2991C/D-, 2992C-, 2993C-, AND 2994C-TYPE MULTIBUTTON ELECTRONIC TELEPHONE (MET) SETS GENERAL DESCRIPTION

1. GENERAL

1.01 This section contains identification, and describes the physical and functional characteristics of the 2991C/D-, 2992C-, 2993C-, and 2994C-type multibutton electronic telephone (MET) sets (Fig. 1 through 8) initially designed to be used with DIMENSION® PBX electronic custom telephone service and the HORIZON® communication system.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add the 2993C04 MET desk set with a built-in speakerphone (BIS)
- Add ZT2JG3B dial
- Add ZD8AJ-50 and ZD8AJ-87 cords
- Add Federal Communications Commission (FCC) Warning (paragraph 1.03)

1.03 *"Warning: This equipment generates, uses, and can radiate RF energy, and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference."*

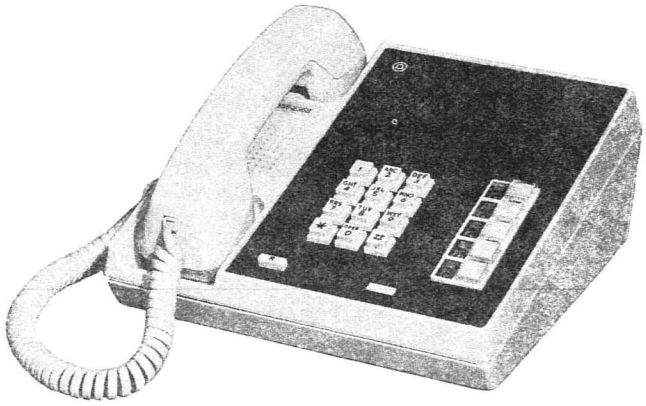


Fig. 1—2991C01 Telephone Set

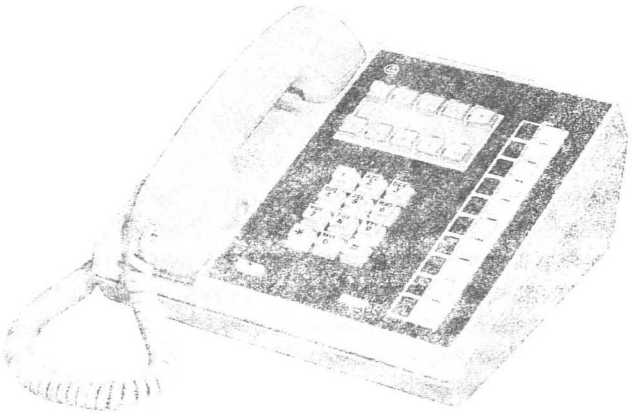


Fig. 2—2991C02 Telephone Set

2. IDENTIFICATION

2.01 For set ordering information refer to Table A.

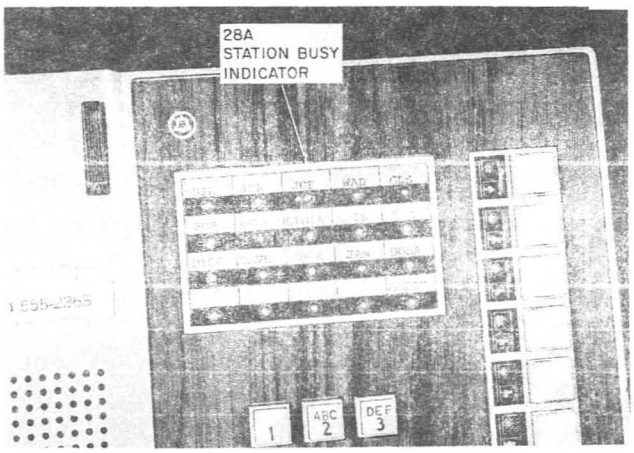


Fig. 3—2991C04 Telephone Set

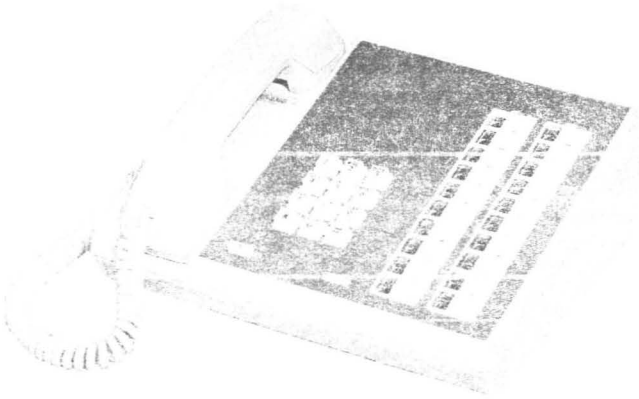


Fig. 5—2992C01 Telephone Set

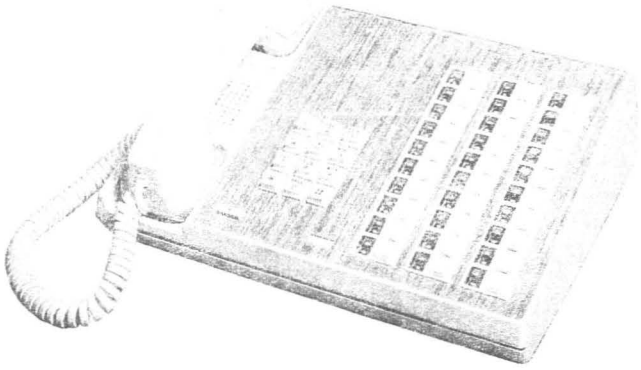


Fig. 6—2993C01 Telephone Set

Adjuncts

2.03 The following adjuncts can be used with all [illegible] sets, [illegible] are not generally recommended [illegible]

