CHAPTER III

NUMBERING SYSTEMS AND PLANS AND NETWORK ROUTING

1. <u>General</u>. This chapter discusses the telephone numbering systems and the numbering plans found in joint tactical circuit-switched networks. Included are the numbering limitations and interface criteria for current tactical CS and switchboard equipment. The chapter also describes Global Block Numbering Plan (GBNP) and assigns standard area and switch codes for joint use.

    a. Table III-1 lists the telephone directory number format codes used throughout this chapter. Each digit position in a telephone number requires a specific range of values that can differ from the other digits in that number. For simplicity, each range has a specific alphabetic character code. In a generic telephone number, these alphabetic character codes are the place holders for the actual numbers. Table III-1 also includes other alphabetic character codes frequently encountered in numbering plans.

    b. Special features dialing codes allow the subscriber to request the services shown in Table III-2. The keys listed apply to 3/4, DTMF-based keypads; e.g., DNVT, DSVT, and STU-III. Precedence, when used, is always the first digit dialed. Only one additional special feature request is permitted per call.

    c. NATO uses the National Identifier (NI) to route calls between the various NATO countries. Table III-3 lists NATO-approved NIs.

    d. Area codes (AC) identify geographic regions of defense, tactical, and commercial switched networks. In DSN, area codes are used to route calls to large areas of the world, such as CONUS and Europe. Tactical area codes identify theaters of operation, parts of a theater, or AORs. When using an area code without an NI, the caller dials a minimum of 10 digits (a 3-digit area code and a 7-digit subscriber number).

    (1) Figure III-1 shows the most common area code formats. The first example is the standard area code used by US commercial networks. The second example is the format in use by the DSN. The third example is the format used by US tactical networks.

Table III-1. Telephone Number Format Codes for Tactical
Networks

Digit Codes	Code	Range of Values
	B	Blank Character
	G	1 through 8
	I	1 through 6
	J	7 through 9
	K	1 through 6 (2 through 8, DSN)
	L	2 through 7
	M	2 through 8
	N	2 through 9
	P	7 through 9
	W	0 through 8
	X	0 through 9
	Y	0 or 1
	Z	0 through 3
Precedence Indicators	Code	Meaning
	R	Routine
	P	Priority
	I	Immediate
	F	Flash
	FO	Flash Override
Other Codes	Code	Meaning
	A	"A" Key on a telephone keypad (Same as # key on commercial phones)
	C	"C" Key on a telephone keypad (Same # as key on commercial phones)
	EOD	End-of-Dial Signal ("C" or "A" key)
	0	Attendant Access (Operator Assistance)
	00	Attendant Access (Operator Assistance)
	0XX(X)	Attendant Access (Operator Assistance)
	R	"R" Key or DSN Route Digit (Same as * key on commercial phones)
	DT	Dial Tone
	PC	Personal code 000 through 999 (Flood Search switches only)

Table III-2. Special-Feature Dialing Codes

Feature	Dialed Codes and Keys
Call Restriction-Security Required Only	(P)+1C+ Number
Call Transfer	2C
Analog Transmission Medium Required	3C
Call Restriction - End-to-End Encryption Required	(P)+4C+Number
Commercial Network Access	(P)+5C+Commercial Number
Preprogrammed Conference	(P)+6C+2 Digit PPC List Number
Force Dial	(P)+6R+TGC+ Number
Call Restriction - Digital Transmission Only	(P)+7C
Compressed Dial	(P)+NX+C
Progressive Conference Initiate	(P)+C+ Number
Call Forward	2+C+ Number
Affiliation	8+R+PC+ Number
Disaffiliation	8+C PC+ Number

Table III-3. Nationality Identifiers and Country Codes

9YX	Country	9YX	Country	9YX	Country
900	Belgium	908	Luxembourg	916	(US/Canadian Strategic)
901	Canada	909	NICS	917	(Spain)
902	Denmark	910	Norway	918	(Spare)
903	France	911	Portugal	919	(Spare)
904	Germany	912	Turkey		
905	Greece	913	United Kingdom		
906	Iceland	914	United States (Tactical)		
907	Italy	915	NICS		

(2) Table III-4 is a listing of the approved area codes for joint usage. Table III-5 lists the assigned, unique area codes for Army units equipped with the AN/TTC-39D or MSE. These units use these assigned area codes wherever they operate.

Area Code Format				Use
Format Range	$\underline{N}$ 2-9	$\underline{X}$ 0-9	$\underline{X}$ 0-9	Standard US commercial area code format.
Format Range	$\underline{K}$ 2-8	$\underline{Y}$ 0,1	$\underline{X}$ 0-9	DSN area code format.
Format Range	$\underline{M}$ 2-8	$\underline{Y}$ 0,1	$\underline{X}$ 0-9	Standard US tactical area code format.

Figure III-1. Area Code Formats

Table III-4. Joint Area Codes

User	Area Code	User	Area Code
USACOM JTF ARFOR SPARE	200 201 202 203	USPACOM JTF ARFOR SPARE	800 801 802 803
USCENTCOM JTF ARFOR SPARE	300 301 302 303	USSOUTHCOM JTF ARFOR SPARE	207 208 307 308
USEUCOM JTF ARFOR SPARE	400 401 402 403	USSOCOM JTF ARFOR SPARE	700 701 702 703
FORSCOM JTF ARFOR SPARE	600 601 602 603	DISA HQ (D333) CONTINGENCY DISN ISTs	408 410 411 412 413

Note: Army AN/TTC-39D or MSE elements assigned to JTF or ARFOR may require these area codes; otherwise, they may be assigned by the CINC as needed after coordination with DISA Contingency Operations Branch.

Table III-5. Area Codes for Army EAC (AN/TTC-39D) and MSE
Networks

User	Area Code	Spares		
EAC (CONUS)	1/	607	608	609
EAC (Europe)	1/	406	407	408
EAC (Pacific)	1/	806	807	808
I Corps	814	810	811	812
III Corps	714	710	711	712
V Corps	614	610	611	612
XVIII Corps	414	415	416	417

1/ EAC elements will use the applicable ARFOR area code.
    Organizations deploying from Europe or CONUS, in support
    of a CINC, continue to use their assigned area codes.

     e. The standard directory number has seven digits. See
Figure III-2 for the format of these numbering plans. The
directory number identifies a specific telephone
subscriber's line within a network or subnetwork. It is
unique within that network or subnetwork.

        (1) Just as in the American standard commercial
network, DSN telephone numbers have two parts. The first
part, to the left of the hyphen, is the switch code. This
code identifies a particular switching center within a
specific network and is unique to that switching center.
The switch code is 3 digits. The flood-search number (CBCS)
is an exception, because it does not have a switch code.

        (2) Additionally, there are AN/TYC-39A MSs assigned
to corps (and above) level MSE-and AN/TTC-39D equipped
units. These MSs were designed to be used in a
deterministic circuit-switched network. AN/TYC-39s deployed
in an MSE network also require a separate area code unless
connected to a CSR TEP modified network. These switches are
assigned spare area codes as well, from Table III-5.

     f. The SB-3614A(V)/TT uses a 7-digit format, NNXXXXX.
To access 10 or 13 digit numbers, an SB-3614A must dial 9,
escape code. For calls from an SB-3614/TT to the network,
subscribers dial a code to receive dial tone from the
network switch and then dial a full 7-, 10- or 13-digit
number. The AN/TTC-41 is an assemblage containing one or
more SB-3614() switchboards. The current AN/TTC-41 versions
generally use the SB-3614A switchboard. Planners and
engineers must verify the types of switches in any AN/TTC-
41s being used before assigning switch numbering.

