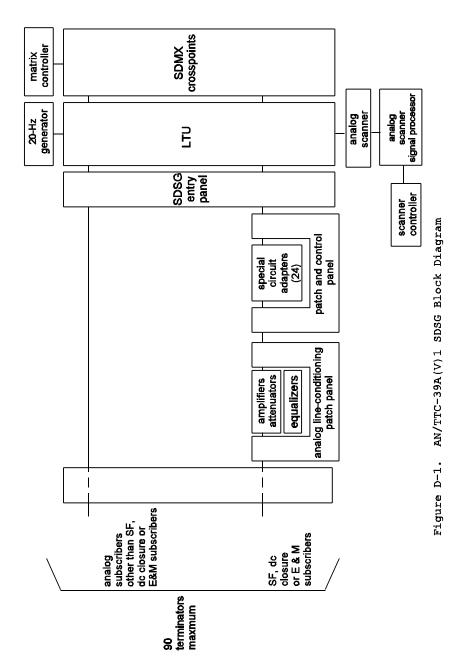
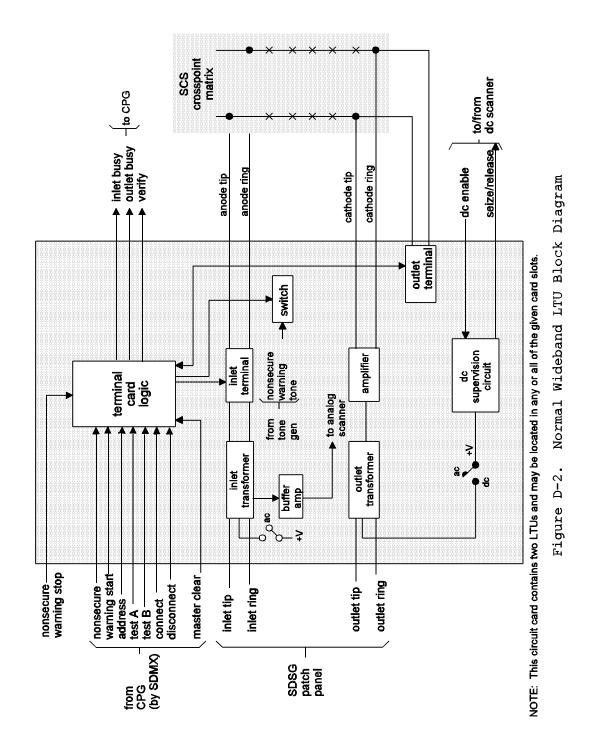
APPENDIX D

LTUS, SPECIAL CIRCUIT ADAPTERS, AND GPMDM CARDS

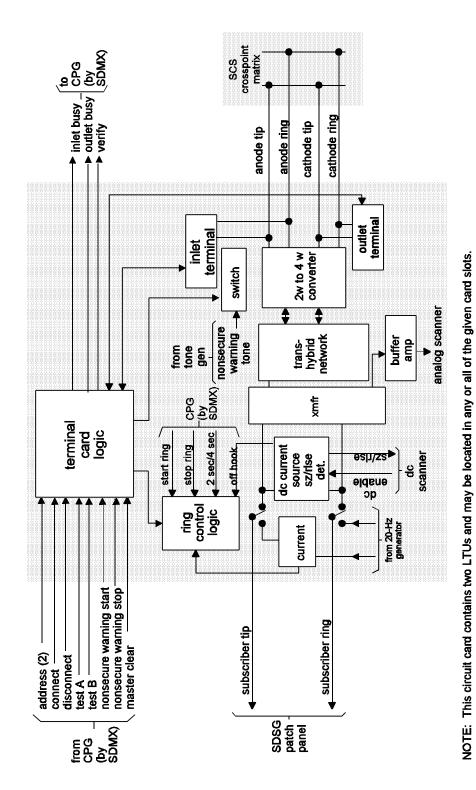
- 1. <u>General</u>. The interface between AN/TTC-39 series CSs and trunks and subscriber circuits occurs through LTUs, special circuit adapters, or GPMDM cards. Because special or unusual interfaces may be encountered by the planner and engineer, a detailed description of these cards is provided in this appendix.
- 2. AN/TTC-39A(V)1 Analog SDMX Interfaces. The AN/TTC-39A(V)1 interoperates with most analog telephones and analog trunks. Analog terminations (loops and trunks) interconnect to the SDSM by LTUs. Some circuits also need special circuit adapters as inputs to the LTUs for proper operation. See Figure D-1 for a block diagram of the SDSG. LTUs and special-circuit adapter interface parameters are outlined in the following paragraphs.
- a. <u>LTU</u>. LTUs are mounted two to a plug-in board and contain the necessary termination hybrids and associated balance networks, amplifiers, pads, equalizers, and signaling equipment to properly interface the subscriber telephone instruments and trunks with the SDSG. The SDSG has 48 card slots for subscriber LTUs, and any mix of cards may be used.
- (1) <u>NWLTU</u>. The NWLTU provides an interface between the SDMX and either a dc or tone supervised loop, trunk, or adapted line. Figure D-2 is a block diagram of the NWLTU.
- (a) The NWLTU has two modes of operation, ac or dc, selectable by strapping with a shorting plug on the PCB. When in the ac supervision mode, the NWLTU directs all supervisory tone signals to the analog scanner without performing any signal processing. In the dc mode, dc power is supplied to the subscriber by a center tap on the inlet and outlet transformers for dc phantom loop supervision. The line on-hook/off-hook status is constantly monitored and is available for the dc scanner.
- (b) When the NWLTU is used with a termination adapter such as the SF, 2,600 Hz, or E&M adapters, the supervisory straps are set to the ac position.





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- (c) The NWLTU operates in the dc supervision mode when the external phantom loop resistance (including the subset) of the loop is less than 2,100 ohms. The NWLTU operates in the ac mode with up to 2 miles of CX-4566 cable, or WF-16 telephone cable under extreme conditions. It will operate with up to 10 percent impedance unbalance in the subscriber loop.
- (d) The NWLTU will recognize a valid on-hook condition for a phantom loop resistance of greater than 6,000 ohms. The NWLTU will recognize a valid off-hook condition for a phantom loop resistance of less than 2,100 ohms.
- (2) <u>CBLTU</u>. The CBLTU (Figure D-3) provides an interface between the SDMX and a CB-supervised, 2-wire loop or trunk.
- (a) The CBLTU contains a dc source combined with a seize/release detector circuit that has an output to the dc scanner. The dc source supplies talking power to the 2-wire CBLTU telephone when the instrument is off-hook. The seize/release detector circuit monitors the dc current flow in the 2-wire line and passes the incoming on-hook/off-hook states to the dc scanner. A third winding on the line transformer is provided for detection of DTMF digits C and 0. The CBLTU sends a 20-Hz ring to a 2-wire subscriber upon receipt of the start ring command from the central processor. The CBLTU is transparent to DTMF signaling tones received or sent from receiver/sender lines connected to the CBLTU at the SDMX.
- (b) The transhybrid network, an impedance matching circuit, presents a nominal 600-ohm resistive impedance in both the receive and transmit directions from the 2-wire to 4-wire converter. The 2- to 4-wire converter transforms the CBLTU 2-wire input terminal to a 4-wire appearance at the switching matrix. The 2- to 4-wire converter permits a 2-wire subscriber to be connected to a 4-wire subscriber. The CBLTU operates over wire lines having a maximum loop resistance of 900 ohms, including the dc resistance of the terminating equipment. Below are CBLTU signaling characteristics:
- $\underline{1}$. The CBLTU provides a minimum dc loop current of 40 mA and a maximum of 50 mA, measured at the CBLTU from a nominal 48 Vdc source to a 900-ohm resistance.



- $\underline{2}$. A dc current flow of 10 mA or more is recognized as an off-hook condition.
- $\underline{3}$. The CBLTU detects incoming dial-pulse digits at signaling rates of 7.5 to 12 pps, with break intervals from 47 percent to 67 percent.
- $\underline{4}$. The CBLTU provides a 20-Hz ring voltage from the ring generator to a telephone set having a 20-Hz impedance of 500 ohms or greater in the on-hook condition.
- $\underline{\mathbf{5}}.$ The CBLTU provides dc and 20-Hz ac current limiting.
- (3) $\underline{20\text{-Hz LTU}}$. The 20-Hz LTU, see Figure D-4, provides the interface between the switching matrix and 20-Hz ringdown loops and trunks. It provides a 2-wire 20-Hz ringdown capability on loops, and two-way ringdown with idle tone on trunks.
- (a) The subscriber's two incoming wires are connected to the terminal circuit that contains a 20-Hz detector. This detector detects the 20-Hz signal from the subscriber and informs the dc scanner. The 2- to 4-wire converter transforms the 2-wire-wire input terminal to a 4-wire set to the switching matrix.
- (b) A terminal classmark restricts idle tone use except when the terminal circuit is used to service a trunk. The 20-Hz ringdown terminal is classmarked to provide one of the following modes of operation:
 - 1. 20-Hz ringdown loop.
 - 2. 20-Hz ringdown trunk.
- (c) A Start ring signal to the terminal results in a two-second ring signal applied to the outgoing 2-wire terminal. A Start Idle command initiates the sending of a 1,050-Hz signal at -14 dBm on the outgoing 2-wire pair. Conversely, this tone is shut off by the Stop Idle command.
- (d) The 20-Hz detector responds to ring signals of frequency between 12 and 25 Hz and amplitudes between 25 V_{rms} and 110 $V_{rms}.$ The 20-Hz detector is not affected by polarity of the signal, and it is insensitive to grounding on either side of the 2-wire subscriber line.

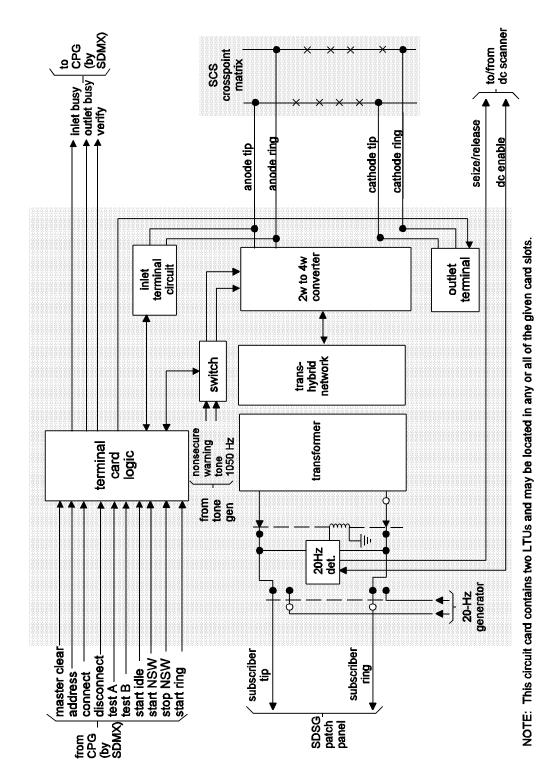


Figure D-4. 20-Hz LTU Block Diagram

- (4) 1,600-Hz LTU. The 1,600-Hz LTU connects the SDMX with 4-wire trunks (see Figure D-5). It provides two-way 1,600-Hz ringdown service with idle tone and provides the interface with equipment that uses HF trunks and the SB-3082.
- (a) Each 1,600-Hz LTU provides one of the following modes of operation, selectable by classmark:
- $\underline{1}$. 1600-Hz ringdown trunk (manual incoming).
- $\underline{2}$. 1600-Hz ringdown trunk (automatic incoming, SB-3082).
- (b) A Start Idle command initiates the sending of a 1,050-Hz signal at $-14~\mathrm{dBm}$ on the 1,600-Hz LTU transmit lines. Conversely, this tone is shut off by the Stop Idle command.
- (c) The 1,600-Hz detector characteristics are as follows:
 - 1. Levels: From +10 dBm to -25 dBm
 - 2. Frequency: 1,600 Hz ± 2 percent.
- $\underline{3}$. Tone Duration: A minimum of 130 ms ± 20 dc scanner after a minimum continuous tone duration of 700 ms \pm 20 percent.
- (5) <u>DSN (AUTOVON) LTU</u>. The AVLTU, see Figure D-6, interfaces with overseas DSN telephones. These are 4-wire subsets employing 15-button DTMF signaling, dc loop supervision on the subset transmit terminals, and dc ringing on the receive terminals.
- (a) The AVLTU is compatible with overseas DSN telephones when the dc resistance of the switch's receive and transmit loops from the switch to the telephone (inclusive of the telephone) is not greater than 900 ohms. A nonsecure warning tone is gated to the subscriber, under CS central processor control, when the DSN telephone is classmarked as a secure terminal but conditions denote a nonsecure connection.
- (b) The AVLTU operates with wire lines that have a loop resistance no greater than 900 ohms, including the dc resistance of the terminating subset for both

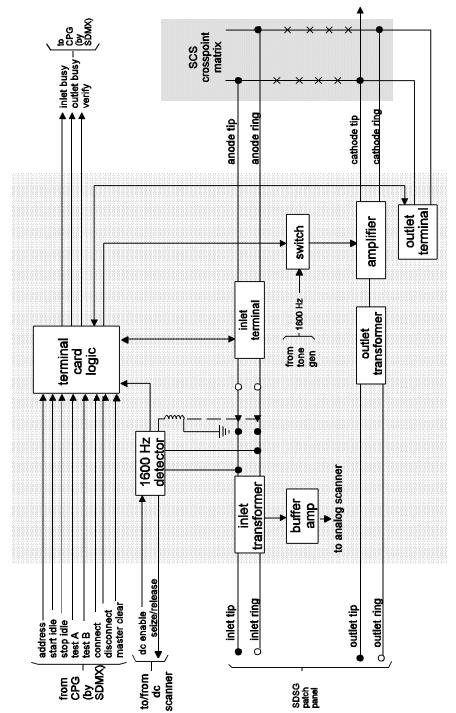


Figure D-5. 1,600-Hz LTU Block Diagram

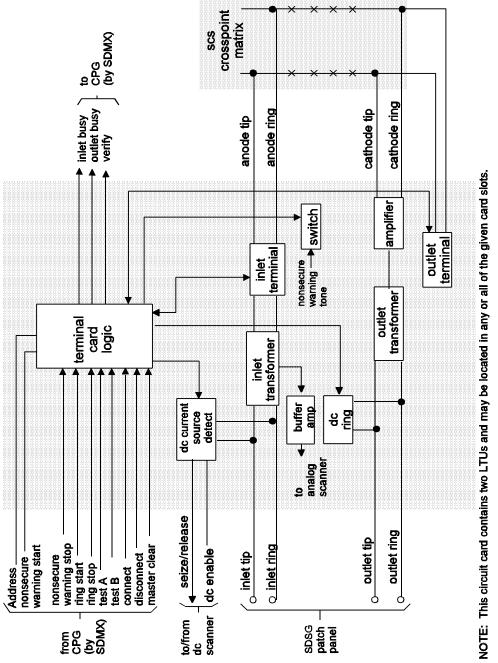
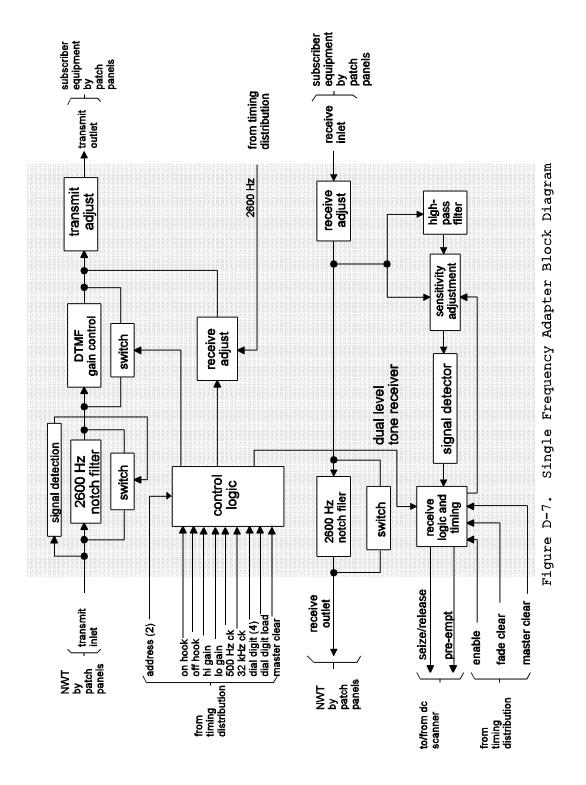


Figure D-6. DSN (AUTOVON) LTU Block Diagram

transmit and receive loops. The AVLTU has the following signaling characteristics:

- $\underline{1}$. Recognizes a dc current flow in the telephone transmit pair of 10 mA or less as a valid on-hook condition. A dc current flow of not less than 30 mA is recognized as a valid off-hook condition.
- $\underline{2}$. Provides to the telephone receive pair a dc ring current not less than 35 mA, measured from a nominal 48-V source to a 900-ohm load.
- b. <u>Special Circuit Adapters</u>. The AN/TTC-39A(V)1 has up to 24 special circuit adapters that permit the SDMX to interface with SF (2,600 Hz), E&M supervised, and dc closure subscriber loop and trunk equipment. (See Figure D-7.)
- (1) <u>SF (2,600 Hz) Adapter</u>. The SF adapter interfaces with a class of equipment that uses SF (2,600 Hz) supervision and control signaling. The SF adapter provides a 4-wire interface to the external equipment and is compatible with standard SF-type signaling systems. In addition, the SF adapter provides seize, release, dialpulse, wink-start, and preempt signal detection. The software interprets these signals in accordance with the SF adapter classmark. The classmark is also used to determine the signaling method: MF, DTMF, or dial-pulse.
- (a) The SF adapter consists of a 2,600-Hz tone receiver with (1) logic and timing, (2) 2,600-Hz transmit control logic, (3) transmission-level coordination circuitry, and (4) 2,600-Hz notch filters with control to restrict the signaling tone to a single trunk.
- $\underline{1}$. The SF tone receiver has a guarding action to prevent voice simulation of signaling tone. To accomplish this, the limiter capture effect is employed in the dual-sensitivity level (HI and LO level) receiver channel.
- $\underline{2}$. Initial onset of signaling time is recognized only as a long duration of HI level tone. Initial onset of LO level tone, or of a HI level tone, of duration less than that specified, is ignored by the SF receiver logic.



