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TERMINAL ATTACHMENT PROGRAM PROGRAM APPLICATION NOTES

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TELECOMMUNICATION REGULATORY SERVICE

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TERMINAL ATTACHMENT PROGRAM
APPLICATION NOTES

SECTION 1 - GENERAL

1.1 INTRODUCTION

These Program Application Notes are intended to assist in the interpretation of the Procedure and Standards associated with the Terminal Attachment Program.

1.2 CONTENT

These Application Notes provide descriptions of categories of terminal devices and interpretive information concerning parameters and testing methods. The Terminal Attachment Program Advisory Committee (TAPAC) has approved the network interface function approach as a replacement for the categories of terminal devices. This approach may be used as an alternative to specific categories.

Information initially published in these Application Notes will be incorporated into future issues of the standards.

1.3 DEVELOPMENT

The detailed information contained in these Notes will be developed by the Department in consultation with representatives of the participating provincial governments, federally regulated carriers, equipment supply and user organizations.

1.4 APPROVAL

Final acceptance of the material content of these Notes is given by the Terminal Attachment Program Advisory Committee. This Committee is composed of representatives of the Department, participating provincial governments, federally regulated carriers, equipment supply and user organizations. Revisions are also discussed and accepted in the Committee.

1.5 COMPOSITION

The Program Application Notes document is composed of four sections providing general information about equipment definitions, pertinent explanatory testing information related to CS01 for devices intended primarily for voice transmission, and similar information related to CS02 for data type devices.

1.6 PUBLICATION

The Department published the information in the form of this Telecommunications Regulatory Circular (TRC), titled Terminal Attachment Program Application Notes, on the recommendation of the Advisory Committee.

The Department reissues these Notes from time to time. Each reissue will bear a new Effective Date together with an indication of the date of the old document it replaces. Changes from the previous issue will be indicated. Users should assure themselves that they are in possession of the latest issue. New issues are available from the nearest Regional Office of the Department or from the Telecommunication Regulatory Service at 300 Slater Street in Ottawa.

SECTION 2 - DEFINITIONS

2.1 GENERAL EQUIPMENT DEFINITIONS

2.1.1 PLUGS AND JACKS, JACK-PLUG-CORD ENSEMBLES

Devices used in combination as a portable or permanent connecting arrangement for Certified terminal equipment. The plug is inserted into the jack to establish an electrical connection to the network facilities. Plugs are customer provided and are certified in accordance with Certification Standard CS-01. Under the terms of the Terminal Attachment Program, only pressure-contact type jacks, and jacks associated with adapters or jack-plug-cord ensembles may be customer-provided and these are also certified in accordance with CS-01. Test methods for jack-plug-cord ensembles are outlined in Supplement B.

2.1.2 BRIDGING ADAPTERS

Devices used as a means of electrically connecting Certified terminal equipment to single and multi-line carrier-provided facilities. The devices are certified in accordance with Certification Standard CS-01.

2.1.3 ACOUSTICALLY COUPLED DEVICES

Devices which operate by means of sound waves passing to or from the transmitter and/or receiver in a telephone handset without any physical electrical connection to carrier-provided facilities. The devices are certified in accordance with Certification Standard CS-01.

2.1.4 DATA CIRCUIT-TERMINAL EQUIPMENT (DCE)

The equipment installed at the user's premises which provides (a) all the functions required to establish, maintain and terminate a connection, (b) the signal conversion and coding between the data terminal equipment (DTE) and the common carrier's line, e.g., data set, modem. DCE may be further interpreted as the network side of the DTE/DCE interface.

2.1.5 DATA TERMINAL EQUIPMENT (DTE)

Equipment comprising the data source, the data sink, or both, that provides for the communication control function (protocol). Data terminal equipment is actually any piece of equipment at which a communications path begins or ends.

2.1.6 DATA TERMINAL CONNECTING ARRANGEMENTS

Certified customer-provided data circuit-terminal equipment, including modems or data sets, may be connected to the carrier's network facilities by means of carrier-provided data transmission connecting arrangements as specified in the in-band section of Certification Standard CS-02. These arrangements may include a carrier-provided telephone as required for network addressing purposes and associated interconnection hardware. To enable network maintenance, customer-provided equipment shall not be connected in series between the carrier-provided network interface and any other carrier-provided device.

The following additional conditions also apply to the connection of customer-provided terminal equipment to the carrier's network facilities:

- (a) The equipment shall not be equipped with operable manual or automatic dialing units; all network addressing shall be performed by carrier-provided equipment.
- (b) The equipment shall be connected to those analogue facilities specified in participating carrier tariffs except two-party line service, multi-party line service and public telephone service (pay telephone).

2.2 TERMINAL EQUIPMENT DEVICE CATEGORY DEFINITIONS

2.2.1 AUTOMATIC ANSWERING DEVICES

Devices used, in conjunction with unattended telephones, to answer incoming calls and deliver recorded messages and announcements. These devices are certified in accordance with Certification Standard CS-01.

2.2.2 AUTOMATIC ANSWERING & RECORDING DEVICES

Devices used in conjunction with unattended telephones, to answer incoming calls, deliver pre-recorded messages (optional) and have the ability to receive and store messages from callers to be replayed later. These devices are certified in accordance with Certification Standard CS-01.

2.2.3 TWO-WAY VOICE RECORDERS

Devices used to record telephone communications. Such devices may also be used to transmit pre-recorded messages over carrier facilities. These devices are certified in accordance with Certification Standard CS-01.

2.2.4 DICTATION UNITS (2-WIRE)

Devices used, in conjunction with attended or unattended telephones, to receive and store messages from callers to be replayed later for possible transcription purposes. These devices could be alternatively defined as Automatic Answering and Recording Devices or Two Way Voice Recorders and are certified in accordance with Certification Standard CS-01.

2.2.5 NON-ADDRESSING ALARM REPORTING DEVICES

These devices are generally associated with exchange telephone services of the public switched telephone network (individual line or PBX). Unlike network addressing alarm devices (which dial one or more pre-programmed telephone numbers when an alarm situation is detected, and then transmit audible tones and/or voice signals), these units respond only to incoming calls from the switched telephone network. Such devices are designed and equipped to respond to all incoming call signals and shall restore the line to on-hook on completion. A local alarm condition will control the nature of the transmitted response of the device but shall not control on-hook/off-hook operation. The device may be designed to respond to tone signals from the calling station to select and monitor multiple channels where alarm response may originate. These devices are certified in accordance with Certification Standard CS-01.

2.2.6 GRAPHIC COMMUNICATIONS EQUIPMENT

The equipment is designed for the sending and receiving of hand-written intelligence over network facilities on an analogue voice-band basis. Hand-written information, such as a message or sketch, transcribed at one point, is received at one or a number of points as the message is written or the

sketch is drawn. The terminals may be electrically connected to the carriers' services and facilities as outlined further under "Data Terminal Connecting Arrangements". These terminals are certified in accordance with Certification Standard CS-02.

2.2.7 FACSIMILE

Facsimile terminals send and receive graphic documents over network facilities on an analogue voice-band basis. Reproduction capabilities include written, drawn, typed, half-tone copy of colour graphics, and high resolution photographs. Electrical connection to the Carrier's services and facilities is permitted as outlined under "Data Terminal Connecting Arrangements". These terminals are certified in accordance with Certification Standard CS-02.

2.2.8 BIOPHYSICAL MEDICAL TERMINAL

Equipment used for sending and receiving data pertaining to medical behavioural characteristics for remote patient monitoring and analytical purposes over network facilities on an analogue voice-band basis. The terminal equipment may be electrically connected to the carrier's services and facilities as outlined further under "Data Terminal Connecting Arrangements". These terminals are certified in accordance with Certification Standard CS-02.

2.2.9 MODEMS

A modem is a device which converts digital signals to analogue and vice versa. For the purposes of the Terminal Attachment Program modems operate within the voice frequency band only. Modems may also be referred to as data sets. Record encryption equipment is also considered to be a modem. Customer-provided modems may be connected to the Carrier's facilities as outlined under "Data Terminal Connecting Arrangements".

In general, modems are self-contained units; however, under this category, attachment of any non-addressing terminal which contains an integrated modem is permitted as further defined below.

An integrated modem will perform in the same manner as self-contained units, with the following exceptions: The integrated modem will be mounted on one or more modules which will contain all components (with the possible exception of a power supply). Terminal equipment containing an integrated modem shall bear a notice stating the trade name and model number of the modem together with the certification label issued by the Department for the modem.

Modems are certified in accordance with Certification Standard CS-02.

2.2.10 TRAFFIC MEASURING EQUIPMENT (TME)

The equipment ranges from simple 2-wire devices which provide time or count usage on services such as WATS, to computerized traffic data analysers which provide call detail recording, usage and status recording on entire PBX systems including associated local, toll, FX, tie trunk and CCSA facilities. On-line identification and reporting of circuit or service outages is also a prime feature of some systems. To be eligible for certification, such services and systems shall not be capable of controlling or addressing a carrier-provided PBX and/or its associated station and trunk lines, or any other exchange and inter-exchange services or facilities. This equipment is certified in accordance with Certification Standard CS-02.

2.2.11 BRIDGED CALL RESTRICTION DEVICES

Devices which observe dialled digits to determine whether to permit a call to be completed or not. Such equipment may be associated with the individual telephone lines or PBX trunks in which case calls are denied to all telephones connected to the line or switched to the trunk. By special carrier-provided wiring arrangements, such equipment may also be associated with particular telephone sets in which case calls are denied to those sets and not to other sets connected to the same line. These devices are certified in accordance with Certification Standard CS-01.

2.2.12 LOUDSPEAKER MONITORING DEVICES

These devices are used to provide loudspeaker amplification of telephone conversations placed over an associated telephone set. Both sides of the conversation are amplified over the loudspeaker to provide for group listening or monitoring. No amplification is provided for transmission to the network. These devices are certified in accordance with Certification Standard CS-01.

2.2.13 HANDSFREE LOUDSPEAKING DEVICES

These are network non-addressing devices which enable the user, or small group of individuals, to carry on a pre-established telephone conversation while the associated telephone handset remains in the on-hook position. The equipment consists of integrated or separately mounted microphone and loudspeaker units which are usually designed to permit transmission in only one direction at a time as

controlled by a switching arrangement. These devices are certified in accordance with Certification Standard CS-01.

2.2.14 HOTEL/MOTEL MESSAGE REGISTERS

Devices which record a completed outgoing call count for calls terminating within a local exchange area and associated with each extension line.

To be eligible for certification, such devices shall not be capable of controlling or addressing a carrier-provided PBX and/or its associated station and trunk lines, or any other exchange and inter-exchange services or facilities. These devices are certified in accordance with Certification Standard CS-02.

2.2.15 SINGLE-LINE HOLD

Devices used with single-line telephones which, when manually operated, enable the user to temporarily replace the handset in a pseudo-on-hook position without effecting call disconnection. While the device is activated, information may be obtained in privacy or the call may be transferred to another telephone on the same line. Removal of any handset on the line from its "on-hook" position automatically deactivates the hold condition. These devices may be optionally equipped with a lamp indication of the on-hold condition. These devices are certified in accordance with Certification Standard CS-01.

2.2.16 AUDIO INPUT ON SINGLE-LINE HOLD

Equipment enabling music or voice messages to be delivered to calling parties while the line is in the hold condition. The audio source is activated and deactivated under control of the hold device.

To be eligible for certification, the audio source and the hold device must either both be submitted for certification testing, or the hold device must comply with the following:

- (a) The level control of the audio source is capable of being adjusted so that the signal level at the network interface does not exceed -9dBm (3 second average), regardless of the input level from the music source (radio, tape recorder, wired music, etc.)
- (b) The level control of the audio source cannot be readily accessed and readjusted by a user.

These devices can be certified in accordance with Certification Standard CS-01. These devices shall, when certified, bear a DOC label for each separate device forming part of the total unit submitted for certification.

2.2.17 AUDIO INPUT ON MULTI-LINE HOLD

Equipment enabling one or more source(s) of music or voice messages(s) to be delivered to calling parties while the line(s) are in the hold condition. The audio source(s) are activated and deactivated under control of the hold device.

If intended for manual operation only, the equipment may be submitted for testing as an individual unit and so certified. If intended for automatic operation, the equipment must be submitted for testing together with its supporting automatic hold and automatic answering equipment. To be eligible for certification, the audio source and the hold device must either both be submitted for certification testing, or the hold device must comply with the following:

- (a) The level control of the audio source is capable of being adjusted so that the signal level at the network interface does not exceed -9dBm (3 second average), regardless of the input level for the music source (radio, tape recorder, wired music, etc.).
- (b) The level control of the audio source cannot be readily accessed and readjusted by the user.

When intended for use with carrier-provided key systems, this equipment shall not be connected in series with the carrier provided key systems nor shall this equipment be capable of initiating via A & A1 leads visual supervisory signals other than those which are proprietary to the system.

This equipment is certified in accordance with Certification Standard CS-01 and the requirements for A & A1 leads as defined in TRC-52. These devices shall, when certified, bear a DOC label for each separate device forming part of the total unit submitted for certification.

2.2.18 NETWORK NON-ADDRESSING TELEPHONE (NO DIAL)

A telecommunications terminal device which has the capability to:

- (a) Respond to a ringing signal from the carrier's network with an audible or visual indication, and
- (b) Change to an off-hook mode by manual operation, and

- (c) Convert real-time voice and voiceband analog electrical signals suitable for transmission over the telephone network and convert received voiceband analog electrical signals into acoustic signals (acoustic input and output signals are conveyed by a handset), and
- (d) To change from an off-hook mode to an on-hook mode upon completion of a call in response to a manual operation, but
- (e) Does not have the capability to address the carrier's network.

The equipment is certified in accordance with Certification Standard CS-01 and the live speech signal power requirements outlined in CS-03.

2.2.19 SLOW SCAN/FRAME FREEZE TV TERMINALS

Devices used for sending and receiving television picture information over the public switched network.

At the non-network port, Frame Freeze Terminals must conform to EIA RS170 and Slow Scan Terminals must conform to EIA RS 232.

This equipment is certified in accordance with Certification Standard CS-02 and is tested using a camera forming part of the system or with an input signal per EIA RS170.

3. EXPLANATORY TESTING INFORMATION FOR CS-01

3.10 EXCEPTIONS

3.11 TRANSMITTED TONE SIGNALS

Tone signals which are transmitted for alerting purposes, whether automatically initiated in short bursts of less than 3 seconds, or manually initiated, by voice terminal equipment such as answer/record machines, shall comply with Section 3.4.1.1 as follows:

- Paragraph (1) shall not apply (3 second average)
- Paragraph (2) shall apply (250 ms average).

3.12 CALL RESTRICTORS (BRIDGED CONNECTIONS)

The following exemptions to requirements and modifications to testing methods apply in the application of CS-01, Issue 2.

- (A) For Call Restrictors with off-hook and on-hook resistance and impedance characteristics;
- (1) The normal order for applying tests shall be amended such that the tests of CS-01 Section 3.10 be applied immediately following those of Section 3.1 but preceding those of Section 3.2.
 - (2) In CS-01 Section 3.10, the 200 ohm upper resistance limit in Figure 3-10(a) does not apply.
 - (3) The following test method replaces that of CS-01 Section 3.10.2 and is used to determine the "holding" current. In all off-hook (or restrictive) modes of operation the average "holding" current must be used in the tests of CS-01 in place of the values specified.

TEST METHOD TO DETERMINE "HOLDING" CURRENT

1. Connect the terminal equipment to the circuit of Figure 3.12(a) as shown below.
2. Place Switch S1 in position "a".
3. Operate the dc feed and dial circuits to bring the terminal equipment into a restricting mode.
4. Vary the voltage of the dc feed circuit to determine the minimum and maximum "holding" current, as well as two values between these limits and plot them on a graph similar to CS-01 Figure 3-10(a) Calculate the average "holding" current and voltage point for these readings.
5. Repeat steps 3 and 4 with switch S1 in position "b".
6. Adjust the dc feed circuit to supply the average "holding" current and voltage determined in step 4.
7. Connect the terminal equipment as shown in CS-01 Figure 3-10(b) with the dialing circuit Figure 3.12(c) connected across the dc feed circuit. Operate the dc feed and dial circuits to place the terminal equipment in an off-hook or restricting mode at the "holding" current as determined in step 4 above.
8. Record the leakage current readings for the four combinations of S1 and S3 as in Figure 3-10(b) CS-01.

