PLANTRONICS DS150A
ComSet * DATA TERMINAL
OPERATION/INSTALLATION

1. GENERAL

1.01   This section is a cover sheet for the Plantronics/*ComSet* Data Terminal DS150A Operation Manual 09135-00.

1.02   This system uses a *"Touch-Tone®"* telephone with the Plantronics *ComSet* Data Terminal attached to input information and receive a visual response from a remote computer via private line or switched network.

1.03   The Plantronics *ComSet* DS150A Visual Data Terminal consists of a cathode ray tube (CRT) display unit, a modem, and a control unit. This is a receive only device. Transmission to the computer and connection to the line is via *"Touch-Tone"* telephone or rotary dial telephone with an associated *"Touch-Tone"* pad.

2. USOC CODE/CUSTOMER OPTIONS

ComSet Terminal (USOC DMV++)

01	300 Baud
02	150 Baud
03	110 Baud

3. ORDERING – SERVICE/RETURNS

3.01   Factory repair service is provided by Plantronics on a repair and return basis.

3.02   All purchasing and returns is handled by Western Electric (WE).

3.03   Order Wording –

(Qty)   Terminal, Data, ComSet, Plantronics, DS-150A

Maintenance Spares

(Qty)   Subassembly, Display, Plantronics, 09103-01
(Qty)   Board, Demodulator, Plantronics, 09110-01
(Qty)   Board, Regulator, Plantronics, 09113-01
(Qty)   Board, Converter, Data, Plantronics, 09116-01
(Qty)   Panel, Front, Plantronics, 09128-01
(Qty)   Cord, Power, Plantronics, 07779-01
(Qty)   Buss, Interconnect, Plantronics, 09077-01
(Qty)   Kit, Fuse, Plantronics, 09172-01

Attachment:

Plantronics/ComSet Data Terminal DS150A Operation Manual 09135-00

PLANTRONICS/ComSet^{TM} DATA TERMINAL DS150A

OPERATION MANUAL

CONTENTS   PAGE

FIGURES

TABLES   PAGE

1.   GENERAL

1.10   This manual describes the Plantronics/ComSet Data Terminal,
        Model DS150A, and includes procedures for installation and
on-site troubleshooting. Full technical discussions and mainten-
ance procedures are in the Plantronics/ComSet Data Terminal Model
DS150A Maintenance Manual, 09134-00. For detailed information on
the Plantronics/ComSet System Operation see Plantronics/ComSet
System Description and Interface Specification 09069-00.

        Terminal Operation

1.02   The Plantronics/ComSet terminal is primarily designed as
        the display vehicle for a data entry or inquiry/response
data system using dial-up or private line networks. A typical
installation (figure 1-1) consists of a standard pushbutton (DTMF)
telephone and the DS150A terminal. The terminal consists of the
display unit, the interface cable (mounted on the phone) and a
power cord.

1.03   In operation of the DS150A terminal, the user originates
        a normal telephone call to the computer or data terminal
equipment (DTE). Upon receiving an indication (2225-Hz answerback
tone) that the connection to the computer is complete, the user
is then ready to enter data. Data is entered via dual-tone multi-
frequency (DTMF) signals generated by the pushbutton pad. Response
data is transmitted from the computer in ASCII format by frequency-
shift keying (FSK) and displayed on the CRT of the display unit.

1.04   The terminal consists of a receive-only modem that ac-
        capts 110, 150, or 300 baud, bit-serial FSK-ASCII format
data from the computer end. This information is formatted into
a 64-character presentation and displayed on the CRT in four
contiguous text segments (lines) of 16 characters in length.
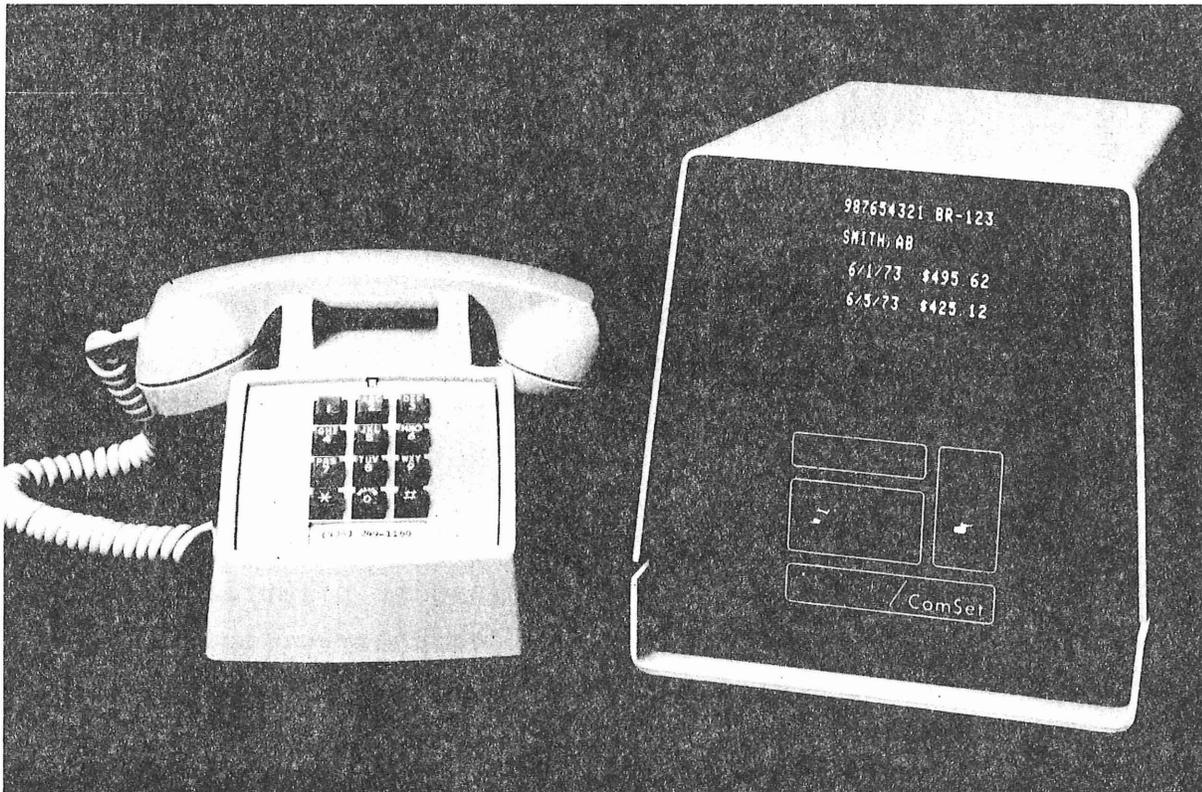Receipt of a "carriage return" (CR) code erases the display