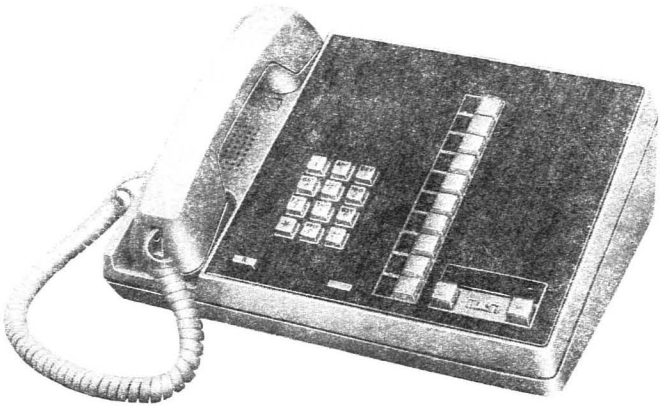


Fig. 7—▶2993C04 Telephone Set With Built-In Speakerphone◀

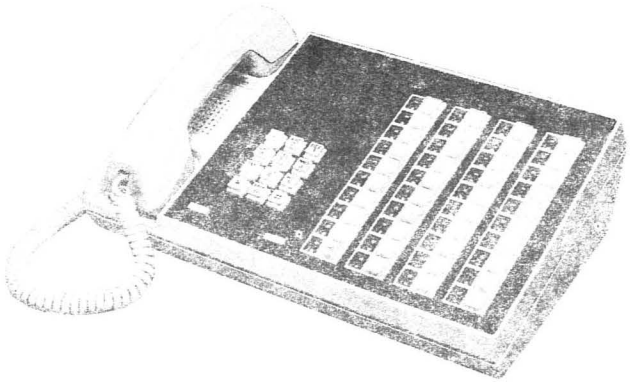


Fig. 8—2994C01 Telephone Set

of the dial. Each set contains one or more vertically oriented line/feature keys positioned to the right of the dial. These keys, available in 5- and 10-button arrays, are arranged to provide 5-, 10-, 20-, 30-, and 40-button sets.

3.02 The upper and lower housings enclose the chassis assembly which consists of a plastic chassis with all components and circuits attached. The upper housing and chassis assembly are common to both the desk and wall mounted sets. A lower housing is used for desk sets, and positions the faceplate at an angle of approximately 15 degrees from the desk top. Desk sets are supplied with a 7-foot long 8-conductor plug-ended mounting cord.

3.03 Wall sets use another housing in place of the lower housing on the desk set. This housing interfaces with a wall bracket that is attached to the wall and supports the chassis so the faceplate slopes outward from the wall at an angle of approximately eight degrees. The wall sets contain all hardware required for installation including the mounting plate and a connecting block for terminating a 4-pair cable. The similarity between desk and wall sets provides for simple conversion of all desk sets, except 2994C01, to wall sets by using the appropriate kit of parts as specified in Table C.

