FEATURE DOCUMENT

SLEEVE LEAD FUNCTION

NO. 2 ELECTRONIC SWITCHING SYSTEM

FIGURES   PAGE

FEATURE DEFINITION AND DESCRIPTION

1. DEFINITION

1.01 The *sleeve lead* function is a feature that provides a third wire for operating a relay or other equipment external to the switching system, but directly associated with a line.

1.02 Sleeve leads are typically used to operate auxiliary circuits such as:

- service observing equipment

- auxiliary line circuit (SD-2H143)

- remote overflow registers or lamps for a private branch exchange (PBX) or multiline hunt group (MLHG)

- dial long lines (DLL) circuits requiring a grounded sleeve lead to indicate seizure

- inward wide area telephone service (INWATS) timers

- emergency line circuits for completion of calls to fire, police, ambulance, etc.

1.03 In the No. 2 Electronic Switching System (ESS), the sleeve lead function is controlled by the peripheral decoder (PD). Peripheral orders are sent to the PD by the No. 2 ESS control unit, which are decoded into information necessary to operate or release relays in external circuits.

1.04 Each sleeve lead requires the assignment of peripheral decoder points and requires use of a remote PD applique circuit.

1.05 Changes are required in the line's translation data to assign a sleeve lead to it. These changes may be made by recent change or by an office data administration (ODA) run.

2. DESCRIPTION

A. Customer (User) Perspective

2.01 The customer is unaware that a sleeve lead function is being performed when the line requiring the function is involved in a call. Depending on the type of circuit being operated, the feature may or may not involve customer interaction.

B. System Implementation

2.02 A sleeve lead may be required for an originating line or for a line being called. In either case, the line's translation indicates whether or not the line has a sleeve lead. If it does not, the call is processed in the normal manner.

2.03 If the line has a sleeve lead, the auxiliary circuit information is read from the line expansion. This information contains the peripheral decoder index, point and bit for accessing the peripheral decoder applique translation. If the line is a special PBX line (a PBX line having different features than listed in the PBX group translation), the special PBX line expansion must be accessed to determine if the line has a unique PD point. If it does, the PD information is read. If it does not have a unique PD point, the one specified in the PBX group translation is used.

2.04 The auxiliary circuit information is used to access the peripheral decoder applique translation and the address of the circuit's call store status block is read. The PD applique translation provides a central pulse distributor (CPD) base enable, a CPD point, and a buffer number. From this information the program forms a CPD enable.

2.05 After the enable is formed, the status bits associated with the auxiliary circuits relay are read from the call store status block. If the relay is to be operated, the status bit associated with the relay is set to one. If the relay is to be released, the bit is set to zero. The status bit is then written back into the status block to indicate the new condition of the relay.

2.06 The program then executes a peripheral order to operate or release the desired relay. When the relay is operated or released, the normal call processing routines are resumed and the call is processed the same as any other call.

3. FEATURE FLOW DIAGRAM

3.01 Figure 1 illustrates the sequence of actions taken by the system when a line requiring the sleeve lead function is involved in a call.

```
   ┌────────────────────┐                              ┌────────────────────┐
   │ A NO. 2 ESS LINE   │                              │ A CALL IS BEING    │
   │ ORIGINATES A CALL  │                              │ PLACED TO A LINE   │
   └────────────────────┘                              │ IN A NO. 2 ESS     │
            │                                           └────────────────────┘
            ▼                                                     │
   ┌────────────────────┐                              ┌────────────────────┐
   │ ORIGINATING        │                              │ TERMINATING        │
   │ TRANSLATION IS     │                              │ TRANSLATION IS     │
   │ DONE ON THE        │                              │ DONE ON THE        │
   │ CALLING LINE.      │                              │ CALLED LINE        │
   └────────────────────┘                              └────────────────────┘
```

