PUB 42602

PRELIMINARY

Bell System Voice Communications
TECHNICAL REFERENCE

Specification

CAK

Customer-Provided Telephone Set Housings

REVISED
May 1972

ENGINEERING DIRECTOR - CUSTOMER TELEPHONE SYSTEMS

NOTICE

This Technical Reference is specifically intended for the manufacturers and designers of custom-built "novel" telephone set housings which are to be designed so as to accommodate standard Bell System functional components. The right to revise this Technical Reference for any reason, including conformity with USASI, EIA, CCITT or other standards, to utilize new advances in the state of the technical arts, or to reflect changes in the design of the equipment and/or service described herein is expressly reserved.

The responsibility of the Bell System with respect to the use of customer-provided equipment is as set forth in the appropriate Tariff regulations.

In furnishing this material, the Bell System Telephone Companies make no claims or representations and assume no responsibility, beyond that set forth in the Tariff regulations, for the suitability of the transmission path or the performance of the telecommunications system.

This Technical Reference supersedes and replaces Bell System Voice Communications Technical Reference for Specification CAK Customer-Provided Telephone Set Housing dated November 1970. This revision includes information regarding "up-right" telephone set housings and provides information on the use of TOUCH-TONE dials with decorator housings.

If further information is required, please contact:

Engineering Director - Customer Telephone Systems
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

SPECIFICATION CAK

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1. GENERAL

The material in this Technical Reference is intended for use by the manufacturers and designers of custom-built "novel" station telephone set housings. In order that these housings be compatible with the Bell System telecommunications network, it is necessary for the housing and handset to contain functional components, including line and headset cords, supplied and installed by the Telephone Company. After the housing containing these components is connected by the Telephone Company, the components will remain the property of the Telephone Company who also will be responsible for their maintenance and repair. The Telephone Company, however, assumes no responsibility for the custom-built items, which remain the customer's property.

This Technical Reference has been revised to include information regarding "up-right" telephone set housings and provide information on the use of TOUCH-TONE® dials with decorator housings.

2. SPECIFICATION

2.1 Design Conformance

If the completed telephone set housing conforms to the requirements set forth in this Technical Reference, each housing shall be marked externally by the supplier as follows:

> "This enclosure conforms to SPECIFICATION CAK, Bell System Identification No. _____."*

Conforming housings will be accepted by all Bell System Telephone Companies for installation of functional components and connection to the telecommunications network.

® Registered Service Mark of AT&T Co.

* Number assigned by AT&T Co. shall be inserted.

A manufacturer obtains a Bell System Identification Number, indicative of design conformance, by submitting a tool-made sample of his housing to the Engineering Manager - Voice Connecting Arrangements, American Telephone and Telegraph Company, 195 Broadway, New York, New York 10007, for evaluation.

Prior to November 1970, telephone set housings were evaluated, and assigned Identification Numbers by individual Telephone Companies for conformance with drawings B-696501, B-696901, and B-696902, which were based on the functional components provided with the F-56659 or F-56660 telephone set. The Bell System Telephone Companies will continue to install functional components in these housings; however, manufacturers may wish to submit samples of these previously approved housings to AT&TCo in order to obtain a Bell System Identification Number.

3. APPARATUS DESCRIPTION

3.1 Components

The succeeding paragraphs contain information concerning the available apparatus, along with its dimensions and specifications for use with customer-provided housings. All dimensions are in inches, with a tolerance of ±.010 inch unless otherwise specified.

In Fig. 1, a phantom view of a typical "antique" telephone set is shown with the Telephone Company-supplied components in their approximate locations. The components are as follows:

Telephone Set Base - this consists essentially of a metal base plate on which is mounted a ringer, a line switch, and an electrical network. Included as loose items are transmitter and receiver units for the handset, miscellaneous wire leads and terminals, and mounting screws.

Rotary Dial - the rotary dial is obtainable in two styles. One dial has a chrome-plated fingerwheel and fingerstop, while the other dial has a dull gold finish.

TOUCH-TONE Dial - the standard 12-button TOUCH-TONE dial is also available.

Cords - two cords: a handset cord, which is a coiled spring type, and a line cord, which is straight, are available in the following colors:

Black	Rose Pink
Ivory	Light Beige
Moss Green	Light Gray
Red	Aqua Blue
Yellow	Turquoise
White	

The same components can be used with a customer-provided desk-stand telephone (old-fashioned pedestal or up-right telephone) and associated subscriber's set ("subset" or "bellbox"). Fig. 11 is a phantom view of this type of telephone, showing the distribution of the components. The line switch must be removed from the telephone set base and mounted separately in the base of the desk-stand. A separate box for mounting

on the wall or other convenient surface contains the remaining circuit components. A third cord, a six-conductor straight cord, is available for connecting the desk-stand to the subset.

4. DESIGNERS SPECIFICATIONS

4.1 Telephone Set Base

In order for the manufacturer's housing to accommodate the Telephone Set Base, the following general qualifications are necessary:

1. The base must be located so that the cradle plunger or actuator contacts the line switch arm squarely.
2. Vertical motion of the cradle plunger or actuator must be sufficient to operate the line switch.
3. Tapped holes must be properly located on the housing base to secure the base.
4. An opening must be provided in the housing base to gain access to the ringer volume control.
5. Openings for ringer sound outlet should be provided.
6. The manufacturer's handset must be designed to utilize the transmitter unit and receiver unit provided, and it is desirable that the spatial relationship between the two be as suggested in a later paragraph.
7. The manufacturer's desk-stand also must be designed to utilize the same components.

4.2 Configuration

The conditions necessary to fulfill the requirements listed in Paragraph 4.1 are shown in detail in Fig. 2 through 8 and 12 through 14.

Base

Fig. 2 gives basic dimensions of the Telephone Company chassis (Telephone Set Base).

Fig. 3 gives the layout of mounting holes and openings for the supplier's housing base, dimensioned from the cradle plunger or switch actuator.

Fig. 4 shows the range of actuator vertical motion necessary to operate the line switch.

Handset

Fig. 5 shows the space relationship between transmitter and receiver necessary to provide an acceptable transmission level. This was established as a result of statistical mouth-to-ear measurement of adult human heads. If, for some reason, it is necessary to locate the transmitter unit at a distance of 2.86 inches or more from the modal point shown, a kit of parts may also be installed by the Telephone Company at its option.* This contains an amplifier which mounts, by means of brackets supplied in the kit, above the ringer of the Telephone Set Base, shown in Fig. 2 as the 4.1 inch

*Generally not required for "up-right" telephone sets.

by 2.37 inch by 1.27 inch block. The space taken up by the amplifier would have the effect of increasing the 1.27 inch dimension to 1.95 inches.

Fig. 6 and 7 show dimensional mounting information respectively for the transmitter and receiver units furnished with the base.

Fig. 8 shows the dimensional requirements of the handset in order to accommodate the Telephone-Company-supplied cord, leads, and connectors.*

Rotary Dial

Fig. 9 gives the dimensions of a mounting receptacle for the rotary dial. Both dials will fit in the same mounting. Only two precautions are necessary in providing for the mounting of the dial:

1. The Telephone Company installer must have access to the back of the dial.
2. The dial mounting should be located no farther than 5 inches from the network on the base, to insure that the connecting leads will reach their terminals.

TOUCH-TONE Dial

Fig. 10 gives dimensional information for mounting the TOUCH-TONE dial and providing it with a faceplate. The same precautions apply as for the rotary dial.

* Extension wires are available (18 inches) for use with "up-right" telephone sets.

Cords

As mentioned above, Fig. 8 shows the conditions for fitting the handset cord in the handset. All other cord terminations are on Telephone Company-supplied apparatus, so it is necessary only for the supplier to provide an opening in the set housing for entry of the cords. Dimensions for this opening are shown in Fig. 3.

Desk-Stand Telephone

Fig. 11, 12, 13 and 14 give special information for adapting the 581A base to a desk-stand telephone setup.

Fig. 12 is similar to Fig. 2 except that the line switch has been removed. This shows the volume which must be allowed inside the housing of the subset or "bell box."

Fig. 13 gives the hole layout of the supplier's subset base necessary for mounting the 581A telephone set base. It is similar to Fig. 3 except that no actuator is involved.

