringer test circuit	J2H018FT-1 (SD-2H129-02, Issue 3B)	1 per 4" MTG PLT
Customer dial pulse receiver test circuit	J2H018FH-2 (SD-2H133-01, Issue 6B)	1 per 4" MTG PLT
Test circuit for ringing and control circuits	J2H018FK-1 (SD-2H135-01, Issue 5AC)	1 per 2" MTG PLT
Customer dial pulse receiver	J2H018DV-1 (SD-2H177-01, Issue 3B)	2 per 4" MTG PLT

*Note:* The quantity of circuits required is the same as the number of original circuits.

## 11. SOFTWARE ENGINEERING

**11.01** No change is required in the LO-1 program to provide zone 16 service. Offices which will use the EF-1 program are required to have the new ringing circuit (SD-2H126-02) and the modified ringer test circuit (SD-2H135-01, Issue 5AC). This will allow the EF-1 program to test the additional circuitry in the SD-2H126-02 circuit, which guarantees that the system program will detect tripping. This additional circuitry is not required in normal system operation and, therefore, in order to avoid program and circuit changes in

all No. 2 ESS offices, will not be tested in the LO-1 program. It can be tested manually, if desired. See Section 232-155-503, Ringing Circuit for Coded, Superimposed and Reverting (SD-2H126)—Test.

## 12. COMPATIBILITY

**12.01** There are no changes in compatibility and interface information for the equipment.

**13. OFFICE DATA**

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

**14. GROWTH/RETROFIT PROCEDURES**

**14.01** In existing No. 2 ESS offices that want to provide zone 16 service, zone 16 changes should be made to SD-2H129-02 (included in Issue 3B), SD-2H133-01 (included in Issue 6B), SD-2H135-01 (included in Issue 5AC), and SD-2H177-01 (included in Issue 3B) circuits, and the new SD-2H126-02 circuit should replace SD-2H126-01.

**15. TESTING**

**15.01** Program tests of SD-2H177-01 and the SD-2H126-02 circuits will automatically be performed.

**15.02** For manual testing of the SD-2H126-02 when using LO-1, see Section 232-155-503, Ringing Circuit for Coded Superimposed and Reverting (SD-2H126)—Test.

**ADMINISTRATION**

**16. MEASUREMENTS**

**16.01** Not applicable.

**17. RECORD KEEPING**

**17.01** Not applicable.

**18. CHARGING**

**18.01** Not applicable.

**AVAILABILITY**

**19. NEW INSTALLATIONS**

**19.01** This feature does not require any program change and is available with both the LO-1 and EF-1 programs. The new circuits and/or the change packages for existing circuits are presently available.

**20. GROWTH/RETROFIT**

**20.01** See Parts 9, 10, 11 and 14 of this section.

**SUPPLEMENTARY INFORMATION**

**21. GLOSSARY**

**21.01** Not applicable.

**22. REASONS FOR REISSUE**

**22.01** This is the initial issue of this section.

**23. REFERENCES**

**23.01** The following documents may be referred to for supplementary information concerning the zone 16 service feature.

- (1) Section 902-215-120, Introduction to Subscriber Long Route Design.
- (2) Section 900-215-121, Subscriber Long Route Design.
- (3) Section 232-155-503, Ringing Circuits for Coded, Superimposed and Reverting (SD-2H126)—Test, Issue 2.