

# MODEL 180455 NETWORK

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## 1. INTRODUCTION

1.01 This document covers the Model 180455 network. (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

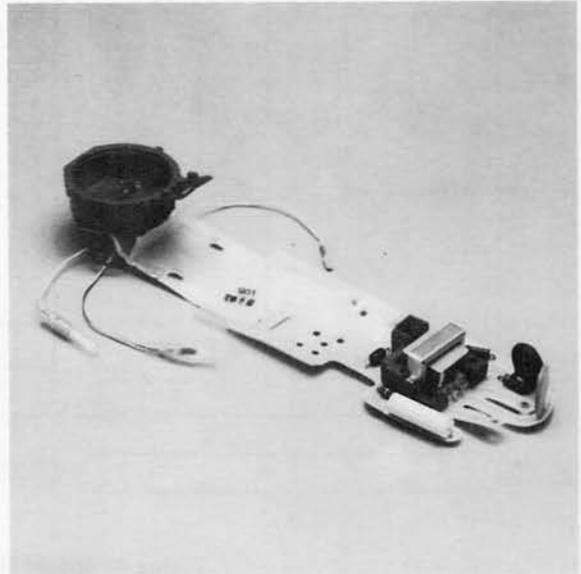
1.02 Whenever this section is reissued, reason for reissue will be listed in this paragraph.

1.03 For information concerning telephones that this network is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

## 2. GENERAL DESCRIPTION

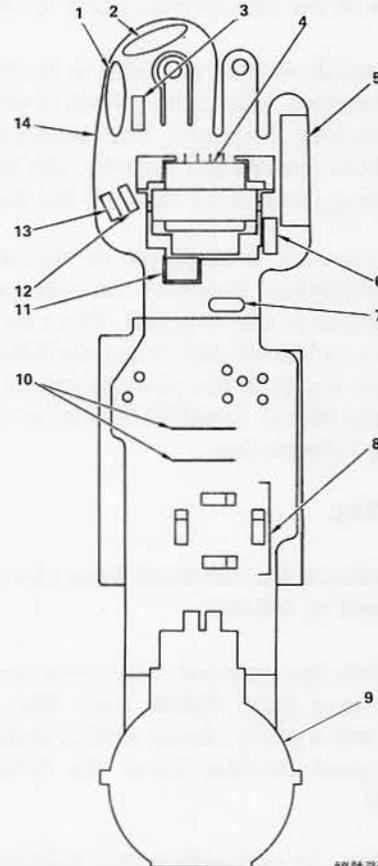
2.01 The Model 180455 network assembly provides all the components necessary to connect and to match the impedance of the Trendline pushbutton dial handset transmitter and receiver units to a four-wire telephone handset cord. The network includes a sidetone balancing circuit, an Automatic Number Identification (ANI) circuit, a recall switch, a dial lamp, and a transmitter cup assembly. All components are assembled on a flexible printed circuit assembly (flexprint). (See Figure 2.)

2.02 The sidetone circuit (see Figure 3) produces the proper level of sidetone via R2, RV2, C1, and the windings of the induction coil. The sidetone circuit allows the user's own voice to be heard in the receiver; this affects how loudly the user speaks.



AW 84-879

Figure 1: Model 180455 Network



AW 84-297

Figure 2: Model 180455 Network, Exploded View

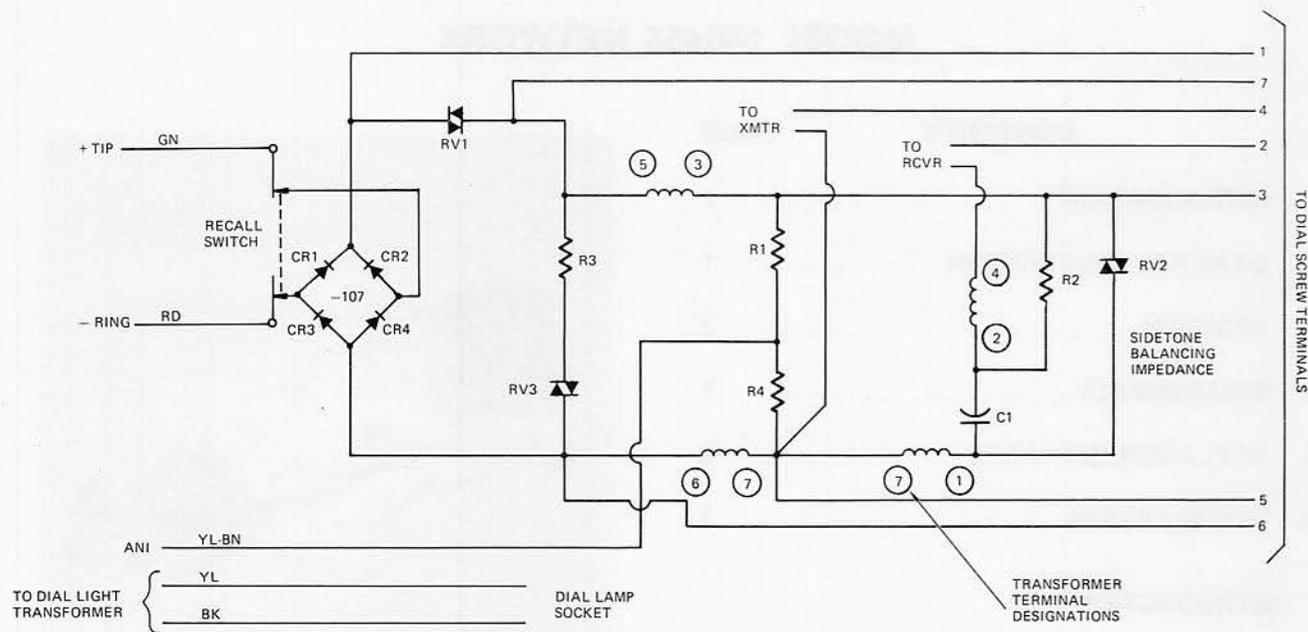


Figure 3: Model 180455 Network, Schematic

**2.03** The ANI circuit consists of two resistors, R1 and R4, that maintain a 2650 ohm ground on the Tip side of the line for two-party identification.

**2.04** The recall switch provides a hookswitch in the handset. When the switch is pressed, the Tip and Ring loop is opened. The recall switch does not turn off the dial lamp. However, the hookswitch in the telephone base does turn off the dial lamp.

**2.05** The network is available in two styles with identification stamped on the plastic insulator attached to the flexprint. The two styles are 180455-105 and 180455-107. The only difference between the two styles is the polarity guard circuit included on the Model 180455-107. Refer to Table A for ordering information.

### 3. REMOVAL

**3.01** To remove the network from the telephone, proceed as follows:

- (a) Remove the number card retainer, number card, and light shield from the telephone handset; use a paper clip or similar instrument to pry the card retainer from the handset. (See Figure 4.)
- (b) Remove the two screws that hold the handset cover to the handset housing. Remove the handset cover.

- (c) Remove the four receiver screws. (See Figure 4.)

- (d) Remove the seven terminal screws that connect the flexprint network to the dial.

- (e) Bend the flexprint network back to expose the four dial mounting screws.

- (f) Remove the four dial mounting screws.

- (g) Lift the pushbutton dial from the handset.

- (h) Remove the two screws that secure the transmitter mounting brackets. Remove the transmitter mounting brackets.

- (j) Lift the network from the handset.

### 4. DISASSEMBLY

**4.01** Disassembly of the network is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
NETWORK CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
(1) Network Model Number (See Part 1)			180455
(2) Network Style (See Part 2)			105
PART 1 NETWORK MODEL NUMBER		PART 2 NETWORK STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
180455	Model 180455 Flexprint Network For Pushbutton Dial Trendline Telephones	105	Network
		107	Network With Polarity Guard

AW 84-939

## 5. REPLACEMENT PARTS

5.01 Replacement parts for the Model 180455 network are listed in Table B.

## 6. INSTALLATION

6.01 To install the network inside a telephone, proceed as follows:

- (a) Remove the handset cover.
- (b) Place the network in the handset, with the network transmitter cup over the transmitter.

*Note:* Observe proper alignment of transmitter and gasket when mounting the network.

- (c) Mount the transmitter cup to the handset using the transmitter mounting brackets and two screws. (See Figure 4.)

*Note:* One end of a transmitter mounting bracket inserts into a notch in the handset.

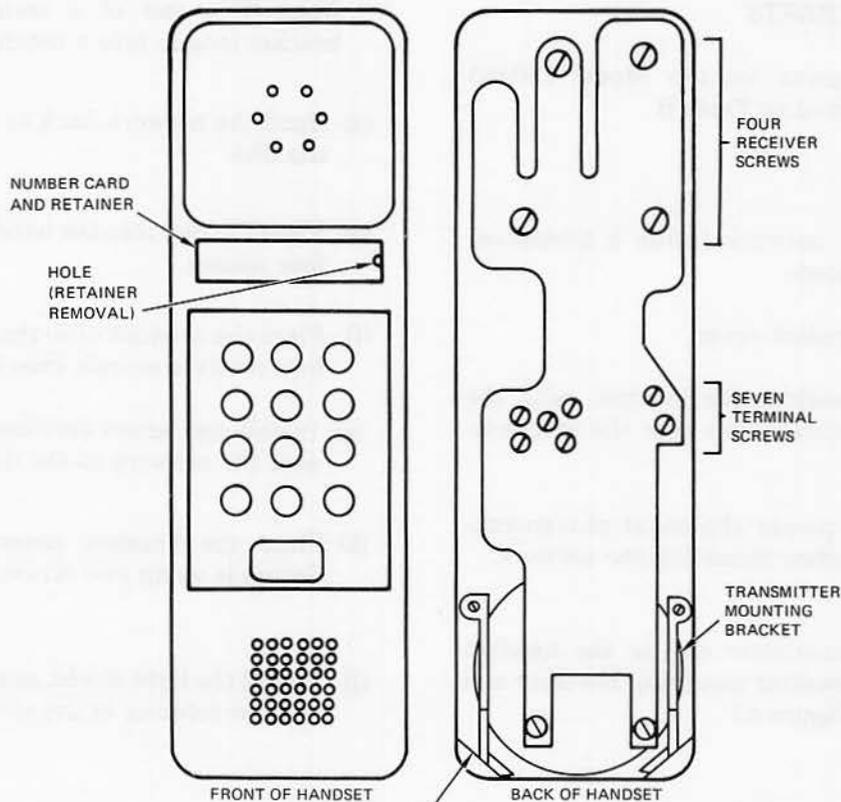
- (d) Bend the network back to allow mounting of the dial.
- (e) Place the dial into the handset. Mount it with four screws.
- (f) Place the network onto the dial and install the four receiver screws. (See Figure 4.)
- (g) Install the seven terminal screws that connect the network to the dial.
- (h) Place the handset cover on the housing. Secure it using two screws.
- (j) Install the light shield, number card, and card number retainer in the slot provided.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED	
			105	107
		<b>Model 180455 Network</b>	<b>105</b>	<b>107</b>
1	095974-102	Varistor, RV3	1	1
2	095974-101	Varistor, RV2	1	1
3	062948-778	Resistor, 220 Ohm, R3	1	1
4	088710-104	Coil Assembly	1	1
5	095995-112	Capacitor, 1.5 MFD, C1	1	1
6	062948-107	Resistor, 33 Ohm, R2	1	1
7	095655-101	Varistor, RV1	1	1
8	180658-101	Diode, 1N4004, CR1 - CR4	—	4
9	180429-101	Transmitter Cup Assembly	1	1
10	180335-101	Strap	1	2
11	180427-101	Lamp Block	1	1
12	062948-160	Resistor, 2 K, R4	1	1
13	062948-113	Resistor, 1.6 K, R1	1	1
14	180447-101	Board, Flexible Printed Wiring	1	—
14	183554-101	Board, Flexible Printed Wiring	—	1
	180414-101	Insulator	1	1

NOTE: All capacitor values are in microfarads (MFD).

AW 84-940



NOTE: Edge of brackets insert into a notch in the handset.

AW 84-298

Figure 4: Location of Network Mounting Hardware

## MODEL 181427 NETWORK

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### 1. INTRODUCTION

1.01 This document covers the Model 181427 network. (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

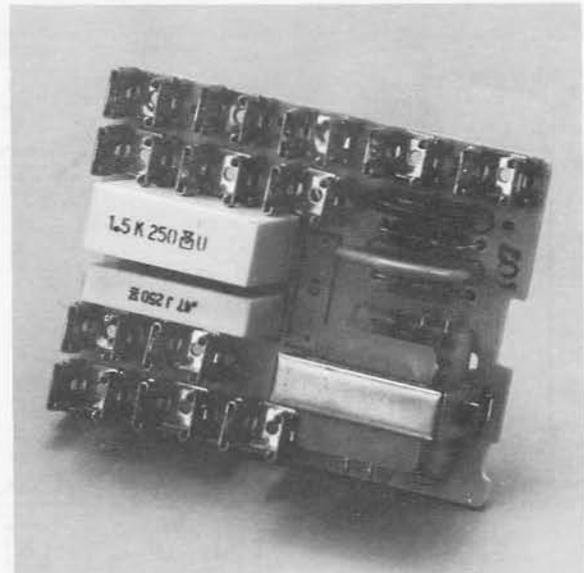
1.02 Whenever this section is reissued, reason for reissue will be listed in this paragraph.

1.03 For information concerning telephones that this network is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

### 2. GENERAL DESCRIPTION

2.01 The Model 181427 network assembly provides all the components necessary to connect and to match the impedance of the handset transmitter and receiver units to a two-wire telephone circuit. The network includes an RF filter, a sidetone balancing circuit, and a 0.47 microfarad ringer series capacitor.

2.02 The network is a printed circuit assembly. All components are assembled on a printed circuit board (PCB). (See Figure 2.) Push-on terminals on the PCB will accommodate up to four lugs per terminal. Additional connections can be made to spare terminals L1, L2, and G. Terminals E1 and E2 are provided as tie points. The schematic for the Model 181427 network is shown in Figure 3. The network is designed for field replacement; it fastens to a network spacer by means of a flexible retaining clip.



