PRIVATE LINE SERVICE TERMINATIONS
STATION ENGINEERING INFORMATION
ALTERNATE ARRANGEMENTS

CONTENTS PAGE

1. GENERAL 1

2. PRIVATE LINE SERVICE TERMINATIONS SERIES 1

3. ALTERNATE SERVICE APPLICATION . . 2

Full Alternate Service 2

Full Data Alternate (PBX and Private Line) 2

Alternate Termination—Full Period and FX or WATS Service 3

4. ALTERNATE SERVICE CONSIDERATION . 6

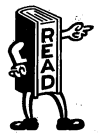
Make Busy Arrangements 6

Signaling Compatibility 7

5. CIRCUIT ARRANGEMENTS 7

1. GENERAL

1.01 This section describes alternate arrangements for private line services. It covers PBX, station, and data applications.



Comments concerning contents, usability, and adequacy of this practice will be welcome. Mail comments directly to the Bell System Practices Organization.

Mail to:
Bell System
Data Design Engineering Manager
2400 Reynolda Road
Winston-Salem, N. C. 27106

1.02 This section is reissued to provide current reference information.

1.03 This section will serve as an aid to those who are engaged in the provision of these services by providing:

- General explanation of alternate arrangements
- Block diagrams showing overall circuit application for alternate arrangements
- Illustrations of alternate arrangements and associated equipment for both 2-wire and 4-wire service.

1.04 General notes for all figures appear on a foldout on the last page of this section.

1.05 General rules for setting screw-type switches on terminating sets are provided in Section 851-300-101.

1.06 For general information for the entire Private Line Service Terminations series, refer to Section 812-002-200.

1.07 Section 812-002-201, Uniform Service Order Code (USOC) Index of Definitions and Applications, complements this section with additional information and references. It provides coordination for the entire Private Line Service Terminations series, and will be maintained to reflect changes in the related sections.

2. PRIVATE LINE SERVICE TERMINATIONS SERIES

2.01 The following sections constitute the Private Line Service Terminations series. All of these are related sections.

SECTION	TITLE
812-002-200	General Information

© American Telephone and Telegraph Company, 1973
Printed in U.S.A.

SECTION	TITLE
812-002-201	Uniform Service Order Code (USOC) Index of Definitions and Applications
812-002-210	PBX Terminations (Tie Trunk and SS-3)
812-002-211	PBX Terminations (Foreign Exchange and Wide Area Telephone Service)
812-002-215	Telephoto Station Arrangements
812-002-221	Station Equipment (Voice)
812-002-230	Station Equipment (Data Voiceband)
812-002-231	Station Equipment (Data Wideband)
812-002-250	Alternate Arrangements
812-002-270	Engineering Sketches and Signaling Devices
812-002-290	V4 Repeater Mountings and Components

3. ALTERNATE SERVICE APPLICATION

Full Alternate Service

3.01 Universal System Service Orders (USSOs) with a circuit identification number prefixed with FA (FAXXXXX) indicates that alternate terminations are to be provided. One arrangement would terminate as a PBX tie trunk, and the other as a PBX Foreign Exchange (FX) trunk.

3.02 USOC 36B or 36H will be included in any full alternate circuit. USOC 36B provides manual operation of the associated transfer circuitry. Automatic operation of the associated transfer circuitry is provided by USOC 36H.

3.03 Since there are no standard arrangements that apply to automatic operation (USOC 36H), only manual arrangements (USOC 36B) are included in this section.

3.04 Refer to Table A for an index of figures in this section. These figures show typical arrangements for the type of service desired. Notes are included which will direct the user to the appropriate sections that will aid in providing the service.

3.05 Fig.1 shows a typical Full Alternate circuit which provides for tie trunk operation between PBXs in the normal condition and Foreign Exchange (FX) trunk operation in the transferred condition.

3.06 The arrangement in Fig. 1 uses the same interexchange facilities (IXC) for both operating conditions. Separate signal conversion equipment and 4-wire local channels are provided due to different modes of operation. (20 Hz Ringdown in both directions for tie trunk operation. Dial pulsing outgoing and 20 Hz incoming for FX trunk operation.) When regular circuit is in use, the alternate circuit should appear busy.

3.07 The associated transfer circuits are located in central offices A and B. These are manually controlled at each PBX over a DC control channel (cable pair). Both ends of the circuit must be in the same condition for the circuit to function (both normal or both transferred).

Full Data Alternate (PBX and Private Line)

3.08 Universal System Service Orders (USSOs) with a circuit identification number prefixed with FDA (FDAXXXXX) indicates that full data alternate terminations are to be provided (Fig. 2 and 3).

3.09 The following is a typical example of the information found on a USSO for full data alternate service:

WP5SP—Indicates PBX termination—Ringdown completion with two-way service

WX4SD—Indicates data set termination arranged for data transmission only (no voice or signaling associated with data set)

1YXKA—Indicates a transfer arrangement (transfers from one termination to another on the same premises).

3.10 The information provided by the USSO along with information shown on Table A will direct the user to the appropriate section. This

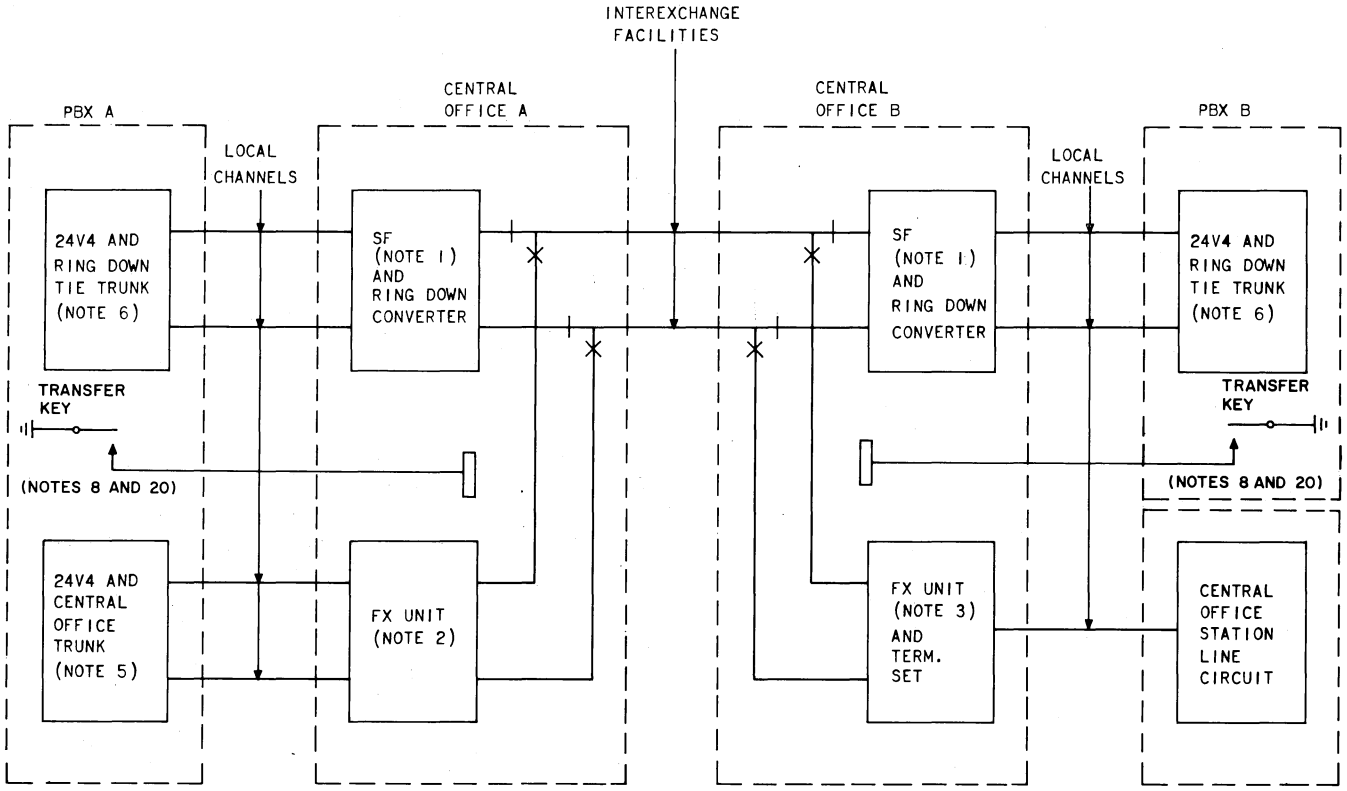


Fig. 1—Typical Full Alternate Circuit (FA) (Arranged for PBX Tie Trunk Operation and PBX Foreign Exchange Trunk Operation)

will provide references to typical terminations required by the USOC description.

3.11 Fig. 2 shows a typical Full Data Alternate PBX circuit. This circuit provides tie trunk operation in the normal condition and data operation in the transferred condition.

3.12 Fig. 3 shows a typical Full Data Alternate Private Line circuit. This circuit provides for voice private line operation in the normal condition and data operation in the transferred condition.

3.13 The arrangements shown in Fig. 2 and 3 use the same interexchange facilities (IXC), signal conversion equipment, and local 4-wire channel for both conditions. The normal and transferred conditions must have compatible signaling when signaling is required with the transferred condition (Fig. 2 and 3 show 20 Hz signaling).

3.14 The associated transfer circuits, for Fig. 2 are located in PBXs A and B, and are manually controlled at each PBX. The associated transfer circuits for Fig. 3 are located in Stations A and B. Both ends of the circuit must be in the same condition for the circuit to function (both normal or both transferred).

Alternate Termination—Full Period and FX or WATS Service

3.15 Circuit identification numbers for Full Period and FX or WATS Services (FPXXXXX) do not provide any indication that an alternate termination will be required. USOCs provide this information for each termination and the associated transfer circuit (see 3.10).

3.16 USOCs are not provided for WATS terminations. The USSO will spell out the requirements for this termination (see 3.10).

TABLE A

FIGURE INDEX

SERVICE	REGULAR TERMINATION			ALTERNATE TERMINATION			ASSOCIATED FIGURE IN THIS SECTION
	APPLICATION		RELATED SECTION	APPLICATION		RELATED SECTION	
Full Alternate (FA)	PBX Foreign Exchange Trunk	2-Wire	812-002-211	PBX Tie Trunk	2-Wire	812-002-210	6
		4-Wire			4-Wire		7
Full Data Alternate (PBX) (FDA or FPA)	PBX Ringdown Tie Trunk		812-002-210	2-Wire Data Set — Data Only		812-002-230	8
				4-Wire Data Set — Data Only			9
				2-Wire Data Set — E/W Voice Coordination and 20 Hz Signaling			10
				4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling			11
				4-Wire Data Set Arranged for Direct Distance Dialing Back Up			12
				4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling Arranged for Direct Distance Dialing Back Up			13
Full Data Alternate (Private Line) (FDA or FPA)	1A1 or 1A2 Key Systems Ringdown Tie Lines		812-002-221	2-Wire Data Set — Data Only			14
				4-Wire Data Set — Data Only			15
				2-Wire Data Set E/W Voice Coordination and 20 Hz Signaling			16
				4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling			17
				4-Wire Data Set Arranged for Direct Distance Dialing Back Up			18

TABLE A (Cont)

FIGURE INDEX

SERVICE	REGULAR TERMINATION		ALTERNATE TERMINATION		ASSOCIATED FIGURE IN THIS SECTION
	APPLICATION	RELATED SECTION	APPLICATION	RELATED SECTION	
Full Data Alternate (Private Line)	1A1 or 1A2 Key Systems Ringdown Tie Lines	812-002-221	4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling Arranged for Direct Distance Dialing Back Up	812-002-230	19
Alternate Termination Full Period Private Line	PBX Foreign Exchange Trunk or PBX WATS Trunk	812-002-211	1A1 or 1A2 Key System Foreign Exchange Line or WATS Line	812-002-221	20
	PBX Ringdown Tie Trunk	812-002-210	1A1 or 1A2 Key System Ringdown Tie Line		21