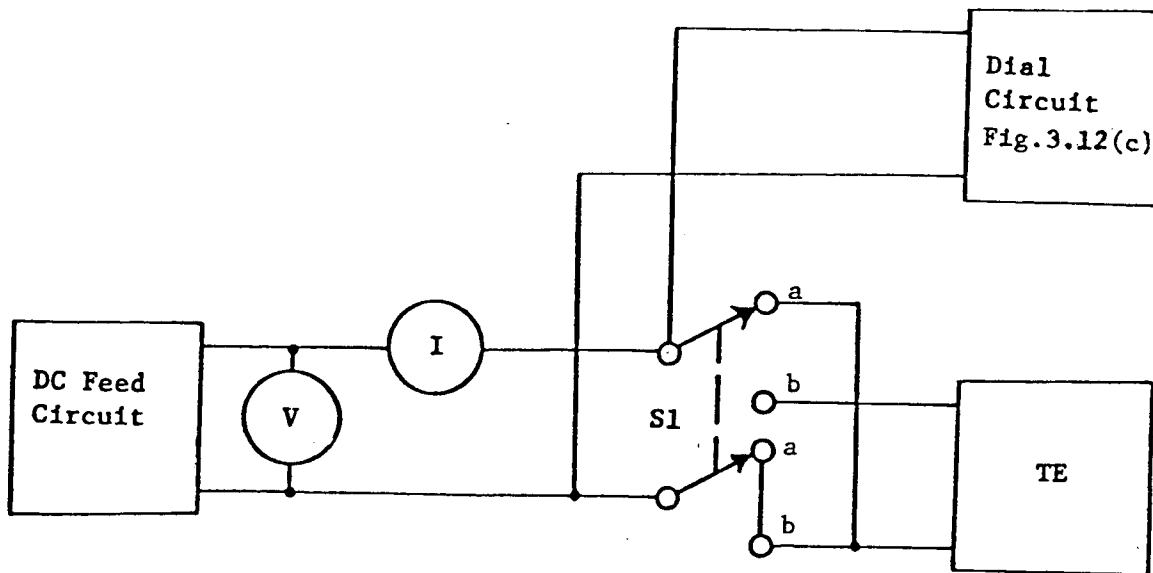


Figure 3.12(a)
Off-Hook Longitudinal Resistance

- (4) With respect to CS-01 Section 3.8; the requirements of CS-01 Section 3.8.1.1 1) do not apply. The requirements of CS-01 Section 3.8.1.1 2) shall be determined using the amended test method which follows.

Rationale for test method given below:

The following test method will identify and permit the acceptance of high impedance call restrictor devices which will not adversely affect the network when bridged across an off-hook telephone set. This test method will also identify low impedance call restrictor devices which cause the return loss to fall below 3dB. Such devices are not acceptable.

In Summary:

$$\text{Return Loss } 20 \log_{10} \left| \frac{Z + Z_x}{Z - Z_x} \right| = 20 \log_{10} \left| \frac{2Z + \Delta Z}{\Delta Z} \right|$$

Where $Z =$ impedance of standard termination
($600\Omega + 2.16 \mu\text{F}$)

$Z_x =$ impedance of call restrictor

$$\Delta Z = |Z - Z_x|$$

The acceptance - rejection criteria for call restrictors tested by this method are:

1. If $Z_x \geq Z$ ACCEPT
 ie. $Z_x = Z + \Delta Z$ (call restrictor impedance equals that of the standard termination or exceeds it by an amount ΔZ .)
2. If $Z_x < Z$ REJECT
 ie. $Z_x = Z - \Delta Z$ (call restrictor impedance is less than that of the standard termination by an amount ΔZ)

Test Method

1. Connect the test circuit as shown in figure 3-12(b) below.
2. Arrange the return loss test set to measure single frequency return loss against 600 ohms in series with 2.16 μ F.
3. Operate the dc feed and dial circuits to bring the terminal equipment off-hook and adjust to the average "holding" current as determined in the amended testing method for CS-01 Section 3.10.2.
4. Vary the oscillator frequency slowly from 200 Hz to 3500 Hz and record the minimum return loss and the frequency at which it occurs. If the 3dB requirement in CS-01 Section 3.8.1.1 2) is met at this time, this test is complete.
5. If the terminal equipment does not meet the 3 dB specification, determine if the $Z + (\Delta) Z$ or $Z - (\Delta) Z$ condition exists by means of an external variable impedance on the return loss test set.
6. The requirement of CS-01 Section 3.8.1.1 2) as applied to call restrictor devices is met if the variable impedance is greater than the 600 ohm and 2.16 μ F specification.
7. The requirement of CS-01 Section 3.8.1.1 2) as applied to call restrictor devices is not met if the variable impedance is less than the 600 ohm and 2.16 μ F specification.

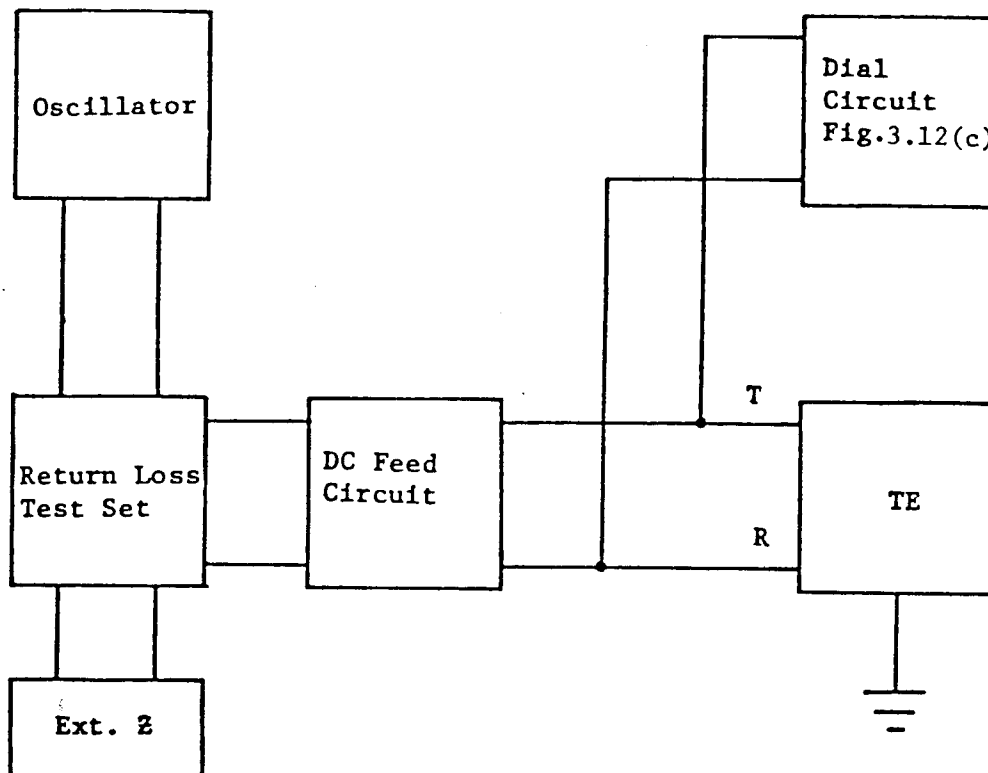
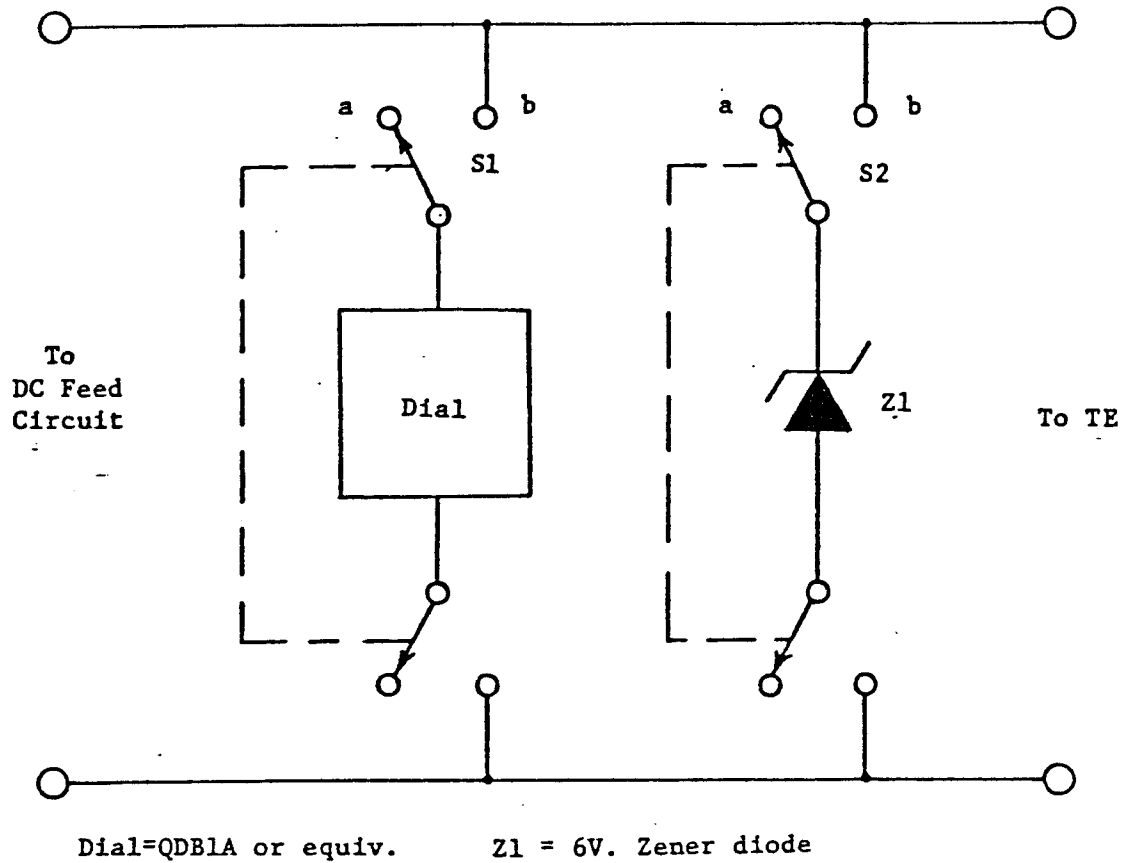


Figure 3.12(b)

Return loss

- (B) For Call Restrictors which operate in an on-hook mode and which have two operating states, (a non-restrictive state and a restrictive state);
- (1) The requirements of CS-01, Section 3.2.1 shall apply in the non restrictive state only.
 - (2) CS-01, Section 3.4 shall apply in the restrictive, state when the dc voltage at the network interface does not exceed 35 Vdc.
 - (3) For the remaining parameters only those associated with on-hook requirements shall apply.



1. Set DC Feed voltage to 50V.
2. Switch S1 to position "b", and dial number(s) necessary to activate the T.E.
3. Set S2 to position "b".
4. Set S1 to position "a".
5. Set DC Feed voltage to V_z .
6. Set S2 to position "a".

Figure 3.12(c)

Dial Circuit

3.13 HANDSFREE LOUDSPEAKING DEVICES

3.13.1 INTRODUCTION

This class of NNAD terminal equipment shall be certified per CS-01 using the test method described herein to measure transmit loudness rating. While this is not a direct measure of speech signal power, it is a viable alternative and has the advantage of being a standardized test method for which the performance of typical types of apparatus is known.

The requirement of CS-01 section 3.4.1.1 (In-Band Transmitted Signal Power) is deemed to be met if the Transmit Objective Loudness Rating (TOLR) as defined in IEEE Std P661/D5 and modified herein for a handsfree loudspeaking device does not exceed the following limits, when determined as specified in the method of measurement described herein.

TABLE 1

d.c. Current	Loudspeaking TOLR shall not exceed (See Note)
70 ma. or maximum current whichever is less	-53 dB
20 ma.	-57 dB

Note: The TOLR figures represent maximum loudness limits. A handsfree "loudspeaking" device with a TOLR of -51 dB is less loud than one with a TOLR of -52 dB.

Demonstration of the compliance of handsfree loudspeaking devices with the following requirements of CS-01 shall be performed using an acoustic input signal as defined in CS-01 Appendix A, with the sound pressure at the test sample microphone location adjusted to -26 dB Pa. The procedure in section 3.13.2.2 below shall be followed when applicable.

CS-01 SECTION

TITLE

3.3.2	Longitudinal AC Signals
3.4.2	Out-of-Band Transmitted Signal Power
3.5	Single Frequency Restrictions

3.13.2 MEASUREMENT OF TRANSMIT LOUDNESS OF HANDSFREE LOUDSPEAKING DEVICES IN ACCORDANCE WITH IEEE STDS. 269-1971 AND P661/D5

3.13.2.1 EXCEPTIONS TO IEEE STANDARD METHOD

These tests shall be undertaken in accordance with IEEE Standard 269-1971 and P661/D5. The following changes apply to IEEE Standard 269-1971:

a) Section 4.2

A loudspeaker may be substituted for the artificial mouth when the manual point-by-point method is used (See section 3.13.2.3 below).

b) Section 4.2.1

The artificial mouth calibration position shall be 50 cm beyond the reference plane (lip ring) instead of 0.3 inches. Figure 3 shall be interpreted accordingly, for these tests.

c) Section 5.2.1

A free space average sound pressure level of -26dB Pa shall be used at the above calibration position.

d) Section 4.5

An "M" type microphone shall be used per ANSI S1.12-1967 (R1972) instead of the "L" type specified for calibration and shown in Fig. 3 of IEEE Std. 269-1971. Alternatively a correction factor may be applied to the readings obtained with the L type microphone.

e) The dc feed circuit described in figure 3-11 (b) of CS-01 shall be used in place of the dc feed circuit and loop shown in IEEE Std. 269-1971.

3.13.2.2 DEFINITION OF TEST CONFIGURATION

An anechoic chamber or otherwise reflection-free space is preferred for acoustic measurements of handsfree loudspeaking devices. If this is not available, a reasonably anechoic environment can be assumed if the reverberation radius of the space (distance from the sound where direct and reflected energies are equal) is greater than the distance from sound source to microphone.

Practically, for measurements at 50 cm as specified in this test method, less than 1 dB measurement error will be incurred in a room having volume of minimum 300 m³ and an average sound absorption coefficient of minimum 0.15; ie a large, average-to-medium dead room.

If the absorption properties of the room are not known, they may be assessed as follows. Use a small microphone or microphone probe to measure the decrease in the level of filtered random noise, in a 1/3 or 1 octave band-centred at 250 Hz, as a function of distance from the artificial mouth. Reflections in normal rooms have the greatest effect on measurement accuracy at 250 Hz.

Under anechoic conditions, a decrease in the sound level of 6 + 1 dB should be observed when measured at 60 cm from the sound source (lip ring) in comparison to the level measured at 30 cm.

The source reference point position for TOLR measurements is defined in IEEE Standard P661/D5 to be 25 mm in front of the lip ring of the artificial mouth. However, for handsfree loudspeaking devices, a 50 cm calibration point is preferred, since it establishes the sound pressure at the microphone of the test sample, and minimizes measurement errors introduced by diffraction effects or by location of the microphone port relative to the virtual source position of the artificial mouth. Thus, to calculate

$$\text{TOLR} = 20 \log \frac{V_T}{S_M}$$

the sound pressure S_M at the 25 mm reference point in the Standard is assumed to be 0 dB Pa, when set to be -26 dB Pa at 50 cm (due to the inverse square pressure differential with 20X distance from the mouth).

The location of the device under test is in accordance with CCITT Green Book, Volume 5, Question 17/XII, Annex 1. See Figure 1. Note that in the CCITT test method, the device is placed on a one meter square table for the measurements.

Certain handsfree loudspeaking devices use level-adjusting circuits which adjust transmit gain in proportion to either talking level (AGC) or room noise or both by selectively differentiating between the dynamic characteristics of speech and

noise. Because the normal sweep signals used to calculate TOLR in the standards more closely approximate the relevant characteristics of background noise than speech, it is necessary to compensate for effects of these circuits. One obvious method is to disconnect AGC circuits in the transmit path and test the device at "normally maximum" device gain. A second procedure is to sweep or pulse the signal at the syllabic rate of speech (period of approximately 200 ms including off intervals which can usually be a small fraction of this period). In any event, either method will require assistance from the manufacturer to modify the device or to construct a suitable test signal.

The presence of these circuits can be detected by switching the acoustic signal slowly (1 second period) between two levels approximately 10 dB apart. Any change in level of the electrical signal transmitted by the handsfree loudspeaking device in any intervals between switching incidences is indicative that these circuits are in use in the equipment under test.

3.13.2.3 TEST METHOD

- 1) Locate the test equipment in a reasonably anechoic environment at least one metre from any reflecting surfaces and where the ambient noise level is less than -46 dB Pa. A reasonably anechoic environment can be achieved as described in Section 3.13.2.2.
- 2) Adjust the sound pressure level at the output of the artificial mouth to be -26 dB Pa when measured on the center axis 50 cm beyond the lip ring in free space. See Section 3.13.2.2.
- 3) Connect the equipment as shown in Figure 2B of IEEE Std. 269-1971 with the following exceptions:
 - a) The DC Feed Circuit shall be as shown in Figure 3-11 (b) of CS-01 with the dc current set to the values shown in Table I of this document.
 - b) Delete the Loop between the Speech Network and DC Feed Circuit. The Loop is to be replaced by a direct connection.

- 4) Position the handsfree loudspeaking device as shown in Figure 1.

(Ref. CCITT document listed in 3.13.2.2 above.)

