20-BUTTON, PUSHBUTTON DIAL, DESK TELEPHONES
GENERAL DESCRIPTION

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1. GENERAL DESCRIPTION

1.01 This document covers the 20-button, pushbutton dial, desk telephone. (See Figure 1.) A general description plus information peculiar to 20-button, pushbutton dial, desk telephones is included.

1.02 Whenever this section is reissued, reason for reissue will be listed in this paragraph.

1.03 For additional information, refer to Section 50-831-104, Replacement Parts, and to Section 50-831-105, Circuit Labels. For information on installation, maintenance, and components or equipment, consult related documents of the ITT Telephone Apparatus Practices Manual.

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Figure 1: 20-Button, Pushbutton Dial, Desk Telephone

1.04 The Model 2831 desk telephones are 20-button, pushbutton dial, antisidetone type units that operate efficiently over a wide range of loop resistances and line impedances. These telephones are designed for use with key telephone systems, such as the ITT 1A2 System, where several telephones have access to the same lines, CO trunks, or intercom lines. All models are equipped with a mounting cord terminated in two Amphenol-type connectors.

1.05 The Model 2831 desk telephones are identified by a code number stamped in ink on the bottom of the base plate. Refer to ordering information in Table A for an explanation of each code number.

1.06 Nineteen pushbutton keys on the telephone are used for line, trunk, or intercom lines. The red key on the far left is used as a hold key and allows any selected line or trunk to be placed in a hold condition. All remaining keys may be used as line keys or may be wired as either intercom lines or signal keys.

TABLE A

ORDERING INFORMATION – TELEPHONES

CODE NUMBERS

TELEPHONE CODE NUMBERS ARE FORMED IN SIX STEPS AS FOLLOWS:

2831 15 O BA 42 M

(1) Type of Instrument (See Part 1)
(2) Color (See Part 2)
(3) Version (See Part 3)
(4) Ringer (See Part 4)
(5) Special Feature (See Part 5)
(6) Dial (See Part 6)

PART 1 TYPE OF INSTRUMENT

CODE	DESCRIPTION	COLOR OFFERED	VERSION OFFERED	RINGER OFFERED	FEATURE OFFERED	DIAL OFFERED
2831	20-Button, Pushbutton Dial, Desk Telephone	00, 05, 13, 15, 44, And 45 (Available On All Models)	O	BA, LR	42, 46, 76	M, R

REFER TO INDIVIDUAL UNIT DESCRIPTION FOR COMPLETE DESCRIPTION OF FEATURE COMBINATIONS

PART 2 COLORS		PART 3 VERSIONS		PART 4 RINGERS		PART 5 SPECIAL FEATURES		PART 6 DIALS	
CODE	COLORS	CODE	VERSIONS	CODE	RINGERS	CODE	SPECIAL FEATURES	CODE	DIALS
00	Black	O	Conventional	LR	Less Ringer	42	Equipped To Operate w/External Speakerphone	M	Metropolitan (Letters & Numerals)
05	Moss Green								
13	Beige			BA	Straight Line	46	42 Combined With Operator Recall Button	R	Regular (Numerals Only)
15	White								
44	Light Ash					76	42 Combined With Automatic Exclusion And Release Button		
45	Cocoa Brown								

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1.07 A signal lamp beneath each of the nineteen line keys indicates status of the associated line. (See Table B.)

1.08 All 20-button telephones are equipped with a hookswitch restoration feature that restores any operated line key when the hookswitch is operated.

1.09 Variations in the Model 2831 series telephones are briefly described below. Circuit label drawings for these models are contained in Section 50-831-105.

MODEL 2831** ( ) 42

1.10 The Model 2831** ( ) 42 is a standard 20-button, pushbutton dial, desk type, key telephone equipped to operate with an external speakerphone. A set of contacts in the dial assembly disconnects the handsfree speaker during dialing; also, contacts in the hookswitch assembly provide on/off control of the handsfree equipment. The Model 2831** ( ) 42 is equipped with a 100-conductor mounting cord fitted with two 50-pin (25-pair) male connectors.