3.04 Electrical interconnections within the sets are made on an interconnect field located above the dial for easy access when the faceplate is removed (Fig. 9). This module consists of a printed wiring board with paths interconnecting pins inserted into the board. These pins are arranged in groups to correspond with the electrical terminations associated with each component. Each component contains 3-foot wiring harness terminated with a miniature 9-pin connector that mates with a specified group of pins on the interconnect module. A plastic guide block on the module protects the pins from being accidentally bent, provides positions to indicate proper connector positions, and prevents the connectors from being inserted improperly. All adjunct features requiring electrical interconnection can be added by simply plugging into the appropriate position in the interconnect module.

3.05 The nonlocking buttons on the line/feature keys provide silent, low-travel movement for ease of operation. A removable cap on each button will accept a designation tab from the preprinted E-6980-1 and E-6980-2 forms supplied with the sets.

* Trademark of American Telephone and Telegraph Company.

TABLE A

MULTIBUTTON ELCTRONIC TELEPHONE SET
(FACTORY ARRANGEMENTS)

SET CODE	DESK SET	WALL SET	5-BUTTON SET	10-BUTTON SET	20-BUTTON SET	30-BUTTON SET	40-BUTTON SET	DIRECT STATION SELECTION (DSS)	STATION BUSY (SB)	BUILT-IN SPEAKER PHONE	FACEPLATE (NOTE)
2991C01	X		X								261B-
2991C02	X			X				X			261C-
2991C04	X			X					X		261C-
2991C05*	X			X							261A-
2991D01		X	X								261B-
2991D05*		X		X							261A-
2992C01*	X				X						262A-
2993C01*	X					X					263A-
2993C04*	X			X						X	273C-
2994C01	X						X				264A-

Note: Sets are shipped with a disposable protective faceplate. Faceplates must be ordered separately. Complete faceplate code by adding color suffix from following:

Avocado (-100)	Gold (-111)	Red (-114)
Teak (-108)	Orange (-112)	Blue (-115)
Walnut (-109)	Brown (-113)	Black (-118)

* Compatible with DIMENSION*/System 85.

Two light emitting diode (LED) indicators, one green and one red, are positioned adjacent to each button. The green LED has a round lens and indicates the status of the line or feature associated with the button. The red LED has a square lens with a diamond pattern. This LED, called the "I-use" LED, is used for line buttons to indicate which line is in use when off-hook or which line is to be used when going off-hook.

LEDs to provide visual indication when any of the designated stations are busy.

3.08 The 2993C04 set, (Fig. 7) provides a built-in speakerphone (1C transmitter-receiver) and a 10-button key array. The 1C transmitter-receiver is mounted in the space normally occupied by key positions 11 through 30 used in the 30-button set. An ON/SPEED, OFF button, volume control and LED are

which incorporates data transmit-receive, power regulation, and logic circuitry. Each line/feature key contains a printed wiring board assembly on which is mounted additional logic circuitry and LED indicators. Sets offering the direct station selection feature contain other printed wiring board assemblies with additional circuitry.

4.02 All printed wiring board assemblies and conventional set components are terminated in miniature connectors that mate with set wiring or plug into an interconnect field (Fig. 9). A block diagram indicating the functional relationship between components is found in Fig. 10.

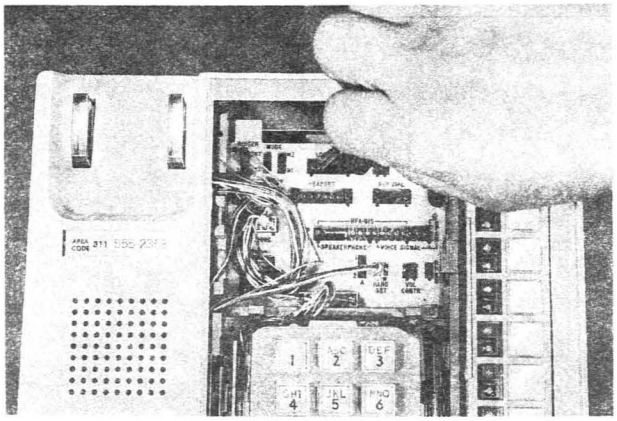


Fig. 9—Interconnect Field

4.03 Connections to the MET set are made via a four pair cord. The purpose of each conductor pair in the cord is as follows.

(a) ***Talk Tip and Talk Ring (TT and TR):*** This pair is the primary speech pair. The line circuit of the serving system connects via these conductors to the speech network in the telephone set. Voice and TOUCH-TONE® dialing signals are carried on this pair.