GET MAJOR CLASS OF LINE

DOES THE LINE HAVE A SLEEVE LEAD — NO → NORMAL CALL PROCESSING OCCURS

YES

IS LINE A SPECIAL PBX LINE — NO →

YES

DOES SPECIAL PBX LINE HAVE A UNIQUE PD POINT — NO →

YES

READ SPECIAL PBX EXPANSION FOR AUXILIARY CIRCUIT INFORMATION

READ AUXILIARY CIRCUIT INFORMATION FROM LINE EXPANSION

ACCESS TRUNK PD APPLIQUE TRANSLATION AND GET ADDRESS OF STATUS BLOCK ASSOCIATED WITH THE AUXILIARY CIRCUIT
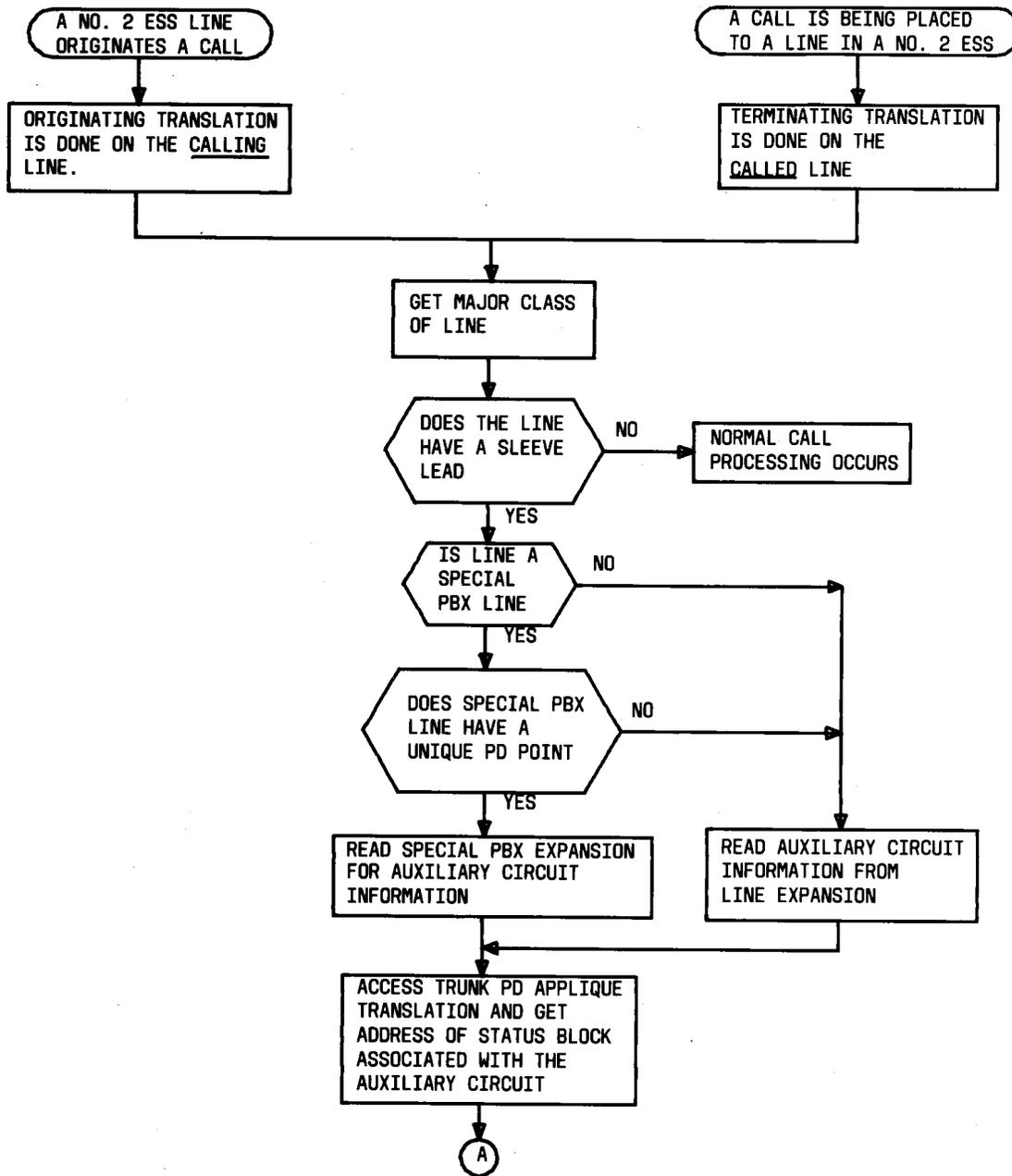
(A)

