AUXILIARY LINE CIRCUITS
NO. 2 ELECTRONIC SWITCHING SYSTEM

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FEATURE DEFINITION AND DESCRIPTION

1. DEFINITION

1.01 The auxiliary 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. An option is provided to connect the circuit to a loop start line with excessive induced voltages. It can also be used as a ground start to loop start converter to permit the use of loop type long line circuits on ground start lines.

1.02 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.

1.03 In the No. 2 Electronic Switching System (ESS), false service requests due to induced ac voltages can be eliminated by installing an auxiliary line circuit between the customer's line and the associated line ferrod.

1.04 The auxiliary line circuits are installed in the miscellaneous trunk frame. A peripheral decoder circuit is required to control one of the relays in the auxiliary line circuit. Software translation changes to implement the feature are required by recent change (RC) messages or office data administration (ODA) runs.

2. DESCRIPTION

A. Customer (User) Perspective

2.01 An auxiliary line circuit has been designed to be installed between a 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 than the line ferrod to induced ac voltages is used in the auxiliary line circuit to detect when the customer goes off-hook. A contact on the relay provides a loop closure to the line ferrod.

2.02 Although the auxiliary line circuit feature is primarily used for ground start lines, a circuit option allows connection to loop start lines with large imbalance. Use of this circuit for converting a loop start dial long line circuit to provide ground start long line operation is recommended when there is a cost advantage. A cost advantage exists when the total cost of the auxiliary line circuit plus the loop start long line circuit is less expensive than the total cost of the standard ground start long line circuit plus the required peripheral decoder point. This arrangement usually results in greater reuse utilization of loop start long line circuits and avoids the need to provide ground start long line circuits (range extenders such as an SD-96371-01) in an ESS.

2.03 An additional contact to be used by interconnecting circuits is provided on the relay operated by the trunk peripheral decoder.

B. System Implementation

2.04 The customer's line entering the central office is routed from a distributing frame to an auxiliary line circuit installed on a miscellaneous trunk frame. The outgoing leads are connected back to a distributing frame and from there to the switching network at the line trunk switch frame.

2.05 Service requests are detected by line relay L in the auxiliary line circuit, SD-2H143-01 (Figure 1). The contacts of line relay L 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.

2.06 After detection of a service request, the origination program calls various programs for translation information, selection of a digit receiver, and loading a peripheral order buffer. If the terminal equipment number translation indicates that the line has an auxiliary line circuit (as indicated by the associated circuit word), the specific relay action is loaded in a peripheral order buffer. The desired relay action is the operation by the trunk peripheral decoder of relay A in the auxiliary line circuit. Operation of relay A releases relay L and also closes the customer's lines through the auxiliary line circuit to the input terminals of the line trunk switching frame.