- (b) The SF receiver performs signal detection while interpretation of the signal intent, on the basis of sequence and time of occurrence, is performed by the dc scanner and processor. Seven signals are interpreted: seize, wink, start, answer, preempt, dial pulse, precedence alert, and release.
- (c) SF transmit control logic consists of the necessary circuitry to receive software commands from the SCG to control the transmission of the 2,600-Hz signaling tone. Signal timing is done by the SF adapter.
- (d) Upon receipt of an on-hook signal, the SF adapter begins transmitting SF tone to the external interface. The off-hook command removes the SF tone from the line.
- (e) A power-on clear circuit places the transmit path in the on-hook (LO level SF transmitting) state, with the DTMF pad removed (HI gain), during system startup.
- (f) The HI level receiver operates with an input level at the SF in the range of -16.0 to -4.0 dBm (-10 dBm \pm 1.5 dB transmit tolerance, \pm 4.5 dB facility tolerance).
- (g) The LO level receiver operates with an input level at the SF in the range of -31 to -13 dBm (-22 dBm \pm 9 dB). Bandwidth of the receiver channel, at the detection threshold, is at least 30 Hz but not greater than 100 Hz, centered at 2,600 Hz.
- (h) An integration time of 140 ms ± 5 percent precedes the report of a low level 2,600-Hz tone below threshold. This condition is interpreted as seize. In addition, the receiver signal processor switches the channel sensitivity from LO to HI.
- (i) The receive logic then begins tracking the HI level SF tone after a 170 ms \pm 5 percent absence of SF tone. Once tracking has begun, the presence of a HI-level SF tone is reported as a release; absence is reported as a seize, without delay.
- (j) The receive logic stops tracking SF tone and switches the receiver back to LO sensitivity after receiving 250 ms \pm 10 ms of HI level tone.

- (k) The SF tone is 2,600 Hz \pm 5 Hz and is transmitted at -10 dBm \pm 1.5 dB for 500 ms \pm 20 percent or until the off-hook signal is received. If off-hook has not been received when the timeout occurs, the SF tone continues to be sent, but at -22 dBm \pm 1.5 dB until off-hook is received.
- (1) Upon command of the processor, the adapter outputs dial pulses at the rate of 10 \pm 0.5 pps at -10 dBm \pm 1.5 dB. The percent interval break (presence of 2,600 Hz) is 60 \pm 1 percent.
- (m) Transmission-level adjustment is performed in both transmit and receive (relative to the AN/TTC-39A) directions. The adjustment is continuously variable over the following minimum ranges, in decibels. A 6-dB pad is switchable into and out of the transmit path upon receipt of the LO-gain and HI-gain adapter commands. (See Table D-1.)

Direction Range

Transmit +10 to -15 dB

Receive +10 to -10 dB

Table D-1. SF Adapter Adjustment

- (2) <u>DC Closure Adapter</u>. The dc closure adapter provides the AN/TTC-39A(V)1 with an interface to commercial central offices and PBXs through a subscriber line. (See Figure D-8.) Incoming seizure is a high-level, 20-Hz ring signal. Outgoing seizure is by dc loop closure. Outgoing signaling is DTMF or dial pulse, as determined by classmark.
- (a) The dc closure adapter consists of dial-pulse control logic, a 2- to 4-wire network (converter and transhybrid network), a 20-Hz ring detector, a dc current sink, and a 2,600-Hz band elimination filter.
- (b) The dial-pulse control logic consists of the necessary circuitry to receive digital dial-pulse information from the switching controller group and out-pulse data in the proper sequence. Upon receipt of an off-hook command, the dial-pulse control logic energizes a dc closure relay if no ring signal is present, thereby closing the voice path. After loading a dial digit, dial

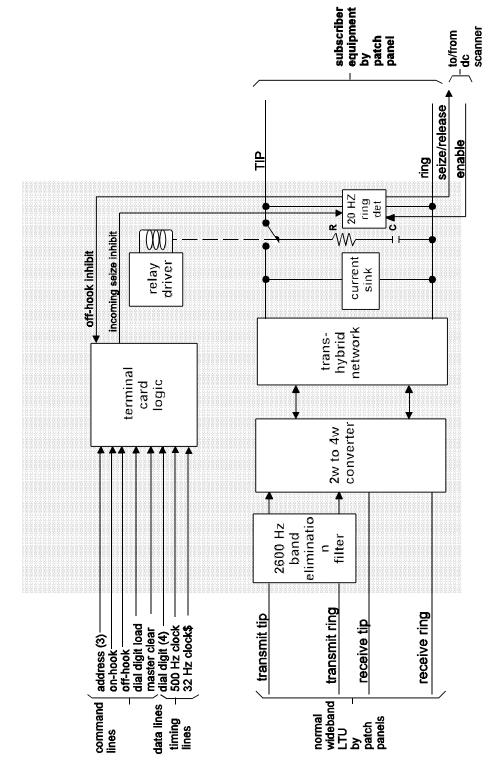
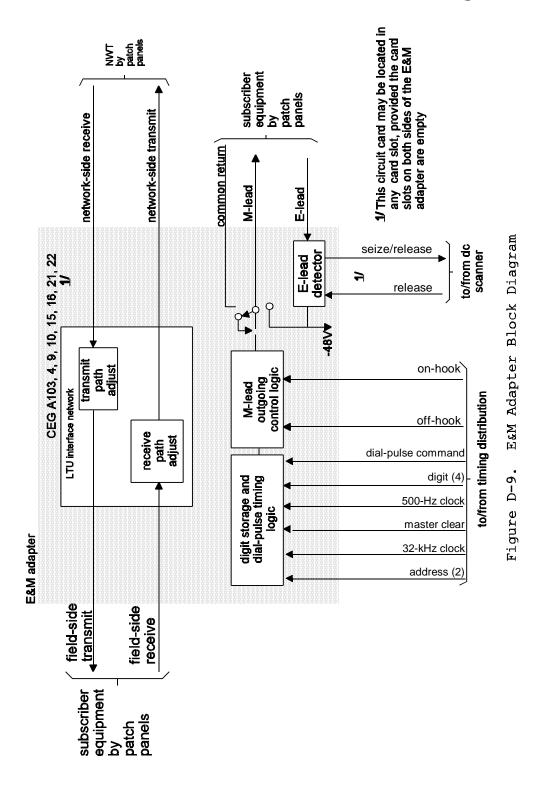


Figure D-8. DC Closure Adapter Block Diagram

pulsing is initiated. Upon completion of dial pulsing, the voice path remains closed until the dc closure relay is deenergized by an on-hook signal.

- (c) The 2- to 4-wire converter transforms the 2-wire input/output terminal of the dc closure adapter to a 4-wire appearance at the NWT interface. The 2- to 4-wire converter permits a 2-wire subscriber to be connected to a 4-wire subscriber at the switch. The transhybrid network is an impedance matching circuit that presents a nominal 600-ohm resistive load in both the receive and transmit directions from the 2- to 4-wire converter.
- (d) The dc current sink provides a low-impedance dc patch across the 2-wire interface to the nominal 40-mA service current supplied from the central office. It incorporates a current limiter and appears as a high ac impedance to prevent loading the dial-pulse output signals. If no off-hook condition exists, the 20-Hz ring detector detects incoming seizure from the commercial central office. After an initial timeout to guard against false seizure, the dc closure adapter detects the seize condition.
- (e) The 2,600-Hz band elimination filter is required in the transmit path to prevent 2,600-Hz tones generated in the tactical network from entering commercial switching networks.
- (f) Outgoing dial pulsing is at a repetition rate of 10 pps, with a 60 percent break. The dc current sinks no less than 20 mA of loop current when terminating a loop resistance of 1,800 ohms from a 48V floating supply. The circuit limits the maximum loop current to 60 mA regardless of loop resistance.
- (g) The 20-Hz ring detector detects signals of frequencies between 16-2/3 and 33-1/3 Hz and amplitudes between 25 and 150 $V_{rms}\,.$
- (3) <u>E&M Adapter</u>. The E&M adapter, with a 6-wire trunk termination, provides the AN/TTC-39A(V)1 with an interface to commercial PBXs and commercial central offices (see Figure D-9). The adapter, in conjunction with an NWT, interfaces with the SDMX. The E&M adapter interfaces with 6-wire E&M converter units similar to the WESCOM 452 FWA for conversion to commercial 4-wire trunks. The E&M



adapter circuit is divided functionally into the dc signaling circuits and the voice path circuits.

- (a) The E&M signaling pair provides duplex dc signaling over the interface. The dc signaling circuits contain an E-lead detector circuit with an output to the dc scanner and outgoing control circuits to switch the M lead from ground to -48V. Outgoing dc signaling over the interface is by M-lead and common signal return. The output of the E-lead detector circuit provides the incoming signaling information and dial-pulse digits to the dc scanner. The adapter outpulses digits as they are received from the processor. The processor controls interdigit timing.
- (b) The adapter is transparent to VF signals. The voice path of the LTU interface circuit consists of a balanced receive pair and a balanced transmit pair that interface with the NWLTU. Transmit and receive adjustments are provided on the adapter to meet transmission requirements over commercial trunks. AC signaling, if used, is by means of the NWLTU and receiver/sender units connected to the crosspoint matrix.

1. Transmission-Line Characteristics

<u>a.</u> Four-Wire Voice Transmission Path. The adapter operates over voice-grade, private-line facilities that have a nominal VF bandwidth from 300 to 3,500 Hz. The terminating impedance at each end of the voice lines is 600 ohms.

<u>b.</u> <u>Supervisory and DC Signaling</u>
<u>Paths</u>. The maximum loop resistance of the E-lead, or the M-lead, and the common signal return lead does not exceed 100 ohms.

2. Signaling Characteristics

a. Outgoing Signaling. In the idle condition, the E&M adapter provides a ground on the M-lead. To seize the trunk, the adapter switches the M-lead from ground to a -48 V source. The adapter provides a minimum dc-loop current of 13 mA over the M-lead and the commonsignal return lead when total loop and terminating resistance is 2,600 ohms maximum. The M-lead connected to -48 V is the busy condition.

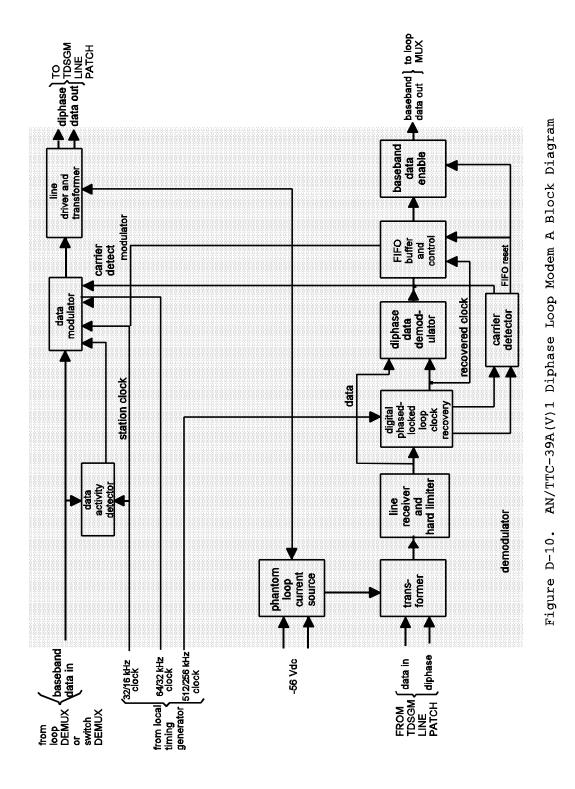
- <u>b.</u> Outgoing Dial Pulsing. The adapter outpulses at a rate of 10 pps over the M-lead and the common return. When outpulsing digits, the adapter alternately switches the M-lead from -48 V to ground (break) and back to -48 V (make). The percentage interval break is 60.
- c. <u>Incoming Signaling</u>. Incoming signaling is on the E-lead. In the idle condition, the E-lead is open. The E-lead connected to the common return is seize/busy. A dc current flow of 5 mA or less over the E-lead is recognized by the adapter as the idle condition. A current flow of 15 mA or more is recognized as a seize/busy condition.
- <u>d</u>. <u>Incoming Dial Pulsing</u>. The adapter detects incoming dial-pulse digits at signaling rates of 7.5 to 12 pps, with break intervals from 47 percent to 67 percent.
- \underline{e} . Current Limiting. The adapter provides dc current limiting on the E&M leads. The maximum current over the M-lead is less than 40 mA. The maximum current over the E-lead is less than 30 mA.
- \underline{f} . AC Signaling. The adapter passes all call progress tones (dial tone, ringback, busy, etc.) between the trunk and the LTU over the 4-wire transmission path. Transmission-level adjustment is provided in both transmit and receive (relative to the AN/TTC-39A(V)1) directions. The adjustment is continuously variable over the minimum ranges shown in Table D-2.

Table D-2. E&M Adapter AC Signaling Ranges

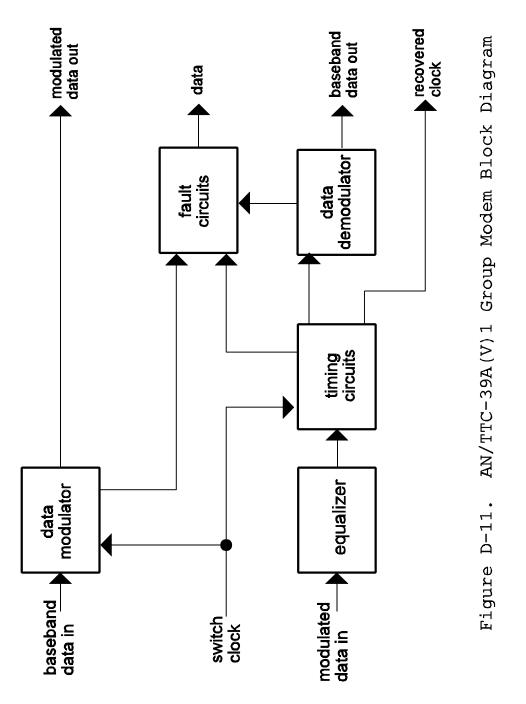
Direction	Range
Transmit	+10 dB to -15 dB
Receive	+10 dB to -10 dB

3. $\frac{AN/TTC-39A(V)1}{Digital} \frac{TDMX}{Interfaces}$. Interface to the AN/TTC-39A(V)1 TDSGs is through the DLPMA for individual loops and through the GPMDM for DTGs.

