

the original complaint and which relate to the original cause of action may be filed with the Commission.

§ 68.404 Number of copies.

An original and two copies of all complaints and amended complaints shall be filed. An original and one copy of all other pleadings shall be filed.

§ 68.406 Service.

(a) The Commission will serve a copy of any complaint or amended complaint filed with it, together with a notice of the filing of the complaint. Such notice shall call upon the defendant to satisfy or answer the complaint in writing within the time specified in said notice of complaint.

(b) All subsequent pleadings and briefs shall be served by the filing party on all other parties to the proceeding in accordance with the requirements of §1.47. Proof of such service shall also be made in accordance with the requirements of said section.

§ 68.408 Answers to complaints and amended complaints.

Any party upon whom a copy of a complaint or amended complaint is served under this subpart shall serve an answer within the time specified by the Commission in its notice of complaint. The answer shall advise the parties and the Commission fully and completely of the nature of the defense, and shall respond specifically to all material allegations of the complaint. In cases involving allegations of harm, the answer shall indicate what action has been taken or is proposed to be taken to stop the occurrence of such harm, both in terms of future production and with reference to articles in the possession of distributors, sellers, and users. Collateral or immaterial issues shall be avoided in answers and every effort should be made to narrow the issues. Matters alleged as affirmative defenses shall be separately stated and numbered. Any defendant failing to file and serve an answer within the time and in the manner prescribed may be deemed in default.

§ 68.410 Replies to answers or amended answers.

Within 10 days after service of an answer or an amended answer, a complainant may serve a reply which shall be responsive to matters contained in such answer or amended answer and shall not contain new matters. Failure to reply will not be deemed an admission of any allegation contained in such answer or amended answer.

§ 68.412 Defective pleadings.

Any pleading filed in a complaint proceeding not in substantial conformity with the requirements of the applicable rules in this part may be dismissed.

§ 68.414 Hearing aid-compatibility: Enforcement.

Enforcement of §§68.4 and 68.112 is hereby delegated to those states which adopt those sections and provide for their enforcement. The procedures followed by a state to enforce those sections shall provide a 30-day period after a complaint is filed, during which time state personnel shall attempt to resolve a dispute on an informal basis. If a state has not adopted or incorporated §§68.4 and 68.112, or failed to act within 6 months from the filing of a complaint with the state public utility commission, the Commission will accept such compliants. A written notification to the complainant that the state believes action is unwarranted is not a failure to act.

[49 FR 1368, Jan. 11, 1984]

Subpart F—Connectors

SOURCE: 41 FR 28699, July 12, 1976, unless otherwise noted.

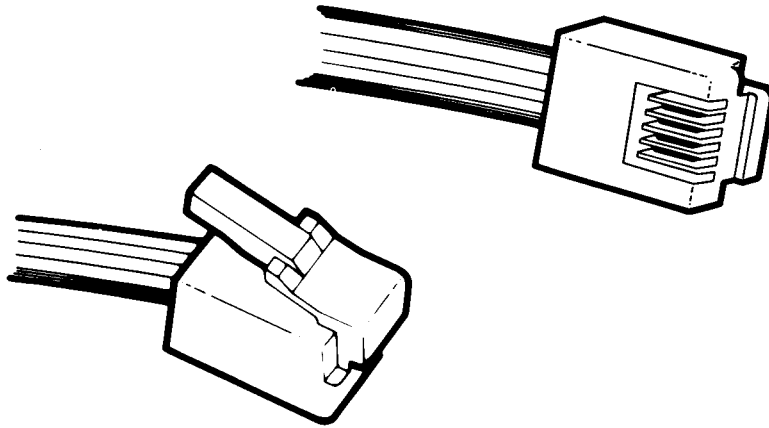
§ 68.500 Specifications.

General. The US customary units are shown in parentheses throughout this subpart F. US customary units were the original dimensional units used in designing the plugs and jacks shown in the following pages. The dimensions shown without parenthesis are in SI units. The SI dimensional units are derived from the US customary units by

multiplying “inches” by “25.4” to derive the exact conversion in millimeters with no rounding-off of the resulting decimal value. The number of decimal places to which the conversion is taken by adding a particular number of zeroes to the right end of the resulting SI value, where required, is governed by the concept that when the calculated SI dimensional unit is divided by “25.4,” the resulting “inches” calculation will be exactly that shown in the parenthesis (the original design dimension). The conversion to SI force units, newtons, is rounded off to a number of decimal places that will result in the calculated SI force value being within less than one percent of the original US customary force unit value located adjacent in parenthesis (the original design value). The rationale for this is that this will bring the force conversions to within the degree of accuracy of the force-measuring device and avoid the carrying of an unrealistic number of decimal places which would otherwise result from an exact conversion. The plugs and jacks described in this section represent the standard connections to be used for connections to the telephone network. The plug and jack designs shown are representative of generic types, and should not be interpreted as the only designs that may be used. Design innovation and improvement is expected; but for interchangeability to be maintained, alternative designs (the “or equivalent” permitted in §68.104) must

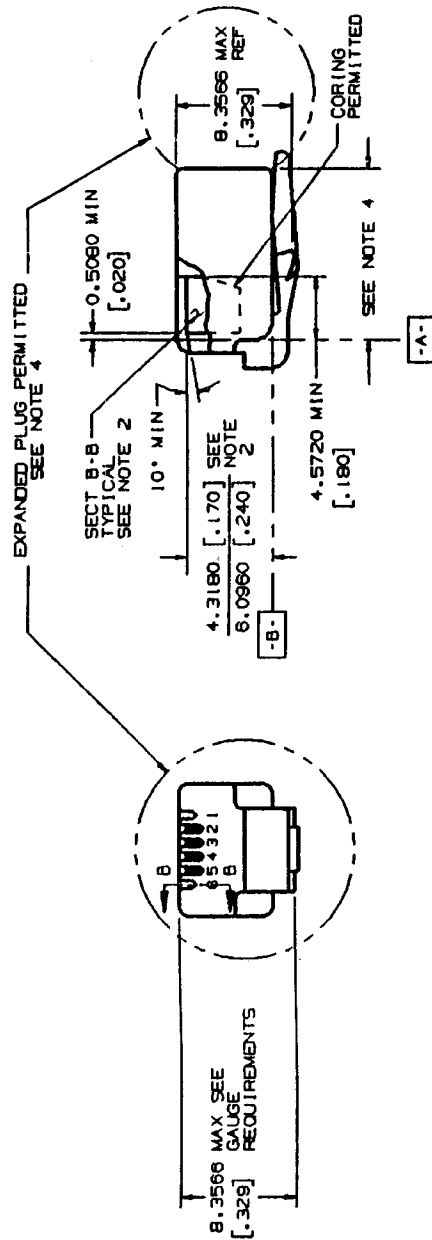
be compatible with the plugs and jacks shown. The interface dimensions between mating plugs and jacks must be maintained. Hardware used to mount, protect, and enclose standard jacks is not described. The only requirement on connecting blocks, housings, dust covers, outdoor boxes, and the like that contain standard network jacks is that they accept standard plugs with cordage. For special purpose applications, plugs may be made longer than shown or adapted for direct use on equipment or apparatus without cordage. The sliding modular plug used on the back of many modular wall telephone sets is an example of such a special purpose application. It is the responsibility of the designers and manufacturers of communication equipment who use such plugs to assure that they are compatible with the hardware used to mount standard jacks with which they plan to interface. For the purposes of this section, hard gold and contact performance equivalent to gold shall be determined in accordance with the standards detailed in Appendix H of TIA Telecommunications Systems Bulletin No. 31 Part 68 Rationale and Measurement Guidelines (TSB.31), prepared by EIA/TIA TR-41 Committee on Telephone Terminals (1992). This publication may be obtained by contacting Global Engineering Documents, 7730 Carondelet Avenue, Suite #407, St. Louis, Missouri, 63105. (Telephone number 1-800-854-7179).

(a) *Minature 6-position plug:*



(Note: This plug is depicted equipped with 4 contacts; it may be fabricated with its full 6 contact capability.)

Figure 68.500(a)(1)(i)-View



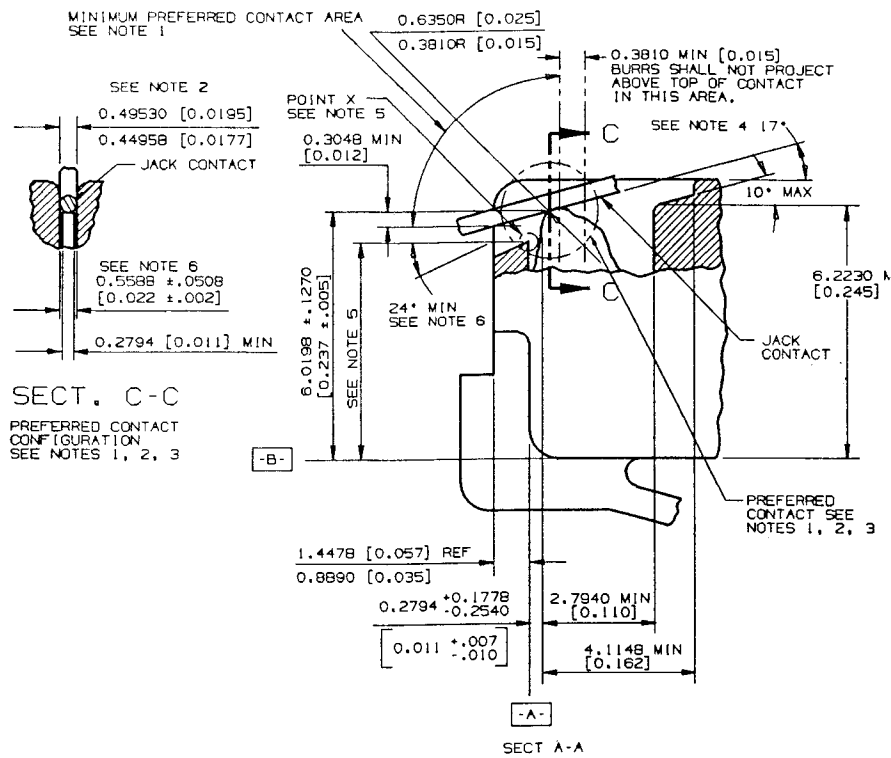
NOTE: ALL NOTES FOLLOW THIS FIGURE.

FIGURE 68.500 (g)(2)(ii) - 6 POSITION PLUG MECHANICAL SPECIFICATION (CONTINUED)

NOTES: (Notes apply to Figures 68.500(a)(2)(i) and 68.500(a)(2)(ii))

1. All plugs must be capable of meeting the requirements of the plugs go and no-go gauges.

2. Section BB applies to any jack contact receiving slot which does not contain a plug contact.
3. The preferred major cordage cross section is 2.5400 mm (.100 inch) max. thick by 5.0800 mm (.200 inch) max. wide, with rounded corners. It should exit the plug on the plug centerline. Other cordage configurations are permitted but may inhibit the special features of some network jack enclosures.
4. The standard plug length is 11.6840 mm (.460 inch) max. Plugs may be made longer than standard or adapted for direct use on special cords, adapters with out cordage, and on apparatus or equipment subject to the limitations described in the Section 68.500 introductory paragraphs. Plugs longer than standard may inhibit the special features of some network jack enclosures.
5. A 12.0396 mm (.474 inch) minimum tab length is required. It is preferred that a maximum tab length be no longer than 13.2080 mm (.520 inch). Longer tabs may be used with the same limitations as described in Note 4.
6. To obtain maximum plug guidance when 6-position plugs are inserted in 8-position jacks, it is desirable to extend the front plug nose to the 2.3368 mm (.092 inch) maximum.
7. These dimensions apply to the location of jack contact receiving slots. It is desirable that plug contacts be centered axially in these slots, but centering is not required.
8. The 6.0452/6.1722 mm (.238/.243 inch) dimension is preferred to obtain maximum plug guidance in jacks with more than 6 conductors. A tolerance range of 5.9182/6.1722 mm (.233/.243 inch) is permitted, but may create targeting problems in 8-position jacks.
9. The center rib centerline shall be coincident with the plug width 9.6520 mm (.380 inch) ref. centerline within $\pm .0762$ mm ($\pm .003$ inch).



NOTE: ALL NOTES FOLLOW THIS FIGURE.

NOTE: THE B POSITION PLUG/JACK CONTACT SPECIFICATION IS IDENTICAL.

FIGURE 68.500(a)(3)(i)- 6 POSITION PLUG
PLUG /JACK CONTACT SPECIFICATION

NOTES: (Notes apply to Figure 68.500(a)(3)(i))

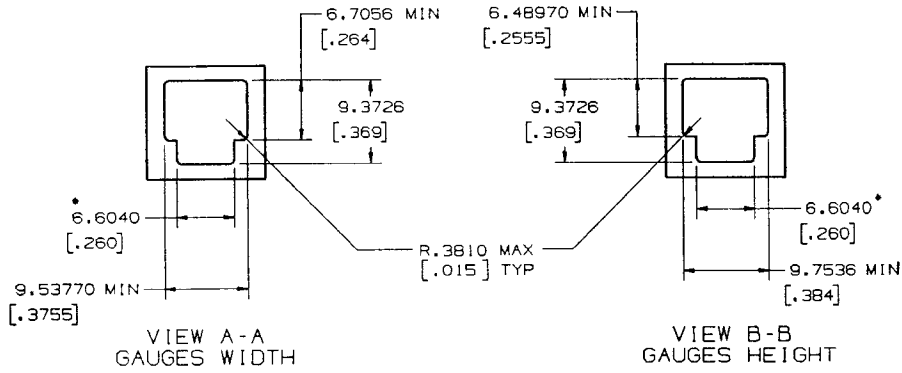
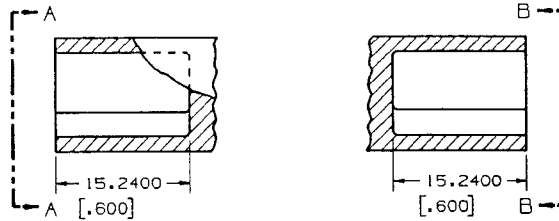
1. The plug/jack contact interface should be hard gold to hard gold and should have a minimum gold thickness of .0012700 mm (0.000050 inch) on each side of the interface. The minimum contact force should be .98 N (100 grams). Any non-gold contact material must be compatible with gold and provide equivalent contact performance. A smooth, burr-free surface is required at the interface in the area shown.
2. The jack contact design is based upon .4572 mm (.018 inch) spring temper phosphor bronze round wire in the modular plug blade and jack contact interface. Other

- contact configurations that provide contact performance equal to or better than the preferred configurations and do not cause damage to the plug or jack are permitted. The preferred jack contact width is .44958/.49530 mm (.0177/.0195 inches). Deviations from the preferred jack contact width are permitted for round sectional shapes as well as noncircular cross sectional shapes but they must be compatible with existing plug configurations. The requirements of Note 1 apply to all possible contact areas.
3. The configuration of the plug contact and the front plastic of the plug should prevent

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- jack contacts from being damaged during plug insertion into jacks.
4. This is the suggested nominal contact angle between plugs and jacks with the plug latched into the jack. If this angle becomes greater than 24 degrees loss of electrical contact may occur between the plug and jack. If the nominal contact angle becomes less than 13 degrees, interference between jack contacts and the internal plastic in the plug may occur.
 5. To avoid loss of electrical contact, the preferred dimension from datum B to the highest point "X" should be 5.0800 mm (.200 inch) max. A dimension greater than 5.3594 mm (.211 inch) may result in loss of electrical contact between plugs and jacks. The 5.3594 mm (.211 inch) max. shall be considered an absolute maximum.
 6. The 24 degree min. angle applies only to plugs with front plastic walls higher than 4.8260 mm (.190 inches).

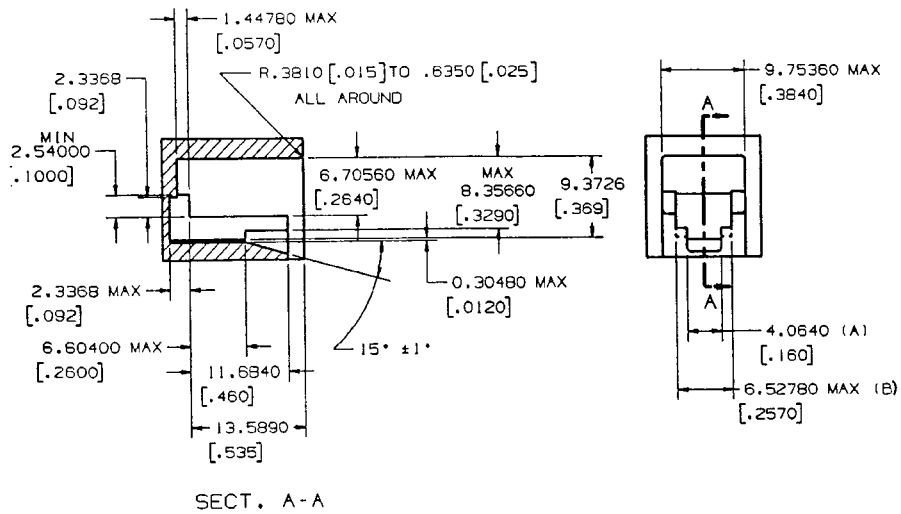


NO-GO GAUGE

NOTES:

1. THE PLUG SHALL NOT BE CAPABLE OF ENTERING THE GAUGE MORE THAN 1.7780mm [.070] BEYOND DATUM-A- (SEE FIGURE 68.500(a)(2)(i)) WITH 8.90 newtons [2.0 POUNDS] INSERTION FORCE.
2. NON-TOLERANCED DIMENSIONS GIVEN TO FOUR PLACES SHALL BE WITHIN ±0.0508mm [.002].
3. *6.6040mm [.260] DIMENSION TO BE CENTRALLY LOCATED WITH RESPECT TO 9.7536mm [.384] MINIMUM AND 9.53770mm [.3755] MINIMUM WITHIN ±0.0508mm [.002].

FIGURE 68.500(a)(4)(i) - 6 POSITION PLUG
MINIMUM PLUG SIZE



GO GAUGE

NOTES

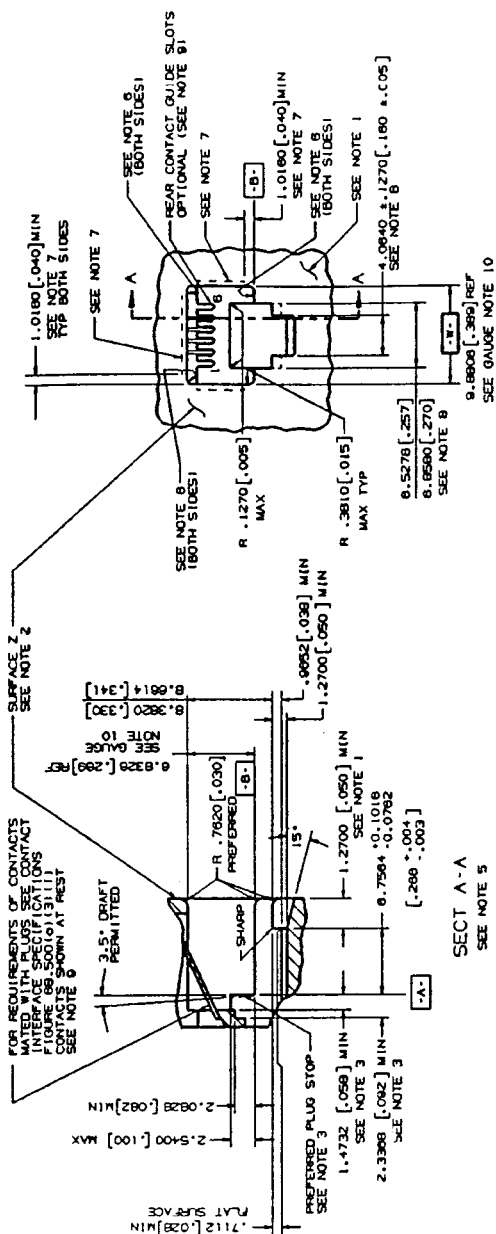
1. THE PLUG SHALL BE CAPABLE OF INSERTION AND LATCHING INTO THE GAUGE WITH 22.24 newtons [5 POUNDS] OR LESS INSERTIONS FORCE. PLUG LATCHING BAR SHALL BE DEPRESSED SO AS NOT TO INTERFERE WITH THE PLUG ENTRY. AFTER INSERTION AND LATCHING, PLUG SHALL BE CAPABLE OF REMOVAL, WITH THE LATCH DEPRESSED, WITH A REMOVAL FORCE OF 44.48 newtons [10 POUNDS] OR LESS APPLIED AT AN ADVANTAGEOUS ANGLE.
2. DIMENSIONS GIVEN TO FOUR DECIMAL PLACES SHALL BE WITHIN ±.0508mm [±.002] .
3. DIMENSIONS (A) AND (B) TO BE CENTRALLY LOCATED WITH RESPECT TO 9.75360mm [.3840]MAX. JACK OPENING WIDTH WITHIN ±0.0254mm [.001] .
4. DO NOT SCALE DRAWINGS FOR EXTERNAL CONFIGURATION.

FIGURE 68.500(a)(15)(i) - 6 POSITION PLUG
MAXIMUM PLUG SIZE

(b) *Miniature 6-position jack:*

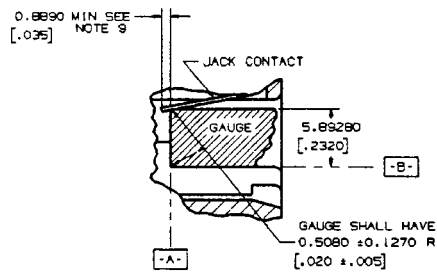
(1) [Reserved]

(NOTE: THIS JACK IS DEPICTED EQUIPPED WITH 4 CONTACTS; IT MAY BE FABRICATED WITH ITS FULL 6 CONTACT CAPACITY.)