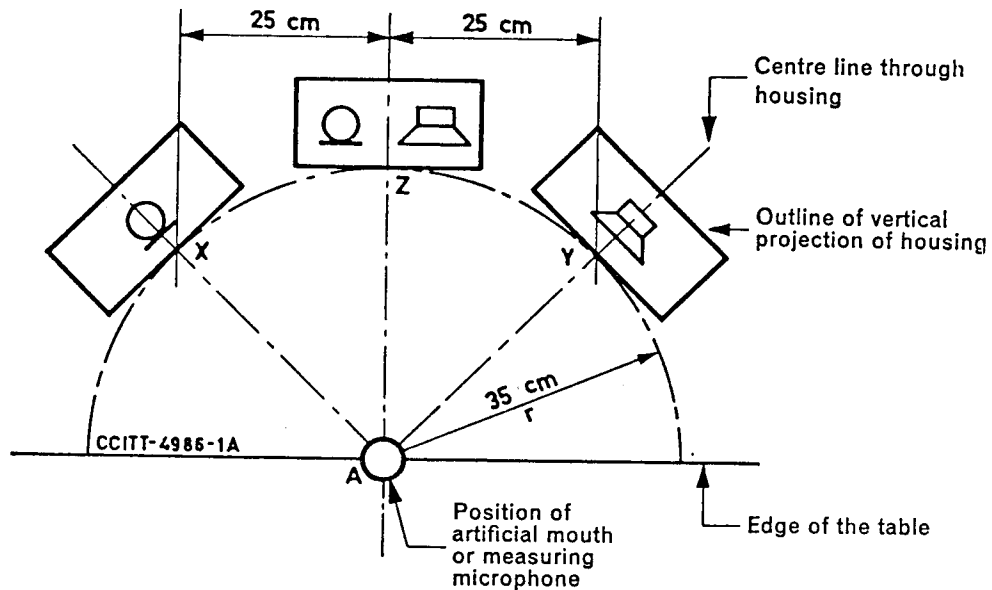


FIGURE 1

Notes to Figure 1:

1. Table should have a hard surface (e.g. polished hardwood) and be not less than 1 square metre in area.
2. All dimensions shown in the figure are parallel to the table surface.
3. The microphone position of loudspeaking telephones should occupy position Z.
4. The centre of the edge of the front of the box should be tangential to a circle of 35 cm radius.
5. The equivalent lip position of the artificial mouth at A is in alignment with the table edge and 35 cm above it. It should be positioned such that its axis passes through the centre of the box housing the microphone.

- 5) Before the following measurements are made it must be determined whether noise adjustment, automatic gain control (AGC) or other gain adjusting circuits exist in the transmit path of the device under test. A procedure for detecting these circuits and a recommended alternate course of action (which replaces (6) if these circuits are found to exist) is covered in Section 3.13.2.2.
- 6) Use either of the measurement methods described in section 4 or 5 of IEEE Std. P661/D5 to determine the TOLR rating of the handsfree "loudspeaking" device.
- 7) The amplitude frequency characteristic described in section 5 of IEEE Std. P661/D5 may be obtained by either:
 - 1) Automatic frequency sweep as described in IEEE Std. 269-1971.
 - 2) Manual point-by-point measurements in the frequency band 300 to 3300 Hz, including either:
 - a) at least 31 frequencies on a linear frequency scale.
 - b) at least 12 frequencies on a logarithmic frequency scale.

(Ref. IEEE Std. P661/D5 Note on Page 23)

SECTION 4 - EXPLANATORY TESTING INFORMATION FOR CS02

4.10 FACSIMILE

4.11 INPUT SIGNAL

The IEEE Test Chart 167A-1975 contains a suitable pattern (Figure 7 and 8) for transmission power level measurements since the percentages of black and white signals are defined.

The facsimile equipment should be conditioned to scan the test pattern repetitively so that transmit state power level measurements can be made.

4.20 MODEM

4.21 INPUT SIGNAL

Modems shall interface with the test message generator in accordance with one of the following specifications:

- (a) EIA RS-232C
- (b) MIL - 188C
- (c) CCITT - V24

Equipment which does not utilize one of the above interface configurations must be supplied with a pair of suitable adaptors which will be retained by the Department of Communications.

Test Patterns:

CS-02 Section 3.4, Power Limitations, will be met under all conditions of input test patterns as follows:

- a. All ones
- b. All zeros
- c. Alternating ones and zeros.

4.30 TRAFFIC MEASURING EQUIPMENT (TME)

4.31 EXCEPTIONS

The following exceptions apply in the application of CS-02:

(A) Passive Monitoring TME:

1. The TME shall not transmit any in-band signal power in any mode. (The requirements of Section 3.3 (Extraneous AC Signals) will apply here).
2. The TME shall comply with the on-hook requirements only of CS-02 in any operating state.
3. The TME shall not operate in an off-hook mode. Hence the off-hook requirements of CS-02 do not apply.

(B) TME which sends timing tones:

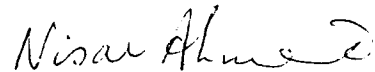
1. The off-hook requirements in the following sections of CS-02 shall apply during the transmission of the timing tones:
 - Extraneous signals (Sections 3.2 and 3.3)
 - Transmitted Signal Power (Section 3.4)
 - Single frequency restrictions (Section 3.5)
 - Longitudinal Balance (Section 3.6)
 - Terminal Impedance (Section 3.8)

Note: The off-hook resistance requirement does not apply. The TME shall meet on-hook resistance requirements in all states of operation.

4.40

OTHER DEVICES

Where not specifically defined in this application note, an appropriate input signal for data circuit terminal equipment shall be a matter of discussion between the Department and the applicant. A copy of an agreed method and supplementary test equipment list will be placed in the Department files. This material will not be treated as proprietary information by the Department.



Nisar Ahmed,
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TERMINAL ATTACHMENT PROGRAM

METHODS OF CONNECTION PROVIDED BY FEDERALLY
REGULATED CARRIERS FOR
D.O.C. CERTIFIED DATA
COMMUNICATIONS EQUIPMENT
AND BRIDGED CALL RESTRICTION DEVICES

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- 9 dBm Output Permissive Connection Method...	3
- 4 dBm Output Fixed loss Loop Connection Method..	5
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Miniature Six Position and Eight Position Jacks - Schematics.....	12
Private Line, Multicom II and Traffic Measuring Equipment.....	14
Connection of Customer Provided Call Restrictors.....	15

ALL NETWORK CONNECTION CONFIGURATIONSGENERAL COMMENTS:

- 1) The supplier is responsible for providing a compatible plug-ended cord for the certified data equipment.
- 2) The output power level of the data equipment must not be easily alterable by the customer above those limits specified in CS-02.
- 3) A standard dial or DTMF telephone set or the TAP telephone set are the normal offerings under TAP *. If the data equipment requires another type of telephone this will be treated on a special assembly basis. Connection of data equipment between the telephone line and the telephone set is not permitted under TAP.
- 4) Network interface jacks are provided in accordance with the Tariffs.

(*) The TAP Telephone only is offered by B.C. Telephone.

PUBLIC SWITCHED NETWORK CONNECTION CONFIGURATIONGENERAL COMMENTS

- 1) Voice and data grades of service apply for both business and residential locations.
- 2) The wiring and colour codes used by the Federally regulated carriers are identical to those used in the United States under the FCC program.
- 3) Data grade lines are conditioned to provide an acceptable data performance at 2400 bps when carrier standard data sets are used.

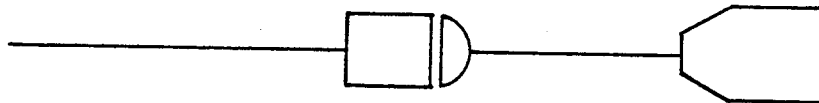
-9 dBm OUTPUT PERMISSIVE CONNECTION METHOD

- The output of the data equipment is fixed at a maximum of -9 dBm.
- A miniature six position, four contact jack is used. These are the same type of jacks which are being installed for Phonecentre applications and in all B.C. Telephone Service Areas.
- The telephone company provides a voice grade line only.
- The six position plug will also fit into an eight position jack. Tip and ring connections appear at contacts five and four respectively of the 8 position jack.
- In areas serviced by CN Telephone and Bell Canada, business installations and installations in non-Phonecentre areas will not be provided with the miniature six position Phonecentre jack. A four prong 404B type jack will be provided instead and customers may have to provide a certified AH conversion plug.

PERMISSIVE ARRANGEMENTS

- Without Telephone - Terminate Only Data Equipment (no telephone) or Non-Adjacent Telephone (i.e. the phone is in a different location).

Voice
Grade
Line

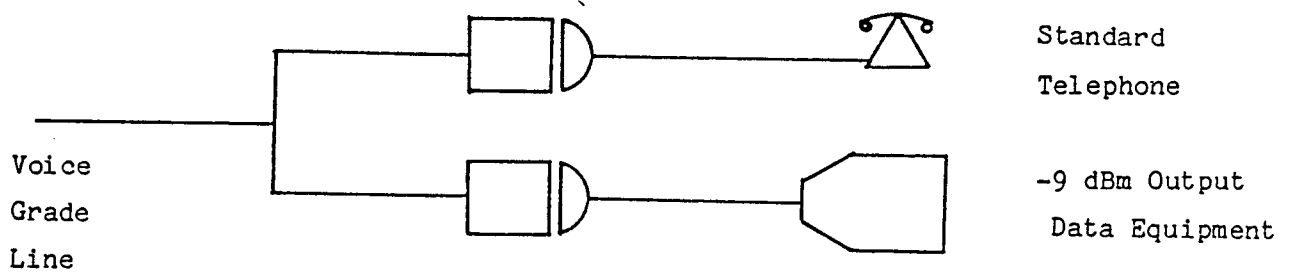


-9 dBm Output
Data Equipment

Miniature
Six position Four Contact
or 404B Jack and Plug

PERMISSIVE ARRANGEMENTS (Continued)

- With Standard Telephone



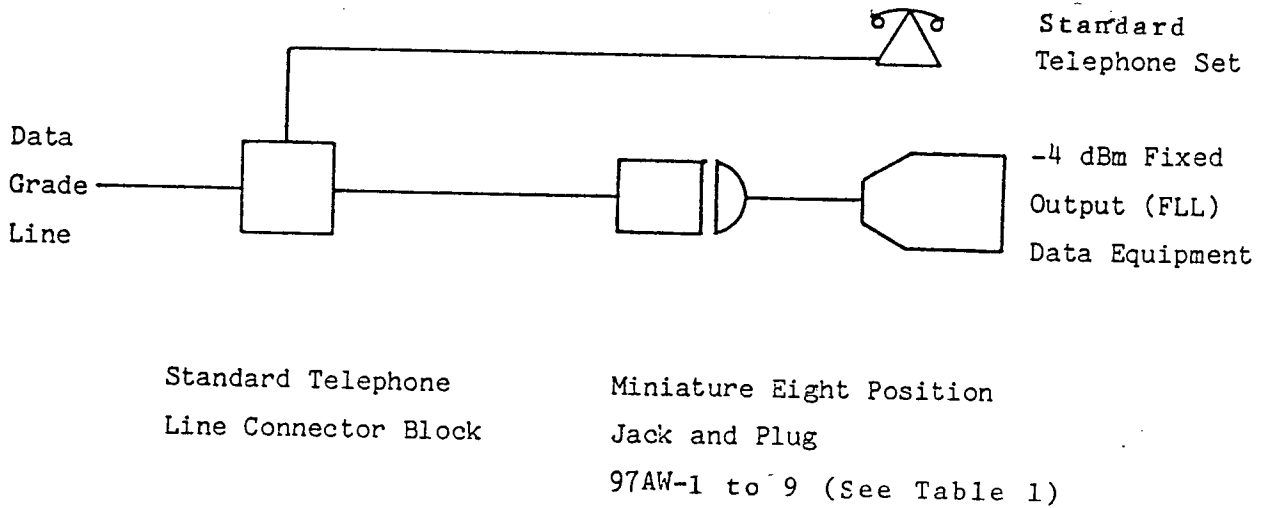
Miniature
Six Position Four Contact
or 404B Jack and Plug

-4 dBm OUTPUT FIXED LOSS LOOP CONNECTION METHOD

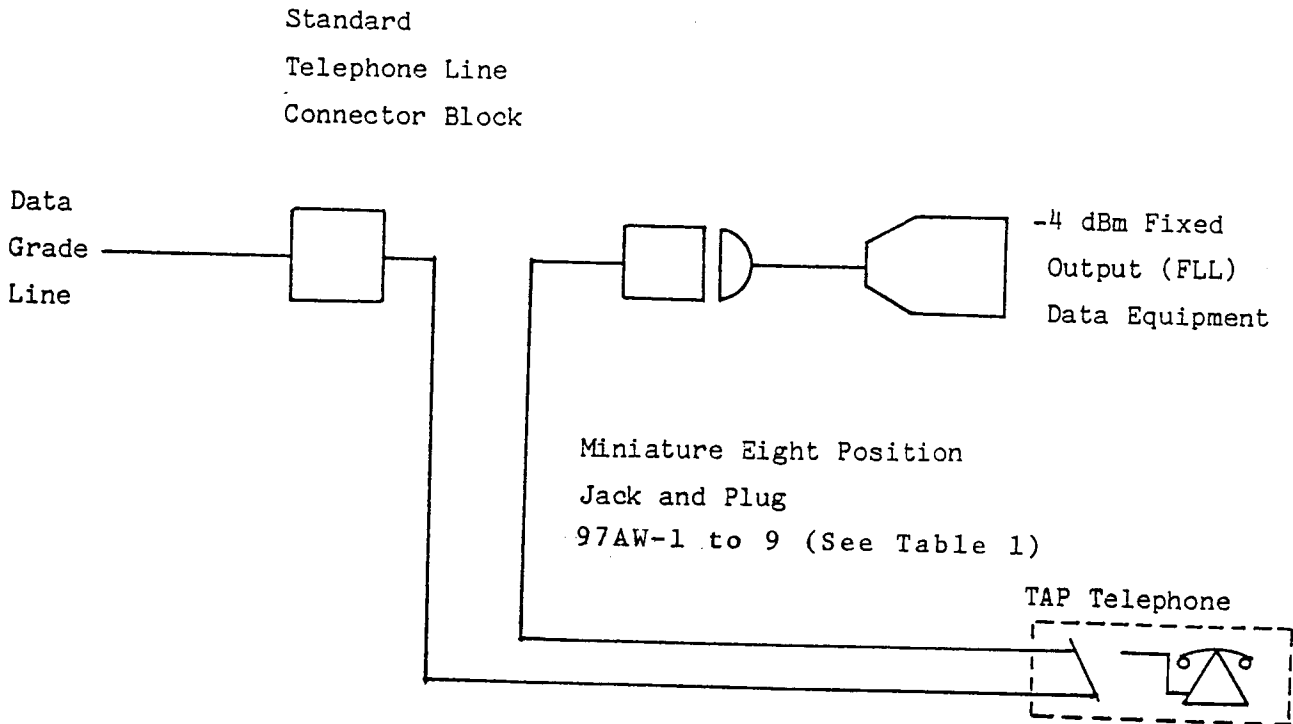
- The output level of the data equipment is fixed at -4 dBm.
- A universal data jack is provided with the switch set to FLL (Fixed Loss Loop). All input and output signals pass through the resistive pad. The value of the resistive pad is selected by the carrier company so that the output signal level of the data equipment after passing through the local loop is a maximum of -12 dBm at the MDF (main distribution frame) of the serving central office. The corresponding programming resistor is included to permit a programmed data set to be used.
- The carrier company will provide a data grade line up to the line side of the jack.

FIXED LOSS LOOP ARRANGEMENTS

- with standard Telephone
- N.B. - Not a B.C. Telephone service offering



- With TAP Telephone



7
FIXED LOSS LOOP ARRANGEMENTS

No Telephone

Data
Grade
Line



-4 dBm
Output (FLL)
Data Equipment

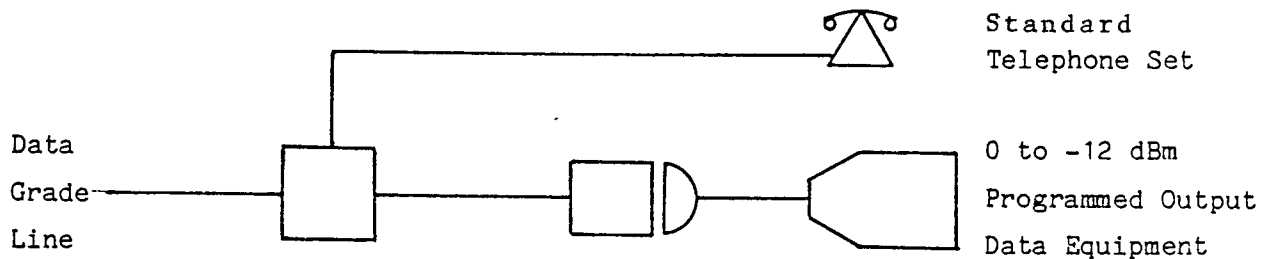
Miniature Eight Position
Data Jack and Plug
97AW-1 to 9 (See Table 1)

PROGRAMMED OUTPUT CONNECTION METHOD

- The output level is adjusted internally by the data set from 0 to -12 dBm depending on the value of the programming resistor.
- A universal data jack is used, with the switch set at PROG (Programmed) position. The telephone company measures the loss of the local loop and installs the jack containing the correct programming resistor. The data equipment uses the resistor to adjust the output signal level to a maximum level appropriate to provide -12 dBm at the MDF (main distribution frame) of the serving central office, after passing through the local loop. The correct value of pad is also included to permit a -4 dBm, FLL data equipment to be used.
- The telephone company will provide a data grade service at terminals 4 & 5 of the jack when the switch is in the PROG position.