K N X - X X X X

DSN 3/4 PLAN
RANGE OF VALUES

2-9   2-9   0-9   0-9   0-9   0-9   0-9

DSN PLAN

N X X

2-9   0-9   0-9

COMMERCIAL PLAN

SWITCH CODES   SUBSCRIBER NUMBER

L N X X X X X

FLOOD SEARCH OR
DETERMINISTIC
GBNP RANGE

2-7   2-9   0-9   0-9   0-9   0-9   0-9

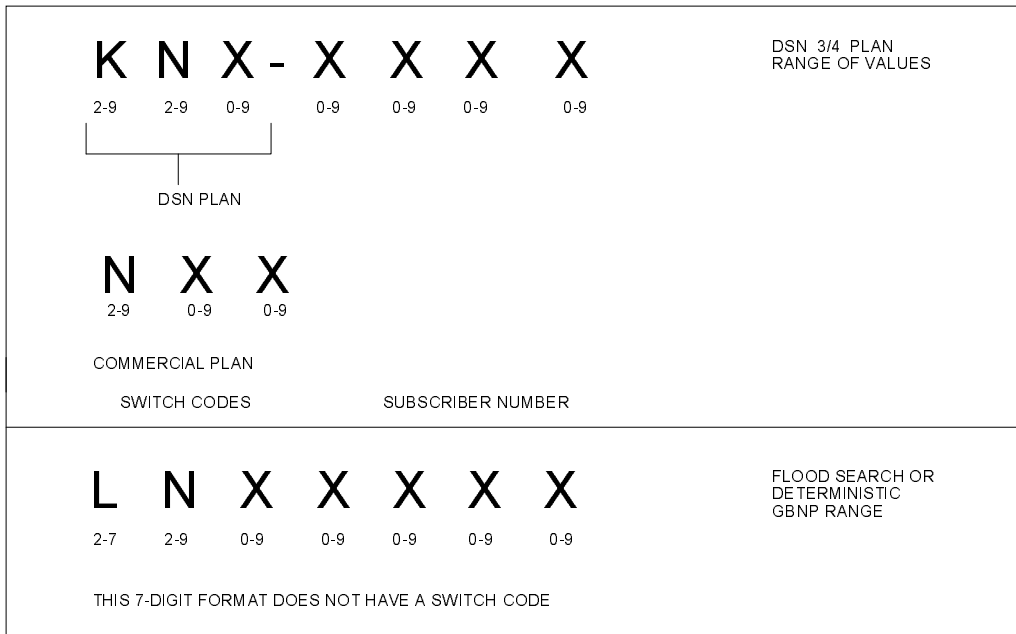THIS 7-DIGIT FORMAT DOES NOT HAVE A SWITCH CODE

Figure III-2.   The Seven-Digit Directory Number Format

g. The SB-3865 uses the 4/3 numbering plan. It accepts any NNXX switch code and any subscriber number in the XXX range. Using an escape code of 9, subscribers may dial 7-digit numbers. To access 10 or 13 digit numbers (area code or NI), a SB-3685 must dial the escape code of 91 to receive a second dial tone from the parent CBCS or AN/TTC-42. This access is permitted for DSVT and DNVT calls only. Other calls requiring these features must be extended by the attendant at a network AN/TTC-39A(V)1, CBCS, or AN/TTC-42, switch directly connected to the SB-3865 subnetwork. To reach the network switch attendant, the subscriber dials the escape code 9 and the attendant (operator) access code NNX 0XXX or NNXX 0XX of the network switch.

h. Roving subscribers and units that move frequently are assigned fixed-directory numbers. This feature is available in the AN/TTC-39A(V)1, CBCSs, the -42, and the SB-3865. Because the majority of CBCS subscribers will be defined in the PAL and already have fixed directory numbers, this feature will be rarely used. It would be required only for fixed directory numbers assigned to nonflood search switches within the home area code. The SB-3865 must be in a network with an AN/TTC-39A(V)1, CBCS, or AN/TTC-42 switch serving as parent switch to perform the routing for the SB-3865. Once assigned, the fixed-directory numbers follow the units or subscribers as they move within an area code. Switch and PRSL codes beginning with 99 are reserved for fixed-directory use. These 7-digit numbers are in the format 99PXJXZ for roving subscribers and 99XXIXX for roving units. There are 10 3-digit switch codes (990 through 999) in the range 99X that would conflict with the fixed-directory numbers if used.

i. Table III-6 lists the conditions under which a CBCS call is completed.

2. <u>Global Block Numbering Plan</u>. Effective 1 June 1995 implementation of the GBNP by all tactical circuit switches and switchboards was started.

a. The basis for the GBNP is fourfold: (1) to incorporate all Services into a joint network, (2) to identify a unique, Service-managed block of unit and subscriber numbers, (3) to simplify network management (DISN/Commercial) routing into a global network, and (4) to identify databases and subnetworks within the block of numbers.

Table III-6. CBCS Call Completion Matrix

Calling Instrument	Called Instrument						
	Analog NS	Analog SR	DNVT NS	DNVT SR	DSVT SP	DSVT SR	DSVT E-E
Analog NS	Yes	No	Yes (IMU)	No	Yes [1] (IMU)	No	No
Analog SR (Approved Loop)	No	Yes	No	Yes (IMU)	Yes (IMU, LKG)	Yes (IMU, LKG)	No
DNVT NS	Yes (IMU)	No	Yes	No	Yes [1]	No	No
DNVT SR (Approved Loop)	No	Yes (IMU)	No	Yes	Yes (LKG)	Yes	No
DSVT SP	Yes (IMU) [1]	Yes (IMU, LKG)	Yes [1]	Yes (LKG)	Yes	Yes	Yes
DSVT SR	No	Yes (IMU, LKG)	No	Yes (LKG)	Yes	Yes	Yes
DSVT E-E	No	No	No	No	Yes	Yes	Yes

1/ NSWT provided to DSVT subscriber.

Legend:

    NS Nonsecure
    SR Security Required
    LKG Loop Key Generator
    SP Security Preferred
    E-E End-to-End Encryption Required
    IMU Intermatrix Unit

(Common equipment required is shown in parentheses.)

    b. Figure III-3 shows the GBNP composition. The GBNP assigns blocks of numbers to each Service and joint component (see Table III-7).

        (1) Table III-8 lists the block assignments by joint component and Service.

DIGITS

1	2	3	4	5	6	7
L	N	X	X	X	X	X
2-7	2-9	0-9	0-9	0-9	0-9	0-9

The Directory Number will be composed by using the:

- "LN" Database Designator,
- Plus the Unit Block(s) "XXX" in Digits 3, 4, and 5,
- Plus the Subscriber Number "XX" in the 6 and 7 digits.

Database Designator	UNIT BLOCKS	Subscriber Number
LN	XXX	XX

4 - Digit Block -- Units requiring > 100 Numbers (LNXX)
5 - Digit Block -- Units requiring < 100 Numbers (LNXXX)
6 - Digit Block -- Units requiring < 10 Numbers (LNXXXX)

Figure III-3. Global Block Numbering Plan Scheme

(2) Table III-9 lists how the seven digits are assigned.