Fig. 1—Sequence of Actions for a Line With a Sleeve Lead (Sheet 1 of 2)

```
                              ( A )
                                │
                                ▼
                   ┌─────────────────────────┐
                   │ READ THE CPD BASE ENABLE │
                   │ AND FORM THE CPD ENABLE  │
                   │ FROM THE CPD POINT, BUFFER│
                   │ NUMBER, AND BASE ENABLE. │
                   └─────────────────────────┘
                                │
                                ▼
                   ┌─────────────────────────┐
                   │ READ CALL STORE STATUS   │
                   │ BITS ASSOCIATED WITH     │
                   │ AUXILIARY CIRCUIT RELAY  │
                   └─────────────────────────┘
                                │
                                ▼
           RELEASE      ╱ IS RELAY TO ╲      OPERATE
         ◄─────────────   BE OPERATED  ─────────────►
                       ╲  OR RELEASED ╱
                         ╲           ╱
              │                                    │
              ▼                                    ▼
   ┌──────────────────┐              ┌──────────────────────┐
   │ ZERO RELAY'S     │              │ SET RELAY'S STATUS   │
   │ STATUS BIT       │              │ BIT TO 1             │
   └──────────────────┘              └──────────────────────┘
              │                                    │
              └──────────────┬─────────────────────┘
                             ▼
                  ┌──────────────────────────┐
                  │ WRITE STATUS BIT BACK INTO│
                  │ CALL STORE STATUS BLOCK  │
                  └──────────────────────────┘
                             │
                             ▼
                  ┌──────────────────────────┐
                  │ SEND CPD ORDER TO OPERATE │
                  │ OR RELEASE THE RELAY     │
                  └──────────────────────────┘
                             │
                             ▼
                  ┌──────────────────────────┐
                  │ RETURN TO NORMAL CALL    │
                  │ PROCESSING ROUTINES      │
                  └──────────────────────────┘
                             │
```
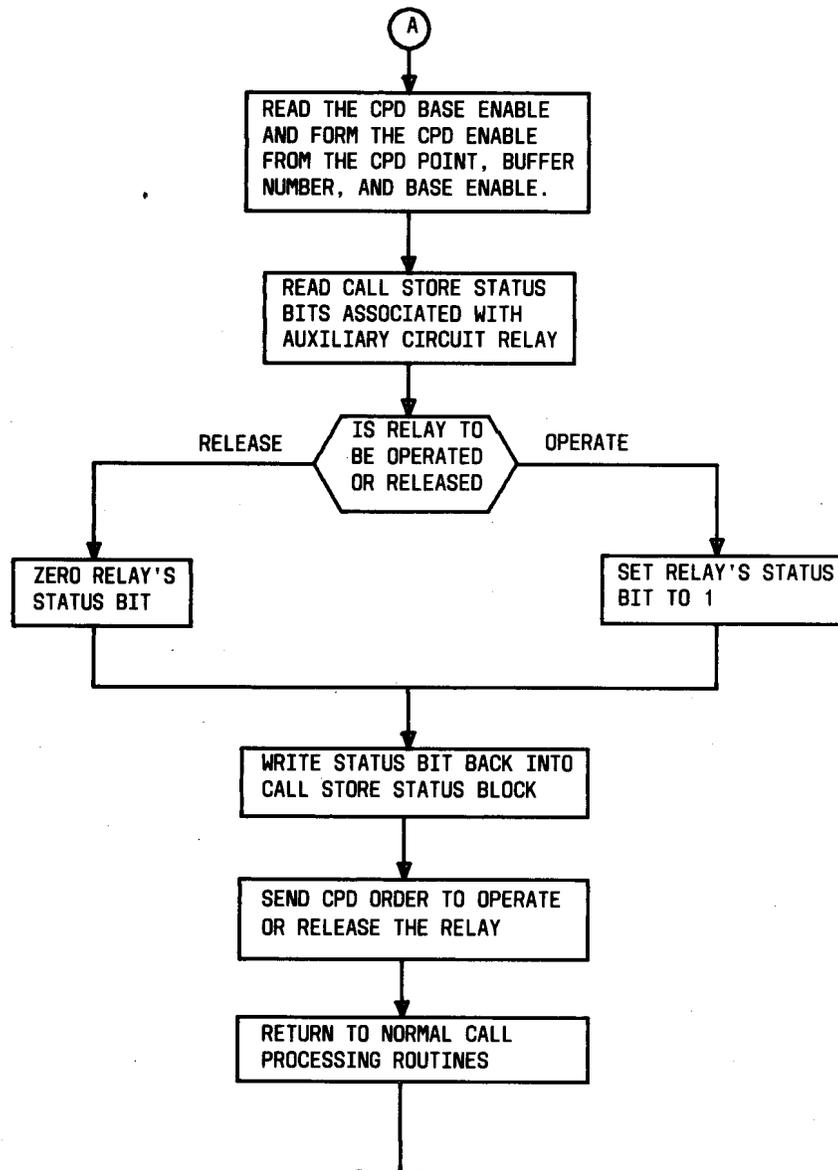
Fig. 1—Sequence of Actions for a Line With a Sleeve Lead (Sheet 2 of 2)

4. INTERACTIONS

4.01 This feature does not interact with other features.

ATTRIBUTES

5. STATION/SYSTEM

5.01 The sleeve lead function is usually assigned on a per-line basis. It may however, be assigned on a group basis for PBXs or multiline hunt groups.