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Figure 1: Model 181427 Network

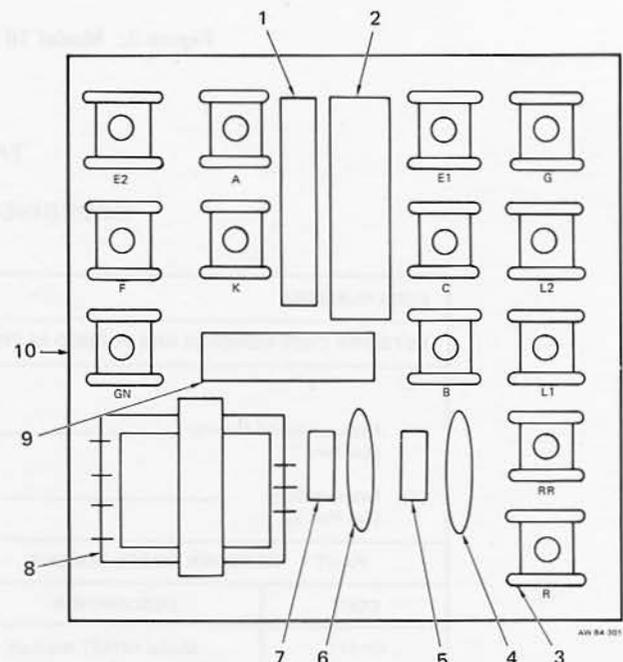


Figure 2: Model 181427 Network Component Location

2.03 The network is available in various styles and is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number and for a description of styles.

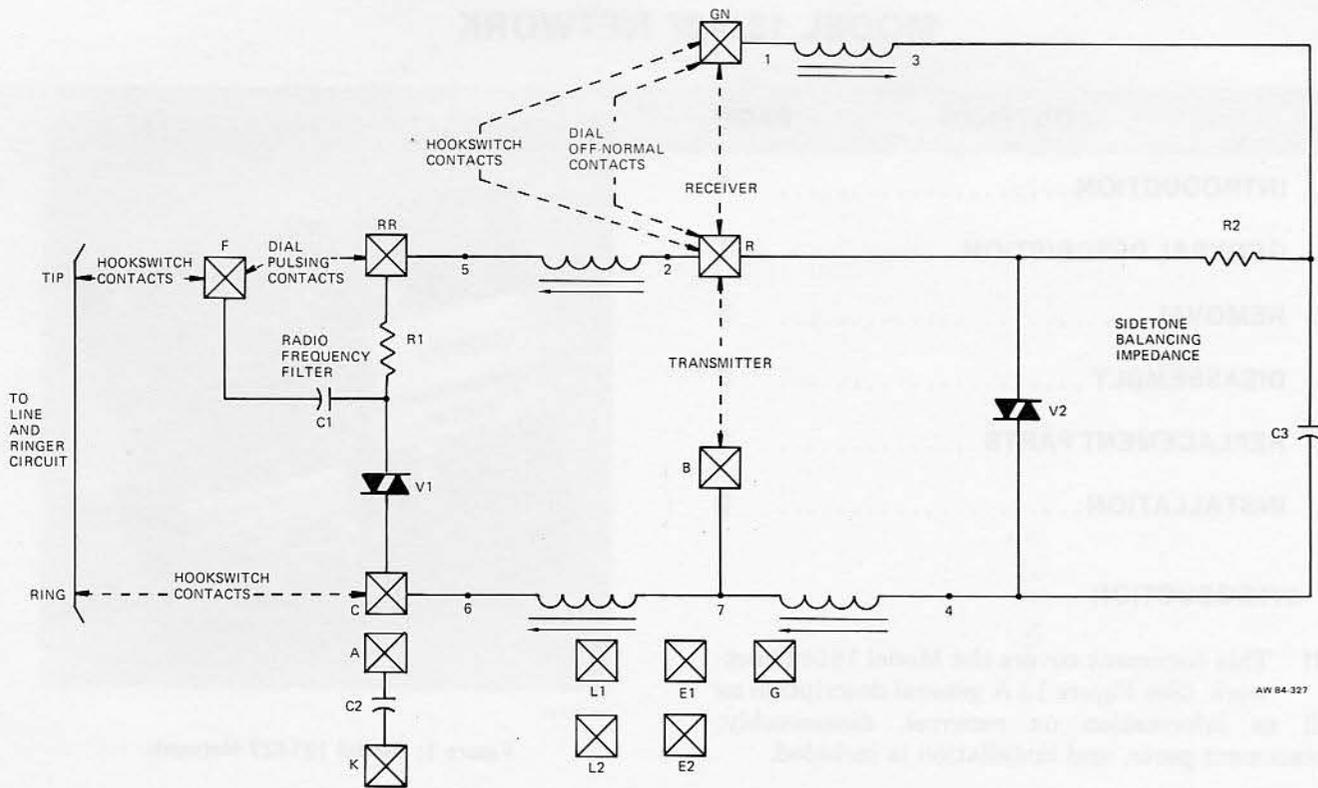


Figure 3: Model 181427 Network Schematic

TABLE A

ORDERING INFORMATION

CODE NUMBERS			
NETWORK CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
(1) Network Model Number (See Part 1)	181427	101	
(2) Network Style (See Part 2)			
PART 1 NETWORK MODEL NUMBER		PART 2 NETWORK STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
181427	Model 181427 Network	101	Standard Network
		102	Network Less RF Filter
		105	Network With Three Terminal Screws
		106	Network Less RF Filter With Three Terminal Screws
		107	Network Less RF Filter With Four Terminal Screws

AW 84 932

### 3. REMOVAL

3.01 To remove the network from the telephone, proceed as follows:

- (a) Remove the telephone housing.
- (b) Remove any telephone component that may obstruct access to the network.
- (c) Disconnect the network leads.
- (d) Remove the network by bending the flexible retaining clip on the network spacer. Lift the network from the network spacer. (See Figure 4.)

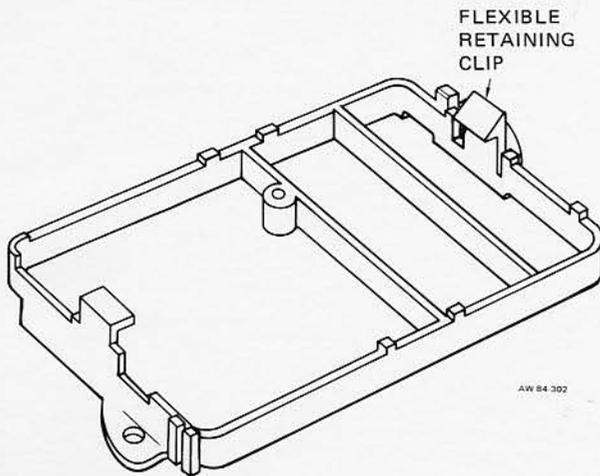


Figure 4: Network Spacer

### 4. DISASSEMBLY

4.01 Disassembly of the network is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

### 5. REPLACEMENT PARTS

5.01 Replacement parts for the Model 181427 network are listed in Table B.

### 6. INSTALLATION

6.01 To install the network inside a telephone, proceed as follows:

- (a) Remove the telephone housing.
- (b) Remove any telephone component that may obstruct access to the network spacer.
- (c) Place the network on the network spacer so that the notches on the spacer align with the grooves in the PCB.
- (d) Press firmly on the PCB until it snaps into place.
- (e) Connect the various leads to the network while referring to the telephone circuit label.

TABLE B

REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED				
			101	102	105	106	107
		<b>Model 181427 Network</b>	<b>101</b>	<b>102</b>	<b>105</b>	<b>106</b>	<b>107</b>
1	181164-110	Capacitor, C2, 0.47 MFD, 400 V	1	1	1	1	1
2	181164-115	Capacitor, C3, 1.5 MFD, 200 V	1	1	1	1	1
3	182373-101	Terminal, Four-Position	13	13	—	—	—
	182373-102	Terminal, Four-Position	—	—	13	13	13
4	095974-102	Varistor, V1, Black	1	1	1	1	1
5	062948-778	Resistor, R1, 220 Ohm, 1/2 W, 10%	1	1	1	1	1
6	095974-101	Varistor, V2, Orange	1	1	1	1	1
7	181789-236	Resistor, R2, 33 Ohm, 1/2 W, 5%	1	1	1	1	1
8	088710-104	Coil Assembly, T1	1	1	1	1	1
9	181164-112	Capacitor, C1, 0.12 MFD, 200 V	1	—	1	—	—
10	181425-101	PC Board, Drilled	1	1	1	1	1
	181649-102	Screw, Terminal (Not Shown)	—	—	3	3	4

AW 84-933

NOTE: All capacitor values are in microfarads (MFD).

**MODEL 182386 AUTOMATIC EXCLUSION PCB**

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**1. INTRODUCTION**

**1.01** This document covers the Model 182386 automatic exclusion PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

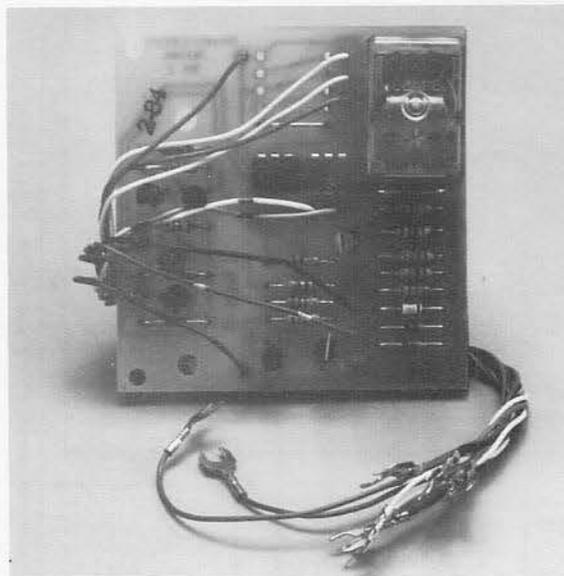
**1.02** Whenever this section is reissued, reason for reissue will be listed in this paragraph.

**1.03** For information concerning telephones that the automatic exclusion PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

**2. GENERAL DESCRIPTION**

**2.01** The Model 182386 PCB is an automatic exclusion (privacy) circuit for use in ITT multibutton telephones. (See Figure 2.) The circuit provides the station user with the ability to exclude other stations from a CO/PBX line. The circuit can only exclude multibutton stations that are equipped with an automatic exclusion PCB.

**2.02** The automatic exclusion circuit is activated when the station user goes off-hook and presses a CO/PBX line button. The PCB applies a logic "0" to the A lead of the selected CO/PBX line. This logic "0" maintains control of the A lead at the off-hook station and excludes all other exclusion telephones. The automatic exclusion circuit can be released by pressing and holding the exclusion release pushbutton at the off-hook station. This allows another station to access the same CO/PBX line.



AW 85-189

Figure 1: Model 182386 Automatic Exclusion PCB

**2.03** The automatic exclusion circuit is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted on brackets using screws. The PCB is connected to the telephone circuit using spade-tip connectors.

**2.04** The automatic exclusion PCB is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number.

**3. REMOVAL**

**3.01** To remove the automatic exclusion PCB from the telephone, proceed as follows:

- (a) Remove the telephone faceplate.
- (b) Disconnect the leads from the exclusion release pushbutton.
- (c) Remove the telephone housing.
- (d) Remove any telephone components that may obstruct access to the automatic exclusion PCB.

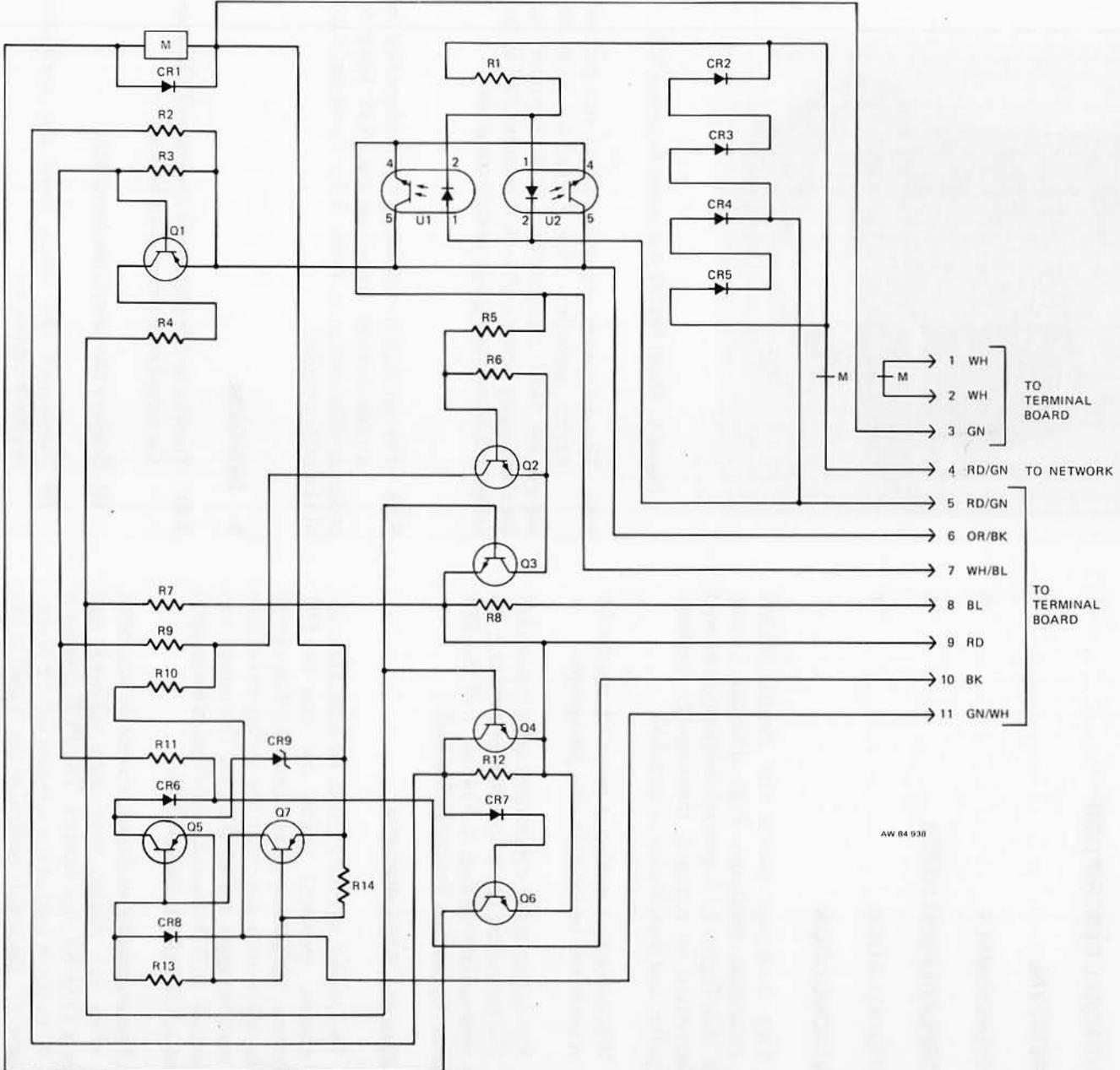
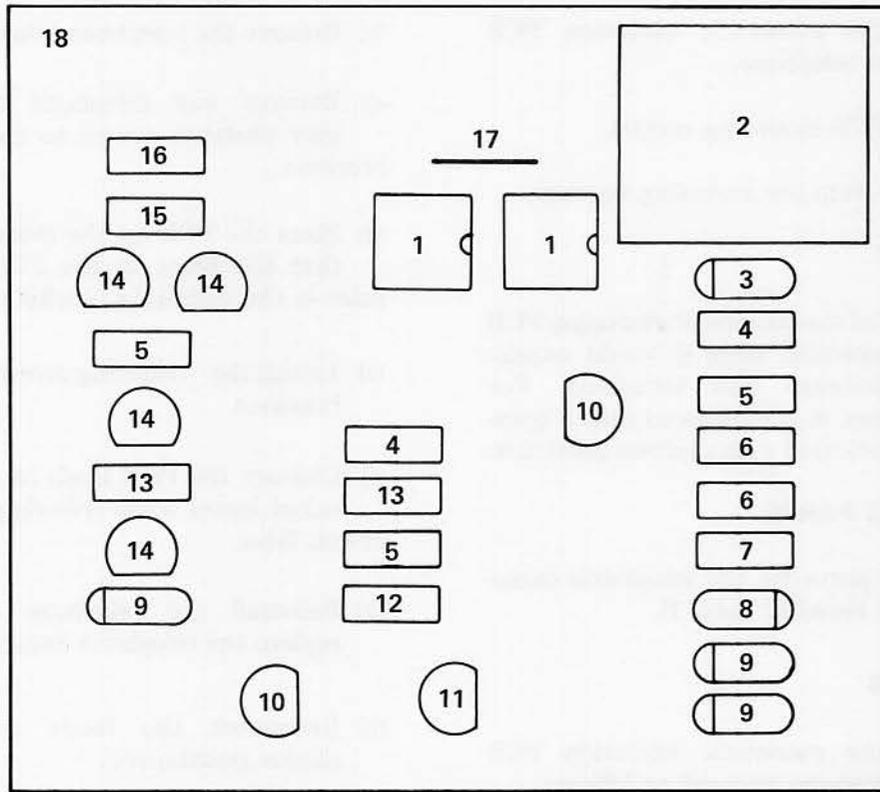