TABLE B

LINE KEY SIGNALS

CONDITION	LAMP INDICATION
Idle	Lamp Extinguished
Busy	Lamp Lit
Hold	Lamp Winking
Call Incoming	Lamp Flashing

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MODEL 2831 ( ) 46**

1.11 The Model 2831** ( ) 46 is the same as the Model 2831** ( ) 42 with the addition of an operator recall button. This button, containing normally closed contacts, can be used to recall the operator if the hookswitch restoration feature is used.

MODEL 2831 ( ) 76**

1.12 The Model 2831** ( ) 76 is the same as the Model 2831** ( ) 42 with the addition of an automatic exclusion (privacy) circuit with a release button. This release button contains normally open contacts. Where this feature is used, all telephones in the key system must contain the exclusion circuit and a release button.

2. INSTALLATION

2.01 Since these telephones are equipped with a connector-terminated mounting cord, installation consists of inserting the connectors into the jacks at the station connecting block and pressing to engage. For specific wiring information, refer to the appropriate circuit label in Section 50-831-105. Cable connections for 20-button telephones with feature codes 42 and 46 are listed in Table C. Cable connections for 20-button telephones with feature code 76 that differ from those listed in Table C are listed in Table D. For general installation information and installation of repair parts, refer to the applicable section of the ITT Telephone Apparatus Practices Manual.

3. MAINTENANCE

3.01 For general maintenance information, refer to the maintenance section of the ITT Telephone Apparatus Practices Manual. For a pictorial view and parts list, refer to Section 50-831-104.

4. SPEAKERPHONE

4.01 An external speakerphone may be installed on 20-button telephones. Most speakerphones provide the following additional features:

(a) Handsfree telephone operation. (Handsfree talking and dialing.)

(b) On-hook dialing.

(c) Automatic switching from speakerphone to handset operation.

(d) Transmitter muting for private conversation.

(e) Visual indication when system is in use.

(f) Cutoff of common ringer or other signaling devices when desired.

5. BUTTON CONVERSIONS

5.01 Any line key may be converted to signaling mode by removing the slotted head pin from the plunger shank. The slotted head pin is removed by turning clockwise. (On earlier models of the 20-button telephone the pin is removed by turning counterclockwise.)

6. BUZZER INSTALLATION

6.01 A buzzer may be installed as the signaling device of a telephone receiving an intercom call. The buzzer may be either installed on the dial mounting bracket or mounted externally. For telephones with feature codes 42 and 46, buzzer leads must be connected to the OR-YL and YL-OR leads inside the telephone. The OR-YL lead is spare and can be found taped and stored inside the telephone. For telephones with feature code 76, a lamp ground lead is used instead of the OR-YL lead (provided the proper station cross connections are made). Buzzers selected for this use must operate at 18 VAC, 60 Hz. (See Figure 2.)

TABLE C

CABLE CONNECTIONS FOR 20-BUTTON TELEPHONES

(FEATURE CODES 42 AND 46)