- a. <u>DLPMA</u>. The DLPMA provides an interface between the TDSG and a digital telephone, DSVT, or DNVT. A block diagram of the DLMPA is shown in Figure D-10.
- (1) The DLPMA consists of a modulator and a demodulator. The DLPMA modulator accepts baseband data at 32 or 16 kbps and converts baseband data to conditioned diphase data. No changes are required on the card to change from 32 kbps to 16 kbps. The modulator's output goes to a line driver and transformer. The line driver accepts diphase data from the data modulator and transmits it by the WF-16 telephone cable. A transformer is used to couple the 3.0 V peak-to-peak diphase signal to the WF-16 telephone cable. The output impedance is 125 ohms.
- (2) The DLPMA demodulator accepts conditioned diphase data and converts it to baseband data. Associated with the demodulator is the clock recovery and data retiming circuitry.
- (3) The maximum steady-state loop current allowed is 188 mA. A jumper plug is used to disable the phantom loop whenever the local battery mode of operation is required.
- (4) The DLPMA provides single-channel, full-duplex transmission of binary signals at a 32-kbps rate, and processes data from a single subscriber at a 32-kbps rate. The DLPMA also accommodates a data rate conversion to 16 kbps. The DLPMA transmits/receives data over WF-16 telephone cable lengths of up to 4 km. The transmitted carrier output level is 3 Vp-p +0.3 V. The receiver responds to signals that exceed +40 mV with respect to the common mode voltage. The carrier detector does not exhibit a random BER in excess of 1 bit in 106 when operated over any wire length up to and including 4 km. Four DLPMAs are packaged on a PWB assembly.
- (5) The DLPMA board has one strap for selecting the -56 V option. See Appendix D and TM 5805-747-12-3 (TO 31W2-2TTC39-91-3) for strapping details.
- b. $\underline{\text{GPMDM}}$. Figure D-11 shows a block diagram of the AN/TTC-39A(V)1 GPMDM. Diphase groups can be strapped for 4 1/2 to 144 channels, or 9-channel modularity, and a group rate of 72 kbps to 4,608 kbps. Dipulse groups can have from 9-72 channels, MOD 9, with rates from 288 kbps to 2,304 kbps.



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- (1) AN/TTC-39A(V)1 groups and their associated equipment, i.e., the GPMDM, group buffer, group framing, group clock, EOW, and NCMD functions, are strapped by the switch supervisor using the ADT (DTG) command. Specific entries required for configuring digital groups are discussed in Chapter V.
- (2) GPMDM cards may be installed in the TDSGM card nest in slots A4-01 through A4-18, and A4-29 through A4-41. Each card occupies a single slot. Immediately to the right of the GPMDM card, a slot is reserved for the group's OW card, the TGMOW. (The TGMOW card incorporates the group buffer, groupframing, and group output functions for framing and synchronizing DTG data. It has a separate circuit for the OW function.) If an LSCDM is used, the associated GPMDM card is installed in slot A4-40, as it replaces either group 15 (on TDSGM frame 1) or group 30 (on frame 2). The LSCDM's group buffer card is installed in slot A4-39. See Section 6-28 of TM 11-5805-747-12-3 (TO 31W2-2TTC39-91-3).
- 4. AN/TTC-39A(V)4 and AN/TTC-39D Digital LTUs. The AN/TTC-39A(V)4 is equipped with seven DLTUs (six, -39D). Five DLTUs are used to terminate local analog loops and trunks. The DPLMA (discussed in subparagraph 3a) is used to terminate digital loops, and the NATO interface LTU is used as a remote interface in the line termination module.
- a. $\underline{4\text{WLTU}}$. The 4WLTU performs signaling protocol conversion to allow standard AN/TTC-39 code word exchanges with the CS. There are four circuits on the PCB, all of which are controlled by a single micro-processor. The 4WLTU consists of the following: a code word generator/detector, a CVSD encoder/decoder, a DTMF transmitter and receiver, a tone generator and tone detector, and a microprocessor.
- (1) The 4WLTU interfaces with the TDSGM patch panel or the ALTG patch panel on the line side of each circuit, and with the loop MUX/DEMUX or group MUX/DEMUX on the switch side of each circuit. The 4WLTU operates in any LTU card slot in the ALTG or in either TDSGM. When used in the top row of the ALTG, the card normally goes in the left card slot of each pair, and the right slot must be vacant. If it is inserted in the right paired slot, only the first two circuits are used. In this case, an MFLTU or TCLTU can be used in the left slot.
- (2) The 4WLTU operates in either the ac supervised local or CB mode. In the local battery mode, it operates

with up to 2 miles of CX-4566 cable or WF-16 telephone cable.

- (3) The 4WLTU cannot detect 570 Hz. Detection of the 570-Hz release acknowledge is assumed in outgoing release processing. During switch-supervisor-initiated trunk tests and periodic trunk tests, and for detecting SEIZE ACK from converter trunks, the 570-Hz test card is used to detect the 570-Hz signal.
- b. $\underline{2\text{WLTU}}$. The 2WLTU provides a general interface between 2-wire subscribers and the TDMX. The 2WLTU has four circuits per PCB. The 2WLTU interfaces with the TDSGM and ALTG as discussed in subparagraph 4a(1) above. In the CB mode, the 2WLTU operates over wire lines using 2.5 miles of WF-16 telephone cable terminated on a CB telephone.
- c. <u>TCLTU</u>. The TCLTU provides a general interface between 2-wire dc closure and 20-Hz ringdown supervised analog loops and trunks and the TDMX.
- (1) The TCLTU has two circuits per PCB and consists of a code-word generator-detector, a CVSD encoder-decoder, a DTMF transmitter, dc closure/dial-pulse line switches, a 1,050-Hz tone generator, a dc current sink, a 20-Hz ring detector, a 20-Hz generator switch, and a microprocessor.
- (2) The TCLTU typically interfaces with the ALTG patch panel on the line side of each circuit, and with the loop MUX/DEMUX or group MUX/DEMUX on the switch side of each circuit. The TCLTU is normally installed in the top row of the ALTG. The ALTG is wired to accommodate cards packaged two circuits per card. The TCLTU can be installed in either or both of the paired card slots. The TCLTU can also be used in the lower row of the ALTG and in TDSGM1 or TDSGM2 (except for 20-Hz ringdown line types, which cannot be used on TDSGM2). However, use of the third and fourth terminations assigned to the card slot is lost.
- d. <u>MFLTU</u>. The MFLTU connects the CS to a variety of trunks that use SF and MF, DTMF, or dial-pulse signaling, e.g., DSN. The MFLTU contains two circuits per PCB.
- (1) The trunk interface consists of a balanced transmit pair and a balanced receive pair. It is used for the transmission of analog voice and signaling information. All switch-side information is exchanged digitally at the switch rate (16 or 32 kbps). The MFLTU detects and generates 2,600-Hz SF signals used to represent seize, release,

preempt wink, and wink-start signals.

- (2) The SF receiver operates in two modes of sensitivity, high and low. If the low level SF tone drops below threshold, the tone absence is considered the beginning of a seize. If the tone is absent for $140~\mathrm{ms}$, the absence is considered a seize indication, and processing is performed for the programmed line type. If the tone is absent for only $200~\pm~40~\mathrm{ms}$, the tone absence is considered a wink start. After the SF receiver detects a valid seize, it changes to the high-sensitivity mode.
- (3) The MFLTU is capable of MF (incoming and outgoing, confirmation and nonconfirmation), dial-pulse (incoming and outgoing), and DTMF (incoming only) signaling. When programmed for DTMF/DP mode, the MFLTU identifies the incoming digitizing type (either DTMF or DP) based on the first received digit.
- (4) Adjustment procedures for the MFLTU are found in paragraph 6-40 of TM 11-5805-778-12-3 (TO 31W2-TTC39-201-3).
- e. <u>EMLTU</u>. The EMLTU provides the CS with standard Type I E&M trunking capability. The EMLTU provides the interface between the 6-wire trunk and the TDMX.
- (1) The EMLTU contains two circuits per PCB, both of which are controlled by a single microprocessor. Because a single E&M trunk employs six wires plus a ground, the EMLTU uses four terminations on the network side for the two circuits. Only the first and third are assigned in the switch database.
- (2) The EMLTU consists of a code-word generator/detector, an MF transceiver, an E&M lead control, level adjustments, and a microprocessor. The EMLTU typically interfaces with the TDSGM patch panel or the ALTG patch panel on the line side of each circuit and with the loop MUX/DEMUX or group MUX/DEMUX on the switch side of each circuit. The EMLTU is independently programmable for either dial-pulse or MF signaling operation, central office or carrier equipment mode, and either wink or timed start.
- f. NILTU. The (AN/TTC-39A(V)4) is equipped with four NILTU, each which terminates two 6-wire E&M dc supervised analog trunks (total of eight), and provides A/D and D/A conversion.

- (1) The NILTU consists of a code-word generator, a CVSD encoder/decoder, an E&M lead control, and a microprocessor.
- (2) The NILTU is located externally to the switch, in the LTU CV-4180(V)2/T. It interfaces with the TDSGM SEP on the line side of each circuit as two channels in a DTG. The NILTU channels connect the TDMX through the group MUX/DEMUX on the switch side.
- (3) The NILTU card operates in any DLTU card slot, but the interfacing NATO analog cable is not designed to directly connect to the switch. It connects to the CV-4180.
- (4) In the AN/TTC-39D, the analog NATO interface is accomplished using the NIU (CV-3478) which is connected through the MFLTU.
- 5. AN/TTC-39A(V)4 and AN/TTC-39D Digital TDMX Interfaces. These switches also use the DLPMA and GPMDM to terminate digital loops and DTGs, as discussed in paragraph 3, for the AN/TTC-39A(V)1.
- 6. <u>CBCS Cards</u>. Subparagraphs a through d provide information on TEP card changes.
- Routing Subsystem Buffer/Data Adapter (RSB/DA). The RS/BDA card is required to interface with the routing signaling channel of the adjacent switch. The RSB/DA is compatible with the TSB slot and is configured in the same modularity of two per card. The RSB/DA replaces the trunk signaling device (TSD) and DA functions performed by the RSS routing processor in flood-search routing switches. RSB/DA is capable of operating in a switch with either a 16 or 32 kbps switch rate. Upon processor controlled strapping, the RSB/DA performs the function of either two RSB circuits or one RSB circuit and one DA circuit. Each RSB circuit provides an interface between the remote signaling buffer interface (RSBIN), which is an extension of the SBC, and the RSS signaling channel which occupies one 16 or 32 kbps channel of a DTG. Each RSB has a dedicated full duplex port on the TDMX such that it can be connected to the RSS channel of any DTG, just like the TSB. The RSB and the TSB connections are both assigned with the ATG command. DA circuit provides an interface between either the RSBIN and a SCC/IST and an asynchronous, serial RS-422, interface to a NMF. Like the RSB, the DA circuit has a dedicated full-duplex TDMX port such that it can be connected to any SCC trunk or IST.

- b. Routing Signaling Buffer Controller (RSBC) CCA. The RSBC card is used in the CDS and SMU to provide a similar capability as the RSB/DA in the existing AN/TTC-39 series and MSE family of switches (see paragraph 4 above). RSBC is compatible with the a controller slot in the CDS and SMU switch nest and is capable of operating in a switch with either a 16 or 32 kbps interface rate. The RSBC performs the function of six RSB circuits, one DA circuit, and the signaling buffer controller (SBC) circuitry to accommodate the RSBs and DA. Each RSB circuit and the associated SBC circuitry provides an interface between the input/output controller (IOC) and a RSS signaling channel occupying one 16 or 32 kbps channel of a DTG. Each RSB has a dedicated full-duplex port on the matrix such that it can be connected to the RSS signaling channel of any DTG. The DA circuit and the associated SBC circuitry provides an interface between the IOC and a nodal control terminal (NCT)/system control center/interswitch trunk and, at a different time, the interface between an NCT/SCC/interswitch trunk, and an asynchronous, serial, RS-422, interface to the local NMF. Like the RSB, the DA circuit has a dedicated full-duplex matrix port such that it can be connected to any NCT, SCC trunk, or IST.
- Input/Output SCSI Link Controller (IOSL) CCA. IOSL is used in the AN/TTC-39 series and MSE family of switches to provide an interface between the Litton processor and the hard and floppy disks used for storage of the circuit switch online operating program (CSOLOP) and circuit switch databases. The AN/TTC-39A(V)3 and A(V)4 will be equipped with two IOSLs floppy disk drive, and the supporting wiring changes as a part of the magnetic tape transport (MTT) replacement associated with the CSR TEP implementation. The IOSL is the interface between the Litton processor, with its input/output exchange (IOE) bus, and the hard and/or floppy disks with their SCSI bus. provides two IOE bus interface ports and an SCSI bus interface port. Either of the IOE bus interface ports will have the capability of being connected to the SCSI bus interface port. The IOSL is capable of handling all SCSI specified command types and performs in both single and multiple initiator environments.
- d. <u>Quad Memory Cards</u>. To accommodate the increased software memory size, 1 Megaword of memory is required in each Litton L-3212A processor. For switches which now contain one Quad Memory Card, one additional card is required per processor. For switches which presently contain four single density Litton memory cards, these cards

can still be used in conjunction with each Litton L-3212A processor. An additional Quad Memory Card is provided as part of the CSR TEP implementation program. The additional Quad Memory Card can be used with the existing Quad Memory Card or four single density Litton memory cards.

APPENDIX E

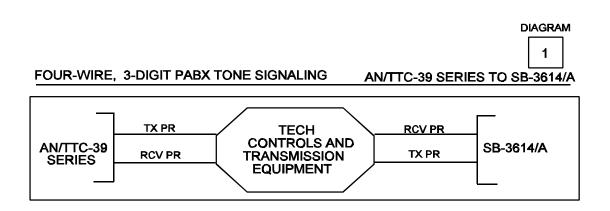
CIRCUIT SWITCH INTERFACE PLANNING GUIDES

- 1. This appendix provides the planner-engineer with a set of circuit switch trunk interface planning guides (CSIPG). These guides are a series of tables and diagrams that describe and depict each type of interswitch trunk. The CSIPG will aid in determining which of the circuit switches and switchboards interface with each other. Other information such as signaling and supervision characteristics, tone levels, etc., is also provided.
- 2. Table E-1 is a matrix indicating the various trunk interfaces applicable to each individual circuit switches and switchboards described in Chapter II and Appendix B. The number cited in each table reflects the diagram number depicting the interface. The trunk configurations are illustrated in Figures E-1 through E-41. The interface planning guides are found in Tables E-2 through E-42.

Table E-1. EAC Circuit Switch Trunk Interfaces

	AN/TTC-39 Series	AN/TTC-42	SB-3865	SB-3614/A	DSN	NATO (Analog)	Commercial
AN/TTC-39 Series	12, 13	14, 15	16, 17, 18	1	19, 20	25	21, 22, 23, 24
AN/TTC-42		26, 27	28, 29, 30	2	31		32
SB-3865			33, 34, 35	5, 6	8		
SB-3614/A				3, 4			37
SB-3614A	9	8	7		11		
AN/TTC-46	38 <u>1</u> /						39, 40
AN/TTC-48	41 <u>2</u> /						40

- $\underline{1}$ / At EAC the AN/TTC-46 (LENS) interfaces normally with the AN/TTC-39D.
- $\overline{2}$ / At EAC the AN/TTC-48 (SENS) normally interfaces with the AN/TTC-39A(V)1, AN/TTC-39A(V)4, or AN/TTC-39D.



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge Restart DTMF Digits Ring Dial Tone, Ringback Preempt, Error	2,250 2,600 570 852/1,209 697/1,633 570 425 440	-7 -7 -7 -7 -7 -7 -14 -14
		Receive Level (dBm)
Seize Release Acknowledge Restart DTMF Digits Dial Tone, Ringback Preempt	2,250 2,600 570 852/1,209 697/1,633 500 1,000	-22 to 0

Receive Level (dBm)
<u>1</u> / -20 to 0
Transmit Level (dBm)
-7 -7 -7 -7 -7 -14 -14

NOTE: All levels shown are for single tones.

 $\underline{1}$ / For SB-3614A, Dial Tone, Ringback, and Preempt Receive Levels are -10 dBm max.