6. LIMITATIONS

6.01 The following limitations apply to the sleeve lead feature:

• A line in the No. 2 ESS is limited to one application of the sleeve lead function

• All 2-, 4-, and 8-party lines requiring a sleeve lead application must have all parties assigned to the same sleeve lead.

7. RESTRICTION CAPABILITY

7.01 This feature may only be restricted by removing it from a line's translations via recent change message.

8. COST DATA

Hardware

8.01 The sleeve lead function requires use of a remote PD applique circuit (SD-2H130) or an auxiliary line circuit (SD-2H143). A single circuit will accommodate up to six auxiliary circuits. If no PD applique circuit or auxiliary line circuit is equipped in the office or no spares are available on existing circuits, a new one must be installed. Refer to J2H018FE for specifications on the PD applique circuit and J2H018FS for the auxiliary line circuit.

Translations

8.02 Each line with a sleeve lead requires one translation word per sleeve lead function in the line expansion. If both a sleeve lead and a message register are assigned to the same line, a 2-word expansion is required to store the sleeve lead function. If a sleeve lead is used for a remote overflow counter for a PBX or multiline hunt group, one word is required in the terminal list of the PBX/MLHG translator.

8.03 Each line that has an assigned sleeve lead also requires one bit to indicate the line has a sleeve lead. This bit appears in the line's expansion.

INCORPORATION INTO SYSTEM

9. PLANNING

9.01 No special planning considerations are required for this feature.

10. HARDWARE ENGINEERING

10.01 The sleeve lead function requires use of a PD applique circuit (SD-2H130) or auxiliary line circuit (SD-2H143). If one is not equipped in

the office, or an existing one has no spare circuits available, a new circuit must be installed. Refer to 8.01 for details.

11. SOFTWARE ENGINEERING

11.01 Refer to Traffic Facilities Practices, Division D, Section 12 for information concerning software engineering and processor time usage for this feature.

12. COMPATIBILITY

12.01 The sleeve lead function may be applied to both loop start and ground start lines. The sleeve lead function may also be used on centrex lines in the EF-1 generic program.