Figure 2: Model 182386 Automatic Exclusion PCB, Schematic



AW 84-937

Figure 3: Model 182386 Automatic Exclusion PCB, Component Location

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
		<u>182386</u>	<u>101</u>
(1)	PCB Model Number (See Part 1)	_____	
(2)	PCB Style (See Part 2)	_____	
PART 1 PCB MODEL NUMBER		PART 2 PCB STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
182386	Model 182386 Automatic Exclusion PCB	101	Standard PCB

AW 84-994

- (e) Disconnect the automatic exclusion PCB leads from the telephone.
- (f) Remove the PCB mounting screws.
- (g) Lift the PCB from the mounting brackets.

#### 4. DISASSEMBLY

**4.01** Disassembly of the automatic exclusion PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

#### 5. REPLACEMENT PARTS

**5.01** Replacement parts for the automatic exclusion PCB are listed in Table B.

#### 6. INSTALLATION

**6.01** To install the automatic exclusion PCB inside the telephone, proceed as follows:

- (a) Remove the telephone faceplate.

- (b) Remove the telephone housing.
- (c) Remove any telephone components that may obstruct access to the PCB mounting brackets.
- (d) Place the PCB on the mounting brackets so that the holes in the PCB align with the holes in the mounting brackets.
- (e) Install the mounting screws in the mounting brackets.
- (f) Connect the PCB leads to the telephone terminal board while referring to the telephone circuit label.
- (g) Reinstall the telephone components and replace the telephone housing.
- (h) Reconnect the leads to the exclusion release pushbutton.

- (j) Replace the telephone faceplate.

TABLE B

REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED
		Model 182386 Automatic Exclusion PCB	101
1	182261-103	Opto-Isolator, U1, U2	2
2	180105-104	Relay, M	1
3	180658-101	Diode, 1N4004, CR1	1
4	181789-146	Resistor, 10 K, R2, R4	2
5	181789-138	Resistor, 2.2 K, R3, R8, R13	3
6	181789-150	Resistor, 22 K, R9, R10	2
7	181789-152	Resistor, 33 K, R11	1
8	183611-149	Diode, Zener, 33 V, $\pm 10\%$ , CR9	1
9	180656-102	Diode, 1N4148, CR6, CR7, CR8	3
10	182090-101	Transistor, PNP, Q1, Q7	2
11	183541-101	Transistor, PNP, Q5	1
12	181789-111	Resistor, 15 Ohm, R14	1
13	181789-134	Resistor, 1 K, R7, R12	2
14	182076-101	Transistor, NPN, Q2, Q3, Q4, Q6	4
15	181789-145	Resistor, 8.2 K, R6	1
16	181789-143	Resistor, 5.6 K, R5	1
17	182126-101	Strap, Wire	1
18	182385-101	Printed Circuit Board, Drilled	1
	182388-101	Tape, Foam (Not Shown)	1
	190106-103	Wire Assembly, WH (Not Shown)	2
	190106-107	Wire Assembly, GN (Not Shown)	1
	190106-343	Wire Assembly, RD-GN (Not Shown)	2
	190106-108	Wire Assembly, OR-BK (Not Shown)	1
	190106-341	Wire Assembly, WH-BL (Not Shown)	1
	190106-104	Wire Assembly, BL (Not Shown)	1
	190106-105	Wire Assembly, RD (Not Shown)	1
	190106-106	Wire Assembly, BK (Not Shown)	1
	190106-345	Wire Assembly, GN-WH (Not Shown)	1

NOTE: All resistors are 1/4 W,  $\pm 5\%$  unless otherwise specified.

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**MODEL 182691 AUTOMATIC EXCLUSION PCB**

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**1. INTRODUCTION**

**1.01** This document covers the Model 182691 automatic exclusion PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

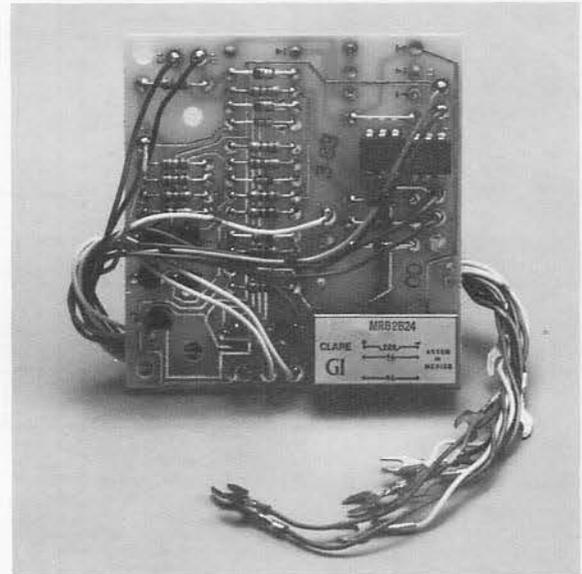
**1.02** Whenever this section is reissued, reason for reissue will be listed in this paragraph.

**1.03** For information concerning telephones that the automatic exclusion PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

**2. GENERAL DESCRIPTION**

**2.01** The Model 182691 PCB is an automatic exclusion (privacy) circuit for use in ITT multibutton telephones. (See Figure 2.) The circuit provides the station user with the ability to exclude other stations from a CO/PBX line. The circuit can only exclude multibutton stations that are equipped with an automatic exclusion PCB.

**2.02** The automatic exclusion circuit is activated when the station user goes off-hook and presses a CO/PBX line button. The PCB applies a logic "0" to the A lead of the selected CO/PBX line. This logic "0" maintains control of the A lead at the off-hook station and excludes all other exclusion telephones. The automatic exclusion circuit can be released by pressing and holding the exclusion release pushbutton at the off-hook station. This allows another station to access the same CO/PBX line.



AW 85-180

**Figure 1: Model 182691 Automatic Exclusion PCB**

**2.03** The automatic exclusion circuit is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted on brackets using screws. The PCB is connected to the telephone circuit using spade-tip connectors.

**2.04** The automatic exclusion PCB is available in two styles and is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number and for a description of each style.

**3. REMOVAL**

**3.01** To remove the automatic exclusion PCB from the telephone, proceed as follows:

- (a) Remove the telephone faceplate.
- (b) Disconnect the leads from the exclusion release pushbutton.
- (c) Remove the telephone housing.
- (d) Remove any telephone components that may obstruct access to the automatic exclusion PCB.

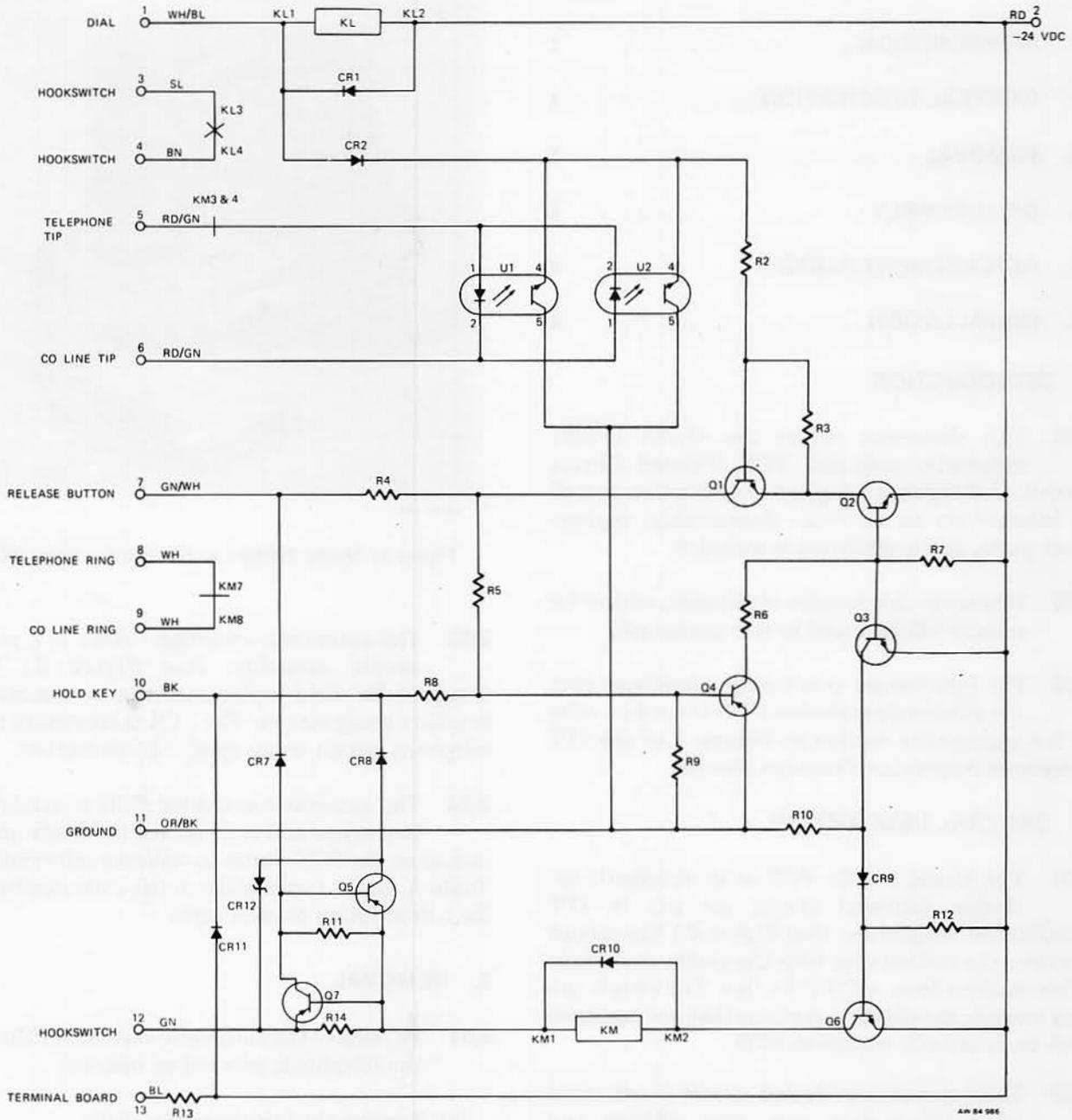
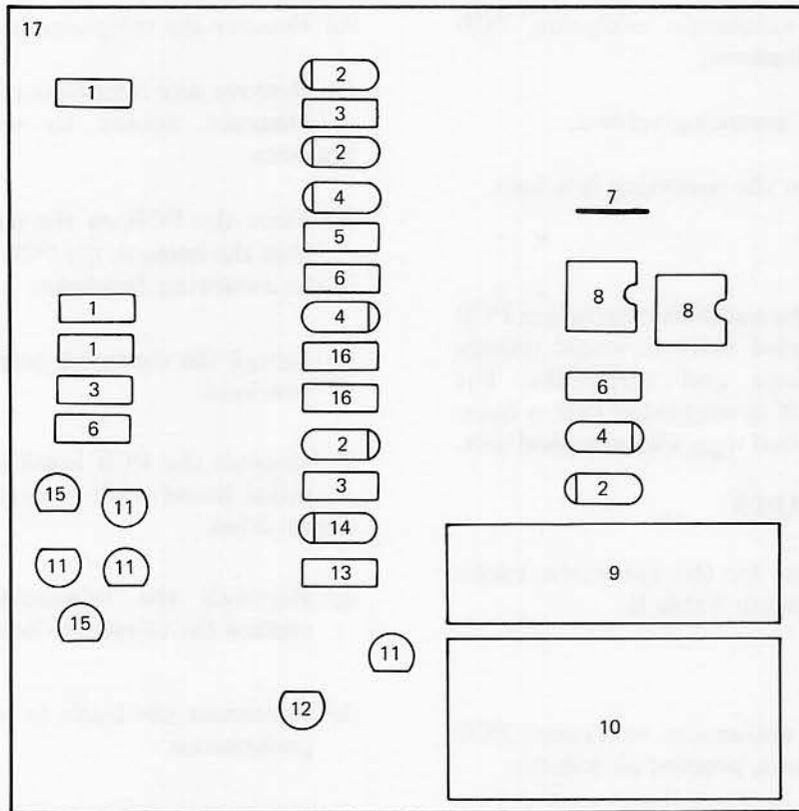


Figure 2: Model 182691 Automatic Exclusion PCB, Schematic



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Figure 3: Model 182691 Automatic Exclusion PCB, Component Location

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
(1) PCB Model Number (See Part 1)	_____		<u>182691</u>
(2) PCB Style (See Part 2)	_____		<u>101</u>
PART 1 PCB MODEL NUMBER		PART 2 PCB STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
182691	Model 182691 Automatic Exclusion PCB	101	Standard PCB
		102	PCB For Handsfree Operation

AW 84-996

**SECTION 55-691-135, ISS 1**

- (e) Disconnect the automatic exclusion PCB leads from the telephone.
- (f) Remove the PCB mounting screws.
- (g) Lift the PCB from the mounting brackets.