Table III-7. GBNP--Service Block Table

Service	Block
Joint	22X-29X
Marine Corps	32X-39X
Air Force	42X-49X
Army	52X-69x
Navy	72X
Spare	73x-78x, 790x-798x

Table III-8. Block Assignment Table

Service	Database	Database/Unit Based Block of Numbers
Joint		

Joint	JTF (Generic) ⇒ Includes	22X
		 • Large JTF
		 • Combined JTF
		 • Small JTF
		 • CINCs:
		   ACOM
		   CENTCOM
		   EUCOM
		   PACOM
		   SOUTHCOM
		   JCSE

Joint Spare	Spare	23X-28X
Joint	JITC	29X
Service		
USN	USN	72X
USMC	MC	32X-39X
USAF	Active Units ANG Reserve Deterministic Spare	42X 43X 44X 46X-49X 45X
Army Corps	I Corps III Corps V Corps XVIII Corps AA&MDC 52 Mech (Tng) USARSO	52X 53X 55X 58X 54X 56X 57X

Army EAC	Korea
	 Europe
	 CONUS (active)
	  NG (2)
	  USAR (3)
	 Spare
		62X
		 63X
		 64X
		 65X
		 66X
		 59X

Army	Signal Tech Numbers	DB0XXXX 1/
Spare	Spare	59X (Army)
Spare	Spare	67X-69X (Army)
Spare	Spare	73X-78X, 790X-798X

1/ DB = Database Designator. 0 = SIG TECH

Table III-9. GBNP Digit Assignment Table

Digits	Assignment
1	1 = NA (Not compatible with deterministic switch routing) 2 = Joint 3 = USMC 4 = USAF 5 = Army (ECB) 6 = Army (EAC) 7 = Spare (GDBM) (USN-72)
2	2-9 Service Sub-Block Corps/EAC Army
3	0 Signal Tech Numbers
3	1-9
4	0-9 Unit Sub-Block
5	0-9 (1-8, deterministic switches)
6	0-9 Unit Sub-Block
7	0-9 Sub-Unit Number

    c. <u>Network Numbering Plan</u>. The CBCS fielding has changed the manner in which directory numbers are composed. The network numbering plan is now composed of the following 13 digits (Figure III-4.):

        (1) National Identifier (NI) code (3 digits).

        (2) National home area code (AC) (3 digits).

        (3) Subscriber directory number (7 digits).

        (4) Non-CBCS (deterministic) switches (e.g., SB-3614A, SB-3865, AN/TTC-42, AN/TYC-39A) will use NNXX codes. If the subscriber is connected to a non-CBCS within the home area code, NNXX gateway routing is used and the 4 digits of the seven-digit number (in the form NNXX) translates to a transmission path from a CBCS to the non-CBCS. (Note: Because ULCS are in effect PBXs, they can be accessed only by way of the CBCS to which they are connected.) It is composed of a basic 13-digit address in the form 9YX-MYX-LNXXXXX, for flood search routing, or 9YX-MYX-NNXXXXX, for deterministic routing. 9YX represents

9YX-MYX-LNXXXXX

(NI)   (AC)   (FLOOD SEARCH ROUTING)

OR

9YX-MYX-NNXXXXX
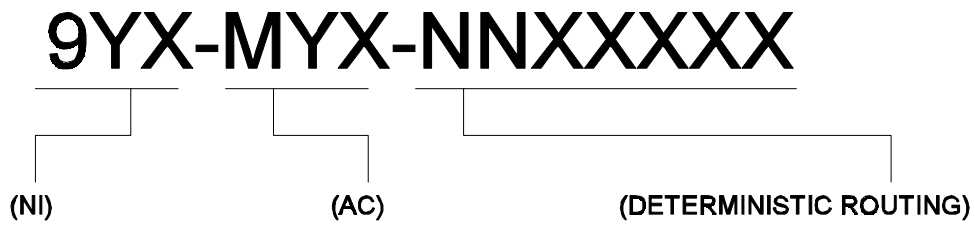
(NI)   (AC)   (DETERMINISTIC ROUTING)
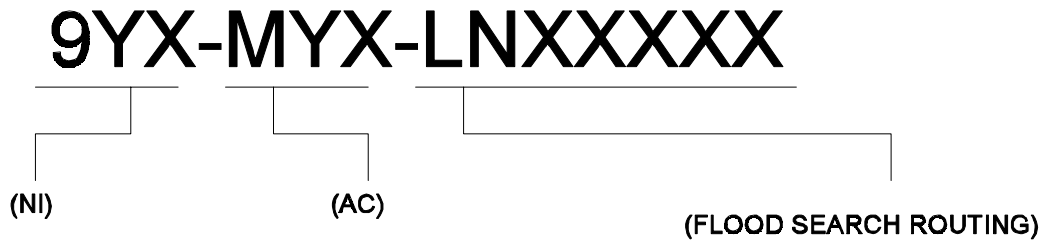
Figure III-4. CBCS Network Numbering Plan

the NI, which is 914 for US tactical systems, see
Table III-3. NYX represents the AC (see Tables III-4 and
III-5). LNXXXXX represents the GBNP directory, see
Figure III-3 for the GBNP format. (See Section A, Chapter V
for a description of the screen commands noted below and the
associated entries and worksheets.) Table III-10 provides a
summary of the routing commands used in the following
discussion.

Table III-10. CBCS Routing Commands

Command	Use
AGC, Assign Gateway and Commercial Office Routing	Used to define routing to all foreign areas codes, to an NNXX code or range of NNXX codes within a foreign area code or within a home area code, and routing to a commercial network.
ANY, Assign NYX Routing	Normally used to define the home area codes for the network. The NATO area code is defined by the ASC command.
ASC, Assign Switch Classmarks	Used to define the classmarks applicable to a CBCS, to include gateway and NATO area codes

(5) The NI code number does not need to be dialed
unless a call is being placed to a non-US switch. The NI
code is inputted during initialization using the ASC
command. Up to 20 NI codes can be accommodated in the
routing tables (1 home and 19 foreign).

(6) The AC is dialed only for calls to another area
within the US tactical network. The home area code is
inputted using the ANY command. The ANY command should not
be used to route to foreign area codes. Foreign area code
information is required for those transmission paths that
directly connect a switch to another area code (flood search
routing takes care of finding the access, or gateway, to a
foreign code from a switch not directly connected). This
information is inputted using the AGC command.

(a) The routing table can accommodate up to
140 US area codes (MYX).

(b) Military networks may sometimes use MYX
area codes with up to 20,000 subscribers in one area.
Within each area code, subscribers will have a 7-digit
directory number (LNXXXXX) that is not related to their home
switch code.

(c) CBCSs can function with the STANAG 5046 compatible deducible numbering plan (LNXXXXX) and simultaneously nondeducible NNXXXX numbering plan used by deterministic-based switches; e.g. SB-3865.

(d) NNXX numbering is used to route to non-CBCS switches within the home area code. CBCS which are directly connected to an NNXX switch must input this information using the AGC command. CBCS routing tables can accommodate up to 200 NNXX codes for non-CBCS routing.

d. Network Call Routing. The CBCS fielding also changed the manner in which network call routing is accomplished.

(1) In flood search routing, a subscriber's directory number is not tied to a switch code. A subscriber can change locations to any other flood search switch in the network and never have to change the directory number.

(2) Abbreviated dialing is not permitted.

(3) Escape codes are not necessary or permitted.

(4) Calls are routed using the flood search technique.

(5) Switches use deterministic routing only for directly connected foreign switches and gateways to foreign area codes.

(6) Area codes are primarily doctrinal or functional separations; i.e., to separate network elements that cannot function together. One important separation is the difference between switches that support the expanded profile (255) classmark and those that do not.

e. Gateway Routing and Numbering (Figure III-5)

(1) Nonflood search routing is discreet routing down a specified trunk group, as opposed to network-wide flood search routing.