Figure E-1. Four-Wire 3-Digit PABX Tone Signaling (AN/TTC-39 Series to SB-3614/A)

Table E-2. CSIPG, AN/TTC-39 Series to SB-3614/A

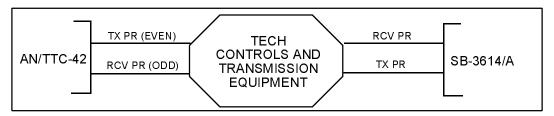
See Diagram 1

	See Diagram 1	
Switch	AN/TTC-39 Series	SB-3614/3614A
Number of Circuits	AN/TTC-39A(V)1 - 96 AN/TTC-39D and AN/TTC-39A(V)4-56	18
Terminal Card	AN/TTC-39A(V)1, LTU/NWT 4WLTU, AN/TTC -39D/AN/TTC-39A(V)4	Type III (PABX Mode)
Special Adapters		
Incoming Call	Call is routed automatically to the called party.	Call is routed automatically to the called party.
Outgoing Call	Subscriber dials called number (P+9+7 digits) and is connected without operator intervention. If any precedence above Routine has been dialed, the AN/TTC-39 series sends the recall digit (R) followed by the 3-digit address (XXX).	Subscriber dials (using a CB DTMF telephone) priority, if required, and a 3-digit trunk number (P + 9SL). Upon hearing second dial tone, the subscriber then dials (DTMF) as an AN/TTC-39 series subscriber.
Precedence/Preemption	5 levels - FO, F, I, P, and R	2 levels - Priority and Routine
Restrictions/Special Instructions	Use terminal type 31.	Subscribers with TA-312 or TA-236 type telephones must use operator assistance to call another switch. The SB-3614A will use this type interface only if a Type VI card is not available.

DIAGRAM 2

FOUR-WIRE 3-DIGIT PABX TONE SIGNALING

AN/TTC-42 TO SB-3614/A



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge Restart DTMF Ring	2,250 2,600 570 852/1,209 697/1,633 570	-7 -7 -7 -7 -7 -7
Dial Tone Ringback Preempt, Error	425 440	-14 -14
		Receive Level (dBm)
	2,250 2,600 570	
Seize Release Acknowledge Restart DTMF Dial Tone, Ringback	2,600	

Receive Level (dBm)
<u>1</u> /
-20 to 0
Transmit Level (dBm)
-7 -7 7
-7 -7 -14
-14

NOTE: All levels shown are for single tones.

 $\underline{1}/$ For SB-3614A, Dial Tone, Ringback, and Preempt Receive Levels are -10 dBm $_{\rm max}.$

Figure E-2. Four-Wire 3-Digit PABX Tone-Signaling Trunk (AN/TTC-42 to SB-3614/A)

Table E-3. CSIPG, AN/TTC-42 to SB-3614/A

Switch	AN/TTC-42	SB-3614/SB-3614A
Number of Circuits	24	18
Terminal Cards	4-Wire ALTU	Type III (PABX Mode)
Special Adapters		
Incoming Call	Call is routed automatically to called party.	Call is routed automatically to the called party.
Outgoing Call	Subscriber dials called number (P+9+7 digits) and is connected without operator intervention. If any precedence above Routine has been dialed, the AN/TTC-42 sends the recall digit (R) followed by the 3-digit address (XXX).	Subscriber dials (using a CB DTMF telephone) priority, if required, and a 3-digit trunk number (P + 9SL). Upon hearing second dial tone, the subscriber dials (DTMF) as an AN/TTC-42 subscriber.
Precedence/Preemption	5 levels - FO, F, I, P, and R	2 levels - priority & routine
Restrictions/Special Instructions	The AN/TTC-42 uses trunk group Type 3, IDX 2.3.1.1.3.	Subscriber with TA-312 or TA-236 type telephones must use operator assistance to call another switch.

DIAGRAM 3

FOUR-WIRE TONE SIGNALING TRUNK

SB-3614/A TO SB-3614/A

	TX PR	TECH	RCV PR	
SB-3614/A	RCV PR	CONTROLS AND TRANSMISSION EQUIPMENT	TX PR	SB-3614/A
		EQUIPMENT		

Function	Frequency (Hz)	Transmit Level (dBm)
Seize	2,250	-7
Release	2,600	-7
Acknowledge	570	-7
Restart	852/1,209	-7
Dial Tone	500	-14
Busy	500	-14
DTMF	697-1,633	-7

Receive Level (dBm)
<u>1</u> / -20 to 0

NOTE: All levels shown are for single tones.

 $\underline{1}/$ For SB-3614A, -10 dBm for dial tone received level max.

Figure E-3. Four-Wire Tone Signaling Trunk (SB-3614/A to SB-3614/A)

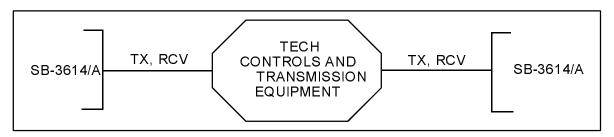
Table E-4. CSIPG, SB-3614/A to SB-3614/A, Tone Signaling

See Diagram 3

See Diagram 5		
Switch	SB-3614/SB-3614A	SB-3614/SB-3614A
Nunber of Circuits	18	18
Terminal Card	Type III (4-wire converter trunk mode)	Type III (4-wire converter trunk mode)
Special Adapters		
Incoming Call	Call is routed automatically to the dialed subscriber.	Call is routed automatically to the dialed subscriber.
Outgoing Call	Subscriber dials PXXX or XXX to access trunk (must be DTMF), dial tone is returned from the distant switch, and the subscriber then dials (DTMF) PXXX or XXX for the desired party.	Subscriber dials PXXX or XXX to access trunk (must be DTMF), dial tone is returned from the distant switch, and the subscriber dials (DTMF) PXXX or XXX for the desired party.
Precedence/Preemption	2 levels - P and R - subscriber must be classmarked for Priority and allowed use of it.	2 levels - P and R - subscriber must be classmarked for Priority and allowed use of it.
Restrictions/Special Instructions	Subscribers with TA-312 or TA-236 type telephones must use operator assistance to call another switch.	Subscribers with TA-312 or TA-236 type telephones must use operator assistance to call another switch.

TWO-WIRE RINGDOWN TRUNK

SB-3614/A TO SB-3614/A



Function	Frequency (Hz)	Transmit Level (dBm)
Ring	20	90 Vrms
Dial Tone	500	-14
Ringback	500	-14
Busy	500	-14
Preempt	1,000	-14
DTMF Tones	697/1,633	-7

Receive Level (dBm)
-20 to 0

NOTE: All levels shown are single tone.

Figure E-4. Two-Wire Ringdown Trunk (SB-3614/A to SB-3614/A)

Table E-5. CSIPG, SB-3614/A to SB-3614/A, Ringdown

See Diagram 4	See	Diag	ıram	4
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	<u> </u>	
Switch	SB-3614/SB-3614A	SB-3614/SB-3614A
Number of Circuits	18	18
Terminal Card	Type ∣ (RD trunk mode)	Type ∣ (RD trunk mode)
Special Adapters		
Incoming Call	Call is routed automatically to the dialed subscriber.	Call is routed automatically to the dialed subscriber.
Outgoing Call	Subscriber dials (DTMF) PXXX or XXX to access trunk. Dial tone is returned from the distant switch, and the subscriber dials (DTMF) PXXX or XXX for the desired party.	Subscriber dials (DTMF) PXXX or XXX to access trunk. Dial tone is returned from the distant switch, and the subscriber dials (DTMF) PXXX or XXX for the desired party.
Precedence/Preemption	2 levels - P and R - subscriber must be classmarked for Priority to be allowed use of it.	2 levels - P and R - subscriber must be classmarked for Priority to be allowed use of it.
Restrictions/Special Instructions	Subscribers with TA-312 or TA-236 type telephones must use operator assistance to call another switch.	Subscribers with TA-312 or TA-236 type telephones must use operator assistance to call another switch.

FOUR-WIRE 3-DIGIT PABX TONE SIGNALING

SB-3865 TO SB-3614/A

TX PR (EVEN)

TECH
CONTROLS AND
TRANSMISSION
EQUIPMENT

TX PR
SB-3614/A

Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge Restart DTMF Ring Dial Tone Ringback Preempt	2,250 2,600 570 852/1,209 697-1,633 570 425 425 425	-7 -7 -7 -7 -7 -14 -14 -14
		Receive Level (dBm)
Seize Release Acknowledge Restart DTMF Dial Tone, Ringback Preempt, Error	2,250 2,600 570 825/1,209 696-1,633 500 1,000	-22 to 0

Receive Level (dBm)
-20 to 0
Transmit Level (dBm)
-7 -7 -7 -7 -7 -14

NOTE: All levels shown are for single tones.

Figure E-5. Four-Wire 3-Digit PABX, Tone Signaling Trunk (SB-3865 to SB-3614/A)

Table E-6. CSIPG, SB-3865 to SB-3614/A

See Diagram 5)
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Switch	SB-3865	SB-3614/SB-3614A
Number of Circuits	See Note 1.	18
Terminal Cards	4-Wire ALTU	Type III (PABX Mode)
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials called number (P + 9 + 7 digits) and is connected without operator intervention. If any precedence above Routine has been dialed, the SB-3865 sends the recall digit (R) followed by the 3-digit address (XXX).	Subscriber dials (using a CB DTMF telephone) Priority, if required, and a 3-digit trunk number (P + 9SL). Upon receiving second dial tone, the subscriber dials (DTMF) as an SB-3865 subscriber.
Precedence/Preemption	5 levels - FO, F, I, P, and R	2 levels - priority and routine
Restrictions/Special Instructions	The SB-3865 uses trunk group Type 3, IDX 2.3.1.1.3.	Subscriber with TA-312 or TA-236 type telephones must use operator assistance to call another switch.

Note 1:

SB-3865 Stack Number of Modules	SB-3614 Trunks
1	4
2	8
3	12

6

FOUR-WIRE 3-DIGIT PABX TONE SIGNALING

SB-3865 TO SB-3614/A

	TX PR (EVEN)	RCVPR	
OD 2005	IX IX (EVEN)		
SB-3865	RCV PR (ODD)	TX PR	SB-3614/A

Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 570	-7 -7 -7
Restart DTMF Ring	852/1,209 697-1,633 570	-7 -7 -7
Dial Tone Ringback Preempt, Error	425 425 425	-14 -14 -14
		Receive Level (dBm)
Seize	2,250	
Release Acknowledge	2,600 570	
		-22 to 0

Receive Level (dBm)
-20 to 0
Transmit Level (dBm)
-7 -7 -7 -7 -7 -14
-14

NOTE: All levels shown are for single tones.

Figure E-6. Four-Wire 3-Digit PABX Tone Signaling Trunk (SB-3865 to SB-3614/A) (Hybrid Stack)

Table E-7. CSIPG, SB-3865 to SB-3614/SB-3614A, Hybrid Stack

See Diagram 6		
Switch	SB-3865	SB-3614/SB-3614A
Number of Circuits	See Note 1.	18
Terminal Cards	4-Wire ALTU	Type III (PABX Mode)
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials called number (P + 4 digits) and is connected without operator intervention. If any precedence above Routine has been dialed, the SB-3865 sends the recall digit (R) followed by the 3-digit address (XXX).	Subscriber dials (using a CB DTMF telephone) Priority, if required, and a 3-digit trunk number (P+9 SL). Upon receiving second dial tone, the subscriber dials (DTMF) as an SB-3865 analog loop subscriber.
Precedence/Preemption	5 levels - FO, F, I, P, and R	2 levels - Priority and Routine.
Restrictions/Special Instructions	The SB-3865 uses SB-3614 trunk group Type 3, IDX 2.3.1.1.1.3, and uses IDX 2.4.3 for SB-3614 subscriber numbers. In the SB-3865 Hybrid Stack configuration (SB-3865 and SB-3614), the SB-3614 subscriber numbers are entered into the SB-3865 table. Only one switch code, assigned to the SB-3865, is used.	Subscriber with TA-312 or TA-236 type telephones must use operator assistance to call another switch.

Note 1:

SB-3865 Stack Number of Modules	SB-3614/A/A Trunks
1	4
2	8
3	12

DIAGRAM 7 SB-3614A TO SB-3865

4-WIRE, DIGITAL DTMF CONFIRMATION TRUNK

SB-3614/A		SB-3865
TED	TYPE VI CARD DTG CONTROLS AND TRANSMISSION EQUIPMENT	TED

Function	Frequency (Hz)	Transmit Level (dBm)	Reecive Level (dBm)
Digits Seize Ringback Preempt Release Interdigit Release Acknowledge Answer Restart Proceed Digit Complements Conference/Special Services/End of Dial(Commercial Call)	697/1,633 2,250 1,000 2,600 941/1633 2,600 2,600 852/1,209 941/1,209 770/1,633 941/1,477	-7 -14 -14 -7 -7 -7 -7 -7 -7	-20 to 0
		Receive Level (dBm)	Transmit Level (dBm)
Digits Seize Release Interdigit Release Acknowledge Answer Restart Proceed Digit Complements Conference/Special Services/End of Dial (Commercial Call)	697/1,633 2,250 2,600 941/1,633 2,600 2,600 852/1,209 941/1,209 770/1,633 941/1,477	-20 to 0	-7

Figure E-7. Four-Wire DTMF Confirmation Trunk (SB-3614A to SB-3865)

5 levels - FO, F, I, P, and R.

IDX 2.3.1.1. Line Type I.

Table E-8. CSIPG, SB-3614A to SB-3865

Switch	SB-3614A	SB-3865
Number of Circuits	18	See Note 1
Terminal Cards	Type V∣	4W ALTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials desired party (P+9+7-or 10-digits) and is connected without operator intervention.	Subscriber dials desired party (P+9+7-or 10- digits) and is connected without operator intervention.

See Diagram 7

Note 1:

Precedence/Preemption

Restrictions/Special Instructions

SB-3865 Stack Number of Modules	SB-3614 Trunks
1	4
2	8
3	12

5 levels - FO, F, I, P, and R



SB-3614/A	7 /	AN/TTC-42
TED	TYPE VI CARD DTG CONTROLS AND TRANSMISSION EQUIPMENT	TED

Function	Frequency	Transmit Level
District	(Hz)	(dBm)
Digits	697/1,633	-7 -
Seize	2,250	-7
Ringback	500	-14
Preempt	1,000	-1 <u>4</u>
Release	2,600	-7
Interdigit	941/1,633	-7
Release Acknowledge	2,600	-7
Answer	2,600	-7
Restart	852/1,209	-7
Proceed	941/1,209	-7
Digit Complements	770/1,633	-7
Conference/Special Services/End of Dial	941/1,477	-7
(Commercial Call)		
		Receive Level
		(dBm)
Digits	697/1,633	
Seize	2,250	
Release	2,600	
Interdigit	941/1633	
Release Acknowledge	2,600	
Answer	2,600	-20 to 0
Restart	852/1,209	
Proceed	941/1,209	
Digit Complements	770/1,633	
Conference/Special Services/End of Dial		
(Commercial Call)		

Receive Level (dBm)
-20 to 0
Transmit Level (dBm)
-7

Figure E-8. Four-Wire DTMF Confirmation Trunk (SB-3614/A to AN/TTC-42)

Table E-9. CSIPG, SB-3614A to AN/TTC-42

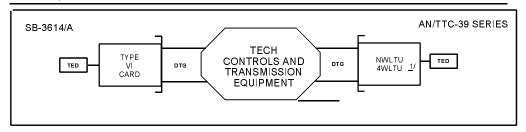
See Diagram 8	3
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Switch	SB-3614A	AN/TTC-42
Number of Circuits	18	96 <u>1</u> /
Terminal Card	Type VI	4W ALTU
Special Adapter		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.
Outgoing Call	Subscriber dials desired party (P+9+7-or 10-digits) and is connected automatically without operator intervention.	Subscriber dials desired party (P+9+7-or10-digits) and is automatically connected without operator intervention.
Precedence/Preemption	5 levels -FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions		IDX 2.3.1.1. Line Type I.

 $[\]underline{1}/$ 24 for USMC version and 96 for USAF version in current configuration. Depends on the number of 4WALTUs installed.

4-WIRE, DTMF CONFIRMATION TRUNK

SB-3614/A TO AN/TTC-39 SERIES



Function	Frequency	Transmit Level
	(Hz)	(dBm)
Digits	97/1,633	-7
Seize	2,250	-7
Ringback	500	-14
Preempt	1,000	-14
Release	2,600	-7
Interdigit	941/1,633	-7
Release Acknowledge	2,600	-7
Answer	2,600	-7
Restart	852/1,209	-7
Proceed	941/1,209	-7
Digit Complements	770/1,633	-7
Conference/Special	941/1,477	-7
Services/End of Dial		
(Commercial Call)		
		Receive Level
		(dBm)
Digits	697/1,633	
Seize	2,250	
Release	2,600	
Interdigit	941/1,633	
Release Acknowledge	2,600	
Answer	2,600	-20 to 0
Restart	852/1,209	
Proceed	941/1,209	
Digit Complements	770/1,633	
Conference/Special		
Services/End of Dial		
(Commercial Call)		

Receive Level (dBm)
-20 to 0
Transmit Level
(dBm)
-7

 $\underline{1}$ / 4WLTU used in the AN/TTC-39D and AN/TTC-39A(V)4.