PROGRAMMED ARRANGEMENTS

- With Standard Telephone



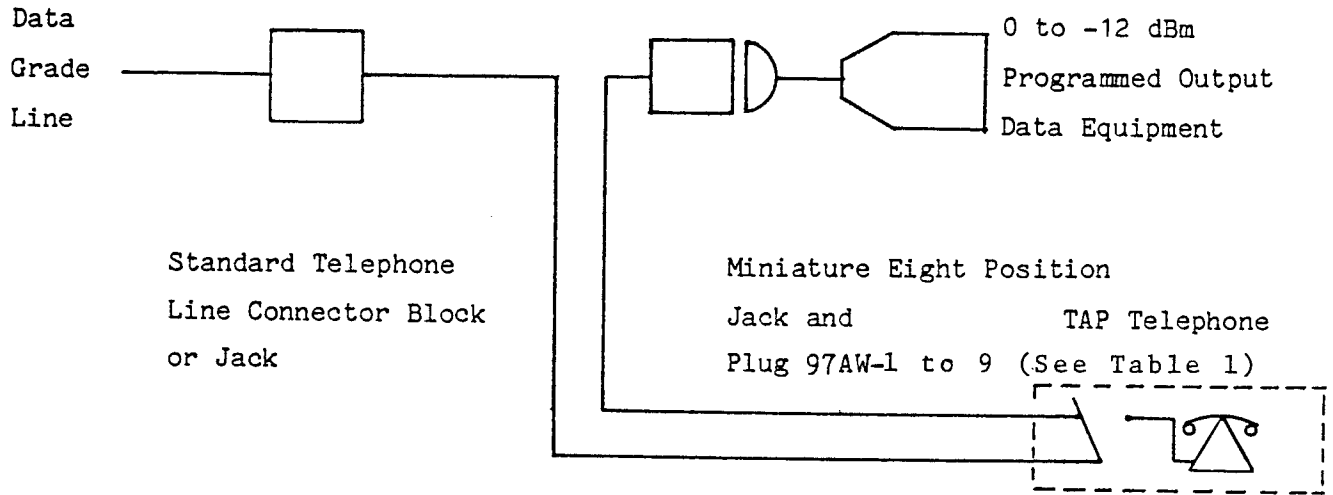
Standard Telephone
Line Connector Block

Miniature Eight Position
Data Jack and Plug
97AW-1 to 9 (See Table 1)

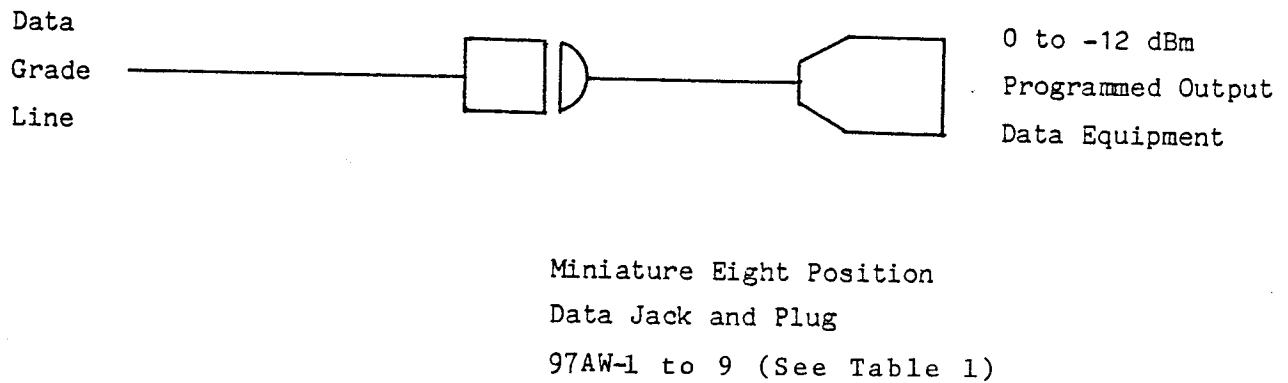
N.B. - Not a B.C. Telephone service offering

PROGRAMMED ARRANGEMENTS (continued)

- With TAP Telephone



- No telephone



TAP TELEPHONE SET

The TAP telephone was developed as an equivalent to the USOC RTC telephone set (eg. W.E. 503), without the aural monitoring feature. The modified exclusion key reduces the loading effect of the telephone set on the data equipment by disconnecting the telephone, other than the ringer, when data is being transmitted. It also eliminates the loading that a standard telephone set would experience from the pad in the universal datajack.

Dial and DTMF versions are available for use with the fixed loss loop and programmed connection methods.

The TAP telephone is ordered as TCS 1152 U1, list 1 or List 2 where List 1 is dial and List 2 is DTMF. The option of "telephone set controls line" or "data set controls line", and "switchhook indication only" must also be specified.

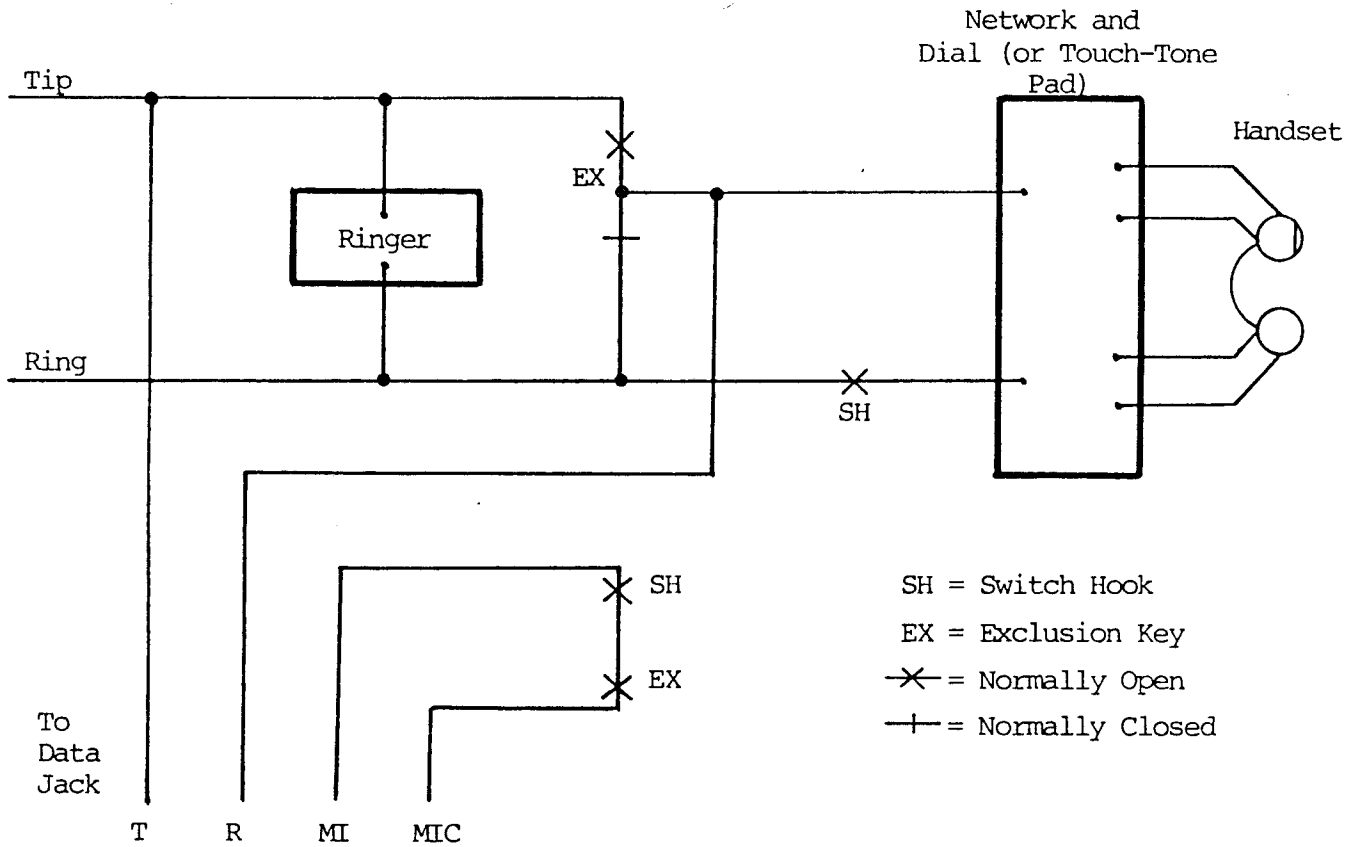
- A -Data Equipment Controls Line - With the exclusion key down, the data equipment is connected to the line. The data equipment will be able to receive calls with the phone on-hook and must also be capable of terminating the call. The telephone, other than the ringer, is disconnected. The mode indication contacts are open.

With the exclusion key up, the telephone operates normally. The data set is disconnected and the mode indication contacts are closed to indicate that the line is being used for voice.

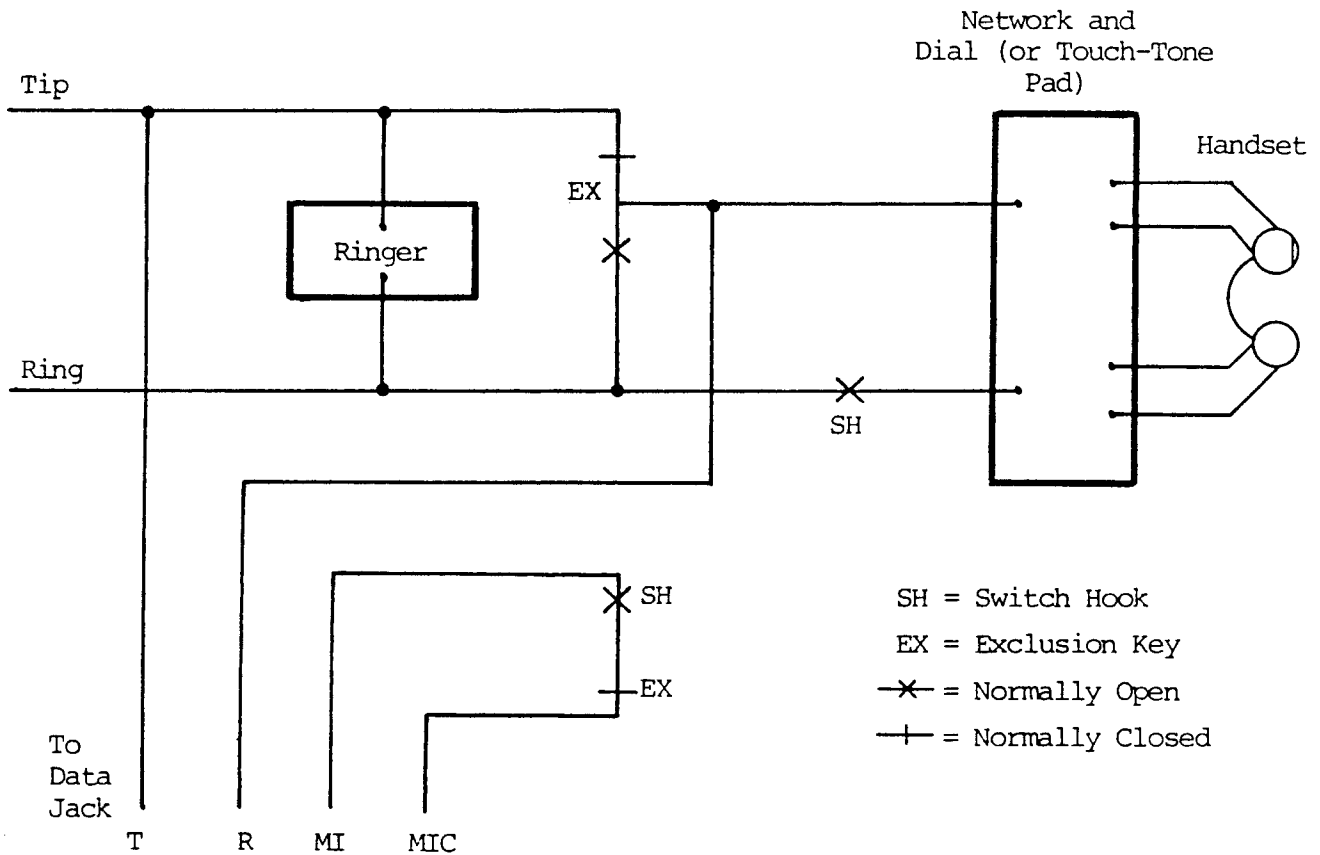
- B -Telephone Set Controls Line - With the exclusion key down, the telephone operates normally. The data equipment is disconnected and the mode indication contacts are closed to indicate to the data equipment that the line is being used for voice.

With the exclusion key up, the data equipment is connected to the line. The telephone, other than the ringer, is disconnected to avoid interfering with the data signal. The mode indication contacts are open.

- G -Switchhook Indication Only - This shorts out the exclusion key contact associated with the mode indication leads MI and MIC. Using just the switchhook contacts makes the overall operation resemble that of the exclusion key telephone set used with data couplers.

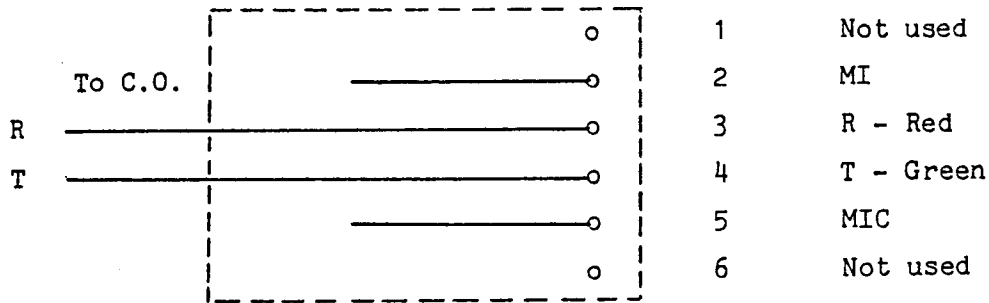


TAP Telephone Set - Data Set Controls Line Option



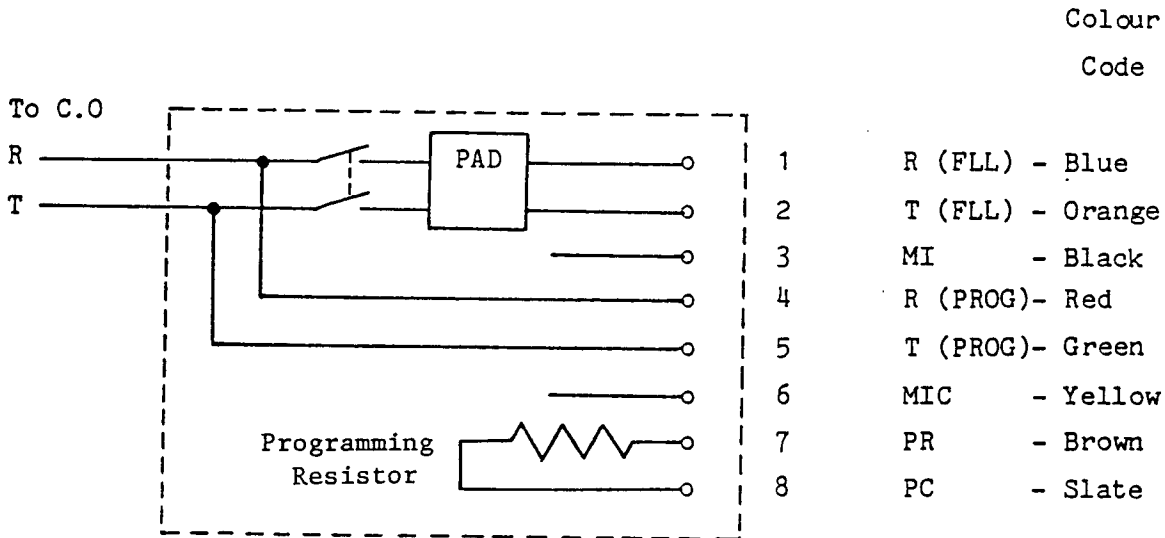
TAP Telephone Set - Telephone Set Controls Line Option

MINIATURE 6 POSITION 4 CONTACT JACK



UNIVERSAL DATA JACK

Each universal data jack contains a resistive pad for fixed loss loop data equipment and a matching programming resistor for programmed data equipment. There are nine different versions of the jack, designed for nine different values of loop loss (See list Table 1). In addition, the 97AW-9 jack contains four additional programming resistors to permit a full range from between 0 dBm to -12 dBm for programmed data equipment.



UNIVERSAL DATA JACK PARAMETERS

<u>MEASURED LOOP LOSS</u>	<u>UNIVERSAL DATA JACK</u>	<u>PROGRAMMING RESISTOR</u>	<u>PROGRAMMED OUTPUT LEVEL AT JACK</u>	<u>FLL OUTPUT LEVEL AT JACK</u>
0.0-1 dB	97AW-1	Open	-12 dBm	-12 dBm
1.1-2 dB	97AW-2	19800 ohms	-11 dBm	-11 dBm
2.1-3 dB	97AW-3	9200 ohms	-10 dBm	-10 dBm
3.1-3 dB	97AW-4	5490 ohms	- 9 dBm	- 9 dBm
4.1-5 dB	97AW-5	3610 ohms	- 8 dBm	- 8 dBm
5.1-6 dB	97AW-6	2520 ohms	- 7 dBm	- 7 dBm
6.1-7 dB	97AW-7	1780 ohms	- 6 dBm	- 6 dBm
7.1-8 dB	97AW-8	1240 ohms	- 5 dBm	- 5 dBm
8.2-9 dB	97AW-9	866 ohms	- 4 dBm	- 4 dBm
9.1-10dB	97AW-9	569 ohms	- 3 dBm	- 4 dBm
10.1-11dB	97AW-9	336 ohms	- 2 dBm	- 4 dBm
11.1-12dB	97AW-9	150 ohms	- 1 dBm	- 4 dBm
12.1- up	97AW-9	0 ohms	- 0 dBm	- 4 dBm

TABLE 1

PRIVATE LINE AND MULTICOM II

This equipment is connected by means of a 4 prong plug and jack (NE404B or equivalent). Pin assignments are given in CS-02, Selections 4.5 and 4.6.