13. OFFICE DATA

13.01 To incorporate the sleeve lead function into a No. 2 ESS, changes must be made to the office translation data. Figure 2 illustrates the data that must be added or changed. Changes can be made by recent change message or by an ODA run.
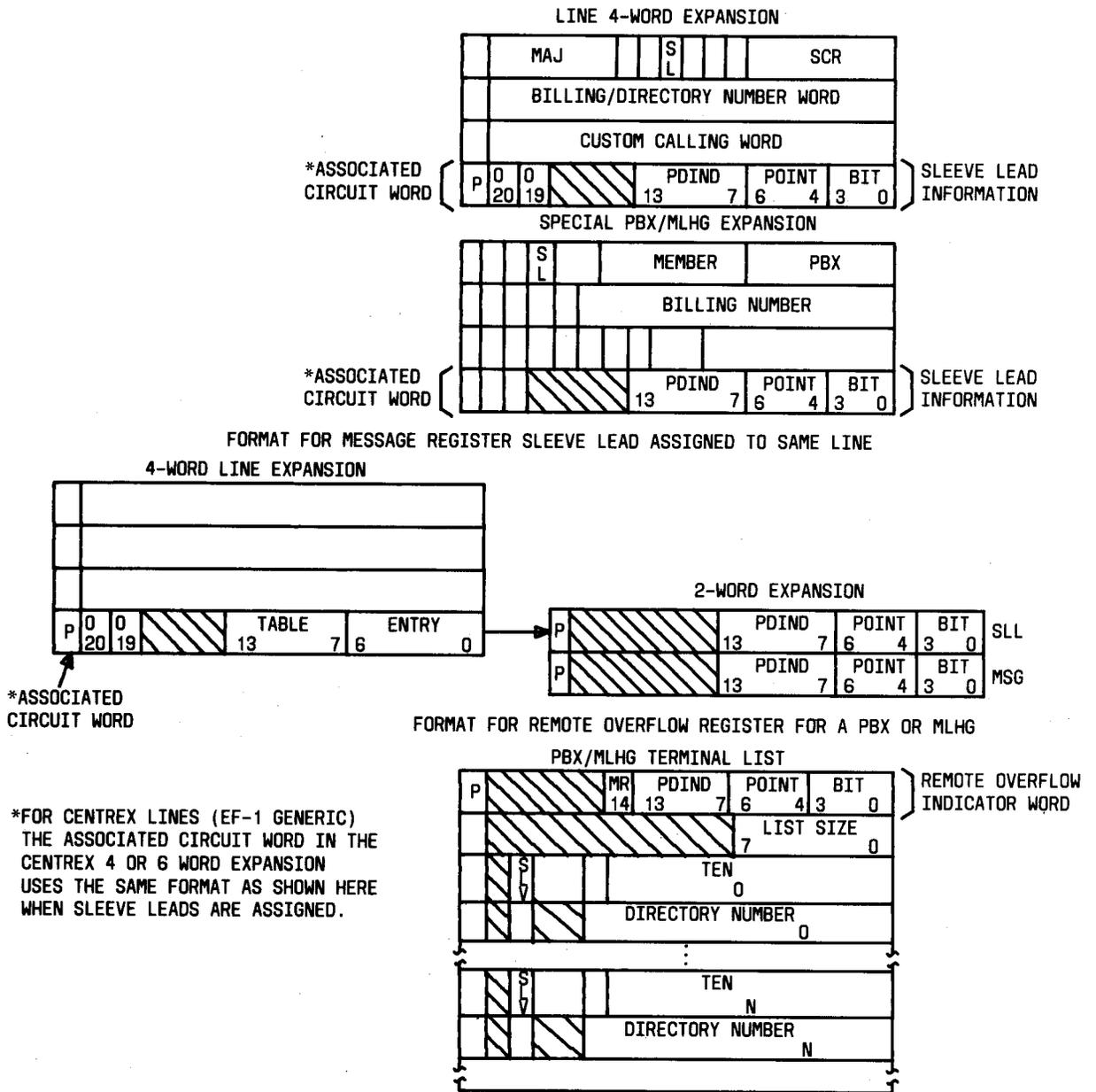
Recent Change

13.02 When the sleeve lead is added via recent change, use the A RC:L message with the SLL keyword to assign the feature to a line. For multiline hunt groups use the A RC:MLH message with the SLL keyword. Refer to IM-2H200 for complete details on the use of this message.

ODA Run

13.03 When the sleeve lead function is incorporated via an ODA run, the following ESS input forms are completed and submitted to the Western Electric Regional Data Center.

• *2100 Directory Number Table:* This form must be marked to indicate that a directory number has an associated sleeve lead.

• *2107 Supplementary Information Table:* This form is required if more than one supplementary item is needed on the 2100 form.

LINE 4-WORD EXPANSION

	MAJ			S L				SCR	

BILLING/DIRECTORY NUMBER WORD

CUSTOM CALLING WORD

*ASSOCIATED CIRCUIT WORD

P	0 20	0 19	/////	PDIND 13 7	POINT 6 4	BIT 3 0

SLEEVE LEAD INFORMATION

SPECIAL PBX/MLHG EXPANSION

			S L		MEMBER	PBX

BILLING NUMBER

*ASSOCIATED CIRCUIT WORD

		/////	PDIND 13 7	POINT 6 4	BIT 3 0

SLEEVE LEAD INFORMATION

FORMAT FOR MESSAGE REGISTER SLEEVE LEAD ASSIGNED TO SAME LINE

4-WORD LINE EXPANSION

P	0 20	0 19	/////	TABLE 13 7	ENTRY 6 0

*ASSOCIATED CIRCUIT WORD

2-WORD EXPANSION

P	/////	PDIND 13 7	POINT 6 4	BIT 3 0	SLL
P	/////	PDIND 13 7	POINT 6 4	BIT 3 0	MSG

FORMAT FOR REMOTE OVERFLOW REGISTER FOR A PBX OR MLHG

*FOR CENTREX LINES (EF-1 GENERIC) THE ASSOCIATED CIRCUIT WORD IN THE CENTREX 4 OR 6 WORD EXPANSION USES THE SAME FORMAT AS SHOWN HERE WHEN SLEEVE LEADS ARE ASSIGNED.