(b) ***Auxiliary Tip and Auxiliary Ring (AT and AR):*** This pair can be used to provide auxiliary speech services to the telephone set.

(c) ***Lamp Tip and Lamp Ring (LT and LR):*** Indicator control signals are received over this pair. In this way, control of the ringer and LED indicator circuitry is maintained.

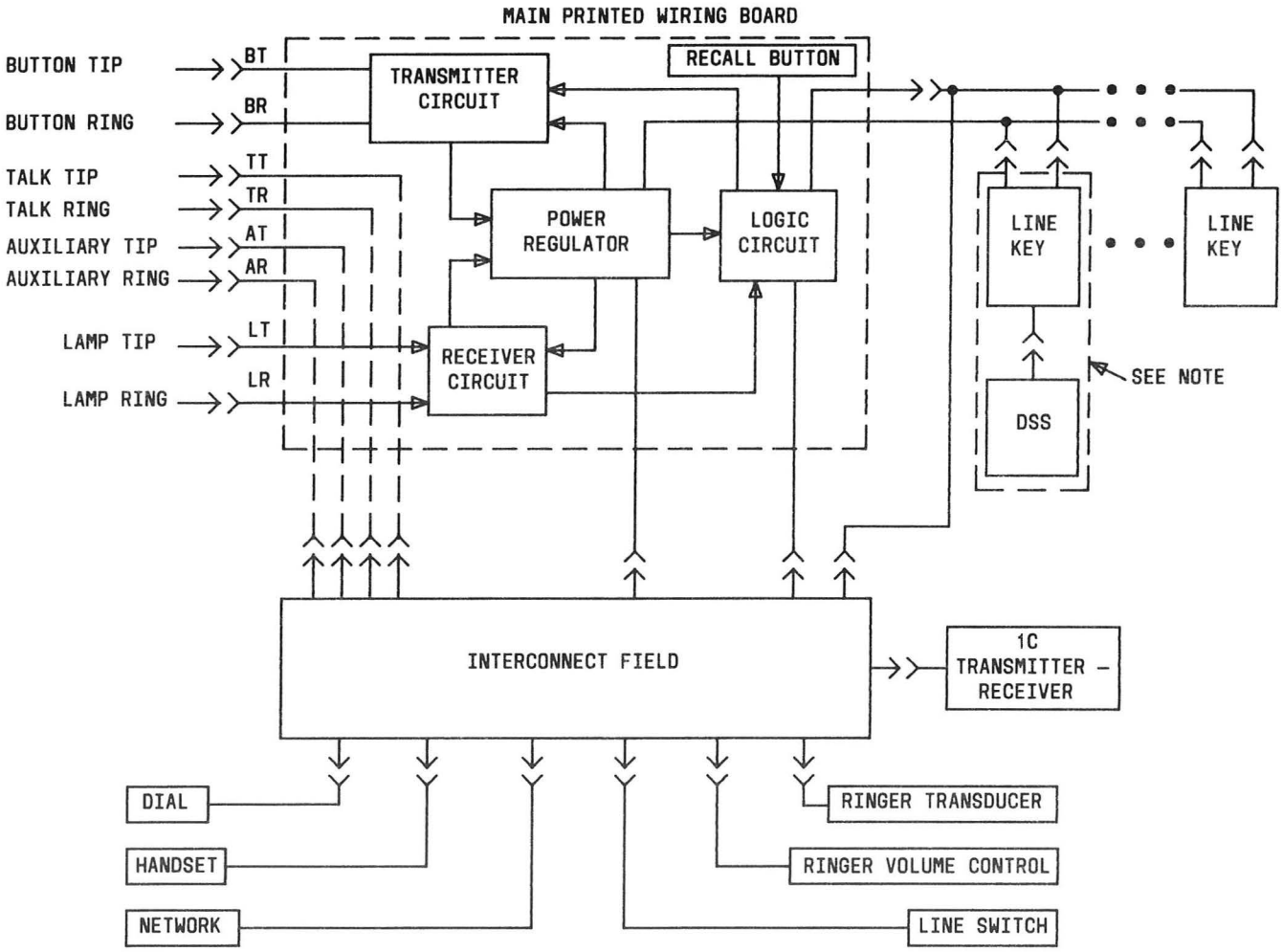
(d) ***Button Tip and Button Ring (BT and BR):*** The condition of telephone feature controls is transmitted from the set over this pair. The controller in the system is thus able to monitor the status of the MET set.