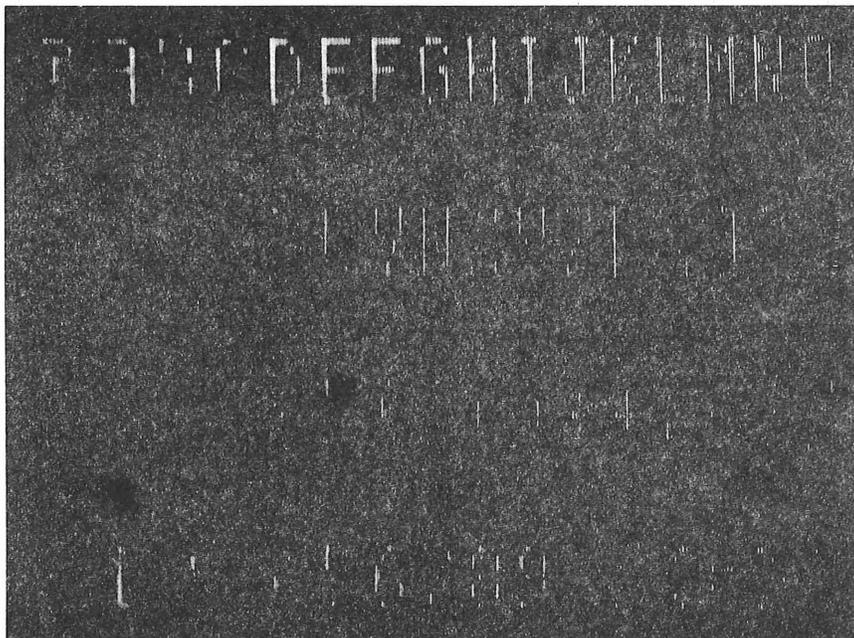Figure 1-1. Plantronics/ComSet Terminal Installation

Figure 1-2. Display Repertoire

screen, cancels the blinking feature (see below), and initializes
the system such that the next incoming character code will be
displayed on the upper left-hand position of the screen. The
first 16 characters subsequent to the "carriage return" will be
presented sequentially on the first text line, characters 17
through 32 on the second text line, 33 through 48 on the third
text line, and the final 16 characters on the last text line.
(Should the terminal receive more than 64 characters after a
CR, the overflow information will over-write, commencing at
character position number 1.)

1.05   To provide means for alerting the viewer, a blink feature
        has been included. On the ASCII command DC-1, all infor-
mation on the screen will commence blinking at a rate of approxi-
mately once per second. Blinking will be terminated upon receipt
of the next CR command.

1.06   Figure 1-2 shows the entire display repertoire of 64
        ASCII alphanumeric and punctuation characters.

Terminal Controls and Indicators

1.07   The status of the system is indicated by two small
        indicators. These light emitting diodes (LEDs) are
mounted on the front panel below the display screen.

        (a) DATA indicates the status of the modem-telephone
             line connection. When the DATA indicator is OFF,
             the terminal cannot receive data from the DTE.
             When the DATA indicator is on it indicates that a
             connection has been established, the remote DTE
             is on-line and the terminal may print received
             data. If the DATA lamp flashes at a steady rate
             it indicates an incomplete connection, i.e., ring-
             ing, busy signal, disconnected call, etc.

(b) POWER indicates the status of the power cord, rear panel power switch, fuse, and power supply. It must be illuminated for the terminal to operate properly.

(c) POWER SWITCH: A rocker switch located at the lower right side of display terminal on rear. Depressing the side of the power switch closest to the outside of the chassis turns power ON.

(d) The CLEAR switch is a spring loaded momentary toggle switch. In its normal (center) or locked (upper) position, the terminal will operate normally. Received data will remain on the display screen indefinitely, provided that the POWER indicator remains on, and the DATA indicator remains off. When the CLEAR switch is activated (downward to its momentary position) and released, the display screen is erased and the system initialized so that subsequent data is received and appears beginning in the upper left-hand character position (position number one). (The Blink feature is not reset by the CLEAR switch; a CR must be received to disable Blink.)

(e) The DATA switch is a two-position toggle switch. In its up (DATA) position, it connects the terminal to the network of the telephone. Thus, when the telephone handset is lifted from its cradle the DS150A terminal is connected to the line. The telephone receiver may be used to monitor the call; however, the microphone will not function. The telephone may not be used for voice communication with the DATA switch in the DATA position. When the DATA switch is actuated to its down position, the terminal is disconnected from the telephone network. In this position, voice communication is possible and the telephone functions normally; however, incoming data will not be displayed by the terminal.

2.   UNPACKING

2.01   To unpack the terminal, refer to figure 2-1 and the
        following procedure:

        (a) With carton flaps open all the way, remove reusable
             telephone collar and turn carton upside down on
             tabletop.

        (b) Lift carton up by flaps, letting the terminal
             slide out.

        (c) Place the terminal on its base and remove plastic
             inserts.

        (d) Remove plastic airbags containing interface
             cable, power cord, and mounting kit.

        (e) Replace collar and inserts in carton.

        (f) Retain carton for shipping or carrying purposes.

3.   INSTALLATION PROCEDURE

3.01   The following are the steps for installing a DS150A
        terminal to a telephone:

        (a) The proper data rate should be selected.

        (b) The interface cable should be attached
             and wired to the telephone set and connected to
             the receptacle at the rear of the display unit.

        (c) The complete terminal should be tested before
             installation at the user site.

        NOTE: DO NOT connect equipment to ac power or telephone
               line until interface cable wiring has been
               completed.

Ⓐ   Collar and Partition provide space for
    packing and transporting telephone set
    (shown).