LINES 1 THROUGH 7				LINES 8 THROUGH 13				LINES 14 THROUGH 19			
TELEPHONE TERMINAL	LEAD COLOR	LEAD DESIG.	CONNECTOR TERMINAL	TELEPHONE TERMINAL	LEAD COLOR	LEAD DESIG.	CONNECTOR TERMINAL	TELEPHONE TERMINAL	LEAD COLOR	LEAD DESIG.	CONNECTOR TERMINAL
	WH-BL	T	26		VI-OR	T	47		BK-GN	T	38
Line 1	BL-WH	R	1	Line 8	OR-VI	R	22	Line 14	GN-BK	R	13
(Blue Plug)	WH-OR	A or S	27	(Black Plug)	GN-RD	A or S	8	(Slate Plug)	BK-BN	A or S	39
	WH-GN	LG	28		VI-BN	LG, P3 or 1R	49		BK-SL	LG	40
	GN-WH	L	3		BN-VI	L, P4 or 1T	24		SL-BK	L	15
	WH-BN	T	29		VI-SL	T	50		YL-BL	T	41
Line 2	BN-WH	R	4	Line 9	SL-VI	R	25	Line 15	BL-YL	R	16
(Orange Plug)	WH-SL	A or S	30	(Yellow Plug)	SL-WH	A or S	5	(White Plug)	BN-BK	A or S	14
	RD-BL	LG	31		VI-GN	LG or T1	48		YL-GN	LG	43
	BL-RD	L	6		GN-VI	L or R1	23		GN-YL	L	18
	RD-OR	T	32	10	OR-WH	A1	2		YL-BN	T	44
Line 3	OR-RD	R	7	G	YL-SL	B1	45	Line 16	BN-YL	R	19
(Green Plug)	RD-GN	A or S	33	A	SL-YL	R1	20	(Red Plug)	BL-BK	A or S	11
	RD-BN	LG	34	15	YL-OR	BL, AG or Spare	42		VI-BL	LG	46
	BN-RD	L	9	6	OR-YL	SG, LK or Spare	17		BL-VI	L	21
	RD-SL	T	35		WH-BL	T	26		VI-OR	T	47
Line 4	SL-RD	R	10	Line 10	BL-WH	R	1	Line 17	OR-VI	R	22
(Ivory Plug)	BK-BL	A or S	36	(Blue Plug)	WH-OR	A or S	27	(Black Plug)	GN-RD	A or S	8
	BK-OR	LG	37		WH-GN	LG	28		VI-BN	LG	49
	OR-BK	L	12		GN-WH	L	3		BN-VI	L	24
	BK-GN	T	38		WH-BN	T	29		VI-SL	T	50
Line 5	GN-BK	R	13	Line 11	BN-WH	R	4	Line 18	SL-VI	R	25
(Slate Plug)	BK-BN	A or S	39	(Orange Plug)	WH-SL	A or S	30	(Yellow Plug)	SL-WH	A or S	5
	BK-SL	LG	40		RD-BL	LG	31		VI-GN	LG	48
	SL-BK	L	15		BL-RD	L	6		GN-VI	L	23
	YL-BL	T	41		RD-OR	T	32		YL-SL	T	45
Line 6	BL-YL	R	16	Line 12	OR-RD	R	7	Line 19	SL-YL	R	20
(White Plug)	BN-BK	A or S	14	(Green Plug)	RD-GN	A or S	33	(Violet Plug)	OR-WH	A or S	2
	YL-GN	LG	43		RD-BN	LG	34		YL-OR	LG	42
	GN-YL	L	18		BN-RD	L	9		OR-YL	L	17
	YL-BN	T	44		RD-SL	T	35				
Line 7	BN-YL	R	19	Line 13	SL-RD	R	10				
(Red Plug)	BL-BK	A or S	11	(Ivory Plug)	BK-BL	A or S	36				
	VI-BL	LG	46		BK-OR	LG	37				
	BL-VI	L	21		OR-BK	L	12				

NOTES:

1. All lamp ground leads are common.
2. Lead designations P3, P4, LK T1, R1, AG and A1 are for speakerphone connections.
3. The YL-OR and OR-YL leads are spare leads and are taped and stored inside the telephone.
4. The designation S indicates that the lead provides an individual signal ground.

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TABLE D

SPECIAL CABLE CONNECTIONS FOR

20-BUTTON TELEPHONES (FEATURE CODE 76)

TELEPHONE TERMINAL	LEAD COLOR	LEAD DESIG.	CONNECTOR TERMINAL
17	OR-YL	-24 VDC	17
Line 16 (Red Plug)	WH-RD	A or S	11
Line 17 (Black Plug)	RD-WH	A or S	8
Line 18 (Yellow Plug)	BL-SL	A or S	5
Line 19 (Violet Plug)	SL-BL	A or S	2

NOTE:

1. This table lists those connections that differ from the connections for feature codes 42 and 46 telephones shown in Table C.