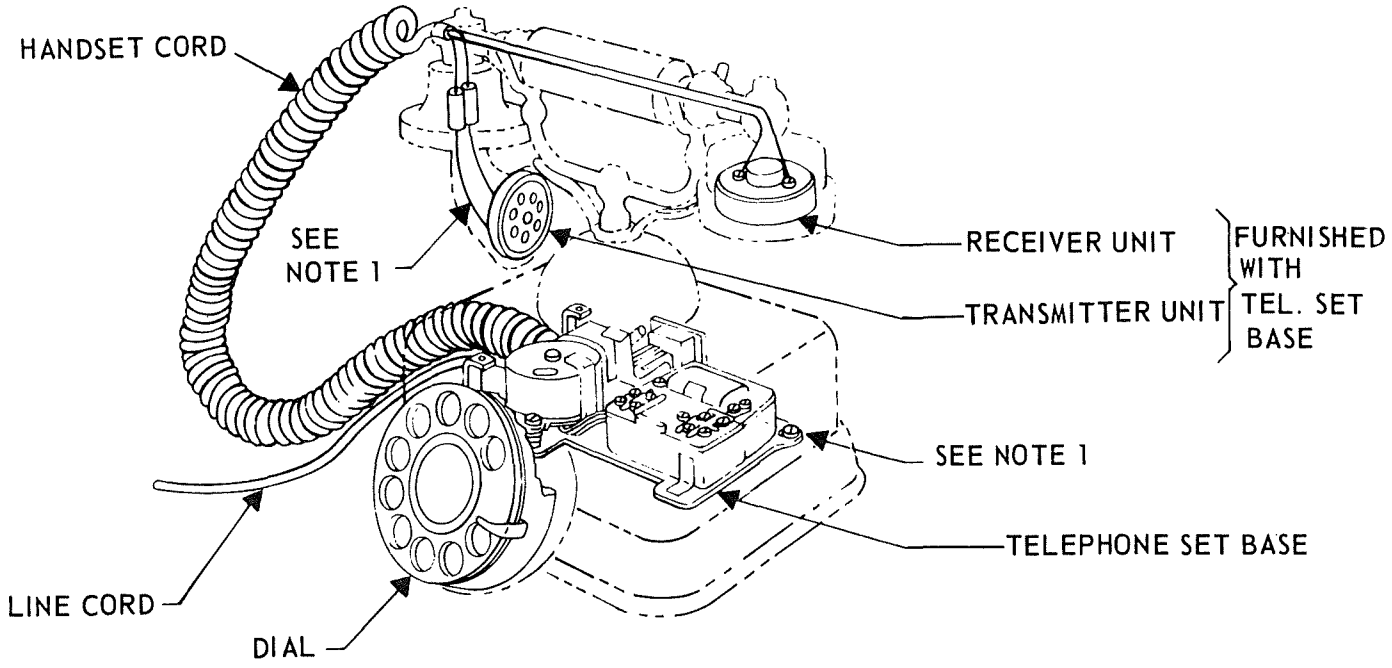
Fig. 14 shows the mounting arrangement for the line switch in the base of the desk-stand telephone and its position relative to the supplier's actuator.

Mounting arrangements for the transmitter and receiver units in the pedestal transmitter and separate hook-supported receiver are the same as shown in Fig. 6 and 7 except that the gridded transmitter cap would be replaced by a faceplate and mouthpiece. The dial mounting arrangements of Fig. 9 and 10 apply as well to the desk-stand telephone. The 5 inch distance restriction, however, would apply to the terminal block in the pedestal base instead of the network.

5. PROTECTION

A 500 volt ac RMS breakdown test is required between any part the user can touch and the telephone circuitry. For example, the manufacturer should design his handset so that the dielectric strength is such as to enable the combined transmitter, receiver, and wires furnished by the Telephone Company and manufacturer's handset assembly to pass such a breakdown test.

This method of testing is described in ASTM Specification D-149 Dielectric Breakdown Voltage Test. Capability to withstand voltages of up to 1000 volts RMS is desirable.



NOTES:

1. CONNECTING WIRE LEADS, TERMINALS, AND MOUNTING SCREWS FURNISHED WITH THE TELEPHONE SET BASE. DIAL LEADS AND MOUNTING SCREWS FURNISHED WITH THE DIAL.

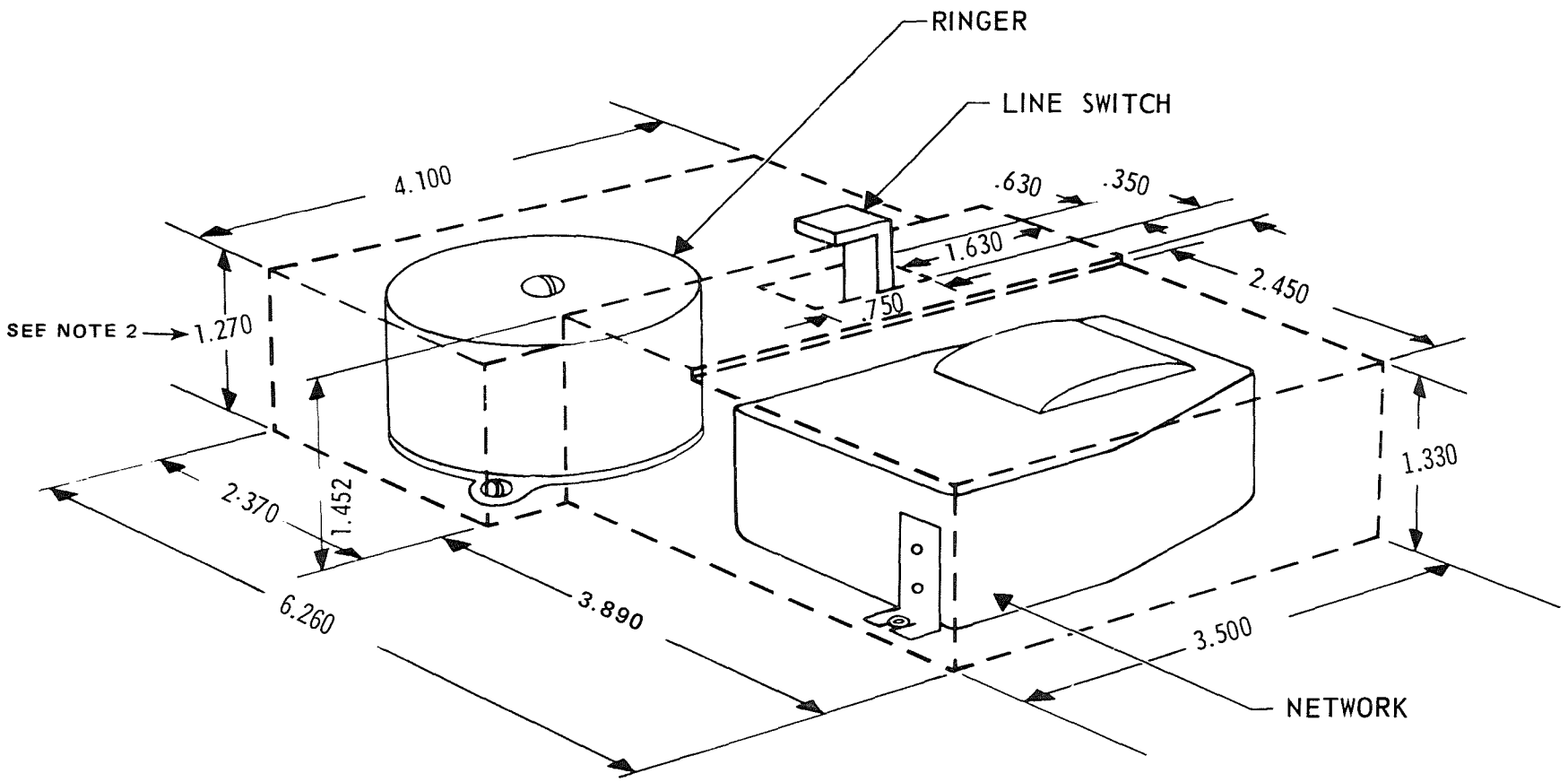
2. COMPLETED TELEPHONE SET HOUSING MUST AFFORD ACCESS TO ALL TELEPHONE COMPANY COMPONENTS, WIRES, AND CONNECTIONS FOR MAINTENANCE AND REPLACEMENT PURPOSES.

3. A 500 VOLT AC RMS BREAKDOWN TEST IS REQUIRED BETWEEN ANY PART THE USER CAN TOUCH AND TELEPHONE CIRCUITRY. THE METHOD OF TESTING IS DESCRIBED IN ASTM SPECIFICATION D-149 DIELECTRIC BREAKDOWN VOLTAGE TEST. CAPABILITY TO WITHSTAND BREAKDOWN VOLTAGES OF UP TO 1000 VOLTS RMS IS DESIRABLE