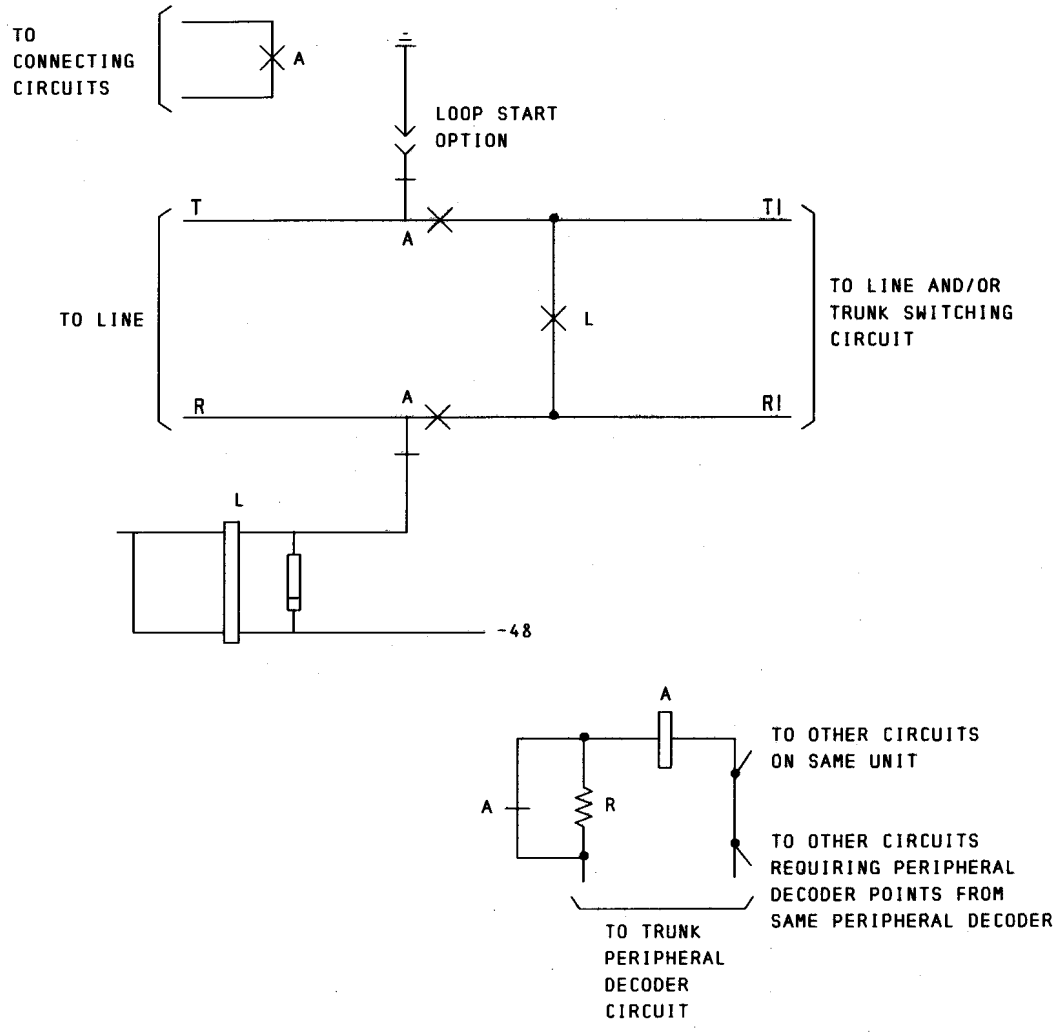

Fig. 1—Auxiliary Line Circuit, SD-2H143-01, Simplified Schematic

2.07 When a busy customer with an auxiliary line circuit goes on-hook, normal system operation restores the line scanner ferrod into the circuit. The disconnect program, through the translation information, finds that the line has an auxiliary line circuit, and directs the trunk peripheral decoder to release relay A. This restores relay L to the circuit. Relay A also opens the line between the customer and the switching network.

2.08 When terminating to a customer with an auxiliary line circuit, the ringing program, via the translation information, obtains the trunk peripheral decoder number and initiates orders to operate relay A in the auxiliary line circuit of the called customer prior to making preringing tests.

3. FEATURE FLOW DIAGRAM

3.01 A feature flow diagram detailing the functional operation of the auxiliary line circuit feature is provided in Figure 2.

4. INTERACTIONS

4.01 The use of the auxiliary line circuit is dependent of other sleeve lead functions such as remote trunk peripheral decoder applique circuits. Other sleeve lead considerations are included in Part 12, COMPATIBILITY.