TRAFFIC MEASURING EQUIPMENT

This equipment is connected by means of a 50 pin Amphenol type connector, 57-20500-16. Pin assignments are given in CS-02, Section 4.7. Traffic measuring equipment will be connected directly to the telephone line with no series resistors or fuses. Line assignments on the connector are arranged between the carrier and the user.

Connection of Customer Provided Call Restrictors

(1) Phone Centre Areas (Line type call restrictors)

Customer provided line type call restrictors, equipped with either 6 position mini-plugs or 4 position plugs certified per CS-01, are acceptable. It should be noted that under the Bell Canada Phone Centre Conversion program, which is limited to residential customers only, 6 position mini-jacks are installed. Therefore, customer provided line type call restrictors intended for such applications should be equipped with 6 position mini-plugs. If the device is equipped with a 4 position plug, a certified adapter unit must be used. (Bell Canada will continue to employ 4 position jacks for all business applications and non phone centre residence applications.)

(2) PBX and/or Key System C.O. Lines (Line type call restrictors)

Customer provided line type call restrictors may be equipped with standard 50 contact Amphenol plugs certified per CS-02 (type 0 connectors). Alternatively, for smaller installations individual 4 position jacks may be provided by Bell Canada, in which case the devices should be equipped with 4 position plugs certified per CS-01.

(3) Telephone Set Type Restrictor (Multiline (KTS) or individual line)

Customer provided set type call restrictors which are equipped with 4 position plugs certified per CS-01 are appropriate for applications involving individual telephone sets (multi-line (KTS) or single line).

(4) Multipin Bridging Adapter Used with Key Systems

Customer provided line type call restrictors intended for connection to key systems via multipin bridging adapters may be equipped with 50 contact Amphenol type connectors wired as type M or type N plugs (CS-01, Issue 1). To avoid causing false HOLD conditions on the key system, the information in CS-01, section 5.1.12 "KTS connection" concerning A/A1 and Tip/Ring open/closure sequences should be considered.

TERMINAL ATTACHMENT PROGRAM

THIS SUPPLEMENT OUTLINES:

- METHODS OF CONNECTION PROVIDED BY FEDERALLY REGULATED CARRIERS FOR D.O.C. CERTIFIED VOICE-TYPE SINGLE-LINE AND MULTI-LINE TERMINAL EQUIPMENT
- REQUIREMENTS FOR TERMINAL CONNECTING EQUIPMENT
- REQUIREMENTS FOR CONNECTION TO KEY TELEPHONE SYSTEMS

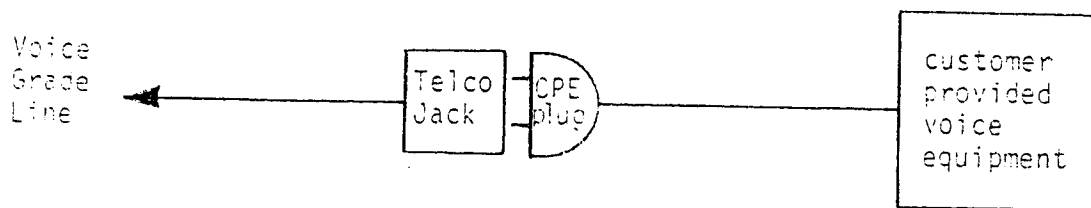
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4.1 REQUIREMENTS FOR A-A1 LEADS	14

1. SINGLE-LINE VOICE-TYPE TERMINAL EQUIPMENT CONNECTING ARRANGEMENTS

1.1 GENERAL

- a) The network interface jack is carrier-provided and provides a bridged connection across Tip and Ring.
- b) Miniature six position, four contact jacks are provided in Phone Centre areas served by Bell Canada and in all areas served by B.C. Telephone Company. See Figure 1.1(a).
- c) 404 type 4 contact jacks (shown in Figure 1.1 (b)) are provided in business locations and non-Phone Centre areas served by Bell Canada and CN Telephone Cos. Customers may use a certified AH conversion adapter to connect a 6 pin miniature plug to a 404 type jack. The use of 404 type jacks is under review by Bell Canada.

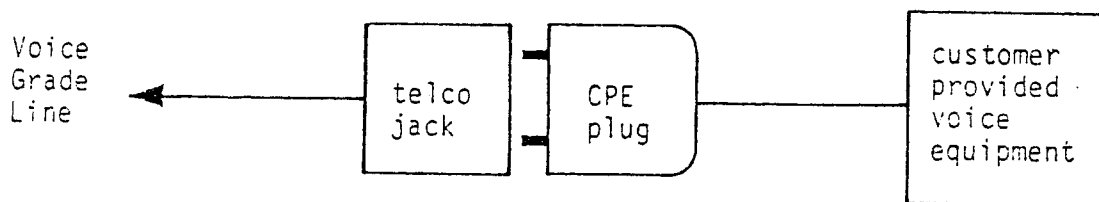


Miniature six position
four contact jack and plug

Carrier (telco) provided jack for use with type G plug provides bridged connection across Tip, Ring, A, A1.

Carrier (telco) provided jack for use with type H plug provides bridged connection across Tip and Ring

FIGURE 1.1(a)



404 type jack and 4 pin plug

Carrier (telco) provided jack for use with type A plug provides bridged connection across Tip, Ring .

Carrier (telco) provided jack for use with type B plug provides bridged connection across Tip, Ring, A and A1.

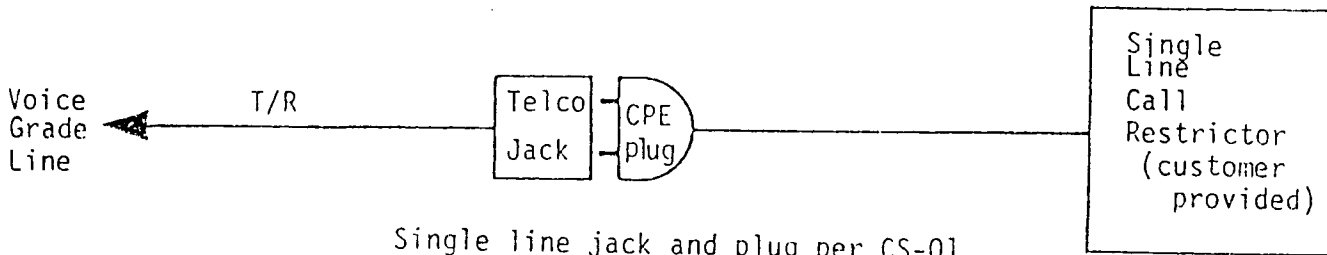
FIGURE 1.1(b)

1.2 CONNECTION OF CALL RESTRICTORS

1.2.1 INTRODUCTION

The following information is additional to that given on page 15 of Supplement A.

1.2.2 LINE-TYPE CALL RESTRICTOR FOR SINGLE-LINE APPLICATION

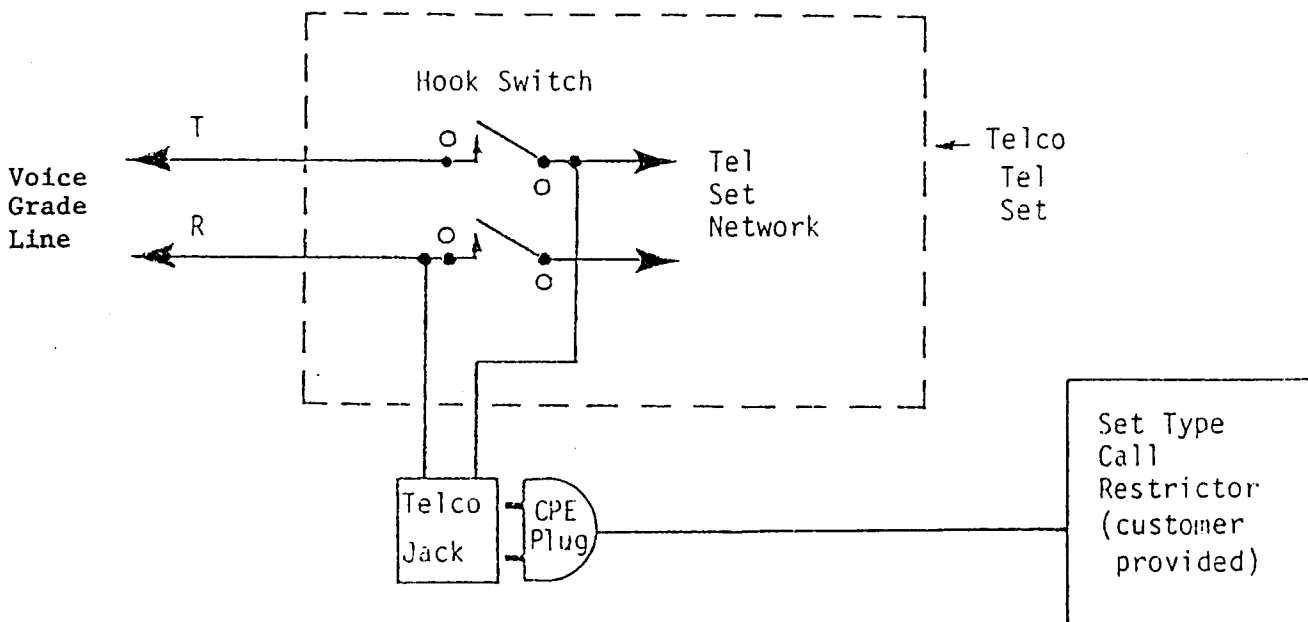


Single line jack and plug per CS-01
(Bridged connection across Tip and Ring)

NOTE: In Phone Centre areas, 6 position four contact miniature jacks will be installed. In Bell Canada business locations, including single line business phones, Key telephone systems, and PBX, 4 position 401 type jacks may be installed.

FIGURE 1.2(a)

1.2.3 TELEPHONE SET TYPE CALL RESTRICTOR (INDIVIDUAL LINE)



Single line jack and plug per CS-01

FIGURE 1.2(b)

1.3 PRESSURE CONTACT JACKS

1.3.1 METHOD OF CONNECTION

The method of connecting certified terminal equipment to the public switched network by means of a pressure contact jack is shown in Figure 1.3 (a).

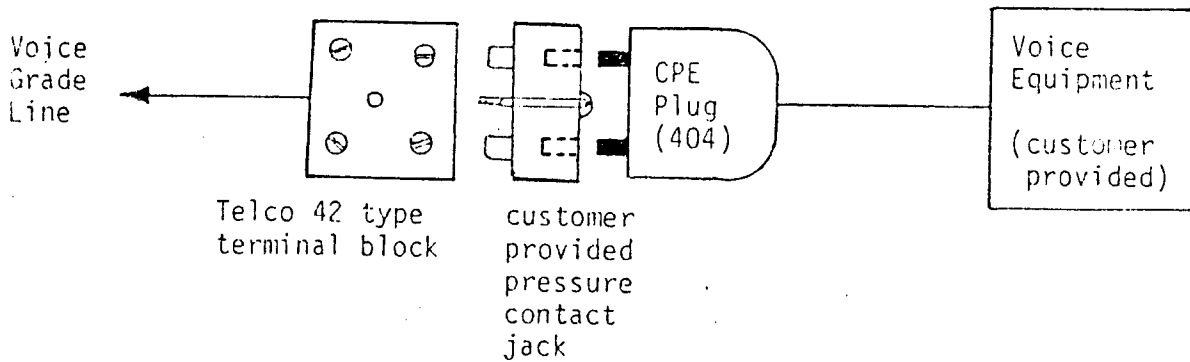


FIGURE 1.3(a)

Carrier-provided 42 type connecting blocks are no longer being installed, and will only be found in some existing residential areas (non-Phone Centre), and in single-line business locations. These blocks provide bridged connection across Tip and Ring. Pressure contact jacks are under discussion in TAPAC with a view to removing them from the Terminal Attachment Program.

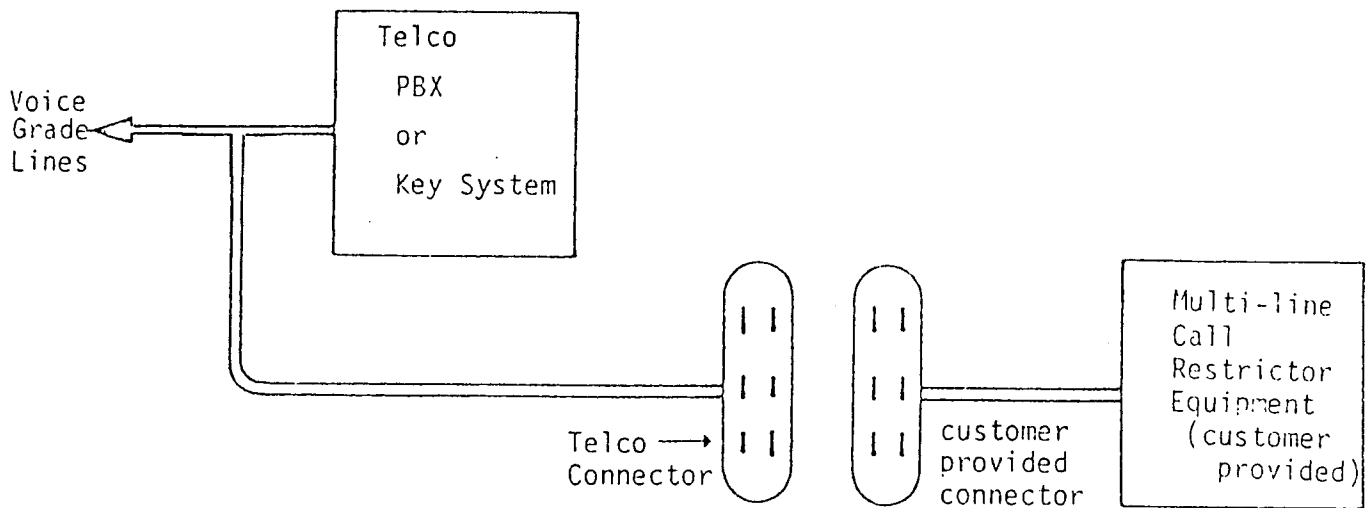
2. MULTI-LINE (PBX or KEY SYSTEM) VOICE-TYPE TERMINAL EQUIPMENT
CONNECTING ARRANGEMENTS

2.1 CONNECTION OF CALL RESTRICTORS

2.1.1 INTRODUCTION

The following information is additional to that given on page 15 of Supplement A.