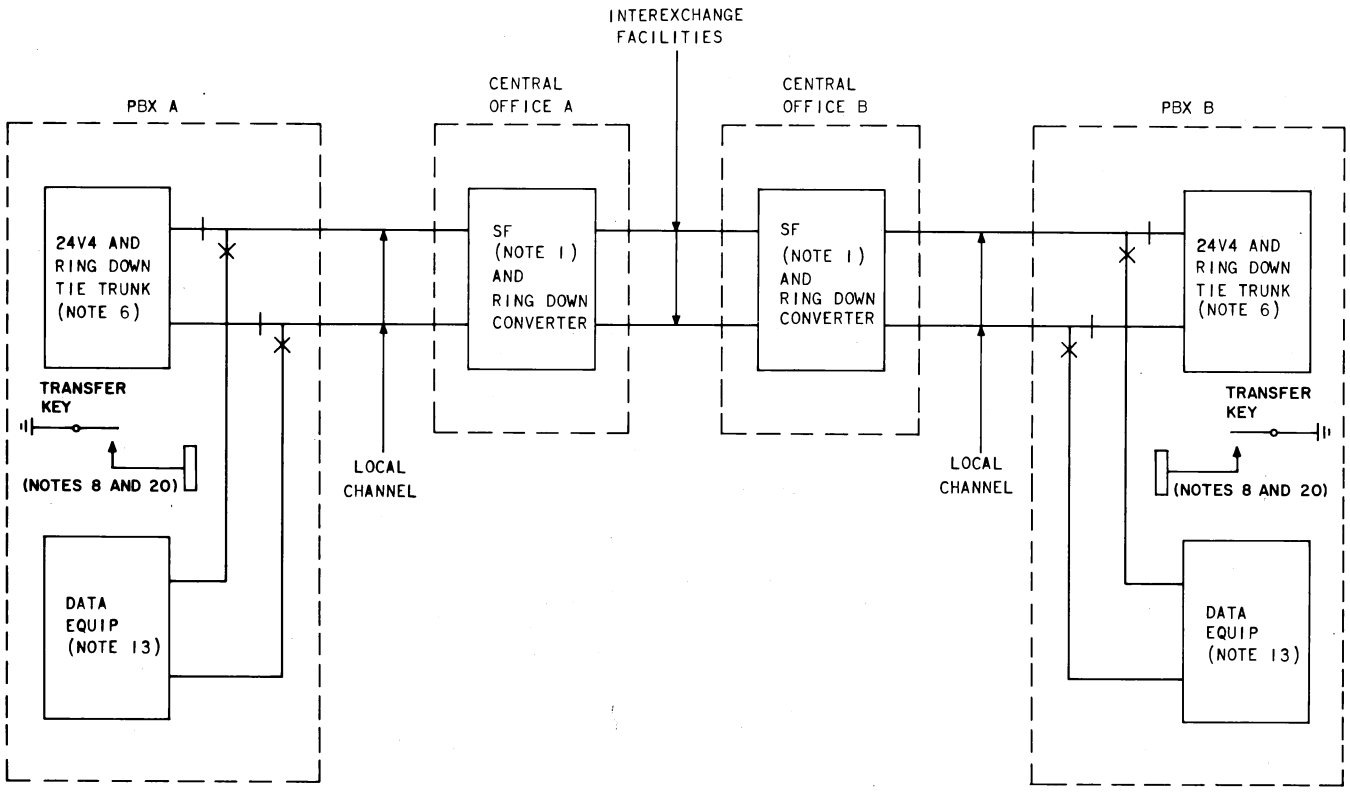


Fig. 2—Typical Full Data Alternate Circuit (FDA) (Arranged for PBX Tie Trunk Operation and Data Operation)

3.17 Fig. 4 shows a typical Full Period circuit with an alternate termination. This circuit provides for tie trunk operation in the normal condition, tie line operation in the transferred condition, or a combination of these.

3.18 The arrangement shown in Fig. 4 uses the same interexchange facilities, signal conversion equipment, local 4-wire channel, and 24V4 repeater for each condition. The PBX tie trunk and tie line circuit must have compatible signaling.

3.19 The associated transfer circuits are located in PBXs A and B, and are manually controlled at each PBX. A transfer circuit and a tie line circuit may be provided at one or both ends of the facility. In either case, the circuit will function regardless of the condition of the transfer circuits at each end.

3.20 Fig. 5 shows a typical Foreign Exchange circuit with an alternate termination. This circuit provides for FX or WATS ***trunk*** operation in the normal condition and FX or WATS ***line*** operation in the transferred condition.

3.21 Each termination is arranged for dial pulsing or TOUCH-TONE® outgoing signaling, and 20 Hz incoming signaling. (OUT WATS would not require 20 Hz incoming signaling. IN WATS would not require dial pulsing or TOUCH-TONE outgoing signaling.)

3.22 The transfer circuit is located at the PBX and is manually controlled.

4. ALTERNATE SERVICE CONSIDERATION

Make Busy Arrangements

4.01 If PBX tie trunks, CO trunks, or key systems are associated with an alternate arrangement, consideration must be given to providing a make busy arrangement.

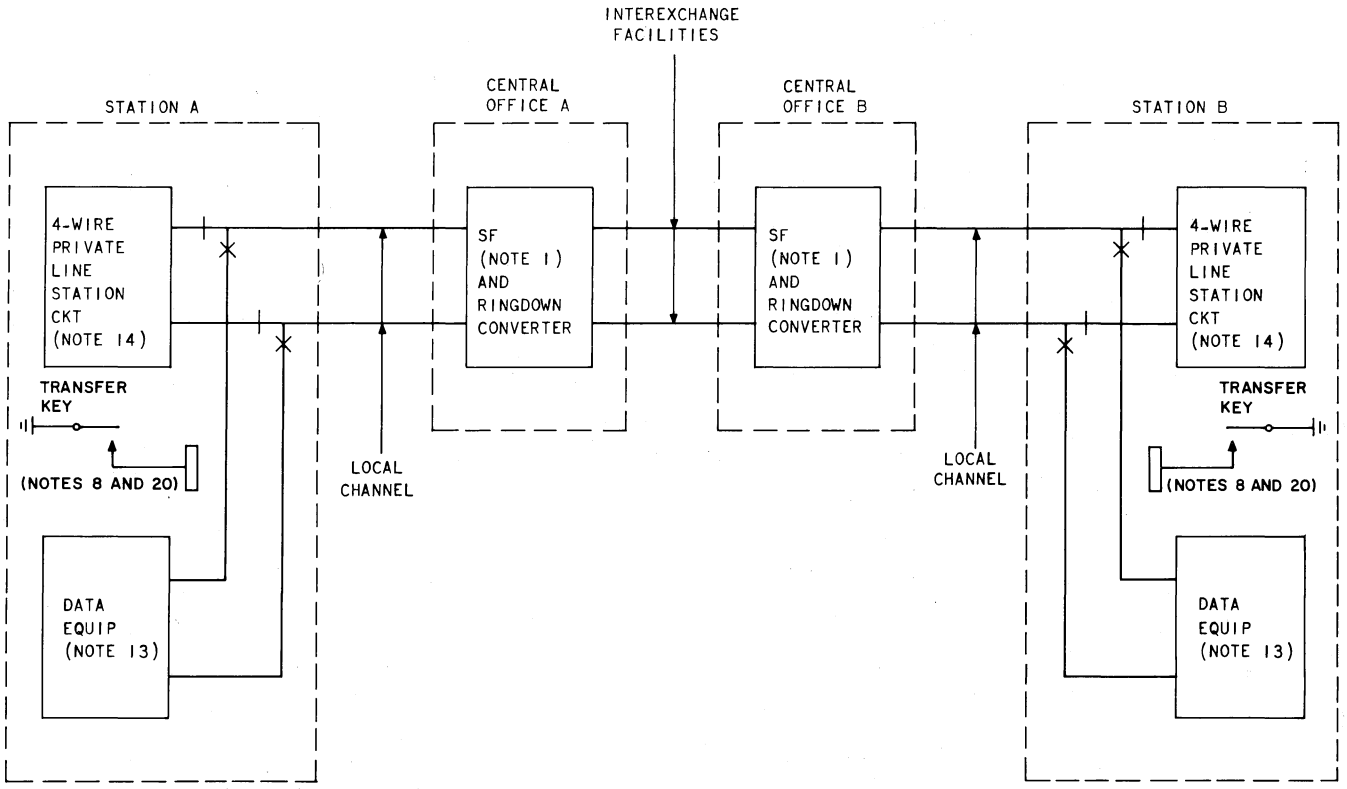


Fig. 3—Typical Full Data Alternate Circuit (FDA) (Arranged for Voice Private Line Operation and Data Operation)

4.02 For example, in Fig. 6 if the circuit is in the FP mode (Regular Termination) the PBX trunk circuit associated with the FX mode (Alternate Termination) must be made busy. The opposite applies if the circuit is in the FX mode.

4.03 Refer to Section 812-002-270 in this series for make busy arrangements.

Signaling Compatibility

4.04 If signaling is required for both regular and alternate terminations, compatibility must be maintained.

4.05 For example, in Fig. 10 both the regular termination (PBX tie trunk) and alternate termination (data equipment) are arranged for 20 Hz signaling. With this there is compatible signaling. In this arrangement if one termination was arranged for 20 Hz signaling, and the other for E and M lead signaling, the circuit would not function.

5. CIRCUIT ARRANGEMENTS

5.01 Figures 6 through 21 provide typical examples of circuit configurations for effecting alternate private line arrangements.

5.02 Table A provides an index for these Figures.

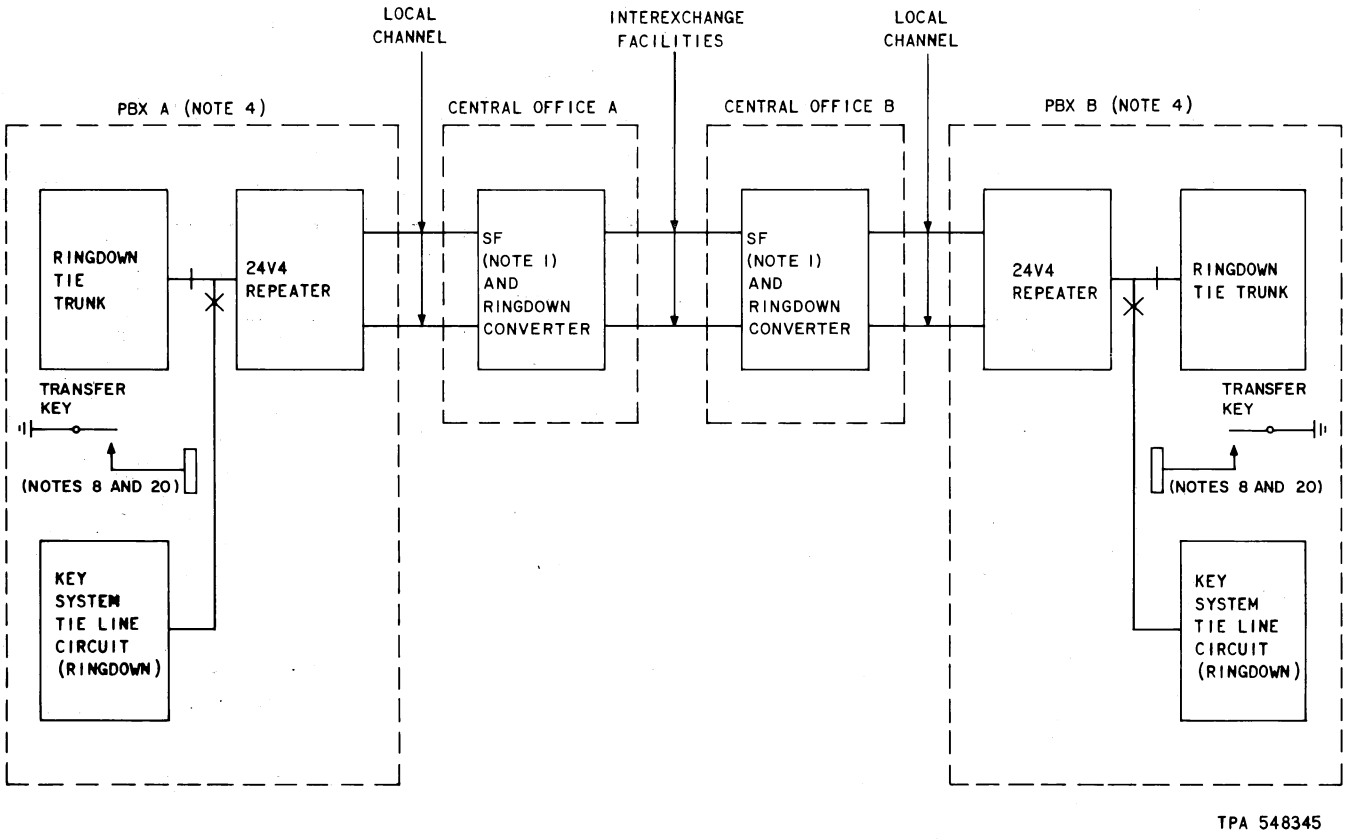


Fig. 4—Typical Full Period Circuit (FP) (Arranged for Tie Trunk Operation and Tie Line Operation)

