FEATURE DOCUMENT
NOISE IMMUNITY LINE CIRCUIT
NO. 3 ELECTRONIC SWITCHING SYSTEM

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INTRODUCTION

1. GENERAL INFORMATION

1.01 The noise immunity line circuit is used to eliminate false service requests caused by noise induced on the customer's line by external sources. The noise immunity line circuits are available for and compatible with all issues of the generic programs for the No. 3 Electronic Switching System (ESS).

1.02 When this section is reissued, the reasons for reissue will be included in this paragraph.

2. DEFINITION

2.01 The Noise Immunity Line Circuit feature, provided on a per-line basis, eliminates false service requests caused by voltages induced in ground start customer lines by external sources.

2.02 Telephone lines which parallel power lines can have large voltages induced by inductive and capacitive coupling. The induced ac voltage can cause currents which will saturate the line ferrod and result in a false service request. Transposition of lines normally causes cancellation of induced voltages in loop start lines. However, ground start lines are not readily compensated.

2.03 In the No. 3 ESS, false service requests due to induced ac voltages can be eliminated by installing a noise immunity line circuit between the customer's line and the associated line ferrod.

2.04 The noise immunity line circuits are housed in the miscellaneous frame. A peripheral decoder circuit is required to control two relays in the noise immunity line circuit. Software translation arrangements, required to implement the feature, are made through the office data administration (ODA) run for the initial installation of the system and through the use of recent change (RC) messages for existing No. 3 ESS systems.

DESCRIPTION

3. USER OPERATION

3.01 When the noise immunity line circuit has been installed, no action is required on the part of the telephone subscriber or the telephone company personnel in order to activate this feature.

3.02 The noise immunity line circuit is designated to be installed between the customer's line and the associated line ferrod. The primary circuit function is to prevent induced ac voltages from causing false service requests when the customer is actually on-hook. A line relay which is less sensitive to induced ac voltages than the line ferrod is used in the noise immunity line circuit to detect when the customer goes off-hook. A contact on the relay provides a loop closure to the line ferrod.

3.03 An additional contact to be used by service observing circuits is also provided on the relay operated by the peripheral decoder point.

4. SYSTEM OPERATION

4.01 The customer's line entering the central office is routed from a combined distributing frame to a noise immunity line circuit installed on a miscellaneous frame. The outgoing leads are connected back to the distributing frame and from there to the switching network frame.

4.02 Service requests are detected by line relay L in the noise immunity line circuit, SD-3H208-01 (Figure 1). The contacts of the L relay are relatively insensitive to induced ac voltages and operate only when the customer goes off-hook to initiate a call. A make contact on the L relay provides a loop closure and subsequent saturation of the line ferrod. From this point, the origination is detected by the line scanner as usual.

4.03 Upon detection of a service request, the line origination program calls various programs for translation information, selection of a digit receiver, and for the initiation of any necessary peripheral actions. If the scan point number (SPN) translation indicates that the line has a noise immunity line circuit (as indicated by the distributor triplet address for the noisy line circuit), the program causes relay A (within the noise immunity line circuit) to be operated via the peripheral decoder. Operation of relay A causes relay L to be released and closes the customer's line through the noise immunity line circuit to the network switching frame.

4.04 When terminating to a customer with a noise immunity line circuit, the program, via the translation information, obtains the distributor triplet address and initiates orders to operate relay