**4. DISASSEMBLY**

**4.01** Disassembly of the automatic exclusion PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

**5. REPLACEMENT PARTS**

**5.01** Replacement parts for the automatic exclusion PCB are listed in Table B.

**6. INSTALLATION**

**6.01** To install the automatic exclusion PCB inside the telephone, proceed as follows:

- (a) Remove the telephone faceplate.

- (b) Remove the telephone housing.
- (c) Remove any telephone components that may obstruct access to the PCB mounting brackets.
- (d) Place the PCB on the mounting brackets so that the holes in the PCB align with the holes in the mounting brackets.
- (e) Install the mounting screws in the mounting brackets.
- (f) Connect the PCB leads to the telephone terminal board while referring to the telephone circuit label.
- (g) Reinstall the telephone components and replace the telephone housing.
- (h) Reconnect the leads to the exclusion release pushbutton.
- (j) Replace the telephone faceplate.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED	
			101	102
		<b>Model 182691 Automatic Exclusion PCB</b>	<b>101</b>	<b>102</b>
1	181789-150	Resistor, 22 K, R4, R5, R8	3	3
2	180658-101	Diode, 1N4004, CR1, CR8, CR10, CR11	4	4
3	181789-138	Resistor, 2.2 K, R9, R11, R13	3	3
4	180656-102	Diode, 1N4148, CR2, CR7, CR9	3	3
5	181789-145	Resistor, 8.2K, R3	1	1
6	181789-146	Resistor, 10 K, R2, R6, R10	3	3
7	182126-101	Strap, Wire	1	1
8	182261-104	Opto-Isolator, U1, U2	2	2
9	182735-101	Relay, Dry Reed, KL	—	1
10	182736-101	Relay, Dry Reed, KM	1	1
11	182076-101	Transistor, NPN, Q1, Q2, Q3, Q6	4	4
12	183541-101	Transistor, PNP, Q5	1	1
13	181789-111	Resistor, 15 Ohm, R14	1	1
14	183611-149	Diode, Zener, 33 V, ±10%, CR12	1	1
15	182090-101	Transistor, PNP, Q4, Q7	2	2
16	181789-134	Resistor, 1 K, R7, R12	2	2
17	182690-101	Printed Card, Drilled	1	1

NOTE: All resistors are 1/4 W, ±5% unless otherwise specified.

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## MODEL 184059 10/20 CALL ANNOUNCE PCB

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### 1. INTRODUCTION

**1.01** This section covers the Model 184059 10/20 call announce PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

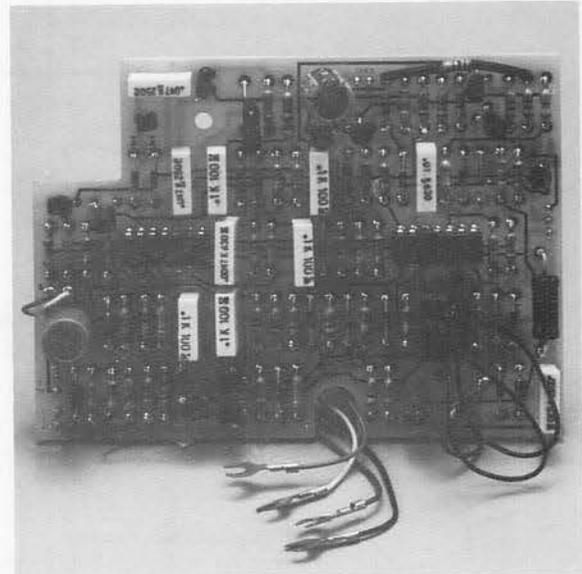
**1.02** Whenever this section is reissued, reason for reissue will be listed in this paragraph.

**1.03** For information concerning telephones that the 10/20 call announce PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

### 2. GENERAL DESCRIPTION

**2.01** The Model 184059 PCB is a call announce circuit for use in ITT multibutton telephones equipped with a built-in call announcer. (See Figure 2.) The circuit and associated call announcer components provide handsfree intercom operation for tone and voice signaling, call announcing, and handsfree answerback.

**2.02** The call announcer circuit is activated by an incoming intercom call. The circuit applies a signal to the LED indicator on the telephone, a one-second confirmation tone to the calling station, and a one-second alerting tone to the called station.



AW 85-190

Figure 1: Model 184059 10/20 Call Announce PCB

**2.03** The circuit is switched to the receive mode for the call announce message. At the end of the message the circuit switches to the transmit mode for handsfree answerback operation through the call announcer. The transmit mode can be deactivated by placing the PRIVATE/NORMAL switch in the PRIVATE position. This will prevent the calling party from overhearing conversation near the called station.

**2.04** The circuit is connected to a volume control on the telephone that can be adjusted for the desired listening level of the call announcer.

**2.05** The circuit is released when the station user goes off-hook during normal handset operation.

**2.06** The 10/20 call announce PCB is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted on brackets inside the telephone. The PCB is connected to the telephone circuit using spade-tip connectors.

**2.07** The 10/20 call announce PCB is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number.

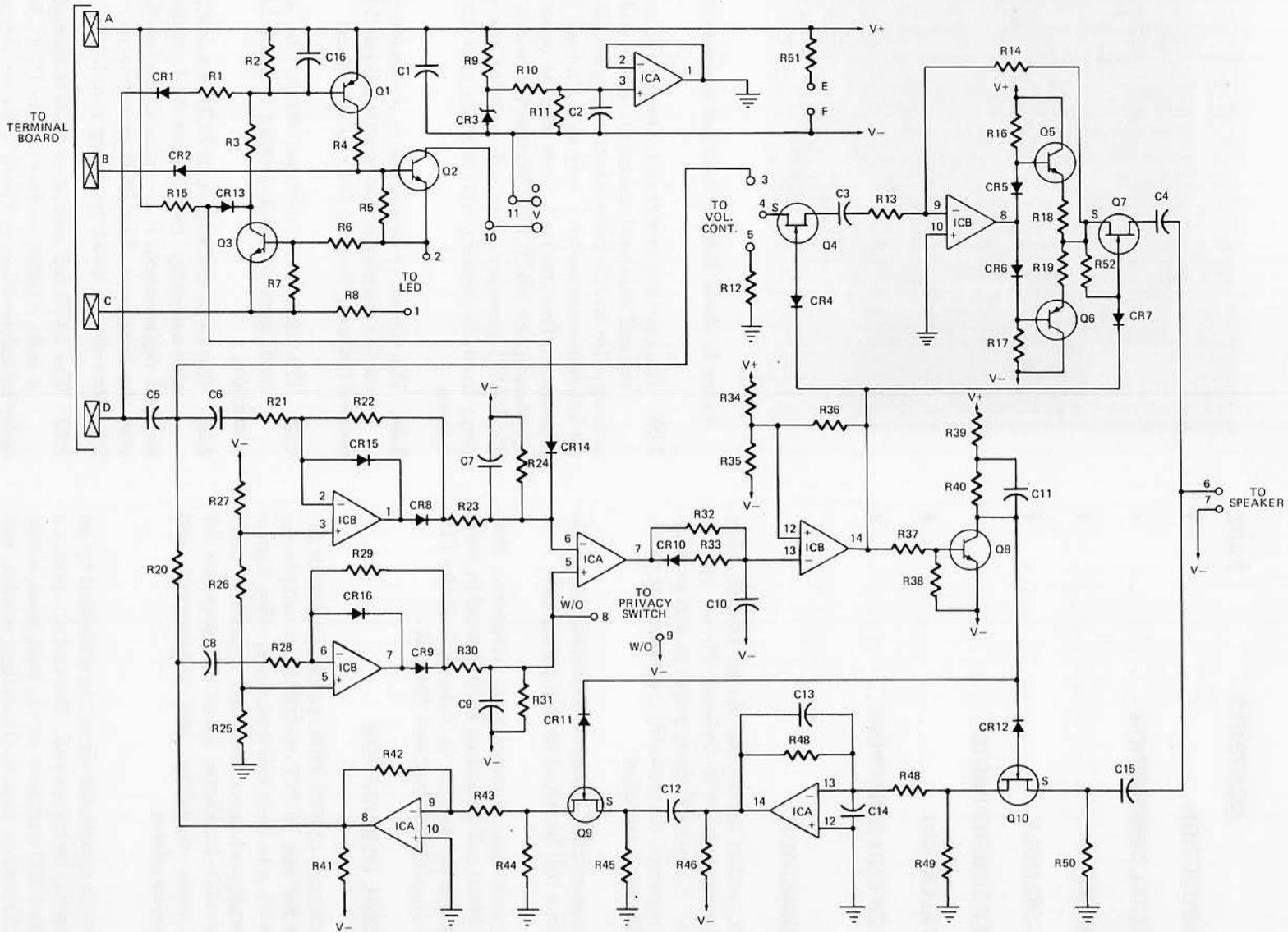
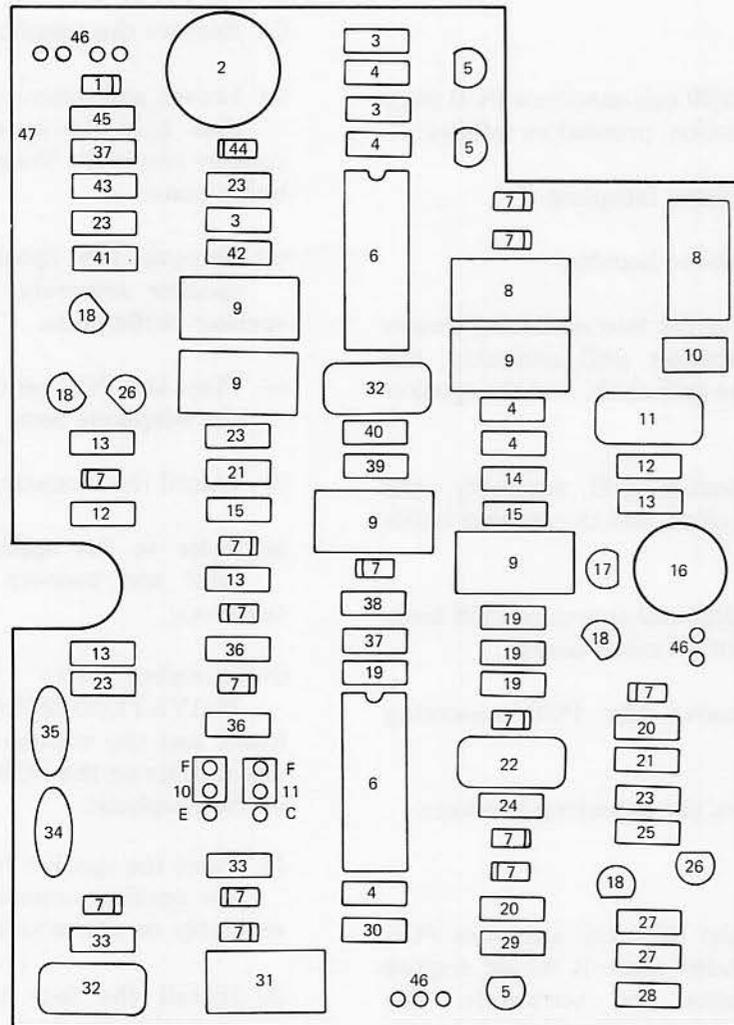


Figure 2: Model 184059 10/20 Call Announce PCB, Schematic



AW 84 984

Figure 3: Model 184059 10/20 Call Announce PCB, Component Location

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
		184059	101
(1) PCB Model Number	_____		
(See Part 1)			
(2) PCB Style	_____		
(See Part 2)			
PART 1 PCB MODEL NUMBER		PART 2 PCB STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
184059	Model 184059 10/20 Call Announce PCB For Telephones Equipped With Built-In Call Announcer	101	Standard Operation

AW 84 992

### 3. REMOVAL

3.01 To remove the 10/20 call announce PCB from its mounting location, proceed as follows:

- (a) Remove the telephone faceplate.
- (b) Remove the telephone housing.
- (c) Loosen and remove the four mounting screws that hold the speaker grill assembly, the speaker assembly, the grill cloth, and the speaker baffle plate.
- (d) Remove the speaker grill assembly, the speaker, the grill cloth, and the speaker baffle plate.
- (e) Disconnect the 10/20 call announce PCB leads from the telephone terminal board.
- (f) Loosen and remove the PCB mounting screws.
- (g) Lift the PCB from the mounting brackets.

### 4. DISASSEMBLY

4.01 Disassembly of the 10/20 call announce PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

### 5. REPLACEMENT PARTS

5.01 Replacement parts for the 10/20 call announce PCB are listed in Table B.

### 6. INSTALLATION

6.01 To install the 10/20 call announce PCB inside a telephone, proceed as follows:

- (a) Remove the telephone faceplate.

- (b) Remove the telephone housing.

- (c) Loosen and remove the four mounting screws that hold the speaker grill assembly, the speaker assembly, the grill cloth, and the speaker baffle plate.

- (d) Remove the speaker grill assembly, the speaker assembly, the grill cloth, and the speaker baffle plate.

- (e) Place the PCB on the mounting brackets on the telephone base.

- (f) Install the mounting screws.

- (g) Refer to the appropriate telephone circuit label and connect the PCB leads to the telephone.

- (h) Connect the speaker leads, the PRIVATE/NORMAL switch leads, the LED leads, and the volume control leads to the terminal posts on the PCB. Refer to the circuit label of the telephone.

- (j) Place the speaker baffle plate, the grill cloth, the speaker assembly, and the speaker grill assembly on the mounting brackets.

- (k) Install the four mounting screws in the mounting brackets.

- (m) Replace the telephone housing.

- (n) Replace the telephone faceplate.