(2) The method used by all CBCSs to perform any nonflood search routing is called gateway routing and is inputted using the AGC command. The AGC command is positioned in the database of the interfacing CBCS. The designated interfacing switch will answer the flood search request message from a subscriber's dialed digits. The

interfacing switch has the option for area node, range of NNXXs, or primary and alternate path routing (when the alternate path is directly connected to the switch providing the primary path). The AGC command is not permitted on a flood search TGC.

(3) There are three types of gateway routing: routing to a foreign area code, routing to a commercial office, and routing to a non-CBCS switch in the same network.

(4) Routing to a foreign area code (either a foreign NI or NAC).

(a) The foreign 9YX NI or MYX area code is inputted using the AGC command, specifying a trunk group cluster for discreet routing to this foreign code.

(b) One primary and up to two alternate TGCs can be specified for each foreign area code on the AGC screen.

(5) Routing to a commercial dial central office (DCO).

(a) A six-digit code consisting of all 9s must be inputted on the AGC screen at any CBCS that has a direct connection to a DCO line, including a directly connected extension switch (such as an EAC SEN) that has access to a DCO line.

(b) One primary and up to two alternate TGCs can be specified for each DCO code on the AGC screen.

(c) The purpose of this type of gateway routing is to allow a call request for DCO access to flood search routing from anywhere in the network to the nearest switch which provides this access.

(6) Routing to any directly connected non-CBCS in the home area code. This method of routing uses the NNXX switch code.

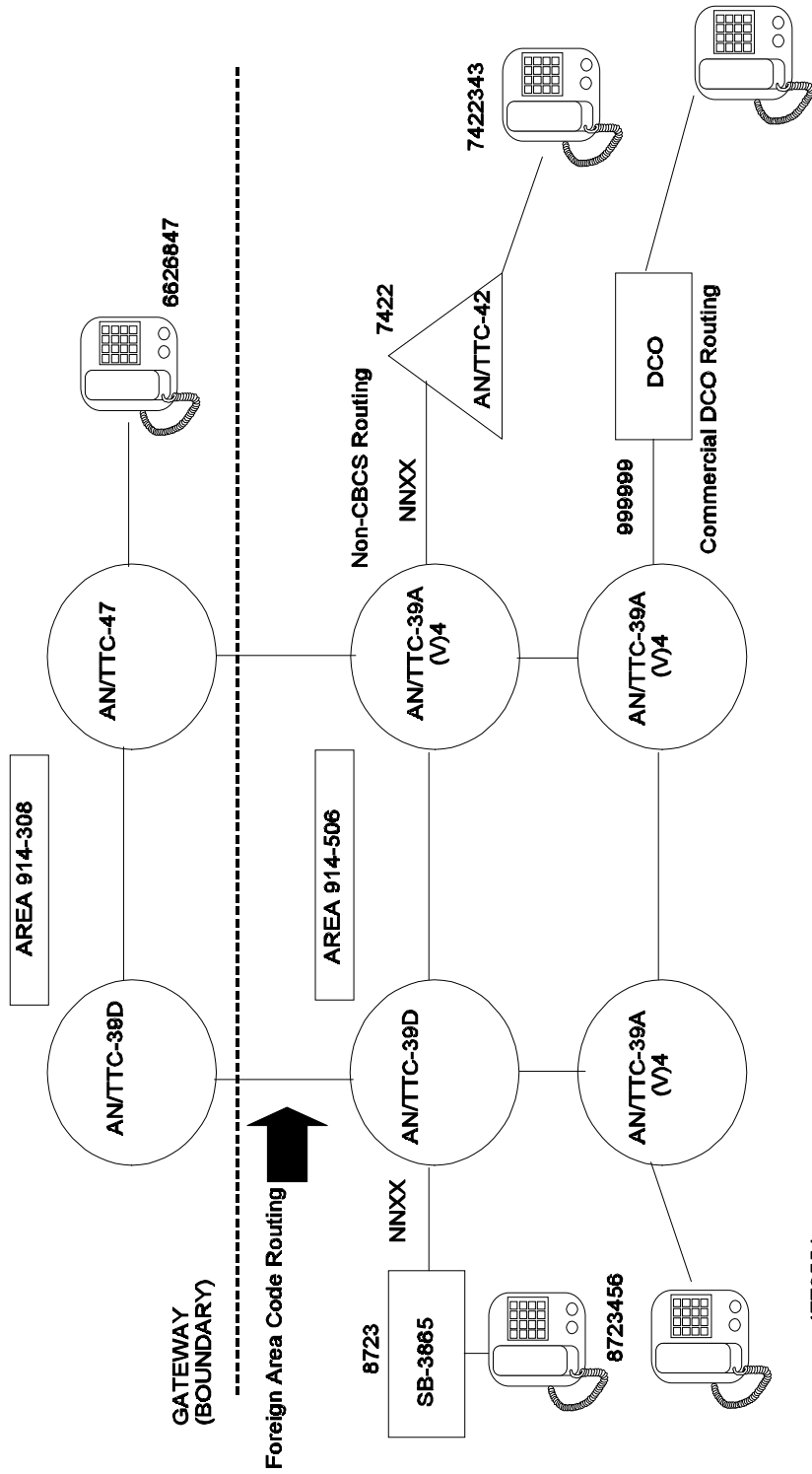(a) The NNXX switch code (or a range of NNXX switch codes) is inputted using the AGC command.

Figure III-5. CBCS Gateway Routing and Numbering

(b) One primary and up to two alternate TGCs can be specified for each NNXX code on the AGC screen (if all TGCs are directly connected between the switch performing the AGS and the non-CBCS switch).

(c) If the NNXX switch is not directly connected to the switch at which the call originates, flood search routing finds a path to the gateway switch.

(d) Each CBCS searches its routing tables for gateway routing information prior to initiating flood search routing. Gateway routing information is compiled from the AGC command inputs.

(7) Routing Using the AGC Command. Figure III-6 is an example of a hypothetical CBCS network illustrating the use of the AGC command. The switch codes shown for each network switch are in accordance with paragraph 14f, Chapter IV and Table IV-3.

(a) Assume a subscriber of AN/TTC-39A(V)4, switch code 71, dials a subscriber number 3200123 at the AN/TTC-42, switch code 3200. (Figure III-7.) Switch 71 broadcasts a flood search message asking all CBCSs in the same 600 area code for exit.

(b) The AN/TTC-39A(V)4, switch code 10, has the AGC screen programmed with exit to the AN/TTC-42, switch code 3200. (Figure III-8.)

(c) Switch 10 returns a message to switch 71 and a path is reserved. Switch 10 completes the call to switch 42 and the subscribers will go to traffic.