Figure E-9. Four-Wire DTMF Confirmation Trunk (SB-3614A to AN/TTC-39 Series)

Table E-10. CSIPG, SB-3614A to AN/TTC-39 Series, DTMF

See Diagram 9			
Switch	SB-3614A	AN/TTC-39 Series	
Number of Circuits	18	AN/TTC-39A(V)1- 96 AN/TTC-39D/A(V)4- 56	
Terminal Card	Type VI	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D/A(V)4-4WLTU	
Special Adapter			
Incoming Call	Calls is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party (P+9+7-or10-digits) and is connected without operator intervention.	Subscriber dials desired party (P+9+7-or10-digits) and is connected without operator intervention.	
Precedence/Preemption	5 levels -FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	Class Code 46.	Line Type 25.	

4-WIRE, SEVEN DIGIT TONE BURST TRUNK

SB-3614/A TO AN/TTC-39 SERIES

SB-3614/A	AN/TTC-39 SERIES
TED	TYPE VI CARD DTG TECH CONTROLS AND TRANSMISSION EQUIPMENT

Function	Frequency (Hz)	Transmit Level (dBm)
Digits Seize Ringback Preempt Release Interdigit Seize/Release Acknowledge Seize Acknowledge/Restart Release Acknowledge Answer Conference/Special Services/End of Dial (Commercial Call)	697/1,633 2,250 500 1,000 2,600 941/1,633 570 852/1,209 2,600 941/1,477	-7 -7 -14 -14 -7 -7 -7 -7 -7 -7
		Receive Level (dBm)
Seize Release Interdigit Seize/Release Acknowledge Seize Acknowledge/Restart Answer Conference/Special Services/End of Dial (Commercial Call)		-20 to 0

Receive Level (dBm)		
-20 to 0		
Transmit Level (dBm)		
-7		

 $\underline{1}$ / 4WLTU used in AN/TTC-39D and AN/TTC-39A(V)4.

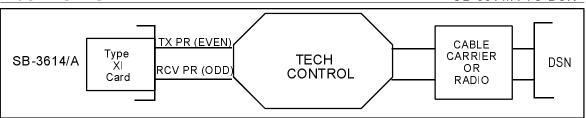
Figure E-10. Four-Wire Seven-Digit Tone Burst Trunk (SB-3614A to AN/TTC-39 Series)

Table E-11. CSIPG, SB-3614A to AN/TTC-39 Series, Tone Burst

See Diagram 10			
Switch	SB-3614A	AN/TTC-39 Series	
Number of Circuits	18	AN/TTC-39A(V)1- 96 AN/TTC-39D/A(V)4- 56	
Terminal Card	Type VI	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D/A(V)4-4WLTU	
Special Adapter			
Incoming Call	Calls is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party (P+(+7-or10-digits) and is connected without operator intervention.	Subscriber dials desired party (P+9+7-or 10-digits) and is connected without operator intervention.	
Precedence/Preemption	5 levels -FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	Class Code 42. Home ID PR must be 72-98 or all incoming calls are intercepted to the operator.	Line Type 26. For satellite connection only.	

4-WIRE, DTMF OUTGOING, SF DIAL PULSE INCOMING TRUNK

SB-3614/A TO DSN



Function	Frequency (Hz)	Transmit Level (dBm)
DTMF Digits	697/1,633	-7
Seize/Seize		
Acknowledge	0.500	
Release/Release	2,600	
Acknowledge		
Busy	500	
Error	1,000	
Ringback	500	
Preempt	1,000	-14
Idle	2,600	-8
		Receive Level
		(dBm)
SF Pulse Digits	10 pps	-4.5 to -16
Seize/Seize Acknowledge		
Release/Release		
Acknowledge	2,600	-4.5 to -31

Receive Level (dBm)
-20 to 0
Transmit Level (dBm)
-8

NOTE: All levels are for single tones.

Figure E-11. Four-Wire Seven-Digit Tone Burst Trunk (SB-3614A to DSN)

Table E-12. CSIPG, SB-3614A to DSN

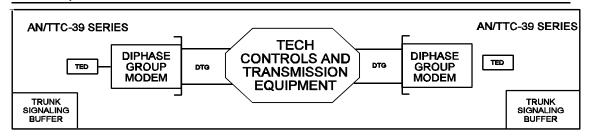
See Diagram 11

OCC Bragiani 11			
Switch	SB-3614A	DSN	
Number of Circuits	18 (2 circuits per card)		
Terminal Card	Type XI		
Special Adapters			
Incoming Call	Incoming calls with a precedence digit are routed automatically, by precedence, to the called subscriber. An incoming call with a precedence alerting signal is routed to the call service attendant for completion.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials 9 (special service prefix), 1 (T digit), precedence, and 7-or 10-digit address (DSN area code and subscriber address).	The DSN subscriber dials the 7-or 10 digit tactical subscriber number.	
	5 levels - FO, F, I, P, and R.		

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4-WIRE, DIGITAL TDM TRUNK

AN/TTC-39 SERIES TO AN/TTC-39 SERIES



Function	Group Rate	Transmit Level (dBm)
	<u> </u>	(dBill)
Multiplexed Channels		
At 32 kbps		
8	256 kbps	
9	288	
16	512	
18	256	1
32	1.024 Mbps	
36	1 152	3 Vp-p Conditioned Diphase
48	1.536	CX-11230 Cable
64	2.048	Max Length 1 Mile
72	2.304	Max Length I Mile
128	4.096	1
144	4.608	
At 16 kbps		
8	128 kbps	1
9	144	
16	256	
18	288	
32	512	
36	576	
48	768	
64	1.024 Mbps	
72	1.152	
128	2.048]
144	2.034	

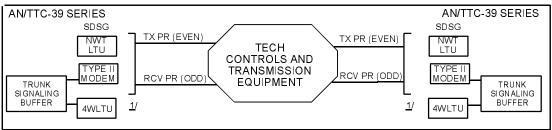
Receive Level (dBm)		
90 rms Conditioned Diphase		
CX-11230 Cable		

Figure E-12. Four-Wire Digital Common Channel Signaling Trunk (AN/TTC-39 Series to AN/TTC-39 Series)

Table E-13. CSIPG, AN/TTC-39 Series to AN/TTC-39 Series, Digital

See Diagrams 12 and 13			
Switch	AN/TTC-39 Series	AN/TTC-39 Series	
Number of Circuits	8, 9, 16, 18, 32, 36, 48, 64, 72, 128, or 144	8, 9, 16, 18, 32, 36, 48, 64, 72, 128, or 144	
Terminal Card	Group Modem	Group Modem	
Special Adapters			
Incoming Call	Call is routed automatically to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7- or 10-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7- or 10-digit address.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	All IST groups have an overhead channel used for framing, common-channel signaling, and SYSCON. The first channel in a DTG and each channel group is always designated as an overhead channel. An IST group can contain both digital and analog trunks; however, all trunk signaling is handled by the overhead channel with its associated TSBs. The maximum number of TSBs is: AN/TTC-39A(V)1-32, of which up to 2 per SDSG may be analog. There are 28 TSBs per TTC-39D and TTC-39A(V)4.		
	Types 1, 3, and 4 MSFs can be used.		
	Maximum number of TEDs: 15		
	Use Modulo 8 or 9 for DTGs.		
	An AN/TTC-39A(V)1 and A(V)4 operating at a basic 32-kbps channel rate accommodates 16-kbps as well as 32-kbps trunks. The AN/TTC-39D operates at a basic 16 kbps rate.		
	Use terminal type number 29.		





Function	Frequency (Hz)	Transmit Level (dBm)
Signaling and Supervision is by Common-Channel Trunk		
Trunk Signaling Buffer (in analog mode)	2,400 bps (1,200 bps)	
Duobinary FSK Mark Space Binary FSK Mark Space	1,200/2,400 1,800 1,200 2,400	-10 to +6

Receive Level (dBm)
20 0
-30 to 0

1/ AN/TTC-39D/A(V)4

Figure E-13. Four-Wire Analog, Automatic, Common Channel Signaling Trunk (AN/TTC-39 Series to AN/TTC-39 Series)

Table E-14. CSIPG, AN/TTC-39 Series to AN/TTC-39 Series, Analog

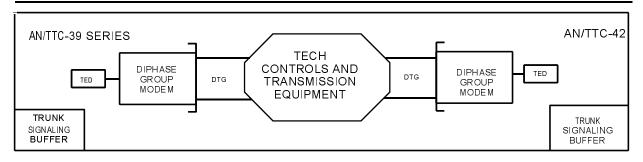
See Diagram 13			
Switch	AN/TTC-39A(V)1	AN/TTC-39A(V)1	
Number of Circuits	AN/TTC-39A(V)1-96 AN/TTC-39D/A(V04-56	AN/TTC-39A(V)1 - 96 AN/TTC-39D/A(V)4-56	
Terminal Card	AN/TTC-39A(V)1, LTU/NWT, Type II modem AN/TTC-39D/A(V)4, 4WLTU	AN/TTC-39A(V)1, LTU/NWT, Type II modem AN/TTC-39D/A(V)4, 4WLTU	
Special Adapters			
Incoming Call	Call is routed automatically to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7- or 10-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7- or 10-digit address.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	Trunking between AN/TTC-39 series CSs must use CCS i.e., each switch must use a TSB and a separate channel or trunk for signaling. If only analog trunks are available, the TSB is used in the analog mode in conjunction with a type II modem, and uses a separate trunk for signaling. The type II modem emulates the MD-701C modem. If both a DTG and analog trunks exist between switches, then the overhead channel of the DTG can be used for control of both the digital and analog trunks. If only digital trunks and another TSB, an analog overhead trunk can be used for the analog trunks.		

Use terminal type number 28.

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4-WIRE, DIGITAL TDM COMMON CHANNEL SIGNALING TRUNK

AN/TTC-39 SERIES TO AN/TTC-42



Function	Group Rate	Transmit Level
Multiplexed Channels		3 Vp-p Conditioned Diphase
At 32 kbps		Max Length:
8 9 16 18	256 kbps 288 512 576	2 Miles
32 36 48 64 72	1.024 Mbps 1.152 1.536 2.048 2.034	1 Mile
At 16 kbps		
8 9 16 18	128 kbps 144 256 288	2 Miles
32 36 64 72	512 576 1.024 Mbps 1.152	1 Mile

Receive Level
90m Vrms Conditioned Diphase
CX-11230 Cable

Figure E-14. Four-Wire Digital TDM, Common Channel Signaling Trunk (AN/TTC-39 Series to AN/TTC-42)

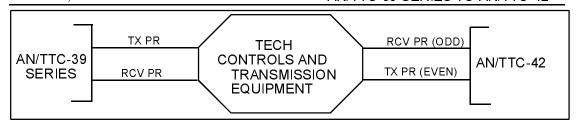
Table E-15. CSIPG, AN/TTC-39 Series to AN/TTC-42, CCIS

See Diagram 14		
Switch	AN/TTC-39 Series	AN/TTC-42
Number of Circuits	8, 9, 16, 18, 32, 36, 48, 64, or 72	8, 9, 16, 18, 32, 36, 48, 64, or 72
Terminal Card	Diphase Group Modem	Diphase Group Modem
Number of TEDs	15	6
Number of TSBs	32; 28, per TTC-39D and -39A(V)4	6
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7-, 10-, or 13-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special feature digit (if needed), trunk access digit (if required) and 7-, 10, or 13- digit address.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	Trunking between switches must use CCS, i.e., each switch must use a TSB and a separate channel or trunk for signaling.	
Switch Rate (kbps)	32, 16	32, 16
Trunk Group Rate	32, 16	32, 16
	Termina⊢Type 29	The AN/TTC-42 uses CCS trunk group Type 7, IDX 2.3.1.1.7

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4-WIRE, DTMF CONFIRMATION TRUNK

AN/TTC-39 SERIES TO AN/TTC-42



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 2,600	-7 -7 -7
Restart DTMF Dial Tone	852/1,209 697-1,633 425	-7 -7 -7
Busy Ringback Preempt	425 425 440/1,620	-14 -14 -14
		Receive Level (dBm)
Seize Release Answer	2,250 2,600 2,600	
Restart DTMF Dial Tone	825/1,209 697-1,633 425	-22 to 0
Busy Ringback Preempt	425 425	

Receive Level (dBm)		
-20 to 0		
-20 to 0		
-20 to 0		
Tansmit Level (dBm)		
-7 -7 -7		
-7 -7 -14		
-14		
-14 -14		

NOTE: All levels shown are for single tones.

Figure E-15. Four-Wire DTMF Confirmation Trunk (AN/TTC-39 Series to AN/TTC-42)

Table E-16. CSIPG, AN/TTC-39 Series to AN/TTC-42, Analog

See Diagram 15			
Switch	AN/TTC-39 Series	AN/TTC-42	
Number of Circuits	AN/TTC-39A(V)1-96 AN/TTC-39D and -39A(V)4-56	96 <u>1</u> /	
Terminal Cards	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D and A(V)4-4WLTU	4-Wire ALTU	
Special Adapters			
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party (P + 9 + 7 digits) and is connected without operator intervention.	Subscriber dials desired party (P + 9 + 7 digits) and is connected without operator intervention.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	Terminal Type 25 (for confirmation signal)	The AN/TTC-42 uses the AN/TTC-38 trunk group Type 1.2, AN/TTC-42, IDX 2.3.1.1.1.2.	

 $[\]underline{1}/$ 24 for USMC version and 96 for USAF version in current configuration. Depends on number of 4W ALTUs installed.

DIAGRAM 16 4-WIRE, DIBITS TRUNK AN/TTC-39 SERIES TO SB-3865 AN/TTC-39 SERIES SB-3865 TECH DIPHASE GROUP MODEM DIPHASE GROUP **CONTROLS AND** TED DDGG TED DTG **TRANSMISSION** MODEM **EQUIPMENT**

Function	Group Rate	Transmit Level
Multiplexed Channels		
At 32 kbps		
4.5 8 9 16 18	144 kbps 256 288 512 576	3 Vp-p Conditioned Diphase CX-11230 Cable Max Length 2 Miles
At 16 kbps		
4.5 8 9 16 18	72 kbps 128 144 256 288	

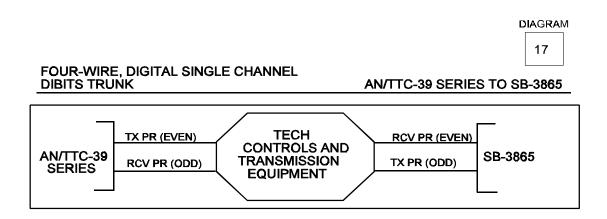
Receive Level
90 mVrms Conditioned Diphase
CX-11230 Cable

Figure E-16. Four-Wire DIBTS Trunk (AN/TTC-39 Series to SB-3865)

Table E-17. CSIPG, AN/TTC-39 Series to SB-3865, DIBTS

See Diagram 16			
Switch	AN/TTC-39 Series	SB-3865	
Number of Circuits	4.5, 8, 9, 16, or 18	4.5, 8, 9, 16, or 18	
Terminal Cards	Diphase Group Modem	Diphase Group Modem	
Special Adapters			
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address. ¹⁷	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	Terminal Type 27	The SB-3865 uses the DIBTS trunk group Type 6, IDX 2.3.1.1.6.	

 $[\]underline{1}/$ For access to the AN/TTC-39 series conference bridge and to 7-, 10- or 13-digit subscriber numbers, SB-3865 DSVT, and DNVT users dial P + 91. Upon receiving second dial tone, required digits are dialed.



Function	Rate	Transmit Level
Single Channel	32/16 kbps <u>1</u> /	4 km WF-16 Cable 3 Vp-p (+10 percent)

 $\underline{1}$ / 16 kbps for AN/TTC-39D only.

Figure E-17. Four-Wire Digital Single Channel DIBTS Trunk (AN/TTC-39 Series to SB-3865)

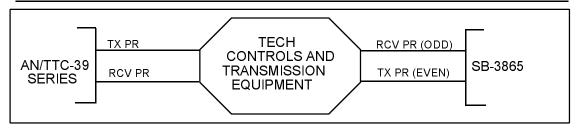
Table E-18. CSIPG, AN/TTC-39 Series to SB-3865, Single Channel

Switch	AN/TTC-39 Series	SB-3865
Number of Circuits	One DIBTS trunk group (18 trunks)	
Terminal Cards	DLPMA	DLTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special feature digit (if needed), trunk access digit and 7-digit address. 1/
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	Terminal Type 27	The SB-3865 uses the DIBTS trunk group type 6, IDX 2.3.1.1.6.