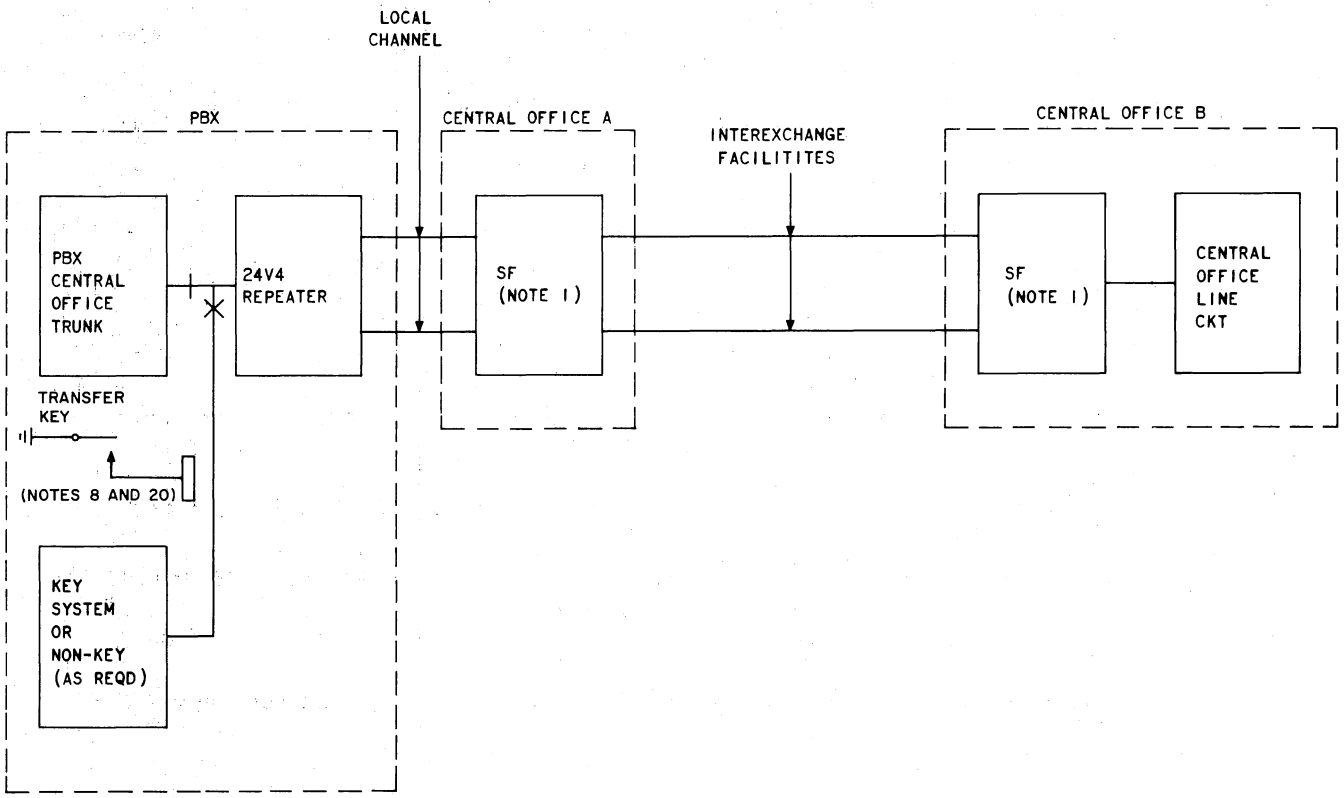


Fig. 5—Typical Foreign Exchange or WATS Service (Arranged for Foreign Exchange Trunk or WATS Trunk Operation—Normal and Transferred Condition)

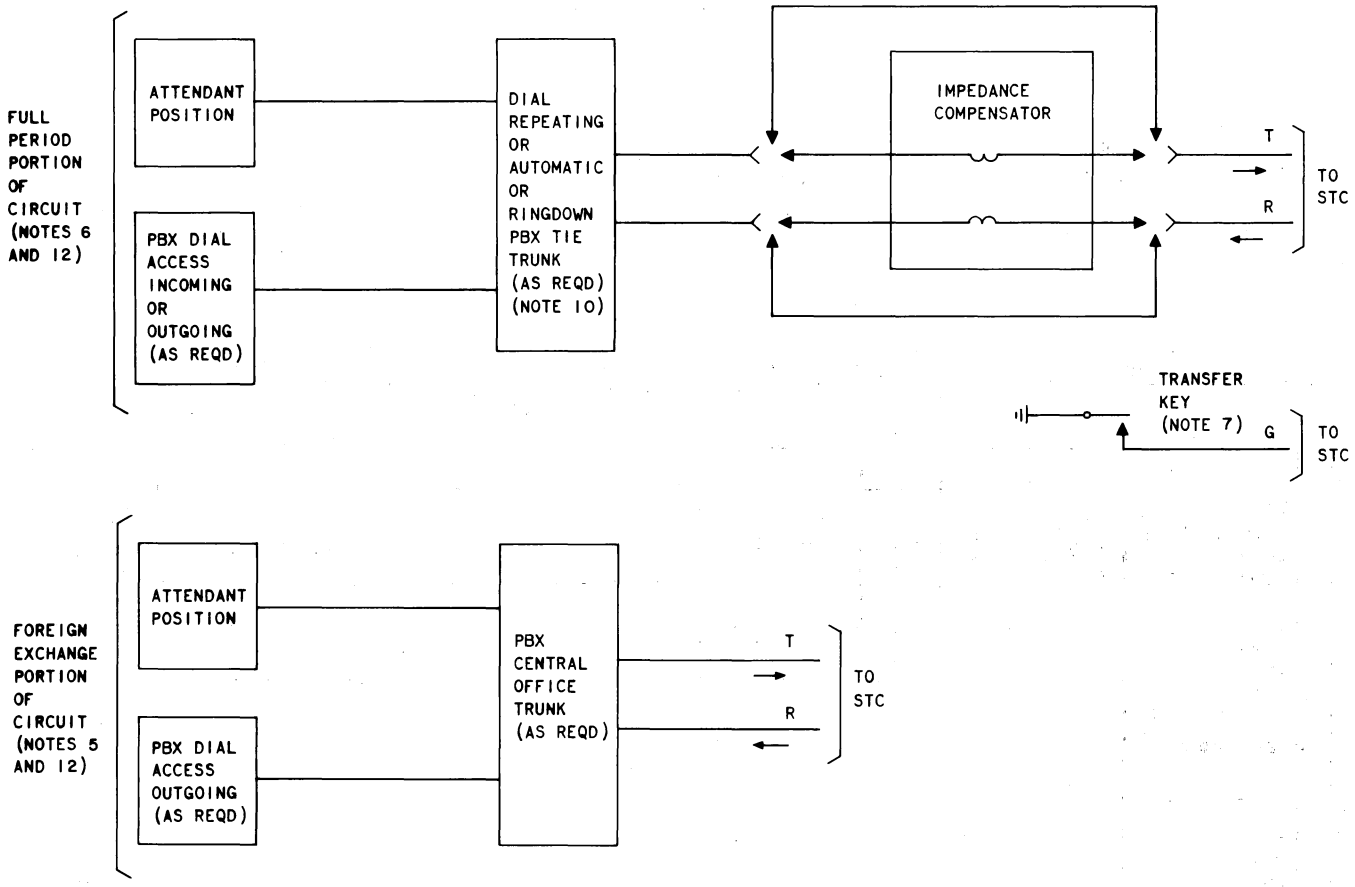


Fig. 6—Full Alternate Circuit (FA) (Manual Transfer Using 2-Wire Local Channels—Transfer Effected in the Central Office)

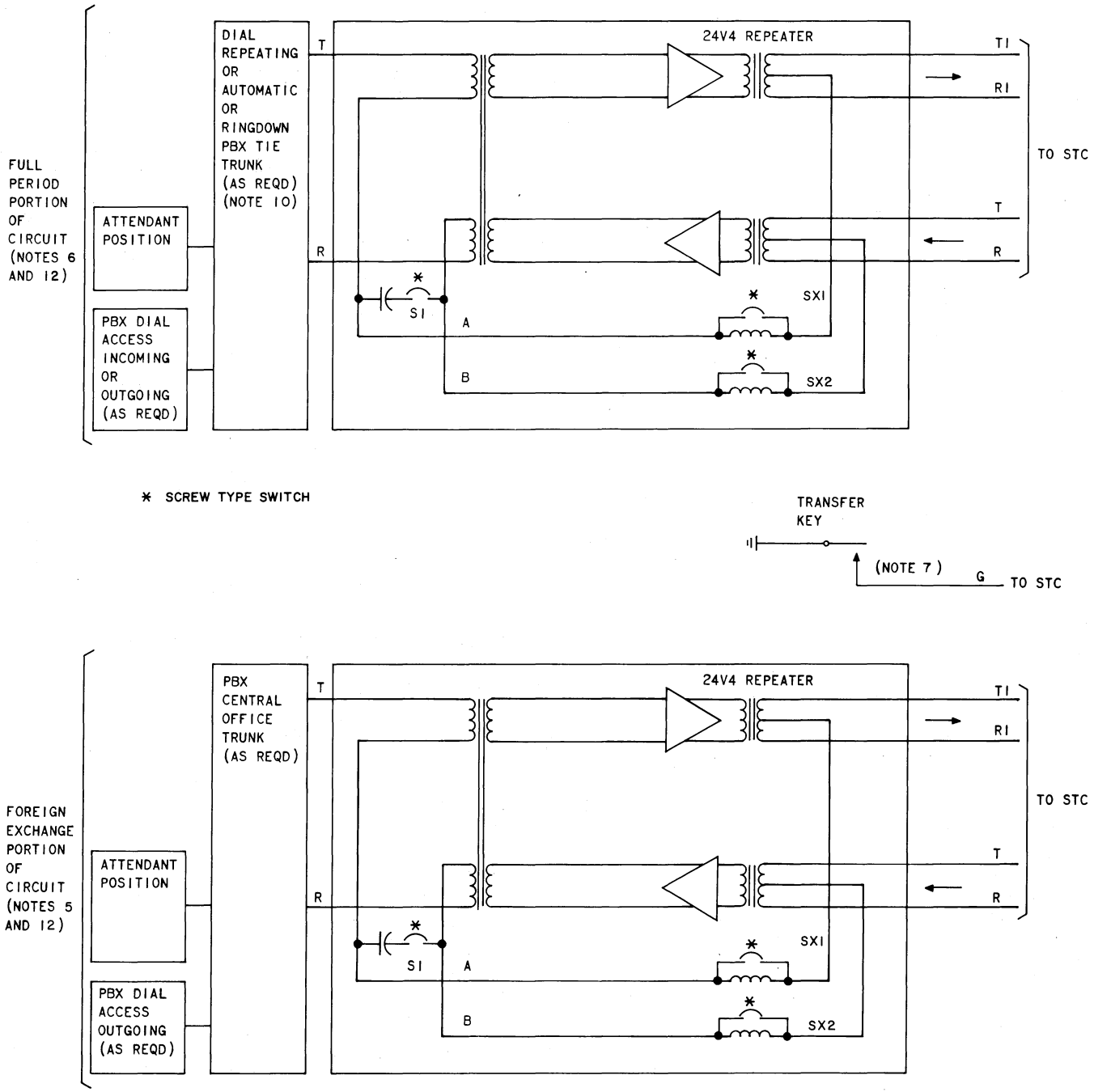


Fig. 7—Full Alternate Circuit (FA) (Manual Transfer Using 4-Wire Local Channels—Transfer Effected in Central Office)