The lamp and button data pairs are used to carry power to the set. The lamp pair is at a positive potential with reference to the button pair, as indicated in Fig. 11. ▶The arrangement for providing power for the built-in speakerphone in the 2993C04 telephone set is shown in Fig. 12.◀

4.04 The two data pairs connected to a MET set terminate on the main printed wiring board in the data receiver and transmitter circuits. The data receiver provides input to the logic circuitry. It includes a transformer for connection to the lamp data pair. The data transmitter receives input from the logic circuitry. It functions in synchronism with received data and includes a transformer for connecting to the button data pair. A switching regulator-type power supply is connected to the center-taps of each transformer and provides dc output voltage to power set circuitry. It receives power phantomed on the data pairs. The logic circuitry responds to received data and inputs from the telephone user. Received information is processed to activate set features, eg, turning the ringer on and off and activating LED indicators. User inputs from recall, direct station selection, or line/feature key button depression and switchhook transitions are translated by the logic circuitry into data signals transmitted from the set.

4.05 The line/feature keys in a MET set provide input to the main printed wiring board. A button depression causes a message to be sent to the controller. The controller sends messages to the MET set to light or extinguish LEDs. The LEDs provide visual indication to a user regarding feature status and/or line usage.

4.06 Depressing a button on a direct station selection key, when provided in a MET set, furnishes an input to the main printed wiring board via the first line key in the set. The resulting message sent to the controller causes the station associated with the depressed button to be signaled.



NOTE: ON SOME CODES OF SETS THE DSS KEY IS NOT PROVIDED AND THE INDICATED BLOCK CONTAINS ONLY LINE KEY FUNCTIONS. ON THE 2991C04 SET THIS BLOCK IS REPLACED BY A STATION BUSY INDICATOR.

Fig. 10—MET Set Functional Block Diagram

4.07 The tone ringer has tone generating components incorporated in the logic circuitry of the main printed wiring board. Its frequency, level, and duty cycle are controlled by data signals and the appropriate drive is provided via the interconnect field to a ringer transducer. The ringer volume control allows manual adjustment of ringer level, separate from that provided by data signals.

4.08 The 28A station busy indicator contains 20 green LEDs and appropriate driver circuitry.

4.09 The built-in speakerphone is turned on by momentarily depressing the ON/QUIET button to either originate or answer a call. The ON/QUIET button must be held depressed until the handset is replaced in its cradle during the transfer from handset to speakerphone operation. Holding the ON/QUIET button depressed also cuts-off the built-in speakerphone microphone, preventing transmission to the line when desired by the user. The speakerphone is turned off by momentarily depressing the OFF button. Lifting of the handset during a speakerphone call will turn the speakerphone off and transfer the call to handset operation. The loudspeaker output sound level is adjustable by the use of the speakerphone volume control.

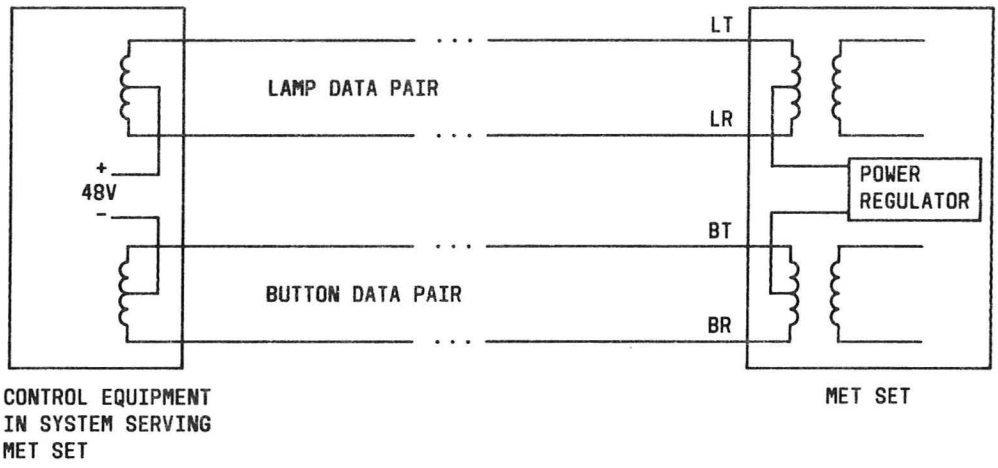


Fig. 11—Arrangement for Providing Power to MET Set

5. ENVIRONMENTAL CONSIDERATIONS

5.01 The MET sets must be located in an area which meets the following requirements:

- Customer approval
- Temperature range of 40°F to 120°F (5.0°C - 48.0°C)
- Humidity range of 20 percent to 90 percent
- Not containing equipment generating radio frequency (RF) interference (eg, arc welder, teletypewriter, etc.).