### 7. PCB OPTION STRAPPING

7.01 The 10/20 call announce PCB provides option strapping pins for the selection of normal call announce operation or all call announce operation. Strap F to 11 and F to 10 for normal call announce operation, or C to 11 and E to 10 for all call announce operation. Refer to Figure 2 for option strapping pin locations showing factory strapping.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED
		<b>Model 184059 10/20 Call Announce PCB</b>	<b>101</b>
1	180658-101	Diode, 1N4004, CR2	1
2	181819-105	Capacitor, 100 MFD, 50 V, C1	1
3	181789-158	Resistor, 100 K, R10, R45, R50	3
4	181789-144	Resistor, 6.8 K, R25, R43, R44, R48, R49	5
5	181469-101	Transistor, FET, 2N4302, Q4, Q9, Q10	3
6	182705-101	IC, LM324, ICA, ICB	2
7	180656-102	Diode, 1N4148, CR1, CR4-CR16	14
8	182075-103	Capacitor, 0.047 MFD, 100 V, C12, C15	2
9	182075-106	Capacitor, 0.1 MFD, 100 V, C2, C7, C9, C10, C11	5
10	181665-104	Capacitor, 100 PFD, C13	1
11	181665-105	Capacitor, 510 PFD, C14	1
12	181789-164	Resistor, 330 K, R15, R47	2
13	181789-146	Resistor, 10 K, R2, R3, R23, R46	4
14	181789-163	Resistor, 270 K, R42	1
15	181789-140	Resistor, 3.3 K, R27, R41	2
16	181819-103	Capacitor, 47 MFD, 25 V, C4	1
17	182420-101	Transistor, FET, E 109, Q7	1
18	180146-101	Transistor, NPN, 2N4141, Q2, Q3, Q5, Q8	4
19	181789-155	Resistor, 56 K, R34, R35, R36, R37	4
20	181789-141	Resistor, 3.9 K, R16, R38	2
21	181789-169	Resistor, 1 M, R31, R40	2
22	182075-101	Capacitor, 0.01 MFD, 100 V, C3	1
23	181789-143	Resistor, 5.6 K, R1, R7, R9, R30, R33	5
24	181789-153	Resistor, 39 K, R13	1
25	181789-138	Resistor, 2.2 K, R17	1
26	180279-101	Transistor, PNP, 2N4143, Q1, Q6	2
27	181789-111	Resistor, 15 Ohm, R18, R19	2
28	181789-166	Resistor, 470 K, R14	1
29	181789-136	Resistor, 1.5 K, R12	1
30	181789-125	Resistor, 220 Ohm, R26	1
31	181789-344	Resistor, 1 K, 1 W, $\pm 5\%$ , R51	1
32	182075-109	Capacitor, 0.0047 MFD, 100 V, C6, C8	2
33	181789-154	Resistor, 47 K, R21, R28	2
34	182130-107	Capacitor, 1.0 MFD, 35 V, C5	1
35	182130-112	Capacitor, 6.8 MFD, 35 V, C16	1
36	181789-167	Resistor, 560 K, R22, R29	2
37	181789-147	Resistor, 12 K, R6, R39	2
38	181789-195	Resistor, 3.3 M, R32	1
39	181789-179	Resistor, 820 K, R24	1
40	181789-135	Resistor, 1.2 K, R20	1
41	181789-142	Resistor, 4.7 K, R4	1
42	181789-168	Resistor, 680 K, R11	1
43	181789-118	Resistor, 56 Ohm, R8	1
44	183611-138	Diode, Zener, 1N4743A, 13 V, CR3	1
45	181789-129	Resistor, 470 Ohm, R5	1
46	183097-101	Square Terminal	15
	183299-101	Shorting Connector (Not Shown)	2
47	184058-101	PC Board, Drilled	1

## NOTES:

AW 84 993

1. All resistors are 1/4 W,  $\pm 5\%$  unless otherwise specified.
2. All capacitor values are in microfarads (MFD) or picofarads (PFD).

## MODELS 184130 AND 183091 NETWORKS

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4. DISASSEMBLY .....	4
5. REPLACEMENT PARTS .....	4
6. INSTALLATION .....	4

### 1. INTRODUCTION

**1.01** This document covers the Models 184130 and 183091 networks. (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

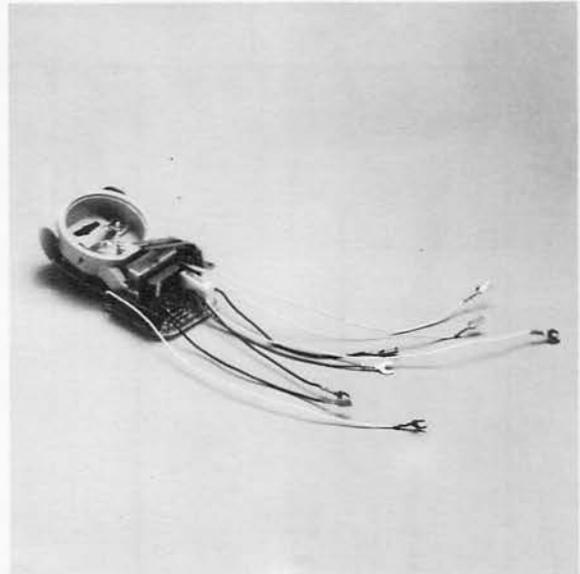
**1.02** Whenever this section is reissued, reason for reissue will be listed in this paragraph.

**1.03** For information concerning telephones that these networks are used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

### 2. GENERAL DESCRIPTION

**2.01** The Models 184130 and 183091 network assemblies provide all the components necessary to connect and to match the impedance of the Trendline rotary dial handset transmitter and receiver units to a four-wire telephone handset cord. The network includes an RF filter, a sidetone balancing circuit, a recall switch, a transmitter cup assembly, and an Automatic Number Identification (ANI) circuit. (See Figures 2 and 3.)

**2.02** The networks are printed circuit assemblies. All components are assembled on a printed circuit board (PCB). (See Figure 4.) The networks are designed for the handset of the rotary dial Trendline telephone. The networks mount in the handset over the transmitter and recall button.



AW 84-878

Figure 1: Models 184130 and 183091 Networks

#### MODEL 184130

**2.03** The Model 184130 network is used in the rotary dial Trendline telephones with modular handsets.

#### MODEL 183091

**2.04** The Model 183091 network is used in the rotary dial Trendline telephones with non-modular handsets.

**2.05** The networks are available in only one style and have no identification other than a PCB part number etched on the PCB. Refer to ordering information in Table A.

### 3. REMOVAL

**3.01** To remove the network from the telephone, proceed as follows:

- (a) Remove the number card retainer, number card, and light shield from the telephone handset; use a paper clip or similar instrument to pry the card retainer from the handset. (See Figure 5.)

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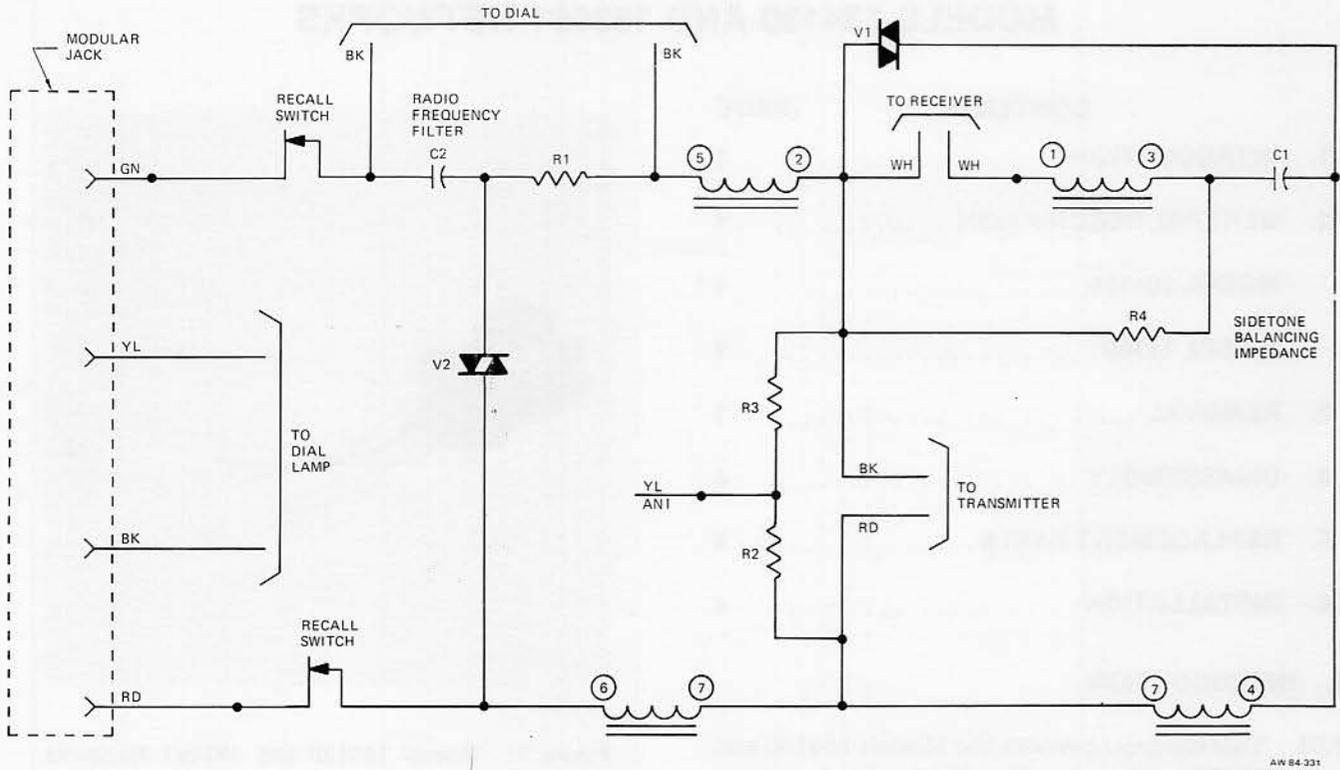


Figure 2: Model 184130 Network, Schematic

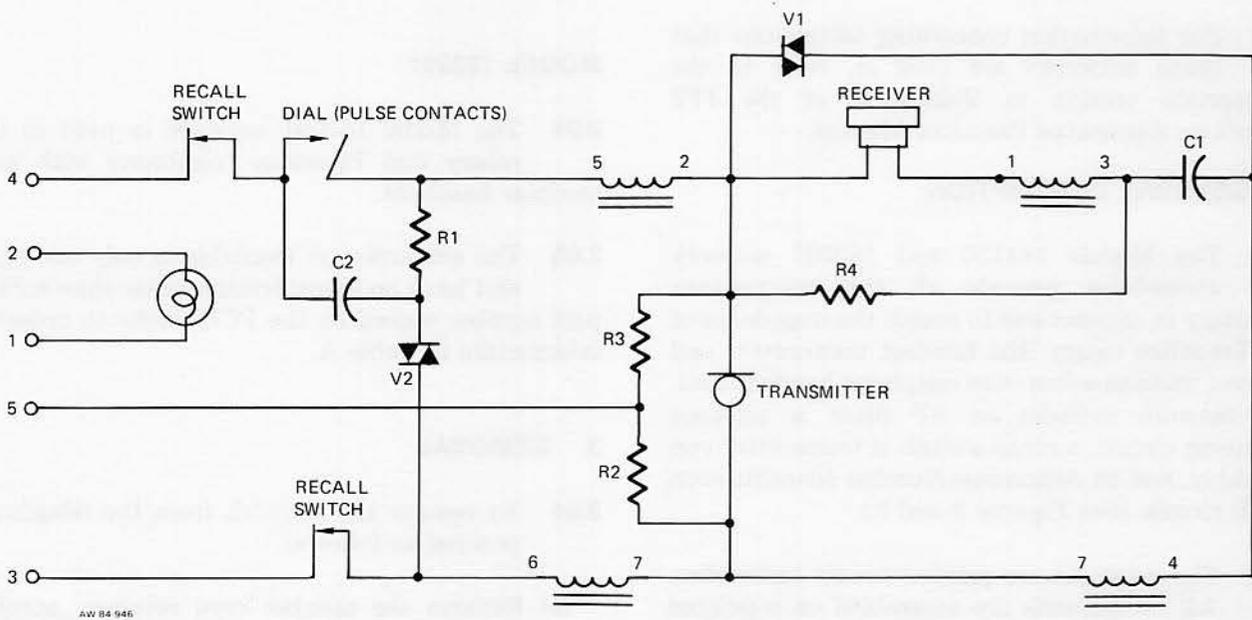
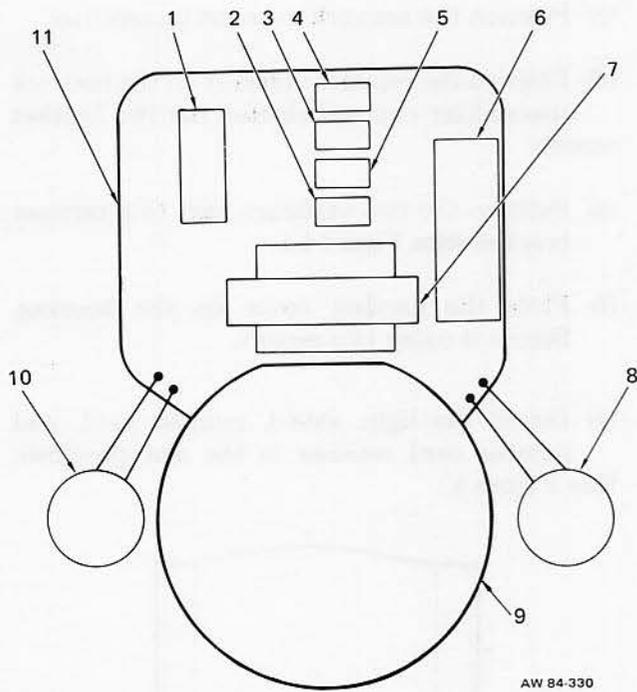


Figure 3: Model 183091 Network, Schematic



AW 84-330

HANDSET COVER  
MOUNTING SCREWS

LIGHT  
GUIDE  
NUMBER  
CARD  
NUMBER  
CARD  
RETAINER

PAPER  
CLIP  
HOLE

AW 84-334

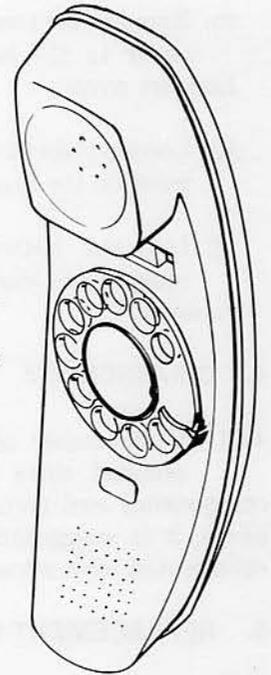


Figure 4: Models 184130 and 183091 Networks, Exploded View

Figure 5: Removal of Number Card Retainer

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
NETWORK CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
		184130	101
(1) Network Model Number (See Part 1)	_____	└──┬──	└──┬──
(2) Network Style (See Part 2)	_____	└──┬──	└──┬──
PART 1 NETWORK MODEL NUMBER		PART 2 NETWORK STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
184130	Model 184130 Network For Rotary Dial Trendline Telephones With Modular Handsets	101	Standard
183091	Model 183091 Network For Rotary Dial Trendline Telephones With Nonmodular Handsets	101	Standard

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- (b) Remove the two screws that hold the handset cover to the handset housing. Remove the handset cover.
- (c) Loosen the two mounting bracket screws and position the brackets away from the network.
- (d) Lift the network from the handset and remove all leads from the dial, lamp, and receiver.