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6.02 A buzzer may also be used in place of the ringer. A 105 VAC buzzer must be provided. The ringer leads are removed and replaced by the buzzer leads.

7. DESIGNATION TABS

7.01 Designation tabs are included with each telephone. These tabs are installed by removing the cap from each key, placing the tab in the cap, and reinstalling the cap. The caps are removed by squeezing the sides and lifting. Note that locking surfaces are located on each of the caps and keys. These locking surfaces must properly align when reinstalling.

8. GROUNDING PUSHBUTTON

8.01 Modifications are made to line 9 of the telephone if a grounding pushbutton is required. A grounding pushbutton is required in some PABX applications for transferring calls, originating calls during a power failure, or other special functions. To convert line 9 to a grounding pushbutton, the following modifications should be made:

(a) Modify button to non-locking operation by removing interlock pin from line 9 plunger.

(b) Ground is provided on the WH-SL (A1) lead by the key system. (No cross-connect is necessary for this lead.)

(c) Cross-connect from the SL-WH lead to the PABX connection for the desired function.

9. DISABLING HOOKSWITCH RESTORATION

9.01 The hookswitch restoration feature used in multibutton telephones allows a station user to preselect a line key and then remove the handset to initiate a call. When the handset is returned to the cradle or the hookswitch is operated (hookswitch flash), the line key will be restored. To disable the hookswitch restoration feature, the following steps are taken:

(a) Remove telephone faceplate.

(b) Remove plastic trip arm by pulling up at the point directly above its mounting shaft.

(c) Remove torsion spring by sliding it off the mounting shaft.

(d) Reinstall telephone faceplate.

9.02 To enable the hookswitch restoration feature, the following steps are taken: (See Figure 3.)

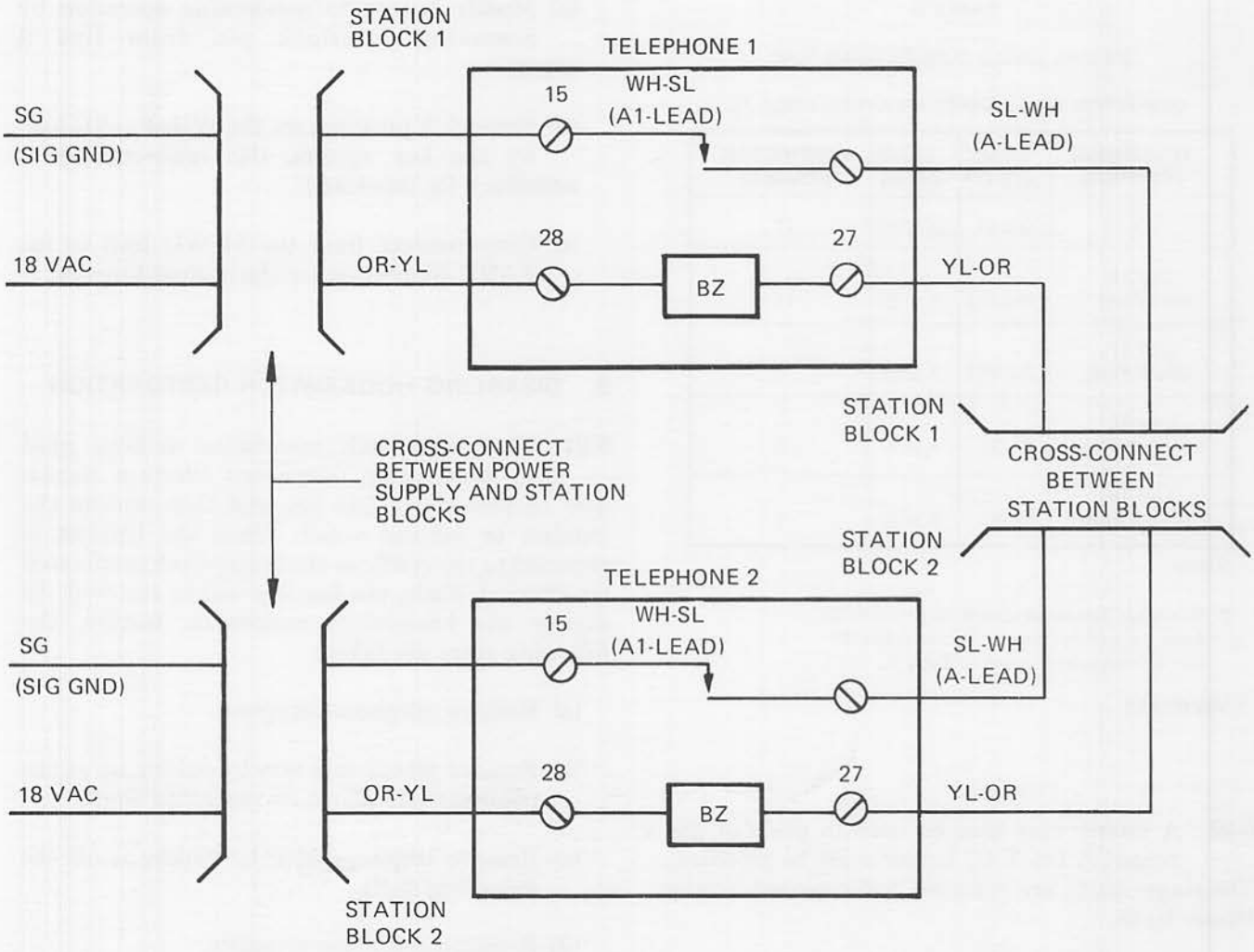
(a) Remove telephone faceplate.