2.1.2 LINE-TYPE CALL RESTRICTOR FOR MULTI-LINE APPLICATION, INCLUDING
PBX AND KEY SYSTEM C.O. LINES



50 contact Amphenol Connector (Type 0 per CS-02)
(Bridged connection across Tip and Ring on each line)

FIGURE 2.1(a)

2.1.3 TELEPHONE SET TYPE CALL RESTRICTOR (KEY TELEPHONE SET)

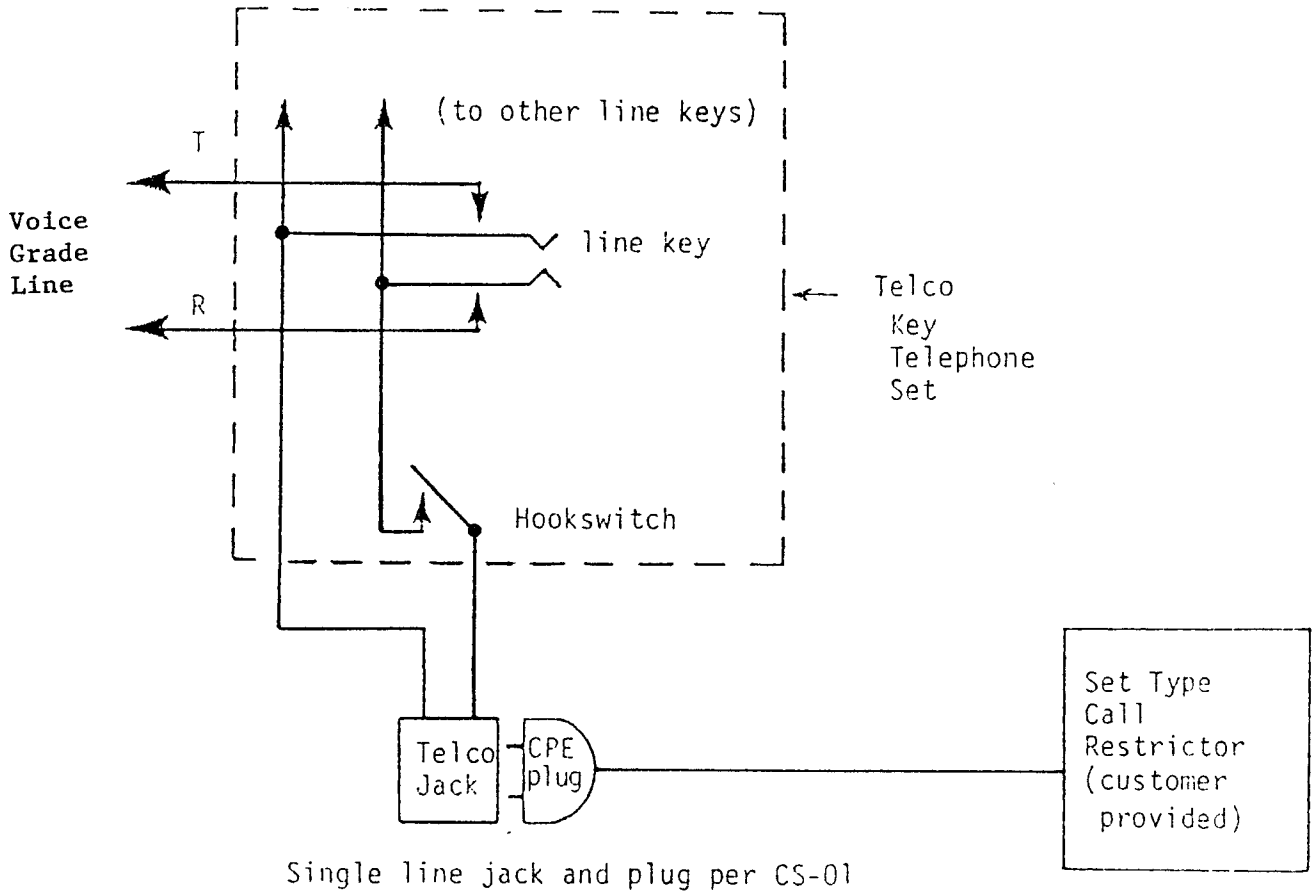
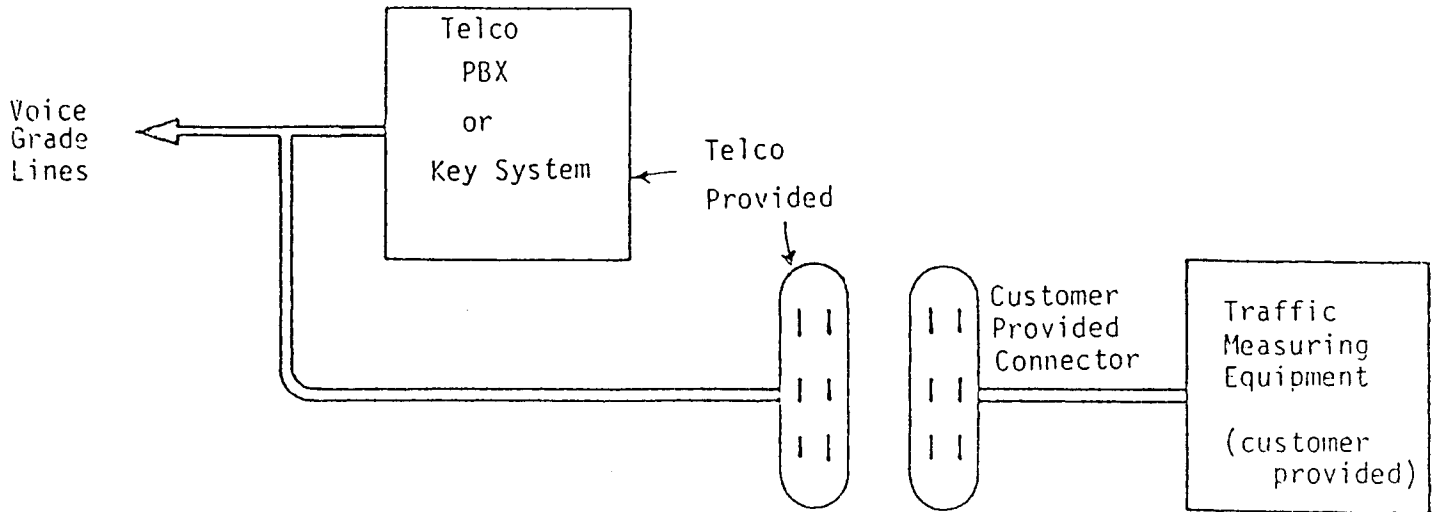


FIGURE 2.1(b)

2.2 CONNECTION OF TRAFFIC MEASURING EQUIPMENT

2.2.1 CONNECTION DIAGRAM

Traffic measuring equipment is connected by means of a 50-Pin "Amphenol" type connector (57-20500-16), as shown in Figure 2.2 (a). The pin assignments are given in CS-02, Section 4.



50 pin Amphenol Type Ribbon Connector
 Bridged Connection across Tip and Ring (up to 25 pairs)

FIGURE 2.2(a)

2.3 CONNECTION OF VOICE-TYPE TERMINAL EQUIPMENT TO MULTI-PIN BRIDGING ADAPTER USED WITH KEY TELEPHONE SETS

2.3.1 CONNECTION DIAGRAM

The method of connection of voice-type terminal equipment to a key telephone system by means of a multipin bridging adapter is shown in Figure 2.3 (a). The pin assignments for 6 button and 10 button key set bridging adapters is given in CS-01. This method of connection also applies to line-type call restrictors.

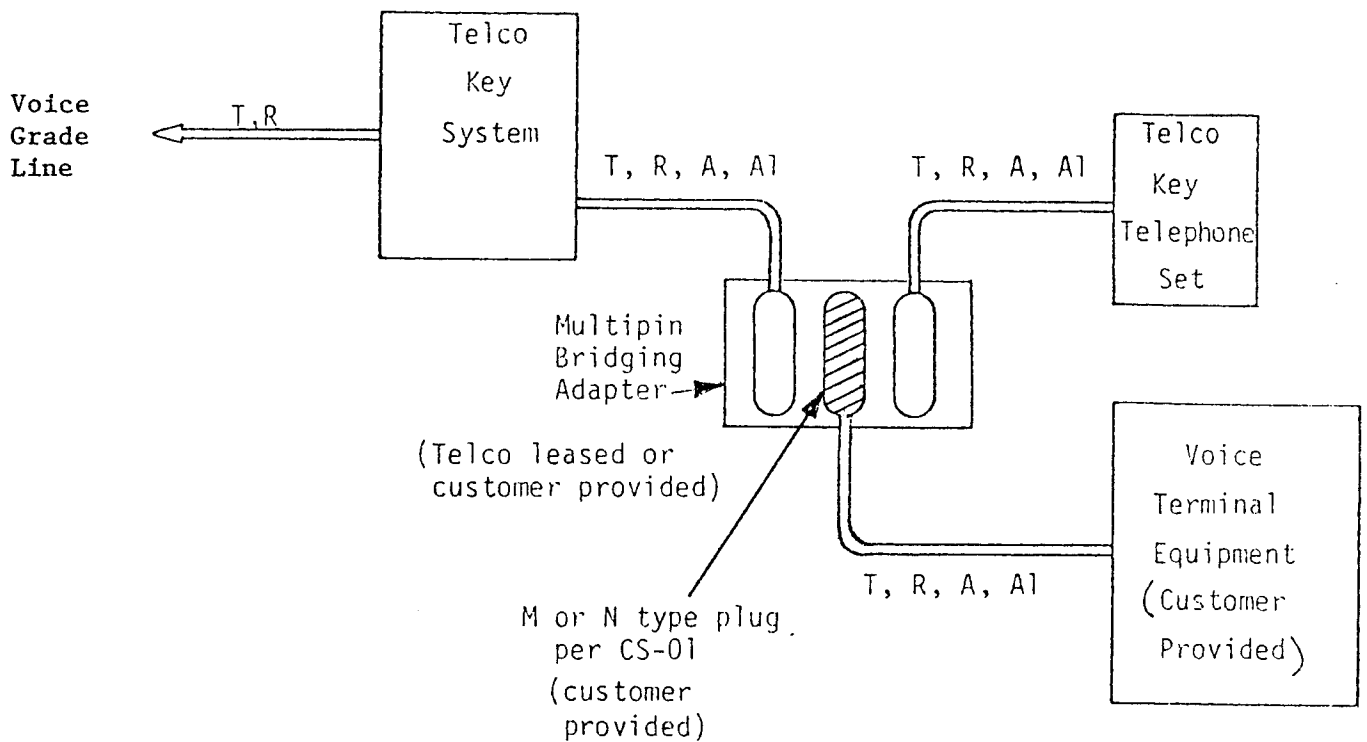


FIGURE 2.3(a)

3. REQUIREMENTS FOR TERMINAL CONNECTING EQUIPMENT

3.1 REQUIREMENTS FOR PLUG-ENDED CORDS

- 1) When a unit of terminal equipment submitted for testing is provided with more than one connecting cord length or type, all of the required tests shall be performed using the shortest length of cord. The following tests shall be repeated with each of the other cords connected:
 - a) Terminating Longitudinal Balance
 - b) On-Hook Terminal Impedance
 - c) Off-Hook Terminal Resistance
- 2) When the connecting cord is wired so as to control the output level of a unit of Data Circuit-Terminal Equipment, that cord shall be used to perform the required tests. The following tests shall be repeated with each of any additional cords connected, with the equipment set for maximum signal output:
 - a) In-Band Transmitted Signal Power
 - b) Out-of-Band Transmitted Signal Power
- 3) When 6-pin miniature plugs are used for purposes other than connection to the public switched network, they shall be permanently staked or attached in such a manner that a tool must be used to disconnect the plug from a jack.
- 4) Plugs intended for connection to the public switched network shall be wired only as shown in the Certification Standards.
- 5) When connecting cords, which are separate from the unit of certified equipment they are intended to be used with, are submitted for testing, the requirements specified in section 3.2.2 shall apply.

3.2 REQUIREMENTS FOR JACK-PLUG-CORD ENSEMBLES

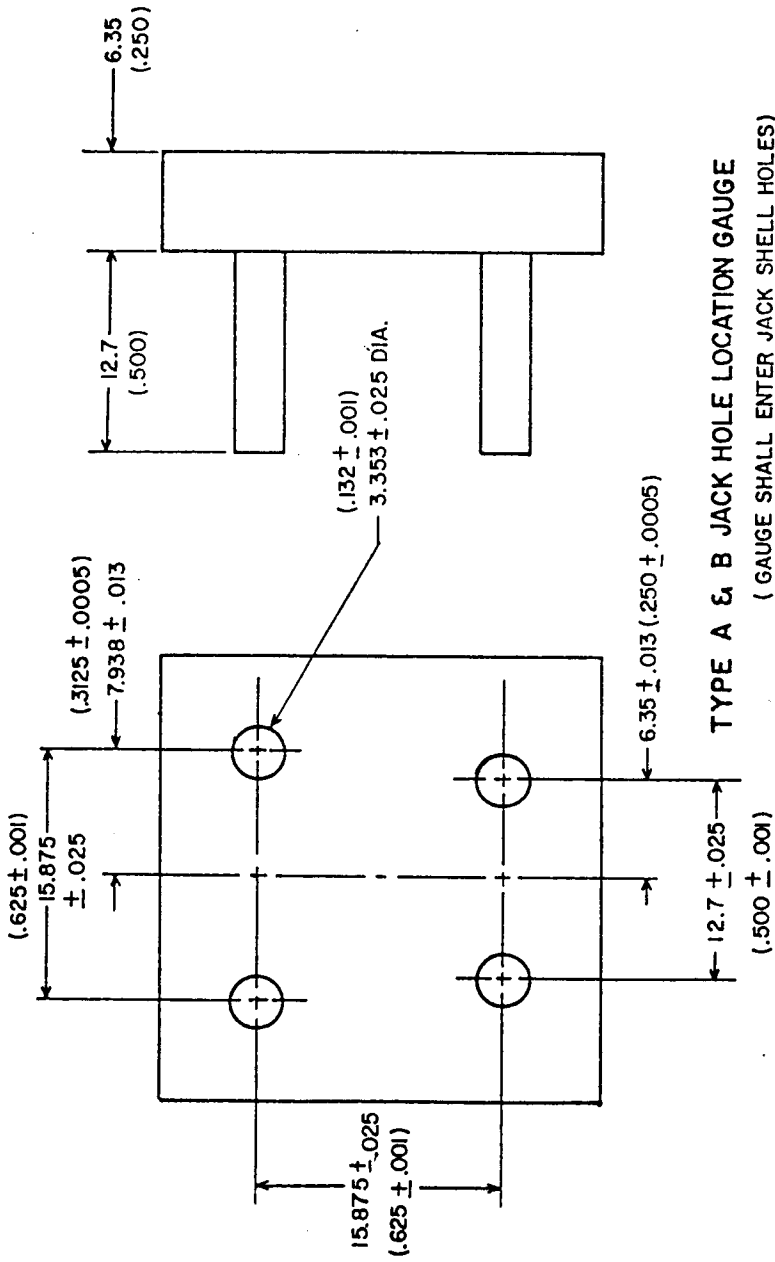
3.2.1 GENERAL

Jack-plug-cord ensembles are intended as extension connections between the tip and ring terminals of the carrier-provided public switched network interface and the plug-ended cord assembly provided with certified terminal equipment. In order to be eligible for certification, jack-plug-cord ensembles shall meet the requirements given in Section 3.2.2. Figures 3.2 (a) to 3.2 (d) show the dimensional details of the minimum and maximum-size gauges for type A and B jacks and plugs, and type H jacks. The gauge dimensions for type H plugs are shown in CS-02, Section 4. The dimensions in the above-mentioned figures are given in millimetres and in(inches).

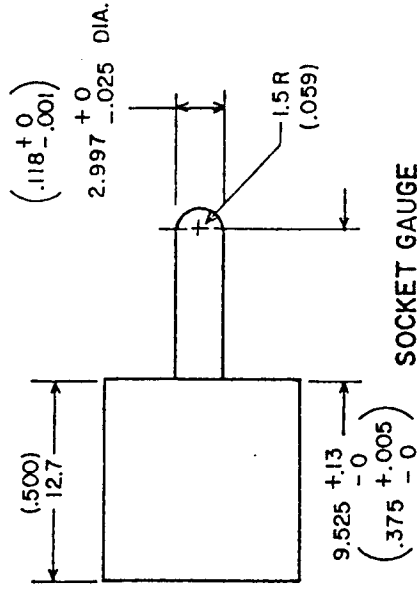
3.2.2 REQUIREMENTS

- 1) Jacks and plugs shall meet the specification requirements of CS-01, Section 4. Conformance with the dimensions shown in the diagrams of Section 4 shall be verified by means of the minimum and maximum-size gauges shown in Figures 3.2 (a) to 3.2 (d) below.
- 2) Jack-plug-cord ensembles shall have an incremental loop resistance not exceeding 2.5 ohms/metre, and a total resistance not exceeding 20 ohms. The resistance measurement shall be made between the tip and ring terminals of the connector at one end of the cord, with the corresponding terminals of the connector at the other end of the cord connected together. Any and all other conductors in the cord will not be considered in this measurement.
- 3) Jack-plug-cord ensembles shall meet the following network protective requirements, as specified in CS-01. Measurements shall be made between the tip and ring terminals of the connector at one end of the cord, with the corresponding terminals of the connector at the other end of the cord open-circuited.