#### 4. DISASSEMBLY

4.01 Disassembly of the network is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

#### 5. REPLACEMENT PARTS

5.01 Replacement parts for the Models 184130 and 183091 networks are listed in Table B.

#### 6. INSTALLATION

6.01 To install the network inside a telephone, proceed as follows:

- (a) Remove the handset cover.
- (b) Connect the various network leads to the telephone components while referring to the appropriate telephone circuit label.

- (c) Position the network over the transmitter.
- (d) Position the retainer brackets on the network transmitter cup and tighten the two bracket screws.
- (e) Position the two varistors next to a retainer bracket. (See Figure 6.)
- (f) Place the handset cover on the housing. Secure it using two screws.
- (g) Install the light shield, number card, and number card retainer in the slot provided. (See Figure 5.)

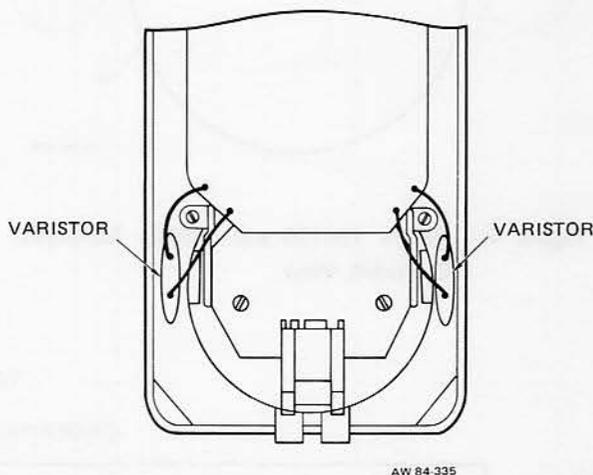


Figure 6: Position of Varistors

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED	
			184130	183091
		Models 184130 And 183091 Networks	184130	183091
1	181164-117	Capacitor, C2, 0.15 MFD, $\pm 20\%$ , 250 V	1	1
2	062948-778	Resistor, R1, 220 Ohm, 1/2 W, $\pm 10\%$	1	1
3	181789-240	Resistor, R3, 1.6 K, 1/2 W, $\pm 5\%$	1	1
4	181789-236	Resistor, R4, 33 Ohm, 1/2 W, $\pm 5\%$	1	1
5	181789-239	Resistor, R2, 2 K, 1/2 W, $\pm 5\%$	1	1
6	095995-112	Capacitor, C1, 1.5 MFD, $\pm 10\%$ , 100 V	1	1
7	088710-104	Coil Assembly, Induction	1	1
8	095974-101	Varistor, V1	1	1
9	182995-101	Transmitter Cup Assembly	1	—
9	088597-101	Transmitter Cup Assembly	—	1
10	095974-102	Varistor, V2	1	1
	088576-101	Switch Assembly (Not Shown)	1	1
11	183090-101	PC Board, Drilled	1	1
	182996-102	Modular Jack Assembly (Not Shown)	1	—

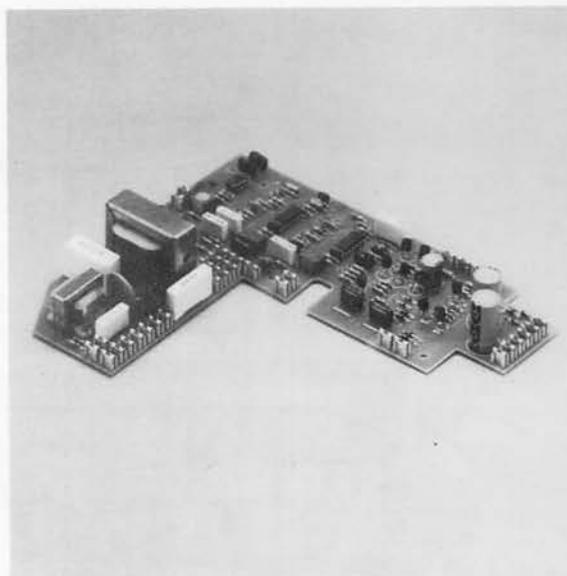
NOTE: All capacitor values are in microfarads (MFD).

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## MODEL 185889

### 10/20 HANDSFREE PCB

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5. REPLACEMENT PARTS .....	4
6. INSTALLATION .....	4



AW 84-877

Figure 1: Model 185889 10/20 Handsfree PCB

#### 1. INTRODUCTION

**1.01** This section covers the Model 185889 10/20 handsfree PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

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

**1.03** For information concerning telephones that the 10/20 handsfree PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

#### 2. GENERAL DESCRIPTION

**2.01** The Model 185889 PCB is a handsfree circuit designed for use in ITT multibutton handsfree telephones. The handsfree components and network components are consolidated onto the PCB. (See Figure 2.)

**2.02** The PCB provides the necessary components for placing or answering calls during handsfree operation. The circuit and associated components form a two-way talk path, with volume control and privacy on transmission.

**2.03** The PCB also provides the components necessary to connect and to match the impedance of the telephone transmitter and receiver to the telephone circuit.

**2.04** The 10/20 handsfree circuit is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted to the telephone base. The two-position terminals on the PCB are used for connection to the telephone.

**2.05** The 10/20 handsfree PCB is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number. The available styles of the PCB are described in the following paragraphs.

##### MODEL 185889-101

**2.06** The Model 185889-101 PCB provides the components to operate in handsfree telephones equipped with a rotary dial.

##### MODEL 185889-102

**2.07** The Model 185889-102 PCB provides the components to operate in handsfree telephones equipped with a pushbutton dial.

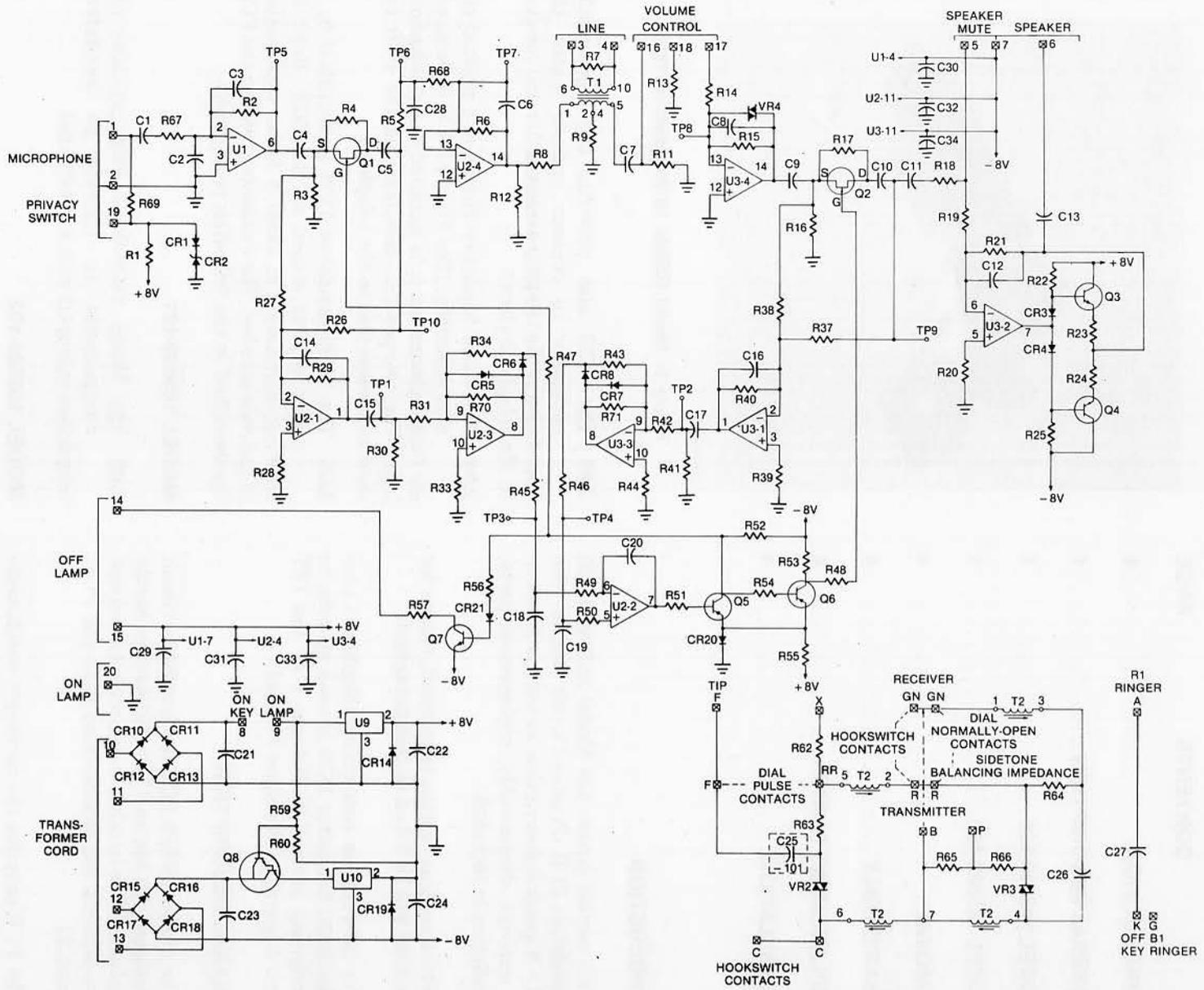


Figure 2: Model 185889 10/20 Handsfree PCB, Schematic

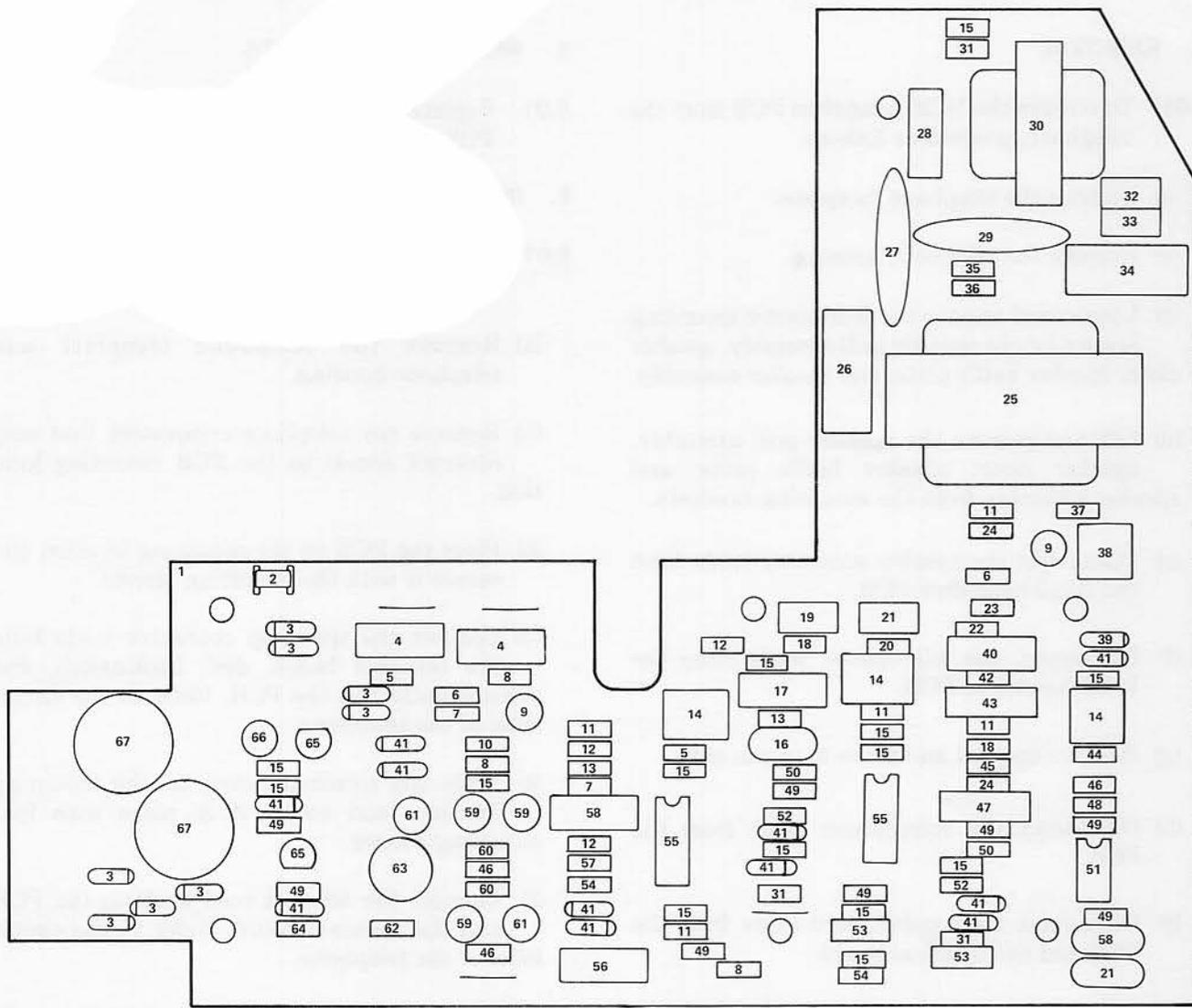


Figure 3: Model 185889 10/20 Handsfree PCB, Component Locations

AW 85-49

TABLE A

ORDERING INFORMATION

<b>CODE NUMBERS</b>			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
		<u>185889</u>	<u>101</u>
(1) PCB Model Number	_____		
(See Part 1)			
(2) PCB Style	_____		
(See Part 2)			
<b>PART 1 PCB MODEL NUMBER</b>		<b>PART 2 PCB STYLE</b>	
<b>CODE</b>	<b>DESCRIPTION</b>	<b>CODE</b>	<b>DESCRIPTION</b>
185889	Model 185889 10/20 Handsfree PCB	101	For Rotary Dial Telephones
		102	For Pushbutton Dial Telephones

AW 85-198

### 3. REMOVAL

**3.01** To remove the 10/20 handsfree PCB from the telephone, proceed as follows:

- (a) Remove the telephone faceplate.
- (b) Remove the telephone housing.
- (c) Loosen and remove the four plastic mounting screws for the speaker grill assembly, speaker cloth, speaker baffle plate, and speaker assembly.
- (d) Lift and remove the speaker grill assembly, speaker cloth, speaker baffle plate, and speaker assembly from the mounting brackets.
- (e) Disconnect the speaker assembly leads from the 10/20 handsfree PCB.
- (f) Disconnect the microphone leads from the 10/20 handsfree PCB.
- (g) Remove the dial and move it to one side.
- (h) Disconnect the transformer leads from the PCB.
- (j) Disconnect the handset cord leads from the PCB and the terminal board.
- (k) Remove the four mounting screws from the terminal board.
- (m) Move the terminal board to one side to allow access to the PCB.
- (n) Disconnect the remaining spade-tip leads that are connected to the PCB.
- (p) Remove the PCB mounting screws and lift the PCB from the telephone base.