3. Planning Factors for Interconnecting Deterministic and Flood-Search Systems. See paragraph 14f(3), Chapter IV.

4. General Guidelines for Developing Routing Tables.
Routing tables will vary with each deployment. Because there are so many different variables when more than three or four switches are involved, it is difficult to establish absolute rules that cover all cases. The guidelines listed below should be followed.

a. Always classmark Spill Forward any TGC that comes from a switch that has only one TGC that accesses the rest of the network. This will permit the second switch in a trunk call to act as an originating switch and perform alternate routing.
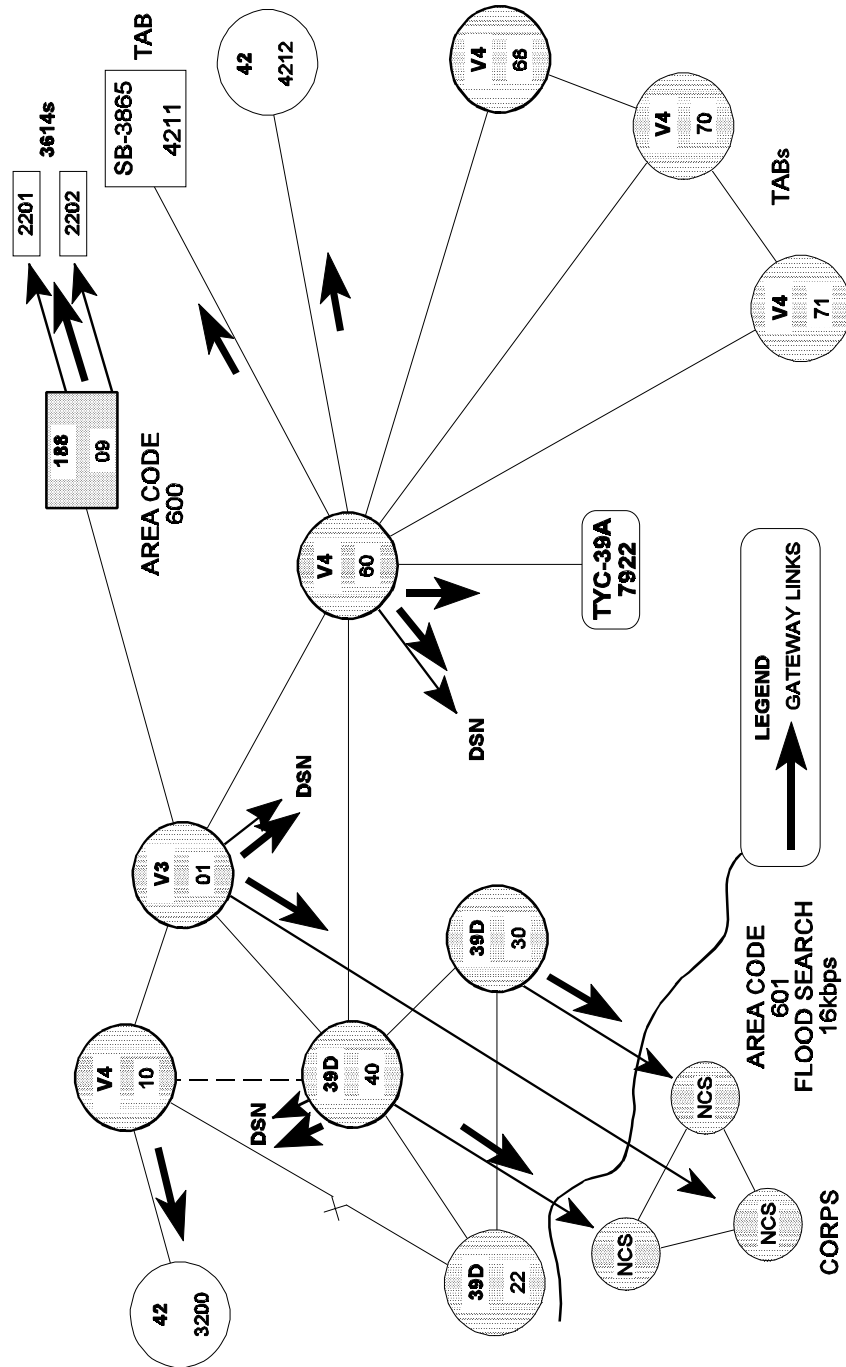
Figure III-6. Example CBCS Network
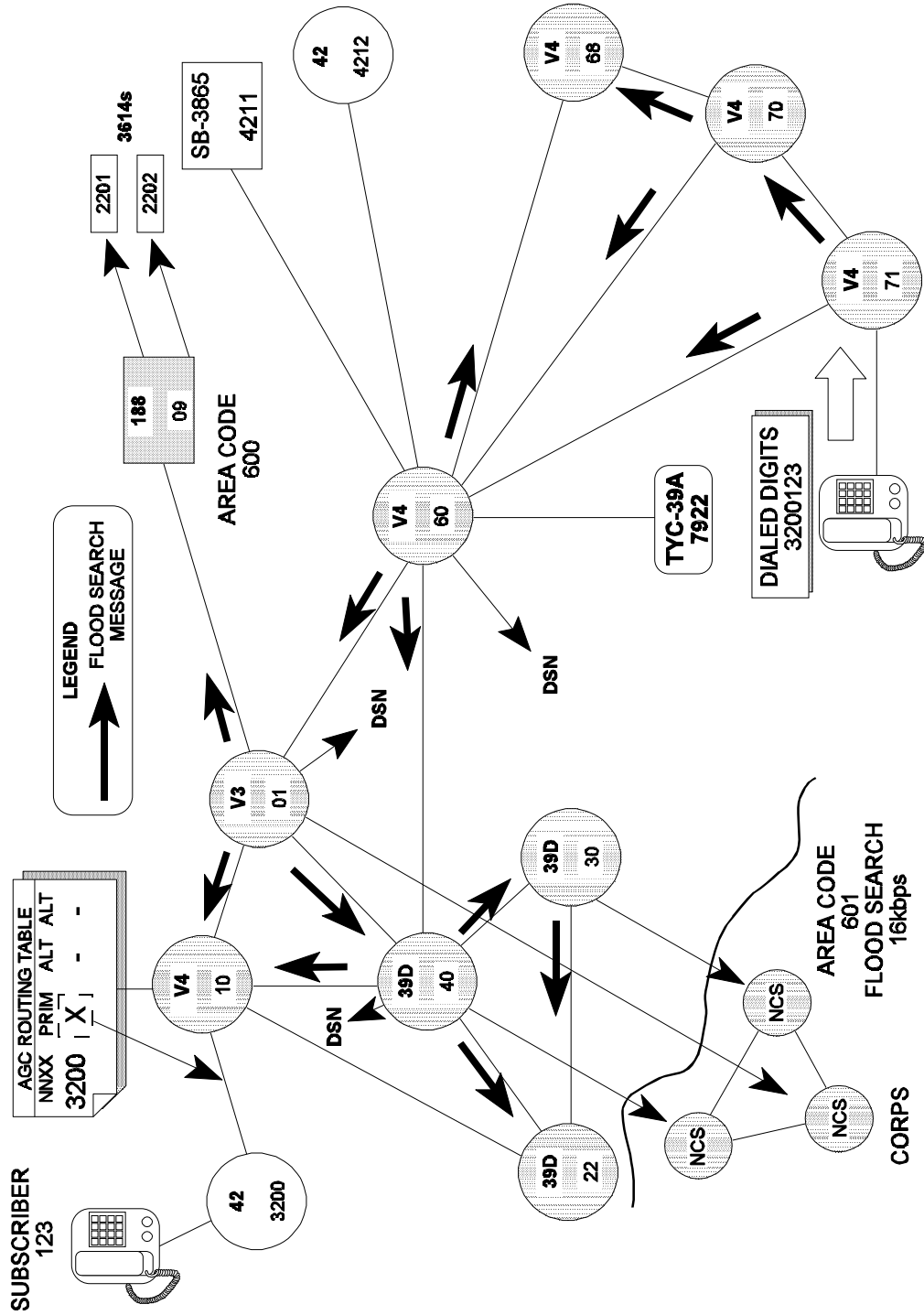
Figure III-7. AGC Route Example - Step 1
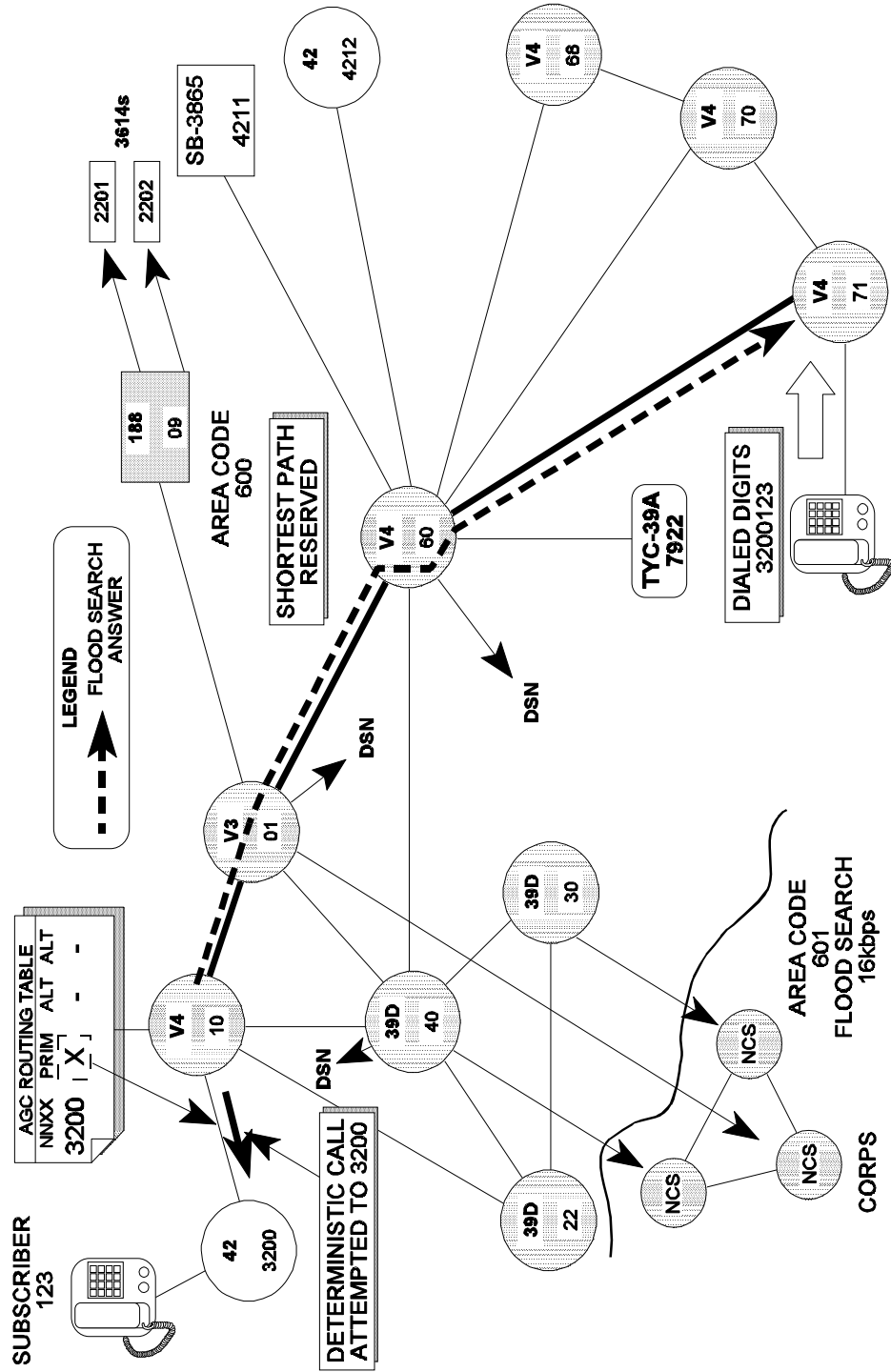
Figure III-8. AGC Route Example –Step 2