 $[\]underline{1}/$ For access to the AN/TTC-39 series conference bridge and to 7-, 10-, or 13-digit subscriber numbers, SB-3865 DSVT and DNVT users dial P + 91. Upon receiving second dial tone from the AN/TTC-39 series switch, required digits are dialed.

FOUR-WIRE DTMF CONFIRMATION TRUNK

AN/TTC-39 SERIES TO SB-3865



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 2,600	-7 -7 -7
Restart DTMF Dial Tone	852/1,209 697-1,633 425	-7 -7 -7
Busy Ringback Preempt	425 425 440/620	-14 -14 -14
		Receive Level (dBm)
Seize Release Answer	2,250 2,600 2,600	
Restart DTMF Dial Tone	825/1,209 697-1,633 425	-22 to 0
Busy Ringback Preempt	425 425	

Receive Level (dBm)
-20 to 0
-20 to 0
-20 to 0
Transmit Level (dBm)
-7 -7 -7
-7 -7 -14
-14 -14

NOTE. All levels shown are for single tones.

Figure E-18. Four-Wire DTMF Confirmation Trunk (AN/TTC-39 Series to SB-3865)

Table E-19. CSIPG, AN/TTC-39 Series to SB-3865, DTMF

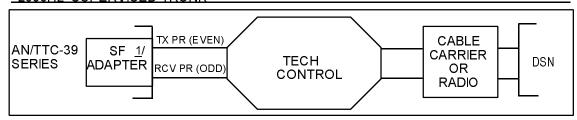
See Diagram 18		
Switch	AN/TTC-39 Series	SB-3865
Number of Circuits	AN/TTC-39A(V)1-96 AN/TTC-39D/-39A(V)4 -56	Note 1
Terminal Cards	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D/-39A(V)4-4WLTU	4-Wire ALTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials desired party (P + 9 + 7 digits) and is connected without operator intervention.	Subscriber dials desired party (P + 9 + 7 digits) and is connected without operator intervention.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	The AN/TTC-39 series uses terminal Type 25 (for confirmation signaling)	The SB-3865 uses AN/TTC-38 trunk group Type 1.2, AN/TTC-42, IDX 2.3.1.1.1.2.

Note 1:

SB-3865 Stack Number of Modules	AN/TTC-38 Trunks
1 2 3	4 8 12

4-WIRE, SF DIAL-PULSE/DTMF, 2600Hz SUPERVISED TRUNK

AN/TTC-39 SERIES TO DSN



Function	Frequency	Transmit Level
Idle Release, Dial Pulse	2,600 2,600	-20 -8
DTMF Tones Busy Tone	697-1,633 425	-7 -14
		Receive Level
Idle Dial Pulse, On Hook Dial/Busy Tone	2,600 2,600 600	
Ring/Ringback Preempt	400 400+620	-22 to 0
Idle Dial Pulse, On Hook Dial Tone Ring/Ringback	2,600 2,600 350+440 440+480	
Preempt Busy Tone	440+620 480+620	

Receive Level
Receive nevel
Transmit Level
-20 -8 -18 -18 -15 (OCONUS)
-20 -8 -10 -13 -15 -21 (CONUS)

NOTE: All levels shown are for single tones unless otherwise noted. Levels given are for composite signals.

1/ MFLTU in AN/TTC-39A(V)4 and AN/TTC-39D. SF adapter transmission level adjustment: Transmit +10 to -15 dB; Receive +10 to -10 dB.

Figure E-19. Four-Wire SF Dial-Pulse or DTMF 2,600-Hz SF, Supervised Trunk (AN/TTC-39 Series to DSN)

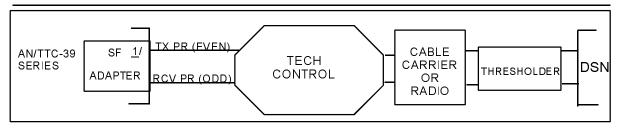
Table E-20. CSIPG, AN/TTC-39 Series to DSN, DTMF

See	Diagram	19
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	e de Bragram re	
Switch	AN/TTC-39 Series	DSN
Number of Circuits	AN/TTC-39A(V)1- 24 AN/TTC-39D and-39A(V)4- 4	-
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D and TTC-39A(V)4-MFLTU	-
Special Adapter	AN/TTC-39A(V)1, SF (2,600 Hz)	
Incoming Call	Incoming calls with a precedence digit are routed automatically, by precedence, to the called subscriber. An incoming call with a precedence alerting signal is routed to the call service attendant for completion.	Call is routed automatically to called subscriber.
Outgoing Call	Subscriber dials the precedence, special- service prefix, DSN area code, and subscriber address (precedence, special-service prefix, and area code digits are optional). The AN/TTC-39 series converts the special service prefix digit into the appropriate route code digit. Signaling is DTMF.	DSN subscriber dials a regular DSN number.
Precedence/Preemption	5 levels -FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	Confirmation signaling cannot be used when transmission is by satellite. Terminal Type 34 - PNID PBX.	

4-WIRE INTERSWITCH TRUNK TO DSN, MF 2600Hz SF SUPERVISION TRUNK

AN/TTC-39 SERIES TO DSN



Function	Frequency (Hz)	Transmit Level (dBm) <u>2</u> /
Idle Release Off Hook	2,600 2,600 -	-20 dBm0 -8 dBm0
MF Signals Busy Tone Ring Back	700-1,700 425 425	-6 dBm0 -14 -14
		Receive Level (dBm)
Idle On Hook Off Hook	2,600 2,600 -	
MF Signals Busy Tone Ring Back	700-1,700 480+620 440+480	-22 to 0
Preempt Busy Tone Ringback	440+620 600 400	

Receive Level (dBm)
Transmit Level (dBm)
-20 <u>3</u> /
-
-6 dBm0 -21 -13 (CONUS)
-15 -18 -18 (OCONUS)

NOTE: All levels shown are for single tones unless otherwise noted.

- 1/ MFLTU used by the AN/TTC-39A(V)4/D.
- 2/ SF adapter transmission level adjustment: Transmit 10 dB to -15 dB;
 Receive 10 dB TO -10 dB.
- 3/ See Subparagraph 6-40, TM-11-5805-12-13 for MFLTU adjustment procedures.

Figure E-20. Four-Wire, MF, Nonconfirmation Signaling, 2,600-Hz SF, Supervised Interswitch Trunk (AN/TTC-39 Series to DSN)

Table E-21. CSIPG, AN/TTC-39 Series to DSN, MF

See Diagram 20

See Diagram 20				
Switch	AN/TTC-39 Series	DSN		
Number of Circuits	AN/TTC-39A(V)1 - 24 AN/TTC-39D/-39A(V)4 - 4			
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D& 39A(V)4- MFLTU			
Special Adapters	AN/TTC-39A(V)1-SF (2,600 Hz)			
Incoming Call	Call is routed automatically to the called subscriber.	Call is routed automatically to the called subscriber.		
Outgoing Call	AN/TTC-39 Series sends KP-P-O-NYX-NNX-XXXX-ST where: KP = MF key pulse P = MF precedence level pulse R = MF route digit pulse (R = 0 from AN/TTC-39 Series) ST = MF end of signaling pulse	DSN sends KP-P-R-NYX-XXXXXXX-ST		
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R		
Restrictions/Special Instructions	Terminal Type 36			

DIAGRAM 21 AN/TTC-39 SERIES TO 2-WIRE dc CLOSURE, DIAL PULSE COMMERCIAL SWITCH LOOP TECH AN/TTC-39 SERIES TX, RCV TX, RCV COMMERCIAL CONTROLS AND dc CLOSURE 1/ **SWITCH LOOP TRANSMISSION EQUIPMENT**

Function	Frequency (Hz)	Transmit Level (dBm)
Seizure Dial Pulse Busy	dc closure 10 pps 425	dc closure -14
		Receive Level
Ring Dial Tone	17 to 33 Note 2	25 to 150 Vrms

Receive Level (dBm)
<u>2</u> /
Transmit Level
90 Vrms <u>2</u> /

NOTE: All levels shown are for single tones.

- $\underline{1}/$ TCLTU in AN/TTC-39A(V)4 and TTC-39D. $\underline{2}/$ Values determined by commercial switch.

Figure E-21. Two-Wire dc Closure, Dial-Pulse Trunk (AN/TTC-39 Series to Commercial Loop)

Table E-22. CSIPG, AN/TTC-39 Series to Commercial Switch Loop

See Diagram 21				
Switch	AN/TTC-39 Series	Commercial		
Number of Circuits	AN/TTC-39A(V)1 - 24 AN/TTC-39D and AN/TTC-39A(V)4 - 12			
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39D and -39A(V)4-TCLTU			
Special Adapters	dc Closure			
Incoming Call	Call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to the called subscriber.		
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C is keyed to complete the connection.	Subscriber dials a regular number which is the CSF attendant. The desired AN/TTC-39 series switch subscriber number must then be given orally to the CSF attendant to set up the connection.		
Precedence/Preemption	5 levels - FO, F, I, P, and R	None		
Restrictions/Special Instructions	The AN/TTC-39 series appears as a 2-wire, dial-pulse subscriber loop off the commercial switch.			
	Use terminal Type 44.			

AN/TTC-39 SERIES TO COMMERCIAL SWITCH 4-WIRE LOOP

4-WIRE, SF, DIAL PULSE TRUNK

AN/TTC-39 SF 1/ SERIES ADAPTER RCV PR (ODD) TECH CONTROL RCV PR	COMMERCIAL SWITCH FOUR-WIRE LOOP
-----------------------------------------------------------------	-------------------------------------------

Function	Frequency (Hz)	Transmit Level (dBm) <u>3</u> /
Idle On Hook Seizure Dial Pulse Busy	2,600 2,600 0 2,600 @ 10 pps 425	-22 -10 Remove Sig. -10 @ No Sig. -14
		Receive Level (dBm)
Idle Seize	2,600 No Signal	-31 to -13

Receive Level (dBm)
<u>2</u> /
Transmit Level (dBm)
<u>2</u> /

NOTE: All levels shown are for single tones.

- MFLTU in AN/TTC-39A(V)4 and TTC-39D.
- Values are determined by commercial switch. SF adapter transmission level adjustment: Transmit 10 dB to -15 dB; Receive +10 dB to -10 dB.

Figure E-22. Four-Wire SF Dial Pulse Trunk (AN/TTC-39 Series to Commercial Switch)

Table E-23. CSIPG, AN/TTC-39 Series to Commercial Switch Four Wire Loop

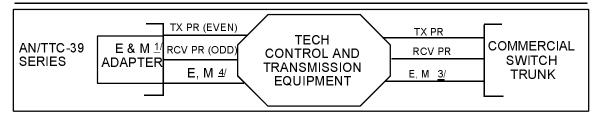
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See Diagram 22			
Switch	AN/TTC-39 series	Commercial	
Number of Circuits	AN/TTC-39A(V)1 - 24 AN/TTC-39D and AN/TTC-39A(V)4 - 4		
Terminal Card	AN/TTC-39A(V)1- LTU/NWT AN/TTC-39D/-39A(V)4-MFLTU		
Special Adapters	SF		
Incoming Call	Call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C is keyed to complete the connection.	Subscriber dials a regular number, which is the CSF attendant. The desired AN/TTC-39 Series switch subscriber number must then be given orally to the CSF attendant to set up the connection.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	None	
Restrictions/Special Instructions	The AN/TTC-39 series appears as a 4-wire, single frequency, dial-pulse subscriber loop off the commercial switch.		
	Use terminal Type 45.	l	

23

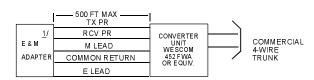
6-WIRE, E & M DIAL PULSE OR MF 2/6 NON-CONFIRMATION SIGNALING TRUNK

AN/TTC-39 SERIES TO COMMERCIAL **SWITCH TRUNK**



Function	Frequency (Hz)	Transmit Level (dBm) <u>3</u> /
M Lead (Seize)	dc	-48 V
M Lead (Idle)	dc	Grd
E Lead (Idle)	dc	-48 V
Dial Pulse (M)	10 pps	-48 V/Grd
2/6 MF	700 to 1,700	-10
Ringback, Busy	425	-14
Error	425/1,050	-14
		Receive Level (dBm)
E Lead (Seize) Dial Pulse (E) 2/6 MF	dc 10 pps 700 to 1,700	-22 to 0

Receive Level (dBm)
Transmit Level (dBm)
Grd Grd/Open <u>2</u> /



NOTE: All levels shown are for single tones.

- EMLTU in AN/TTC-39A(V)4 and AN/TTC-39D. Values are determined by commercial switch. Not required when converter is in use. E&M adapter transmission level adjustment: Transmit +10 dB to -15 dB; Receive +10 dB to -10 dB.

Figure E-23. Six-Wire E&M Dial Pulse or Nonconfirmation Signaling (AN/TTC-39 Series to Commercial Switch Trunk)

Table E-24. CSIPG, AN/TTC-39 Series to Commercial Switch Trunk

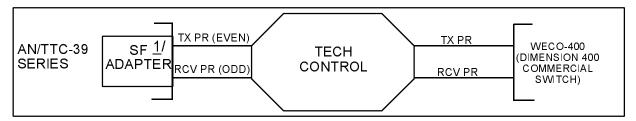
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See Diagram 23			
Switch	AN/TTC-39 series	C ommercial	
Number of Circuits	AN/TTC-39A(V)1 - 16 AN/TTC-39D/A(V)4 -4		
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39A(V)4 and -39D-EMLTU		
Special Adapters	E&M		
Incoming Call	Call is automatically routed to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone. Subscriber then keys address digits, and the digits are either outpulsed (DP) on the M lead or sent by 2/6 MF on the TX, depending on the terminal type classmark used. The subscriber then dials C (EOD) or waits 10 seconds for full connection.	Subscriber dials desired AN/TTC-39 series switch subscriber number.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	None	
Restrictions/Special Instructions	Use terminal types: 46 - E&M, wink-start signaling 82 - E&M, dial-pulse signaling, wink-start 83 - E&M, dial-pulse signaling, timed-start Can be made to operate with a 4-wire trunk by using a WESCOM 452 FWA converter or equivalent.		

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4-WIRE, SF, DIAL PULSE, 3-DIGIT TRUNK

AN/TTC-39 SERIES TO WECO-400



Function	Frequency (Hz)	Transmit Level (dBm) <u>2</u> /
Idle Release Seize	2,600 2,600 No Signal	-22 -10 No Signal
Busy Ringback Dial Pulse	425 425 2,600 @ 10 pps	
		Receive Level (dBm)
Idle Seize Dial Pulse	2,600 No Signal 2,600 @ 10 pps	-31 to -13 -16 to -4

Receive Level (dBm)
<u>3</u> /
Transmit Level (dBm)
<u>3</u> /

NOTE: All levels shown are for single tones.

- <u>1</u>/ <u>2</u>/ MFLTU in AN/TTC-39A(V)4 and AN/TTC-39D. SF adapter transmission level adjustment: Transmit +10 dB to -15 dB; Receive +10 dB to -10 dB.
- <u>3</u>/ Values are determined by commercial switch.

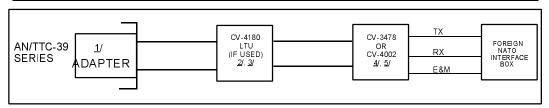
Figure E-24. Four-Wire, SF Dial Pulse, 3-Digit (AN/TTC-39 Series to WECO 400)

Table E-25. CSIPG, AN/TTC-39 Series to WECO 400

Oce Diagram 24			
Switch	AN/TTC-39 series	WECO 400	
Number of Circuits	AN/TTC-39A(V)1 - 24 AN/TTC-39D & AN/TTC-39A(V)4- 4	44 trunks, 300 lines	
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39A(V)4 & AN/TTC-39D-MFLTU	-	
Special Adapters	SF		
Incoming Call	Call is automatically routed to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber dials 9 + 7-digit address.	Subscriber dials number for an AN/TTC-39 series switch trunk and, upon receipt of dial tone, dials called number.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	None	
Restrictions/Special Instructions	The WECO 400 looks like an AN/TTC-28 to the AN/TTC-39 series switch; thus the commercial escape digits (5+C) are not used.		
	Use terminal Type 37.		

6-WIRE, E&M, NATO ANALOG

AN/TTC-39 SERIES TO NATO



	_	_		
Function	Frequency (Hz)	Transmit Level (dBm) <u>6</u> /	Receive Level (dBm) <u>6</u> /	Receive Level (dBm)
Idle Seize Dial Pulse	2,600 No Signal 2,600/10 pps	-10,22 -10	-31 TO -13 -31 TO -13 -16 TO -4	0 +24 +24/0
Busy (Line Trunk) Error Tone	425 425/1,050	-14 -14		
		Receive Level (dBm)	Transmit Level (dbm)	Six Volts
Idle Seize Dial Pulse	2,600 No Signal 2600 @ 10 pps	-31 to -13 -31 to -13 -16 to -4	-10,-22 -10	0 +24 +24/0

NOTE: All levels shown are for single tones.