Reusable Collar Ⓐ

Partition Ⓐ

User Guide and Installation
        Instructions

Reusable Foam Inserts

Reusable Carton

REPACKING: To avoid shipping damage and possible
            loss of warranty coverage, use this
            carton should you find it necessary to
            transport the set. Keep this carton
            and the packing material it contains,
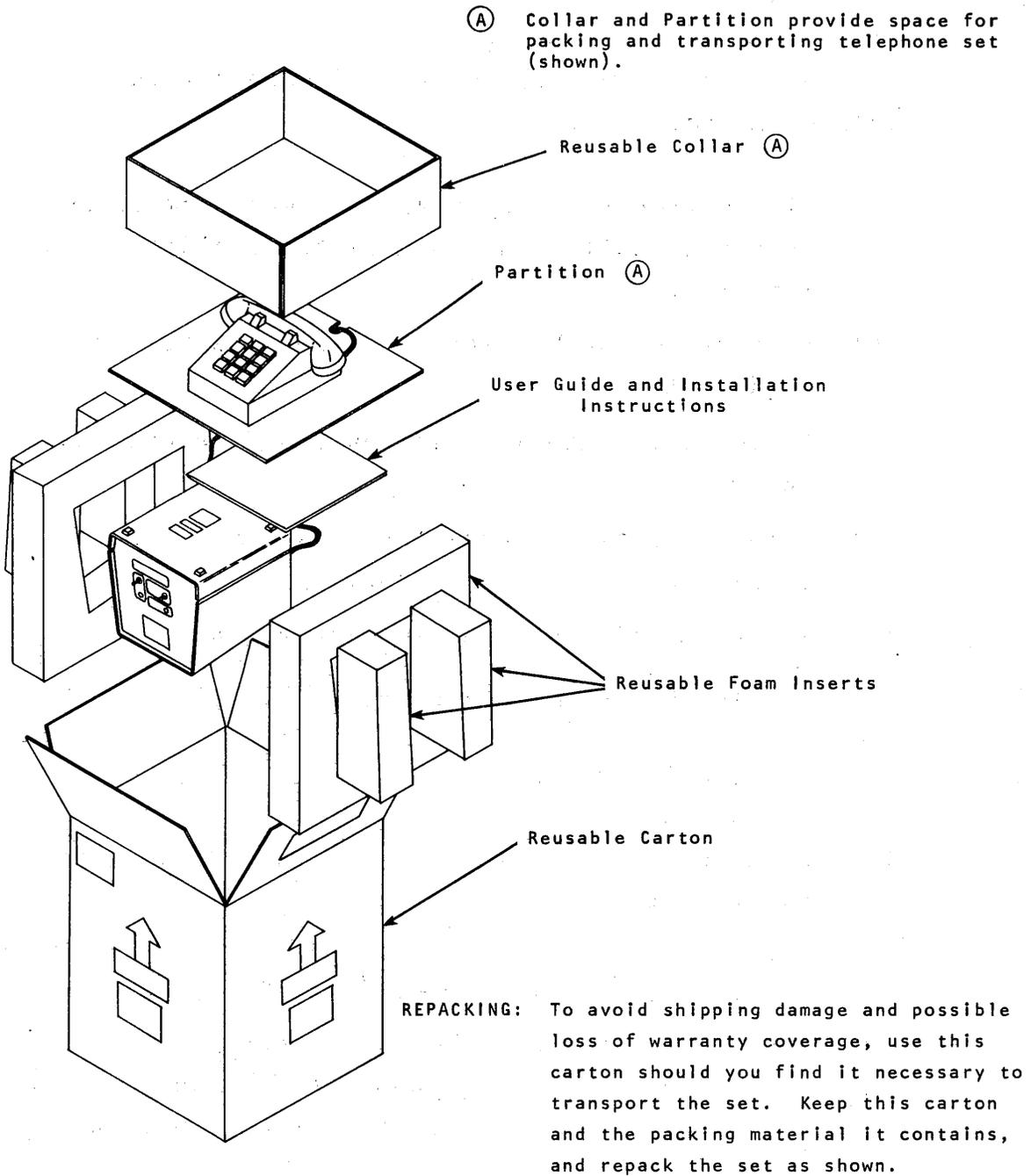   and repack the set as shown.

Figure 2-1. Terminal Packing, Exploded View (Shown with
             Telephone in Place)

3.02   The terminal is factory set at 300 baud. If a data rate other than 300 baud is to be used, proceed as follows:

(a)   Remove display unit from housing by removing the three screws from the bottom and the three screws from the rear of the terminal.

(b)   Remove the back panel and slide the unit forward out of its housing.

(c)   Locate data rate selector switch at bottom left rear of display unit on data converter card (see figure 3-1).

(d)   Set desired data rate placing selector switch segments to the positions indicated in table 3-1.

(e)   Remount the unit in the housing.

3.03   To connect the interface cable to the telephone set, proceed as follows:

(a)   Attach interface cable to telephone set per figures 3-2 and 3-3. Figure 3-2 gives instructions for standard telephones. Figure 3-3 is for Automatic Electric type 890 or phones of similar design.

(b)   Connect interface cable spade lugs per table 3-2.

(c)   Connect interface cable to receptacle at rear of terminal, see figure 3-4.

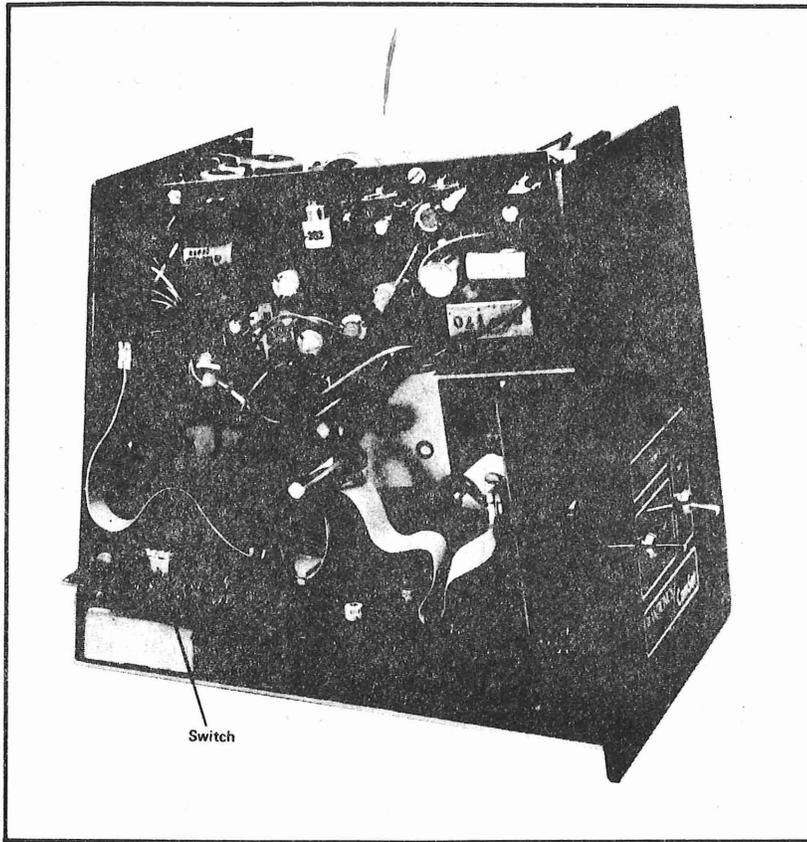(d)   Connect power supply cord to receptacle at rear of terminal, see figure 3-4.