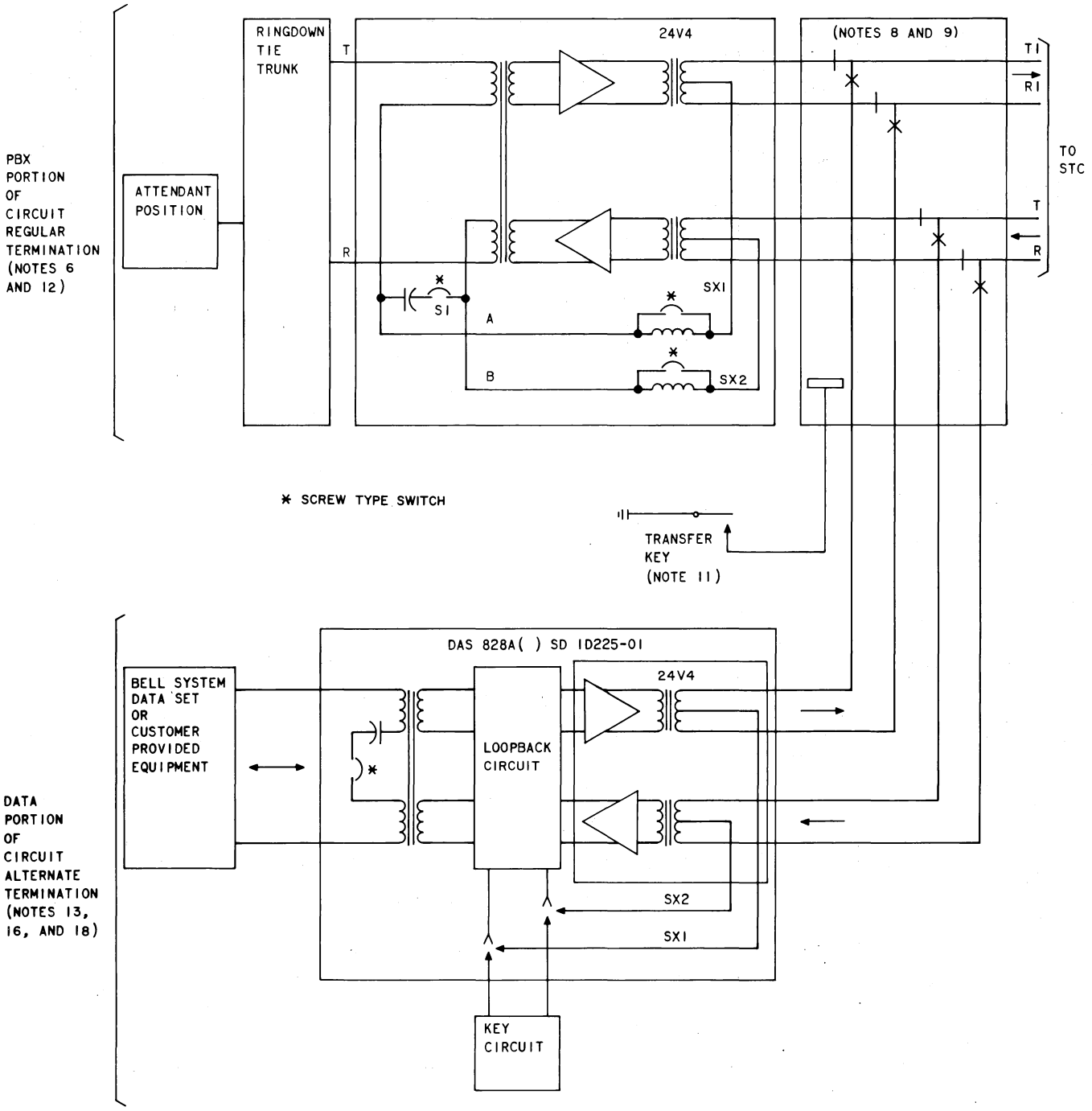


Fig. 8—Full Data Alternate (PBX) Arranged for 2-Wire Data Set—(Regular Termination, PBX—Alternate Termination, Data Equipment)

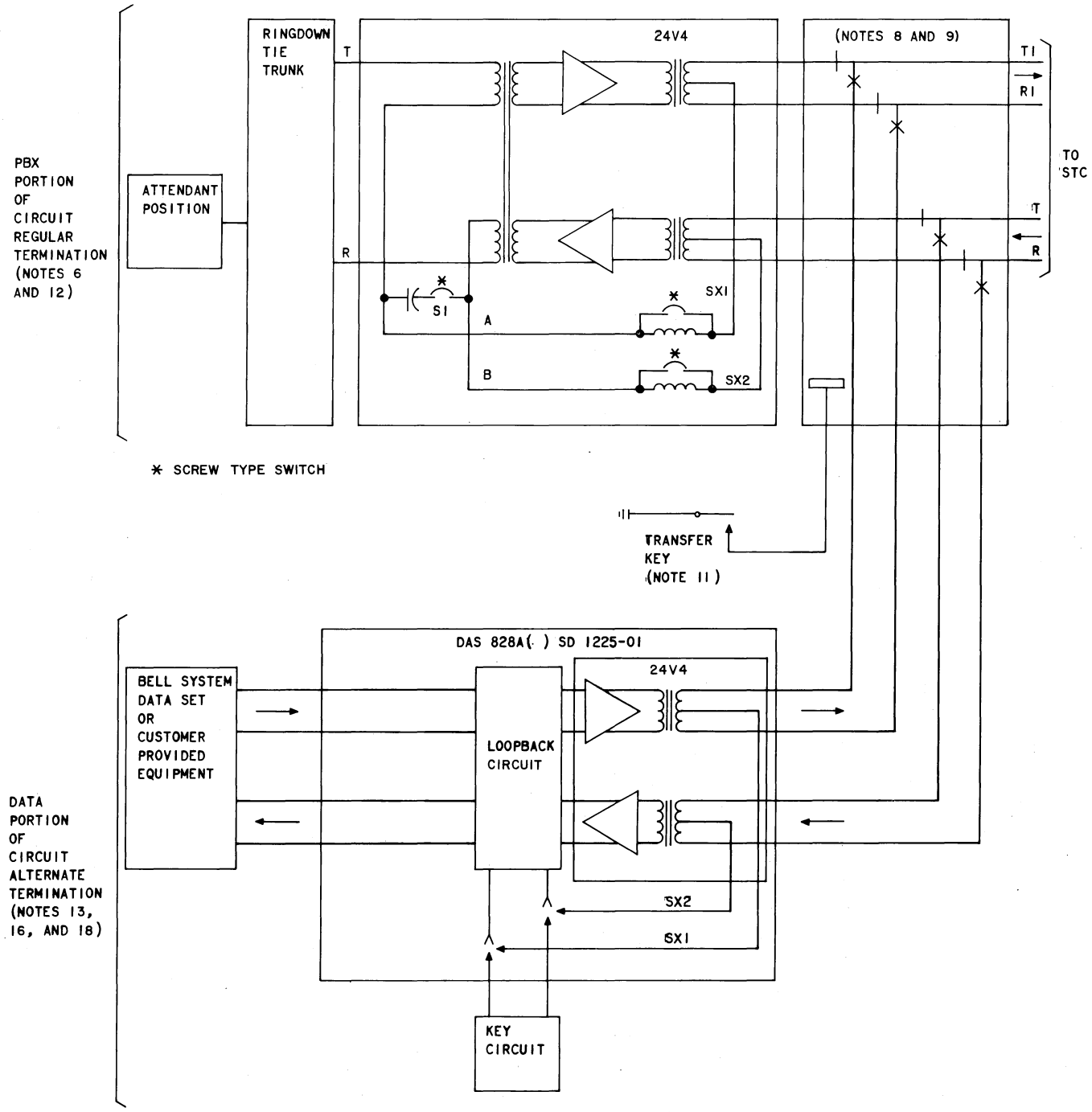


Fig. 9—Full Data Alternate (PBX) Arranged for 4-Wire Data Set—(Regular Termination, PBX—Alternate Termination, Data Equipment)

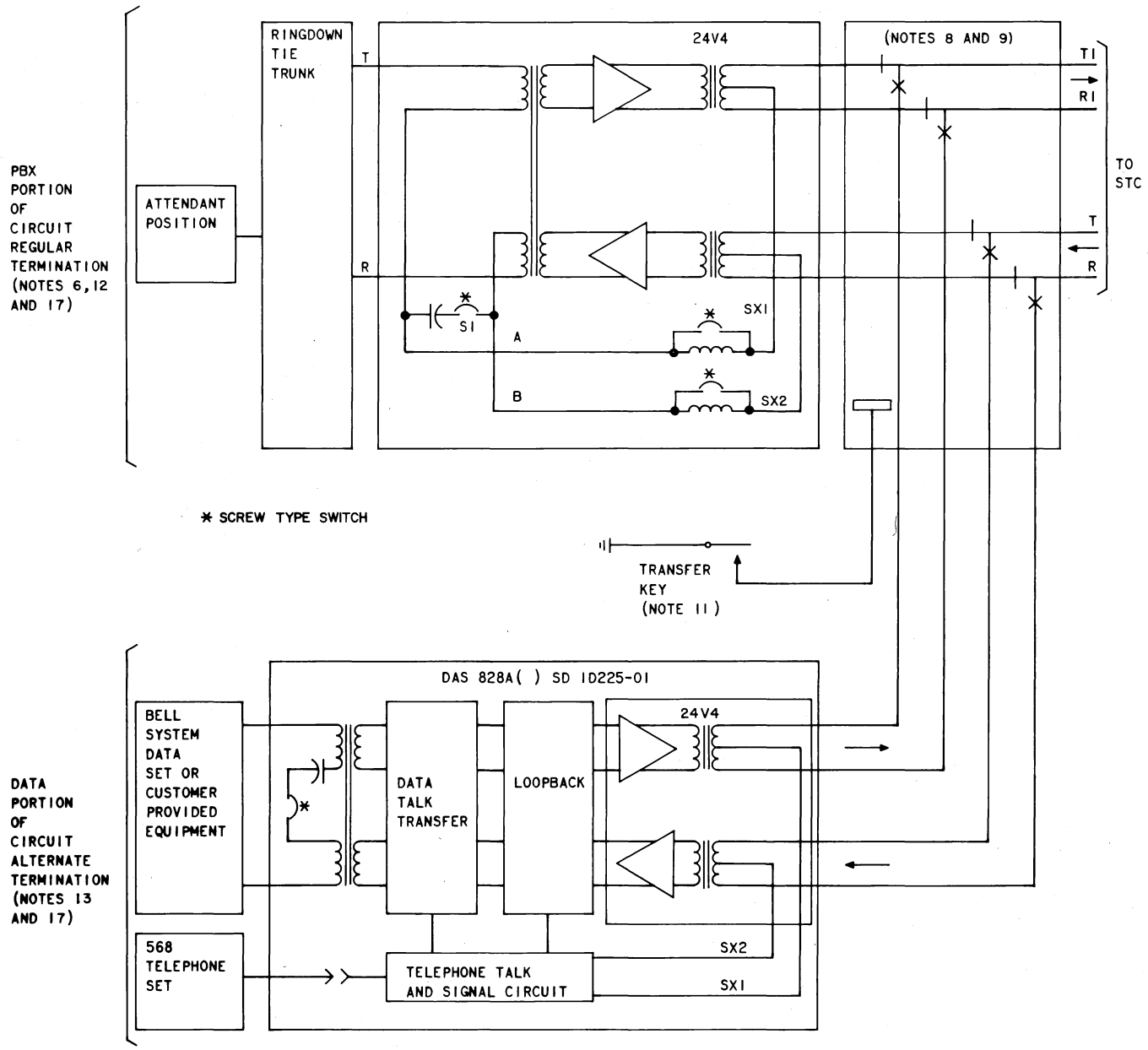


Fig. 10—Full Data Alternate (PBX) Arranged for 2-Wire Data Set E/W Voice Coordination and 20 Hz Signaling—(Regular Termination, PBX—Alternate Termination, Data Equipment)