PBX/MLHG TERMINAL LIST

P	/////	MR 14	PDIND 13 7	POINT 6 4	BIT 3 0

REMOTE OVERFLOW INDICATOR WORD

/////	LIST SIZE 7 0

S V			TEN 0

		DIRECTORY NUMBER 0

S V			TEN N

		DIRECTORY NUMBER N

Fig. 2—Translator Layouts for Sleeve Lead Function

• **2201 Trunk Assignment Table:** This form is needed to assign a PD applique circuit to a line requiring a sleeve lead function.

13.04 For centrex lines (EF-1 generic program only), use the **2101 Centrex Directory Number Table** instead of the 2100 form. The 2107 form is always required when the 2101 form is used to assign this feature.

13.05 When the sleeve lead function is assigned to a member of a multiline hunt group, the 2105 form must be submitted in addition to those outlined in 13.03.

13.06 When changes are made via recent change, the appropriate ESS output forms should be marked to indicate the change.

14. GROWTH/RETROFIT PROCEDURES

14.01 Adding a sleeve lead in an existing office is accomplished in the same manner as for a new installation. Refer to HARDWARE ENGINEERING and OFFICE DATA for requirements for incorporation of this feature.

15. TESTING

15.01 To test the sleeve lead function, test calls should be made involving the line it is applied to and the relay checked for operation and release.

ADMINISTRATION

16. MEASUREMENTS

16.01 No measurements are required on the sleeve lead feature.

17. RECORD KEEPING

17.01 All output forms resulting from the ODA run should be maintained as part of the office records. If changes were made by recent change, the appropriate forms should be marked to indicate the change.

18. CHARGING

18.01 Any charging for the sleeve lead function will be done in connection with the associated feature.

AVAILABILITY

19. NEW INSTALLATIONS

19.01 The sleeve lead function is available for all new No. 2 ESS installations.

20. GROWTH/RETROFIT

20.01 This feature may be retrofitted into any existing No. 2 ESS via recent change or an ODA run.

SUPPLEMENTARY INFORMATION

21. GLOSSARY

21.01 The following is an explanation of terms used in this section that may be unfamiliar to the reader.

- *Auxiliary Line Circuit*—A circuit that prevents excessive longitudinal noise on a line from appearing as a service request.

- *Call Store Status Block*—A block of call store that stores the present state of various equipment (e.g., busy/idle status of trunks in a group or operated/released states of relays).

- *Central Pulse Distributor (CPD)*—A No. 2 ESS equipment unit that readies (enables) peripheral units to receive data from the control unit and provides facilities for transmitting information to peripheral decoders for controlling relays.

- *CPD Enable*—A pulse from the CPD that readies peripheral units to receive information from the control unit.

- *Dial Long Lines (DLL) Circuits*—Circuits that extend the range of lines that are beyond the normal range of the central office.

- *INWATS Timer*—A timer that records the incoming calls to a line that subscribes to inward wide area telephone service.

- *Multiline Hunt Group (MLHG)*—A customer feature that allows calls to hunt over a specified group of lines in an attempt to connect the calling party to an idle line within the group.

- *Office Data Administration (ODA) Run*—Mechanism by which No. 2 ESS office data may be changed. Information from the ESS input forms are inputted into the WECo Regional Data Center computer, assembled, then sent to the No. 2 ESS and installed into the system.

- *Private Branch Exchange (PBX)*—A business customer service that allows intragroup

calling on an extension dialed basis. Access to PBX lines from the regular telephone network is through a limited number of listed directory numbers.

• **Peripheral Decoder (PD)**—An equipment unit that decodes orders from the control unit into operate and release information for relays.

• **Peripheral Order**—A command sent out by the control unit to operate a peripheral equipment unit.

• **Recent Change**—A teletypewriter input message that makes changes to the office translation data.

• **Remote Message Register**—A message register located on the customer's premises.

• **Remote Overflow Register**—A register assigned to a group of facilities to record the number of access attempts that were unsuccessful because all facilities were busy.

• **Remote PD Applique Circuit**—An applique circuit that allows the PD to control up to six circuits external to the ESS.

22. REASONS FOR REISSUE

22.01 This is the initial issue of this section.

23. REFERENCES

23.01 The following documents may be consulted for additional information related to the sleeve lead feature:

• Translation Guide, TG-2H

• PD, PR, PF-2H213—Translation Program

• PA-2H200—Office Data Tables Layout Specification

• IM-2H200—Input Message Manual

• OM-2H200—Output Message Manual

• SD and CD-2H130—Remote Trunk Peripheral Decoder Applique Circuit

• SD and CD-2H143—Auxiliary Line Circuit.