b. If a switch provides an entry into another network, such as NATO, DSN, or deterministic, classmark the switch as a gateway.

c. ULCS switches have two types of Spill Forward classmarks, Spill Forward In and Spill Forward Out.

(1) Spill Forward In. This classmark applies only to DIBTS and CCIS trunk group types. If Spill Forward In is marked YES, the switch will assume routing control of calls entering via the subject trunk group. If Spill Forward In is marked NO, the switch will perform intermediate or terminating switch functions for incoming calls, depending on the call address.

(2) Spill Forward Out. This classmark applies to all trunk group types except 2-wire, demand assigned multiple access (DAMA), and DSN. If spill Forward Out is marked YES, the switch will assume routing control of calls exiting via the specified trunk group. If Spill Forward Out is marked NO, the switch will perform normal originating or intermediate switching functions for outgoing calls.

5. Numbering Plan Worksheets. Figures III-9, III-10, and III-11 are worksheets to assist the planner or engineer to allocate directory numbers. These worksheets also provide information for the databases of network switches. (See Chapter V.) These worksheets are suitable for automation using a database or spreadsheet program. They may be modified to fit local situations.

a. Figure III-9 provides a means to record area code assignments. This worksheet provides a means to record area codes within a theater of operations. Although it is desirable to have a minimum of area codes in a theater, several may be necessary. The planner or engineer uses this worksheet as an index of the organizations within an area code. This worksheet may be used to keep track of NIs (9YX) in a theater.

b. Figure III-10 provides a means to record switch codes. Each area code in the AOR requires a set of these forms. A separate set may be developed to support the Annex K of each operation or contingency plan. Entries should be made in unit or command sequence. A new form is needed for each major unit or command. Centralized preparation of these worksheets reduces confusion and duplication.

ORGANIZATION _____

ADDRESS _____

TELEPHONE AREA CODE ASSIGNMENT WORKSHEET

AREA CODE _____   ASSIGNMENTS MADE BY: (NAME/OFFICE CODE)   DATE: _____

OPLAN/CONPLAN REF.

AREA CODE	UNIT/ ORGANIZATION	POC NAME & NUMBER	SWITCH CODE	START DATE	STOP DATE	REMARKS
KYX, MYX, NYX (OR 9YX)						

Refer to Chapter III, CJCSM 6231.02A   Page ____ of ____

Figure III-9. Area Code Assignment Worksheet

III-22

CJCSM 6231.02A
1 August 1998

ORGANIZATION _____

ADDRESS _____

TELEPHONE SWITCH CODE ASSIGNMENT WORKSHEET

AREA CODE _____   ASSIGNMENTS MADE BY: (NAME/OFFICE CODE)   DATE: _____

OPLAN/CONPLAN REF. _____

SUBSCRIBER UNIT/HQS: _____

PARENT ORGANIZATION: _____   SPECIAL REQUIREMENTS

	SWITCH LOCATION	SWITCH TYPE	NUMBER & FORMAT	SWITCH SIZE LOOPS/TRUNKS	CURRENT SWITCH CODE	NEW SWITCH CODE	"O" DIGITS	START DATE	STOP DATE	REMARKS
1										
2										
3										
4										
5										
6										
7										
8										

Refer to Chapter III, CJCSM 6231.02A   Page ____ of _____

Figure III-10.   Switch Code Assignment Worksheet

CLASSIFICATION

ORGANIZATION _____

ADDRESS _____

TELEPHONE AREA CODE ASSIGNMENT WORKSHEET

AREA CODE _____   ASSIGNMENTS MADE BY: (NAME/OFFICE CODE)   DATE: _____

SUBSCRIBER UNIT/HQS: _____   POC NAME: TEL NR. _____

PARENT ORGANIZATION   OPLAN/CONPLAN REF. __

DIRECTORY ENTRY	FDUL ONLY SWITCH TYPE	INTERNAL NNXX	INTERNAL OXXX	FDSL OR FDUL NUMBER	SECURITY TYPE	START DATE	STOP DATE	REMARKS
Unit, Name or Office Code					DVST, STU-III or None			

Refer to Chapter III, CJCSM 6231.02A   Page _____ of _____

CLASSIFICATION

Figure III-11. Fixed Directory Assignment Worksheet

c. If required, Figure III-11 provides a means to control fixed-directory assignments. This worksheet provides a means to record fixed-directory numbers within each area code. Centralized planning prevents duplicate assignments and provides a complete source of fixed-directory information. The use of the worksheet and information requested are similar to that for switch codes. A separate set of these forms may be made to support each contingency or operations plan.