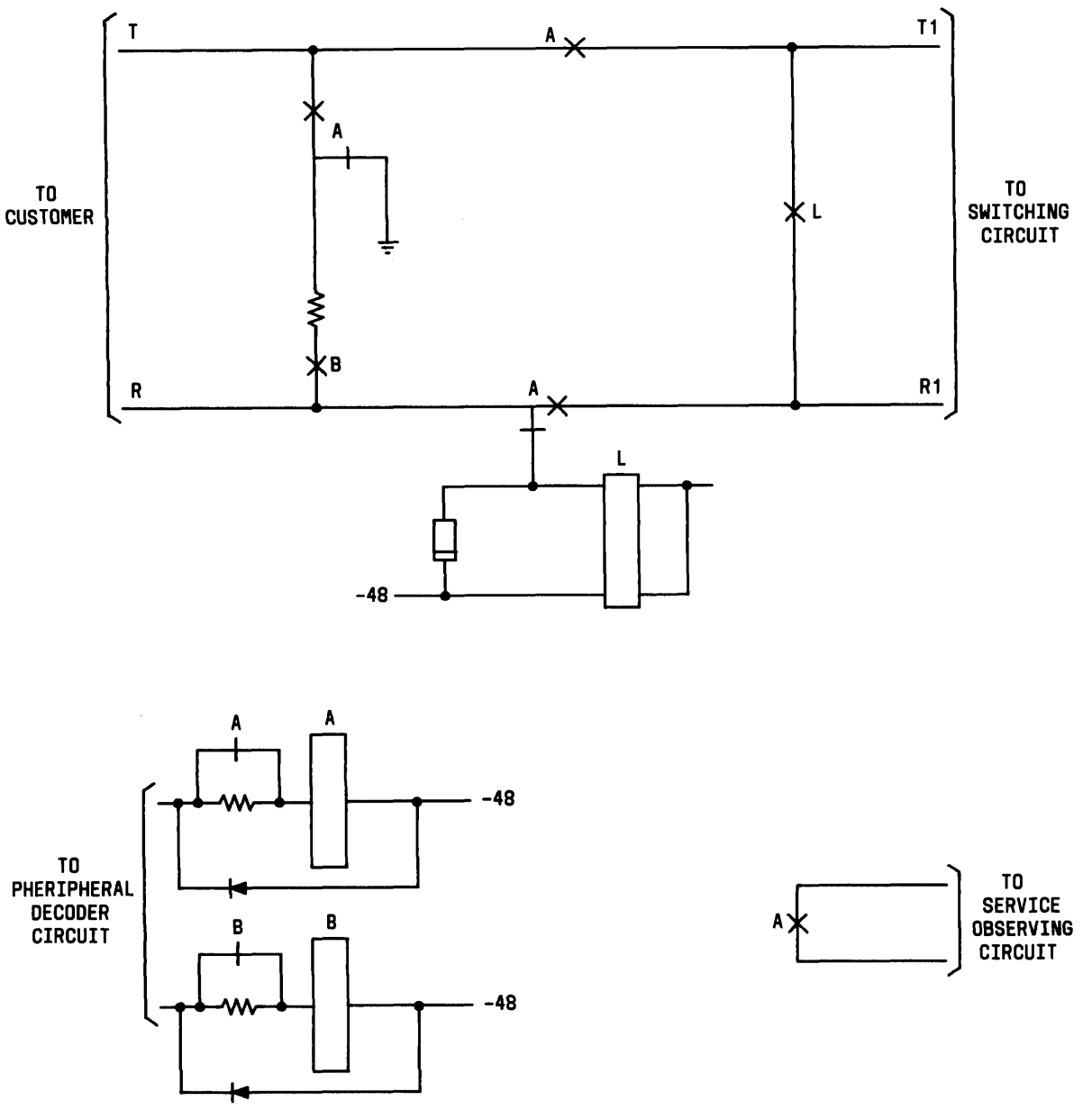

Fig. 1—Noise Immunity Line Circuit, SD-3H208, Simplified Schematic

A in the noise immunity line circuit prior to setting up the ringing connections.

4.05 When a busy customer with a noise immunity line circuit goes on-hook, the normal disconnect sequence is begun. The disconnect program, through the translation information, finds that the line has a noise immunity line circuit, and initiates the release of relay A. This causes the L relay to be restored into the circuit and the through connection to be broken between the customer and the network switching frame.

4.06 When the A relay has been released, a restore-verify test is made to determine that the noise immunity line circuit has been properly idled and that the noise immunity line circuit and the line ferrod have been properly restored. The program accomplishes this by causing the B relay to be operated in order to simulate a customer off-hook condition. Operation of the B relay causes

the L relay to operate and saturate the line ferrod. The program recognizes the ferrod saturation as an indication that the ferrod has been properly restored and that the noise immunity line circuit is working properly. At this point, relay B is released to make the line available for use by the customer.

4.07 A trouble is indicated if ferrod saturation does not occur. This trouble is brought to the attention of the maintenance personnel via a TTY message. This message is the REPT LINE TRBL message which is described in further detail in the Output Message Manual (OM-3H300). A functional flowchart showing the operations of the Noise Immunity Line Circuit feature is shown in Figure 2.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The noise immunity line circuit is provided, when required, on a per-line basis.

6. LIMITATIONS

6.01 The noise immunity line circuit unit occupies a single 4-inch mounting space on the miscellaneous frame and can accommodate up to 16 lines. With proper engineering, adequate distributor triplets and translation space for the distributor triplet address may be provided for any reasonable number of noise immunity line circuits. The distributor triplets must be used for various peripheral operations other than noise immunity line circuits. This fact should be considered when determining the number of noise immunity line circuits to be provided.