4. CUSTOMER-OWNED CIRCUITRY IS NOT PERMITTED IN OR ON THIS TELEPHONE SET HOUSING.

PHANTOM VIEW – TELEPHONE SET BASE

FIG. 1

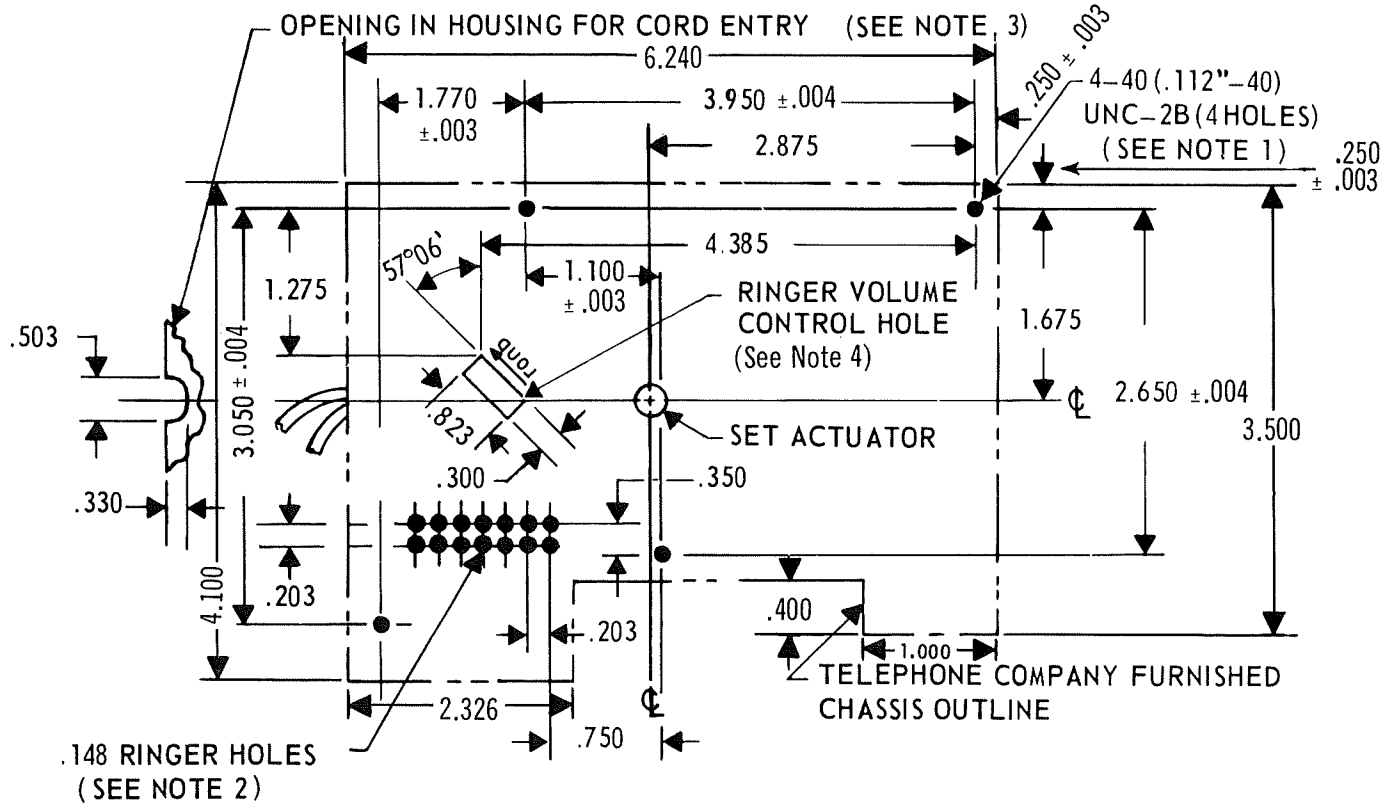


PRELIMINARY

NOTES:

1. VERTICAL DIMENSIONS ARE RELATIVE TO BOTTOM OF MOUNTING HOLE BOSSES OR TO TOP OF FLAT SURFACE UPON WHICH CHASSIS IS MOUNTED.
2. IF TOUCH-TONE DIAL IS TO BE USED, THIS DIMENSION SHOULD BE INCREASED TO 2.000 INCHES TO ACCOMMODATE A TERMINAL BLOCK AND POSSIBLE USE OF A POLARITY GUARD.

TELEPHONE COMPANY CHASSIS
TELEPHONE SET BASE
FIG. 2

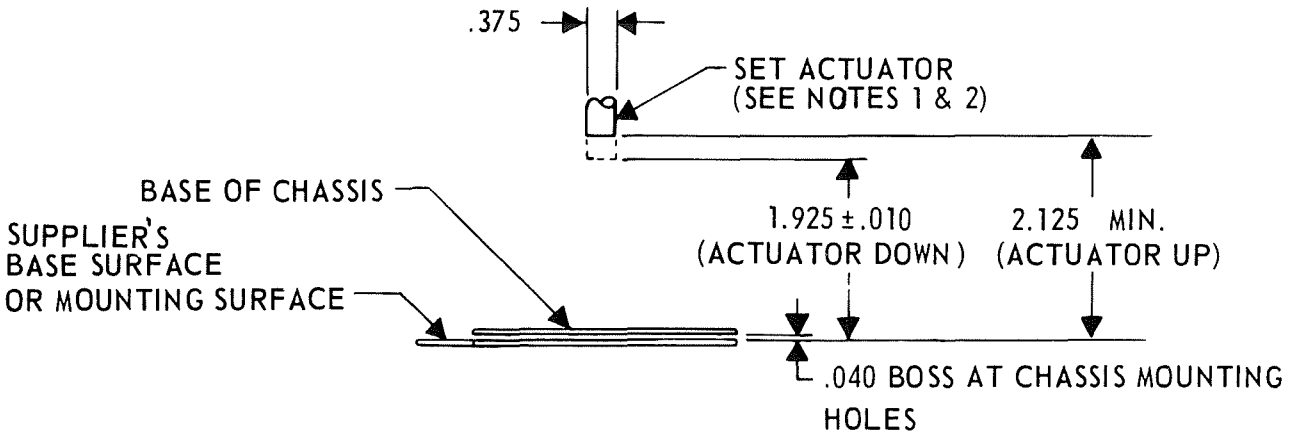


(VIEW LOCATING MOUNTING HOLES FROM ACTUATOR PIN)

NOTES:

1. MINIMUM 2 THREADS IN METAL, 4 THREADS IN PLASTIC, AND CLEARANCE OR ADDITIONAL THREADS FOR SCREW PENETRATION TO DEPTH OF 0.250 INCH.
2. ACOUSTIC PROPERTIES OF HOUSING MAY REQUIRE ADDITIONAL RINGER SOUND HOLES.
3. SHAPE OF OPENING MAY BE VARIED SUCH THAT WIDTH, AND HEIGHT DIMENSIONS SHOWN ARE INTERCHANGED. EDGES OF SLOT SHOULD BE SMOOTH, TO PREVENT DAMAGE TO CORD JACKETS.
4. THE WORD LOUD AND THE ARROW SHOWN SHOULD BE STAMPED ON THE EXPOSED SIDE OF THE BASE

INFORMATION FOR MOUNTING CHASSIS ON SUPPLIER'S HOUSING BASE
FIG. 3



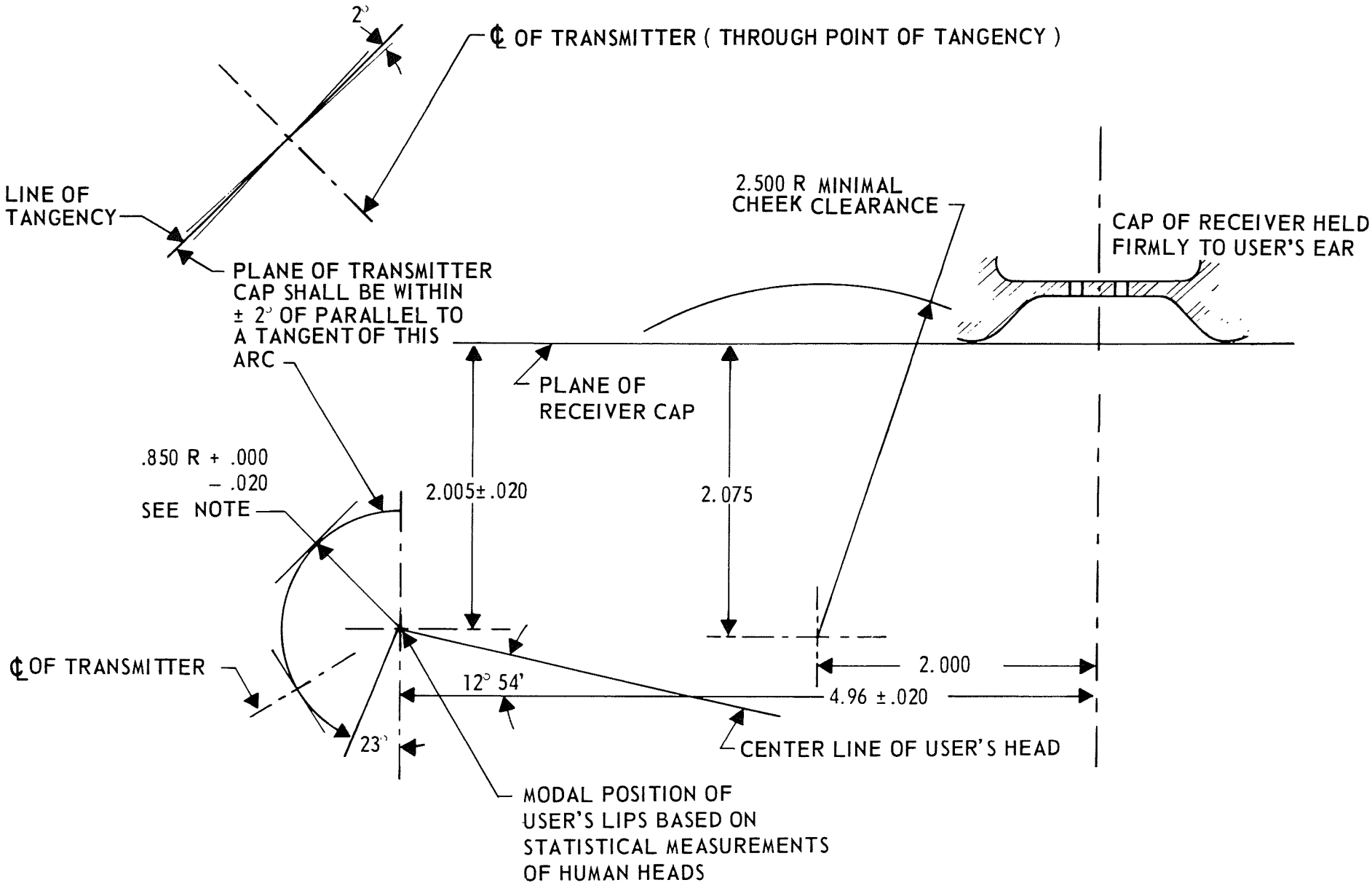
NOTES:

1. **SUPPLIER'S HANDSET WHEN "ON HOOK" SHALL FULLY OPERATE SET ACTUATOR UNDER FOLLOWING CONDITIONS:**

   HANDSET WEIGHTED WITH 110 GRAMS (TO REPRESENT TELEPHONE COMPANY'S TRANSMITTER AND RECEIVER UNITS) AND WITH 150 GRAMS APPLIED TO END OF SET ACTUATOR (TO REPRESENT THE TELEPHONE COMPANY'S SWITCH MECHANISM).

2. **SET ACTUATOR SHALL BE SELF SUPPORTING IN OFF-HOOK POSITION AND SHALL ALLOW THE LINE SWITCH MECHANISM TO MOVE FREELY TO ITS FULLY OPERATED CONDITION.**

LINE SWITCH ACTUATOR HEIGHT RANGE
FIG. 4



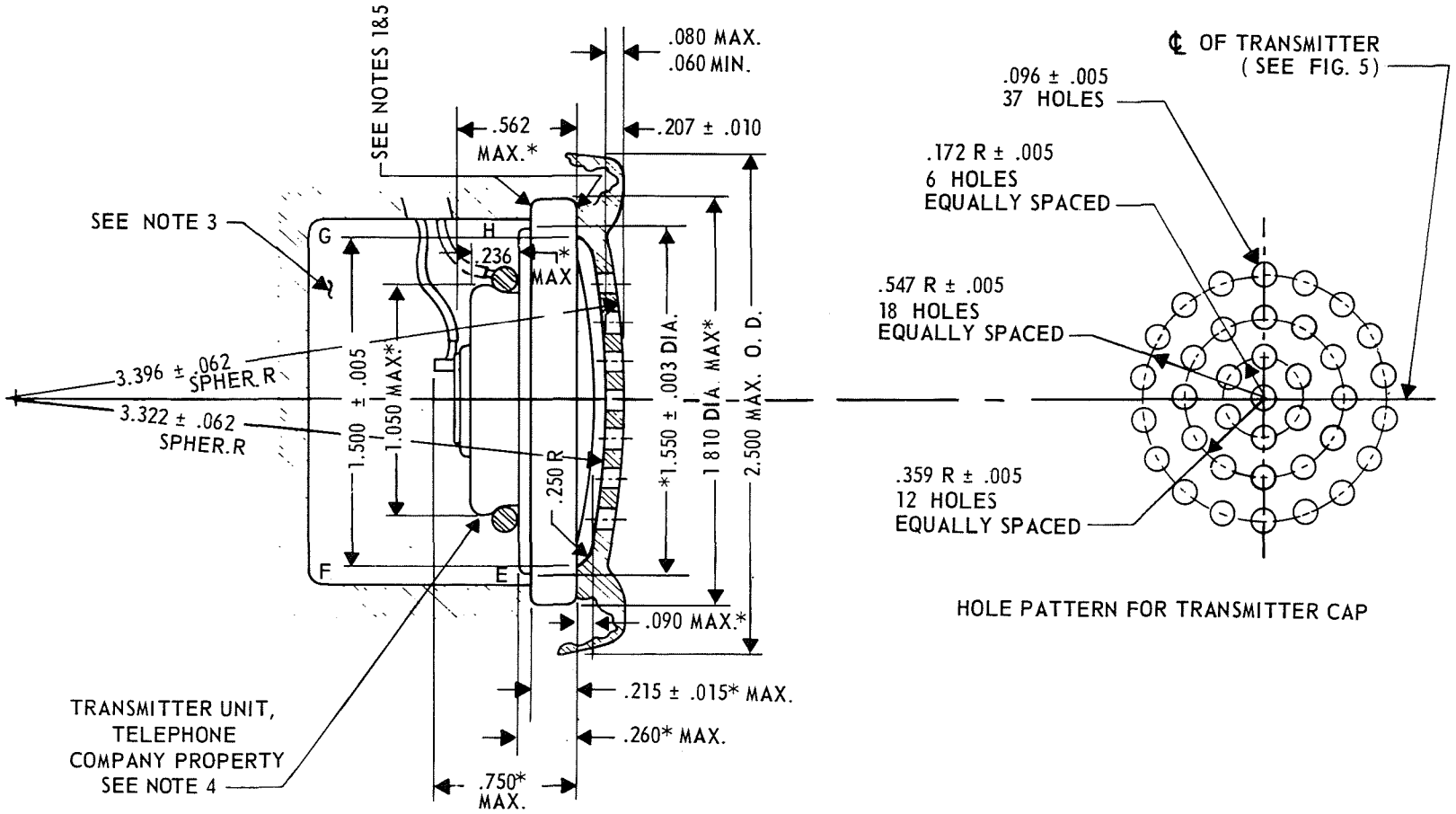
PRELIMINARY

NOTES:

1. **THIS DIMENSION IS EFFECTIVE ONLY WITH THE USE OF THE TRANSMITTER UNIT AS SHOWN IN FIGURE 6.**

MODAL POSITION FOR HANDSET

FIG. 5



HOLE PATTERN FOR TRANSMITTER CAP

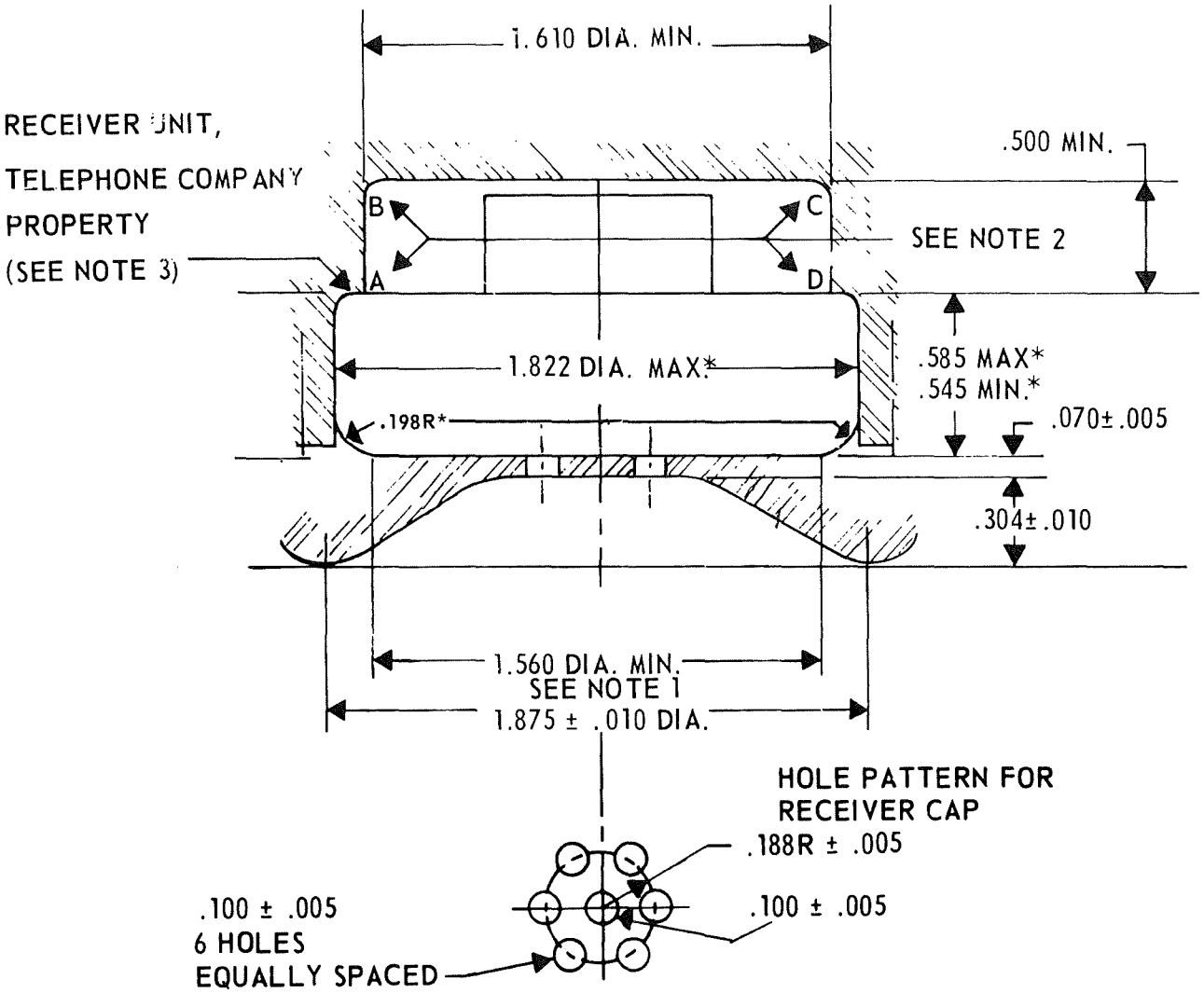
NOTES:

1. TRANSMITTER CLAMPING SURFACES SHALL ENGAGE THE TRANSMITTER UNIT FERRULE AND BE FLAT AND SMOOTH TO SEAL FRONT CAVITY ACOUSTICALLY
2. THE VOLUME OF BACK CUP E–F–G–H SHALL BE 0.80 CUBIC INCH MINIMUM AND BE ACOUSTICALLY SEALED
3. PROVISION SHALL BE MADE IN BACK OF CAVITY OF TRANSMITTER OR OTHER ACCESSIBLE LOCATION FOR CONNECTORS AND SLEEVES OF TRANSMITTER AND CORD LEADS, SLACK MUST BE PROVIDED TO ALLOW REMOVAL OF UNIT WITHOUT DISCONNECTING WIRES.
4. DIMENSIONS DESIGNATED WITH ASTERISKS (*) APPLY TO TELEPHONE COMPANY–SUPPLIED TRANSMITTER UNITS.
5. THE TRANSMITTER CAP AND TRANSMITTER CLAMPING SURFACES SHALL BE MADE OF A NONCONDUCTING MATERIAL.

TRANSMITTER DESIGN REFERENCE DIMENSIONS
FIG. 6

PRELIMINARY

PRELIMINARY



NOTES:

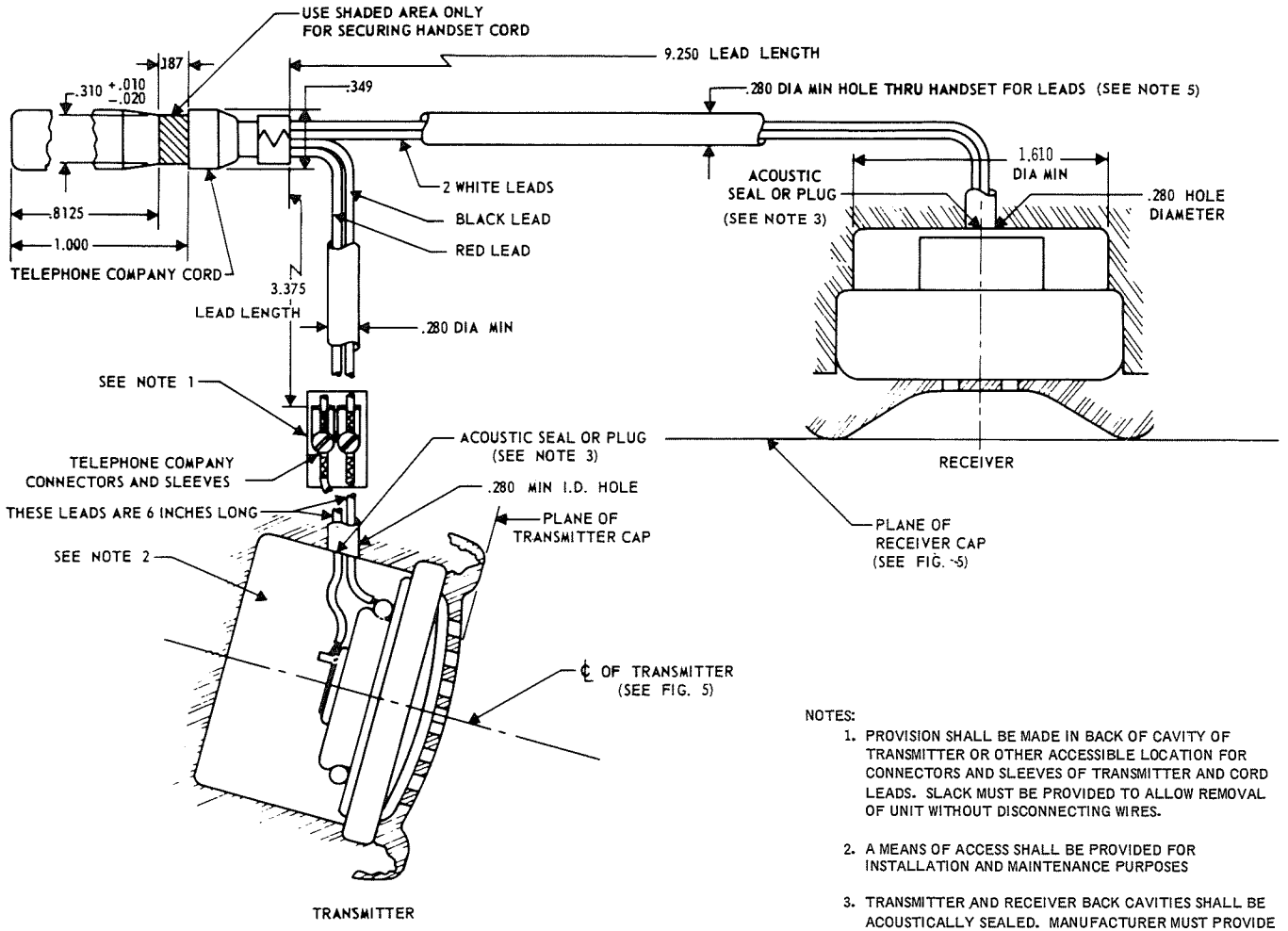
1. CAP SHALL BE FLAT AND SMOOTH TO CLAMP THE RECEIVER UNIT UNIFORMLY AND TO SEAL FRONT CAVITY ACOUSTICALLY.

   IT IS RECOMMENDED THAT THE RECEIVER CAP AND RECEIVER CLAMPING SURFACES BE MADE OF A NON CONDUCTING MATERIAL.

2. VOLUME OF BACK CUP A–B–C–D– SHALL BE 0.75 CUBIC INCH MINIMUM AND BE ACOUSTICALLY SEALED. THE RECEIVER UNIT SHALL SEAT ON ITS FERRULE WITHOUT PRESSURE ON OTHER PORTIONS OF THE UNIT.