- $\underline{1}/$ Depends upon specific configuration. See Figure VII-12. $\underline{2}/$ MFLTU/CV-3478 (NIU): the MFLTU is normally located in the switch, but may be in the CV-4180.
- 3/ NILTU is normally in the CV-4180, but may be in the switch. See Figure VII-12.
- 4/ DPLMA/CV-4002 (NAI): the DPLMA is normally in the switch, but may be in the CV-4180.
- 5/ No device is used if NILTU is used
- 6/ SF adapter level adjustment and NATO interface unit level adjust: Transmit +10 dB to -15 dB; Receive 10 dB to -10 dB.

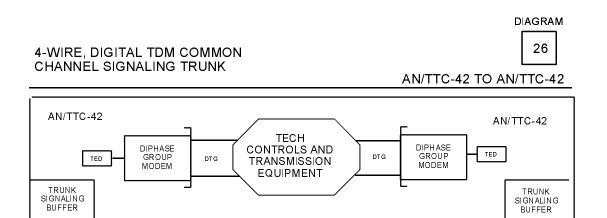
Figure E-25. Six-Wire, E&M, NATO Analog Trunk (AN/TTC-39 Series to NATO)

Table E-26. CSIPG, AN/TTC-39A(V)1 and A(V)4 to NATO

	See	Diagran	n 26
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	See Diagram 26	
Switch	AN/TTC-39A(V)1 and AN/TTC-39A(V)4	NATO using NATO analog interface units.
Number of Circuits	AN/TTC-39A(V)1-16 max (8 per NIU) AN/TTC-39A(V)4 - 8	Up to 8 per NIU
Terminal Card	AN/TTC-39A(V)1-LTU/NWT AN/TTC-39A(V)4- NILTU ^{1/}	
Special Adapters	AN/TTC-39A(V)1-SF, CV-3478 (NIU) AN/TTC-39A(V)4- CV-4180(V)2/T AN/TTC-39D <u>1</u> / <u>2</u> /	
Incoming Call	Call is routed automatically to the called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials P + 9YX + up to 10 digits for desired party and is connected to called party automatically.	Subscriber dials P + up to 13 address digits and is connected to called party automatically.
Precedence/ Preemption	5 levels - FO, F, I, P, and R	3 levels: Digit 1 - R routine (R) Digit 2 - O ordinary priority (P&I) Digit 3 - S special (F&FO)
Restrictions/ Special Instluctions	Because the number of address digits varies, the switch waits for 16 seconds after the last digit to ensure it is the last digit. The switch adds a traffic mode digit (T): T = 1 for unencrypted calls or T = 2 for NBST encrypted calls. The T digit is the first digit sent over the trunk.	
	Use terminal Type 39 for 39A(V)1 or Type 87 for other versions. Data calls to, from, or by a NATO trunk are prevented by software. The NIU may be collocated with the AN/TTC-39A(V)1, the AN/TTC-39A(V)4, or may be remotely located by using radios for the transmission medium. The NILTU is normally located external to the switch in the LTU, CV-4180.	

 $[\]underline{1}'$ In the AN/TTC-39D, the analog NATO interface is by means of an MFLTU located in an external CV-4180(V)2/T LTU $\underline{2}'$ In the AN/TTC-39D, the analog NATO interface is through the NIU (CV-3478) which is interfaced through the MFLTU in the switch.



Function	Group Rate	Transmit Level (dBm)
Multiplexed Channels		3 Vp-p Conditioned Diphase CX-11230 Cable
At 32 kbps		CX-11230 Cable Max Length
8 9 16 18	256 kbps 288 512 576	2 Miles
32 36 64 72	1.024 Mbps 1.152 2.048 2.304	1 Mile
At 16 kbps		
8 9 16 18	128 kbps 144 256 288	2 Miles
32 36 64 72	512 576 1.024 Mbps 1.152	1 Mile

Receive Level (dBm)	
90m Vrms Conditioned Diphase	
CX-11230 Cable	

NOTE: All levels shown are for single tone.

Figure E-26. Four-Wire, Digital TDM, Common-Channel Signaling Trunk (AN/TTC-42 to AN/TTC-42)

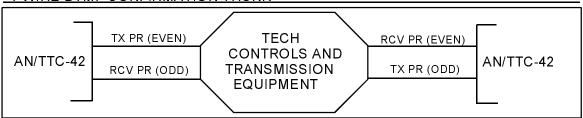
Table E-27. CSIPG, AN/TTC-42 to AN/TTC-42, CCIS

See Diagram 26		
Switch	AN/TTC-42	AN/TTC-42
Number of Circuits	8, 9, 16, 18, 32, 36, 64, or 72	8, 9, 16, 18, 32, 36, 64, or 72
Terminal Card	Diphase Group Modem	Diphase Group Modem
Number of TEDs	6	6
Number of TSBs	6	6
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7-, 10-, or 13-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required), and 7-, 10-, or 13-digit address.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	Trunking between switches must use CCS, that is, each switch must use a TSB a separate channel or trunk for signaling.	
Switch Rate (kbps)	32, 16	32, 16
Trunk Group Rate (kbps)	32, 16	32, 16
		The AN/TTC-42 uses CCS trunk group Type 7, IDX 2.3.1.1.7

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4-WIRE DTMF CONFIRMATION TRUNK

AN/TTC-42 TO AN/TTC-42



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 2,600	-7 -7 -7
Restart DTMF Dial Tone	852/1,209 697-1,633 425	-7 -7 -7
Busy Ringback Preempt	425 425 425	-14 -14 -14
		Receive Level (dBm)
Seize Release Answer	2,250 2,600 2,600	
Restart DTMF Dial Tone	825/1,209 697-1,633 425	-20 to 0
Busy, Ringback	425	

Receive Level (dBm)
-20 to 0
-20 to 0
-20 to 0
Transmit Level (dBm)
-7 -7 -7
-7 -7 -14
-14
-14

NOTE: All levels shown are for single tones.

Figure E-27. Four-Wire DTMF Confirmation Trunk (AN/TTC-42 to AN/TTC-42)

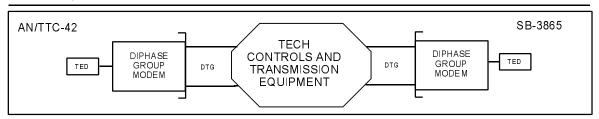
Table E-28. CSIPG, AN/TTC-42 to AN/TTC-42, DTMF

	<u> </u>	
Switch	AN/TTC-42	AN/TTC-42
Number of Circuits	96 <u>1</u> /	96 <u>1</u> /
Terminal Cards	4-Wire ALTU	4-Wire ALTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.
Outgoing Call	Subscriber dials desired party (P+9+7 digits) and is connected without operator intervention.	Subscriber dials desired party (P+9+7 digits) and is connected without operator intervention.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	The AN/TTC-42 uses AN/TTC-38 trunk group Type 1.2, AN/TTC-42, IDX 2.3.1.1.1.2.	The AN/TTC-42 uses the AN/TTC-38 trunk group Type 1.2, AN/TTC-42, IDX 2.3.1.1.1.2.

 $[\]underline{1}/$ 24 for USMC version and 96 for USAF version in current configuration. Depends on the number of 4W ALTUs installed.

4-WIRE, DIBTS TRUNK

AN/TTC-42 TO SB-3865



Function	Group Rate	Transmit Level
Multiplexed Channels		
At 32 kbps		
4.5 8 9 16 18	144 kbps 256 288 512 576	3 Vp-p Conditioned Diphase CX-11230 Cable Max Length 2 Miles
At 16 kbps		_
4.5 8 9 16 18	72 kbps 128 144 256 288	

Receive Level
90m Vrms Conditioned Diphase
CX-11230 Cable

Figure E-28. Four-Wire DIBTS Trunk (AN/TTC-42 to SB-3865)

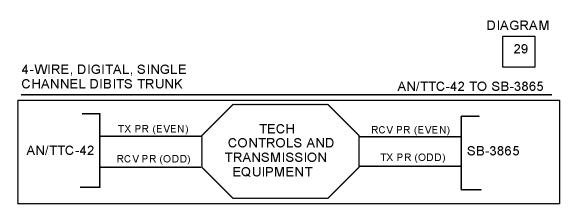
Table E-29. CSIPG, AN/TTC-42 to SB-3865, DIBTS

See Diagram 28

AN/TTC-42	SB-3865
4.5, 8, 9, 16, or 18	4.5, 8, 9, 16, or 18
Diphase Group Modem	Diphase Group Modem
Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required), and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required), and 7-digit address. ¹⁷
5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
The AN/TTC-42 uses DIBTS trunk group Type 6, IDX 2.3.1.1.6.	The SB-3865 uses the DIBTS trunk group Type 6, IDX 2.3.1.1.6.
	4.5, 8, 9, 16, or 18 Diphase Group Modem Call is routed automatically to called subscriber. Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required), and 7-digit address. 5 levels - FO, F, I, P, and R The AN/TTC-42 uses DIBTS trunk

 $[\]underline{1}/$ For access to the AN/TTC-42 conference bridge and to 7-, 10-, or 13-digit subscriber numbers, SB-3865, DSVT, and users dial P + 91. Upon receiving second dial tone from the AN/TTC-42 switch, required digits are dialed.

DNVT



Function	Group Rate	Transmit Level
Single Channel	32/16 kbps	4 km WF-16 Cable 3 Vp-p (+10 percent)

Figure E-29. Four-Wire, Digital, Single-Channel DIBTS Trunk (AN/TTC-42 to SB-3865)

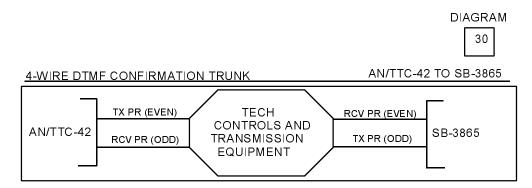
Table E-30. CSIPG, AN/TTC-42 to SB-3865, Single Channel

See Diagram 29

occ Blagram 25			
Switch	AN/TTC-42	SB-3865	
Number of Circuits	One DIBTS trunk group (18 trunks)	One DIBTS trunk group	
Terminal Cards	DLTU	DLTU	
Special Adapters			
Incoming Call	Call is routed automatically to called party.	Call is routed automatically to the called party.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address. 1/	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	The AN/TTC-42 uses DIBTS trunk group Type 6, IDX 2.3.1.1.6.	The SB-3865 uses the DIBTS trunk group Type 6, IDX 2.3.1.1.6.	

 $[\]underline{1}/$ For access to the AN/TTC-42 conference bridge, and to 7-, 10-, or 13-digit subscriber numbers, SB-3865, DSVT, and users dial P + 91. Upon receiving second dial tone from the AN/TTC-42, required digits are dialed.

DNVT



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 2,600	-7 -7 -7
Restart DTMF Dial Tone	852/1,209 697/1,633 425	-7 -7 -7
Busy Ringback Preempt	425 425 425	-14 -14 -14
		Receive Level (dBm)
Seize Release Answer	2,250 2,600 2,600	
Restart DTMF Dial Tone	825/1,209 697-1,633 425	-20 to 0
Busy Ringback	425	
Preempt	425	

Receive Level (dBm)	
-20 to 0	
-20 to 0	
-20 to 0	
Transmit Level (dBm)	
-7 -7 -7	
-7 -7 -14	
-14	
-14	

NOTE: All levels shown are for single tones.

Figure E-30. Four-Wire DTMF Confirmation Trunk (AN/TTC-42 to SB-3865)

Table E-31. CSIPG, AN/TTC-42 to SB-3865, DTMF

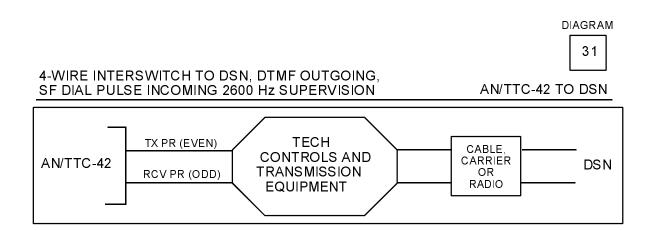
See Diagram 30

Switch	AN/TTC-42	SB-3865
Number of Circuits	96 <u>1</u> /	Depends on stack size. See table inset below.
Terminal Card	4-Wire ALTU	4-Wire ALTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials called number (P+9+7 digits) and is connected without operator intervention.	Subscriber dials desired party (P+9+7 digits) and is connected without operator intervention.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I P, and R
Restrictions/Special Instructions	The AN/TTC-42 uses AN/TTC-38 trunk group Type 1.3, SB-3865, IDX 2.3.1.1.1.3.	The SB-3865 uses AN/TTC-38 trunk group Type 1.2, AN/TTC-42, IDX 2.3.1.1.1.2.

SB-3865 Stack Number of Modules	AN/TTC-38 Trunks
1	4
2	8
3	12

 $\underline{1}/$ 24 for USMC version and 96 for USAF version in current configuration. Depends on the number of 4W ALTUs

installed.



Function	Frequency (Hz)	Transmit Level (dBm) <u>1</u> /	
On-Hook Release Seize	2,250 2,600 	-20 dBm0 -8 dBm0 	
DTMF Signals Busy Tone Ringback	697/1,633 425 425	-7 dBm0 -14 -14	
		Receive Level (dBm)	
On-Hook Seize	2,600		
MF Signals Busy Tone Ringback	700-1,700 480+620 440+480	-31 to -4.5	

Receive Level (dBm)
Transmit Level (dBm)
-20

NOTE: All levels shown are for single tones.

 $\underline{1}/$ SF adapter transmission level adjustments: Transmit +10 dB to -15 dB; Receive 10 dB to -10dB.

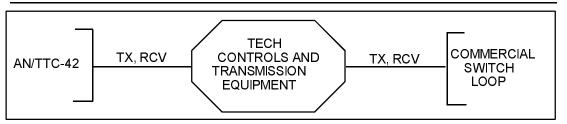
Figure E-31. Four-Wire, SF Dial-Pulse or DTMF, 2,600 Hz Supervised Interswitch Trunk (AN/TTC-42 to DSN)

Table E-32. CSIPG, AN/TTC-42 to DSN

See Diagram 31			
Switch	AN/TTC-42	DSN	
Number of Circuits	24		
Terminal Cards	AIU		
Special Adapters			
Incoming Call	Incoming calls with a precedence digit are routed automatically, by precedence, to called party. An incoming call with a precedence alerting signal is routed to the call-service attendant for completion.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials the precedence, DSN area code, and subscriber address (precedence is optional).	DSN subscriber dials a regular DSN number.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	DSN access line options: - INID PBX - PNID PBX The AN/TTC-42 uses a DSN trunk group Type 9, IDX 2.3.1.1.9.		

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2-WIRE, dc CLOSURE, DIAL-PULSE TRUNK AN/TTC-42 TO COMMERCIAL SWITCH LOOP



Function	Frequency (Hz)	Transmit Level (dBm)
Seizure Digits Busy	dc closure 10 pps 425	dc closure -14
		Receive Level
Ring	17 TO 33	25 to 150V rms
Dial Tone	<u>1</u> /	

Receive Level (dBm)
<u>1</u> /
Transmit Level
90 Vrms
<u>1</u> /

NOTE: All levels shown are for single tones.

 $\underline{1}/$ Values are determined by commercial switch.

Figure E-32. Two-Wire, dc Closure, Dial-Pulse Trunk (AN/TTC-42 to Commercial Switch Loop)

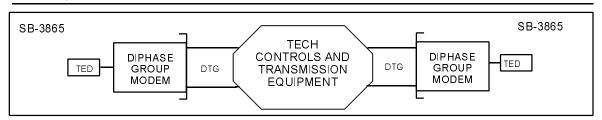
Table E-33. CSIPG, AN/TTC-42 to Commercial Switch Loop

See	Diagram	ı 32
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See Diagram 32				
Switch	AN/TTC-42	Commercial		
Number of Circuits	6			
Terminal Card	2-Wire ALTU			
Special Adapters				
Incoming Call	Incoming call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to called subscriber.		
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C must be keyed to complete connection.	DSN subscriber dials a regular DSN number.		
Precedence/Preemption	5 levels - FO, F, I, P, and R	None		
Restrictions/Special Instructions	The AN/TTC-42 appears as a 2-wire, dial-pulse subscriber loop off the commercial switch. The AN/TTC-42 uses 2-wire trunk group Type 5, IDX 2.3.1.1.5 (pulse).			