7. INTERACTIONS

7.01 The immunity line circuit may be used to provide other sleeve lead functions. Typical circuits and services which also utilize the sleeve lead functions are as follows:

- Ground start dial long lines range extender SD-96371-01
- Auxiliary line circuit (Group Alerting)
- Secretarial answering services
- 1A line concentrator systems
- MLHG lines requiring a relay not part of the line circuit
- Service observed lines.

An additional contact closure is supplied by the noise immunity line circuit so that one of the sleeve lead functions (usually service observing) can be handled, by the same distributor triplet, in addition to the noise immunity line circuit.

8. RESTRICTION CAPABILITY

8.01 Restrictions are not required for this feature.

INCORPORATION INTO SYSTEM

9. COST FACTORS

A. Software Costs

9.01 Additions to the translation data in program storage for the Noise Immunity Line Circuit feature are required on a per-line basis in the Line Data Words of the Line Subtranslator.

B. Hardware Costs

9.02 In addition to the noise immunity line circuit (SD-3H208) which is installed in the miscellaneous frame, interconnections from the noise immunity line circuit must be made at the combined distributing frame to both the customer's line and the switching network at the network switch frame. One distributor triplet must be assigned for each customer line.

10. DATA ASSIGNMENTS AND RECORDS

10.01 The distributor triplet address for the noise immunity line circuit (shown in Figure 3) must be assigned either through the use of a recent change message or, in the case of initial installation of a system, the ODA run.

10.02 The recent change message used to assign a noise immunity line circuit is the RC:LINE message, with keyword DPU. When this keyword is used, the DP keyword (for sleeve lead) is not allowed.

10.03 When the noise immunity line circuit is assigned via the ODA run, the Supplementary Information Table (Form ESS 3107) must be completed, in addition to the other required forms, and sent to the WECo Regional Data Center.

10.04 If an ODA run is made to incorporate the feature, the resulting output forms should be retained as a part of the office records. Records for trouble reports and maintenance should be kept in accordance with local procedures.

11. HARDWARE RESTRICTIONS

11.01 Only one sleeve lead circuit may be used in addition to the noise immunity line circuit.

12. INSTALLATION/ADDITION/DELETION

12.01 The procedures for providing the noise immunity line circuit include installing the noise immunity line circuit units in the miscellaneous frame, making the circuit connections as described earlier, and organizing the software through the use of recent change messages or an ODA run. Other necessary procedures, including continuity and operational tests can be found in the Installation Engineering Handbook 269. The network design worksheets can be found in Division D, Section 13-b(2) of the Traffic Facilities Practices.

13. TESTING

13.01 No special testing is required other than performing a test call to and from the line having the noise immunity line circuit.

13.02 Line test procedures, used to determine if a noise immunity line circuit is necessary, may be found in Section 233-142-100.

14. OTHER PLANNING TOPICS

14.01 Care should be taken to insure that enough translation area is available for the required number of noise immunity line circuit assignments, that enough space is available in the miscellaneous frame to accommodate the required number of units, and that enough distributor triplets are available for the required number of noise immunity line circuits.

ADMINISTRATION

15. MEASUREMENTS

15.01 No traffic or plant measurements are required.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list identifies terms and abbreviations used in this document:

- Ground Start—Origination detected as the result of completing an electrical circuit by applying a ground to one side of the loop facilities at the customer location.
- Loop Start—Origination of a call by closing the tip and ring loop through the customer telephone set.
- Office Data Administration (ODA) Run—Mechanism by which translation information may be assembled or changed for a No. 3 ESS. Information from the ESS input forms is inputted into the regional ODA computer, assembled, then sent back to the No. 3 ESS.
- Recent Change (RC) Messages—Mechanism for making changes to information stored in the program store via TTY input messages.
- Sleeve Lead—A term used in earlier systems to identify a conductor, usually accompanying the tip and ring leads of a switched connection, that provides for miscellaneous functions necessary for the control and supervision of the connection. In ESS, sleeve lead does not apply to a specific conductor but does identify similar functions. The ESS sleeve lead identifies a circuit path via line translation for control and supervision operations which require the use of one or more scan points and/or peripheral decoder points.