Figure 3-1   Baud Rate Switch Location

Table 3-1   Baud Rate Selection S1-2, S1-3 and S1-4

Set Switch ON	Set Switch OFF	Baud Rate
S1-2, S1-4	S1-3	300
S1-3, S1-4	S1-2	150
S1-3	S1-2, S1-4	110

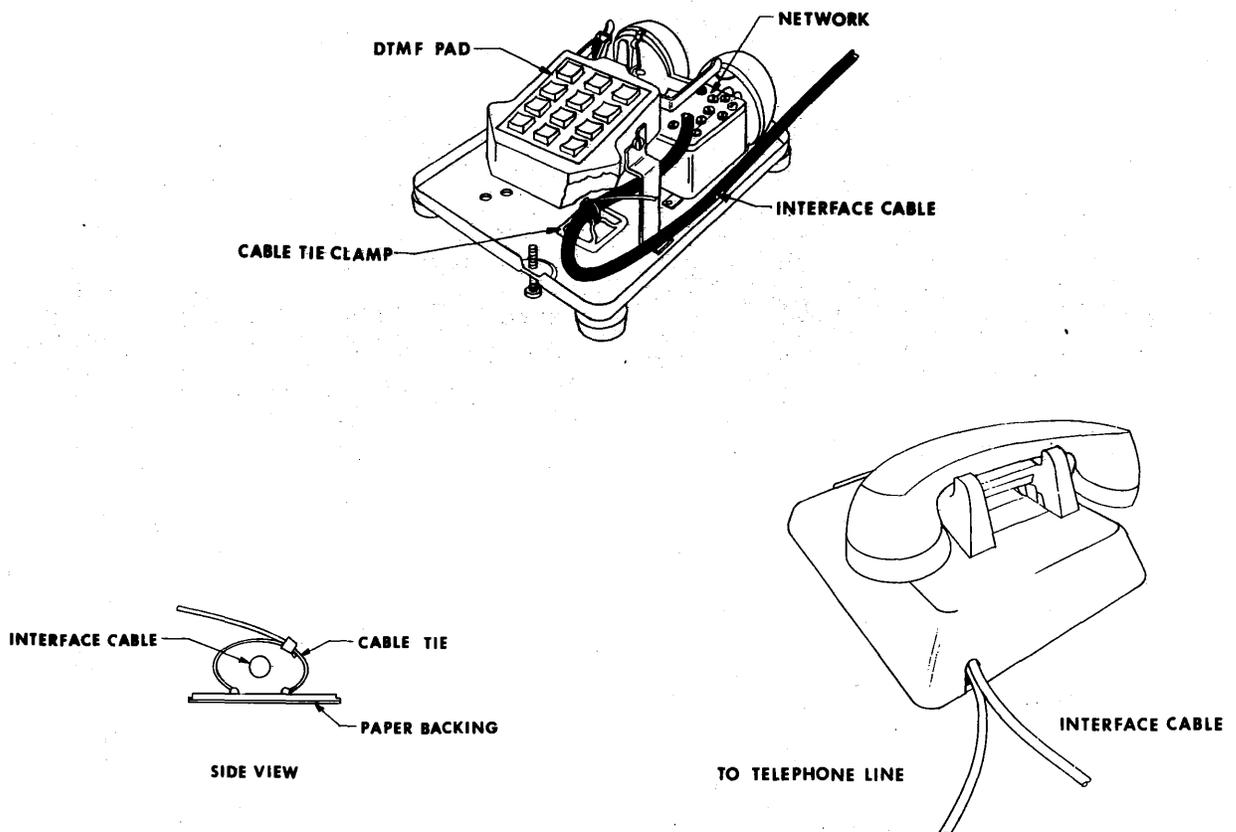| STEP	PROCEDURE
1.	Remove telephone housing from base plate.
2.	Remove paper backing from adhesive side of cable-tie clamp.
3.	Install cable-tie clamp to base plate, under DTMF pad.
4.	Fasten interface cable to clamp with cable-tie.
5.	Make interface cable connections as stated in tables 3-2 and 3-3, as appropriate. Use plastic snap-on insulator provided in mounting kit for wire splice.
6.	Replace telephone housing, ensuring interface cable is not trapped or stressed by housing or base and that cradle switch operation is free.