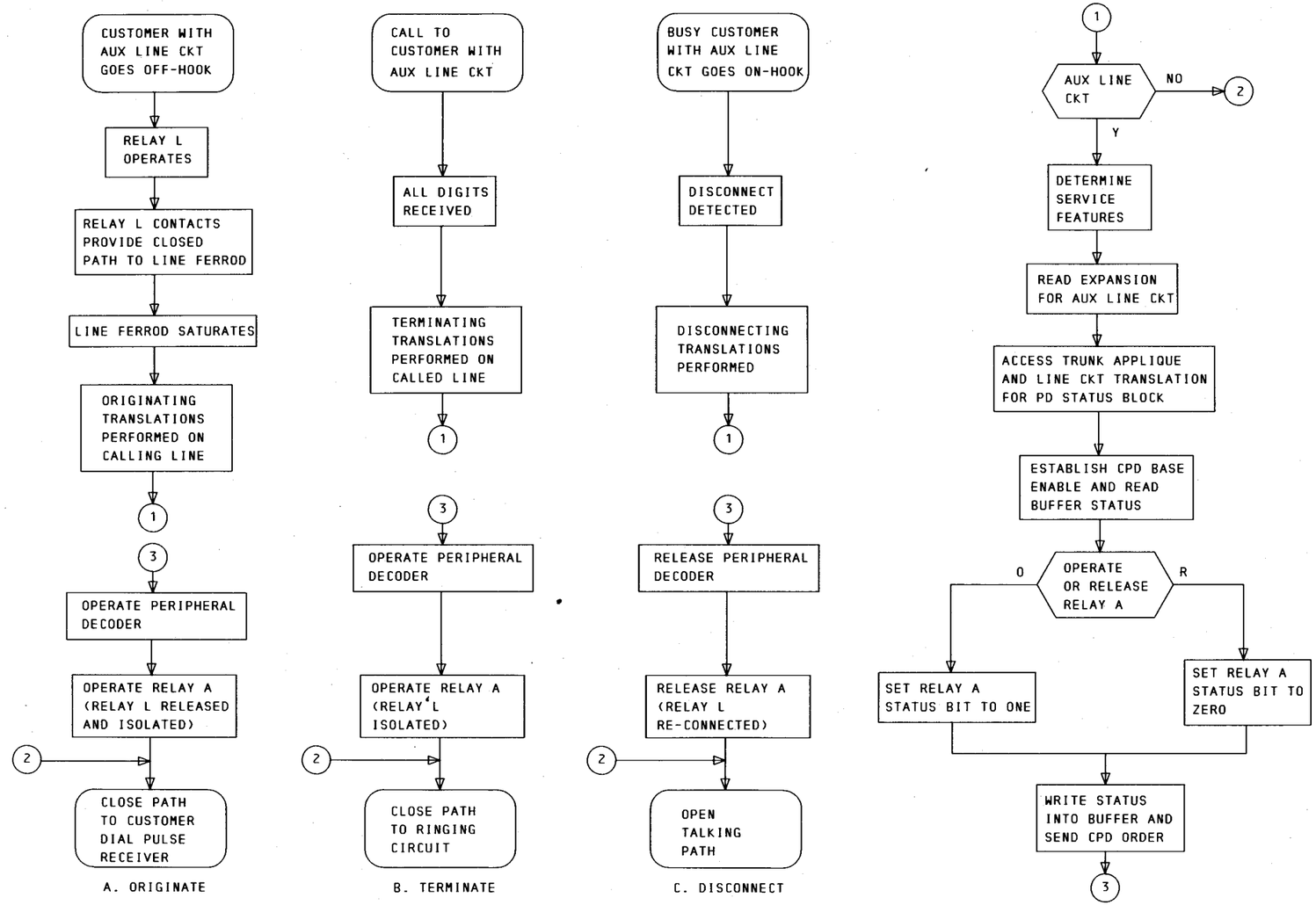

Fig. 2—Auxiliary Line Circuit Feature Flow Diagram

ATTRIBUTES

5. STATION/SYSTEM

5.01 The auxiliary line circuit feature is provided on a per-line basis.

6. LIMITATIONS

6.01 A maximum of two peripheral decoder points, one for a sleeve lead and one for a message register, are permitted for an associated circuit word in the general purpose expansion tables. If a line requires an auxiliary line circuit, another sleeve lead can be connected to spare contacts on the auxiliary line circuit. A relay or several sleeve leads can be connected to a multicontact relay connected to the remote trunk peripheral decoder applique circuit. Six auxiliary line circuits are installed on the same mounting plate to form an auxiliary line unit.