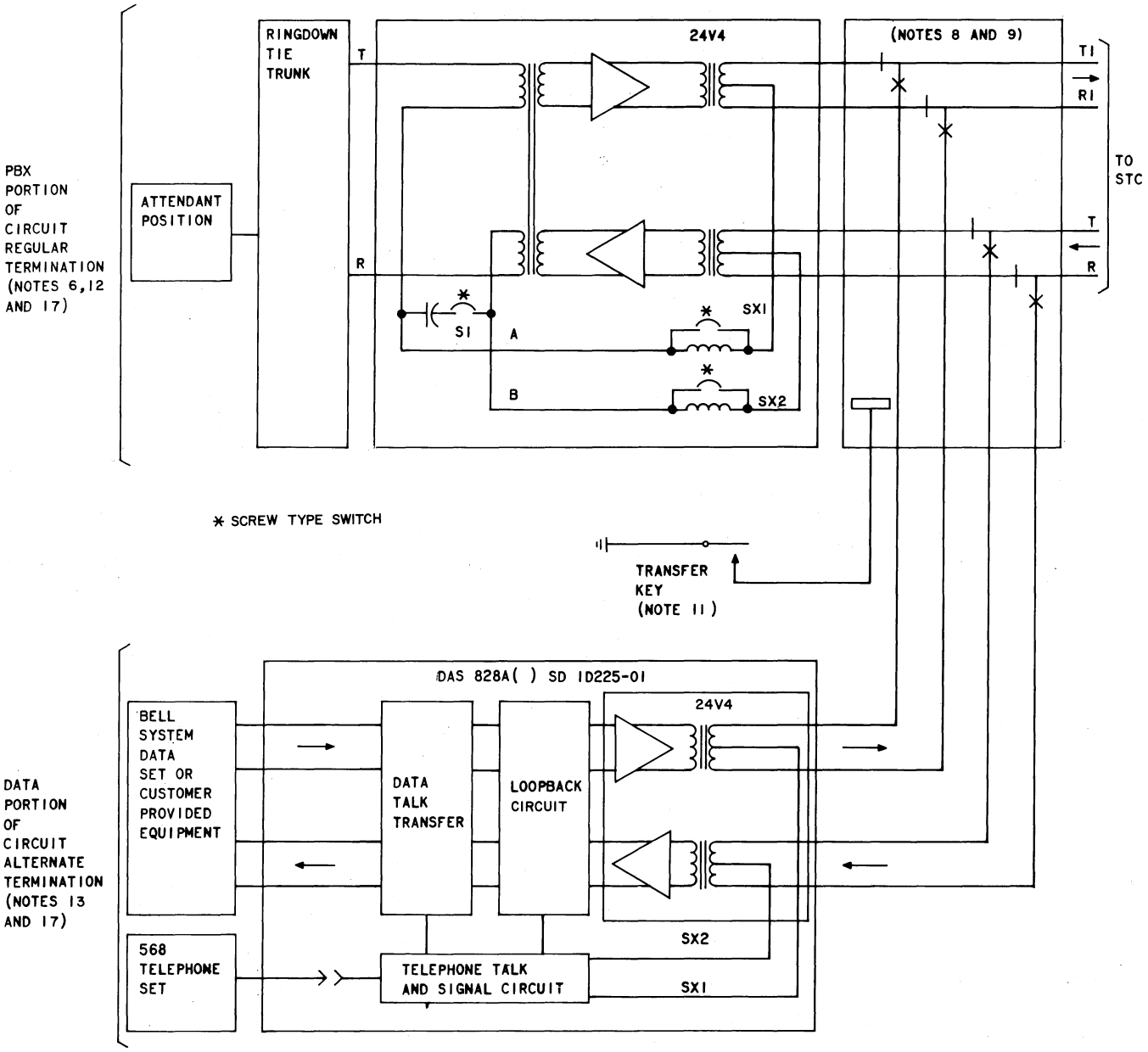


Fig. 11—Full Data Alternate (PBX) Arranged for 4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling (Regular Termination, PBX—Alternate Termination, Data Equipment)

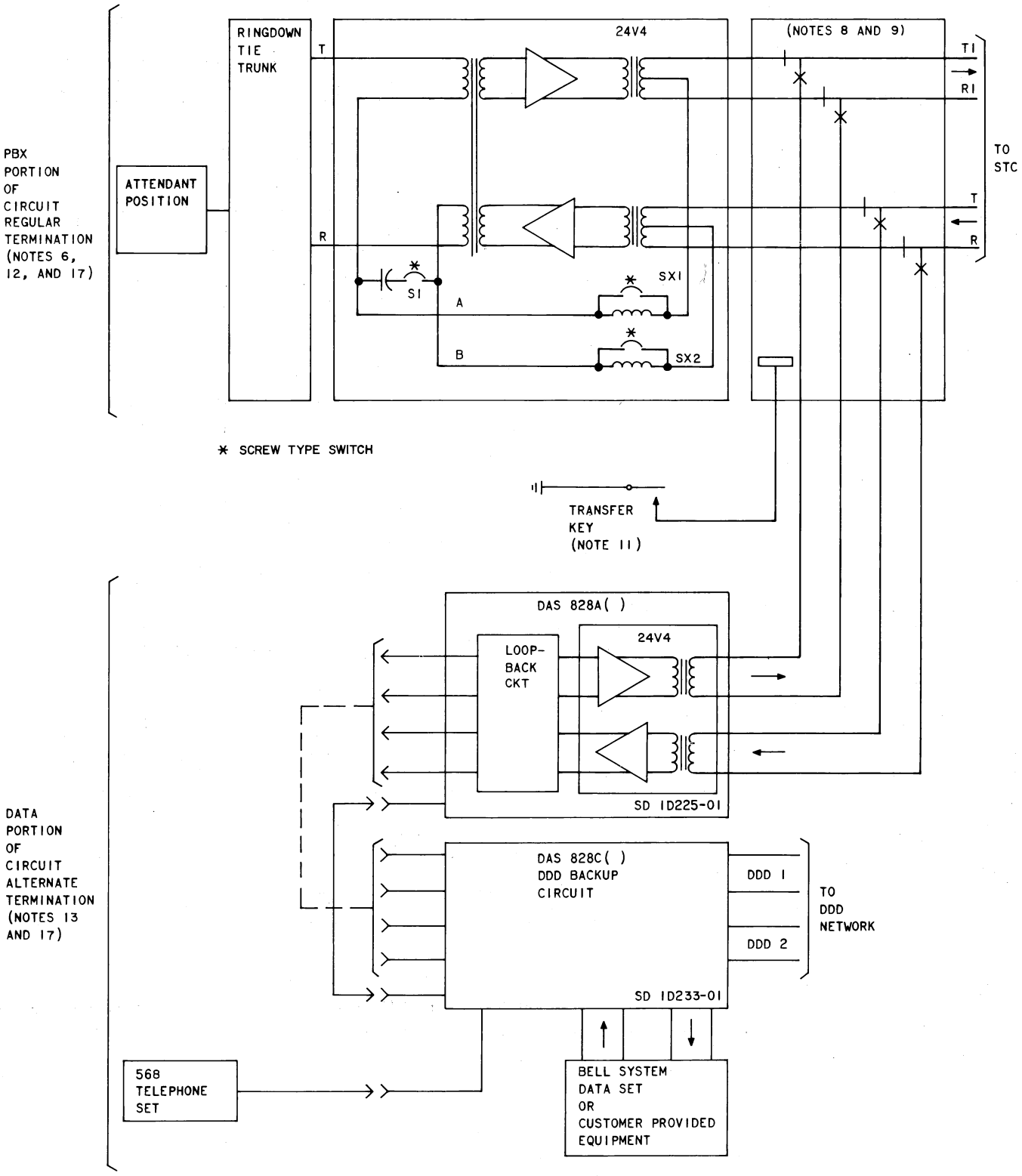


Fig. 12—Full Data Alternate (PBX) Arranged for 4-Wire Data Set and Direct Distance Dialing (DDD) Backup (Regular Termination,PBX—Alternate Termination, Data Equipment)