3. DIMENSIONS DESIGNATED WITH ASTERISKS (*) APPLY TO TELEPHONE COMPANY – SUPPLIED RECEIVER UNITS.

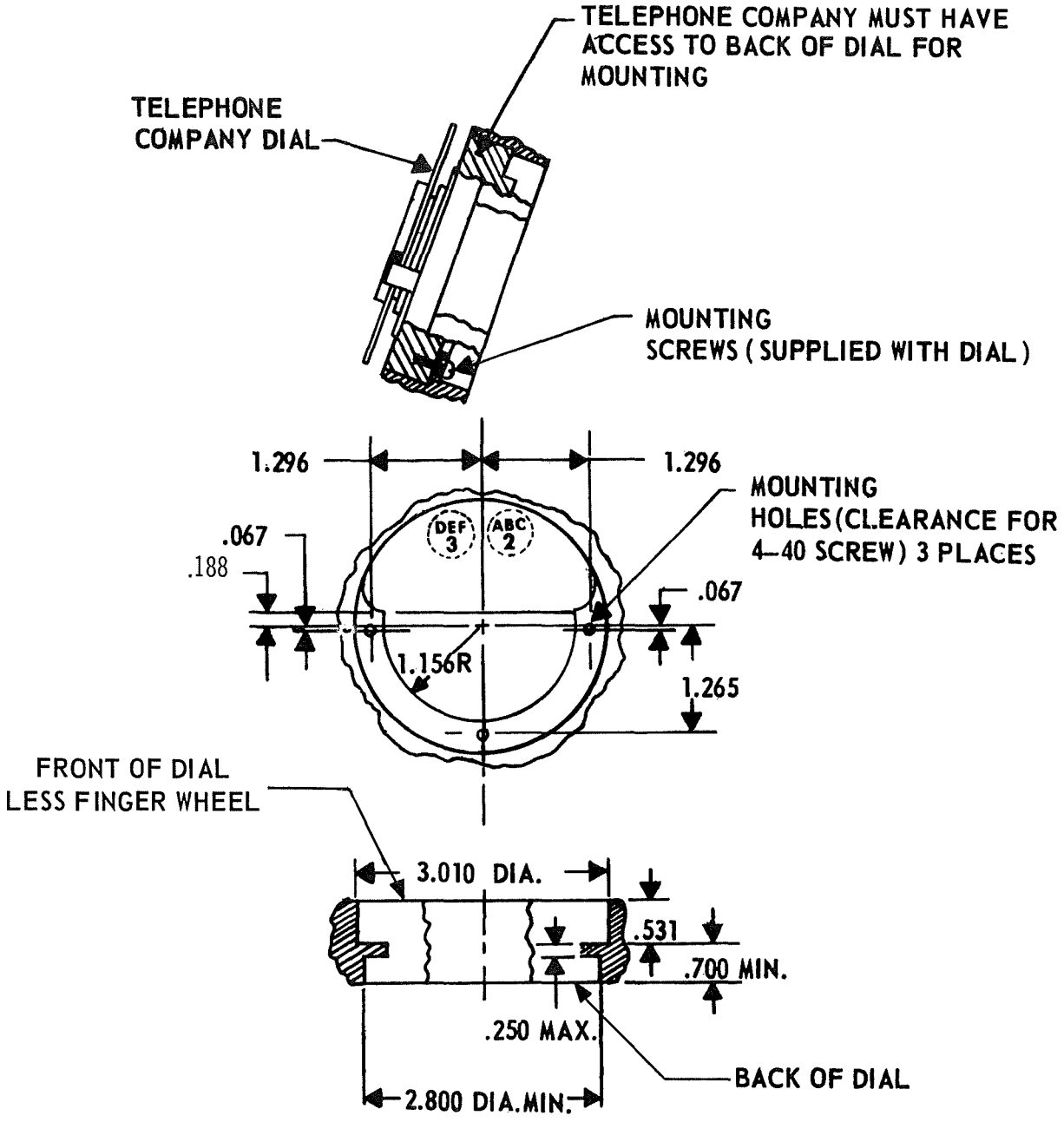
RECEIVER DESIGN REFERENCE DIMENSIONS
FIG. 7



NOTES:

1. PROVISION SHALL BE MADE IN BACK OF CAVITY OF TRANSMITTER OR OTHER ACCESSIBLE LOCATION FOR CONNECTORS AND SLEEVES OF TRANSMITTER AND CORD LEADS. SLACK MUST BE PROVIDED TO ALLOW REMOVAL OF UNIT WITHOUT DISCONNECTING WIRES.
2. A MEANS OF ACCESS SHALL BE PROVIDED FOR INSTALLATION AND MAINTENANCE PURPOSES
3. TRANSMITTER AND RECEIVER BACK CAVITIES SHALL BE ACOUSTICALLY SEALED. MANUFACTURER MUST PROVIDE NECESSARY PARTS OF SEAL.
4. A 500 VOLT AC RMS BREAKDOWN TEST IS REQUIRED BETWEEN ANY PART THE USER CAN TOUCH AND THE TELEPHONE CIRCUITRY. THE METHOD OF TESTING IS DESCRIBED IN ASTM SPECIFICATION D-149 "DIELECTRIC BREAKDOWN VOLTAGE TEST" AND IS REQUIRED FOR ALL CUSTOMER-OWNED DECORATOR TYPE TELEPHONE SETS.
5. THE DESIGN OF THE HANDLE SHALL BE SUCH THAT NO SPECIAL TOOLS ARE NEEDED TO THREAD THE RECEIVER LEADS THROUGH IT, UNLESS A PRE-THREADED STRING OR FISH-WIRE IS PROVIDED BY THE SUPPLIER.

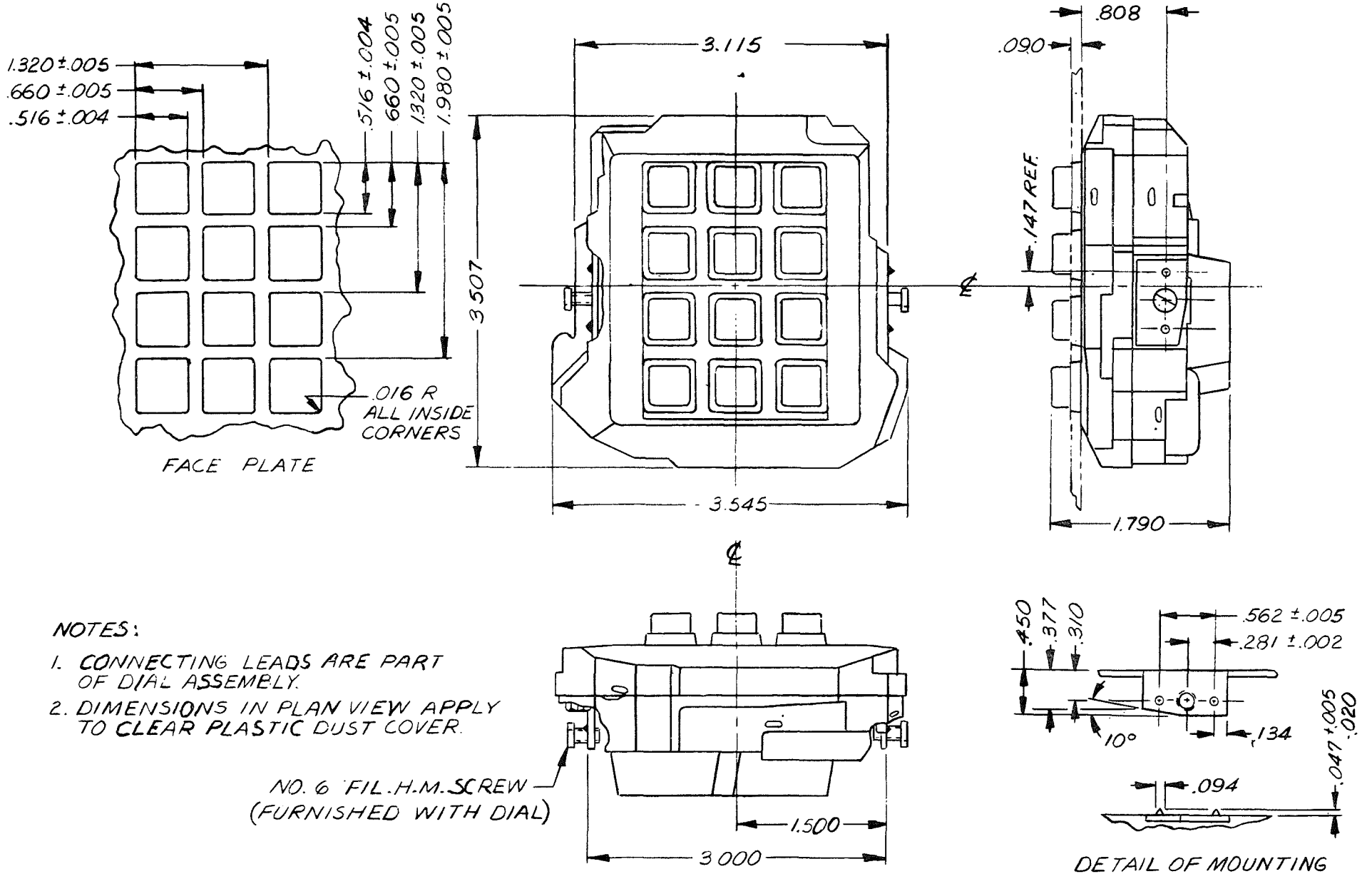
DESIGN REFERENCE DIMENSIONS FOR CORDING AND WIRING HANDSET
FIG. 8



NOTES:

1. MOUNTING SCREWS AND CONNECTING LEADS SUPPLIED WITH DIAL

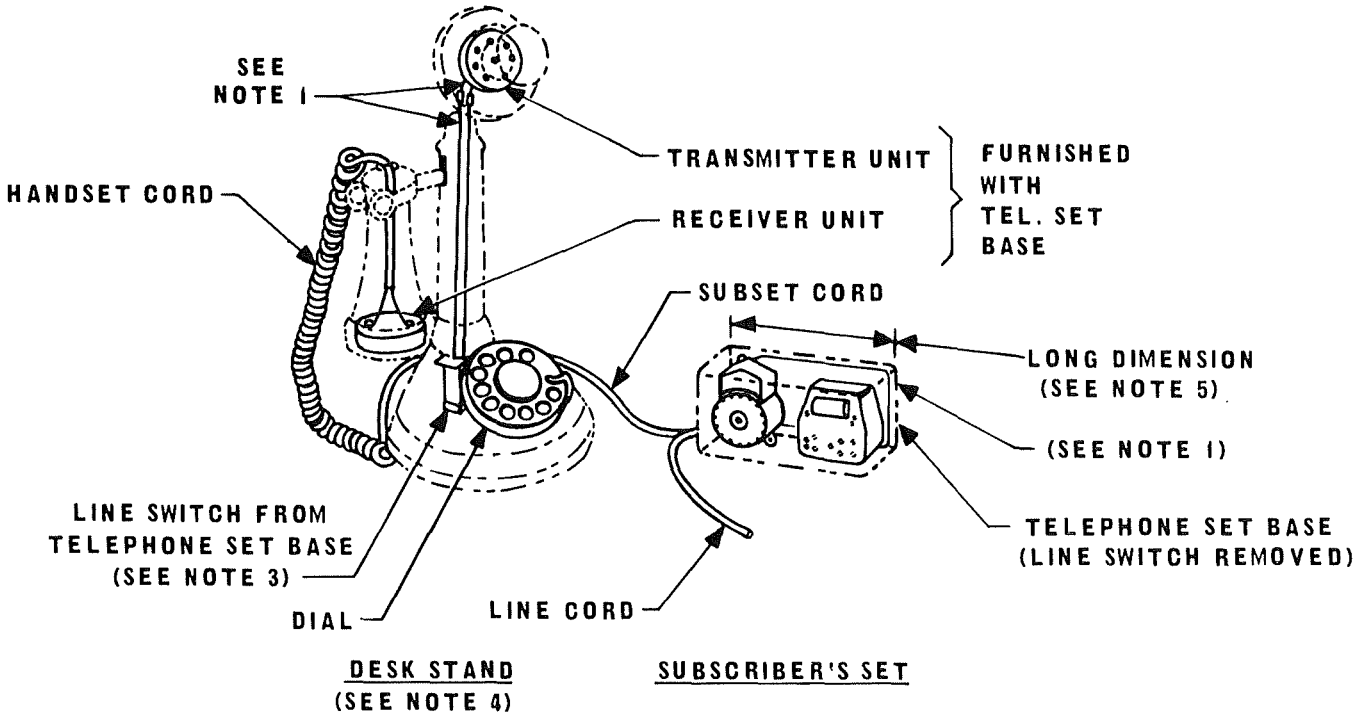
DIAL MOUNTING REQUIREMENTS
FIG. 9



TOUCH TONE DIAL MOUNTING AND FACE PLATE REQUIREMENTS

FIG. 10

PRELIMINARY



NOTES:

1. CONNECTING WIRE LEADS, TERMINALS AND MOUNTING SCREWS FURNISHED WITH THE TELEPHONE SET BASE. DIAL LEADS AND MOUNTING SCREWS FURNISHED WITH THE DIAL.

2. COMPLETED DESK STAND AND SUBSET HOUSINGS MUST AFFORD ACCESS TO ALL TELEPHONE COMPANY COMPONENTS, WIRES AND CONNECTIONS FOR MAINTENANCE AND REPLACEMENT PURPOSES.

3. LINE SWITCH SHALL BE ACTUATED BY A PLUNGER LINKED TO THE RECEIVER HOOK (SEE FIGURE 14).

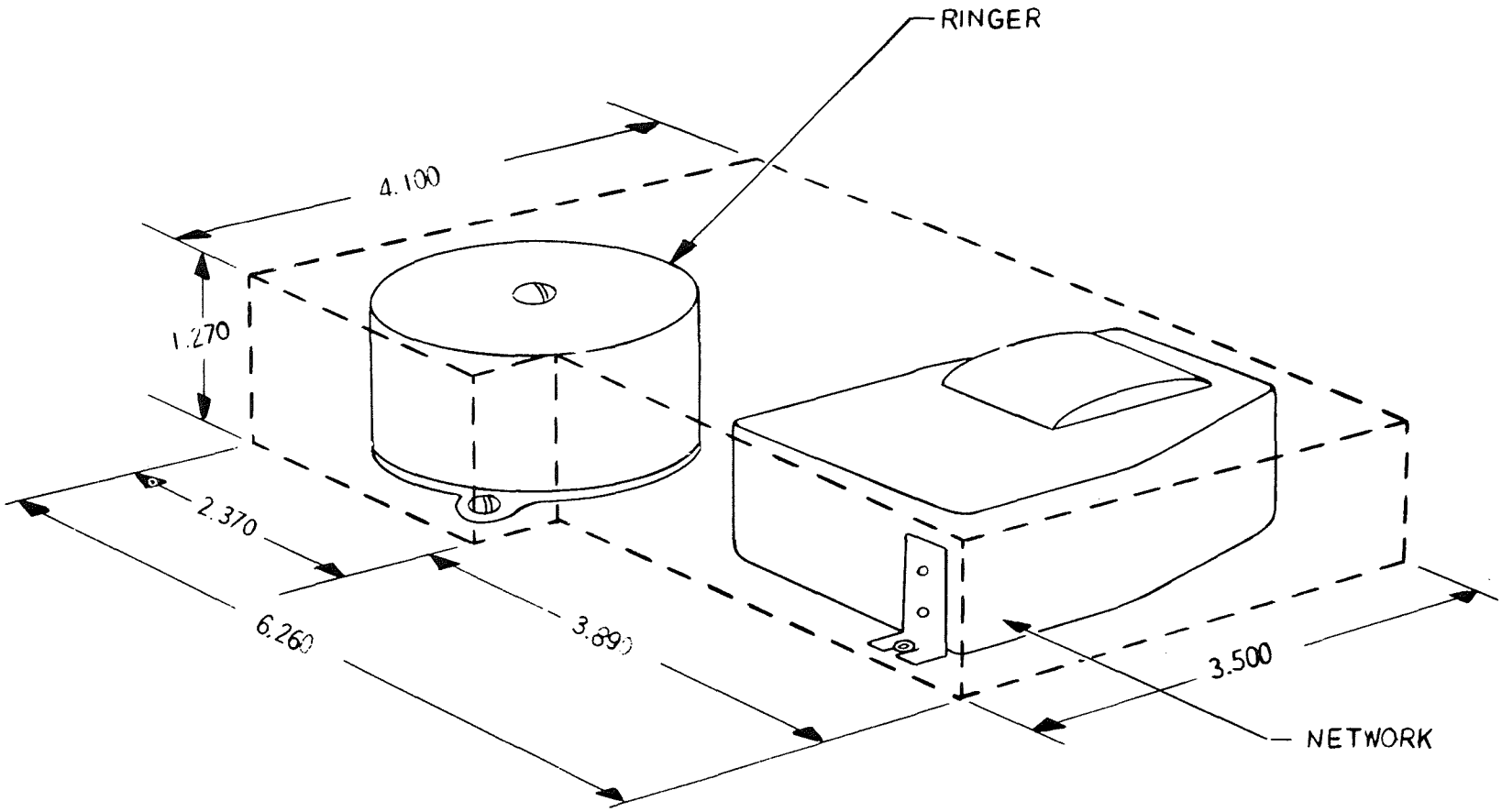
4. IN THE DESK STAND BASE, THE SUPPLIER SHALL PROVIDE A CONNECTING BLOCK CONTAINING AT LEAST FOUR SINGLE AND TWO DOUBLE SCREW TERMINALS WHEN INTENDED FOR USE WITH A ROTARY DIAL, OR SEVEN SINGLE AND TWO DOUBLE, FOR A TOUCH-TONE DIAL.

5. INSTRUCTIONS GIVEN THE TELEPHONE COMPANY INSTALLER WILL CAUTION HIM THAT WHEN MOUNTING THE SUBSCRIBER'S SET ON A VERTICAL SURFACE, THE LONG DIMENSION SHOULD BE WITHIN ± 12° OF THE HORIZONTAL TO INSURE PROPER OPERATION OF THE RINGER.

6. A 500 VOLT AC RMS BREAKDOWN TEST IS REQUIRED BETWEEN ANY PART THE USER CAN TOUCH AND TELEPHONE CIRCUITRY. THE METHOD OF TESTING IS DESCRIBED IN ASTM, SPECIFICATION D-149 DIELECTRIC BREAKDOWN VOLTAGE TEST. CAPABILITY TO WITHSTAND VOLTAGES OF UP TO 1000 VOLTS RMS IS DESIRABLE.