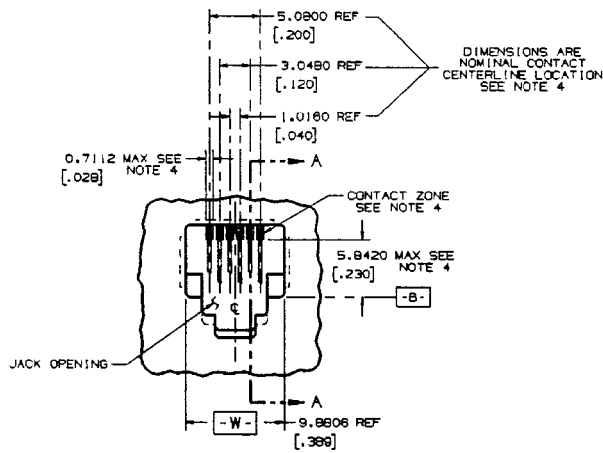


NOTE: ALL NOTES FOLLOW FIGURE 68.500(b)(1)(i) UNLESS SPECIFIED.

FIGURE 68.500(b)(2)(i) - 6 POSITION JACK MECHANICAL SPECIFICATION



SEC A-A
(SHOWN WITHOUT REAR CONTACT GUIDES)



VIEW OF CONTACT ZONE
(SHOWN WITHOUT REAR CONTACT GUIDES)

NOTE: ALL NOTES FOLLOW THIS FIGURE.

FIGURE 68.500(b)(3)(i)- 6 POSITION JACK
MECHANICAL SPECIFICATIONS (CONTINUED)

NOTES: (Notes apply to Figures 68.500(b)(2)(i) and 68.500(b)(3)(i).)

1. Front surface projections beyond the 1.2700 mm (.050 inch) min. shall be configured so

as not to prevent finger access to the plug release catch (Reference Figure 68.500(a)(2)(i), 6-Position Plug, Mechanical Specifications). A catch length greater

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- than 1.2700 mm (.050 inch) is beneficial in providing greater breakout strength.
2. Surface Z need not be planar or coincident with the surface under the plug release catch. Surface Z projections must not prevent insertion, latching, and unlatching of the standard 6-position plug described in §68.500(a).
 3. The preferred plug stop surface is indicated. If some other internal feature is used as a plug stop, it must be located so that the axial movement of a latched plug is no greater than 1.1430 mm (0.045 inch).
 4. To prevent mistargeting between the plug and jack contacts, the jack contacts should be completely contained in their individual contact zones, .7112 mm (.028 inch) max. wide, where they extend into the jack openings. There is no location requirement for jack contacts below these zones 5.8420 mm (.230 inch) max., but adequate contact separation must be maintained to prevent electrical breakdown. These shaded contact zones should be centrally located, (included all locating tolerances), about the jack opening width 9.8806 mm (.389 inch) Ref, (Datum -W-). Contacts located outside of these zones may result in mistargeting between the jack and plug contacts.
 5. All inside and outside corners in the plug cavity to be .3810 mm (.015 inch) radius max. unless specified.
 6. These surfaces shall have 0°15' maximum draft.
 7. Relief inside the dotted areas on 3 sides of the jack opening is permitted. The 6.8326 mm (.269 inch) Ref and 9.8806 mm (.389 inch) Ref Gauge Requirements must be maintained in each corner, (ref. 1.0160 mm (0.040 inch) min), to assure proper plug/jack interface guidance. A .8128 mm ±.1270 mm (.032 inch ±.005 inch) relief on the top side, (opposite plug catch), is required on jacks in connecting blocks which mount and connect portable wall telephones so as to assure interface with the special purpose sliding modular plug used on many wall telephone sets.
 8. 4.0640 mm (.160 inch) and 6.5278/6.8580 mm (.257/.270 inch) dimensions to be centrally located to jack opening width -W- within ±.1778 mm (0.007 inch).
 9. Minimum acceptable jack contact length. When contact guide slots are used, the contacts must always be contained inside the guide slots and the contacts must move freely in the slots so as not to restrain plug insertion or damage jack contacts.
 10. Gauge Requirements:
 - GO: The jack shall be capable of accepting a 9.7536 x 6.7056 mm (0.3840 x 0.2640 inch) gauge and the gauge shall be capable of being removed with a maximum force of 8.9 newtons (2 pounds).
 - NO GO: The jack shall not accept either a 10.00760 x 6.45160 mm (0.3940 x 0.254 inch) horizontal width of opening gauge or a 6.95960 x 9.5504 mm (.2740 x .376 inch) vertical height of opening gauge. However, if either gauge is accepted the force necessary to remove the gauge shall be minimum .83 newtons (3.0 ounces).Removal forces do not include forces contributed by contact springs nor shall external forces be applied to the jack that will affect these removal forces.
Gauges shall have a .7620 mm (.030 inch) radius on the nose and a .3810 mm (0.015 inch) radius on all edges with clearance provided for contacts.
- (c) *Miniature 8-position plug, unkeyed:*

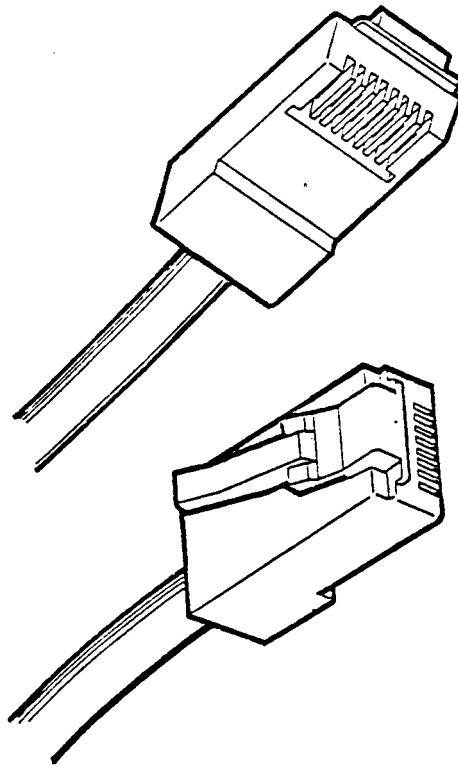


Figure 68.500(c)(1)(i) – View

NOTE: THIS PLUG IS DEPICTED WITH ITS FULL 8 CONTACT CAPACITY. IT MAY BE FABRICATED WITH LESS THAN 8 CONTACTS.

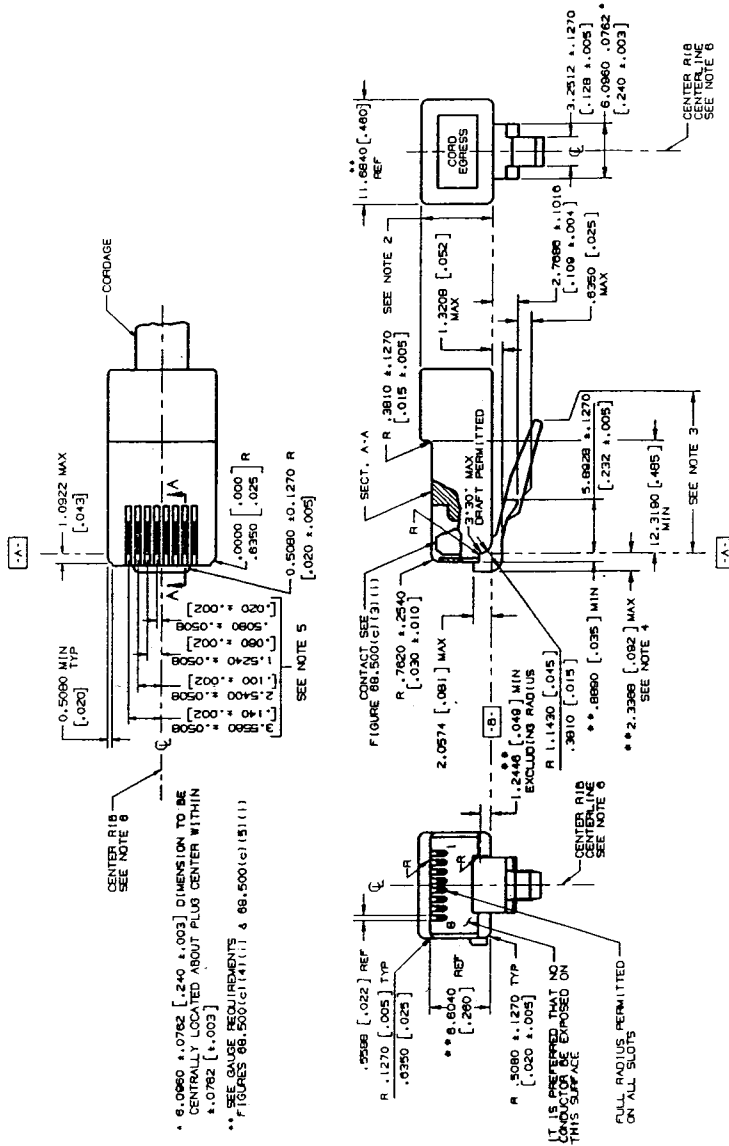
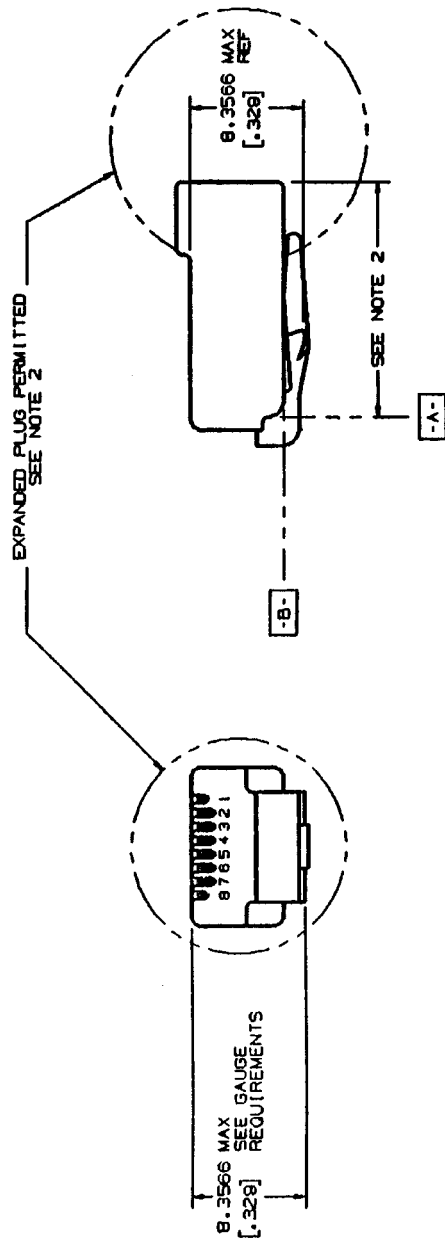


FIGURE 68.500(c)(1)(1) - 8 POSITION UNKEYED
 PLUG, MECHANICAL SPECIFICATION



NOTE: ALL NOTES FOLLOW THIS FIGURE.

FIGURE 68.500(c)(2)(ii) - 8 POSITION UNKEYED PLUG, MECHANICAL SPECIFICATION (CONTINUED)

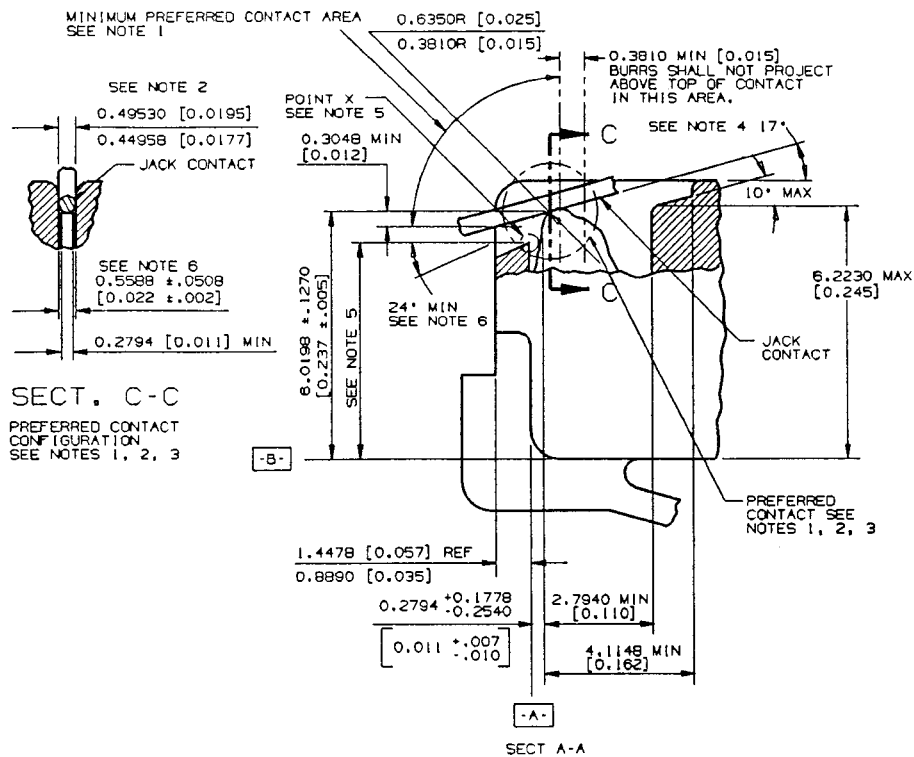
NOTES: (Notes apply to Figures 68.500(c)(2)(i) and 68.500(c)(2)(ii))

1. All plugs must be capable of meeting the requirements of the plug go and no-go gauges.

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2. The standard plug height in the area shown is 8.0010 mm (.315 inch) maximum. The standard plug length is 23.1140 mm (.910 inch) maximum. Plugs may be made longer than standard or adapted for direct use on special cords, adapters without cordage, apparatus or equipment subject to the limitations described in the introductory paragraphs of 68.500. Plugs longer and/or higher than standard may inhibit the special features of some network jack enclosures.
3. A 14.6050 mm (.575 inch) minimum tab length is required. It is preferred that a maximum tab length be no longer than 15.8750 mm (.625 inch). Longer tabs may be used with the same limitations described in Note 2.
4. To obtain maximum plug guidance in jacks, it is desirable to extend the front plug nose to the 2.3368 mm (.092 inch) maximum.
5. These dimensions apply to the location of jack contact receiving slots. It is desirable that plug contacts be centered axially in these slots, but centering is not required.
6. The center rib centerline shall be coincident with the plug width 11.6840 mm ref. (.460 inch ref.) centerline within ± 0.0762 mm (.003 inch).

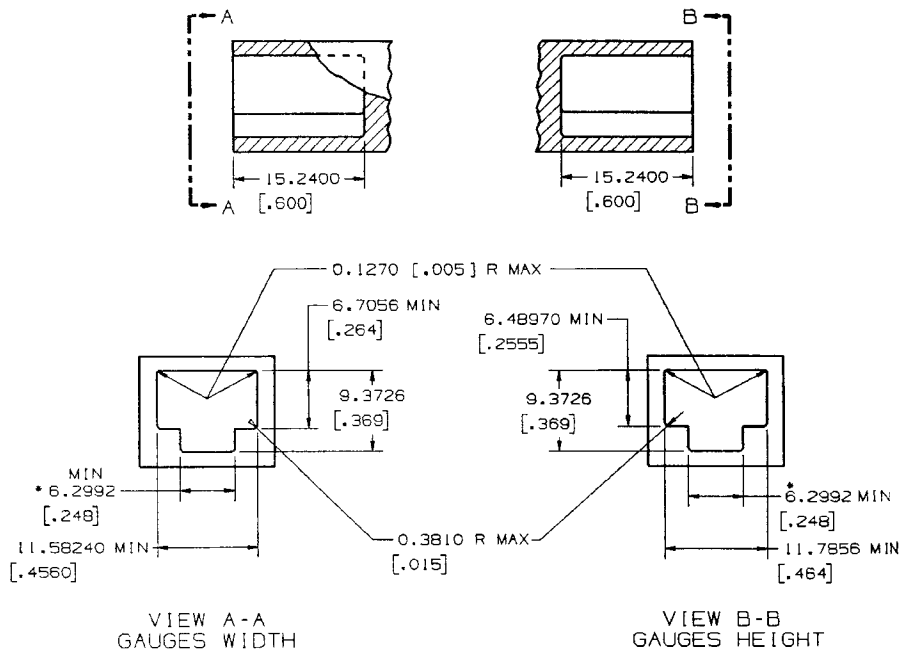


NOTE: ALL NOTES FOLLOW THIS FIGURE.
NOTE: THE 6 POSITION PLUG/JACK CONTACT SPECIFICATION IS IDENTICAL.

FIGURE 68.500(c)(3)(i) - 6 POSITION UNKEYED PLUG
PLUG /JACK CONTACT SPECIFICATION

NOTES: (Notes apply to Figure 68.500(c)(3)(i))

1. The plug/jack contact interface should be hard gold to hard gold and should have a minimum gold thickness of .0012700 mm (.000050 inch) on each side of the interface. The minimum contact force should be .98 N (100 grams). Any non-gold contact material must be compatible with gold and provide equivalent contact performance. A smooth, burr-free surface is required at the interface in the area shown.
2. The jack contact design is based upon .4572 mm (.018 inch) spring temper phosphor bronze round wire in the modular plug blade and jack contact interface. Other contact configurations that provide contact performance equal to or better than the preferred configurations and do not cause damage to the plug or jack are permitted. The preferred jack contact width is .44958/.49530 mm (.0177/.0195 inches). Deviations from the preferred jack contact width are permitted for round contacts as well as noncircular cross sectional shapes but they must be compatible with existing plug configurations. The requirements of Note 1 apply to all possible contact areas.
3. The configuration of the plug contact and the front plastic of the plug should prevent jack contacts from being damaged during plug insertion into jacks.
4. This is the suggested nominal contact angle between plugs and jacks with the plug latched into the jack. If this angle becomes greater than 24 degrees loss of electrical contact may occur between the plug and jack. If the nominal contact angle becomes less than 13 degrees, interference between jack contacts and the internal plastic in the plug may occur.
5. To avoid loss of electrical contact, the preferred dimension from datum B to the highest point "X" should be 5.0800 mm (.200 inch) max. A dimension greater than 5.3594 mm (.211 inch) may result in loss of electrical contact between plugs and jacks. The 5.3594 mm (.211 inch) max. shall be considered an absolute maximum.
6. The 24 degree min. angle applies only to plugs with front plastic walls higher than 4.8260 mm (.190 inches).

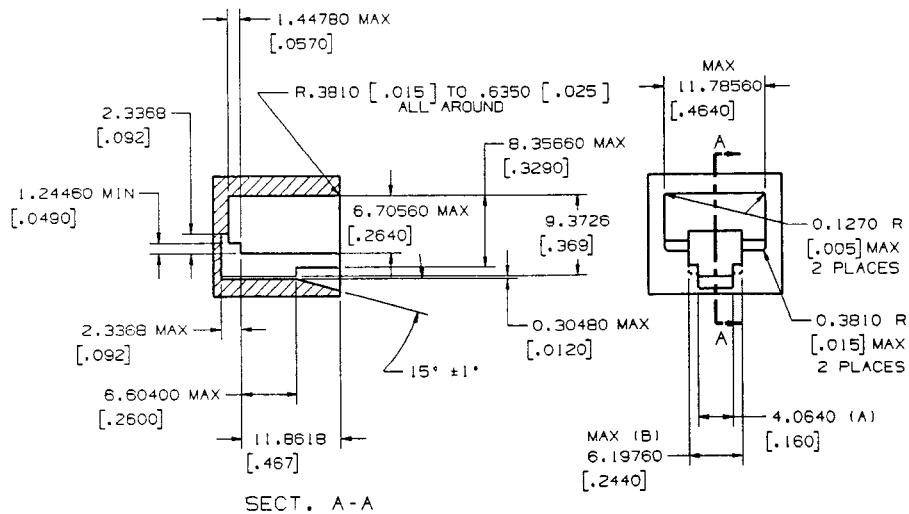


NO-GO GAUGE

NOTES:

1. THE PLUG SHALL NOT BE CAPABLE OF ENTERING THE GAUGE MORE THAN 1.7780mm [0.070] BEYOND DATUM-A-(SEE FIGURE 68.500(c)(2)(i)) WITH 8.90 newton [2.0 POUNDS] INSERTION FORCE.
2. NON-TOLERANCED DIMENSIONS GIVEN TO FOUR PLACES SHALL BE WITHIN ±0.0508mm [0.002] .
3. * 6.2992mm [0.248] DIMENSION TO BE CENTRALLY LOCATED WITH RESPECT TO 11.7856mm [0.464] MINIMUM AND 11.58240mm [0.4560] MINIMUM WITHIN ±0.0508mm [0.002] .

FIGURE 68.500(c)(4)(i)-B POSITION UNKEYED PLUG, MINIMUM PLUG SIZE



GO GAUGE

NOTES:

1. THE PLUG SHALL BE CAPABLE OF INSERTION AND LATCHING INTO THE GAUGE WITH 22.24 newtons [5 POUNDS] OR OR LESS INSERTION FORCE. PLUG LATCHING BAR SHALL BE DEPRESSED SO AS NOT TO INTERFERE WITH THE PLUG ENTRY. AFTER INSERTION AND LATCHING, PLUG SHALL BE CAPABLE OF REMOVAL, WITH THE LATCH DEPRESSED, WITH REMOVAL FORCE OF 44.48 newtons [10 POUNDS] OR LESS APPLIED AT AN ADVANTAGEOUS ANGLE.
2. DIMENSIONS GIVEN TO FOUR DECIMAL PLACES SHALL BE WITHIN $\pm 0.0508\text{mm}$ [.002] .
3. DIMENSIONS (A) AND (B) TO BE CENTRALLY LOCATED WITH RESPECT TO 11.78560mm [.4640] MAX. JACK OPENING WIDTH WITHIN $\pm 0.0254\text{mm}$ [.001] .
4. DO NOT SCALE DRAWINGS FOR EXTERNAL CONFIGURATION.