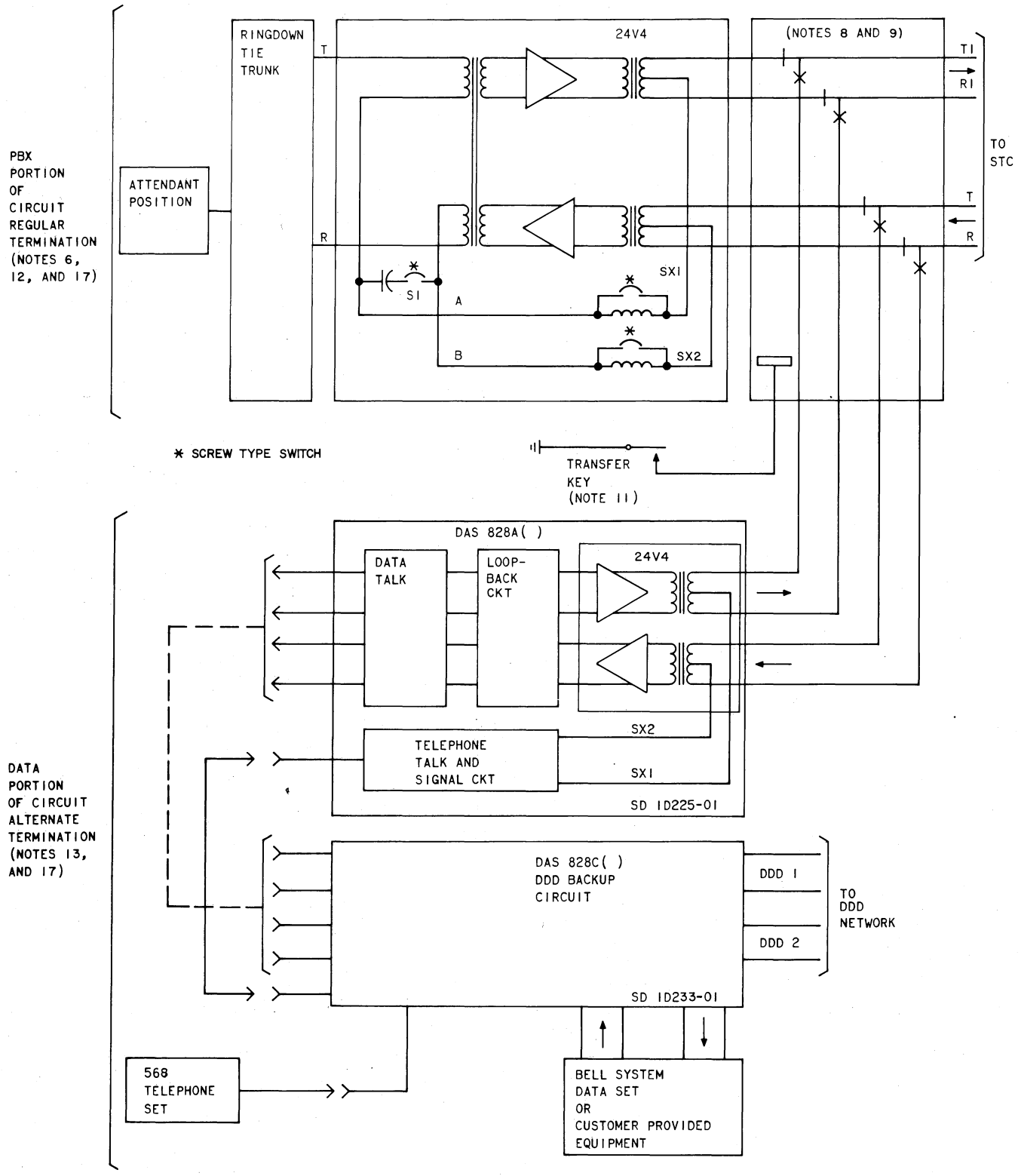


Fig. 13—Full Data Alternate (PBX) Arranged for 4-Wire Data Set E/W Voice Coordination—20 Hz Signaling and Direct Distance Dialing (DDD) Backup—(Regular Termination, PBX — Alternate Termination, Data Equipment)

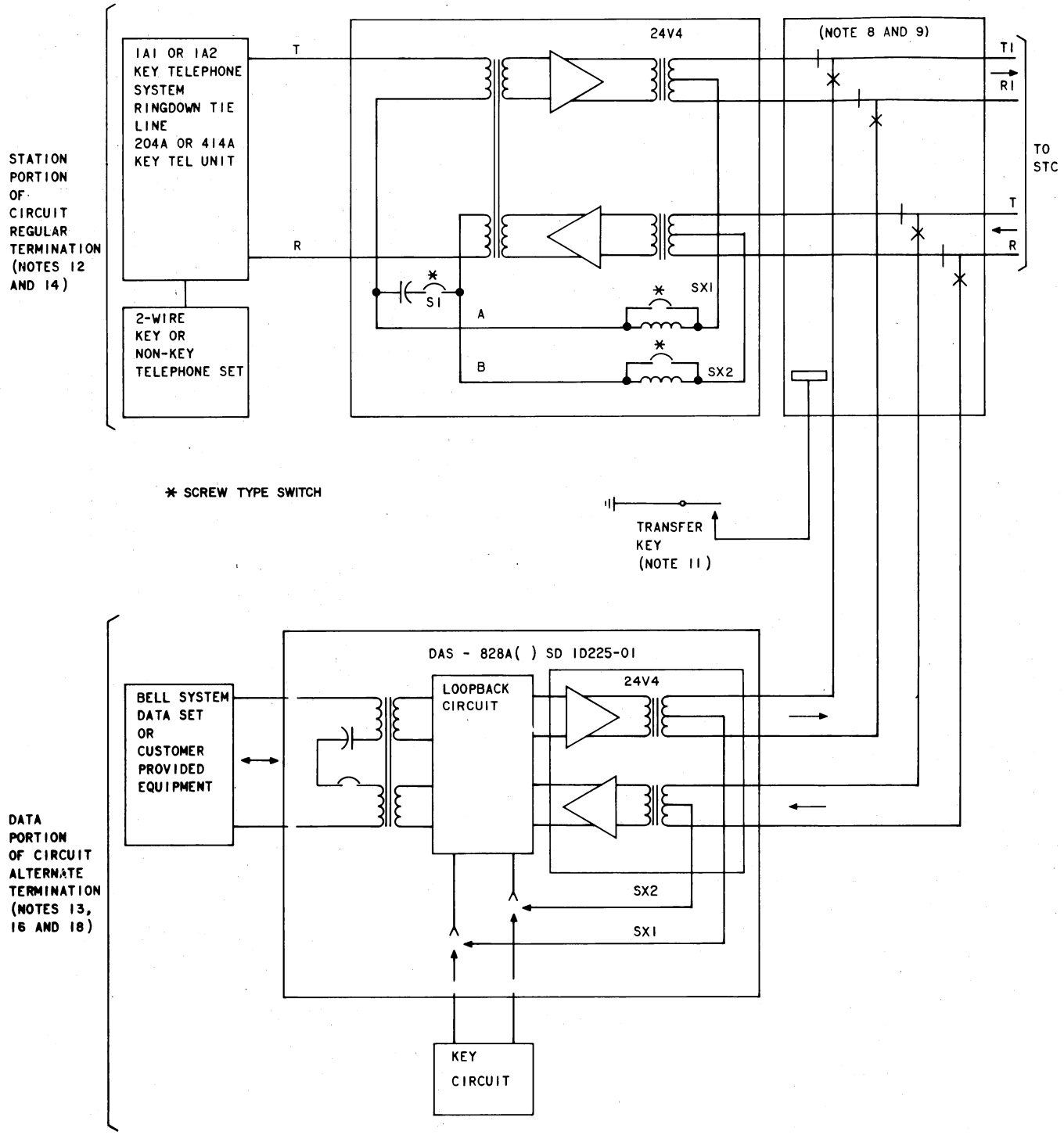


Fig. 14—Full Data Alternate (Private Line) Arranged for 2-Wire Data Set (Regular Termination, Key Equipment—Alternate Termination, Data Equipment)

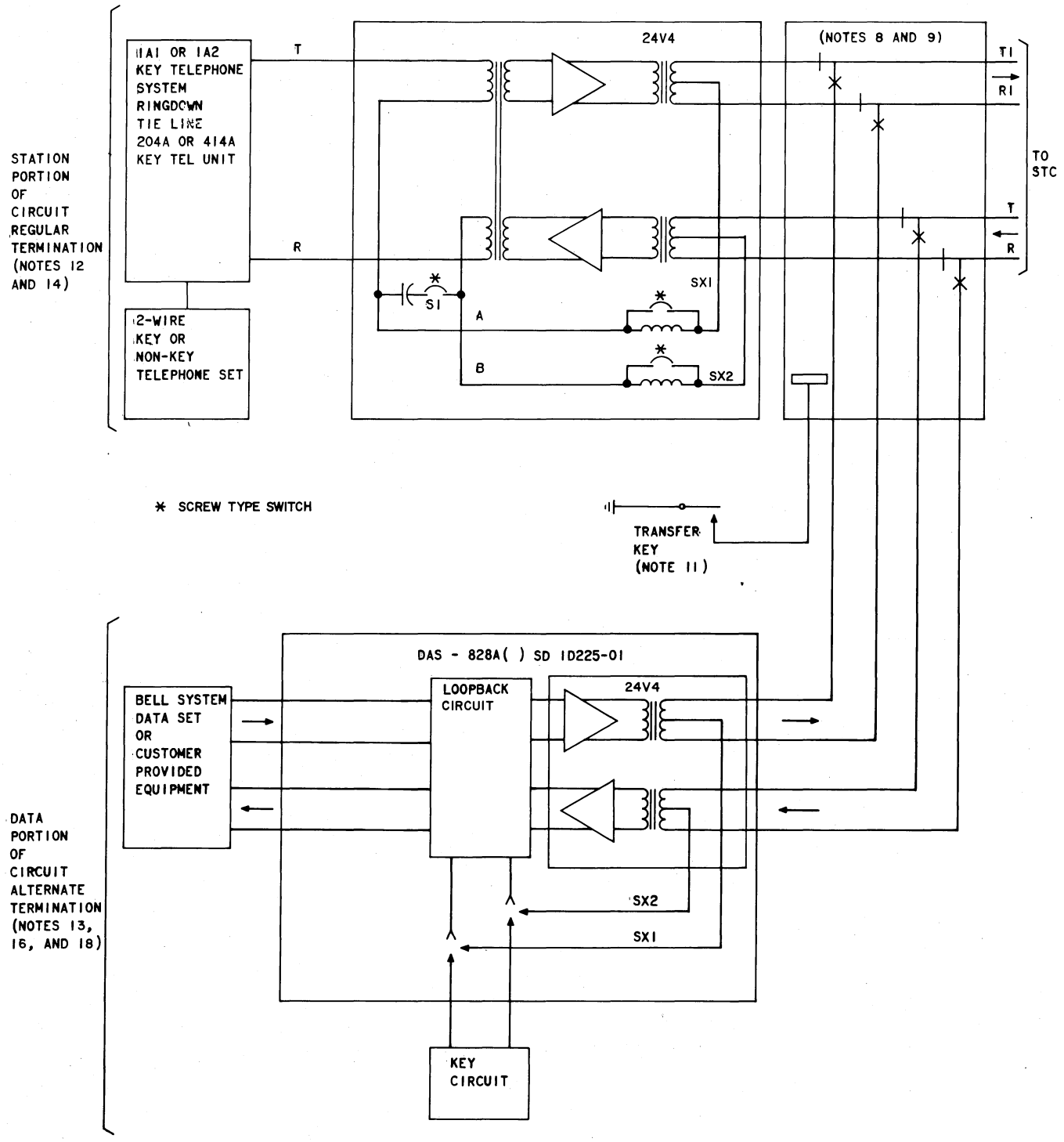


Fig. 15—Full Data Alternate (Private Line) Arranged for 4-Wire Data Set (Regular Termination, Key Equipment—Alternate Termination, Data Equipment)