Figure 3-2. Attaching Interface Cable to Standard Desk Sets

| STEP	PROCEDURE
1.	Remove telephone housing from base.
2.	Remove paper backing from adhesive side of cable-tie clamp.
3.	Install cable-tie clamp on base.
4.	Fasten interface cable to clamp with cable-tie.
5.	Make all interface cable connections as stated in tables 3-2 and 3-3, as appropriate. Use plastic snap-on insulators provided in mounting kit for wire splice.
6.	Route interface cable through remaining cable exit hole in rear of base.
7.	Replace telephone housing, ensuring interface and telephone line cables are not trapped or stressed by housing or base and that cradle switch operation is free.
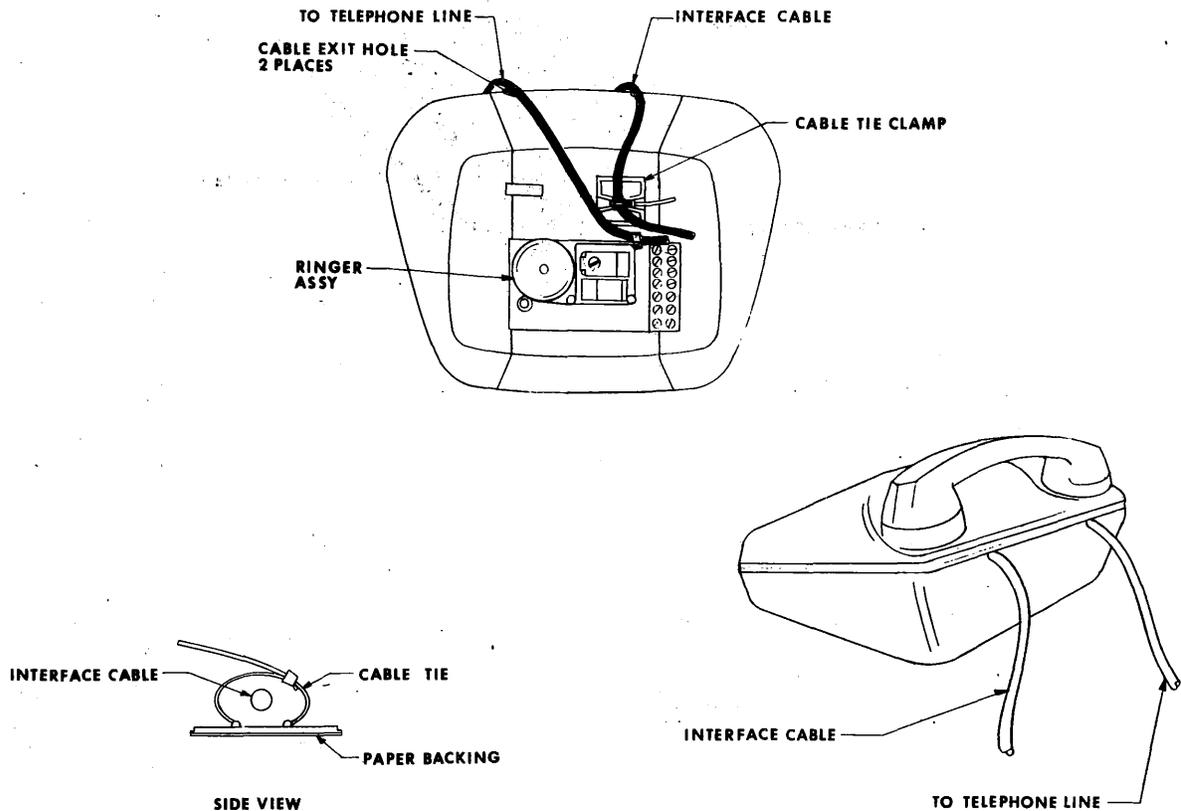
Figure 3-3.   Connecting Interface Cable to AE890 Desk Sets

Table 3-2.   Interface Cable and Telephone Set Connections

Telephone Set Circuit	Interface Cable			Telephone Set			
	Lead Color	Switch Circuit	Lead Function	WECO 2500 D	WECO 2554 B	WECO 500/D with 1035C3A Dial	ITT 2500
XMTR	Red		Add (R) to Positive Transmitter Lead	Network T (or Term Strip 11)	Term Strip 11	Splice to previously spliced (R) Transmitter Lead and (S-W) 4 lead of 1035 dial.	Term Strip 11
Splice	Green		Remove Negative Transmitter lead from Normal termination and splice to (Gn)	Remove (BK) Handset wire from Network B and splice.	Remove (BK) Handset wire from Network B and splice.	Remove (BK) Handset wire from Network B and splice.	Remove (BK) Handset wire from Network B and splice.
Removed	Black		Add (BK) to normal termination for negative transmitter lead.	Network B	Network B	Network B	Network B

Telephone Set Circuit	Interface Cable			Telephone Set			
	Lead Color	Switch Circuit	Lead Function	SC 2500	SC 500D with 1035 C3A Dial	AE 80 (Touch-Call)	AE 890
XMTR	Red		Add (R) 2 to Positive Transmitter Lead.	Term Strip 11	Network R	Trans Unit 5	Induction Coil 5
Splice	Green		Remove Negative Transmitter lead from Normal termination and splice to (Gn) 5.	Remove (BK) handset wire from Network B and splice.	Remove (BK) Handset wire from Network B and splice.	Remove (GN) wire from spacer terminal A and splice.	Remove (GN) wire from Terminal Strip 6B and splice.
Removed	Black		Add (BK) 8 to normal termination for negative transmitter lead.	Network B	Network B	Spacer Term A	Term Strip 6B

Table 3-3. Connections For Western Electric 500D Telephone Set
With 1035 Dial and 185A Network.

STEP	PROCEDURE
1.	Insulate separately and store 1035 dial leads as follows: 6, 7, 9, and 11.
	Modify 500 D, add 185A network and add 1035 C3 dial as follows:
2.	Remove (W) line switch lead from F of network and splice to (W-BL) S lead of 1035 dial.
3.	Remove (Y) and (S) line switch leads from L2 of network and store.
4.	Remove (BL) dial pulse lead from F of network and connect to L2 of network. Connect one wire of 185A network to C of network.
5.	Remove (BL or G) dial pulse lead from RR of network and connect to (BL-W) 1 lead of 1035 dial and one wire of the 185A network.
6.	Connect (V-G) 12 lead of 1035 dial to RR of network.
7.	Remove (W) handset lead and (R) line switch lead from GN of network and splice to (O-W) 2 of 1035 dial.
8.	Connect (BR-W) 3 of 1035 dial to GN of network.
9.	Remove (R) handset lead from R of network and splice to (S-W) 4 lead of 1035 dial.
10.	Connect (W-S) 10 lead of 1035 dial to R of network.
11.	Connect (S-V) 5 lead of 1035 dial to B of network.
12.	Connect (V-S) 14 lead of 1035 dial to C of network.
13.	Remove (BR) line switch lead from C of network and store.
14.	Add connections as shown in table 3-2.
	NOTE: NO WIRES REMAIN ON TERMINAL "F" OF NETWORK.