### 4. DISASSEMBLY

**4.01** Disassembly of the 10/20 handsfree PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

### 5. REPLACEMENT PARTS

**5.01** Replacement parts for the 10/20 handsfree PCB are listed in Table B.

### 6. INSTALLATION

**6.01** To install the 10/20 handsfree PCB inside the telephone, proceed as follows:

- (a) Remove the telephone faceplate and telephone housing.
- (b) Remove any telephone component that may obstruct access to the PCB mounting location.
- (c) Place the PCB on the mounting location and secure it with the mounting screws.
- (d) Connect the spade-tip connector leads from the terminal board, dial, hookswitch, and volume control to the PCB. Refer to the circuit label of the telephone.
- (e) Place the terminal board on the mounting brackets and secure it in place with four mounting screws.
- (f) Connect the handset cord leads to the PCB and the terminal board. Refer to the circuit label of the telephone.
- (g) Connect the transformer cord leads to the PCB.
- (h) Place the dial in the mounting brackets and secure it in place with the mounting screws.
- (j) Connect the microphone leads to the PCB. Refer to the circuit label of the telephone.
- (k) Connect the speaker assembly leads to the PCB. Refer to the circuit label of the telephone.
- (m) Place the speaker assembly, speaker baffle plate, speaker cloth, and speaker grill assembly on the mounting brackets.
- (n) Secure them in place with the four plastic mounting screws.
- (p) Replace the telephone housing and telephone faceplate.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED	
			101	102
		<b>Model 185889 10/20 Handsfree PCB</b>	<b>101</b>	<b>102</b>
1	185888-101	Printed Card, Drilled	1	1
2	187948-101	Terminal, Two-Position	35	35
3	180658-101	Diode, 1N4004, CR10-13, CR15-18	8	8
4	181164-119	Capacitor, 0.22 MFD, C10, C11	2	2
5	181789-153	Resistor, 39 K, R18, R20	2	2
6	181789-169	Resistor, 1 M, R47, R48	2	2
7	181789-164	Resistor, 330 K, R40, R54	2	2
8	181789-158	Resistor, 100 K, R17, R51, R53	3	3
9	181469-101	Transistor, 2N4302, Q1, Q2	2	2
10	181789-149	Resistor, 18 K, R56	1	1
11	181789-134	Resistor, 1 K, R3, R12, R16, R30, R41	5	5
12	181789-145	Resistor, 8.2 K, R13, R19, R37	3	3
13	181789-152	Resistor, 33 K, R15, R38	2	2
14	183588-348	Capacitor, 1 MFD, C1, C9, C15	3	3
15	181789-146	Resistor, 10 K, R14, R28, R31, R34, R39, R42, R43, R49, R50, R52, R59, R60, R62, R69	14	14
16	095655-101	Varistor, VR4	1	1
17	182075-109	Capacitor, 0.0047 MFD, C8	1	1
18	181789-128	Resistor, 390 Ohm, R8, R11	2	2
19	181668-102	Capacitor, 2.2 MFD, C7	1	1
20	181789-167	Resistor, 560 K, R29	1	1
21	181665-106	Capacitor, 300 PFD, C3, C14	2	2
22	181789-147	Resistor, 12 K, R26	1	1
23	181789-161	Resistor, 180 K, R27	1	1
24	181789-160	Resistor, 150 K, R4, R6	2	2
25	185334-101	Transformer, Hybrid, T1	1	1
26	181164-110	Capacitor, 0.47 MFD, C27	1	1
27	095974-102	Varistor, VR2	1	1
28	181164-112	Capacitor, 0.12 MFD, C25	1	—
29	095974-101	Varistor, VR3	1	1
30	088710-104	Coil, Induction, T2	1	1
31	181789-125	Resistor, 220 Ohm, R45, R46, R63	3	3
32	181789-240	Resistor, 1.6 K, 1/2 W, R66	1	1
33	181789-239	Resistor, 2 K, 1/2 W, R65	1	1
34	181164-115	Capacitor, 1.5 MFD, C26	1	1
35	181789-115	Resistor, 33 Ohm, R64	1	1
36	181789-133	Resistor, 910 Ohm, R7	1	1
37	181789-122	Resistor, 120 Ohm, R9	1	1
38	183588-338	Capacitor, 0.33 MFD, C4	1	1
39	180281-101	Diode, Zener, 1N4734, 5.6 V, CR2	1	1
40	182075-103	Capacitor, 0.047 MFD, C5	1	1
41	180656-102	Diode, 1N4148, CR1, CR3-8, CR14, CR19-21	11	11
42	181789-142	Resistor, 4.7 K, R5	1	1
43	182075-102	Capacitor, 0.022 MFD, C28	1	1
44	181789-132	Resistor, 820 Ohm, R1	1	1
45	181789-141	Resistor, 3.9 K, R68	1	1
46	181789-138	Resistor, 2.2 K, R22, R25, R67	3	3
47	182135-127	Capacitor, 680 PFD, C6	1	1
48	181789-162	Resistor, 220 K, R2	1	1
49	180464-112	Capacitor, 0.1 MFD, C22, C24, C29-34	8	8

TABLE B

## REPLACEMENT PARTS LIST (Cont)

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED	
			101	102
		<b>Model 185889 10/20 Handsfree PCB</b>	<b>101</b>	<b>102</b>
50	181789-140	Resistor, 3.3 K, R33, R44	2	2
51	183547-102	Op Amp, LF356 (DIP), U1	1	1
52	181789-166	Resistor, 470 K, R70, R71	2	2
53	181664-109	Capacitor, 4.7 MFD, 20 V, C18, C19	2	2
54	181665-104	Capacitor, 100 PFD, C12, C20	2	2
55	185747-101	Quad Op Amp, U2, U3	2	2
56	182075-104	Capacitor, 0.47 MFD, C17	1	1
57	181789-179	Resistor, 820 K, R21	1	1
58	181665-105	Capacitor, 510 PFD, C2, C16	2	2
59	180279-101	Transistor, 2N4143, Q4, Q5, Q6	3	3
60	181789-111	Resistor, 15 Ohm, R23, R24	2	2
61	180147-101	Transistor, 2N4141, Q3, Q7	2	2
62	181789-226	Resistor, 160 Ohm, 1/2 W, R57	1	1
63	181819-103	Capacitor, 47 MFD, 25 V, C13	1	1
64	181789-139	Resistor, 2.7 K, R55	1	1
65	183584-101	Voltage Regulator, U9, U10	2	2
66	181471-101	Transistor, 2N5305, Q8	1	1
67	181819-101	Capacitor, 470 MFD, 25 V, C21, C23	2	2

## NOTES:

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1. All resistors are 1/4 W,  $\pm 5\%$  unless otherwise specified.
2. All capacitor values are in microfarads (MFD) or picofarads (PFD).

## MODEL 186260 DUAL HOOKSWITCH FLASH PCB

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4. DISASSEMBLY .....	3
5. REPLACEMENT PARTS .....	3
6. INSTALLATION .....	3

**1.01** This section covers the Model 186260 dual hookswitch flash PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

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

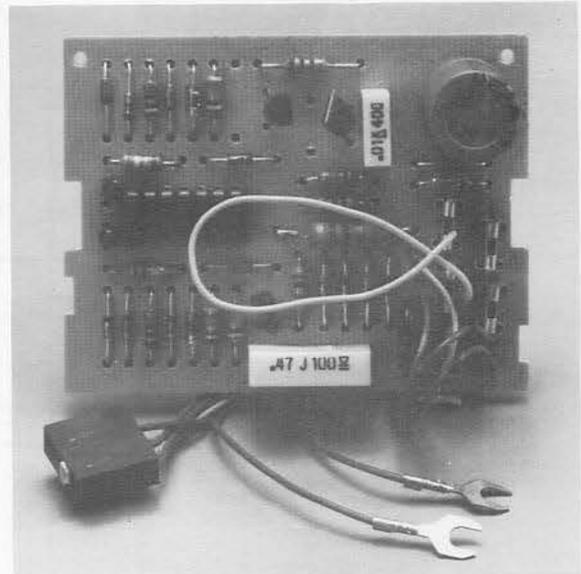
**1.03** For information concerning telephones that the dual hookswitch flash PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

### 2. GENERAL DESCRIPTION

**2.01** The Model 186260 PCB is a dual hookswitch flash circuit for use in ITT single-line telephones used with a PBX. The circuit provides a precise time period for hookswitch flash operation and hookswitch line disconnect. (See Figure 2.)

**2.02** The dual hookswitch flash circuit is activated by the telephone hookswitch or the FLASH button on the telephone. The circuit provides two separate timed line disconnects.

**2.03** A 1.5 to 2.5 second line disconnect is sent via the telephone to the PBX when the station user presses and releases the telephone hookswitch. The PBX line is disconnected.



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Figure 1: Model 186260 Dual Hookswitch Flash PCB

**2.04** A 500 to 700 millisecond line disconnect is sent via the telephone to the PBX when the station user presses and releases the FLASH button. The PBX recognizes the line disconnect as a hookswitch flash, used to place a call on hold and to access other PBX features.

**2.05** The dual hookswitch flash circuit is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted to the telephone base. The PCB is connected to the telephone circuit with spade-tip leads and a double-row slip-on connector block.

**2.06** The dual hookswitch flash PCB is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number.

### 3. REMOVAL

**3.01** To remove the dual hookswitch flash PCB from the telephone, proceed as follows:

- (a) Remove the telephone faceplate.

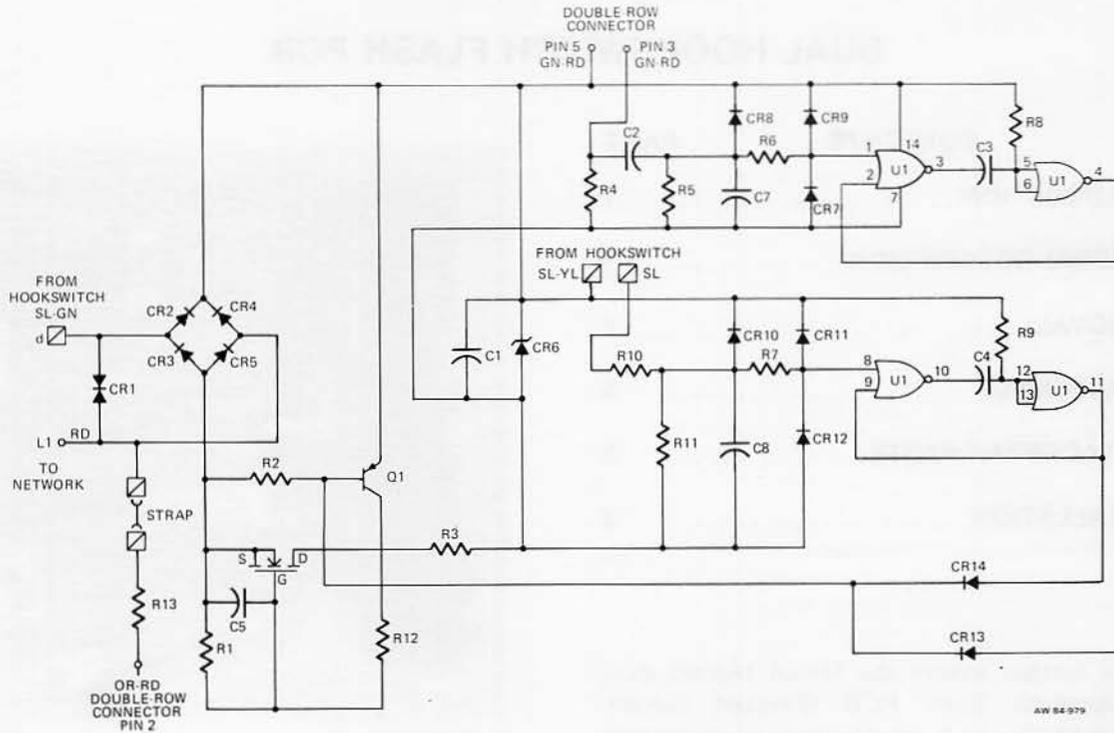


Figure 2: Model 186260 Dual Hookswitch Flash PCB, Schematic

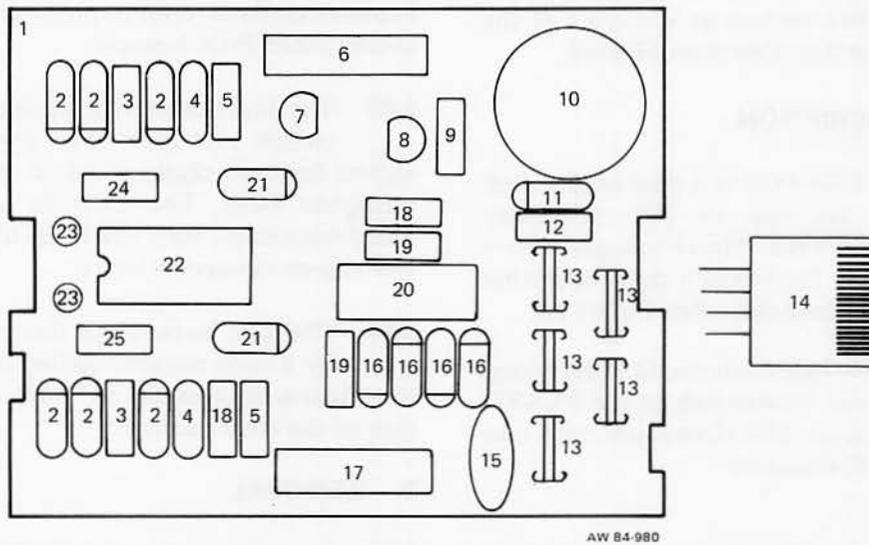


Figure 3: Model 186260 Dual Hookswitch Flash PCB, Component Location

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
(1) PCB Model Number (See Part 1)			186260
(2) PCB Style (See Part 2)			101
PART 1 PCB MODEL NUMBER		PART 2 PCB STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
186260	Model 186260 Dual Hookswitch Flash PCB	101	Standard PCB

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- (b) Remove the telephone housing.
- (c) Loosen the dial mounting screws.
- (d) Lift the dial from the mounting brackets and move it to one side.
- (e) Disconnect the double-row connector from the rear of the dial.
- (f) Disconnect the spade-tip connector leads that are attached to the PCB.
- (g) Remove the PCB from the mounting location.