FIGURE 68.500(c)(5)(i)-8 POSITION UNKEYED PLUG, MAXIMUM PLUG SIZE

(d) *Miniature 8-position series jack:*

(d) *Miniature 8-position series jack:*

APPENDIX A-17

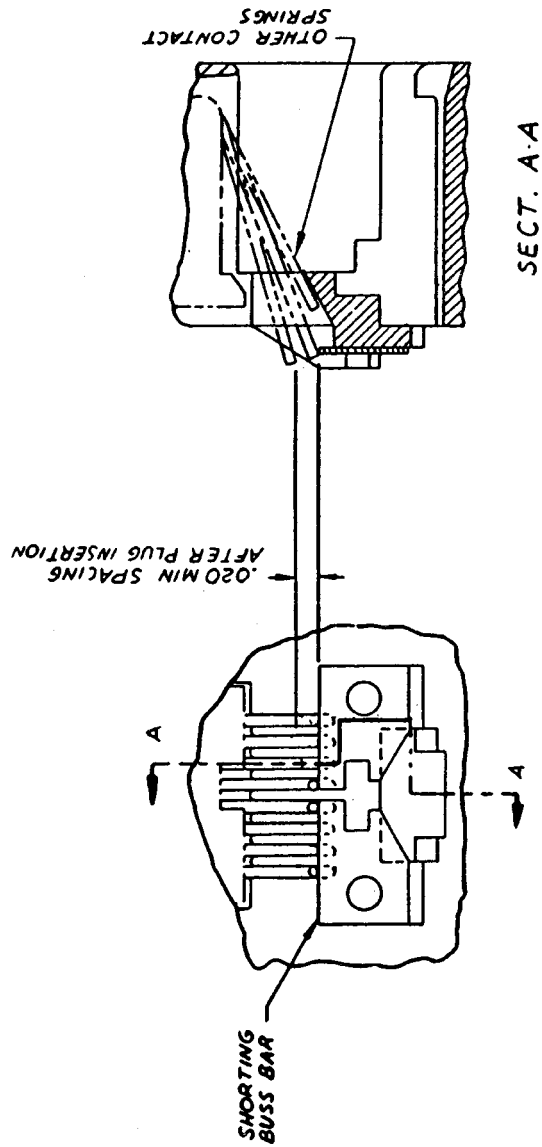
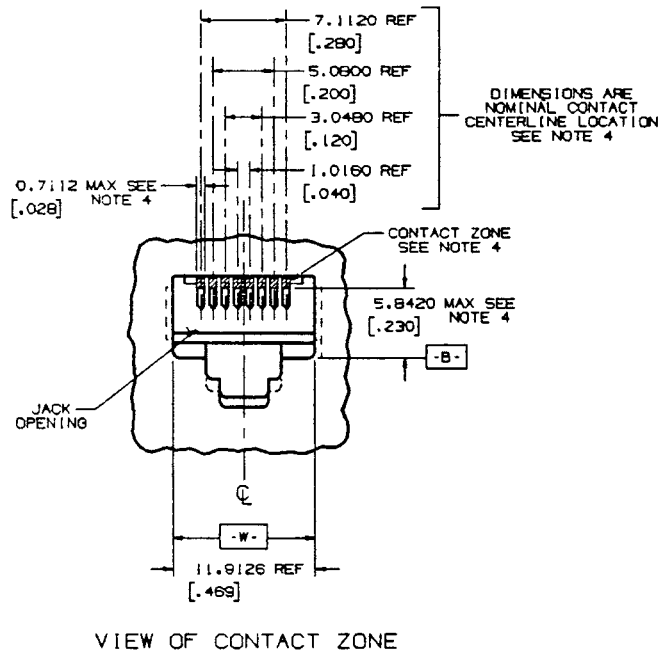


Figure 68.500(d)(3)--8 Position Series Jack, Contact Specification



NOTE: ALL NOTES FOLLOW THIS FIGURE.

FIGURE 68.500(d)(3)(i)-8 POSITION SERIES JACK, MECHANICAL SPECIFICATION (CONTINUED)

NOTES: (Notes apply to Figures 68.500(d)(2)(i) and 68.500(d)(3)(i))

1. Front surface projections beyond the 1.3970 mm (.055 inch) minimum shall be configured so as not to prevent finger access to the plug release catch (Reference Figure 68.500(a)(2)(i) and Figure 68.500(c)(2)(i) 6 and 8-Position Plug, Mechanical Specifications). A catch length greater than 1.3970 mm (.055 inch) is beneficial in providing for greater breakout strength and improved guidance when interfacing with a 6-position plug.
2. Surface Z need not be planar or coincident with the surface under the plug release catch. Surface Z projections must not prevent insertion, latching, and unlatching of the standard 8-position plug on Figure 68.500(c)(2)(i).
3. The preferred plug stop surface is indicated. If some other internal feature is used as a plug stop, it must be located so

- that the axial movement of a latched plug is no greater than 1.1430 mm (.045 inch).
4. To prevent mistargeting between the plug and jack contacts, the jack contacts should be completely contained in their individual contact zones, (.7112 mm (.028 inch) max. wide), where they extend into the jack openings. There is no location requirement for jack contacts below these zones (5.8420 mm (.230 inch) max.), but adequate contact separation must be maintained to prevent electrical breakdown. These shaded contact zones should be centrally located, (include all locating tolerances), about the jack opening width 11.9126 mm (.469 inch) Ref, (Datum -W-). Contacts located outside of these zones may result in mistargeting between the jack and plug contacts.
 5. All inside and outside corners in the plug cavity to be .3810 mm (.015 inch) radius max. unless specified.
 6. These surfaces shall have 0°15' maximum draft.
 7. Relief inside the dotted areas on both sides of the jack opening is permitted. The 6.8326 mm (.269 inch) Ref and 11.9126 mm (.469 inch) Ref Gauge Requirements must be maintained in each of the corners indicated, (Ref. 1.5240 mm (.060 inch) min), to assure proper plug/jack interface guidance.
 8. 4.0640 mm (.160 inch) and 6.2992 mm (0.248 inch) dimensions to be centrally located to jack opening width -W- within $\pm .1270$ mm (.005 inch).
 9. The contact lengths shall be such that the contacts will always be contained inside the guide slots, and the contacts must move freely in the slots so as not to restrain plug insertion or damage jack contacts.
 10. Gauge Requirements:

GO: The jack shall be capable of accepting an 11.7856 x 6.7056 mm (.4640 x .2640 inch) gauge and the gauge shall be capable of being removed with a maximum force of 8.9 newtons (2.0 pounds).

NO GO: The jack shall not accept either a 12.0396 x 6.4516 mm (.4740 x .254 inch) horizontal width of opening gauge or a 6.9596 x 11.5824 mm (.2740 x .456 inch) vertical height of opening gauge. However, if the gauge is accepted, the force necessary to remove the gauge shall be a minimum of .83 newtons (3.0 ounces).

Removal forces do not include forces contributed by contact springs nor shall external forces be applied to the jack that will affect these removal forces.

Gauges shall have a .7620 mm (.030 inch) radius on the nose and a .3810 mm (.015 inch) radius on all edges with clearance provided for contacts.
 11. With no plug inserted, conductors 1 and 4 are bridged as well as conductors 5 and 8. With a miniature 8-position plug inserted into the jack, the bridge connectors are broken and a series connection can be made in both sides of the line. With a 6-position plug inserted, the bridged connections remain unbroken.
 12. The jack contact/bridging interface should be hard gold to hard gold and should have a minimum gold thickness of .0012700 mm (.000050 inch) on each side of the interface. The minimum contact bridging force should be .294 N (30 grams). Any non-gold contact material must be compatible with gold and provide equivalent contact performance.
 - (e) *50-position miniature ribbon plug:*
 - (1) Contact finish in the region of contact shall be gold, .0007620 mm (.000030 inch) minimum thickness, electrodeposited hard gold preferred.¹
 - (2) "Datum B" is the center line of contact cavities.
 - (3) The center line of each contact shall be located within .2286 mm (.009 inch) of true position with respect to "Datum B".¹
 - (4) Contact width at region of contact shall be 1.1430 \pm .0508 mm (.045 \pm 0.002 inch).¹
 - (5) Center line of shell dimension indicated shall be within .1270 mm (.005 inch) of "Datum B".¹
 - (6) Center line of barrier dimension indicated shall be within .1270 mm (.005 inch) of "Datum B".¹
 - (7) "Surface X" shall have a .0001016 mm (4 microinch) finish or better; finishing shall be done in the direction of the arrow.²
 - (8) A force of not more than 178 newtons (40 pounds) shall be sufficient to fully insert the plug onto the sizing gauge shown on Figure 68.500(e)(1). The plug is fully inserted when "Surface A" of the plug¹ touches "Surface A" of the sizing gauge.
 - (9) After one insertion of the plug on the sizing gauge, Figure 68.500(e)(2), a force of not more than 44.5 newtons (10 pounds) shall be sufficient to fully insert the plug on the continuity gauge shown in Figure 68.500(e)(3). The plug is fully inserted on the continuity gauge when "Surface A" of the plug¹ touches "Surface A" of the continuity gauge.
 - (10) When the plug is fully inserted on the continuity gauge, Figure 68.500(e)(3), after having been inserted once on the sizing gauge, Figure 68.500(e)(2), all contacts of the plug shall electrically contact the continuity gauge as determined by an electrical continuity test which applies an open circuit voltage of not more than 10 volts, and will not indicate continuity if the resistance of the circuit being checked is more than 200 ohms.

¹Figure 68.500(e)(1).²Figures 68.500 (e)(2) and (e)(3).

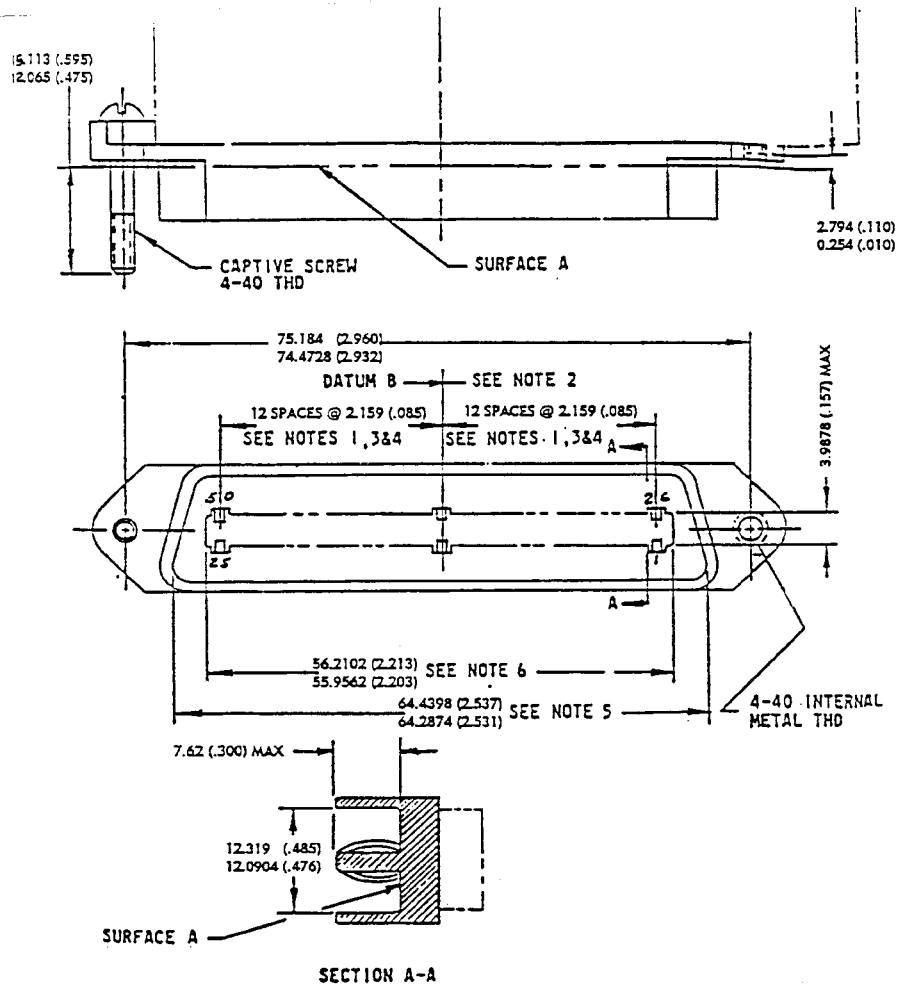


Figure 68.500(e)(1)--50 Position
Miniature Ribbon Plug

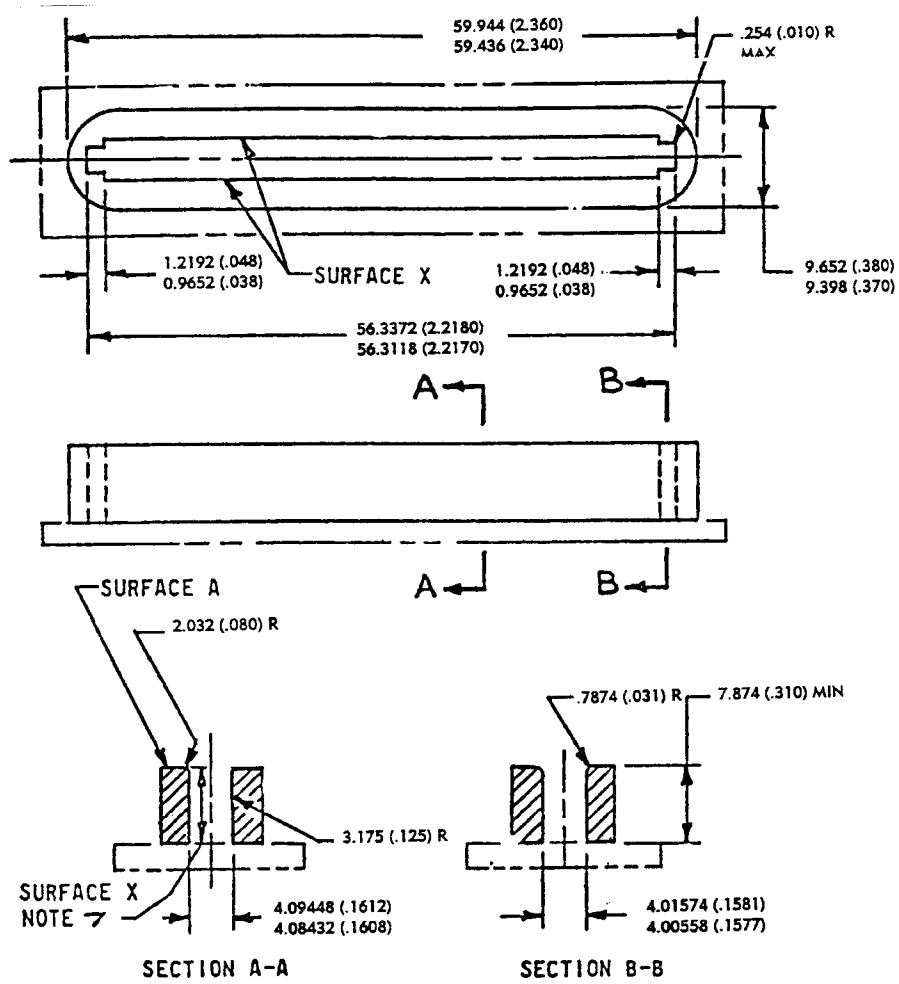


Figure 68.500(e)(2)--50 Position
Miniature Ribbon Plug
Sizing Gauge

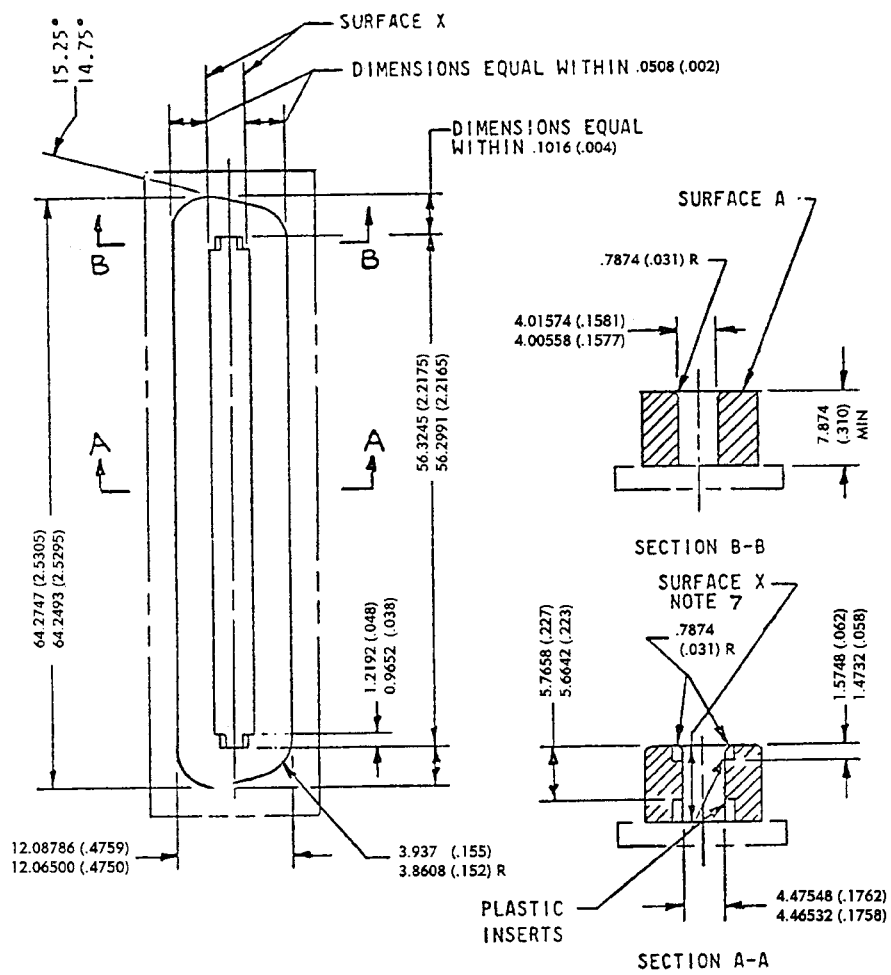


Figure 68.500(e)(3)--50 Position
Miniature Ribbon Plug
Continuity Gauge

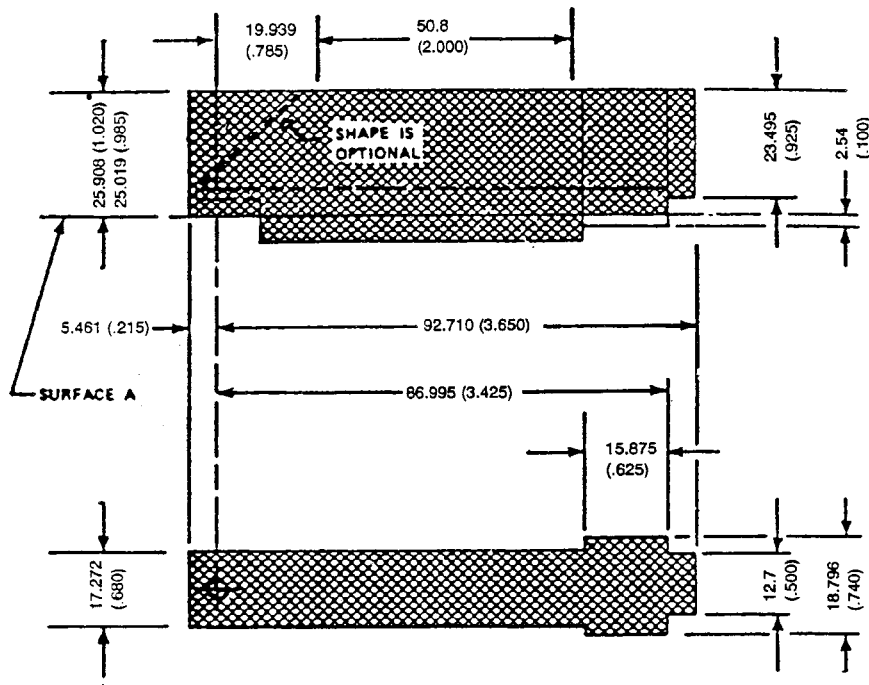


Figure 68.500(e)(4)

50-POSITION MINIATURE RIBBON PLUG - HOOD ENVELOPE

(f) *50-position miniature ribbon jack:*

(1) Contact finish in the region of contact shall be gold, .0007620 mm (.000030 inch) minimum thickness, electrodeposited hard gold preferred.¹

(2) "Datum B" is the center line of contact cavities.

(3) The center line of each contact shall be located within .2286 mm (.009 inch) of true position with respect to "Datum B".¹

(4) Contact width at region of contact shall be 1.1430 ± 0.0508 mm (.045 \pm 0.002 inch).¹

(5) Center line of shell dimension indicated shall be within .1270 mm (.005 inch) of "Datum B".¹

(6) Center line of cavity dimension indicated shall be within .1270 mm (.005 inch) of "Datum B".¹

(7) "Surface X" shall have a .0001016 mm (4 microinch) finish or better; finishing shall be done in the direction of the arrow.²

¹Figure 68.500(f)(1).

²Figures 68.500 (f)(2) and (f)(3).

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(8) A force of not more than 134 newtons (30 pounds) shall be sufficient to fully insert the jack onto the sizing gauge shown on Figure 68.500(f)(2).