The MET set and cabling must not be located in an environment with an RF level in excess of 2-volt per meter; and the set and its line cord must be located so as to provide a separation of 12 inches or more between office equipment and power line cords (eg, typewriter, etc).

6. D-KIT OF PARTS

6.01 The following kits are used to convert desk sets to wall sets.

- D-180663, D-180664, or D-180665 wall kit (refer to Table C) consists of all items required to convert a desk set to a wall set including the following: wall bracket, wall housing, 1-foot long D8W-50 cord, plug retainer, handset hook, and strain relief strap.

6.02 Standard modular G-type handsets can be used with the desk sets when modified with the D-180851 kit. This kit consists of ivory colored transmitter and receiver caps used to replace the standard caps on the G-type handset. Modified G-type handsets can be used to provide the following features when the appropriate K-type handset is not available or is incompatible:

- Amplified receiver (G6BM)
- Amplified transmitter (G7BM)
- Noisy location (G8BM)
- Acoustic or inductive coupling to customer-provided equipment (G15A).

7. ADJUNCTS

7.01 Available adjuncts necessary for additional features are as follows:

(a) TOUCH-A-MATIC Automatic Dialer (refer to paragraph 2.03). Order one of the following for each installation:

(1) 2870A1 dial

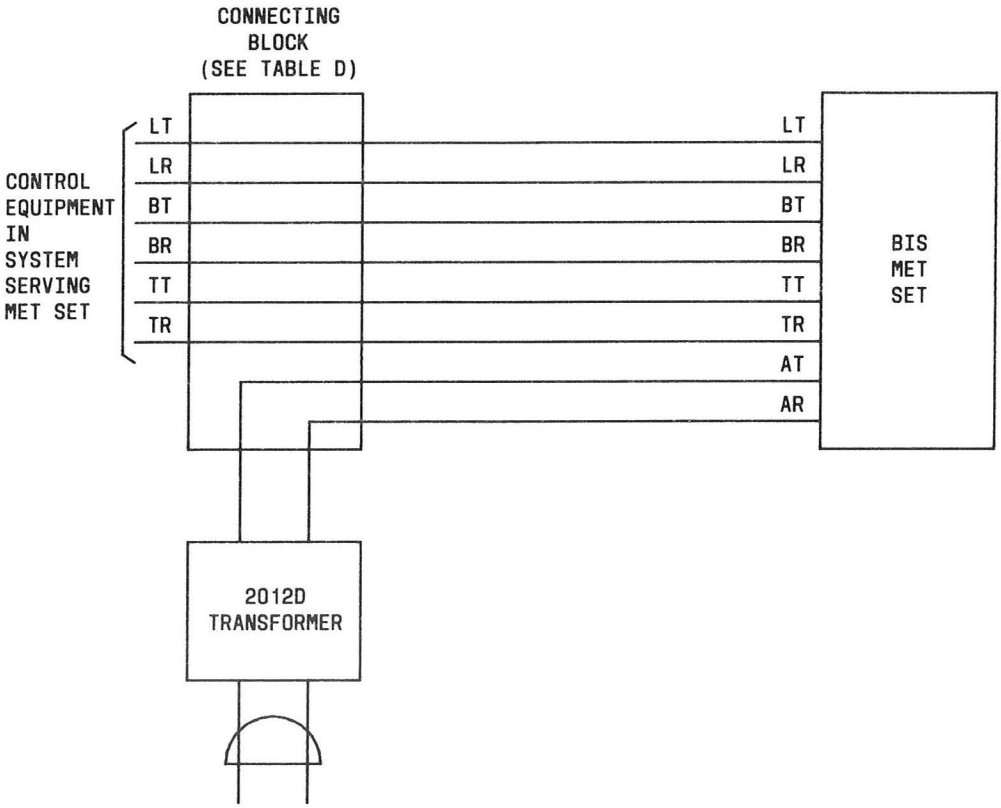


Fig. 12—Arrangement for Providing Power to the Built-In Speakerphone in the 2993C04 Telephone Set

(2) D10Y-50 cord (this cord is connector ended to plug into the interconnect field and replaces the cord supplied with the dial).