7. CUSTOMER-OWNED CIRCUITRY IS NOT PERMITTED IN OR ON THESE HOUSINGS.

PHANTOM VIEW – TELEPHONE SET BASE ADAPTED FOR USE WITH DESK STAND TELEPHONE
FIG. 11



NOTES:

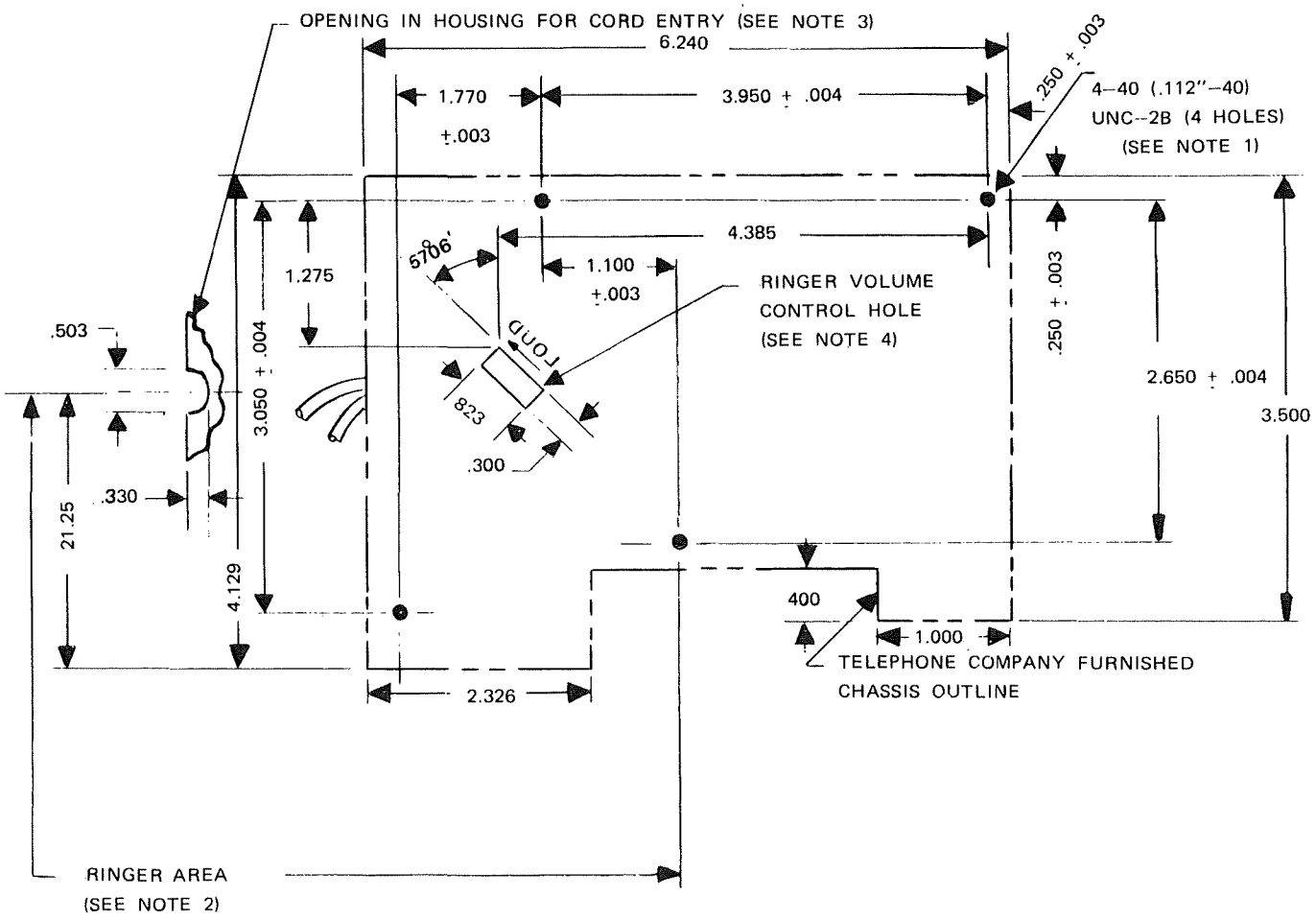
1. VERTICAL DIMENSIONS ARE RELATIVE TO BOTTOM OF MOUNTING HOLE BOSSES OR TO TOP OF FLAT SURFACE UPON WHICH CHASSIS IS MOUNTED.

TELEPHONE COMPANY CHASSIS WITH LINE SWITCH REMOVED

SUBSCRIBER'S SET

FIG. 12

PRELIMINARY

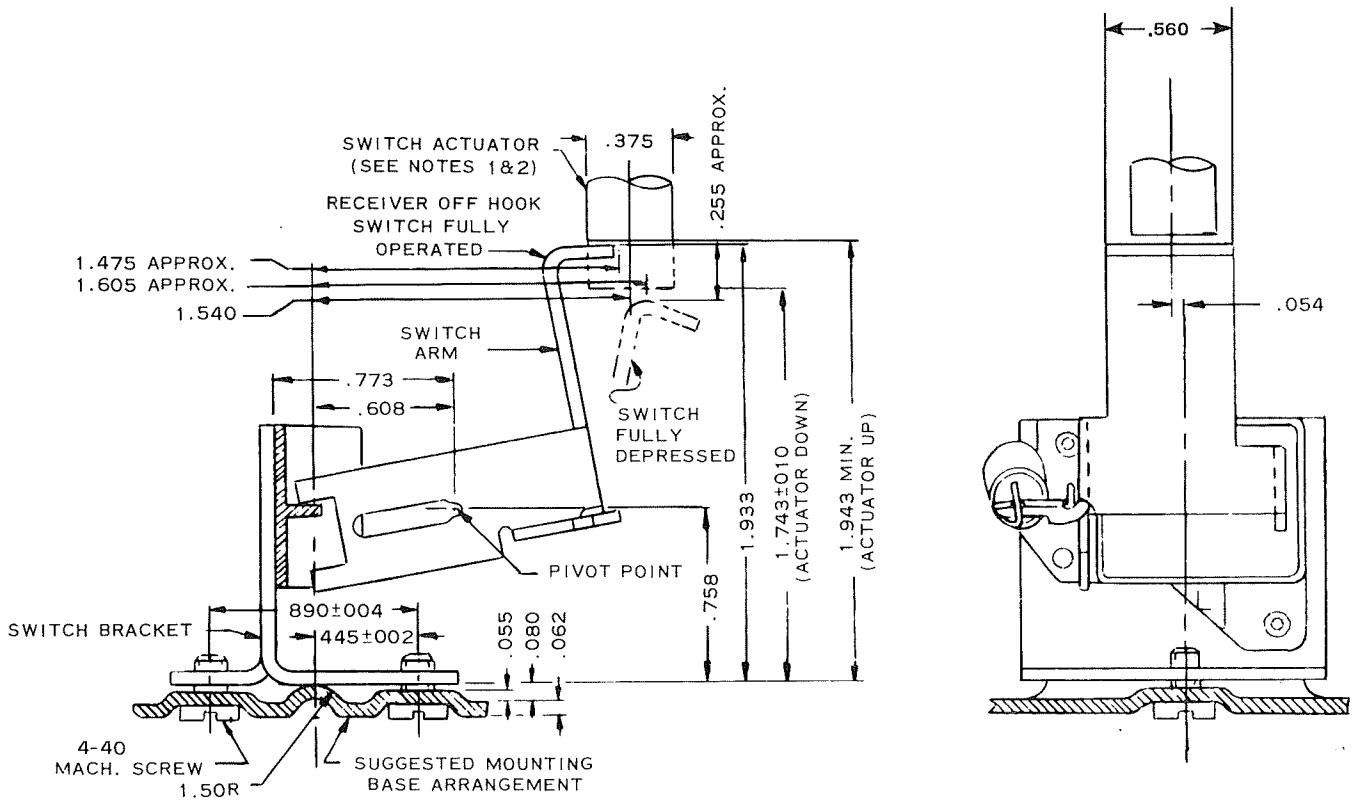


NOTES:

1. MINIMUM 2 THREADS IN METAL, 4 THREADS IN PLASTIC, AND CLEARANCE OR ADDITIONAL THREADS FOR SCREW PENETRATION TO DEPTH OF 0.250 INCH.
2. HOUSING SHOULD HAVE LOUVERS OR OTHER TYPE OPENINGS IN THE AREA SHOWN, FOR SOUND OUTLET.
3. SHAPE OF OPENING MAY BE VARIED SUCH THAT WIDTH, AND HEIGHT DIMENSIONS SHOWN ARE INTERCHANGED. EDGES OF SLOT SHOULD BE SMOOTH TO PREVENT DAMAGE TO CORD JACKETS.
4. THE WORD LOUD AND THE ARROW SHOWN SHOULD BE STAMPED ON THE EXPOSED SIDE OF THE BASE.

INFORMATION FOR MOUNTING CHASSIS ON SUPPLIER'S SUBSCRIBER'S SET HOUSING BASE

FIG. 13



NOTES:

1. **SUPPLIER'S RECEIVER WHEN "ON HOOK" SHALL FULLY OPERATE ACTUATOR UNDER FOLLOWING CONDITIONS:**

   RECEIVER WEIGHTED WITH 80 GRAMS (TO REPRESENT TELEPHONE COMPANY'S RECEIVER UNIT) AND WITH 150 GRAMS APPLIED TO END OF ACTUATOR (TO REPRESENT THE TELEPHONE COMPANY'S SWITCH MECHANISM).

2. **ACTUATOR SHALL BE SELF SUPPORTING IN OFF-HOOK POSITION AND SHALL ALLOW THE LINE SWITCH MECHANISM TO MOVE FREELY TO IT'S FULLY OPERATED CONDITION.**

DESK-STAND
LINE SWITCH ACTUATOR HEIGHT RANGE

FIGURE 14