The jack is fully inserted when "Surface A" of the jack¹ touches "Surface A" of the sizing gauge.

(9) After one insertion of the jack on the sizing gauge, Figure 68.500(f)(2), a force of not more than 44.5 newtons (10 pounds) shall be sufficient to fully insert the jack on the continuity gauge shown in Figure 68.500(f)(3). The jack is fully inserted on the continuity

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gauge when "Surface A" of the jack¹ touches "Surface A" of the continuity gauge.

(10) When the jack is fully inserted on the continuity gauge, Figure 68.500(f)(3), after having been inserted once on the sizing gauge, all contacts of the jack shall electrically contact the continuity gauge as determined by an electrical continuity test which applies an open circuit voltage of not more than 10 volts, and will not indicate continuity if the resistance of the circuit being checked is more than 200 ohms.

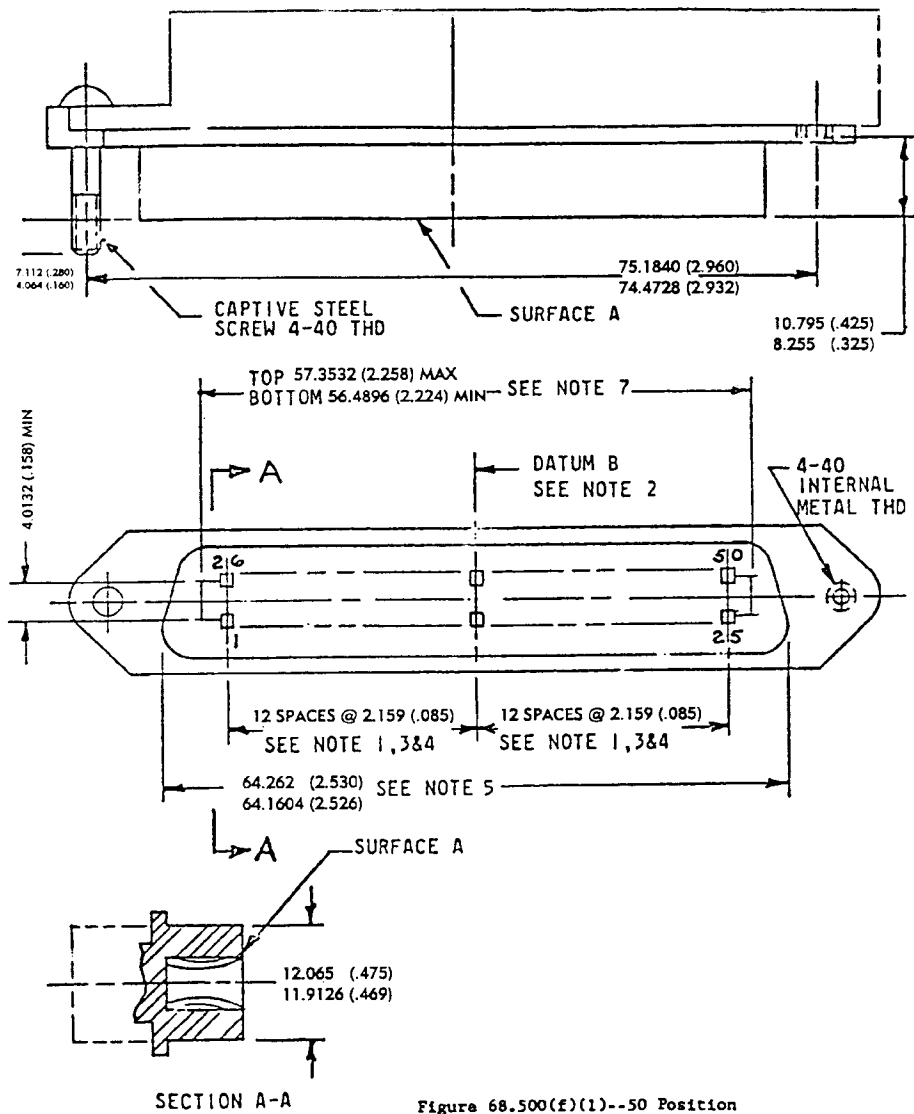


Figure 68.500(E)(1)--50 Position
Miniature Ribbon Jack

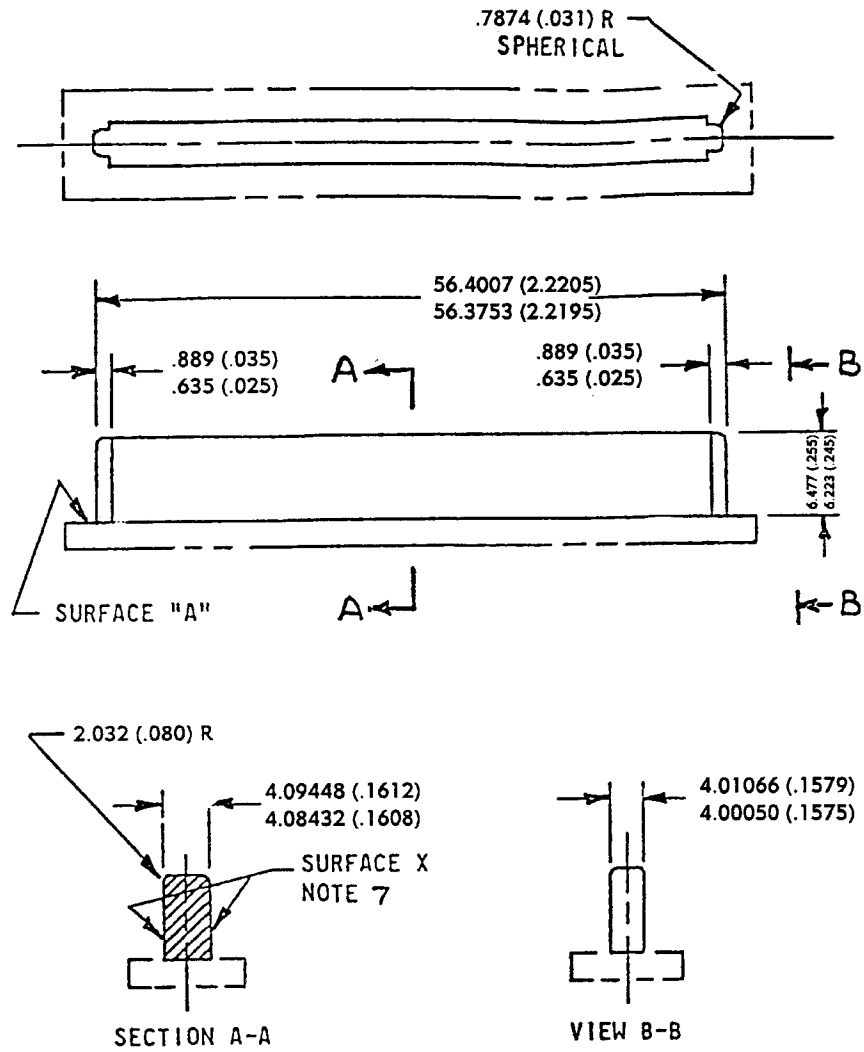


Figure 68.500(f)(2)--50 Position
Miniature Ribbon Jack
Sizing Gauge

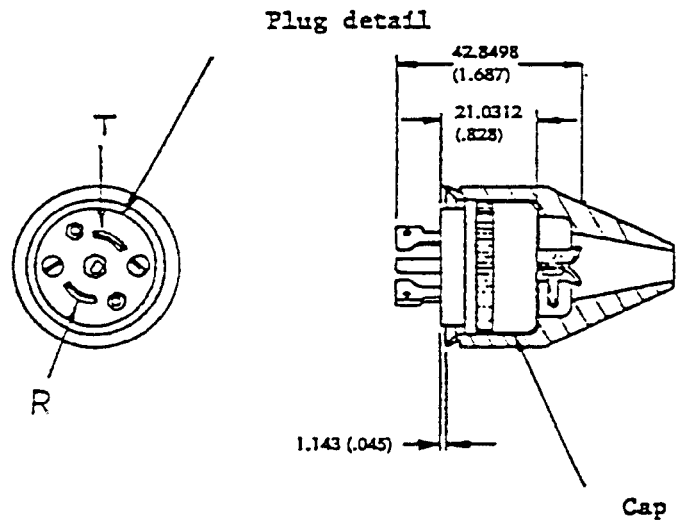


Figure 68.500(g)(1)--3 Position Plug
Plug Assembly

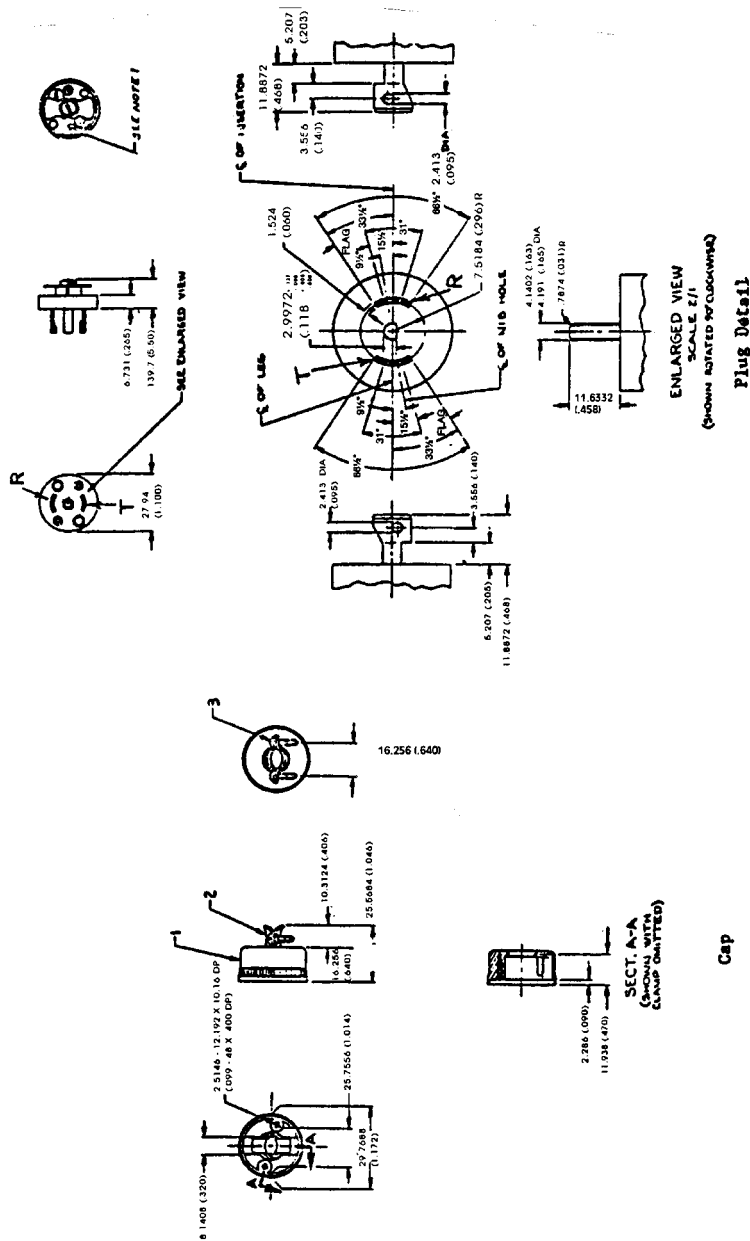


Figure 68.500(g)(2)--3 Position Plug Detail

(h) 3-Position weatherproof jack:
 Contact blade material shall be brass, with minimum .00762 mm (.0003 inch) thick nickel plating.

NOTE: All linear dimensions are in millimeters (inches).

(Note: All linear dimensions are in inches.)

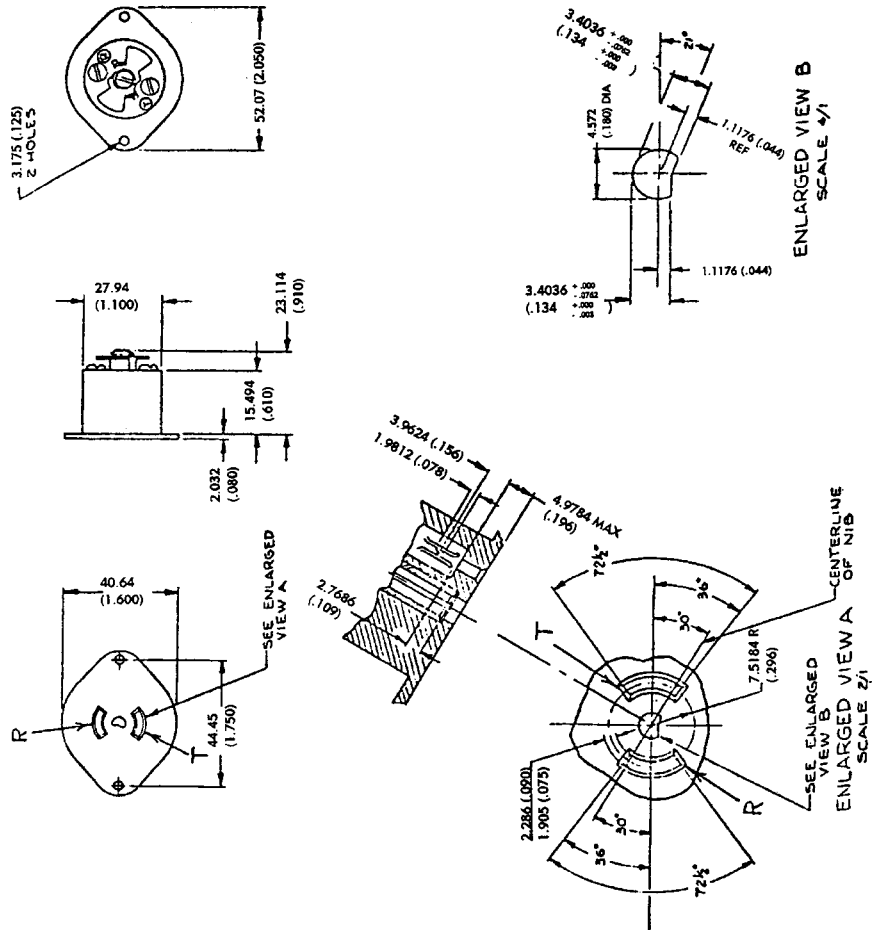


Figure 68.500(h)--3 Position Plug Detail

(Ed. 7/77)

(i) Miniature 8-position plug, keyed:

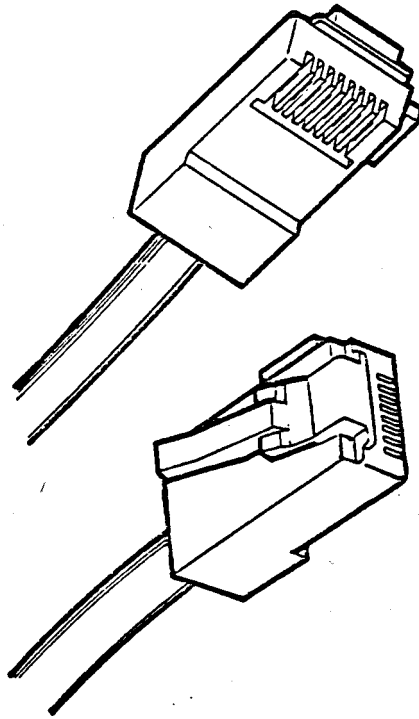
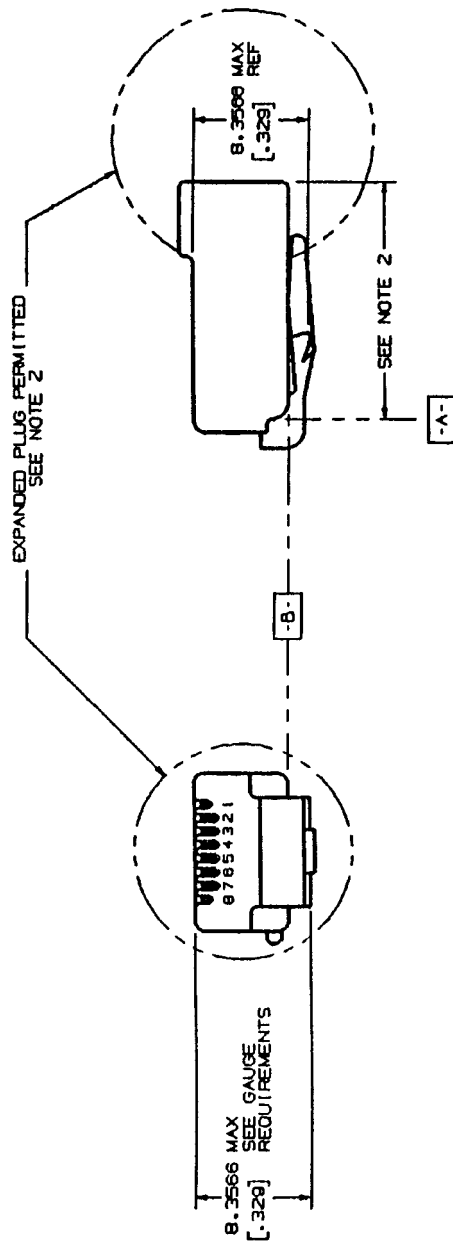


Figure 68.500(i)(1)(i)–View



NOTE: ALL NOTES FOLLOW THIS FIGURE

FIGURE 68.500(i)(2)(ii) - B POSITION KEYED PLUG, MECHANICAL SPECIFICATION (CONTINUED)

NOTES: (Notes apply to Figures 68.500(i)(2) (i) and 68.500(i)(2)(ii))

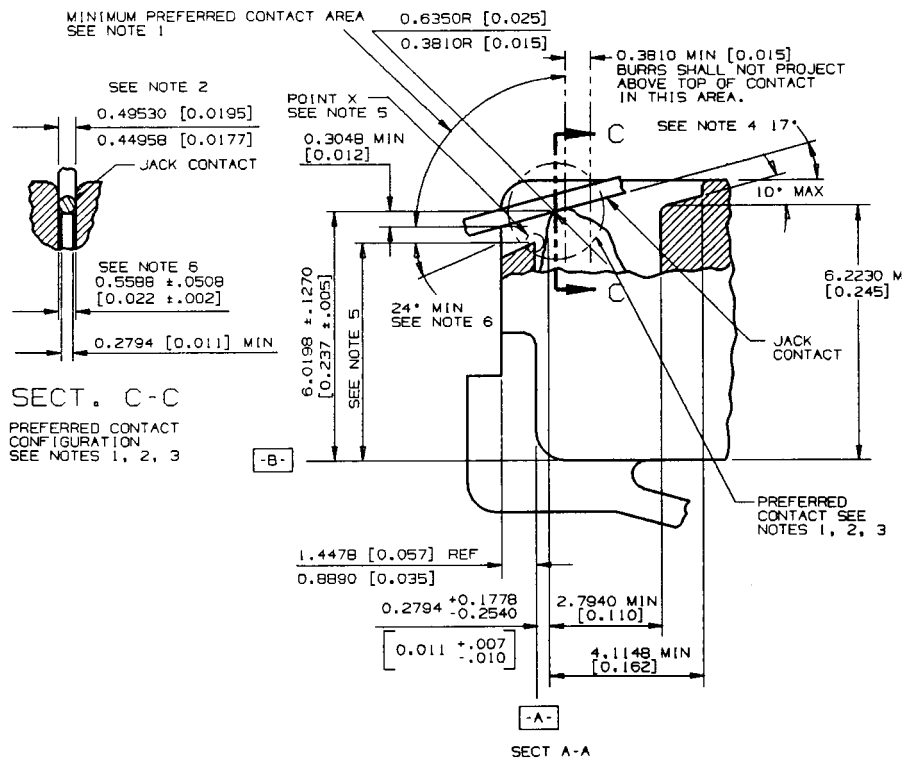
1. All plugs must be capable of meeting the requirements of the plug go and no-go gauges.

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2. The standard plug height in the area shown is 8.0010 mm (.315 inch) maximum. The standard plug length is 23.1140 mm (.910 inch) maximum. Plugs may be made longer than standard or adapted for direct use on special cords, adapters without cordage, apparatus or equipment subject to the limitations described in the introductory paragraphs of 68.500. Plugs longer and/or higher than standard may inhibit the special features of some network jack enclosures.
3. A 14.6050 mm (.575 inch) minimum tab length is required. It is preferred that maximum tab length be no longer than 15.8750

- mm (.625 inch). Longer tabs may be used with the same limitations described in Note 2.
4. To obtain maximum plug guidance in jacks, it is desirable to extend the front plug nose to the 2.3368 mm (.092 inch) maximum.
5. These dimensions apply to the location of jack contact receiving slots. It is desirable that plug contacts be centered axially in these slots, but centering is not required.
6. The center rib centerline shall be coincident with the plug width, 11.6840 mm ref (.460 inch ref.) center line within $\pm .0762$ mm ($\pm .003$ inch).



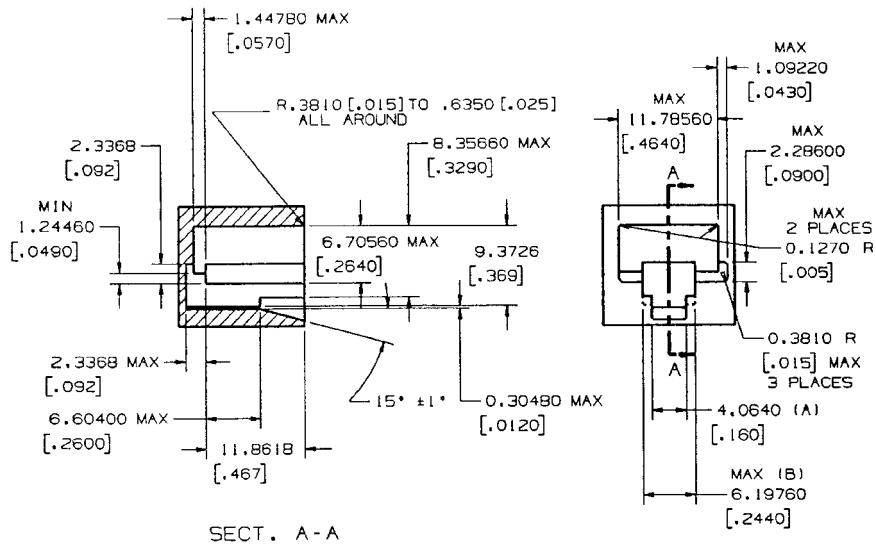
NOTE: ALL NOTES FOLLOW THIS FIGURE.