(b) Install torsion spring by sliding it onto the mounting shaft and hooking one end between the mounting shaft and the hookswitch operating arm.

(c) Install plastic trip arm by placing the notch in the trip arm on the end of the torsion spring (opposite the end hooked behind the operating arm) and pressing the trip arm onto the mounting shaft.

(d) When the hookswitch is operated, the plastic trip arm should engage with the latch arm.

(e) Reinstall telephone faceplate.



NOTES:

1. THE ARRANGEMENT SHOWN IS USING LINE 9 OF A TELEPHONE WITH FEATURE CODES 42 AND 46 AS AN EXAMPLE. IF ANOTHER LINE IS USED, SUBSTITUTE THE APPROPRIATE A1 AND A-LEADS FOR THAT LINE.

2. IN THE 20-BUTTON TELEPHONE, GROUND IS CONNECTED TO TERMINAL 15 (WH-SL LEAD). NO CROSS-CONNECT IS NECESSARY FOR THIS LEAD.

3. FOR TELEPHONES WITH FEATURE CODE 76, A LAMP GROUND LEAD IS USED INSTEAD OF THE OR-YL LEAD (PROVIDED THE PROPER STATION CROSS-CONNECTIONS ARE MADE).

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Figure 2: Circuit Diagram For Signal Buzzer

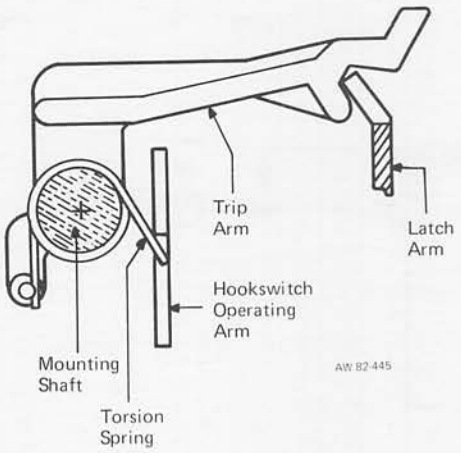

Figure 3: Installation of Trip Arm and Torsion Spring

9.03 Whenever the hookswitch restoration feature is disabled, it may become necessary to shorten or lengthen the spring connected to the operating arm to insure proper hookswitch operation. Proper operation requires the cradle to be fully depressed by the weight of the handset and return to the full up position when the handset is off-hook.