4-WIRE, DIBTS TRUNK

SB-3865 TO SB-3865



Function	Frequency (Hz)	Transmit Level (dBm)	
Multiplexed Channels			
at 32 kbps			
4.5 8 9 16 18	144 kbps 256 288 512 576	3 Vp-p Conditioned Diphase CX-11230 Cable Max Length 2 Miles	
At 16 kbps			
4.5 8 9 16 18	72 kbps 128 144 256 288		

Receive Level (dBm)
90mV rms Conditioned Diphase
CX-11230 Cable

Figure E-33. Four-Wire, DIBTS Trunk (SB-3865 to SB-3865)

Table E-34. CSIPG, SB-3865 to SB-3865, DIBTS

Gee Diagram 33			
Switch	SB-3865	SB-3865	
Number of Circuits	4.5, 8, 9, 16, or 18	4.5, 8, 9, 16, or 18	
Terminal Card	Diphase Group Modem	Diphase Group Modem	
Special Adapters			
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and seven digit address. 1/	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	DIBTS trunk group Type 6, IDX 2.3.1.1.6. DSVT Direct Dialing Zone rules apply when tandem routing provides access to an AN/TTC-39A(V)1 or AN/TTC-42.	DIBTS trunk group type 6, IDX 2.3.1.1.6. DSVT Direct Dialing Zone rules apply when tandem routing provides access to an AN/TTC-39A(V)1 or AN/TTC-42.	

^{1/} For access to the AN/TTC-39 series CS or AN/TTC-42 conference bridge and to 7-, 10- or 13-digit subscriber numbers, SB-3865, DSVT, and DNVT users dial P + 91. Upon receiving second dial tone from the AN/TTC-39 series CS or AN/TTC-42, required digits are dialed.

DIAGRAM

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SB-3865 TO SB-3865

4-WIRE, DIGITAL, SINGLE CHANNEL DIBTS TRUNK

_	1			
	TX PR (ODD)	TECH	RCV PR (EVEN)	
SB-3865	RCV PR (EVEN)	CONTROLS AND TRANSMISSION	TX PR (ODD)	SB-3865
_		EQUIPMENT		

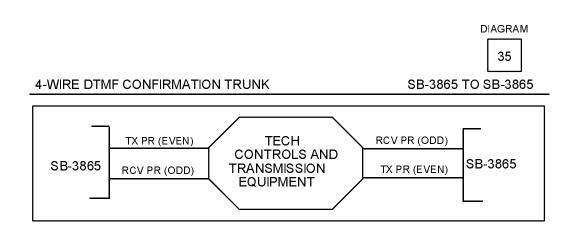
Function	Frequency	Transmit Level
Single Channel	32/16 kbs	4 km WF-16 Cable 3Vp-p (+10 percent)

Figure E-34. Four-Wire Digital, Single-Channel DIBTS Trunk (SB-3865 to SB-3865)

Table E-35. CSIPG, SB-3865 to SB-3865, Single Channel

See Diagram 54				
Switch	SB-3865	SB-3865		
Number of Circuits	One DIBTS trunk group (18 trunks)	One DIBTS trunk group		
Terminal Card	DLTU	DLTU		
Special Adapters				
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.		
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-digit address. 1/		
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R		
Restrictions/Special Instructions	DIBTS trunk group Type 6, IDX 2.3.1.1.6. DSVT Direct Dialing Zone rules apply when tandem routing provides access to an AN/TTC-42.	DIBTS trunk group Type 6, IDX 2.3.1.1.6. DSVT Direct Dialing Zone rules apply when tandem routing provides access to an AN/TTC-39 series CS or AN/TTC-42.		

^{1/} For access to the AN/TTC-39 series or AN/TTC-42 conference bridge and to 7-, 10-, or 13-digit subscriber numbers, SB-3865 DSVT and DNVT users dial P + 91. Upon receiving second dial tone, required digits are dialed.



Function	Frequency (Hz)	Transmit Level (dBm)
Seize Release Acknowledge	2,250 2,600 2,600	-7 -7 -7
Restart DTMF Dial Tone	852/1,209 697-1,633 425	-7 -7 -7
Busy Ringback Preempt	425 425 425	-14 -14 -14
		Receive Level (dBm)
Seize Release Answer	2,250 2,600 2,600	
Restart DTMF Dial Tone	825/1,209 697-1,633 425	-2 to 0
Busy, Ringback Preempt	425 425	

Receive Level (dBm)
-20 to 0
-20 to 0
-20 to 0
Transmit Level (dBm)
-7 -7 -7
-7 -7 -14
-14
-14

NOTE: All levels shown are for single tones.

Figure E-35. Four-Wire DTMF Confirmation Trunk (SB-3865 to SB-3865)

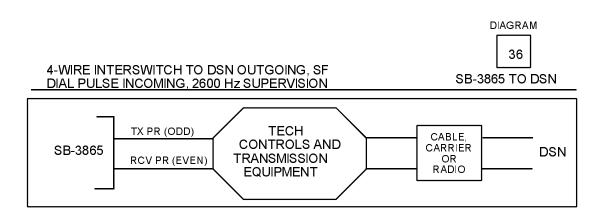
Table E-36. CSIPG, SB-3865 to SB-3865, DTMF

See Diagram 35

Switch	SB-3865	SB-3865
	02 0000	00 0000
Number of Circuits	Note 1	Note 1
Terminal Card	4-Wire ALTU	4-Wire ALTU
Special Adapters		
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber dials desired party (P+9+7 digits) and is connected without operator intervention.	Subscriber dials desired party (P + 9 + 7 digits) and is connected without operator intervention.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R
Restrictions/Special Instructions	The SB-3865 uses AN/TTC-38 trunk group Type 1.3, SB-3865. IDX 2.3.1.1.1.3.	The SB-3865 uses AN/TTC-38 trunk group Type 1.3, SB-3865. IDX 2.3.1.1.1.3.

Note 1:

NOTE 1.	
SB-3865 Stack Number of Modules	AN/TTC-38 Trunks
1	4
2	8
3	12



Function	Frequency (Hz)	Transmit Level (dBm)	Receiv (
On Hook Release Seize	2,250 2,600 -	-20 dBm0 -8 dBm0 -	
MF Signals Busy Tone Ring Back	697/1,633 425 425	-7 dBm0 -14 -14	
		Receive Level (dBm)	Transm (
On-Hook Seize	2,600		-20
Release/ Release Acknowledge	2,600	-31 to -4.5	
Dial Pulse Digits	10 pps		

Receive Level (dBm)
Transmit Level (dBm)
-20 dBm0

NOTE: All levels shown are for single tones.

Figure E-36. Four-Wire SF Dial Pulse or DTMF, 2,600 Hz Supervised Interswitch Trunk (SB-3865 to DSN)

Table E-37. CSIPG, SB-3865 to DSN

	Occ Diagram oo	
Switch	SB-3865	DSN
Number of Circuits	Note 1	
Terminal Card	AIU	
Special Adapters		
Incoming Call	Incoming calls with a precedence digit are routed automatically, by precedence, to called party. An incoming call with a precedence alerting signal is routed to the call-service attendant for completion.	Call is routed automatically to called party.
Outgoing Call	Subscriber dials the precedence, then escape code 91. Subscriber then receives second dial tone and dials the DSN area code and the subscriber address (precedence is optional).	DSN subscriber dials a regular DSN number.
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P & R
Restrictions/Special Instructions	DSN Access line options: - INID PBX - PNID PBX SB-3865 network is stand-alone without access to an AN/TTC-42 or AN/TTC-39 series. The SB-3865 uses DSN trunk group Type 9, IDX 2.3.1.1.9. SB-3865 must be in Type II, Emergency mode if not connected to CPS (AN/TTC-42 or AN/TTC-39 series).	

Note 1:

SB-3865 Stack Number of Modules	DSN Trunks
1	4
2	8
3	12

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2-WIRE, dc CLOSURE, DIAL PULSE SB-3614/A TO COMMERCIAL SWITCH LOOP TECH CONTROLS AND TRANSMISSION EQUIPMENT TX, RCV COMMERCIAL SWITCH LOOP

Function	Frequency	Transmit Level
Seizure Dial Pulse Busy	dc closure 10 pps 500	dc closure -14 +6/-3
		Receive Level
Ring Dial Tone	16 to 25 500	12

Receive Level		
<u>1</u> /		
Transmit Level		
90 Vrms <u>1</u> /		

Figure E-37. Two-Wire dc Closure, Dial-Pulse Trunk (SB-3614/A to Commercial Loop)

 $[\]underline{1}$ / Values determined by commercial switch.

Table E-38. CSIPG, SB-3614/A to Commercial Switch Loop

See Diagram 37				
Switch	SB-3614/A	Commercial		
Number of Circuits	15			
Terminal Card	Type V			
Special Adapters				
Incoming Call	Call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to the called subscriber.		
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C is keyed to complete the connection.	Subscriber dials a regular number which is the CSF attendant. The desired SB-3614/A switch subscriber number must then be given orally to the CSF attendant, to set up the connection.		
Precedence/Preemption	5 levels - FO, F, I, P, and R	None		
Restrictions/Special Instructions	The SB-3614/A appears as a 2-wire, dial-pulse subscriber loop off the commercial switch.			

4-WIRE, DIGITAL TDM TRUNK AN/TTC-46 TO AN/TTC-39 SERIES AN/TTC-46 AN/TTC-46 TO AN/TTC-39 SERIES AN/TTC-46 TO AN/TTC-39 SERIES AN/TTC-46 TO AN/TTC-39 SERIES DIPHASE GROUP MODEM TED TED TOSGM DTG TECH CONTROLS AND TRANSMISSION EQUIPMENT

Function	Group Bit Rates	Transmit Level
Multiplexed Channels		
At 16 kbps		
8 9 16	128 kbps 144 256	3 Vp-p Conditioned Diphase CX-11230 Cable
18 32 36 64 72	288 512 576 1.024 Mbps 1.152	Max Length 1 Mile

Receive Level			
90 rms Conditioned Diphase			
CX-11230 Cable			

Figure E-38. Four-Wire Digital Common-Channel Signaling Trunk (AN/TTC-46 to AN/TTC-39 Series)

Table E-39. CSIPG, AN/TTC-46 to AN/TTC-39 Series

Switch	AN/TTC-46	AN/TTC-39 Series	
Number of Circuits	8, 9, 16, 18, 32, 36, 64, or 72	8, 9, 16, 18, 32, 36, 64, or 72,	
Terminal Card	TDSGM	Group Modem	
Special Adapters			
Incoming Call	Call is routed automatically to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required), and 7-or 10-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit (if required) and 7- or 10-digit address.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	There are 28 TSBs per TTC-39D and 4 per AN/TTC-46.		
	Type 1 MSF can be used.		
	Maximum number of TEDs: AN/TTC-39 series- 15; AN/TTC-46- 3.		
	Use Modulo 8 or 9 for DTGs.		
	The AN/TTC-39D and AN/TTC-46 normally operate at a basic 16-kbps rate.		
	Use terminal Type 29.		

4-WIRE, SF, DIAL PULSE TRUNK

AN/TTC-46 TO COMMERCIAL SWITCH 4-WIRE LOOP

		Y DD (EVEN)		$\overline{}$		
AN/TTC-46	MFLTU	X PR (EVEN)	TECH CONTROLS AI	ND T	TX PR	COMMERCIAL SWITCH
7 (17) 45	R	CV PR (ODD)	TRANSMISSIC EQUIPMENT		RCV PR	FOUR-WIRE LOOP
				_/		<u> </u>

Function	Frequency (Hz)	Transmit Level (dBm)
Idle On Hook Seizure Dial Pulse Busy	2,600 2,600 0 2,600 @ 10 pps 425	-22 -10 Remove Sig. -10 @ No Sig. -14
		Receive Level (dBm)
Idle Seize	2,600 No Signal	-31 to -13

Receive Level (dBm)	
<u>1</u> /	
Transmit Level (dBm)	
<u>1</u> /	

 $\underline{1}$ / Values are determined by commercial switch.

Figure E-39. Four-Wire, SF Dial Pulse Trunk (AN/TTC-46 to Commercial Switch)

Table E-40. CSIPG, AN/TTC-46 to Commercial Switch Loop

See Diagram 39			
Switch	AN/TTC-46	Commercial	
Number of Circuits	2		
Terminal Card	MFLTU <u>1</u> /		
Special Adapters			
Incoming Call	Call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to the called subscriber.	
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C is keyed to complete the connection.	Subscriber dials a regular number, which is the CSF attendant. The desired AN/TTC-46 switch subscriber number must then be given orally to the CSF attendant, to set up the connection.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	None	
Restrictions/Special Instructions	The AN/TTC-46 appears as a 4-wire, single frequency, dial-pulse subscriber loop off the commercial switch.		
	Use terminal Type 45.		

 $[\]underline{1}/$ Or NWLTU and SF adapter combination dependent on the option year of switch.

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2-WIRE, dc CLOSURE, DIAL PULSE AN/TTC-46/48 TO COMMERCIAL SWITCH LOOP TECH CONTROLS AND TRANSMISSION EQUIPMENT TX, RCV COMMERCIAL SWITCH LOOP

Function	Frequency	Transmit Level
Seizure Dial Pulse Busy	dc closure 10 pps 425	dc closure -14
		Receive Level
Ring Dial Tone	17 to 33 <u>1</u> /	25 to 150 Vrms

Receive Level (dBm)	
<u>1</u> /	
Transmit Level	
90 Vrms <u>1</u> /	

NOTE: All levels shown are for single tones.

 $\underline{1}$ / Values determined by commercial switch.

Figure E-40. Two-Wire dc Closure, Dial-Pulse Trunk (AN/TTC-46/48 to Commercial Switch)

Table E-41. CSIPG, AN/TTC-46/48 to Commercial Switch Loop

See Diagram 40		
Switch	AN/TTC-46/48	Commercial
Number of Circuits	2	
Terminal Card	AN/TTC-46: TCLTU <u>1</u> / AN/TTC-48: Type V	
Special Adapters		
Incoming Call	Call is ringdown to CSF attendant, who forwards the call to the called subscriber.	Call is routed automatically to the called subscriber.
Outgoing Call	Subscriber (or CSF attendant) keys network access code 5C and waits for dial tone from commercial switch. Subscriber then keys address digits, and the digits are outpulsed (DP) to the commercial switch. After address digits are keyed, C is keyed to complete the connection.	Subscriber dials a regular number which is the CSF attendant. The desired AN/TTC-46/48 switch subscriber number must then be given orally to the CSF attendant, to set up the connection.
Precedence/Preemption	5 levels - FO, F, I, P, and R	None
Restrictions/Special Instructions	The AN/TTC-46/48 appears as a 2-wire, dial-pulse subscriber loop off the commercial switch.	
	Use terminal Type 44.	

 $[\]underline{1}/$ Or NWLTU and dc closure adapter combination dependent on option year of switch.

4-WIRE, DIBTS TRUNK

AN/TTC-39 SERIES TO AN/TTC-48



Function	Group Rate	Transmit Level
Multiplexed Channels		3 Vp-p
At 16 kbps	256 kbps	Conditioned Diphase CX-11230 Cable Max Length 2 Miles

Receive Level
90 mVrms Conditioned Diphase
CX-11230 Cable

Figure E-41. Four-Wire DIBTS Trunk (AN/TTC-39 Series to AN/TTC-48)

Table E-42. CSIPG, AN/TTC-39 Series to AN/TTC-48

oce blagfam 41			
Switch	AN/TTC-39 Series	AN/TTC-48	
Number of Circuits	16	16	
Terminal Cards	Group Modem/DLPMA	Communications Modem	
Special Adapters			
Incoming Call	Call is routed automatically to called subscriber.	Call is routed automatically to called subscriber.	
Outgoing Call	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit and 7-or 10-digit address.	Subscriber dials desired party and is connected without operator intervention. Subscriber dials precedence digit, special-feature digit (if needed), trunk access digit, and 7-or 10-digit address.	
Precedence/Preemption	5 levels - FO, F, I, P, and R	5 levels - FO, F, I, P, and R	
Restrictions/Special Instructions	AN/TTC-39A(V)1 and A(V)4 - Terminal Type 27. 16 or 32 kbps	The AN/TTC-48 operator must ensure that: (a) the AN/TTC-39 series switch is assigned as the Parent Switch using the	
	AN/TTC-39D- Terminal Type 86. 16 kbps	command FO 24 and (b) the timing is slaved off the AN/TTC -39 series switch using command FO 21.	
	Use Modulo 8 for DTG.		
	Use MSF type 1.		