(b) 4A Speakerphone Adjunct (refer to paragraph 2.03). Order one each of the following for each installation:

(1) 108AA-50 loudspeaker set

(2) 680AE-50 transmitter

(3) 85B1-49 power unit

(4) 223C adapter (see Note)

(5) 841010762 dial assembly (see Note).

Note: The 223C adapter is equipped with a D16H-50 cord which plugs into the interconnect field. The 841010762 dial and bracket assembly is required for speakerphone operation and is used to replace the 841015019 dial and bracket assembly supplied with the set.

(c) SPOKESMAN® Loudspeaker (refer to paragraph 2.03). Order one of the following for each installation:

(1) 107B-50 loudspeaker set

(2) 2012B manufactured discontinued (MD) or 2012D transformer

(3) D2N-50 cord

(4) 42A or 44A connecting block.

(d) Head Telephone Set Adapter: Order as Plantronics Jackset Model JS0180-3A (1-1/2 foot cord) or JS0180-4A (8-foot cord)

▶8. Z72JG3B DIAL

8.01 The Z72JG3B dial has a built-in polarity guard.

8.02 To disable the polarity guard circuit remove the strap as follows:

- Remove clear plastic cover from the dial.
- The strap, located approximately in the center of the printed wiring board, is an 0.4-inch long bare wire.
- Take care that the wire does not fall into the set when you cut the wire at each end where the strap enters the printed wiring board.
- Discard the wire removed from the circuit path.
- Replace the plastic cover on the dial.
- Mark the set base "DIAL MOD".◀

▶TABLE B◀

FIELD REPLACEABLE COMPONENTS

COMPONENT	2991C01 (DESK)/ 2991D01 (WALL)	2991C02	2991C04	2991C05 (DESK)/ 2991D05 (WALL)	2992C01	2993C01	2993C04	2994C01
Line Key	680B	681D‡‡ and 665B§§	681B	681B	681B	681B	681B	681B
Button Cap*	840693725	840693725	840693725	840693725	840693725	840693725	840693725	840693725
TOUCH-TONE Telephone Dial or Dial and Bracket Assembly†	Z72JG3B	Z72JG3B	Z72JG3B	Z72JG3B	Z72JG3B	Z72JG3B	841010762	Z72JG3B
	841015019	841015019	841015019	841015019	841015019	841015019		841015019
Handset‡ §	K2D-50	K2D-50	K2D-50	K2D-50	K2D-50	K2D-50	K2D-50	K2D-50
Handset Cord¶	H4DU-50	H4DU-50	H4DU-50	H4DU-50	H4DU-50	H4DU-50	H4DU-50	H4DU-50
Mounting Cord**	D8W-50	D8W-50	D8W-50	D8W-50	D8W-50	D8W-50	D8W-50	D8W-50
Upper Housing	61AU-50	61AU-50	61AU-50	61AU-50	62AU-50	63AU-50	63AU-50	64AU-50
Lower Housing	61AL-50 (Desk)/ 61AY-50 (Wall)	61AL-50	61AL-50	61AL-50 (Desk)/ 61AY-50 (Wall)	62AL-50	63AL-50	63AL-50	63AL-50
Faceplate††	261B	261C	261C	261A	262A	263A	263C	264A
Handset Jack	616JK	616JK	616JK	616JK	616JK	616JK	616JK	616JK
Tone Ringer Transducer Assembly	841023476	841023476	841023476	841023476	841023476	841023476	841023476	841023476
Tone Ringer Volume Control Assembly	841027865	841027865	841027865	841027865	841027865	841027865	841027865	841027865
Line Switch Assembly	841023468	841023468	841023468	841023468	841023468	841023468	841023468	841023468
Designation Sheet	E-6980-1	E-6980-1	E-6980-1	E-6980-1	E-6980-1 and E-6980-2	E-6980-1 and E-6980-2	E-6980-1	E-6980-1 and E-6980-2
Station Busy Indicator			28A					
Wall Bracket Assembly	840362503 (Wall)			840362503 (Wall)				
1C Transmitter-Receiver							103820806	
103A Block Connector							103104220	
2012D Transformer							102600715	

TABLE B (Contd)

* Package of 11.

† In early sets the assembly consists of 35AY3A dial and 841009251 mounting brackets. Current sets are equipped with a Z72JG3B dial and (2)841009251 mounting brackets (ordered separately). For 4A speakerphone application, replace this dial or assembly with an 841010762 TOUCH-TONE telephone dial and bracket assembly which consists of a 35AU3A dial equipped with 841009251 brackets. All 2993C04 sets use the 841010762 dial and bracket assembly.