9.04 Earlier models of multibutton telephones may not provide the preselect function with the hookswitch restoration feature. These models include an adjustment screw on the latch arm rather than the plastic trip arm or torsion spring. To disable hookswitch restoration in these telephones, the following steps are taken:

(a) Remove telephone faceplate and housing.

(b) Turn the screw in the latch arm approximately five turns counterclockwise.

(c) Reinstall telephone faceplate and housing.

10. CONNECTING 174B CALL ANNOUNCER

10.01 A 174B call announcer is used to provide tone and voice signaling to, and handsfree answerback from, an intercom station. The 174B call announcer connects to 20-button telephones as follows:

(a) Connect BK (-24 VDC) lead of call announcer together with VI-BL lead of telephone to terminal 17 of the terminal board.

(b) Connect YL (GND) lead of call announcer together with YL-OR lead of telephone to terminal 27 of the terminal board.

(c) Connect RD (CA RST) lead of call announcer together with VI-BN lead of telephone to terminal 21 of terminal board.

(d) Connect GN (CA RT) lead of call announcer together with VI-GN lead of telephone to terminal 13 of terminal board. (The VI-GN lead must be moved from RR on network.)

11. BUSY LAMP CONNECTIONS

11.01 Busy lamp connections may vary depending on the type of key system being used. Modifications for the 20-button desk telephones with feature codes 42 and 46 should be as follows: (Refer to Figure 4.)

(a) Remove GN-WH lead from terminal 22 and connect to terminal 16 on the telephone terminal board.

(b) Connect one 1N4004 diode between terminals 22 and 16 on the terminal board, and connect another 1N4004 diode between terminals 22 and 28 on the terminal board as shown in Figure 4.

(c) Connect OR-YL mounting cord lead to terminal 28 of terminal board.

11.02 Modifications for the 20-button desk telephones with feature code 76 should be as follows: (Refer to Figure 5.)

(a) Connect one 1N4004 diode from terminal 22 to terminal 28 on telephone terminal board as shown in Figure 5.

(b) Connect any "LG" lamp ground lead to terminal 28 on the telephone terminal board. (Proper station cross-connections must be made to allow the use of an LG lead.)