NOTE: THE 6 POSITION PLUG/JACK CONTACT SPECIFICATION IS IDENTICAL.

FIGURE 68.500(1)(3)(1) - B POSITION KEYED PLUG
PLUG /JACK CONTACT SPECIFICATION

NOTES: (Notes apply to Figure 68.500(i)(3)(i))

1. The plug/jack contact interface should be hard gold to hard gold and should have a minimum gold thickness of .0012700mm (.000050 inch) on each side of the interface. The minimum contact force should be .98 N (100 grams). Any non-gold contact material must be compatible with gold and provide equivalent contact performance. A smooth, burr-free surface is required at the interface in the area shown.
2. The jack contact design is based upon .4572 mm (.018 inch) spring temper phosphor bronze round wire in the modular plug blade and jack contact interface. Other contact configurations that provide contact performance equal to or better than the preferred configurations and do not cause damage to the plug or jack are permitted. The preferred jack contact width is .44958/.49530 mm (.0177/.0195 inches). Deviations from the preferred jack contact width are permitted for round contacts as well as noncircular cross sectional shapes but they must be compatible with existing plug configurations. The requirements of Note 1 apply to all possible contact areas.
3. The configuration of the plug contact and the front plastic of the plug should prevent jack contacts from being damaged during plug insertion into jacks.
4. This is the suggested nominal contact angle between plugs and jacks with the plug latched into the jack. If this angle becomes greater than 24 degrees loss of electrical contact may occur between the plug and jack. If the nominal contact angle becomes less than 13 degrees, interference between jack contacts and the internal plastic in the plug may occur.
5. To avoid loss of electrical contact, the preferred dimension from "Datum B" to the highest point "X" should be 5.0800 mm (.200 inch) max. A dimension greater than 5.3594 mm (.211 inch) may result in loss of electrical contact between plugs and jacks. The 5.3594 mm (.211 inch) max. shall be considered an absolute maximum.
6. The 25 degree min. angle applies only to plugs with front plastic walls higher than 4.8260 mm (.190 inches).

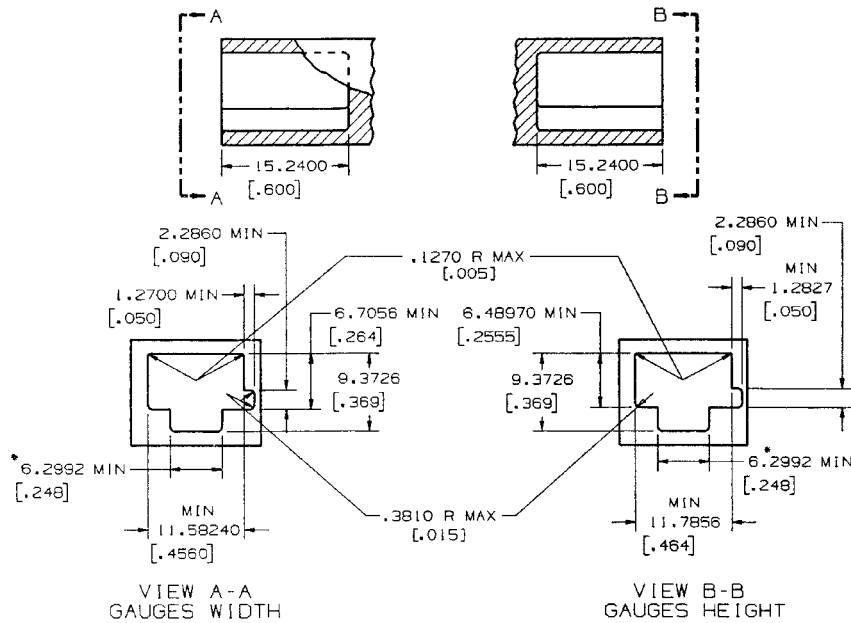


GO GAUGE

NOTES:

1. THE PLUG SHALL BE CAPABLE OF INSERTION AND LATCHING INTO THE GAUGE WITH 22.24 newtons [5 POUNDS] OR LESS INSERTION FORCE. PLUG LATCHING BAR SHALL BE DEPRESSED SO AS NOT TO INTERFERE WITH THE PLUG ENTRY. AFTER INSERTION AND LATCHING, PLUG SHALL BE CAPABLE OF REMOVAL, WITH THE LATCH DEPRESSED, WITH A REMOVAL FORCE OF 44.48 newtons [10 POUNDS] OR LESS APPLIED AT AN ADVANTAGEOUS ANGLE.
2. DIMENSIONS GIVEN TO FOUR DECIMAL PLACES SHALL BE WITHIN $\pm 0.0508\text{mm}$ [.002].
3. DIMENSIONS (A) AND (B) TO BE CENTRALLY LOCATED WITH RESPECT TO 11.78560mm [.4640] MAX. JACK OPENING WIDTH WITHIN $\pm 0.0254\text{mm}$ [.001].
4. DO NOT SCALE DRAWINGS FOR EXTERNAL CONFIGURATION.

FIGURE 68.500(1)(4)(i)-B POSITION KEYED PLUG
MAXIMUM PLUG SIZE



NO-GO GAUGE

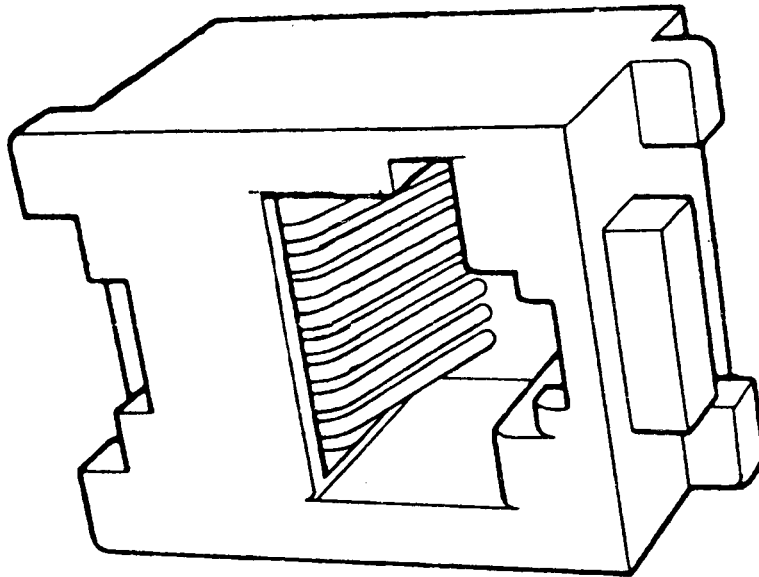
NOTES:

1. THE PLUG SHALL NOT BE CAPABLE OF ENTERING THE GAUGE MORE THAN 1.7780mm [.070] BEYOND DATUM-A- (SEE FIGURE 68.500(i)(2)(i)) WITH 8.90 newton [2.0 POUNDS] INSERTION FORCE.
2. NON-TOLERANCED DIMENSIONS GIVEN TO FOUR PLACES SHALL BE WITHIN ±.0508mm [.002] .
3. *6.2992mm [.248] DIMENSION TO BE CENTRALLY LOCATED WITH RESPECT TO 11.7856mm [.464] MINIMUM AND 11.58240mm [.4560] MINIMUM WITHIN ±.0508mm [.002] .

FIGURE 68.500(i)(5)(i)-8 POSITION KEYED PLUG, MINIMUM PLUG SIZE

(j) *Miniature 8-position keyed jack:*

Figure 68.500(j)(1)--View



2. Surface Z need not be planar or coincident with the surface under the plug release catch. Surface Z projections must not prevent insertion, latching, and unlatching of the standard 8-position plug on Figure 68.500(i)(2)(i).
 3. The preferred plug stop surface is indicated. If some other internal feature is used as a plug stop, it must be located so that the axial movement of a latched plug is no greater than 1.1430 mm (.045) inch.
 4. To prevent mistargeting between the plug and jack contacts, the jack contacts should be completely contained in their individual contact zones, (.7112 mm (.028 inch) max wide), where they extend into the jack openings. There is no location requirement for jack contacts below these zones (5.8420 mm (.230 inch) max), but adequate contact separation must be maintained to prevent electrical breakdown. These shaded contact zones should be centrally located, (include all locating tolerances), about the jack opening width 11.9126 mm (.469 inch) Ref, (Datum-W-). Contacts located outside of these zones may result in mistargeting between the jack and plug contacts.
 5. All inside and outside corners in the plug cavity to be .3810 mm (.015 inch) radius max unless specified.
 6. These surfaces shall have 0°15' maximum draft.
 7. Relief inside the dotted areas on both sides of the jack opening is permitted. The 6.8326 mm (.269 inch) Ref and 11.9126 mm (.469 inch) Ref Gauge Requirements must be maintained in each of the corners indicated, (Ref. 1.5240 mm (.060 inch) min), to assure proper plug/jack interface guidance.
 8. 4.0640 mm (.160 inch) and 6.2992 mm (.248 inch) dimensions to be centrally located to jack opening width -W- within ±.1270 mm (.005).
 9. The contact lengths shall be such that the contacts will always be contained inside the guide slots and the contacts must move freely in the slots so as not to restrain plug insertion or damage jack contacts.
 10. Gauge Requirements:
 - GO: The jack shall be capable of accepting and 11.78560 × 6.70560 mm (.4640 × .2640 inch) gauge and the gauge shall be capable of being removed with a maximum force of 8.9 newtons (2.0 pounds).
 - NO GO: The jack shall not accept either a 12.03960 × 6.4516 mm (.4740 × .254 inch) horizontal width of opening gauge or a 6.95960 × 11.5824 mm (.2740 × .456 inch) vertical height of opening gauge. However, if the gauge is accepted, the force necessary to remove the gauge shall be minimum of .83 newtons (3.0 ounces).
- Removal forces do not include forces contributed by contact springs nor shall ex-

ternal forces be applied to the jack that will affect these removal forces.

Gauges shall have a .7620 mm (.030 inch) radius on the nose and a .3810 mm (.015 inch) radius on all edges with clearance provided for contracts.

[41 FR 28699, July 12, 1976, as amended at 45 FR 52151, Aug. 6, 1980; 50 FR 27251, July 2, 1985; 58 FR 44907, Aug. 25, 1993; 62 FR 36465, July 8, 1997]

§ 68.502 Configurations.

This section describes connection configurations which telephone subscribers may request their local telephone company to provide, in accordance with § 68.104 of these rules. In the absence of a request for a specific jack configuration, the telephone company shall install the standard jack depicted in § 68.502(a)(1). The listed configurations are for connections to be made by the telephone company to the standard jacks specified in this subpart. Plugs on registered terminal equipment and registered protective circuitry shall be wired so as to be compatible with the jack connections specified herein. The following nomenclature is used in this section:

T/R—Connections to the “tip” and “ring” wires of a telephone communications line, trunk, channel or facility.

A/A1—Connections to the “hold” functions of key telephone systems which use such connections. In such systems, the “A” lead corresponding to a particular telephone line is shorted to the “A1” lead when that line is placed in the “off-hook” state to permit proper operation of the “hold” functions associated with that line.

MB/MB1—Connections to leads implementing a make-busy feature where required. The MB lead is shorted by the terminal equipment to the MB1 lead when the corresponding telephone line is to be placed in an unavailable, or artificially busy condition.

Bridged—A bridged connection is a parallel connection.

Data—Data configurations are those which use jacks incorporating components to limit signal power levels of data equipment. Data equipment with a maximum signal power output of -9 dBm may be connected to other than data configurations. See § 68.308 of these rules.

A “USOC” (Universal Service Ordering Code) is specified for each configuration. These USOCs are generic telephone company service ordering codes. If a telephone subscriber wishes to

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have the telephone company install a standard jack other than the one depicted in §68.502(a)(1) below, he shall specify the appropriate USOC when requesting the installations.

(a) *Bridged configurations other than data; single line connections—(1) Bridged T/R; 6-position jack.*

ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring only—Conductors

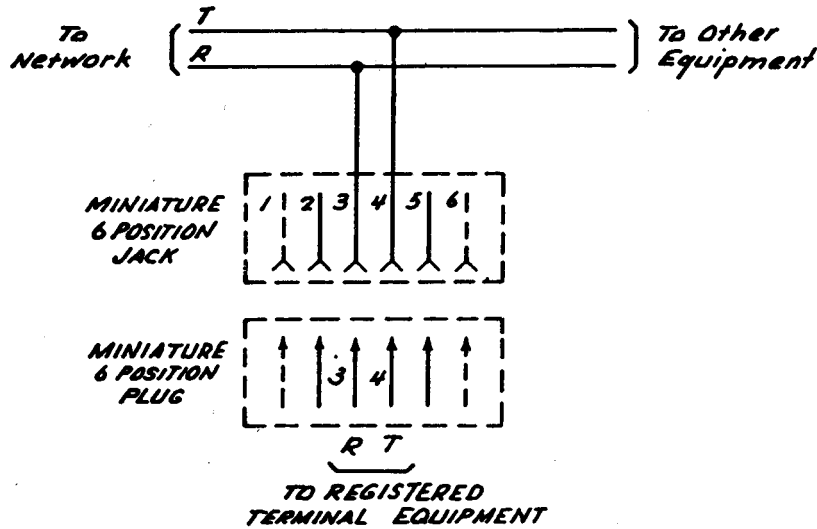
1, 2, 5 and 6 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ11W for Portable Wall-Mounted equipment—RJ11C all others.

MECHANICAL ARRANGEMENT: Miniature 6 position jack.

TYPICAL USAGE: Single line non-key telephone, ancillary devices, PBXs and key telephone systems.

WIRING DIAGRAM:



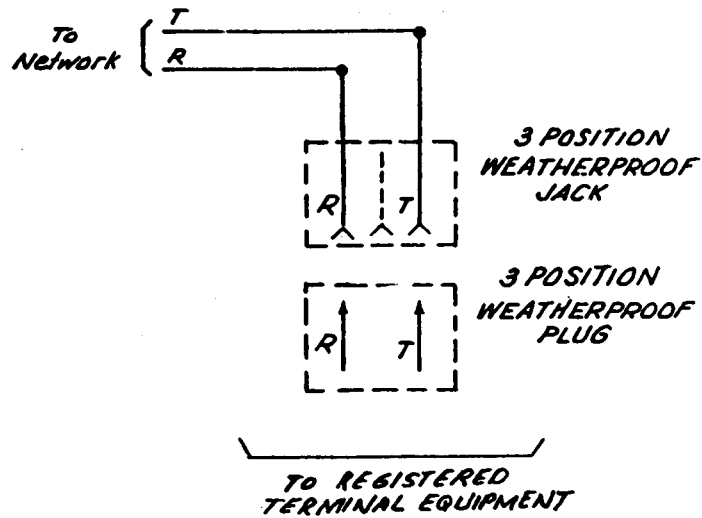
(2) *Bridged T/R; 3-position weatherproof jack.*

ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ15C.

MECHANICAL ARRANGEMENT: 3 position weatherproof jack.

TYPICAL USAGE: Providing telephone service to boats in marinas.

WIRING DIAGRAM:



(3) *Bridged T/R with make-busy arrangement; 6-position jack.*

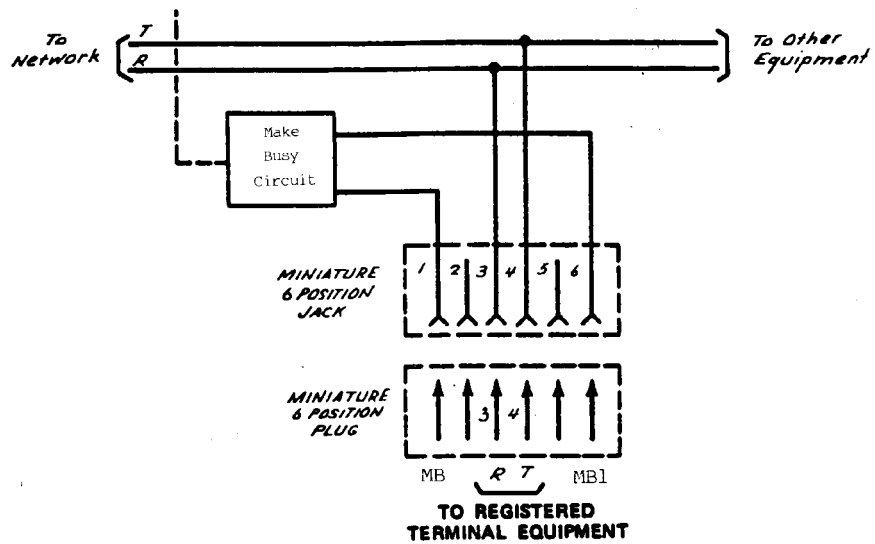
ELECTRICAL NETWORK CONNECTION: Single-line bridged tip and ring only with MB/MB1 leads. Conductors 2 and 5 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ18W for portable wall-mounted equipment—RJ18C for all others.

MECHANICAL ARRANGEMENT: Miniature 6-position jack.

TYPICAL USAGE: Single-line non-key telephone and ancillary devices connected directly to central office lines, where a make-busy requirement is needed.

WIRING DIAGRAM:



(b) *Series configurations*—(1) *Series T/R ahead of all station equipment; 8-position series jack.*

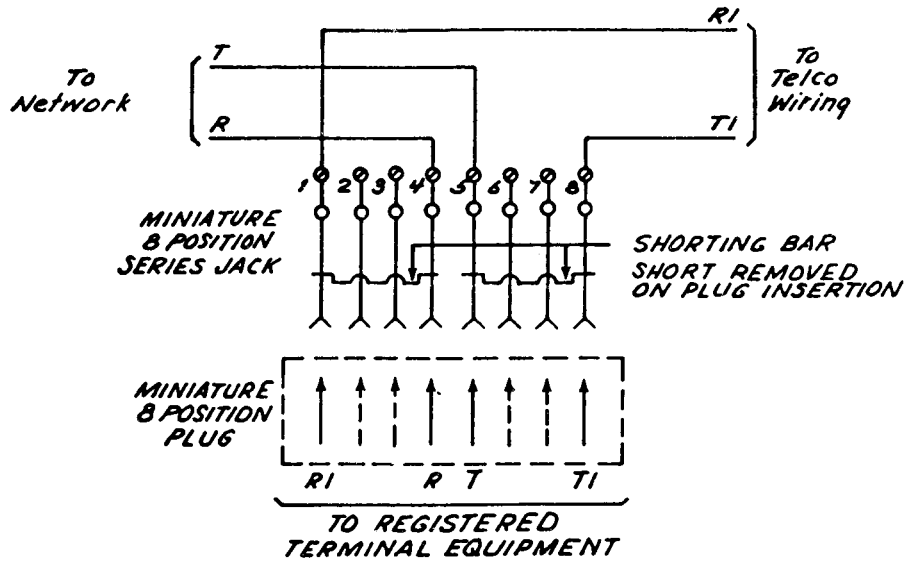
ELECTRICAL NETWORK CONNECTION: Series tip and ring ahead of all station equipment. Conductors 2, 3, 6 and 7 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ31X.

MECHANICAL ARRANGEMENT: Miniature 8 position series jack.

TYPICAL USAGE: Alarm reporting devices.

WIRING DIAGRAM:



(2) [Reserved]

(3) *Series single-line tip and ring ahead of all station equipment; 8-position series jack equipped with continuity circuit.*

ELECTRICAL NETWORK CONNECTION: Series tip and ring ahead of all station equipment

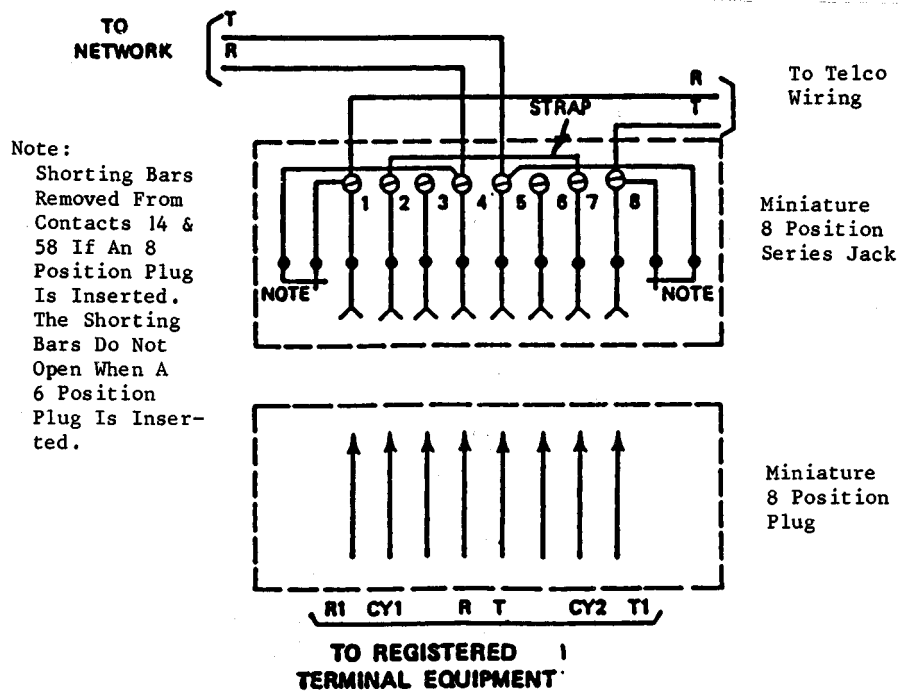
with continuity circuit. Conductors 3 and 6 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ38X.