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CHAPTER IV

NETWORK PLANNING CONSIDERATIONS

1. General. The planning considerations discussed in this chapter pertain to the way in which the AN/TTC-39 series CS is used. Most of these considerations are not new to the planner or engineer, because they were first encountered with the AN/TTC-39. The AN/TTC-39 introduced a hybrid analog and digital circuit switching environment, a hybrid analog and digital transmission capability, and a mixed secure and nonsecure environment. AN/TTC-39 series CSs do not significantly change this environment, because they are essentially product-improved AN/TTC-39s. The considerations discussed in this chapter should not be labeled as problems. Any system can encounter difficulties if it is employed without considering the constraints placed upon the original design. By understanding some of the issues that can arise, a planner or engineer should be able to avoid some of the difficulties that could occur.

2. A/D Conversion

    a. Testing has confirmed that conversion of signals from analog to digital (A/D) and back to analog using the CVSD algorithm, under most conditions, will provide acceptable quality for signaling and voice. As a general rule, the system should perform no more than two complete A/D conversions (A/D-D/A-A/D-D/A) when operating at 32 kbps. Generally, successive A/D conversions should be avoided when operating at 16 kbps or in a hybrid configuration due to circuit degradation. Analog applique unit (AAU) cards in DGM equipment, IMUs in the AN/TTC-39A(V)1, and CVSD cards in the CNCE all provide A/D conversions of approximately equal quality. AAU cards have a switch for adjusting to different input levels, and this switch should be set to the correct level. A/D and D/A conversion in the AN/TTC-39A(V)4/D is performed by the firmware on the DLTU type circuit cards. (For more information on AAU A/D conversions, see Chapter I, Section A, CJCSM 6231.04.)

    b. The planner-engineer should be aware that the AN/TRC-170 provides a 4-wire transmission path. It has no hybrids for two- to 4-wire conversion. When using the AN/TRC-170 with AAU cards for analog transmission, operators must provide external hybrids if the terminal equipment is 2-wire. (For example, if an AN/TRC-97 is used, hybrids are available as part of the tropo terminal.)

3. <u>Quasi-Analog Signals</u>. Quasi-analog signals are digital signals converted to a form suitable for transmission over a specified analog voice (3 kHz) channel. Signals, such as FSK and QPSK, are considered quasi-analog. Problems develop when these signals undergo an A/D conversion and the quasi-analog signal's rate exceeds 1.2 and 2.4 kbps respectively. CVSD modulation is optimized for voice and performs relatively poorly for quasi-analog data. A CVSD rate of 32 kbps performs better than 16 kbps for A/D and D/A conversion of quasi-analog signals.

4. <u>System Timing</u>. The AN/TTC-39 series CS can operate in a master timing mode or can derive timing from an incoming digital group and thereby slave to another timing source. The recommended timing configuration depends on the system configuration and available transmission media. (See CJCSM 6231.04 for a detailed discussion of system timing.)

5. <u>Analog Versus Digital Telephones</u>. The allocation of telephones to subscribers is based on several factors, including:

   a. A multiline (extension) capability at a location requires that analog telephones be used.

   b. A secure voice capability requires a secure digital telephone or STU-III. This assumes that an approved loop is not used. (See paragraph 7 below.)

   c. The planner-engineer must balance the distribution of instruments connected to the space and time-division matrices, based on the number of terminations available. (The AN/TTC-39A(V)4/D does not have a space division matrix.) If a switch is heavily loaded, the planner or engineer must also consider the probable calling patterns from the terminals to ensure that the number of IMUs needed does not exceed the number available. For example, are more calls made to analog instruments or to digital instruments? These considerations may outweigh the desire to minimize the amount of cable used.

6. <u>Modulo 8 Versus Modulo 9</u>

   a. <u>General</u>. With AN/TTC-39 series CSs, two different transmission rate families are associated with transmitting DTGs. The first is usually referred to as the modulo (MOD) 8 family (256, 512, 1,024, and 2,048 kbps). At the 32-kbps channel rate, these groups have capacities of 8, 16, 32, and 64 channels, respectively. The second is referred to as the

modulo (MOD) 9 family (288, 576, 1,152, and 2,304 kbps). At
the 32-kbps channel rate, these groups have capacities of 9,
18, 36, and 72 channels, respectively.

    b. <u>AN/TTC-39 Series TDMX Efficiency</u>. Although the
AN/TTC-39 series' TDMX can operate with both rate families,
the switch is more efficient when operated at MOD 9 because
of the NCMDs. Whenever a MOD 8 group is created, the switch
uses one NCMD (with 9 terminations) for each 8 channels
transmitted, wasting 1 channel. Whenever a MOD 9 group is
created, all terminations on an NCMD are used. Table IV-1
shows the number of channels available in a DTG versus the
number of TDMX terminations used for different information
rates in the two-rate families.

    c. <u>Equipment Compatibility</u>. Not all equipment is
compatible with the rates of both families. Table IV-2
lists the capabilities of different equipment to accept MOD
8 or MOD 9 rates.

Table IV-1. Channel Availability versus TDMX
Terminations

Group Information Rate (kHz)	TDMX Terminations Used	Channels Available 1/
288	9	9 (1 overhead + 8 traffic)
576	18	18 (1 overhead + 17 traffic)
1,152	36	36 (1 overhead + 35 traffic)
2,304	72	72 (1 overhead + 71 traffic)
256	8	8 (1 overhead + 7 traffic)
512	16	16 (1 overhead + 15 traffic)
1,024	32	32 (1 overhead + 31 traffic)
2,048	72	64 (1 overhead + 63 traffic)

<u>1</u>/ If the switch has been CSR TEP modified, there are two
overhead channels and one less traffic channel if it is
used as a flood search link

Table IV-2. Equipment versus Rate-Family Capability

Equipment	Rate-Family Capability
DGM Family	Either modulo 8 or modulo 9 DTGs, but not at the same time.
AN/TRC-170	Either modulo 8 or modulo 9 DTGs, but not at the same time.
AN/TSQ-111	Both modulo 8 and modulo 9 DTGs, simultaneously.
AN/TTC-39 Series	Both modulo 8 and modulo 9 DTGs, simultaneously.
AN/TAC-1	Both modulo 8 and modulo 9 DTGs, simultaneously (the second group can be from the other family).
AN/TTC-42	Both modulo 8 and modulo 9 DTGs.
SB-3865	Both modulo 8 and modulo 9 DTGs.
TD-1389 (LRM)	Modulo 8 DTG only at 128/256 kHz in the LGM-emulate mode.
MSE	Both modulo 8 or modulo 9 DTGs simultaneously (database modification required in the NCS/LENS).
TD-1337 (TSSP)	Both modulo 8 and modulo 9 DTGs, simultaneously.

    d. System Implications. Below are six of the more important system implications:

        (1) Using rates from the MOD 9 family for group outputs optimizes the number of channels available from the AN/TTC-39 series TDMX.

        (2) A system configuration should not contain a mixture of rates of different families in a TD-1236 TGM.