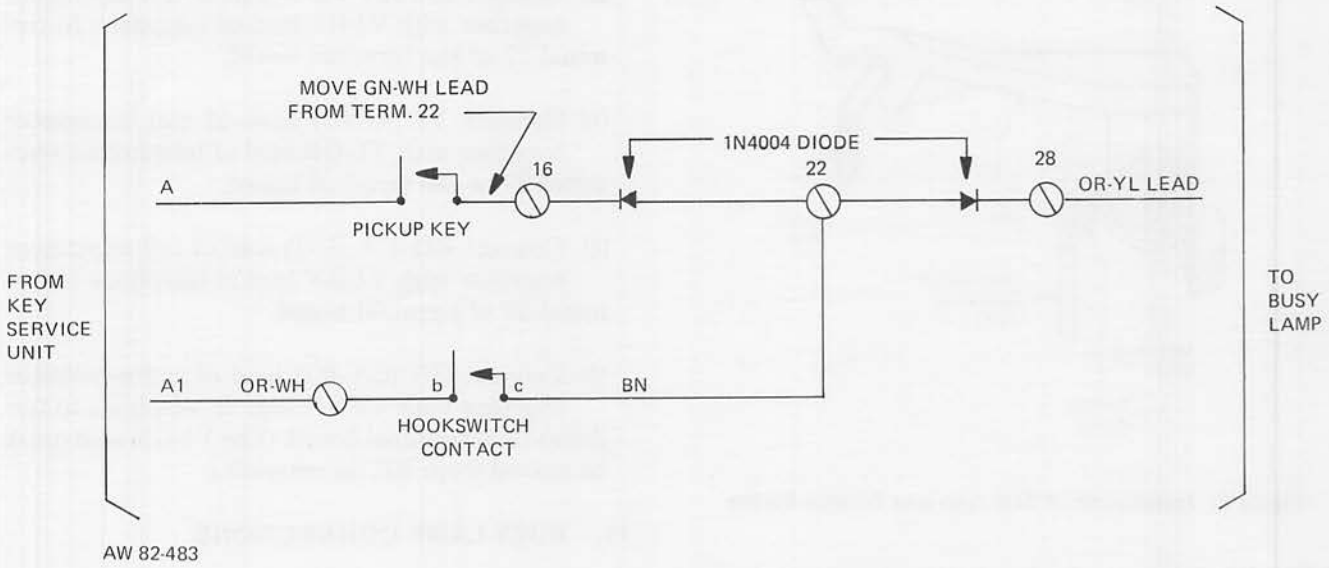

Figure 4: Busy Lamp Connections For 20-Button Telephones with Feature Codes 42 and 46

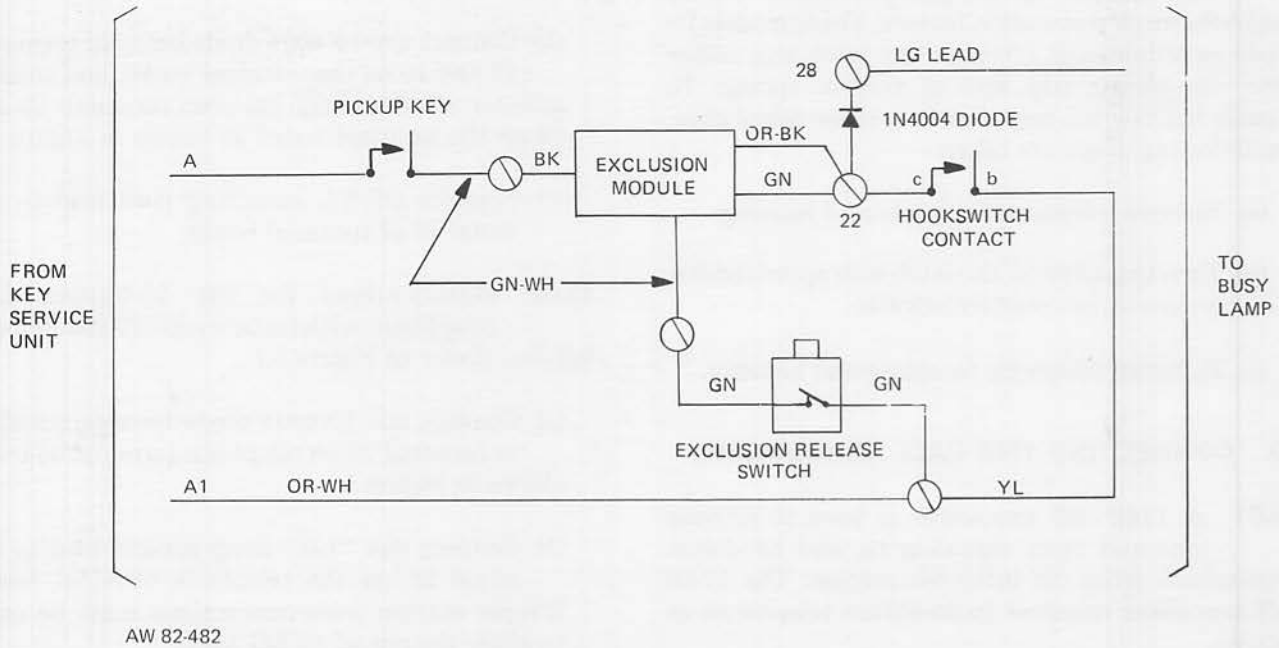

Figure 5: Busy Lamp Connections For 20-Button Telephones with Feature Code 76