MECHANICAL ARRANGEMENT: Miniature 8-position series jack.

TYPICAL USAGE: Alarm reporting devices.

WIRING DIAGRAM:



(c) *Two-line configurations—(1) Bridged T/R; 6-position jack.*

ELECTRICAL NETWORK CONNECTION: Two line bridged tip and ring.

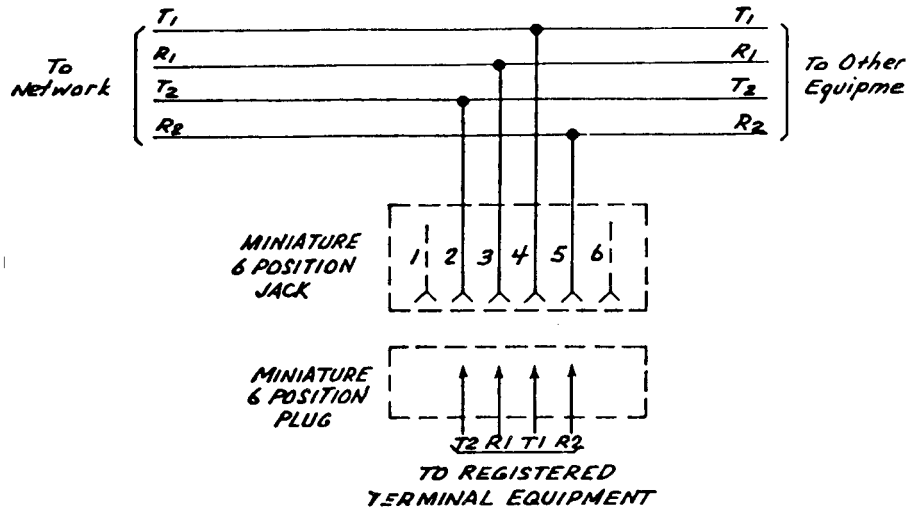
UNIVERSAL SERVICE ORDER CODE (USOC): RJ14W for Portable Wall-Mounted equipment—RJ14C for all others.

MECHANICAL ARRANGEMENT: Miniature 6-position jack.

TYPICAL USAGE: Two line non-key telephone sets and ancillary devices.

WIRING DIAGRAM:

NOTE: The telephone company will wire the lines to the jack in the sequence designated by the customer.



(d) Multiple-line bridged configurations—(1) Up to 25 bridged T/R; 50-position jack.

ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.

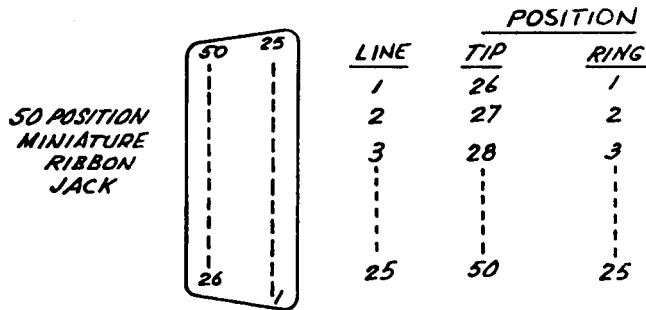
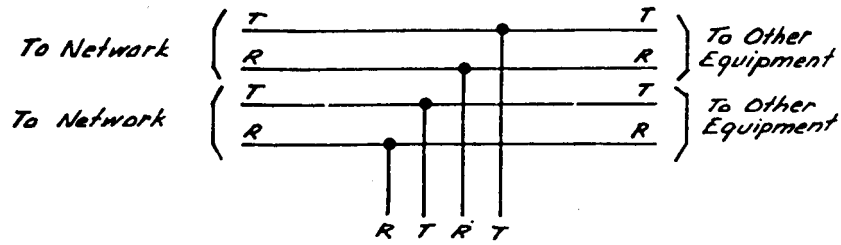
UNIVERSAL SERVICE ORDER CODE (USOC): RJ21X.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: Traffic data recording systems, PBXs and key telephone systems.

WIRING DIAGRAM:

NOTE: At the time the jack is ordered the customer must specify the sequence in which the central office lines are to be connected to the jack. The telephone company will consecutively wire these lines to the jack as shown below without skipping any positions.



(2) Bridged multiple-line 50-position T/R with make-busy arrangement.

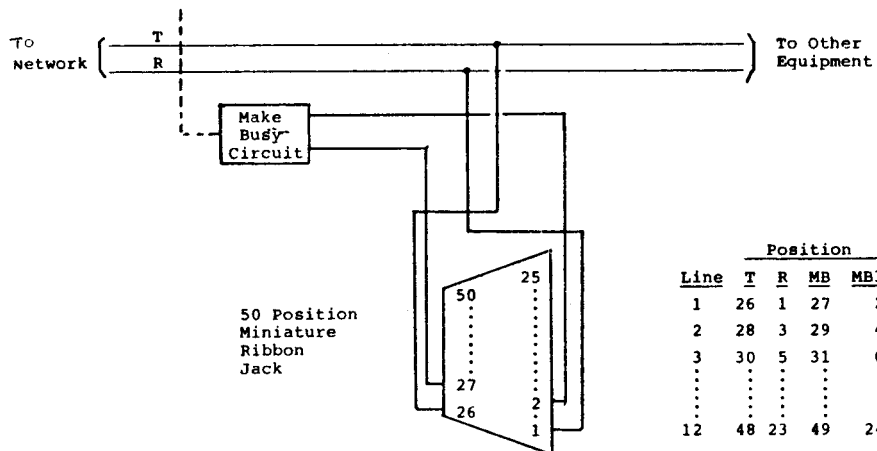
ELECTRICAL NETWORK CONNECTION: Multiple line bridge tip and ring with MB/MB1 leads for make-busy indication.

UNIVERSAL SERVICE ORDERING CODE (USOC): RJ2MB.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: 2-12 non-key telephone and ancillary devices connected directly to central office lines where a make-busy requirement is needed.

WIRING DIAGRAM:



(e) *Data configurations.* There are two categories of data configurations, which may be implemented either on an 8 position keyed data jack, or on a 50 position unkeyed ribbon jack. These are: a "universal" configuration, which incorporates both a programming resistor (for programmed data signal power limiting) and an attenuator (for "fixed-loss loop" data signal power limiting), and a "programmed" configuration, which incorporates a programming resistor, but not an attenuator. The programming resistor is selected as follows:

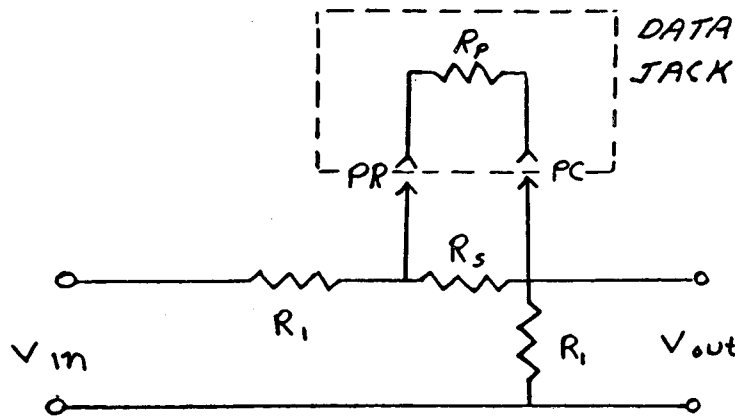
The proper programming resistor (R_p) shall be selected by the telephone company at the time of installation based upon the loop loss of the telephone line to arrive at the optimum signal power level of -12 dBm at the central office. The table shown below gives the required signal power output for the programmed data equipment for each value of the programming resistor.

Programming Resistor (R_p)*	Programmed Data Equipment Signal Power Output**
short	0 dbm
150 ohms	-1 dbm
336 ohms	-2 dbm
569 ohms	-3 dbm
866 ohms	-4 dbm
1,240 ohms	-5 dbm
1,780 ohms	-6 dbm
2,520 ohms	-7 dbm
3,610 ohms	-8 dbm
5,490 ohms	-9 dbm
9,200 ohms	-10 dbm
19,800 ohms	-11 dbm
open	-12 dbm

*Tolerance of R_p is $\pm 1\%$.
 **Tolerance of programmed data equipment signal power output is ± 1 dB.

The voltages impressed on resistor R_p by the data equipment shall be such as not to cause power dissipation in R_p in excess of 50 milliwatts.

The circuit shown below was used in calculating values of the programming resistors and may be useful in implementing the automatic control of signal power output in the programmed data equipment.



R_1 is the source impedance for the input signal V_{in} , and also the terminating impedance of the load. R_s is a series resistance, on which the computation of the programming resistor R_p is based. The table of values of R_p is derived for $R_1=600$ ohms; $R_s=3600$ ohms.

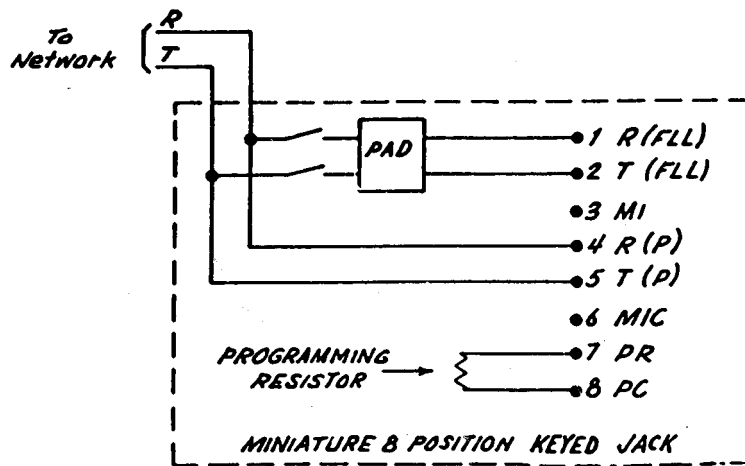
In "universal" configurations, the proper attenuator shall be installed or adjusted by the telephone company at the time of installation, based upon the loop loss of the telephone line, to arrive at the optimum power level of -12 dBm at the central office, with a data device maximum signal power level of -4 dBm.

The switch which is incorporated in "universal" configurations shall be operated to the position appropriate for the type of data equipment which is connected.

(1) *Bridged T/R; 8-position keyed data jack—Universal.*

ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.
 UNIVERSAL SERVICE ORDER CODE: RJ41S.
 MECHANICAL ARRANGEMENT: Single miniature 8-position keyed jack for surface mounting.

TYPICAL USAGE: Universal jack for fixed loss loop (FLL) or programmed (P) types of data equipment. WIRING DIAGRAM:



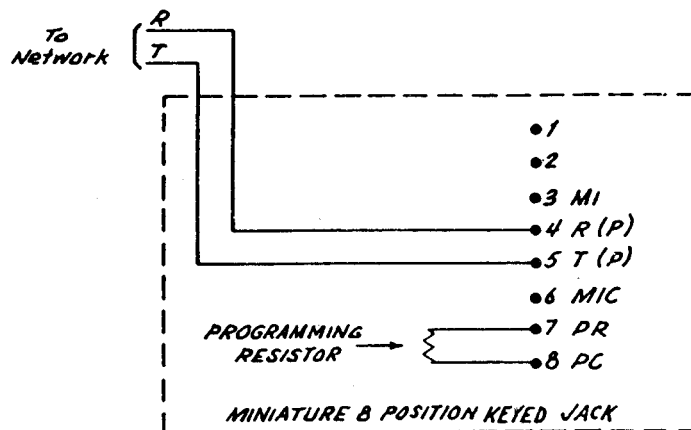
(2) Bridged T/R; 8-position keyed data jack—Programmed.

ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ45S.

MECHANICAL ARRANGEMENT: Single miniature 8-position keyed jack for surface mounting.

TYPICAL USAGE: Programmed data equipment.

WIRING DIAGRAM:



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(3) *Multiple bridged T/R; 8-position keyed data jack—Universal.*

ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ41M.

MECHANICAL ARRANGEMENT: Up to 8 miniature 8-position keyed jacks in multiple mounting arrangement.

TYPICAL USAGE: Multiple installations of fixed loss loop or programmed types of data equipment.

WIRING DIAGRAM: Multiple arrangement of § 68.502(e)(1).

(4) *Multiple bridged T/R; 8-position keyed data jack—Programmed.*

ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ45M.

MECHANICAL ARRANGEMENT: Up to 8 miniature 8-position keyed jacks in multiple mounting arrangement.

TYPICAL USAGE: Multiple installations of programmed types of data equipment.

WIRING DIAGRAM: Multiple arrangement of § 68.502(e)(2).

(5) *Bridged T/R; 50-position ribbon jack—Universal.*

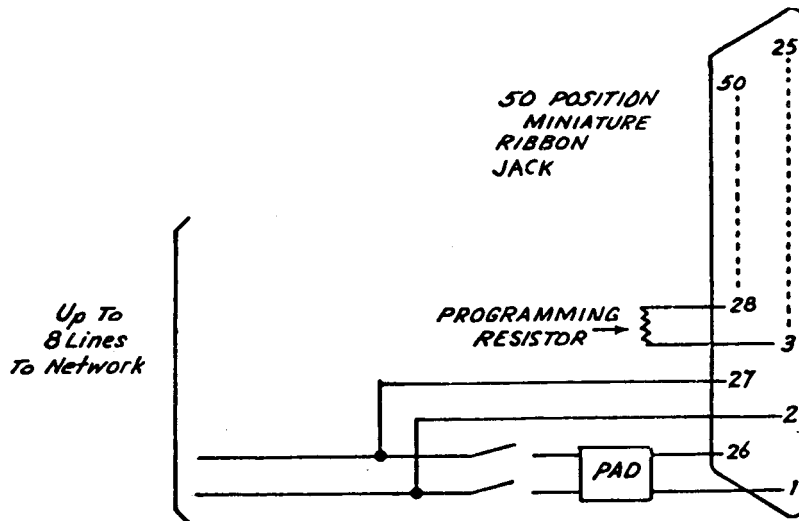
ELECTRICAL NETWORK CONNECTION: Single or multiple line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ26X.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: Universal jack for fixed loss loop (FLL) or programmed (P) types of data equipment.

WIRING DIAGRAM:



Line	Position					
	FLL		P		PR	PC
	T	R	T	R		
1	26	1	27	2	28	3
2	29	4	30	5	31	6
3	32	7	33	8	34	9
4	35	10	36	11	37	12
5	38	13	39	14	40	15
6	41	16	42	17	43	18
7	44	19	45	20	46	21
8	47	22	48	23	49	24

NOTE: At the time the jack is ordered, the customer shall specify the number of and sequence of central office lines to be connected to the jack. The telephone company will consecutively wire these lines to the jack in accordance with the table above, without skipping any positions.

(6) *Bridged T/R; 50-position ribbon jack—Programmed.*

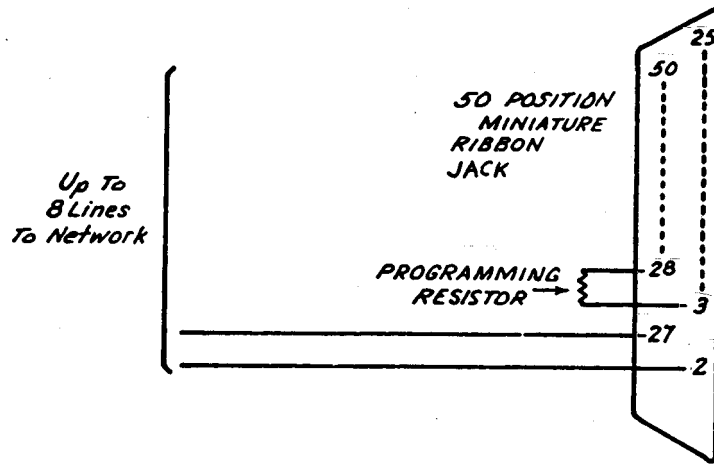
ELECTRICAL NETWORK CONNECTION: Single or multiple line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ27X.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: Programmed jack for programmed (P) types of data equipment.

WIRING DIAGRAM:



Line	Position			
	P		PR	PC
	T	R		
1	27	2	28	3
2	30	5	31	6
3	33	8	34	9
4	36	11	37	12
5	39	14	40	15
6	42	17	43	18
7	45	20	46	21
8	48	23	49	24

NOTE: At the time the jack is ordered, the customer shall specify the number of and sequence of central office lines to be connected to the jack. The telephone company will consecutively wire these lines to the jack in accordance with the table above, without skipping any positions.

(f) *Multiple line series configurations—*
 (1) *Up to eight (8) position jacks.* Multiple series jacks in this category consist of multiple arrangements of configurations specified in paragraph (b) of this section, in a multiple mounting arrangement. Such multiple arrangements may be ordered as a unit under the following:

UNIVERSAL SERVICE ORDER CODE: RJ31M:
 Multiple series T/R ahead of all station equipment (reference §68.502(b)(1)).

[41 FR 28699, July 12, 1976, as amended at 44 FR 7959, Feb. 8, 1979; 46 FR 38516, July 28, 1981; 50 FR 47549, Nov. 19, 1985; 50 FR 49930, Dec. 6, 1985; 51 FR 951, Jan. 9, 1986]

§ 68.504 Universal patent license agreement.

UNIVERSAL PATENT LICENSE AGREEMENT

Effective as of _____ WESTERN ELECTRIC COMPANY, INCORPORATED, a New York corporation ("WESTERN"), having an office at 222 Broadway, New York, New York 10038, and _____ ("the CORPORATION"), having an office at _____ agree as follows:

ARTICLE I—DEFINITIONS

1.01 Terms in this agreement (other than technical terms, names of parties, companies and Article headings) which are in capital letters shall have the meanings specified in the General Definitions Appendix, and technical terms in this agreement which are in capital letters shall have the meanings specified in the Technical Definitions Appendix.

ARTICLE II—GRANTS OF LICENSES AND IMMUNITIES

2.01 WESTERN grants to the CORPORATION under WESTERN'S PATENTS non-exclusive licenses for products of the following kinds:

2.02 All licenses herein granted shall commence on the effective date hereof and, except as provided in Article V and notwithstanding the expiration of the FIVE YEAR PERIOD, shall continue for the entire terms that the patents under which they are granted are in force or for that part of such terms for which WESTERN has the right to grant such licenses.

2.03 WESTERN grants under all patents issued in countries other than the United States and owned or controlled by AMERICAN TELEPHONE AND TELEGRAPH COMPANY, a New York corporation ("AT&T"), WESTERN or their SUBSIDIARIES, royalty-free immunity relating to the sale, lease or use in, or the importation into, such other countries of LICENSED PRODUCTS, and maintenance parts therefor, manufactured under the licenses granted under WESTERN'S PATENTS: provided, however, that nothing in this section 2.03 shall relieve the CORPORATION of its obligation to pay any royalty which may be predicated upon such manufacture of any such LICENSED PRODUCT or part, whether or not the first sale, lease or use thereof occurs outside of the United States.

2.04 The licenses granted for LICENSED PRODUCTS are licenses to make, have made, use, lease and sell such LICENSED PRODUCTS. Such licenses include the rights to maintain LICENSED PRODUCTS, to practice methods and processes involved in the use of LICENSED PRODUCTS and to make and have made, to use and have used, and to maintain machines, tools, materials and other instrumentalities, and to use and have used methods and processes, insofar as such machines, tools, materials, other instrumentalities, methods and processes are involved in or incidental to the development, manufacture, installation, testing or repair of LICENSED PRODUCTS.

2.05 The grant of each license to the CORPORATION includes the right to grant sublicenses within the scope of such license to its SUBSIDIARIES. Such right may be exercised at any time prior to termination or cancellation of the corresponding license under the provisions of Article V. Any such sublicenses granted to any present SUBSIDIARY may be made effective, retroactively, as of the effective date hereof, and any such sublicenses granted to any future SUBSIDIARY may be made effective, retroactively, as of the date such company became a SUBSIDIARY.

2.06 It is recognized that WESTERN or any of its ASSOCIATED COMPANIES may have entered into or may hereafter enter into a contract with a national government to do development work financed by such government and may be required under such contract (either unconditionally or by reason of any action or inaction thereunder) to assign to such government its rights to grant, or may now or hereafter be restrained by such government from granting, licenses or immunities to others than its ASSOCIATED COMPANIES under patents for inventions arising out of such work or covered by such contract. The resulting inability of WESTERN to grant the licenses or immunities purported to be granted by it under pat-

ents for such inventions shall not be considered to be a breach of this agreement, if:

(i) Such contract is for the benefit of such government's military or national defense establishment or the Energy Research and Development Administration of the United States Government or the National Aeronautics and Space Administration of the United States Government, or

(ii) In cases other than (i), such contract is with the United States Government or any agency of and within such Government, and any such requirement or restraint is pursuant to a statute or officially promulgated regulation of such Government or agency applicable to such contract;

provided, however, that

(iii) WESTERN (or, if an ASSOCIATED COMPANY thereof has entered into such contract, such ASSOCIATED COMPANY) shall exert its best efforts to enable WESTERN to grant the licenses or immunities herein purported to be granted by it under such patents; and

(iv) Within ninety (90) days after the filing of any application for any such patent, WESTERN shall give written notice to the other party identifying such application by country, number and date of filing.

For the purposes of this section 2.06, AT&T, WESTERN and their ASSOCIATED COMPANIES shall all be deemed to be ASSOCIATED COMPANIES of one another.