7. RESTRICTION CAPABILITY

7.01 Not applicable.

8. COST DATA

A. Software Costs

8.01 Additions to the translations data in program storage for the auxiliary line circuit feature are required on a per-line basis in the Four-Word or Two-Word Expansions in the General Purpose Expansion Tables.

B. Hardware Costs

8.02 In addition to the auxiliary line circuit which is installed in the miscellaneous trunk frame, interconnections from the auxiliary line circuit must be made at the combined distributing frame to both the customer's line and the switching network at the line trunk switch frame. One decoder point must be assigned for each customer line.

INCORPORATION INTO SYSTEM

9. PLANNING

9.01 The auxiliary line circuit should be ordered for all ground start and loop start lines known to have high induced ac voltages. Sufficient spares as determined by the operating company should also be ordered.

10. HARDWARE ENGINEERING

10.01 The hardware required to apply the auxiliary line circuit to one customer line is as follows:

(a) One SD-2H143-01 auxiliary line circuit (order code 73700) of an auxiliary line unit.

(b) One peripheral decoder point. The six auxiliary line circuits contained in each auxiliary line unit utilize the six consecutive outputs of either the first two or the last two buffers of a peripheral decoder.

(c) If the line ferrod was wired for ground start operation, it must be rewired for loop start operation.

11. SOFTWARE ENGINEERING

11.01 The procedures for the software engineering for the auxiliary line circuit feature are outlined in the Traffic Facilities Practices, Division D, Section 12. Changes to this feature can be made either by an ODA run or by RC messages. Part 13, OFFICE DATA identifies the forms to be completed for an ODA run.

12. COMPATIBILITY

12.01 Listed below are typical circuits and services which utilize sleeve lead functions. It is not anticipated that the auxiliary line circuit feature will be required in combination with such applications. However, where excessive induced ac voltages occur, it will be necessary to investigate each application separately.

(a) Ground start dial long lines range extender SD-96371-01

(b) Auxiliary line circuit (INWATS) SD-99439-01

(c) Auxiliary line circuit (Group Alerting) SD-95884-01

(d) Secretarial answering services

(e) 1A line concentrator systems

(f) Service observed lines

(g) MLHG lines requiring a relay not part of the line circuit.

12.02 For a more detailed analysis of sleeve lead functions, refer to Section 232-190-134—Sleeve Lead Function.

13. OFFICE DATA

A. Translation Layouts

13.01 The primary translations required for the auxiliary line circuit feature are the 4-word (Line Circuit or Custom Calling and the Special PBX-CU-MLHG) expansion. If more than one associated circuit is required, a 2-word (Associated Circuit) expansion is necessary. These expansions are shown in Figure 3. Changes to the auxiliary line circuit feature can be made either by an ODA run or by RC messages.

B. Office Data Administration (ODA)

13.02 When an ODA run is required, the following completed forms must be submitted to the appropriate WECo Regional Data Center for processing:

- ESS 2100 - Directory Number Table
- ESS 2105 - Multiline Hunting Group
- ESS 2107 - Supplementary Information Table
- ESS 2201 - Trunk Assignment Table

The No. 2 ESS Translation Guide, TG-2H, contains the details necessary for completing the above forms.

C. Recent Change (RC) Messages

13.03 The auxiliary line circuit feature can be added to or deleted from an existing customer's line without an ODA run through the use of the SLL keyword in the A RC:L (for lines) or the A RC:MLH (for multiline hunt groups) recent change messages. The A VY:L or the A VY:MLH messages can be used to verify the assignment of the feature.

14. GROWTH/RETROFIT PROCEDURES

14.01 The procedures for providing the auxiliary line circuit are shown in Figure 4. The addition of lines to the No. 2 ESS central office from another office, changes to power company facilities, and rerouting of operating company outside plant facilities are typical examples which could require additional auxiliary line circuits.