<u>SECTION</u>	<u>REQUIREMENT</u>
3.6	Terminating Longitudinal Balance
3.7	On-Hook Terminal Impedance
3.9	On-Hook Terminal Resistance



TYPE A & B JACK HOLE LOCATION GAUGE
 (GAUGE SHALL ENTER JACK SHELL HOLES)



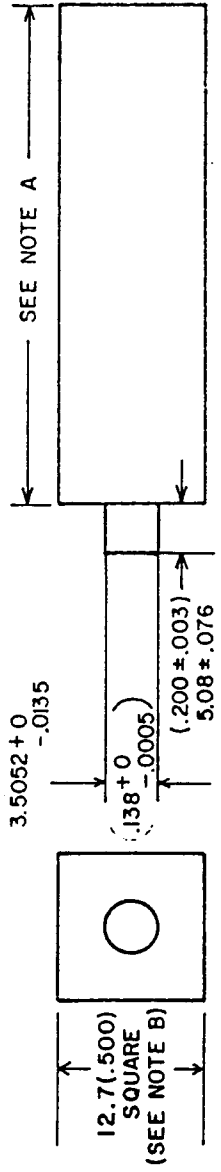
SOCKET GAUGE

(A MINIMUM PULL OF 2.224 N. SHALL BE REQUIRED TO WITHDRAW GAUGE FROM CONTACT WHEN FULLY INSERTED)

NOTES

- A : THIS DIMENSION IS ARBITRARY
- B : THE GAUGE HANDLE MAY BE SQUARE OR ROUND

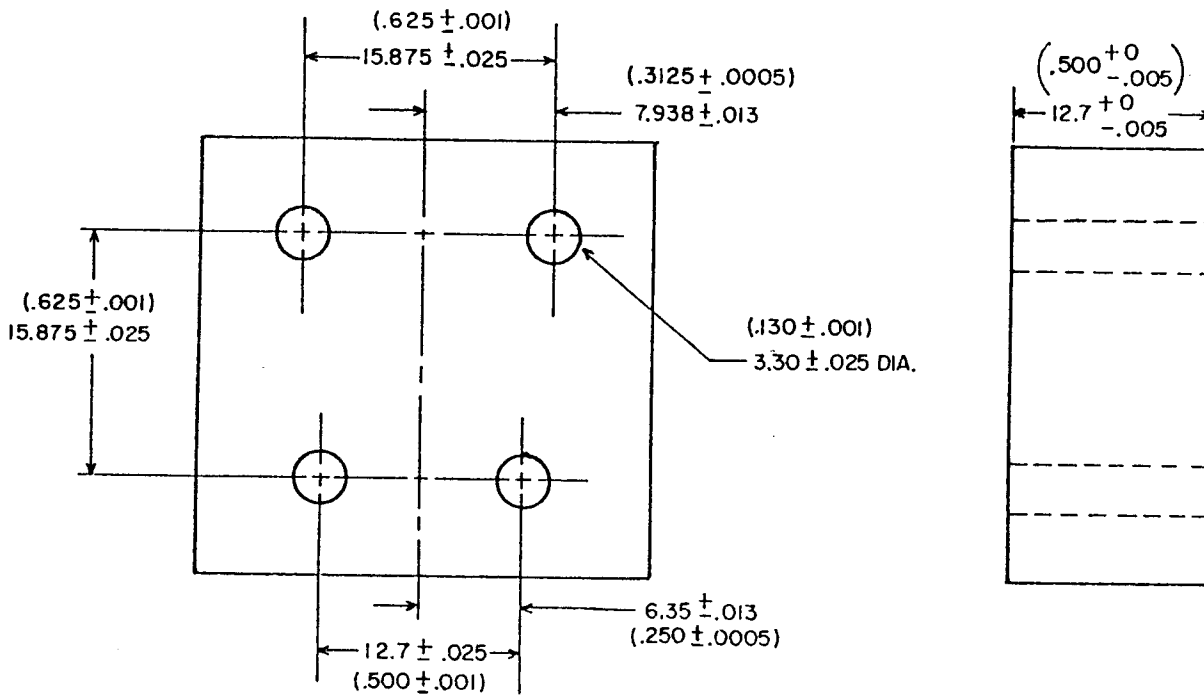
DIMENSIONS IN MILLIMETERS AND (INCHES)



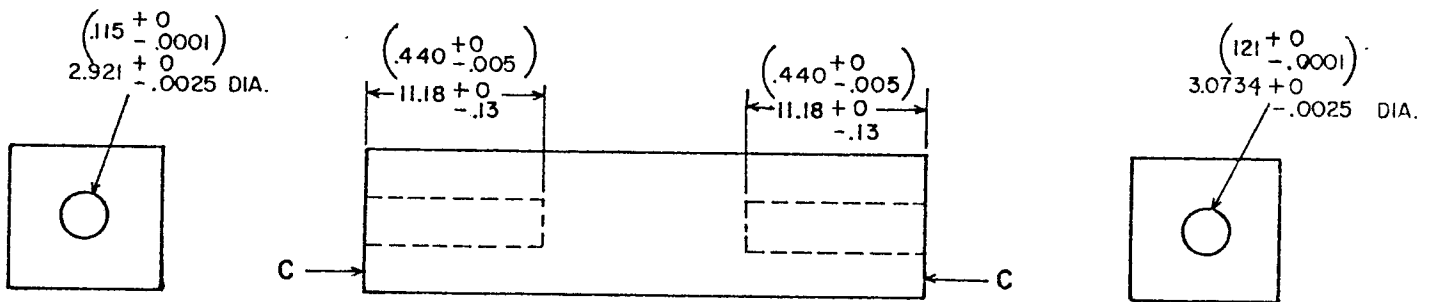
TYPE A & B JACK HOLE SIZE GAUGE
 (GAUGE SHALL ENTER JACK HOLES)

FIGURE 3.2 (a)

DIMENSIONS IN MILLIMETERS AND (INCHES)



**TYPE A AND B
PLUG PIN LOCATION AND MAXIMUM LENGTH GAUGE**
(PLUG PIN SHALL ENTER GAUGE AND NOT PROTRUDE BEYOND
OPPOSITE SURFACE)



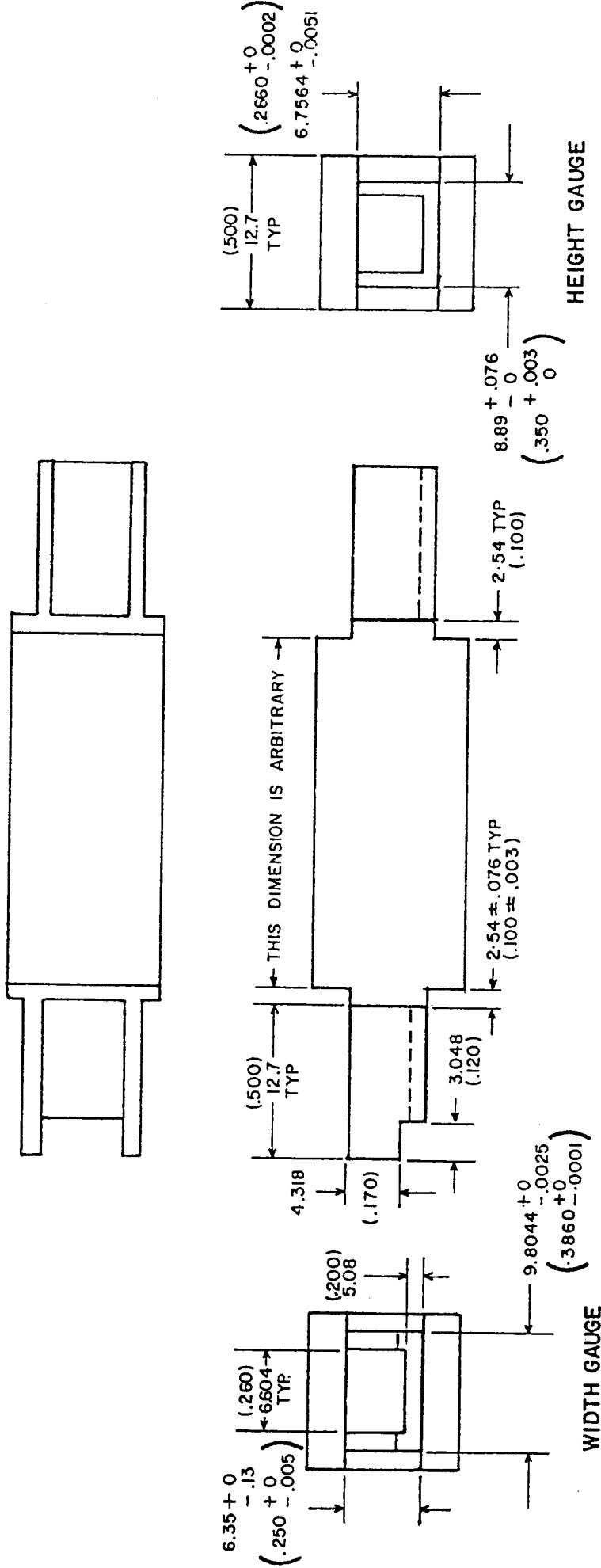
MINIMUM

**TYPE A AND B
PLUG PIN SIZE AND MINIMUM LENGTH GAUGE**
(PLUG PINS SHOULD FIT INTO MAXIMUM GAUGE BUT NOT
INTO THE MINIMUM GAUGE, AND SHOULDER SHOULD NOT
SEAT ON SURFACE "c")

MAXIMUM

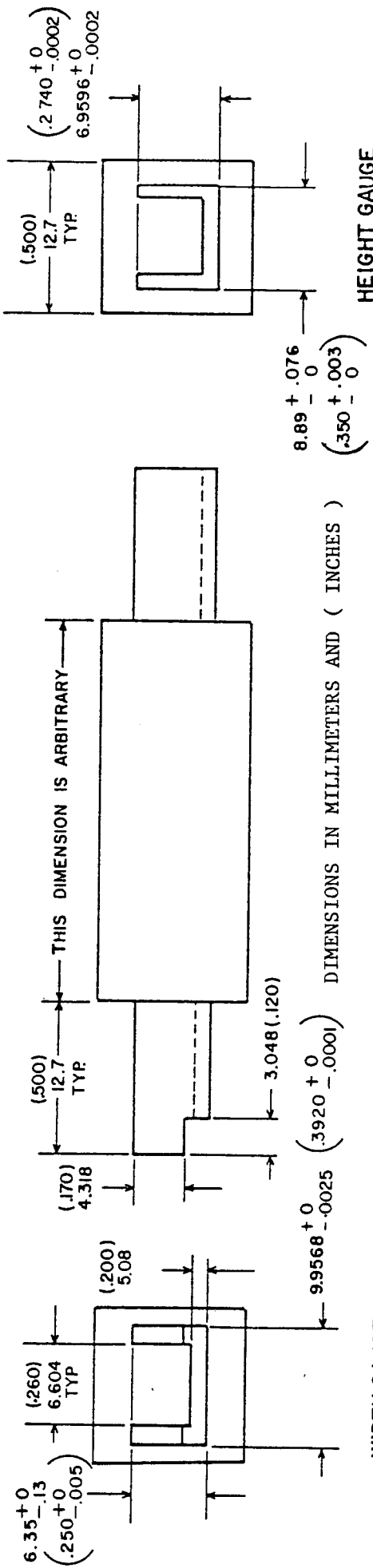
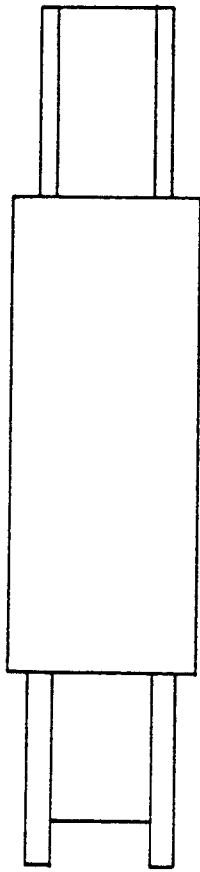
FIGURE 3.2(b)

DIMENSIONS IN MILLIMETERS AND (INCHES)



MINIMUM SIZE GAUGE FOR TYPE H JACK
(BOTH ENDS OF GAUGE SHALL ENTER JACK)

FIGURE 3.2(c)



MAXIMUM SIZE GAUGE FOR TYPE H JACK
 (BOTH ENDS OF GAUGE SHALL NOT ENTER JACK)

FIGURE 3.2(d)

4. REQUIREMENTS FOR CONNECTION TO KEY TELEPHONE SYSTEMS

4.1 REQUIREMENTS FOR A-A1 LEADS

4.1.1 INTRODUCTION

Network non-addressing devices intended for connection to generic 1A1/1A2 (10A1/10A2) type key telephone systems at the T, R, A, and A1 interface shall comply with the requirements given in Section 2.3.2. Requirements for lamp (L), and lamp ground (LG) leads are not included, as they apply to network addressing devices.

4.1.2 REQUIREMENTS

4.1.2.1 GENERAL REQUIREMENTS

1) EXTRANEIOUS ENERGY

The A/A1 leads of the terminal equipment shall comply with the CS-01 requirements for Metallic AC and DC Signals, and Out-Of-Band Transmitted Signal Power.

2) OPEN-CIRCUIT RESISTANCE

In the open-circuit state, the resistance between the A/A1 leads shall exceed 100K ohms, at voltages up to 28V dc.

3) CLOSED-CIRCUIT RESISTANCE

In the closed-circuit state, the resistance between A/A1 leads shall be less than 50 ohms at currents of 18 ma or higher.

4.1.2.2 TIMING REQUIREMENTS

1) WHEN THE TERMINAL EQUIPMENT IS TAKEN OFF-HOOK (Idle to Busy, Ringing to Busy, Hold to Busy):

The A/A1 connection shall close less than 20 ms prior to, but not later than, the Tip, Ring connection.

2) WHEN THE TERMINAL EQUIPMENT IS PLACED ON-HOOK (Busy to Idle):

The A/A1 connection shall break within 40 ms after the Tip, Ring connection breaks.

3) TRANSITION FROM OFF-HOOK TO HOLD:

The A/A1 connection shall open 70 ms or more prior to the opening of the Tip, Ring connection.

4.1.3 POTENTIAL PROBLEMS WHICH CAN RESULT FROM FAILURE TO MEET THE
TIMING REQUIREMENTS

- 1) Failure to meet the requirements of 4.1.2.2(1) could result in a transient hold condition between idle and busy, or a flash recall signal between hold and busy.
- 2) Failure to meet the requirements of 4.1.2.2(2) could result in a false-hold condition which would show up as a permanent off-hook condition to the C.O. or PBX.
- 3) Failure to meet the requirements of 4.1.2.2(3) could result in an unintentional disconnection.

TERMINAL ATTACHMENT PROGRAM
NETWORK INTERFACE FUNCTION APPROACH
TOWARDS CERTIFICATION OF NETWORK
NON-ADDRESSING CUSTOMER PROVIDED
TERMINAL EQUIPMENT

1. GENERAL

1.1 Definition of Network Interface Function

The network interface function for terminal equipment is the description of its external behaviors, including both inputs and outputs, at the network interface.

1.2 Administrative Aspects

- 1.2.1 Applicants for testing and/or certification of terminal equipment must provide a detailed listing of the network interface functions of their equipment.

2. CURRENTLY PERMITTED NETWORK INTERFACE FUNCTIONS

- 2.1 To be eligible for certification under the Terminal Attachment Program (TAP), all customer-provided terminal equipment must be capable of meeting the applicable on-hook requirements of the Department's certification standards.

In addition to this requirement, terminal equipment which is intended to perform one or more of the following network interface functions must comply with the specific technical requirements listed in Supplement D (Decision Table for Network Interface Functions) and be so certified.

VOICEBAND TRANSMISSION CAPABILITY

- Transmits and/or receives analog voiceband signals.

Note: Terminal equipment which has been designed to transmit other than voiceband signals (e.g. digital) will not be compatible with the public switched telephone network. Similarly, analog voiceband terminal equipment may not be compatible with carrier-provided digital terminal PBX or Push-button Telephone systems unless special access arrangements are provided by the carrier in accordance with its tariffs.

ON-HOOK/OFF-HOOK MODE CHANGES

- Changes from an on-hook mode to an off-hook mode and vice versa in response to a manual operation.

ALERTING

- Responds to network-alerting signals by producing an audible sound, a visual signal and/or some other indication.

AUTOMATIC ANSWER

- In response to a network-alerting signal, automatically changes from an on-hook mode to an off-hook mode for a time interval which shall terminate with the completion of the call.

AUTOMATIC CALL RESTRICTION

- In response to network-addressing signals designated as restricted by the subscriber, automatically changes from an on-hook mode to an off-hook mode terminating with the completion of the call attempt.

AUTOMATIC CALL TERMINATION

- Changes from an off-hook mode to an on-hook mode upon completion of a call in response to an automatic operation.

ACOUSTIC OPERATION

- Operates by acoustic connection to carrier-provided telephones and/or to customer-provided non-addressing telephones.

Note: Terminal equipment intended for acoustic operation may also be connected to some carriers' telephones in accordance with applicable tariffs.

TWO-WAY MANUAL BRIDGING

- Manually bridges any combination of two or more primary exchange (including foreign exchange) central-office line services, WATS, P.B.X. extension lines and inter-communicating channels for two-way voice grade transmission.

Note: Two-way voice conferencing terminal equipment may be connected to some carriers' facilities only through special carrier-provided jack-type connecting arrangements.

Satisfactory operation and transmission may not be obtainable when two or more network transmission facilities are connected together in tandem and, except as explicitly specified in the carrier's tariffs, the carrier does not undertake to provide satisfactory operation or transmission on any of the possible connections.

ONE-WAY MANUAL BRIDGING

- Manually bridges any combination of two or more primary exchange (including foreign exchange) central-office line services, P.B.X. extension lines, inter-exchange lines, WATS, and other voice or data circuits and channels for simultaneous one-way transmission purposes.

Note: One-way simultaneous data transmission broadcasting terminal equipment may be connected to some carrier's facilities by means of approved jack-type connecting arrangements which are specified in the Department's standards and in the carrier's tariffs.

The basic customer-provided data circuit-terminal equipment must also be certified; otherwise carrier provided data access arrangements, such as data connectors or couplers, are required on each line connectable to the broadcasting equipment as specified in the carrier's tariffs.

ONE-WAY AUTOMATIC BRIDGING

- Automatically bridges central-office line services to voice channel facilities for one-way transmission purposes.

Note: This function is only permitted by carrier tariffs when incorporated in Radio Common Carrier Paging Control Terminal Equipment which is certified in accordance with Certification Standard CS-04. As specified in carrier tariffs, the direction of transmission associated with these bridged facilities shall be one-way only in the direction of the radio-paging transmitter.

VOICE CHANNEL DERIVATION

- Derives additional voice communications channels from or otherwise increases the call-carrying capacity of carrier-provided point-to-point voice frequency band facilities.

Note: Such terminal equipment may be connected to some carrier's facilities through special "channels

for voice without signalling or conditioning", or as may be otherwise specified in the carrier's tariffs.

3. CURRENTLY NONPERMISSIBLE FUNCTIONS

- 3.1 Customer-provided terminal equipment which is intended to perform any network interface function(s) other than those specified in Part 2 is not eligible for certification under the Terminal Attachment Program, and without restricting the generality of the foregoing, terminal equipment which performs any of the following specific functions will not be certified (unless permitted by further tariff revision).

NETWORK ADDRESSING

- Generates network-addressing signals which permit origination of outgoing calls.

BILLING VIOLATION

- Transmits and/or receives data signals during the initial two-second off-hook time interval, with the exception of a fixed sequence of signals transmitted following every transition from on-hook to off-hook.