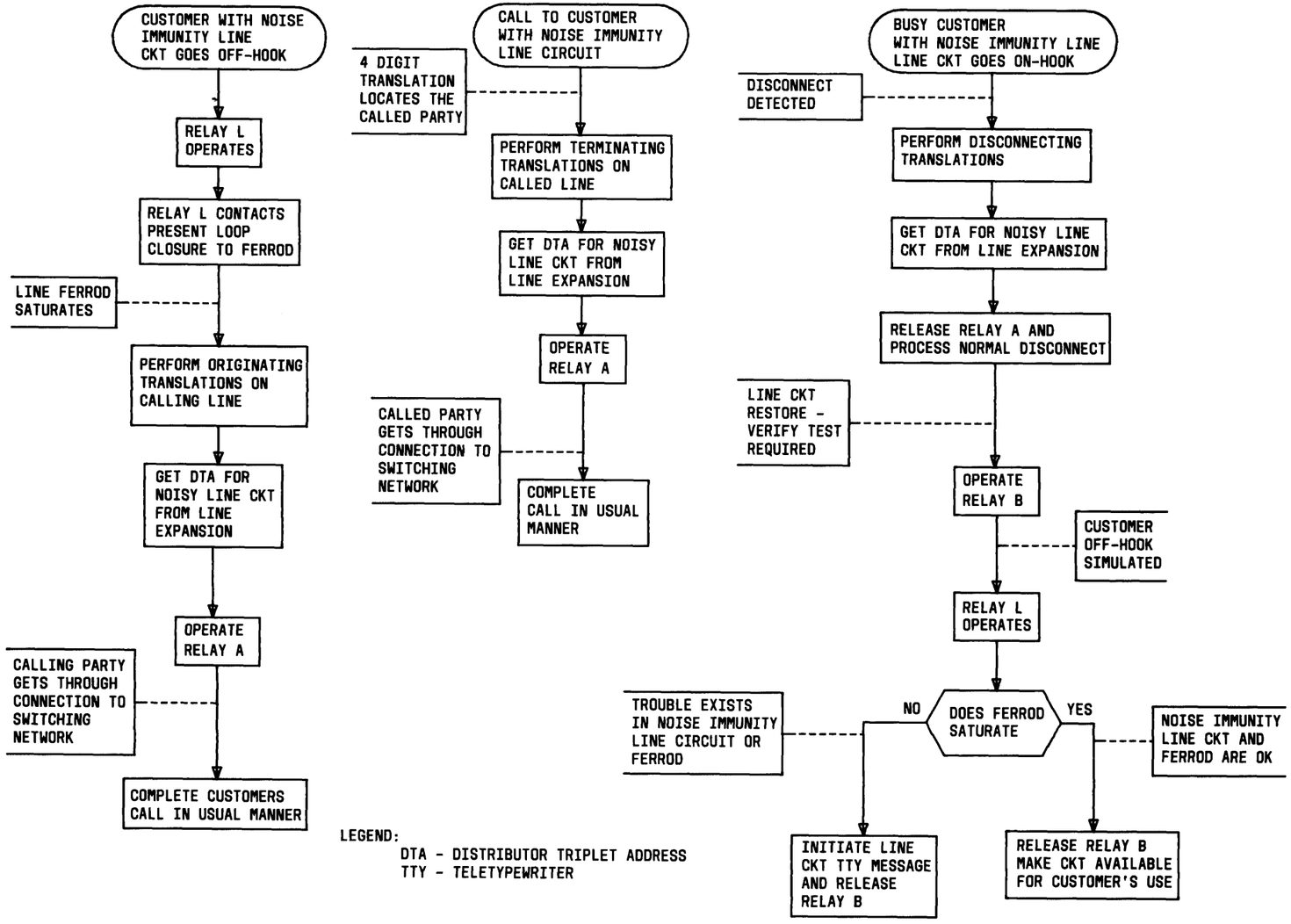

Fig. 2—Noise Immunity Line Circuit Feature Flow Diagram

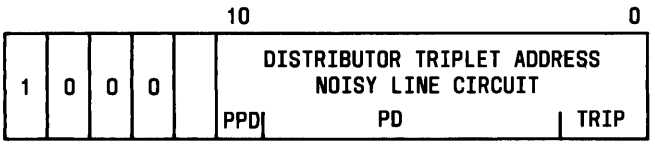

Fig. 3—Line Data Word for Noise Immunity Circuit (For Lines or PBX/MLHG Lines)

18. REFERENCES

18.01 The following documents may be referred to for additional information concerning the Noise Immunity Line Circuit feature:

- CD and SD-3H208—Electronic Switching Systems No. 3 Noise Immunity Line Circuit
- IM-3H300—Input Message Manual No. 3 ESS
- PA-3H300—Office Data Tables Layout Specification No. 3 ESS
- OM-3H300—Output Message Manual No. 3 ESS
- Section 233-154-130—Recent Change Users Guide
- TG-3, Translation Guide
- Traffic Facilities Practices, Division D, Section 13
- Section 233-142-100—TOP No. 3 ESS