References:

      Section 502-501-101 (500D)
            501-164-130 (1035 C3A)

On-Off Switch   Interface Cable   Fuse   AC Cord Receptacle
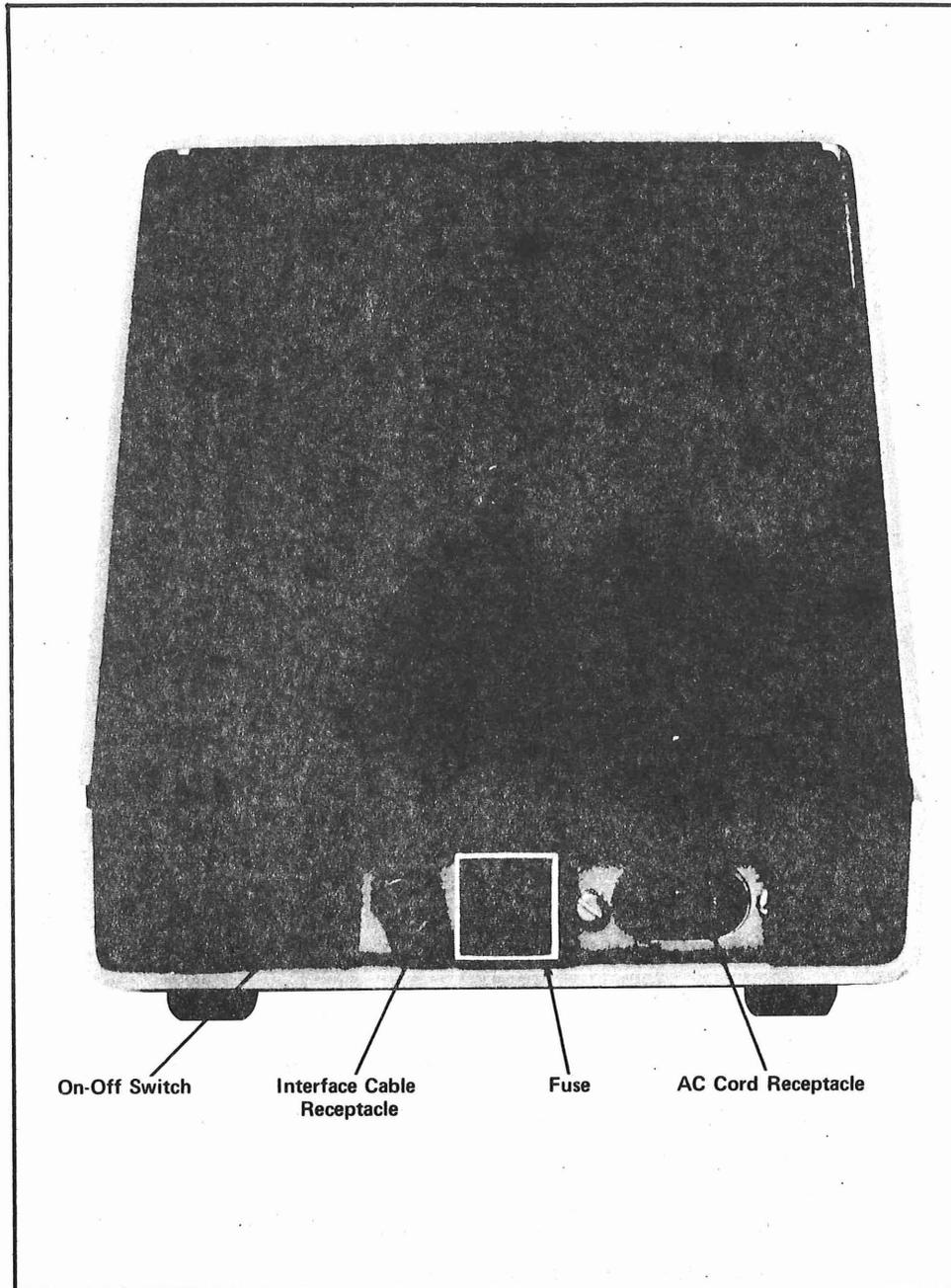   Receptacle

Figure 3-4.   Connecting Interface Cable to DS150A Terminal

4.   OPERATION AND TEST PROCEDURE

4.01   This procedure verifies operation of the DS150A terminal.

(a)   Connect telephone set to telephone line using standard plant practices.

(b)   Plug in power cord.

(c)   Set POWER switch in ON position.

(d)   Scattered characters may appear on the screen after 30 seconds; this is normal. Clear screen by depressing CLEAR switch and release.

(e)   Ensure that the DATA switch on display unit is in UP position.

(f)   Pick up telephone handset and ensure dial tone is present.

(g)   Place call to number. (If this is a test, see Plantronics Automatic Test Station Product Information Bulletin 24-004).

(h)   On receipt of answerback tone, you are ready to communicate with the computer. Do not replace handset in cradle.

(i)   Enter data via pushbutton pad according to the appropriate system procedures. Response will appear on CRT display.

(j)   Upon completion of call, replace handset in cradle. DATA indicator should now be extinguished.

NOTE: The DATA switch must be in the UP position for communications with the computer. In the event you wish to use the telephone for voice communications place the DATA switch in the DOWN position.

5.   TRANSPORTATION TO USER SITE

5.01   If above installation has been accomplished at a test
         or shop location, then it is necessary to move both the
telephone set and the terminal to the user location.

5.02   Repack the terminal in shipping carton with telephone
         set. Refer to figure 2-1 and the following procedure:

         (a)   Set POWER switch in OFF position

         (b)   Disconnect power supply cord from mains supply.

         (c)   Disconnect power supply cord from display unit.

         (d)   Using standard plant practice, disconnect telephone
               instrument from test line.

         (e)   Disconnect interface cable from rear of display unit.

         (f)   Place display unit between foam inserts in carton.

         (g)   Place power supply cord in space provided alongside
               display unit.

         (h)   Replace collar on top of display unit in carton.

         (i)   Place telephone set with interface cable attached
               in collar zone of carton.

         (j)   Tape carton closed.

6.   USER SITE REQUIREMENTS

6.01   The following facilities are required at the user site:

         (a)   Telephone line with a dual-tone multifrequency
               capability; or an auxiliary 12-button DTMF pad must
               be attached to telephone set before attachment of
               interface cable. (See Installation Procedure,
               Section 3.)

(b) Three-wire 117V, 60-Hz power receptacle within
     reach of 8-foot power cord on display unit.