SWITCHING AND ROUTING

- Switches or controls the distribution or routing of outgoing calls.

AUTOMATIC CALL INITIATION

- Automatically changes from an on-hook mode to an off-hook mode in response to stimuli other than telecommunications signals.

TERMINAL ATTACHMENT PROGRAM
TECHNICAL REQUIREMENTS
ASSOCIATED WITH
NETWORK INTERFACE FUNCTIONS

1. DEFINITIONS

1.1 Network Non-Addressing Terminal Equipment

Equipment that forms the end point of a telecommunications channel, or other such facility, where information is received or originated. Such terminal equipment is not capable of manually or automatically generating network addressing signals which permits origination of outgoing calls.

2. TECHNICAL REQUIREMENTS

Specific technical requirements associated with the network interface functions identified in Supplement C are identified in Table I, "A Decision Table for Network Interface Functions".

A DECISION TABLE FOR
 NETWORK INTERFACE FUNCTIONS
 (NETWORK NON-ADDRESSING TERMINAL EQUIPMENT)

BASIC REQUIREMENTS WHICH HAVE TO BE MET BY ALL CUSTOMER-PROVIDED TERMINAL EQUIPMENT	2.1 Connecting Arrangements 2.2 Surge Voltage Application 2.3 Operational Performance	REMARKS see notes 1 and 2
	3.2 Extraneous DC Signals 3.3 Extraneous AC Signals 3.6 Terminating Longitudinal Balance 3.7 On-Hook Terminal Impedance 3.9 On-Hook Terminal Resistance	

ADDITIONAL REQUIREMENTS FUNCTIONS	3.4 Transmitted Signal Power	3.5 Single Frequency Restriction	3.8 Off-Hook Terminal Impedance	3.10 Off-Hook Terminal Resistance	REMARKS
VOICEBAND TRANSMISSION CAPABILITY	X	X			see note 7
ON-HOOK OFF-HOOK MODE CHANGES			X	X	
ALERTING					see note 3
AUTOMATIC ANSWER			X	X	see note 3
AUTOMATIC CALL RESTRICTION	X	X	X	X (min limit)	see note 4
AUTOMATIC CALL TERMINATION					see note 5
ACOUSTIC OPERATION	X	X			see note 7
TWO-WAY MANUAL BRIDGING	X	X	X	X	
ONE-WAY MANUAL BRIDGING	X	X	X		
ONE-WAY AUTOMATIC BRIDGING					see note 8
VOICE CHANNEL DERIVATION	X	X	X	X	see note 6

TABLE I

NOTES FOR TABLE I

1. All the requirements and their numbers are based on Certification Standards CS-01 and CS-02 as appropriate.
2. In applying the decision table to NNAD now in the TAP it is essential to completely identify all device functions to ensure that the appropriate certification requirements are recognized and complied with. For example, some types of traffic measuring equipment and call restriction devices may at all times present on-hook impedance parameters. They transmit voiceband tones only in the operating state which are subject to sections 3.4 and 3.5 of the Certification Standards CS-01 and CS-02.
3. Response of terminal equipment to network-alerting signals must be verified.
4. Transmitted Signal Power (3.4), and Single Frequency Restriction (3.5) requirements apply to those call restriction devices that transmit voiceband tones in the restriction state.
5. Automatic Off-Hook to On-Hook mode change by the terminal equipment must be verified.
6. Additional technical information is being derived and will be published in a future supplement.
7. For live voice transmission, the requirements specified in CS03 shall be met.
8. Only CS04 is applicable for ONE-WAY AUTOMATIC BRIDGING.

TERMINAL ATTACHMENT PROGRAM

CONNECTION OF CUSTOMER-PROVIDED

NETWORK NON-ADDRESSING

TERMINAL EQUIPMENT

1. CONNECTION OF CUSTOMER-PROVIDED NETWORK NON-ADDRESSING TERMINAL EQUIPMENT
- 1.1 The following miscellaneous terms and conditions, as specified in the carriers' tariffs, are applicable to the connection of customer-provided terminal equipment under the Terminal Attachment Program.
 - 1.1.1 Except for jack-plug-cord ensembles (telephone extension cords), and various plug adapter units, customer-provided terminal equipment may not be connected to two-party line service, multi-party line service and public or semi-public telephone services (coin telephone services).
 - 1.1.2 Except for jack-plug-cord ensembles (telephone extension cords) and various plug adapter units, customer-provided equipment may not be connected between the network point-of-interface and any carrier-provided equipment, apparatus or devices, as well as between items of carrier-provided equipment, apparatus or devices, except where specified in the carriers' tariffs.
 - 1.1.3 Customer-provided terminal equipment may be arranged for connection to the carriers' facilities only on a bridged tip and ring basis by means of approved jack-type connecting arrangements which are specified in the Department's standards and in the carrier's tariffs. All such connections shall be made in such a manner as to allow for easy and immediate disconnection of the terminal equipment by untrained persons. Jacks shall be so arranged that, if the plug connected thereto is withdrawn, no interference to the operation of equipment at the customer's premises which remains directly or indirectly connected to the telecommunications network shall occur by reason of such withdrawal. In certain situations where the customer elects to connect multi-line terminal equipment to the carriers' facilities through "Amphenol-type" jack and plug arrangements, certified single-line adapters must be utilized to comply with the foregoing requirements.
 - 1.1.4 In the case of modular voice-type terminal equipment, consisting of a basic terminal component (that which connects to the network point-of-interface) and one or more additional components of non-integrated equipment, all of the additional components must connect to the basic terminal component, and to each other, through hard-wired connections and/or by means of proprietary non-TAP-standard plug-type connecting arrangements. Also, all such modular components which may affect compliance must be certified as an operational system and otherwise comply with the terms and conditions specified in the carriers' tariffs pertaining to the connection of TAP-certified terminal equipment.

- 1.1.5 Customer-provided terminal equipment may be connected to approved jack-type connecting arrangements only by means of standard customer-provided plug-type arrangements which have been certified by the Department.
- 1.1.6 Adapter units, which convert one type of plug arrangement to another type, must be certified by the Department.
- 1.1.7 If so permitted by the carrier's tariffs, certified customer-provided single-line jack-plug-cord ensembles (telephone extension cords) and certified single-line bridging adapters, which meet the terms and conditions as may be specified in the carrier's tariffs pertaining to the connection of TAP-certified equipment, may be connected to jack-type connecting arrangements provided by the carrier. Also, if permitted by the carrier's tariffs, certified customer-provided multi-pin bridging adapters may be used as an alternative to those which may be provided by the carrier in accordance with applicable tariffs.

2. COMPATIBILITY INFORMATION

- 2.1 Terminal equipment which transmits or receives other than analog voiceband signals (e.g. digital) will not be compatible with the public switched telephone network. Similarly, analog voiceband terminal equipment may not be compatible with carrier-provided digital terminal PBX or Push-button Telephone systems unless special access arrangements are provided by the carrier in accordance with its tariffs. The carrier's liability in this regard is as specified in the carrier's tariffs.
- 2.2 The certification standards for terminal equipment are based on the concept of standard arrangements whereby the terminal connecting plug is connected directly to the appropriate voice or data network-interface jack provided by the carrier. Equipment so connected normally operates in a bridged or parallel mode. Terminal equipment which is configured in connecting arrangements other than this may require the definition of unique certification standards to be specified by the Department and approved by the carriers. For example, customer-provided jack-plug-cord ensembles (telephone extension cords), plug adapter units, and single-line and multi-pin bridging

adapters must meet the certification requirements of the Department. Moreover, as noted in the Department's Certification Procedure, CP-01, Issue 3, Part 1, Section 1.9.1, Equipment Attachment Limitations, the customer must be aware that although individual units of terminal equipment may comply with the certification requirements, this may not prevent degradation of telephone service when connected in a nonstandard manner by the customer, for example through a jack-plug-cord ensemble and/or other types of customer-provided connecting arrangements listed in this note.

- 2.3 Satisfactory operation and transmission may not be obtainable when two or more network transmission facilities are connected together in tandem and, except as may be explicitly specified in the carrier's tariffs, the carrier does not undertake to provide satisfactory operation or transmission on any of the possible connections.
- 2.4 Data Circuit-terminal Equipment which is arranged to transmit at a fixed level of no greater than -9dBm (permissive data) may be connected to voice or data-type jacks. Data connections behind any P.B.X. system must be made with voice-type jacks using the -9dBm type of equipment as specified in the Department's related certification documents.
- 2.5 Each carrier determines the allowable network interface functions which may or may not be performed by customer-provided terminal equipment intended for connection to the carrier's facilities under the terms and conditions of this Program. At its discretion, the carrier may add or delete functions and/or otherwise alter the terms and conditions specified in its tariffs pertaining to the connection of terminal equipment under this program. However, such changes will be made in consultation with the Department and are subject to the approval of the carrier's regulatory body.
- 2.6 As an alternative to the Terminal Attachment Program, certain customer-provided terminal equipment may be electrically connected through connecting equipment as may be specified in the carriers' tariffs.

TERMINAL ATTACHMENT PROGRAM
INFORMATION ON ADMINISTRATION AND CERTIFICATION
OF NETWORK ADDRESSING TERMINAL EQUIPMENT

NOTE

The conditions outlined in this document will not be applicable until associated carrier tariffs are approved by CRTC.

1. GENERAL

- 1.1 This Supplement provides information on administrative aspects for certification of network-addressing terminal equipment for connection to the public switched telephone network in the Terminal Attachment Program.
- 1.2 Certification is subject to compliance with the requirements set out in the Certification Procedure (CP-01), Program Application Notes (TRC-52) and the appropriate Certification Standard.
- 1.3 In addition to the options provided in CP-01, an applicant for Certification may perform the testing at any approved Canadian test location and submit the test results to the DOC attested to by a Canadian Registered Professional Engineer.
- 1.4 Prospective applicants for testing and/or certification by the Department are advised to determine the terms and conditions under which customer - provided terminal equipment may be connected to individual carrier's facilities before making application under this program.

1.5 Definitions

In the context of this glossary, the term "equipment" shall mean any telecommunications oriented equipment, apparatus, or device; the term "network" means carrier-provided facilities associated with the "switched telephone network" unless otherwise specified.

- 1) Host Equipment - Any equipment which is capable of operating by itself through direct tip/ring connections to the network and is eligible for certification, and provides for the through connection of either ancillary or auxiliary equipment or both.
- 2) Ancillary Equipment - Equipment which is not capable of operating by itself through direct tip/ring connections to the network and is not eligible for certification as terminal equipment. Such equipment is only authorized for indirect network connection if it has been included as a component or function of a telephone terminal equipment or auxiliary terminal equipment package submitted for certification. Typical examples: head telephone sets and handsets.
- 3) Auxiliary Terminal Equipment - Any equipment which is capable of operating by itself through direct tip/ring connections to the network and is eligible for certification. Typical examples: handsfree "speakerphones", automatic dialers, automatic answering/recording equipment.

2. EQUIPMENT CERTIFICATION

2.1 Equipment Packages

- 2.1.1 A "package" of terminal equipment is an assembly of two or more devices which can affect compliance with the standards and which is connectable to the carrier's network through carrier-provided connecting arrangements (jacks) as specified in the Department's standards. These packages could consist of separate units or modules or they could be contained in some type of housing or cabinet.
- 2.1.2 A package will be certified by the Department only after all network interface functions affecting certification of the package have been collectively tested to the applicable certification standards. The unit directly connected to the network shall bear the DOC label.
- 2.1.3 Ancillary devices, which are not capable of operating through direct connection to tip & ring, can only be part of a certified package.
- 2.1.4 If new or redesigned functional units are introduced into the total equipment package, then the entire package will have to be retested to network interface standards and recertified by the Department.

2.2 Equipment-to-Equipment Certification

- 2.2.1 "Equipment-to-Equipment Connection" means the tandem connection of auxiliary terminal equipment to host equipment.

Note: "Mix and match" of subordinate ancillary devices and common equipment would allow connection, for example, of one supplier's key sets to another's common equipment. In order to accommodate this concept in the TAP, "equipment-to-equipment" certification standards will be required as well as generic test beds for each type of common equipment (PBX, KTS, etc.). Also, appropriate labelling methods would be required to identify permissible combinations.

To ensure that ongoing maintenance responsibilities are met, agreement must be reached between suppliers of "host" terminal equipment and suppliers of ancillary devices if such equipment configurations are hardwired together in lieu of normal jack/plug connection arrangements.

- 2.2.2 The following additional rules shall apply, as may be specified in the carrier's tariffs, to all connections of auxiliary equipment connected in tandem to host terminal equipment:
 - 1) Where TAP standard jack/plug connecting arrangements are utilized to effect "equipment-to-equipment" connections, user substitution of other certified auxiliary equipment is permitted.
 - 2) If the plug has been removed from the auxiliary equipment to permit its use as a hardwired component, such plug must be restored prior to reuse of that equipment for direct connection to the network. The standard plug shall be removed and restored by duly trained personnel.

2.3 Load Numbers

2.3.1 The "Load Number" assigned to each terminal device denotes the percentage of the total load allowed to be connected to a telephone loop which is used by the device. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

2.3.2 Load Numbers offer the following advantages:

- (a) They provide the user with an indicator which warns when no additional equipment should be added to a line or trunk to prevent overloading.
- (b) They provide flexibility in deciding at what specified levels certain design requirements will be met.

2.3.3 Load Numbers for terminal equipment are calculated as specified in the certification standards:

- a) An integer prefix from 0 to 100 shall be determined through testing by the largest of the Evaluation Numbers.
- b) An alphabetic suffix shall be specified in the load number in accordance with the appropriate ringing type, if applicable.
- c) The manufacturer may assign a Load Number of 100 to the terminal equipment. Requirements for such assignments are outlined in the Certification Standard.

3. LOAD NUMBER IDENTIFICATION

3.1 Load Numbers of terminal equipment (part 2.3) shall be identified by the certificate holder on the unit of certified terminal equipment and in the instruction or operating manual with the terminal equipment.

3.2 An explanatory note on Load Numbers and their use shall be provided for the terminal equipment user in the information accompanying the terminal equipment.

4. CONNECTION OF CUSTOMER-PROVIDED MULTI-LINE TERMINAL EQUIPMENT WITH PREMISES WIRING

4.1 Rules for the wiring on the customer side of the network point of connection for the installation of multiple line terminal equipment are covered in the carrier's tariffs and TAP Program documentation.

4.2 Terminal equipment shall be installed in such a manner that certification requirements will continue to be met when the terminal equipment is installed and connected to the carrier's facilities.

4.3 The installer(s) shall attest to the following installation and acceptance tests:

4.3.1 Wiring Installation Attestation

- 1) At least ten working days prior to connecting the installation to the carrier's facilities, or completing a significant addition or change to the installation, the installer shall complete Part I of the installation form (Exhibit 1), which form shall then be posted permanently on the job site.
- 2) Upon successful completion of the acceptance tests specified in CS-03 and below, the installer shall complete Part II of the Installation Attestation form, provided that should the installation, or any portion thereof, fail to meet the acceptance tests, such installation or portion thereof shall be disconnected and remain disconnected from the carrier's facilities until such time as the acceptance tests can be met and the Part II Form is completed.
- 3) An addition or change to an installation shall be considered significant when the number of extensions added, replaced or reconfigured exceeds:
 - a) 50; and,
 - b) 20 percent of the total extensions which were in place prior to such an addition or change.

4.3.2 Acceptance Tests

- 1) All applicable tests described in the Terminal Equipment Installation Wiring section of CS-03 shall be performed at each terminal equipment network interface.
- 2) In order to ensure that all the wiring conforms to requirements, appropriate test calls, as described in the Acceptance Tests subsection of CS-03, must be made to and from each major location on the customer's premises.
- 3) Major locations shall be defined as:
 - a) Each building on a customer's premises
 - b) Each floor of each building
 - c) For buildings whose floor areas are large enough that a floor is served by several telephone equipment rooms, the areas served by each equipment room.
- 4) The carrier may, at its discretion, monitor the acceptance testing on site, from its test centre, or otherwise.

- 4.4 Prospective users and installers of terminal equipment shall determine in advance of an installation, the terms and conditions, as outlined in CS03, under which the installation of the terminal equipment and associated wiring may be connected to individual carrier's facilities.

A FORM OF INSTALLATION ATTESTATION

Part I

I, the undersigned, do hereby attest that:

1. This attestation is in respect to the installation of PBX, PABX and KEY terminal equipment described below:

Certification No. _____
 Equipment type _____
 Certification Holder _____
 Model _____
 Serial # _____
 Prepared by _____
 Prepared for _____
 Dated _____

(Use separate sheets as necessary if space above is insufficient.)

2. The installation was performed by myself or under my direct supervision, and is located at _____.
3. I have been authorized by the certification holder to install the above mentioned equipment, and I meet the training and other requirements of the said certification holder.
4. The installation is in compliance with the Canadian Electrical Code, Part I issued by the Canadian Standards Association dated _____.
5. The installation is in compliance with Certification Standard CS-03.

Installer

Name _____
 Address _____
 Telephone _____

Part II

ACCEPTANCE TESTS

I hereby attest that the above installation meets the requirements of the Acceptance Tests set forth in section 4.3.2 of the Program Application Notes, TRC-52.

The carrier* did did not

monitor these tests.

Signed: _____
Installer

_____ Date

* Specific carrier name to be identified