ARTICLE III—ROYALTY

3.01 The CORPORATION shall pay to WESTERN royalty, at the applicable rate hereinafter specified, on each LICENSED PRODUCT, and maintenance part therefor, which is a ROYALTY-BEARING PRODUCT, and

(i) Which is sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES while any license acquired hereunder by the CORPORATION with respect to such ROYALTY-BEARING PRODUCT shall remain in force, or

(ii) Which is made by or for the CORPORATION or any of its SUBSIDIARIES while any such license shall remain in force and is thereafter sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES,

whether or not such SUBSIDIARIES are sub-licensed pursuant to section 2.05, such royalty rate to be applied, except as provided in section 3.05, to the NET SELLING PRICE of such ROYALTY-BEARING PRODUCT if sold for a separate consideration payable wholly in money and in all other cases to the FAIR MARKET VALUE thereof. The royalty rates applicable to LICENSED PRODUCTS of the kinds specified in section 2.01, and maintenance parts therefor, are as follows:

(iii)

3.02 If a LICENSED PRODUCT is a ROYALTY-BEARING PRODUCT solely on account of one or a limited number of WESTERN'S PATENTS, the CORPORATION may elect to reduce the amount of royalty otherwise payable hereunder on said LICENSED PRODUCT by a royalty reduction percentage, and as of an effective date, established by WESTERN. Upon written request from the CORPORATION identifying the LICENSED PRODUCT and each relevant patent, WESTERN will inform the CORPORATION of the royalty reduction percentage applicable in respect of said LICENSED PRODUCT and patent or patents and the effective date thereof.

3.03 A LICENSED PRODUCT, or maintenance part therefor, which is made and sold by the CORPORATION or any of its SUBSIDIARIES and which is a ROYALTY-BEARING PRODUCT hereunder on account of one or more of WESTERN'S PATENTS, may be treated by the CORPORATION as not licensed and not subject to royalty hereunder if all of the following conditions are met:

(i) The purchaser is licensed under the same patent or patents, pursuant to another agreement, to have said LICENSED PRODUCT or part made;

(ii) The purchaser expressly advises the CORPORATION or its SUBSIDIARY, whichever effects the making and sale, in writing at or prior to (but in no event later than) the time of such sale that, in purchasing said LICENSED PRODUCT or part, it is exercising its own license or licenses under said patent or patents to have said LICENSED PRODUCT or part made; and

(iii) The CORPORATION retains such written advice and makes it available to WESTERN at the latter's request.

3.04 Only one royalty shall be payable hereunder in respect of any ROYALTY-BEARING PRODUCT. Royalty shall accrue hereunder on any LICENSED PRODUCT, or maintenance part therefor, upon its first becoming a ROYALTY-BEARING PRODUCT, and the royalty thereon shall become payable in accordance with the provisions of this Article III upon the first sale, lease or putting into use thereof.

3.05 If any sale of a ROYALTY-BEARING PRODUCT shall be made by the CORPORATION on a SUBSIDIARY thereof to:

(i) Any company of which the CORPORATION is a SUBSIDIARY at the time of such sale, or

(ii) The CORPORATION or a SUBSIDIARY thereof or any other SUBSIDIARY of a company of which the CORPORATION is a SUBSIDIARY at the time of such sale.

royalty payable hereunder shall be computed on the FAIR MARKET VALUE of such ROYALTY-BEARING PRODUCT,

ARTICLE IV—REPORTS AND PAYMENTS

4.01 The CORPORATION shall keep full, clear and accurate records with respect to ROYALTY-BEARING PRODUCTS. WESTERN shall have the right through its accredited auditing representatives to make an examination and audit, during normal business hours, not more frequently than annually, of all such records and such other records and accounts as may under recognized accounting practices contain information bearing upon the amount of royalty payable to it under this agreement. Prompt adjustment shall be made by the proper party to compensate for any errors or omissions disclosed by such examination or audit. Neither such right to examine and audit nor the right to receive such adjustment shall be affected by any statement to the contrary, appearing on checks or otherwise, unless such statement appears in a letter, signed by the party having such right and delivered to the other party, expressly waiving such right.¹

4.02 (a) Within sixty (60) days after the end of each semiannual period ending on June 30th or December 31st, commencing with the semiannual period during which this agreement first becomes effective, the CORPORATION shall furnish to WESTERN a statement, in form acceptable to WESTERN, certified by a responsible official of the CORPORATION:

(i) Showing all ROYALTY-BEARING PRODUCTS, by kinds of LICENSED PRODUCTS, which were sold, leased or put into use during such semiannual period, the NET SELLING PRICES of such ROYALTY-BEARING PRODUCTS or (where royalty is based on FAIR MARKET VALUES) the FAIR MARKET VALUES thereof and the amount of royalty payable thereon (or if no such ROYALTY-BEARING PRODUCT has been so sold, leased or put into use, showing that fact);

(ii) Identifying, if royalty is reduced under provisions of section 3.02, each LICENSED PRODUCT by its type and the patent or patents involved in such royalty reduction;

(iii) Showing, by purchasers and kinds of LICENSED PRODUCTS, the monetary totals of the sales, to each purchaser exercising its own "to have made" license or licenses, of LICENSED PRODUCTS and

¹If licensee insists on a non-Western auditor, third line, insert, after "representatives", -or, at the election of the CORPORATION, through a firm of certified public accountants proposed by WESTERN and accepted by the CORPORATION-.

maintenance parts in transactions of the character described in section 3.03; and

(iv) Identifying all transactions of the character described in section 3.05.

(b) Within such sixty (60) days the CORPORATION shall, irrespective of its own business and accounting methods, pay to WESTERN the royalties payable for such semiannual period.

(c) Notwithstanding the provisions of section 6.03(a)(v), the CORPORATION shall furnish whatever additional information WESTERN may reasonably prescribe from time to time to enable WESTERN to ascertain which LICENSED PRODUCTS (and maintenance parts therefor) sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES are subject to the payment of royalty to WESTERN, and the amount of royalty payable thereon.

4.03 Royalty payments provided for in this agreement shall, when overdue, bear interest at an annual rate of one percent (1%) over the prime rate or successive prime rates in effect in New York City during delinquency.

4.04 Payment to WESTERN shall be made in United States dollars to WESTERN'S Treasury Organization at 222 Broadway, New York, New York 10038, or at such changed address as WESTERN shall have specified by written notice. If any royalty for any semiannual period referred to in section 4.02 is computed in other currency, conversion to United States dollars shall be at the prevailing rate for bank cable transfers on New York City as quoted for the last day of such semiannual period by leading banks dealing in the New York City foreign exchange market.

ARTICLE V—TERMINATION, CANCELLATION AND SURRENDER

5.01 (a) If the CORPORATION shall fail to fulfill one or more of its obligations under ARTICLES III or IV, WESTERN may, upon election and in addition to any other remedies that it may have, at any time terminate all licenses and rights granted to the CORPORATION hereunder, by not less than six (6) months' written notice to the CORPORATION specifying any such breach, unless within the period of such notice all breaches specified therein shall have been remedied.

(b) Termination by WESTERN of licenses and rights granted to the CORPORATION shall terminate the obligations of the CORPORATION under the provisions of Articles III and IV relating to such terminated licenses and rights, except such obligations as to ROYALTY-BEARING PRODUCTS made, sold, leased or put into use prior to such termination.

5.02 By written notice to WESTERN, the CORPORATION may cancel the licenses for

any specified products granted hereunder to it under WESTERN'S PATENTS. Such cancellation shall be effective as of the date of giving said notice but shall not relieve the CORPORATION of its obligation to pay accrued royalties with respect to such specified products.

5.03 By written notice to WESTERN, specifying any of WESTERN'S PATENTS by number and date of issuance, the CORPORATION may surrender and terminate all licenses and rights granted to it under such specified patent or patents or under any specified invention or inventions thereof. Such surrender and termination shall be effective as of a date specified in said notice which shall not be more than six (6) months prior to the date of giving said notice. As of said effective date, such specified patent or patents or invention or inventions shall cease to be among, or among the inventions of, WESTERN'S PATENTS for the purposes of this agreement without affecting obligations in respect of royalties accrued prior to said effective date.

5.04 (a) Every sublicense granted by the CORPORATION shall terminate with termination or cancellation of its corresponding license.

(b) Any sublicenses granted shall terminate if and when the grantee thereof ceases to be a SUBSIDIARY of the CORPORATION. Each LICENSED PRODUCT and each maintenance part, made by or for a SUBSIDIARY of the CORPORATION, and on which royalty has accrued but which remains not sold, leased or put into use at the time such SUBSIDIARY ceases to be a SUBSIDIARY of the CORPORATION, shall be deemed to have been put into use by such SUBSIDIARY immediately prior to such time at the place said LICENSED PRODUCT or part is then located.

5.05 Licenses, immunities and rights with respect to each LICENSED PRODUCT, and each maintenance part, made, sold, leased or put into use prior to any termination or cancellation under the provisions of this Article V shall survive such termination or cancellation.

ARTICLE VI—MISCELLANEOUS PROVISIONS

6.01 (a) WESTERN shall, upon written request from the CORPORATION sufficiently identifying any patent by country, number and date of issuance, inform the CORPORATION as to the extent to which any such patent is subject to the licenses, immunities and rights granted to the CORPORATION.

(b) If such licenses, immunities or rights under any such patent are restricted in scope, copies of all pertinent provisions of any contract (other than provisions of a contract with a government to the extent that disclosure thereof is prohibited under the government's laws or regulations) creating

Federal Communications Commission

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such restrictions shall, upon request, be furnished to the CORPORATION.

6.02 Upon written request from the CORPORATION, WESTERN shall inform the CORPORATION which of WESTERN'S PATENTS cover inventions under which the United States Government holds a royalty-free license.

6.03 (a) Nothing contained in this agreement shall be construed as:

(i) Requiring the filing of any patent application, the securing of any patent or the maintaining of any patent in force; or

(ii) A warranty or representation by WESTERN as to the validity or scope of any patent; or

(iii) A warranty or representation that any manufacture, sale, lease, use or importation will be free from infringement of patents other than those under which and to the extent to which licenses or immunities are in force hereunder; or

(iv) An agreement to bring or prosecute actions or suits against third parties for infringement; or

(v) An obligation to furnish any manufacturing or technical information or assistance; or

(vi) Conferring any right to use, in advertising, publicity or otherwise, any name, trade name or trademark, or any contraction, abbreviation or simulation thereof; or

(vii) Conferring by implication, estoppel or otherwise upon the CORPORATION any license or other right under any patent, except the licenses and rights expressly granted to the CORPORATION; or

(viii) An obligation upon WESTERN to make any determination as to the applicability of any patent to any product of the CORPORATION or any of its SUBSIDIARIES; or

(ix) A release for any infringement prior to the effective date hereof.

(b) Neither WESTERN nor AT&T makes any representations, extends any warranties of any kind or assumes any responsibility whatever with respect to the manufacture, sale, lease, use or importation of any LICENSED PRODUCT, or part thereof, by the CORPORATION, any of its SUBSIDIARIES, or any direct or indirect supplier or vendee or other transferee of any such company, other than the licenses, immunities and rights expressly herein granted.

6.04 Neither this agreement nor any licenses or rights hereunder, in whole or in part, shall be assignable or otherwise transferable.

6.05 Any notice, request or information shall be deemed to be sufficiently given when sent by registered mail addressed to the addressee at its office above specified (and when addressed to WESTERN to the attention of its Patent Licensing Organization) and any royalty statement shall be deemed

to be sufficiently furnished when sent by registered mail addressed to WESTERN'S Treasury Organization at 222 Broadway, New York, New York 10038, or at such changed address as the addressee shall have specified by written notice.

6.06 This agreement sets forth the entire agreement and understanding between the parties as to the subject matter hereof and merges all prior discussions between them, and neither of the parties shall be bound by any conditions, definitions, warranties, understandings or representations with respect to such subject matter other than as expressly provided herein, or in any prior existing written agreement between the parties, or as duly set forth on or subsequent to the effective date hereof in writing and signed by a proper and duly authorized representative of the party to be bound thereby.

6.07 The construction and performance of this agreement shall be governed by the law of the State of New York.

IN WITNESS WHEREOF, each of the parties has caused this agreement to be executed in duplicate originals by its duly authorized representatives on the respective dates entered below.

WESTERN ELECTRIC COMPANY, INCORPORATED

By Director of Patent Licensing

Date

[SEAL] Attest:

Secretary

By Title

Date

[SEAL] Attest:

Secretary

GENERAL DEFINITIONS APPENDIX

FAIR MARKET VALUE means the NET SELLING PRICE which the CORPORATION or any of its SUBSIDIARIES, whichever effects the sale, lease or use of the product or maintenance part, would realize from an unaffiliated buyer in an arm's length sale of an identical product or maintenance part in the same quantity and at the same time and place as such sale, lease or use.

FIVE YEAR PERIOD means the period commencing on the effective date of this agreement and having a duration of five years.

LICENSED PRODUCT means:

- (i) Any product as such, or
(ii) Any product which is any specified combination, of the kinds listed in section 2.01 of this agreement. Although the term does not mean, and although licenses are

not granted for any other combination, a LICENSED PRODUCT

(iii) Shall not lose its status as such on account of, and

(iv) Shall not cause an unlicensed combination to infringe WESTERN'S PATENTS solely on account of, such LICENSED PRODUCT being made, sold, leased or put into use as part of an unlicensed combination.

NET SELLING PRICE means the gross selling price of the ROYALTY-BEARING PRODUCT in the form in which it is sold, whether or not assembled (and without excluding therefrom any components or sub-assemblies thereof, whatever their origin and whether or not patent impacted), less the following items but only insofar as they pertain to the sale of such ROYALTY-BEARING PRODUCT by the CORPORATION or any of its SUBSIDIARIES and are included in such gross selling price:

(i) Usual trade discounts actually allowed (other than cash discounts, advertising allowances, or fees or commissions to any employees of the CORPORATION, a SUBSIDIARY of the CORPORATION, a company of which the CORPORATION is a SUBSIDIARY at the time of the sale, or any other SUBSIDIARY of a company of which the CORPORATION is a SUBSIDIARY at the time of such sale);

(ii) Packing costs;

(iii) Import, export, excise and sales taxes, and customs duties;

(iv) Costs of insurance and transportation from the place of manufacture to the customer's premises or point of installation;

(v) Costs of installation at the place of use; and

(vi) Costs of special engineering services not incident to the design or manufacture of the ROYALTY-BEARING PRODUCT.

ROYALTY-BEARING PRODUCT means any LICENSED PRODUCT, and any maintenance part therefor,

(i) Which upon manufacture includes, or the manufacture of which employs, any invention of any of WESTERN'S PATENTS in force at the time and place of such manufacture, or

(ii) Which includes when sold, leased or put into use, or the use of which employs, any invention of any of WESTERN'S PATENTS in force at the time and place of such sale, lease or use,

other than

(iii) Inventions under which the United States Government holds a royalty-free license if such LICENSED PRODUCT or part is contracted for, directly or indirectly, by the United States Government, or by another national government with funds derived through the Military Assistance Pro-

gram or otherwise through the United States Government, and

(iv) Inventions employed in the manufacture of, or included in, such LICENSED PRODUCT or any original part thereof, or such maintenance part therefor or any original part thereof, by a direct or indirect supplier of the CORPORATION or any of its SUBSIDIARIES, but only to the extent such supplier has exercised its own licenses granted by WESTERN under patents for such inventions to so employ or include said inventions.

SUBSIDIARY means a company the majority of whose stock entitled to vote for election of directors is now or hereafter controlled by the parent company either directly or indirectly, but any such company shall be deemed to be a SUBSIDIARY only so long as such control exists.

WESTERN'S PATENTS means all patents issued at any time in the United States for:

(i) Inventions made prior to the termination of the FIVE YEAR PERIOD and owned or controlled at any time during the FIVE YEAR PERIOD by AT&T, WESTERN or any of their SUBSIDIARIES,

(ii) Inventions made during the FIVE YEAR PERIOD, solely or jointly with anyone, and in the course of their employment by employees of any such company who are employed to do research, development or other inventive work, and

(iii) Any other inventions made prior to the termination of the FIVE YEAR PERIOD, with respect to which and to the extent to which any such company shall at any time during the FIVE YEAR PERIOD have the right to grant the licenses and rights which are herein granted by WESTERN:

provided, however, that said patents do not include those issued for inventions made by employees of any SUBSIDIARY of WESTERN or AT&T exclusively engaged in the performance of contracts with the Energy Research and Development Administration of the United States.

TECHNICAL DEFINITIONS APPENDIX

BILATERAL PATENT LICENSE AGREEMENT

Effective as of _____ WESTERN ELECTRIC COMPANY, INCORPORATED, a New York corporation ("WESTERN"), having an office at 222 Broadway, New York, New York 10038, and _____ ("the CORPORATION") having an office at _____ agree as follows:

ARTICLE I—DEFINITIONS

1.01 Terms in this agreement (other than technical terms, names of parties, companies and Article headings) which are in capital letters shall have the meanings specified in the General Definitions Appendix, and technical terms in this agreement which are in capital letters shall have the meanings specified in the Technical Definitions Appendix.

ARTICLE II—GRANTS OF LICENSES AND IMMUNITIES

2.01 WESTERN grants to the CORPORATION under WESTERN'S PATENTS non-exclusive licenses for products of the following kinds:

2.02 The CORPORATION grants to WESTERN and to AMERICAN TELEPHONE AND TELEGRAPH COMPANY, a New York corporation ("AT&T"), severally, under the CORPORATION'S PATENTS nonexclusive royalty-free licenses for products of the following kinds:

2.03 All licenses herein granted shall commence on the effective date hereof and, except as provided in Article VI and notwithstanding the expiration of the FIVE YEAR PERIOD, shall continue for the entire terms that the patents under which they are granted are in force or for that part of such terms for which the grantor has the right to grant such licenses.

2.04 (a) WESTERN grants under all patents issued in countries other than the United States and owned or controlled by AT&T, WESTERN or their SUBSIDIARIES, royalty-free immunity relating to the sale, lease or use in, or the importation into, such other countries of LICENSED PRODUCTS, and maintenance parts therefor, manufactured under the licenses granted under WESTERN'S PATENTS; provided, however, that nothing in this section 2.04(a) shall relieve the CORPORATION of its obligation to pay any royalty which may be predicated upon such manufacture of any such LICENSED PRODUCT or part, whether or not the first sale, lease or use thereof occurs outside of the United States.

(b) The CORPORATION grants under all patents issued in countries other than the United States and owned or controlled by it or its ASSOCIATED COMPANIES, royalty-free immunity relating to the sale, lease or use in, or the importation into, such other countries of LICENSED PRODUCTS, and maintenance parts therefor, manufactured under the licenses granted under the CORPORATION'S PATENTS.

2.05 The licenses granted for LICENSED PRODUCTS are licenses to make, have made, use, lease and sell such LICENSED PRODUCTS. Such licenses include the rights

to maintain LICENSED PRODUCTS, to practice methods and processes involved in the use of LICENSED PRODUCTS and to make and have made, to use and have used, and to maintain machines, tools, materials and other instrumentalities, and to use and have used methods and processes, insofar as such machines, tools, materials, other instrumentalities, methods and processes are involved in or incidental to the development, manufacture, installation, testing or repair of LICENSED PRODUCTS.

2.06 The grant of each license to the CORPORATION includes the right to grant sublicenses within the scope of such license to its SUBSIDIARIES. The grant of each license to WESTERN or AT&T includes the right to grant sublicenses within the scope of such license to its ASSOCIATED COMPANIES. Such right of either party or AT&T may be exercised at any time prior to termination or cancellation of the corresponding license under the provisions of Article VI. Any such sublicenses granted to any present SUBSIDIARY or any present ASSOCIATED COMPANY may be made effective, retroactively, as of the effective date hereof, and any such sublicenses granted to any future SUBSIDIARY or any future ASSOCIATED COMPANY may be made effective, retroactively, as of the date such company became a SUBSIDIARY or an ASSOCIATED COMPANY.

ARTICLE III—ACQUISITION AND WARRANTY

3.01 WESTERN and the CORPORATION shall each acquire rights to inventions made during the FIVE YEAR PERIOD which relate to the subject matter of licenses granted and are made, in the course of their employment, either solely or jointly with anyone, by its or its ASSOCIATED COMPANIES employees (and in the case of WESTERN'S obligation, by employees of AT&T or its SUBSIDIARIES) who are employed to do research, development or other inventive work, such that each grantee shall by virtue of this agreement, receive in respect of patents issued for such inventions, licenses and rights of the scope and upon the terms herein provided to be granted to such grantee.

3.02 WESTERN and, except as may be stated in a letter from the CORPORATION to WESTERN referring to this agreement and delivered before or concurrently with the execution hereof by WESTERN, the CORPORATION each warrants that there are no commitments or restrictions which will limit the licenses and rights granted by it under patents issued at any time for inventions owned at any time during the FIVE YEAR PERIOD by it or any of its ASSOCIATED COMPANIES (and in the case of WESTERN'S warranty, by AT&T or any of its SUBSIDIARIES).

3.03 It is recognized that either party or any of its ASSOCIATED COMPANIES may

have entered into or may hereafter enter into a contract with a national government to do development work financed by such government and may be required under such contract (either unconditionally or by reason of any action or inaction thereunder) to assign to such government its rights to grant, or may now or hereafter be restrained by such government from granting, licenses or immunities to others than its ASSOCIATED COMPANIES under patents for inventions arising out of such work or covered by such contract. The resulting inability of such party to grant the licenses or immunities purported to be granted by it under patents for such inventions shall not be considered to be a breach of this agreement, if:

(i) Such contract is for the benefit of such government's military or national defense establishment or the Energy Research and Development Administration of the United States Government or the National Aeronautics and Space Administration of the United States Government, or

(ii) In cases other than (i), such contract is with the United States Government or any agency of and within such Government, and any such requirement or restraint is pursuant to a statute or officially promulgated regulation of such Government or agency applicable to such contract;

provided, however, that:

(iii) Such party (or, if an ASSOCIATED COMPANY thereof has entered into such contract, such ASSOCIATED COMPANY) shall exert its best efforts to enable such party to grant the licenses or immunities herein purported to be granted by it under such patents; and

(iv) Within ninety (90) days after the filing of any application for any such patent, such party shall give written notice to the other party identifying such application by country, number and date of filing.