(c) Desk, table, or platform capable of supporting
     the terminal and telephone set. Maximum separa-
     tion between these units is 4 feet.

7.   USER SITE INSTALLATION

7.01   Install telephone set with the terminal attached
        according to standard plant practices. Then test the
completed installation per Section 4.

7.02   It is suggested that the DS150A carton, including collar
        and inserts, be retained at the user location in case
it is necessary to transport a unit to a different location.

8.   TROUBLESHOOTING

8.01   Table 8-1 provides guidelines for the analysis and
        correction of troubles that may occur in the
terminal. This is intended solely for the purpose of correcting
troubles that do not require field change-out of any parts. If
suggested action does not correct the deficiency, remove and
return terminal for servicing. (A more detailed trouble-
shooting and maintenance guide is available in the Plantronics/
ComSet Data Terminal Model DS150A Maintenance Manual, 09134-00.)

8.02   The key to quick and efficient troubleshooting of the
        terminal is the ability to use the video display
indicators to help identify the particular problem. Table 8-1
lists the trouble indications and the suggested action to correct
or identify the problem.

Table 8-1. On-Site Troubleshooting Procedures

	SYMPTOM	ACTION
1.	POWER lamp OFF	-Test 117-Vac power source -Plug in power cord -Turn POWER switch ON -Replace 1-amphere slow-blow fuse
2.	Scattered characters on screen when power first turned on (acceptable occurrence)	-Set DATA switch to DATA position -Check symptom 1 -Depress CLEAR switch
3.	No dial tone	-Check telephone line -Check interface cable to telephone set connections for wrong punchings, opens or shorts -Replace telephone set
4.	Busy signal	-Line in use -Line not available
5.	DTMF pad does not operate	-Calling party control (CPC) battery reversal; install polarity guard per plant practices -Reverse tip and ring leads at connector block -Check symptom 3
6.	No answerback tone	-Wrong telephone number -Distant dataset problem
7.	No DATA lamp indication upon receipt of carrier	-Check handset receiver, listen for answerback tone or FSK data. If remote station has timed out, recall -Place DATA switch in DATA (up) position -Interface cable connected to rear of display unit -Check interface cable to telephone set connections for wrong punchings, opens or shorts
8.	No response to first # key entry	-Computer system busy -Does this system respond to # key -Recall -Check symptom 7
9.	With echoplex option in use, wrong data returned	-Noisy line -Pressed wrong DTMF -Recall -Check DTMF common switch and tones generator for proper operation
10.	No data on screen	-Check symptom 7 -Remove display unit from housing and adjust brightness control (remembering original position) -Check circuit connectors in display unit

Table 8-1.   On-Site Troubleshooting Procedures (Cont'd)

|	SYMPTOM	ACTION
11.	Wrong message or characters on screen	-Pressed wrong DTMF -Noisy telephone line -Recall -Proper data rate selected
12.	DATA lamp stays on after message received	-Computer modem waiting for DTMF disconnect sequence, if used
13.	Bright background or dull characters	-Remove display unit from housing and adjust brightness
14.	Telephone will not operate for voice communication (microphone inoperable)	-Place DATA switch in down position -Is interface cable connected to rear of display unit -Check interface cable to telephone set connection for wrong punchings, opens or shorts
15.	CLEAR switch erases screen but continues to BLINK with next message to screen (acceptable occurrence)	-BLINK initialized with receipt of DC-1. -Screen continues to BLINK until receipt of CR. DTE must output CR or, in echoplex mode, DTMF # must be entered.

Brightness
Control
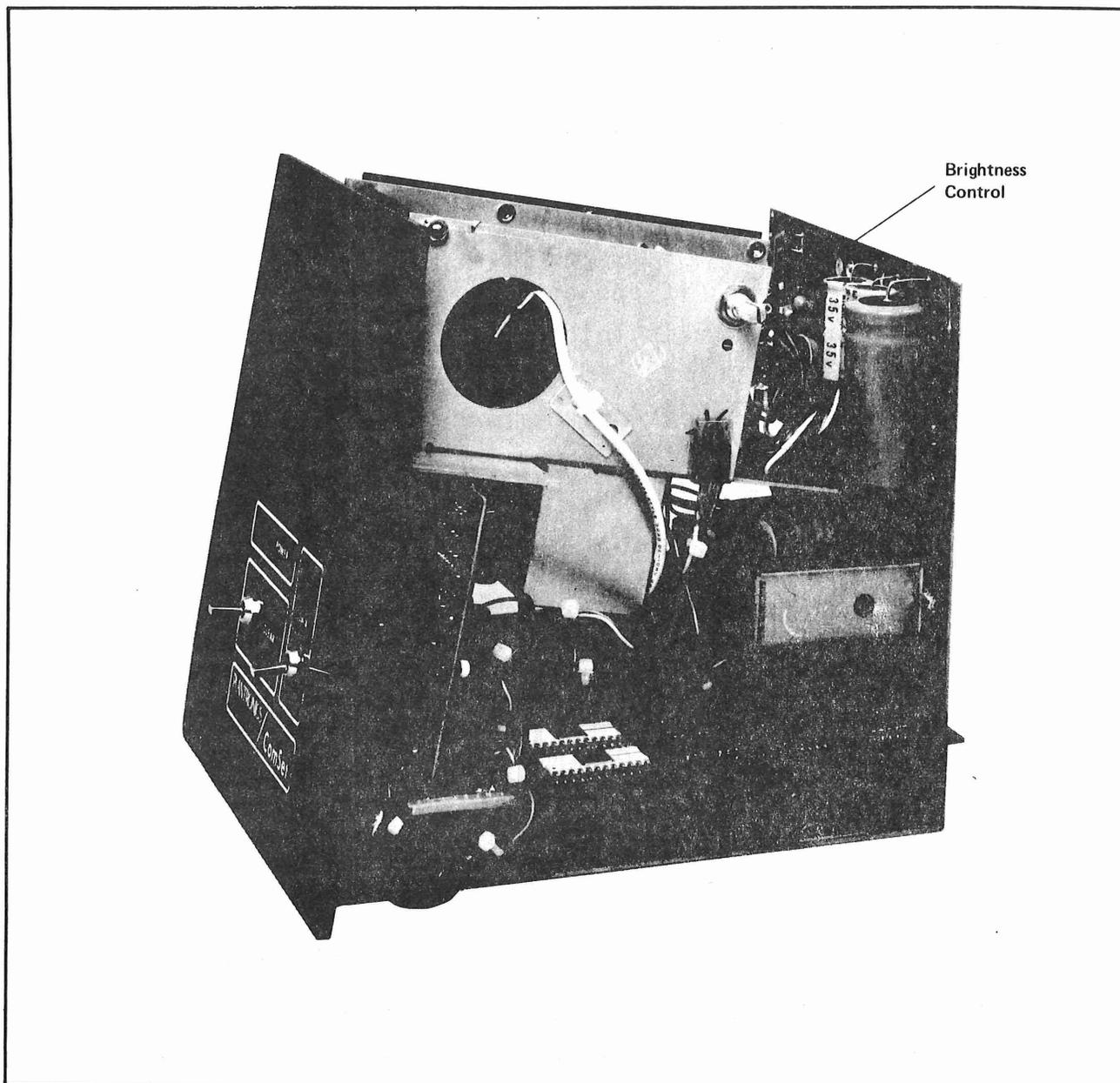
Figure 8-1.   Brightness Control Location