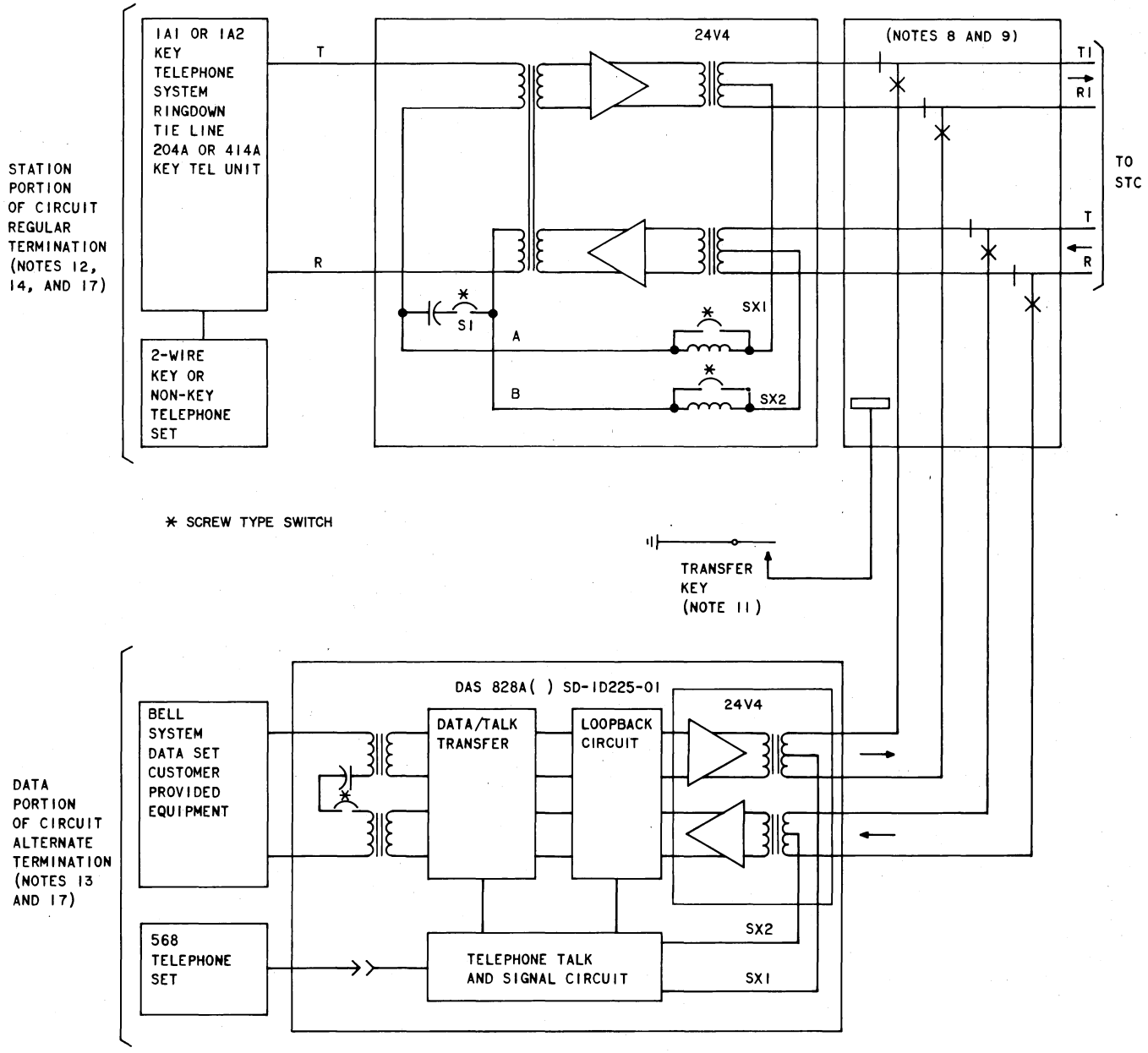


Fig. 16—Full Data Alternate (Private Line) Arranged for 2-Wire Data Set E/W Voice Coordination and 20Hz Signaling (Regular Termination, Key Equipment—Alternate Termination, Data Equipment)

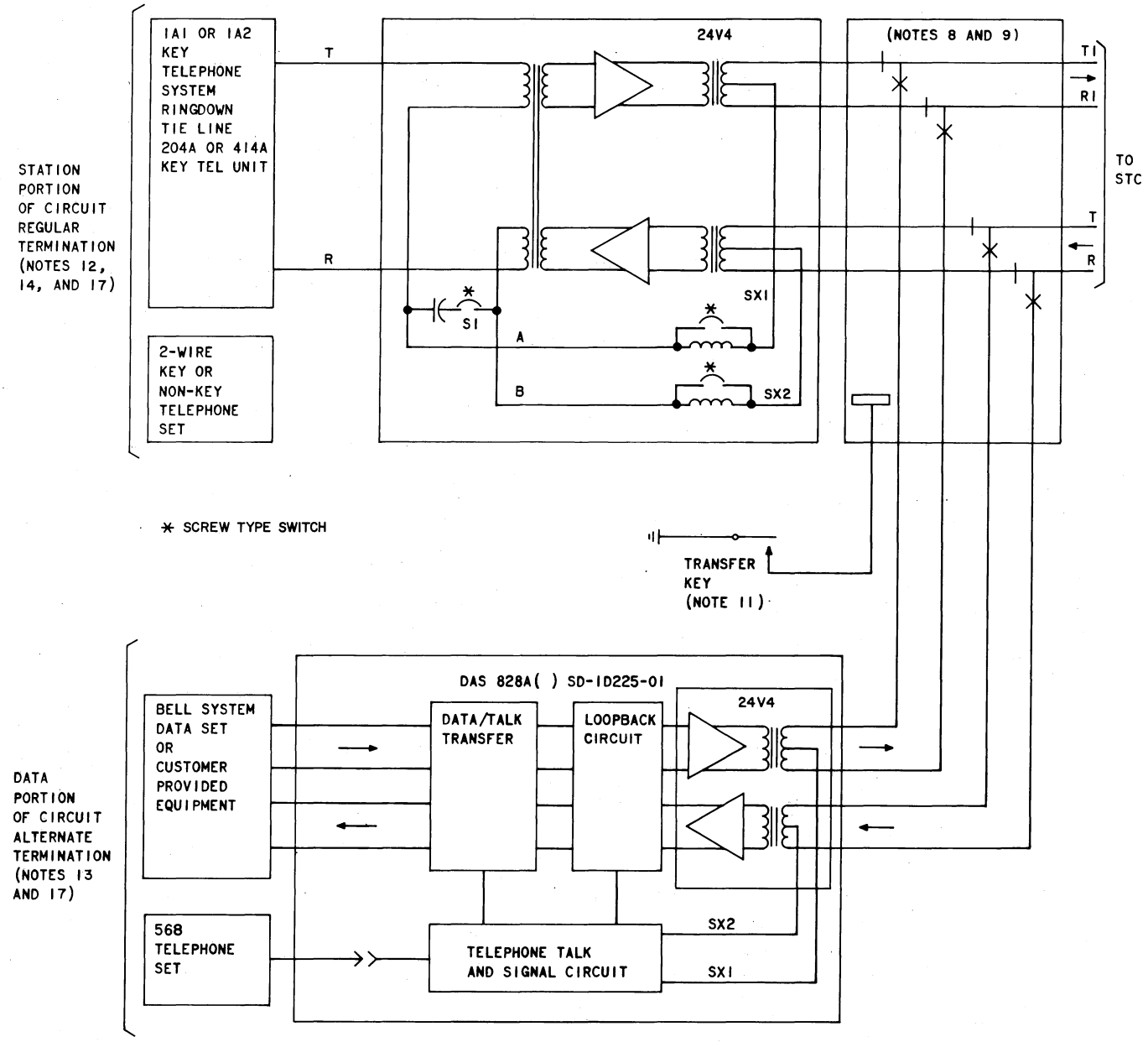


Fig. 17—Full Data Alternate (Private Line) Arranged for 4-Wire Data Set E/W Voice Coordination and 20 Hz Signaling (Regular Termination, Key Equipment—Alternate Termination, Data Equipment)

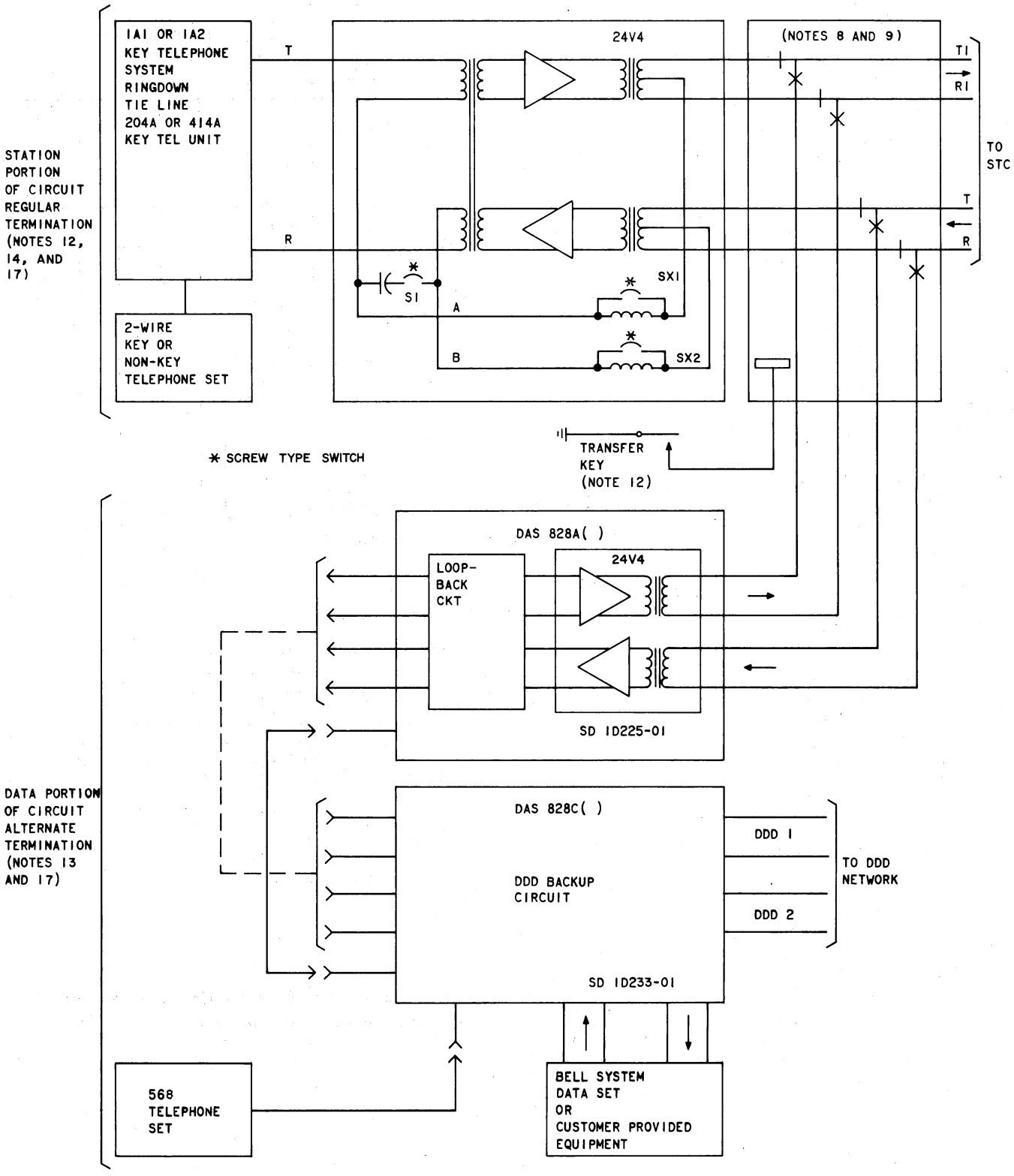


Fig. 18—Full Data Alternate (Private Line) Arranged for 4-Wire Data Set and Direct Distance Dialing (DDD) Backup (Regular Termination, Key Equipment—Alternate Termination, Data Equipment)