For the purposes of this section 3.03, AT&T, WESTERN and their ASSOCIATED COMPANIES shall all be deemed to be ASSOCIATED COMPANIES of one another, and the CORPORATION and its ASSOCIATED COMPANIES shall be deemed to be ASSOCIATED COMPANIES of one another.

ARTICLE IV—ROYALTY

4.01 The CORPORATION shall pay to WESTERN royalty, at the applicable rate hereinafter specified, on each LICENSED PRODUCT, and maintenance part therefor, which is a ROYALTY-BEARING PRODUCT, and

(i) Which is sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES while any license acquired hereunder by the CORPORATION with re-

spect to such ROYALTY-BEARING PRODUCT shall remain in force, or

(ii) Which is made by or for the CORPORATION or any of its SUBSIDIARIES while any such license shall remain in force and is thereafter sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES,

whether or not such SUBSIDIARIES are sub-licensed pursuant to section 2.06, such royalty rate to be applied, except as provided in section 4.05, to the NET SELLING PRICE of such ROYALTY-BEARING PRODUCT if sold for a separate consideration payable wholly in money and in all other cases to the FAIR MARKET VALUE thereof. The royalty rates applicable to LICENSED PRODUCTS of the kinds specified in section 2.01, and maintenance parts therefor, are as follows:

(iii)

4.02 If a LICENSED PRODUCT is a ROYALTY-BEARING PRODUCT solely on account of one or a limited number of WESTERN'S PATENTS, the CORPORATION may elect to reduce the amount of royalty otherwise payable hereunder on said LICENSED PRODUCT by a royalty reduction percentage, and as of an effective date, established by WESTERN. Upon written request from the CORPORATION identifying the LICENSED PRODUCT and each relevant patent, WESTERN will inform the CORPORATION of the royalty reduction percentage applicable in respect of said LICENSED PRODUCT and patent or patents and the effective date thereof.

4.03 A LICENSED PRODUCT, or maintenance part therefor, which is made and sold by the CORPORATION or any of its SUBSIDIARIES and which is a ROYALTY-BEARING PRODUCT hereunder on account of one or more of WESTERN'S PATENTS, may be treated by the CORPORATION as not licensed and not subject to royalty hereunder if all of the following conditions are met:

(i) The purchaser is licensed under the same patent or patents, pursuant to another agreement, to have said LICENSED PRODUCT or part made;

(ii) The purchaser expressly advises the CORPORATION or its SUBSIDIARY, whichever effects the making and sale, in writing at or prior to (but in no event later than) the time of such sale that, in purchasing said LICENSED PRODUCT or part, it is exercising its own license or licenses under said patent or patents to have said LICENSED PRODUCT or part made; and

(iii) The CORPORATION retains such written advice and makes it available to WESTERN at the latter's request.

4.04 Only one royalty shall be payable hereunder in respect of any ROYALTY-BEARING PRODUCT. Royalty shall accrue

hereunder on any LICENSED PRODUCT, or maintenance part therefor, upon its first becoming a ROYALTY-BEARING PRODUCT, and the royalty thereon shall become payable in accordance with the provisions of this Article IV upon the first sale, lease or putting into use thereof.

4.05 If any sale of a ROYALTY-BEARING PRODUCT shall be made by the CORPORATION or a SUBSIDIARY thereof to:

(i) Any company of which the CORPORATION is a SUBSIDIARY at the time of such sale, or

(ii) The CORPORATION or a SUBSIDIARY thereof or any other SUBSIDIARY of a company of which the CORPORATION is a SUBSIDIARY at the time of such sale,

royalty payable hereunder shall be computed on the FAIR MARKET VALUE of such ROYALTY-BEARING PRODUCT.

ARTICLE V—REPORTS AND PAYMENTS

5.01 The CORPORATION shall keep full, clear and accurate records with respect to ROYALTY-BEARING PRODUCTS. WESTERN shall have the right through its accredited auditing representatives to make an examination and audit, during normal business hours, not more frequently than annually, of all such records and such other records and accounts as may under recognized accounting practices contain information bearing upon the amount of royalty payable to it under this agreement. Prompt adjustment shall be made by the proper party to compensate for any errors or omissions disclosed by such examination or audit. Neither such right to examine and audit nor the right to receive such adjustments shall be affected by any statement to the contrary, appearing on checks or otherwise, unless such statement appears in a letter, signed by the party having such right and delivered to the other party, expressly waiving such right.¹

5.02 (a) Within sixty (60) days after the end of each semiannual period ending on June 30th or December 31st, commencing with the semiannual period during which this agreement first becomes effective, the CORPORATION shall furnish to WESTERN a statement, in form acceptable to WESTERN; certified by a responsible official of the CORPORATION:

(i) Showing all ROYALTY-BEARING PRODUCTS, by kinds of LICENSED PRODUCTS, which were sold, leased or put into use during such semiannual period,

the NET SELLING PRICES of such ROYALTY-BEARING PRODUCTS or (where royalty is based on FAIR MARKET VALUES) the FAIR MARKET VALUES thereof and the amount of royalty payable thereon (or if no such ROYALTY-BEARING PRODUCT has been so sold, leased or put into use, showing that fact);

(ii) Identifying, if royalty is reduced under provisions of section 4.02, each LICENSED PRODUCT by its type and the patent or patents involved in such royalty reduction;

(iii) Showing, by purchasers and kinds of LICENSED PRODUCTS, the monetary totals of the sales, to each purchaser exercising its own "to have made" license or licenses, of LICENSED PRODUCTS and maintenance parts in transactions of the character described in section 4.03; and

(iv) Identifying all transactions of the character described in section 4.05.

(b) Within such sixty (60) days the CORPORATION shall, irrespective of its own business and accounting methods, pay to WESTERN the royalties payable for such semiannual period.

(c) Notwithstanding the provisions of section 7.04(a)(v), the CORPORATION shall furnish whatever additional information WESTERN may reasonably prescribe from time to time to enable WESTERN to ascertain which LICENSED PRODUCTS (and maintenance parts therefor) sold, leased or put into use by the CORPORATION or any of its SUBSIDIARIES are subject to the payment of royalty to WESTERN, and the amount of royalty payable thereon.

5.03 Royalty payments provided for in this agreement shall, when overdue, bear interest at an annual rate of one percent (1%) over the prime rate or successive prime rates in effect in New York City during delinquency.

5.04 Payment to WESTERN shall be made in United States dollars to WESTERN'S Treasury Organization at 222 Broadway, New York, New York 10038, or at such changed address as WESTERN shall have specified by written notice. If any royalty for any semiannual period referred to in section 5.02 is computed in other currency, conversion to United States dollars shall be at the prevailing rate for bank cable transfers on New York City as quoted for the last day of such semiannual period by leading banks dealing in the New York City foreign exchange market.

ARTICLE VI—TERMINATION, CANCELLATION AND SURRENDER

6.01 Any termination under the provisions of this Article VI by one party of licenses and rights of the other party shall not affect the licenses and rights of the terminating party and its sublicensees (or of AT&T and

¹If licensee insists on a non-Western auditor, third line, insert, after "representatives", -or, at the election of the CORPORATION, through a firm of certified public accountants proposed by WESTERN and accepted by the CORPORATION-.

its sublicensees if WESTERN is the terminating party), nor the obligations of the CORPORATION under the provisions of Articles IV and V if it is the terminating party.

6.02 If WESTERN shall fail to fulfill one or more of its obligations under this agreement, the CORPORATION may, upon election and in addition to any other remedies that it may have, at any time terminate all licenses and rights granted to WESTERN and AT&T hereunder, by not less than six (6) months' written notice to WESTERN specifying any such breach, unless within the period of such notice all breaches specified therein shall have been remedied.

6.03 (a) If the CORPORATION shall fail to fulfill one or more of:

(i) Its obligations under Articles IV or V, or

(ii) Its obligations under this agreement whereby WESTERN or AT&T fails to receive licenses or rights which it is entitled hereunder to receive under patents issued in the United States,

WESTERN may, upon the election and in addition to any other remedies that it may have, at any time terminate all licenses and rights granted to the CORPORATION hereunder, by not less than six (6) months' written notice to the CORPORATION specifying any such breach, unless within the period of such notice all breaches specified therein shall have been remedied.

(b) Termination by WESTERN of licenses and rights granted to the CORPORATION shall terminate the obligations of the CORPORATION under the provisions of Articles IV and V relating to such terminated licenses and rights, except such obligations as to ROYALTY-BEARING PRODUCTS made, sold, leased or put into use prior to such termination.

6.04 (a) By written notice to WESTERN, the CORPORATION may cancel the licenses for any specified products granted hereunder to it under WESTERN'S PATENTS. Such cancellation shall be effective as of the date of giving said notice but shall not relieve the CORPORATION of its obligation to pay accrued royalties with respect to such specified products.

(b) By written notice to the CORPORATION, WESTERN or AT&T may cancel the licenses for any specified products granted hereunder to it under the CORPORATION'S PATENTS, such cancellation to be effective as of the date of giving said notice.

6.05 By written notice to WESTERN, specifying any of WESTERN'S PATENTS by number and date of issuance, the CORPORATION may surrender and terminate all licenses and rights granted to it under such specified patent or patents or under any specified invention or inventions thereof. Such surrender and termination shall be effective as of a date specified in said notice

which shall not be more than six (6) months prior to the date of giving said notice. As of said effective date, such specified patent or patents or invention or inventions shall cease to be among, or among the inventions of, WESTERN'S PATENTS for the purposes of this agreement without affecting obligations in respect of royalties accrued prior to said effective date.

6.06 (a) Every sublicense granted by a party or AT&T shall terminate with termination or cancellation of its corresponding license.

(b) Any sublicenses granted shall terminate if and when the grantee thereof ceases to be an ASSOCIATED COMPANY of WESTERN or AT&T or a SUBSIDIARY of the CORPORATION. Each LICENSED PRODUCT and each maintenance part, made by or for a SUBSIDIARY of the CORPORATION, and on which royalty has accrued but which remains not sold, leased or put into use at the time such SUBSIDIARY ceases to be a SUBSIDIARY of the CORPORATION, shall be deemed to have been put into use by such SUBSIDIARY immediately prior to such time at the place said LICENSED PRODUCT or part is then located.

(c) If an ASSOCIATED COMPANY'S relationship to a party or AT&T changes so that such ASSOCIATED COMPANY is no longer an ASSOCIATED COMPANY of such party or AT&T, licenses and rights acquired under the patents and patent rights of such ASSOCIATED COMPANY for inventions made prior to the date such relationship changed shall not be affected by such change.

6.07 Licenses, immunities and rights with respect to each LICENSED PRODUCT, and each maintenance part, made, sold, leased or put into use prior to any termination or cancellation under the provisions of this Article VI shall survive such termination or cancellation.

ARTICLE VII—MISCELLANEOUS PROVISIONS

7.01 With respect to patents or inventions owned jointly by the CORPORATION, or any of its ASSOCIATED COMPANIES, with any other person or persons who has or have granted, or who shall hereafter grant, to WESTERN or AT&T, licenses or other rights thereunder, the CORPORATION, to the extent that the licenses and rights so granted do not exceed the scope of the licenses and rights herein granted by the CORPORATION, consents to the grant of licenses and rights to WESTERN and AT&T under such patents and inventions by such other person or persons.

7.02 (a) Each party shall, upon written request from the other party sufficiently identifying any patent by country, number and date of issuance, inform the other party as to the extent to which any such patent is subject to the licenses, immunities and rights granted to such other party.

(b) If such licenses, immunities or rights under any such patent are restricted in scope, copies of all pertinent provisions of any contract (other than provisions of a contract with a government to the extent that disclosure thereof is prohibited under that government's laws or regulations) creating such restrictions shall, upon request, be furnished to the party making such request.

7.03 Upon written request from one party, the other party shall inform the requesting party which of said other party's patents cover inventions under which the United States Government holds a royalty-free license.

7.04 (a) Nothing contained in this agreement shall be construed as:

(i) Requiring the filing of any patent application, the securing of any patent or the maintaining of any patent in force; or

(ii) A warranty or representation by any grantor as to the validity or scope of any patent; or

(iii) A warranty or representation that any manufacture, sale, lease, use or importation will be free from infringement of patents other than those under which and to the extent to which licenses or immunities are in force hereunder; or

(iv) An agreement to bring or prosecute actions or suits against third parties for infringement; or

(v) An obligation to furnish any manufacturing or technical information or assistance; or

(vi) Conferring any right to use, in advertising, publicity or otherwise, any name, trade name or trademark, or any contraction, abbreviation or simulation thereof; or

(vii) Conferring by implication, estoppel or otherwise upon any grantee any license or other right under any patent, except the licenses and rights expressly granted to such grantee; or

(viii) An obligation upon any grantor to make any determination as to the applicability of any patent to any product of any grantee or any of its ASSOCIATED COMPANIES; or

(ix) A release for any infringement prior to the effective date hereof.

(b) Neither party nor AT&T makes any representations, extends any warranties of any kind or assumes any responsibility whatever with respect to the manufacture, sale, lease, use or importation of any LICENSED PRODUCT, or part thereof, by any grantee, any of its ASSOCIATED COMPANIES, or any direct or indirect supplier or vendee or other transferee of any such company, other than the licenses, immunities, rights and warranties expressly herein granted.

7.05 Neither this agreement nor any licenses or rights hereunder, in whole or in

part, shall be assignable or otherwise transferable.

7.06 Any notice, request or information shall be deemed to be sufficiently given when sent by registered mail addressed to the addressee at its office above specified (and when addressed to WESTERN, to the attention of its Patent Licensing Organization) and any royalty statement shall be deemed to be sufficiently furnished when sent by registered mail addressed to WESTERN'S Treasury Organization at 222 Broadway, New York, New York 10038, or at such changed address as the addressee shall have specified by written notice.

7.07 This agreement sets forth the entire agreement and understanding between the parties as to the subject matter hereof and merges all prior discussions between them and neither of the parties shall be bound by any conditions, definitions, warranties, understandings or representations with respect to such subject matter other than as expressly provided herein, or in any prior existing written agreement between the parties, or as duly set forth on or subsequent to the effective date hereof in writing and signed by a proper and duly authorized representative of the party to be bound thereby.

7.08 The construction and performance of this agreement shall be governed by the law of the State of New York.

IN WITNESS WHEREOF, each of the parties has caused this agreement to be executed in duplicate originals by its duly authorized representatives on the respective dates entered below.

WESTERN ELECTRIC COMPANY, INCORPORATED

By Director of Patent Licensing

Date

[SEAL]

Attest:

Secretary

By Title

Date

[SEAL]

Attest:

Secretary

GENERAL DEFINITIONS APPENDIX

ASSOCIATED COMPANIES of AT&T are The Southern New England Telephone Company, a Connecticut corporation, and its SUBSIDIARIES, Cincinnati Bell Inc., an Ohio corporation, and its SUBSIDIARIES, and SUBSIDIARIES of AT&T other than WESTERN and its SUBSIDIARIES.

ASSOCIATED COMPANIES of the CORPORATION are SUBSIDIARIES of the CORPORATION, companies presently having the CORPORATION as a SUBSIDIARY and other SUBSIDIARIES of such companies.

ASSOCIATED COMPANIES of WESTERN are SUBSIDIARIES of WESTERN.

The CORPORATION'S PATENTS means all patents issued at any time in the United States for:

(i) Inventions made prior to the termination of the FIVE YEAR PERIOD and owned or controlled at any time during the FIVE YEAR PERIOD by the CORPORATION or any of its ASSOCIATED COMPANIES,

(ii) Inventions made during the FIVE YEAR PERIOD, solely or jointly with anyone, and in the course of their employment by employees of any such company who are employed to do research, development or other inventive work, and

(iii) Any other inventions made prior to the termination of the FIVE YEAR PERIOD, with respect to which and to the extent to which any such company shall at any time during the FIVE YEAR PERIOD have the right to grant the licenses and rights which are herein granted by the CORPORATION.

FAIR MARKET VALUE means the NET SELLING PRICE which the CORPORATION or any of its SUBSIDIARIES, whichever effects the sale, lease or use of the product or maintenance part, would realize from an unaffiliated buyer in an arm's length sale of an identical product or maintenance part in the same quantity and at the same time and place as such sale, lease or use.

FIVE YEAR PERIOD means the period commencing on the effective date of this agreement and having a duration of five years.

LICENSED PRODUCT means, as to any respective grantee,

- (i) any product as such, or
- (ii) any product which is any specified combination.

of the kinds listed in section 2.01 or 2.02 of this agreement. Although the term does not mean, and although licenses are not granted for, any other combination, a LICENSED PRODUCT

(iii) shall not lose its status as such on account of, and

(iv) shall not cause an unlicensed combination to infringe the grantor's patents (i.e., WESTERN'S PATENTS or the CORPORATION'S PATENTS, as the case may be) solely on account of, such LICENSED PRODUCT being made, sold, leased or put into use as part of an unlicensed combination.

NET SELLING PRICE means the gross selling price of the ROYALTY-BEARING

PRODUCT in the form in which it is sold, whether or not assembled (and without excluding therefrom any components or sub-assemblies thereof, whatever their origin and whether or not patent impacted), less the following items but only insofar as they pertain to the sale of such ROYALTY-BEARING PRODUCT by the CORPORATION or any of its SUBSIDIARIES and are included in such gross selling price:

(i) Usual trade discounts actually allowed (other than cash discounts, advertising allowances, or fees or commissions to any employees of the CORPORATION, a SUBSIDIARY of the CORPORATION, a company of which the CORPORATION is a SUBSIDIARY at the time of the sale, or any other SUBSIDIARY of a company of which the CORPORATION is a SUBSIDIARY at the time of such sale);

(ii) Packing costs;

(iii) Import, export, excise and sales taxes, and customs duties;

(iv) Costs of insurance and transportation from the place of manufacture to the customer's premises or point of installation;

(v) Costs of installation at the place of use; and

(vi) Costs of special engineering services not incident to the design or manufacture of the ROYALTY-BEARING PRODUCT.

ROYALTY-BEARING PRODUCT means any LICENSED PRODUCT of the kinds specified in section 2.01 of this agreement (other than any LICENSED PRODUCT for which all the licenses granted in this agreement are at a royalty rate of zero percent (0%)), and any maintenance part therefor,

(i) Which upon manufacture includes, or the manufacture of which employs, any invention of any of WESTERN'S PATENTS in force at the time and place of such manufacture, or

(ii) Which includes when sold, leased or put into use, or the use of which employs, any invention of any of WESTERN'S PATENTS in force at the time and place of such sale, lease or use,

other than:

(iii) Inventions under which the United States Government holds a royalty-free license if such LICENSED PRODUCT or part is contracted for, directly or indirectly, by the United States Government, or by another national government with funds derived through the Military Assistance Program or otherwise through the United States Government, and

(iv) Inventions employed in the manufacture of, or included in, such LICENSED PRODUCT or any original part thereof, or such maintenance part therefor or any original part thereof, by a direct or indirect supplier of the CORPORATION or any

of its SUBSIDIARIES, but only to the extent such supplier has exercised its own licenses granted by WESTERN under patents for such inventions to so employ or include said inventions.

SUBSIDIARY means a company the majority of whose stock entitled to vote for election of directors is now or hereafter controlled by the parent company either directly or indirectly, but any such company shall be deemed to be a SUBSIDIARY only so long as such control exists.

WESTERN'S PATENTS means all patents issued at any time in the United States for:

(i) Inventions made prior to the termination of the FIVE YEAR PERIOD and owned or controlled at any time during the FIVE YEAR PERIOD by AT&T, WESTERN or any of their SUBSIDIARIES,

(ii) Inventions made during the FIVE YEAR PERIOD, solely or jointly with anyone, and in the course of their employment by employees of any such company who are employed to do research, development or other inventive work, and

(iii) Any other inventions made prior to the termination of the FIVE YEAR PERIOD, with respect to which and to the extent to which any such company shall at any time during the FIVE YEAR PERIOD have the right to grant the licenses and rights which are herein granted by WESTERN;

provided, however, that said patents do not include those issued for inventions made by employees of any SUBSIDIARY of WESTERN or AT&T exclusively engaged in the performance of contracts with the Energy Research and Development Administration of the United States.

[41 FR 28699, July 12, 1976, as amended at 50 FR 47549, Nov. 19, 1985]

§68.506 Configurations used to connect multi-line communications systems such as Private Branch Exchange (PBX) and key telephone systems.

Any of the jack configurations specified in §68.502, used singly, in multiple combinations, or combined in common mechanical arrays, may be used as the interface between multi-line equipment such as PBX and key telephone systems, and the telephone network. The telephone company and installation supervisor may mutually agree to use electrical connections alternative to those specified in §68.502.

[43 FR 16501, Apr. 19, 1978]

PART 69—ACCESS CHARGES

Subpart A—General

Sec.

- 69.1 Application of access charges.
- 69.2 Definitions.
- 69.3 Filing of access service tariffs.
- 69.4 Charges to be filed.
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- 69.105 Carrier common line for non-price cap local exchange carriers.
- 69.106 Local switching.
- 69.108 Transport rate benchmark.
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- 69.113 Non-premium charges for MTS-WATS equivalent services.
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- 69.117 Lifeline assistance.
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- 69.151 Applicability.
- 69.152 End user common line for price cap local exchange carriers.
- 69.153 Presubscribed interexchange carrier charge (PICC).
- 69.154 Per-minute carrier common line charge.
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- 69.302 Net investment.