15. TESTING

15.01 No special testing is required other than performing a test call to and from the line having the auxiliary line circuit feature.

ADMINISTRATION

16. MEASUREMENTS

16.01 No traffic or plant measurements are required.

17. RECORD KEEPING

17.01 The following translation administration record forms reflecting the auxiliary line circuit feature must be maintained by the operating companies after each ODA run is made:

- ESS 2100-R
- ESS 2105-R
- ESS 2201-R

17.02 A record of all recent change messages must be maintained in addition to the ESS-R forms.

18. CHARGING

18.01 Not applicable.

AVAILABILITY

19. NEW INSTALLATIONS

19.01 The auxiliary line circuit feature is available in all issues of the generic program.

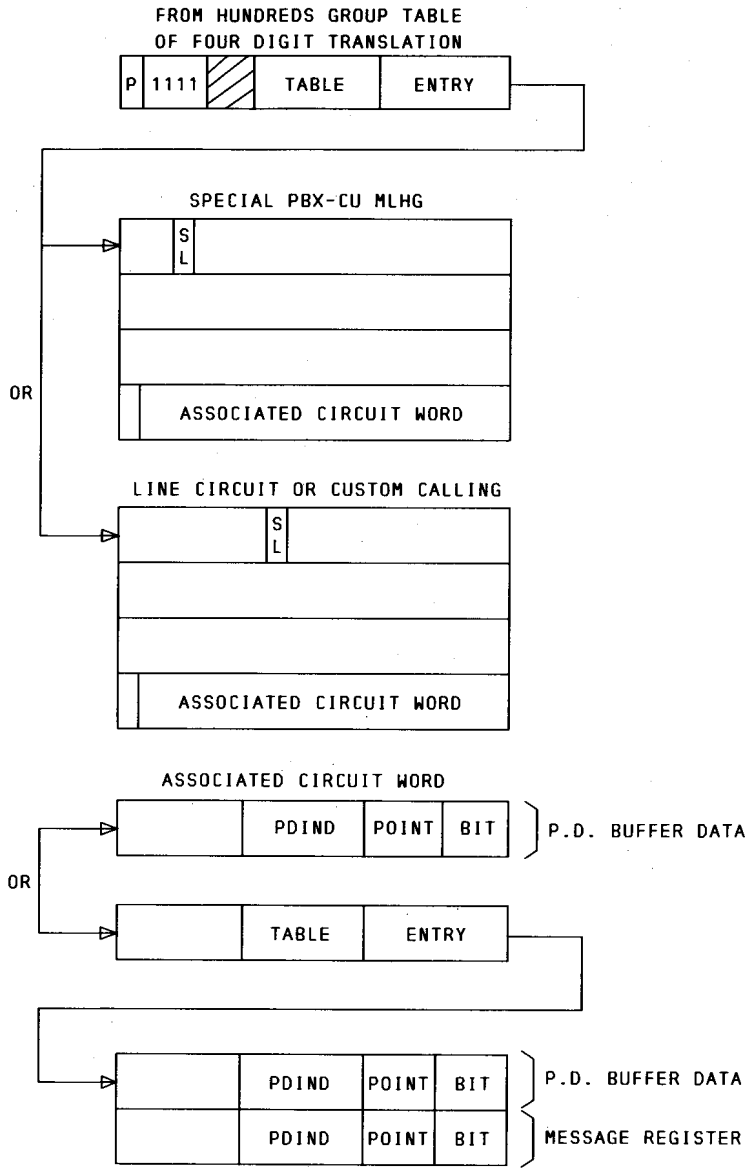

Fig. 3—Translations for Auxiliary Line Circuit

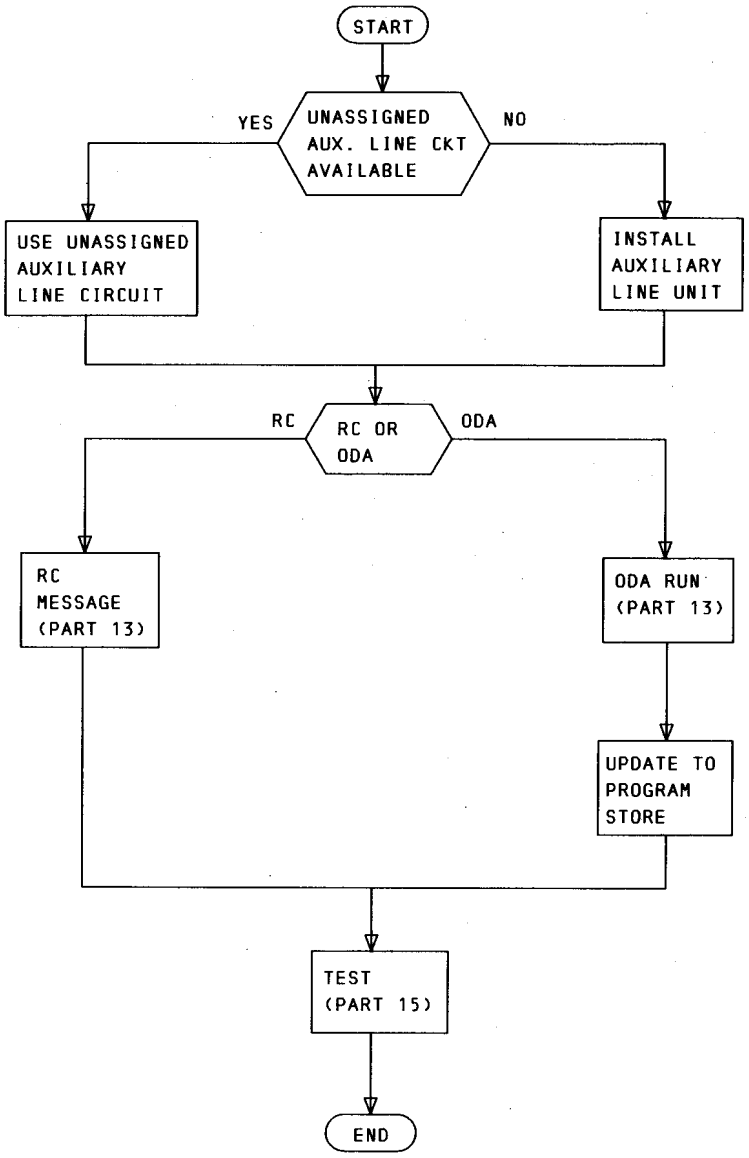

Fig. 4—Procedure for Installing the Auxiliary Line Circuit Feature

20. GROWTH/RETROFIT

20.01 For offices requiring growth/retrofit, the auxiliary line circuit feature is available in all issues of the generic program.

SUPPLEMENTARY INFORMATION

21. GLOSSARY

21.01 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. 2 ESS. Information from the ESS input forms is inputted into the regional ODA computer, reassembled, then sent back to the No. 2 ESS.
- Recent Change (RC) Messages - Mechanism for making changes to information stored in the program store. These changes are accomplished via TTY input messages and are stored in the recent change area of call store until some later time when the program store can be updated.
- 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.

22. REASONS FOR REISSUE

22.01 This is the initial issue of this document.

23. REFERENCES

23.01 The following documents may be referred to for supplementary information concerning the auxiliary line circuit feature:

- Auxiliary Line Circuit CD-2H143-01 and SD-2H143-01-1
- Input Message Manual No. 2 ESS IM-2H200
- Office Data Tables Layout Specification No. 2 ESS PA-2H200
- Output Message Manual No. 2 ESS OM-2H200
- Sleeve Lead Function Section 232-190-134
- Traffic Facilities Practices No. 2 ESS TFP-Division D, Section 12
- Translation Guide, TG-2H
- Section 232-118-103 Recent Change Procedures (Central Office Changes) Generic Program EF-1 No. 2 and No. 2 Electronic Switching Systems