‡ K2C-50 handset replaces K1C-50 (MD) handset. The K2C-50 handset is repairable, refer to Section 501-210-105.

§ K2D-50 handset replaces K2C-50 (MD) handset.

¶ Available in 6- and 12-foot lengths.

** Available in 1-, 7-, 14-, and 25-foot lengths.

†† Sets are shipped with a disposable protective faceplate. Faceplates must be ordered separately. Complete faceplate code by adding color suffix from following.

Avocado (-100)	Gold (-111)	Red (-114)
Teak (-108)	Orange (-112)	Blue (-115)
Walnut (-109)	Brown (-113)	Black (-118)

‡‡ 681D key replaces 681C (MD) key.

§§ 10-button DSS Key.

TABLE C

D-KITS TO CONVERT DESK SETS TO WALL SETS

SET CODE	WALL MOUNTING
2991C01	Kit D-180663
2991C02	
2991C04	
2991C05	
2992C01	Kit D-180664
2993C01	Kit D-180665

◗TABLE D◖

MULTIBUTTON ELECTRONIC TELEPHONE SET CONNECTING APPARATUS

APPARATUS	DESCRIPTION
85A Connecting Block	An 8-position modular jack with screw terminals for termination of 4-pair station cable. Used with MET wall sets. (Supplied with each MET wall set and wall conversion kit.)
86A Connecting Block*	An 8-position modular jack with screw terminals for termination of 4-pair station cable. Used for surface mounted installation. Can be mounted to a standard wall outlet box by using a 275A adapter. Intended for use in locations where protection of the modular jack and screw terminals from moisture and dust is required.
96A Connecting Block*	Three 8-position modular jacks with 66-type terminals for termination of 25-pair station cable. Installation and mounting is the same as the 66E3-25 connecting block.
102A Connecting Block*	A flush-mounted, 8-position modular jack with quick-connect contacts for termination of 4-pair station cable. Can be mounted in a standard wall outlet box or in a wall, using existing hardware.
103A Connecting Block*	An 8-position modular jack with quick-connect contacts for termination of 4-pair station cable. Used for surface-mounted installation with screws, magnets, or adhesive strips.
104A Connecting Block*	Provides two 8-position modular jacks with quick-connect contacts for termination of two 4-pair station cables. Jacks may be independently terminated or interconnected via station cable. Used for surface-mounted installation with screws, magnets, or adhesive strips.
258A Adapter†	Six 8-position modular jacks in a single housing, wired to a 50-contact miniature ribbon plug. Used to adapt a 25-pair connector cable or a 66E-type connecting block.
259A Adapter†	An 8-position modular jack wired to the first four contact pairs (1-26, 2-27, 3-28, 4-29) of a 50-position miniature ribbon plug. Used to adapt a 25-pair connector cable or a 66E-type connecting block.
259B Adapter†	An 8-position modular jack wired to the second four contact pairs (5-30, 6-31, 7-32, 8-33) of a 50-position miniature ribbon plug. Used to adapt a 25-pair connector cable or a 66E-type connecting block.
259C Adapter†	An 8-conductor, modular jack-equipped miniature ribbon connector used to connect multibutton electronic telephone (MET) sets to existing 25-pair connector cables.
275A Adapter*	A wall plate for mounting an 86A connecting block to a standard wall outlet box.
400A Faceplate*	A mounting for two 102A flush-type connecting blocks in a standard wall outlet box.
KS-20458L12, L13, L14, L19, L20, and L21 Cover‡	Encloses a 259-type (L12, L13, L14) or 258A (L19, L20, L21) adapter, telephone set mounting cord plug, and connector end of a 25-pair station cable. Mounts with screws (L12, L19) magnets (L13, L20), or adhesive strips (L14, L21).
D8W-50 Cord	Plug-ended 8-conductor modular mounting cord used on MET sets. Available in the following lengths: 1-foot (short), 7-foot (standard), 14-foot (long), and 25-foot (extra long) used to connect with 8-position modular jacks.
ZD8AJ-50, ZD8AJ-87 Cord	Connects between line cord and modular jack for DIMENSION®/System 85.

* Refer to Section 461-604-104 for additional information.

† Refer to Section 461-200-102 for additional information.

‡ Refer to Section 461-200-103 for additional information.