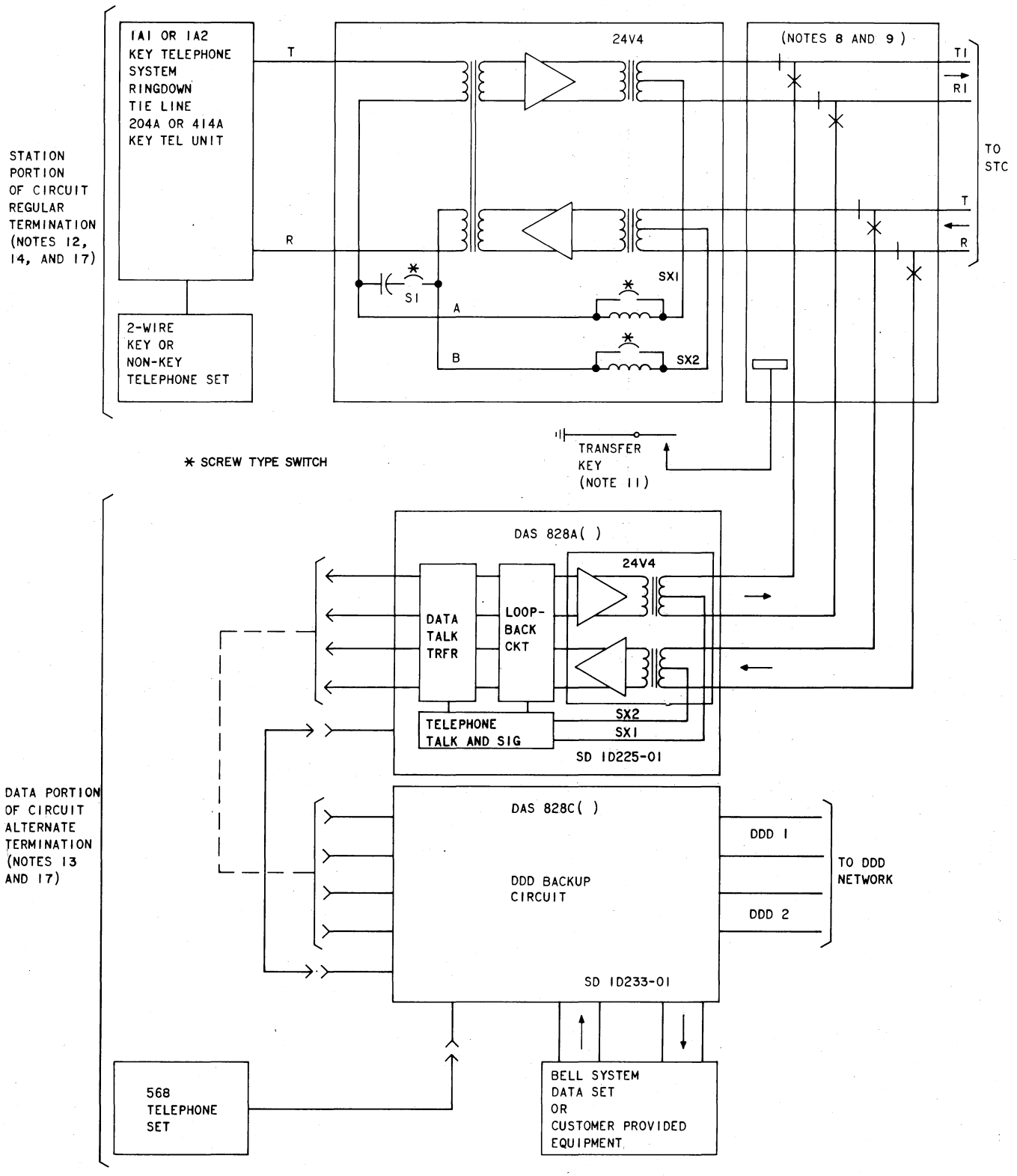


Fig. 19—Full Data Alternate (Private Line) Arranged for 4-Wire Data Set E/W Voice Coordination—20 Hz Signaling and Direct Distance Dialing (DDD) Backup (Regular Termination, Key Equipment—Alternate Termination, Data Equipment

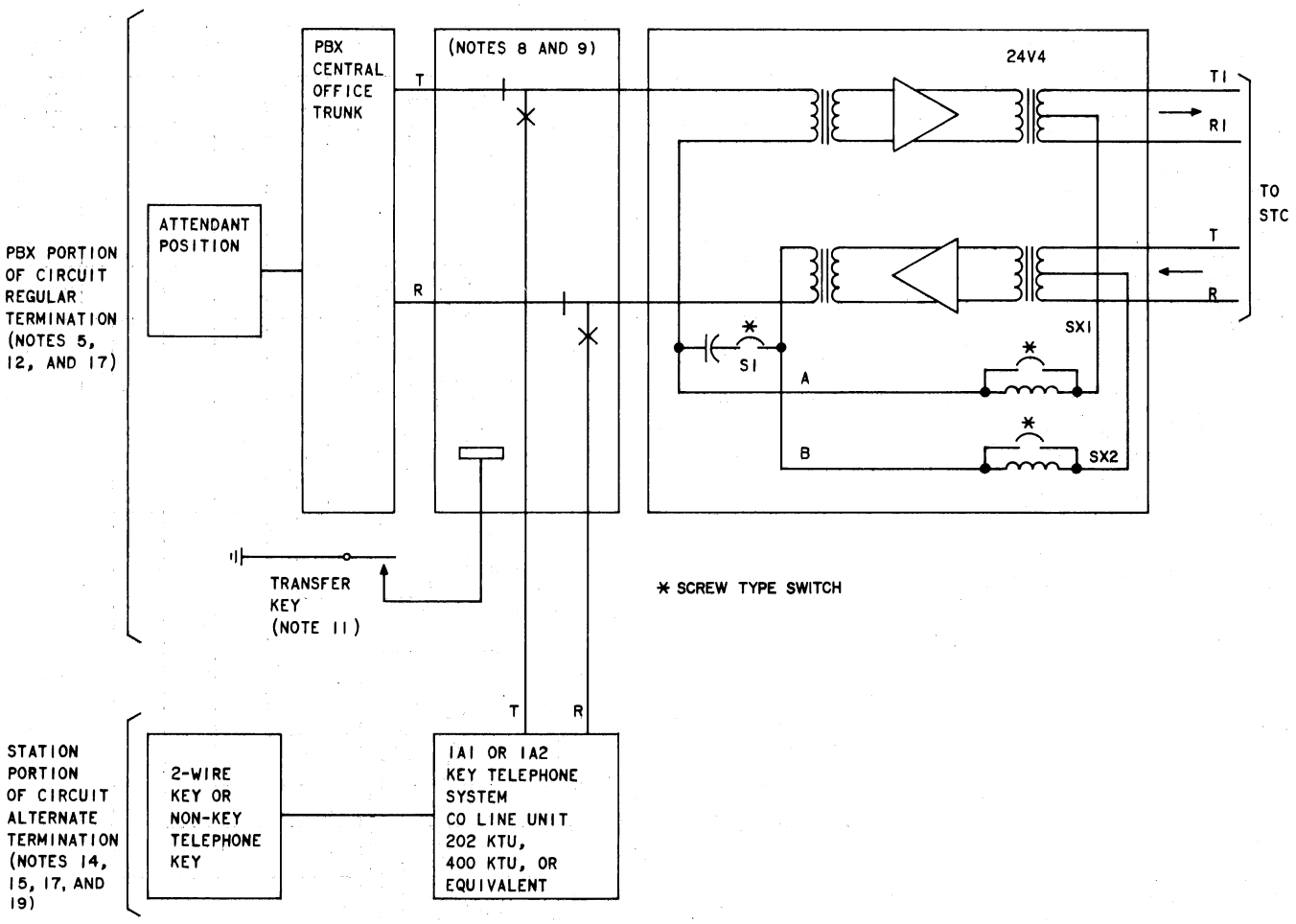


Fig. 20—Alternate Termination for Foreign Exchange or WATS Service (Regular Termination, Foreign Exchange Trunk or WATS Trunk—Alternate Termination, Foreign Exchange Line or WATS Line)

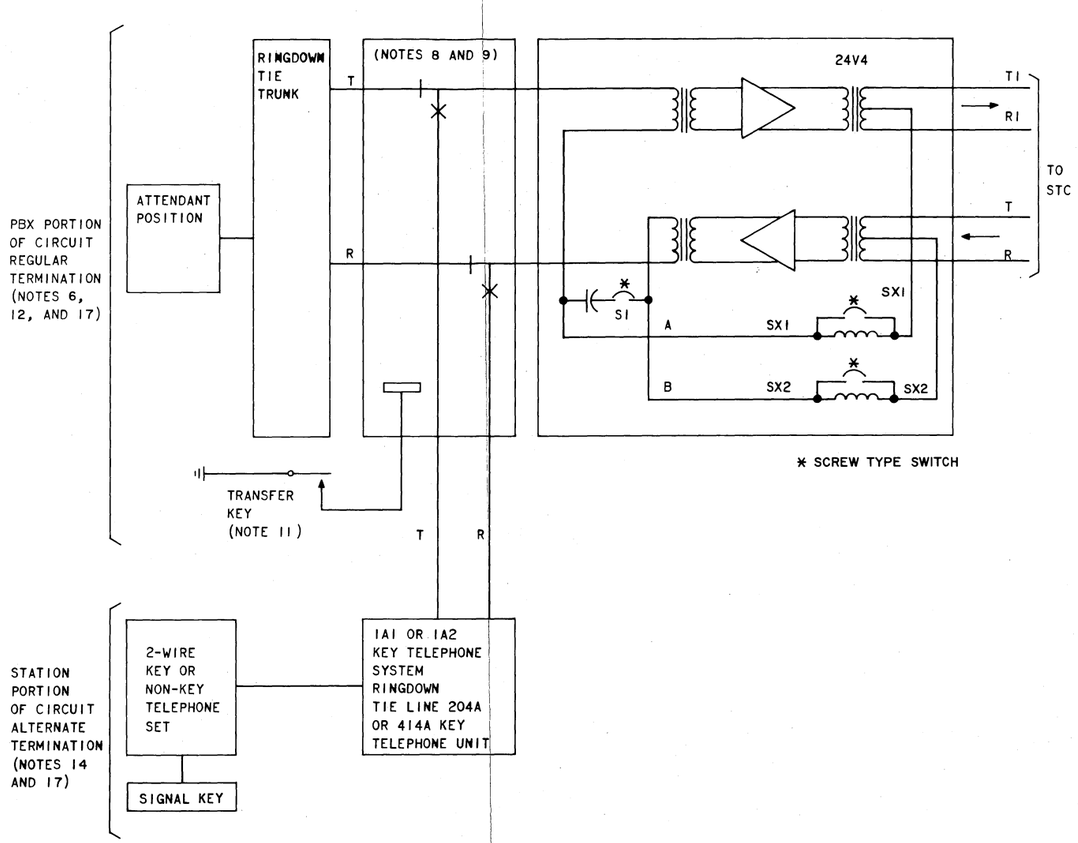


Fig. 21—Alternate Termination for Full Period Service (Regular Termination, PBX Tie Line Ringdown—Alternate Termination, Station Tie Line Ringdown)

GENERAL FIGURE NOTES

1. Single Frequency Unit.

2. Four-Wire Foreign Exchange Unit—Station End 2600 Hz.

3. Four-Wire Foreign Exchange Unit—Central Office End 2600 Hz.

4. Under some conditions it may be required to equip either PBX (not both) with the transfer arrangement.

5. See Section 812-002-211 for PBX equipment applicable to this arrangement.

6. See Section 812-002-210 for PBX equipment applicable to this arrangement.

7. In the normal condition (transfer key not operated), this circuit is in the FP mode. In the operated condition (transfer key operated), this circuit is in the FX mode. See Section 812-002-200 for associated central office transfer arrangement.

8. In the normal condition (transfer circuit unoperated), this circuit terminates in the regular termination. In the transferred condition (transfer circuit operated) this circuit terminates in the alternate termination.

9. Refer to Section 812-002-270 for transfer arrangements.

10. Provide proper tie trunk as specified by the USOCs.

11. Transfer key may be locking or non-locking, depending on the operational requirements of the associated transfer circuit.

12. Provide a make busy arrangement on PBX tie trunks and key telephone set when the circuit is transferred to the other termination (regular or alternate). See Section 812-002-270 for make busy arrangements.

13. See Section 812-002-230 for data equipment applicable to this arrangement.

14. See Section 812-002-221 for station equipment applicable to this arrangement.

15. When key equipment (1A1 or 1A2) is not required, terminate directly into 2-wire telephone set.

16. The data termination does not have voice capability; therefore, when the circuit is transferred to the data mode, the station or PBX termination cannot signal the distant end. The associated business machine may be equipped to alert the attendant to restore the circuit to the station or PBX termination for voice communication. If this is not done, some other means of coordination will be required.

17. The signaling capability of the regular termination must be compatible with the alternate termination.

18. The data termination is arranged for data only (no voice or signaling).

19. If the CO trunk is arranged for ground start, the station portion can only be used to receive calls. If the CO trunk is arranged for loop start, the station portion may originate and receive calls.

20. Both ends of the circuit must be in the same condition for the circuit to function (both normal or both transferred).