9.   REMOVAL/REPLACEMENT

9.01   Before disassembly of equipment, set POWER switch on
        rear of display unit to OFF position and disconnect power
supply cord from 117-Vac main.

9.02   Proceed as follows if the entire terminal, including
        the interface cable is to be removed.

        (a)   Following standard plant practices, disconnect the
              telephone from the line.

        (b)   Follow, in reverse, the installation procedure
              given in Section 3.

        (c)   Following standard plant practices re-connect the
              telephone to the line.

9.03   An alternative to the above procedure might be to remove
        and replace entire units, including the telephone by
proceeding as follows:

        (a)   Turn off power switch at rear of display unit.

        (b)   Disconnect power supply cord from 117-Vac main.

        (c)   Using standard plant practices, disconnect telephone
              being replaced from line and connect replacement
              telephone to the line.

        (d)   Disconnect interface cable and power supply cord
              from rear of display unit, see figure 3-2.

9.04   If only the display unit is to be replaced (not the
        interface cable), proceed as follows:

        (a)   Disconnect the interface cable and power cord from
              the rear of the display unit being replaced, and
              set display unit aside.

(b) Connect interface cable to receptacle at rear of new display unit, see figure 3-2.

(c) Connect power cord to receptacle at rear of new display unit, see figure 3-2.

(d) Test new display unit using procedure given in Section 4.

9.05   Pack the equipment for transportation using the procedure given in Section 5, but note that the telephone set might not be included.   In any case, be sure to place the collar and partition on top of the display unit to provide a tight fit in the packing container.

10.   SPECIFICATIONS

10.01   Display Format

(a) 5 x 7 character dot matrix

(b) 64 character maximum (four lines of 16 characters each)

10.02   Input Signal

(a) Format: ASCII

(b) Frequencies: 2025 Hz = Space
                   2225 Hz = Mark

(c) Control Codes: CR erases screen and initializes system
                     DC-1 starts screen blinking. Reset on CR

(d) Data Rate: 110, 150, 300 baud (10,15,30 characters per second) selectable at time of installation.

(e) Levels: -40 dBm (minimum)
               0 dBm (maximum)

(f) Stability: 2125 Hz ±2% center frequency
                 200 Hz ±5% modulation

10.03   Input Impedance: 200 ohms (replacing telephone set transmitter)

10.04   Input Loop Current: 20 mA min, 50 mA max.

10.05   Input Response Time: 2 ms (maximum)

10.06   Error Rate: 1 in 10^7 (maximum)

10.07   Operating Voltage: 117 Vac ±10%, 60 Hz

10.08   Noise Performance

     (a)   Insensitive to power line noise at 50/60 Hz and related harmonics

     (b)   Insensitive to impulse noise from atmospheric static and switching transients found on unconditioned telephone lines.

     (c)   Signal to In-Band Non-Coherent Noise Immunity: 6 dB (minimum)

     (d)   Signal to Out-of-Band Noise Immunity: -20 dB (minimum)

10.09   Physical Characteristics

     (a)   Weight: 10 pounds (approximately)

     (b)   Shipping Weight: 16 pounds

     (c)   Dimensions: 9-1/4 in. deep
                          7-7/8 in. wide
                          8-1/8 in. high

10.10   Operating Environment

     (a) Temperature: 0°C to 50°C (operating)

                            -10°C to 65°C (non-operating)

     (b) Maximum relative humidity: 90% (no condensation)

     (c) Altitude (Operating): 10,000 feet maximum

11.   PLANTRONICS WARRANTY AND SERVICE POLICY

11.01   Warranty. Plantronics/ComSet products are guaranteed
free from defects in workmanship and materials for a
period of one (1) year from date of shipment. Excluded from
this warranty are parts which are considered to be subject to wear
and tear in normal usage, such as cords, cables, and all external
decorative finishes.

Products returned for repair during the warranty period will be
repaired at no charge, provided that the products have not, in the
judgment of Plantronics, Inc., been subjected to improper instal-
lation, breakage, abuse, neglect or unauthorized repair attempt
or alteration. Plantronics will prepay the return transportation
by the most appropriate means of delivery.

Products returned during the warranty period shall be subject to
a handling charge if replacement of damaged items is necessary.

11.02   Factory Service. Factory repair service is provided by
Plantronics for products that are out of warranty. This
service is operated on a repair and return basis. Charges are
based on labor, material, and transportation costs. Equipment
returned for repair will be inspected to determine the extent of
damage and the cause of failure. This information will be compared
with that provided by the customer for each returned item. Unless
otherwise directed by the customer, Plantronics will then complete
the repair and reconcile all discrepancies to the actual quantity

and condition of the equipment received. Shipments to Plantronics shall be prepaid. Cost of return transportation will be included with the repair billing. Plantronics will select the most appropriate means of return shipment unless otherwise designated by the customer.

11.03   Plantronics will accept returned products, transportation prepaid to:

> Plantronics, Inc.
> Customer Service Department
> 345 Encinal Street
> Santa Cruz, California 95060

11.04   The following information should be included with the returned units:

(a) Bill-to address

(b) Ship-to address

(c) Purchase order/control number

(d) Reason for return and unit serial number