#### 4. DISASSEMBLY

**4.01** Disassembly of the dual hookswitch flash PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

#### 5. REPLACEMENT PARTS

**5.01** Replacement parts for the dual hookswitch flash PCB are listed in Table B.

#### 6. INSTALLATION

**6.01** To install the dual hookswitch flash PCB inside the telephone, proceed as follows:

- (a) Remove the telephone faceplate and housing.
- (b) Remove the dial and move it to one side.
- (c) Place the PCB in the mounting location.
- (d) Connect the spade-tip leads to the PCB while referring to the circuit label of the telephone.
- (e) Attach the double-row connector to the rear of the dial.
- (f) Replace the dial in the mounting brackets and secure it with the mounting screws.
- (g) Replace the telephone housing and faceplate.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED
		<b>Model 186260 Dual Hookswitch Flash PCB</b>	<b>101</b>
1	186259-101	PC Board, Drilled	1
2	180656-102	Diode, 1N4148, CR7-CR12	6
3	181789-134	Resistor, 1 K, 1/4 W, $\pm 5\%$ , R6, R7	2
4	180464-112	Capacitor, 0.1 MFD, 50 V, C7, C8	2
5	181789-158	Resistor, 100 K, 1/4 W, $\pm 5\%$ , R4, R11	2
6	181789-121	Resistor, 100 Ohm, 1/4 W, $\pm 5\%$ , R10	1
7	185327-101	Transistor, 2N5401, Q1	1
8	186271-101	VMOS, VK1010, Q2	1
9	182075-126	Capacitor, 0.01 MFD, 250 V, C5	1
10	181819-101	Capacitor, 470 MFD, 16 V, C1	1
11	182311-101	Diode, Zener, 1N5231B, CR6	1
12	181789-156	Resistor, 68 K, 1/4 W, $\pm 5\%$ , R13	1
13	187948-101	Terminal, Spade	5
14	188695-101	Connector, Double-Row	1
15	184672-101	MOV, Bidirectional, CR1	1
16	180658-101	Diode, 1N4004, CR2-CR5	4
17	182075-104	Capacitor, 0.47 MFD, 100 V, C2	1
18	181789-146	Resistor, 10 K, 1/4 W, $\pm 5\%$ , R5, R12	2
19	181789-169	Resistor, 1 M, 1/4 W, $\pm 5\%$ , R1, R2	2
20	185672-470	Resistor, 47 Ohm, 1 W, $\pm 5\%$ , R3	1
21	184751-101	Diode, Schottky, 1N6263, CR13, CR14	2
22	182407-154	IC, CD4001UBE, U1	1
23	182315-102	Capacitor, 6.8 MFD, 10 V, C3, C4	2
24	181789-193	Resistor, 620 K, 1/4 W, $\pm 5\%$ , R9	1
25	181789-160	Resistor, 150 K, 1/4 W, $\pm 5\%$ , R8	1
	190106-628	Wire Assembly, YL, (Not Shown)	1
	190106-105	Wire Assembly, RD, (Not Shown)	1

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## MODEL 187995 HOLD CIRCUIT PCB

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4. DISASSEMBLY .....	3
5. REPLACEMENT PARTS .....	3
6. INSTALLATION .....	3

### 1. INTRODUCTION

**1.01** This section covers the Model 187995 hold circuit PCB (Printed Circuit Board). (See Figure 1.) A general description as well as information on removal, disassembly, replacement parts, and installation is included.

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

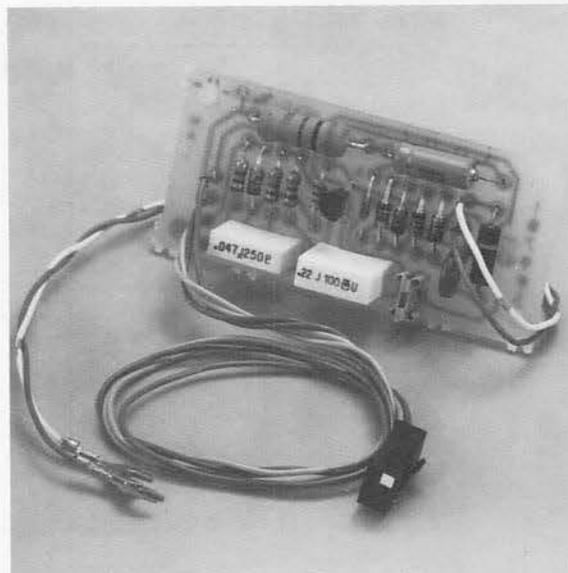
**1.03** For information concerning telephones that the hold circuit PCB is used in, refer to the appropriate section in Volume 1 of the ITT Telephone Apparatus Practices Manual.

### 2. GENERAL DESCRIPTION

**2.01** The Model 187995 PCB is a hold circuit designed for use in ITT single-line telephones. The circuit allows the station user to place a CO/PBX (Central Office/Private Branch Exchange) line on hold. (See Figure 2.)

**2.02** The circuit provides all the components necessary to maintain the CO/PBX line connection when the station user goes on-hook. The circuit also provides a clock pulse output to the hold indicator. The call remains on hold until the station user goes off-hook at the held station or any connected extension.

**2.03** The hold circuit is a printed circuit assembly. (See Figure 3.) It is designed for field replacement; it is mounted to the telephone base inside the



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Figure 1: Model 187995 Hold Circuit PCB

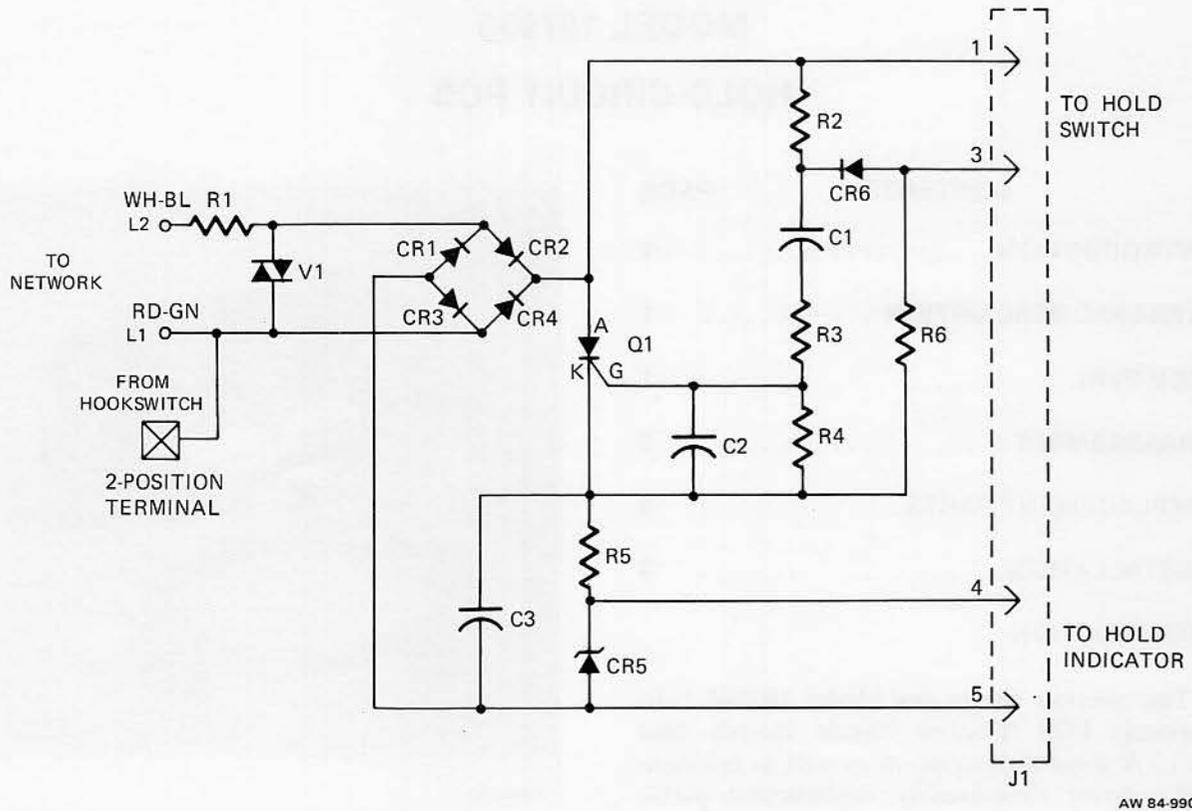
telephone. The PCB is connected to the telephone components with spade-tip leads and a double-row slip-on connector block.

**2.04** The hold circuit PCB is identified by a code number etched on the PCB. Refer to ordering information in Table A for an explanation of the code number.

### 3. REMOVAL

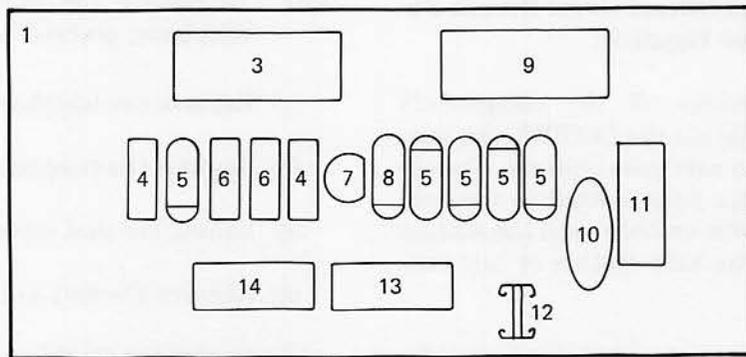
**3.01** To remove the hold circuit PCB from the telephone, proceed as follows:

- (a) Remove the telephone faceplate.
- (b) Remove the telephone housing.
- (c) Loosen the dial mounting screws.
- (d) Remove the dial and move it to one side.
- (e) Locate the double-row connector behind the HOLD button on the pushbutton dial. Remove the connector from the mating pins.



AW 84-990

Figure 2: Model 187995 Hold Circuit PCB, Schematic



AW 84-991

Figure 3: Model 187995 Hold Circuit PCB, Component Locations

TABLE A  
ORDERING INFORMATION

CODE NUMBERS			
PCB CODE NUMBERS ARE FORMED IN TWO STEPS AS FOLLOWS:			
(1) PCB Model Number (See Part 1)			187995
(2) PCB Style (See Part 2)			101
PART 1 PCB MODEL NUMBER		PART 2 PCB STYLE	
CODE	DESCRIPTION	CODE	DESCRIPTION
187995	Model 187995 Hold Circuit PCB	101	Standard

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(f) Disconnect the PCB spade-tip leads from the network, and disconnect the hookswitch lead from the two-position terminal on the PCB.

(g) Lift the PCB from the foam tape on the base assembly of the telephone.

#### 4. DISASSEMBLY

4.01 Disassembly of the hold circuit PCB is not recommended since it would require removal of components and terminals. For maintenance purposes, it is suggested that a questionable unit be substituted with a known good unit.

#### 5. REPLACEMENT PARTS

5.01 Replacement parts for the hold circuit PCB are listed in Table B.

#### 6. INSTALLATION

6.01 To install the hold circuit PCB inside the telephone, proceed as follows:

(a) Remove the telephone faceplate.

(b) Remove the telephone housing.

(c) Remove the dial and move it to one side.

(d) Connect the PCB spade-tip leads to the network, and connect the hookswitch lead to the two-position terminal on the PCB. Refer to the circuit label of the telephone.

(e) Place the PCB on the foam tape on the base assembly, and press down to secure it in place.

(f) Attach the PCB double-row connector to the mating pins located behind the HOLD button on the rear of the dial.

(g) Place the dial in the mounting brackets and secure it with the dial mounting screws.

(h) Replace the telephone housing.

(j) Replace the telephone faceplate.

TABLE B  
REPLACEMENT PARTS LIST

INDEX NO	PART NUMBER	DESCRIPTION	QUANTITY USED
		<b>Model 187995 Hold Circuit PCB</b>	<b>101</b>
1	187994-101	PC Board, Drilled	1
2	188417-101	Connector, Double-Row, J1	1
3	186280-301	Resistor, 300 Ohm, 2 W, $\pm 5\%$ , R5	1
4	181789-169	Resistor, 1 M, 1/4 W, $\pm 5\%$ , R2, R6	2
5	180658-101	Diode, 1N4004, CR1-4, CR6	5
6	181789-134	Resistor, 1 K, 1/4 W, $\pm 5\%$ , R3, R4	2
7	186256-101	SCR, Q1	1
8	182311-101	Diode, Zener, 1N5231B, 5.1 V, CR5	1
9	181819-163	Capacitor, 10 MFD, 25 V, C3	1
10	184672-104	Varistor, MOV, V1	1
11	062948-756	Resistor, 100 Ohm, 1/2 W, $\pm 5\%$ , R1	1
12	181666-102	Terminal, Two-Position	1
13	182075-110	Capacitor, 0.22 MFD, 100 V, $\pm 20\%$ , C2	1
14	182075-107	Capacitor, 0.047 MFD, 100 V, $\pm 10\%$ , C1	1
	190106-341	Wire Assembly, WH-BL (Not Shown)	1
	190106-109	Wire Assembly, RD-GN (Not Shown)	1

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