        (3) The AN/TAC-1 has two groups and can be used to transmit MOD 8 and MOD 9 rates, simultaneously.

        (4) When interfacing with USMC-provided links, the interface will be MOD 9 because of the TD-754 associated with the AN/GRC-201 tropo radio. (NOTE: This is not the case if the USMC is using the AN/TRC-170 tropo.)

        (5) When an LRM is used as a terminal multiplexer, the group rate must be MOD 8. (The LRM can emulate an LGM only at the group rates of 128/256 kHz, MOD 8 rates.)

(6) The TD-1337 (found in the AN/TSC-85B, -100A, -93B, and -94A) can mix MOD 8 and MOD 9 rates, simultaneously.

7. <u>Approved Loops</u>. The use of approved loops is not recommended. Although the switch can be set up for approved loops, they use switch resources inefficiently and cause problems with a user who can and cannot be called. Below are four such conditions.

    a. An approved loop requires that all loops in the field cable be approved loops. When only 1 approved loop is needed, the other 11 circuits in the field cable cannot be used. If the approved loop subscriber is a DNVT, the clock for all circuits in that field cable must be changed from BLACK to RED.

    b. An approved loop instrument can complete a nonsecure call to a nonapproved loop subscriber depending on the security classmark of the terminal devices.

    c. A call from an approved loop instrument to a DSVT ties up an LKG for the call's duration.

    d. A call from an approved loop instrument over a digital trunk ties up an LKG for the call's duration.

8. <u>LKGs</u>. LKGs are pooled resources that are used only during establishment of secure calls. Their numbers should be sufficient for most deployments. However, the planner or engineer should be aware of two types of calls, in addition to the calls noted in subparagraphs 7c and d, that can tie up an LKG for a call's duration:

    a. Secure digital conference calls. (One LKG is used for each DSVT in the conference.)

    b. Calls between approved loop instruments at different switches can tie up a LKG at each switch for the duration of the call.

9. <u>Echo Suppression</u>. The path delay associated with satellite communications can cause difficulty for voice users who have 2-wire telephones. The hybrid circuit at the distant end causes an echo to be returned to the speaker approximately 1/2 second after speaking. Normally, these echo signals are attenuated by echo suppressors. The use of 4-wire telephones and switchboards eliminates the need for echo suppressors. All digital telephones are 4. The use of

2-wire telephones will cause problems only if they are used for calls over satellite circuits that do not have echo suppressors.

    a.   Echo Suppression in the AN/TSC-94A and AN/TSC-100A. These terminals have no echo suppressors on either the analog or digital circuits.

    b.   Echo Suppression in the AN/TSC-93A and AN/TSC-85A. These terminals are equipped with echo suppressors for analog circuits.

10. Transmission Considerations. For Army deployments, the switch is connected directly to the transmission system.

    a.   The communications nodal control element (CNCE) is discussed in CJCSM 6231.06. Individual analog circuits, DTGs, or both are interconnected through the CNCE to the transmission media. The CNCE can automatically monitor and test and route or reroute all circuits connected through the facility. For nodal configurations that do not use the CNCE, the SG-1139 Digital Test Set provides a means of testing DTGs. The SG-1139 interconnects to a loop modem appearance on the TDMX, and an AOD 61 maintenance command interconnects the loop channel to a channel in the DTG for testing. An assign online diagnostics (AOD) 62 maintenance command verifies that the connection has been made.

    b.   Standard analog interswitch trunks (see Chapter VII) that interconnect the AN/TTC-39 series CS to other inventory CSs and switchboards through the CNCE use standard 4-kHz frequency channels derived from several transmission media: tropo, LOS, HF, or satellite. The AN/TTC-39A(V)4/D primarily use digital ISTs. Transmission considerations for these media are discussed in CJCSM 6231.04. Circuit standards are discussed in CJCSM 6231.06. Each 4-wire channel, derived from a multiplex system, is specified to provide a BER of 1×10^{-5}. These channels should provide high-quality voice circuits, even in a tactical environment. These analog trunks must be secured by a COMSEC device when using the AS feature. CJCSM 6231.04 provides information on analog system configurations and their capability to secure transmission links.

    c.   Digital circuits that traverse DTGs support (1) digital interswitch trunks between AN/TTC-39 series CSs and (2) individual digital subscriber lines accessing the CS as long locals. DTGs are supported by (1) AN/TRC-170 digital tropo terminals, (2) GMF satellite terminals, (3) Army LOS

terminals (AN/TRC-173A, -174A, and -175A), and (4) DGMs. Transmission equipment is discussed in CJCSM 6231.04.

d. Digital channels, derived from DTGs, terminate on the NCMD addresses based on the DTG's MSF. (See CJCSM 6231.04.) For Type 1 and Type 4 MSFs (used with the CNCE), the channels are assigned on a one-for-one basis to the NCMD addresses when using 9-channel modularity. When using 8-channel modularity, the ninth channel on the NCMD is bypassed.

(1) For Type 3 MSFs used with a TGM, the channels are assigned by group and channel sequence, as indicated in CJCSM 6231.04. Note that the starting address for the NCMD is channel 1. Thus, time slot 0 is assigned to the first channel of the NCMD card, and other time slots are assigned contiguously.

(2) Overhead channels, such as time slot 0, within the DTG, are used to carry out-of-band common-channel signaling and supervision information when the DTG carries interswitch trunks. These overhead channels are terminated in TSBs (terminal Type 117) at the CS. Overhead channels in digital loop groups that carry subscribers must be terminated on an NCMD address and are not available for traffic. These overhead channels are assigned to terminal Type 119, loop-group signaling channels. Assignment of DTG time slots to NCMD addresses is made using the ATS worksheet. Because these assignments can be either simple or complex, depending on the multiplex configuration, refer to the guidelines below.

(3) Normally, DTGs carrying digital interswitch trunks between directly interconnected AN/TTC-39 series CSs, or between an AN/TTC-39 series CS and an AN/TYC-39 MS; when used, use a Type 1 MSF. This DTG carries one overhead channel and n traffic channels, depending on the size of the group. These trunks are assigned sequentially to the NCMD addresses.

(4) Digital loop groups carry subscribers and are terminated either on an LGM, CV-4180(V)2/T, or RMC. (See CJCSM 6231.04). DSVTs or DNVTs connected to RMC and LGM channels are assigned to NCMD addresses, using a Type 1 MSF format. (See CJCSM 6231.04.) (RLGMs use a Type 2 MSF.) An 18-channel group formed by either an LGM or an RMC carries a dummy channel following the overhead channel. This dummy channel is also terminated on the NCMD but is not available for traffic. Note also that when loop groups are

interconnected to the low side of a TGM, and the TGM is
interconnected to the CS, the planner-engineer must
deinterleave the Type 3 MSFs.

        e.   The AN/TTC-39A(V)1/4 can operate at a VDR of 16- or
32 kbps for deterministic routing. The AN/TTC-39D operates
at 16 kbps for flood search routing. Initial fielding of
the AN/TTC-39 required switches to operate at the 16- or
32-kbps VDR. However, because systems such as MSE, which
must interoperate with the TRI-TAC network, are fielded, use
of the 16-kbps VDR becomes a reality that the system planner
and engineer must consider. When operating as a 16-kbps
switch, all DTGs and subscriber loops are operated at a
16-kbps rate. However, when operating as a 32-kbps switch,
DTGs terminating on the AN/TTC-39A(V)1 or AN/TTC-39A(V)4 may
be (1) 32 kbps, using a Type 1 MSF; (2) 16 kbps DTGs, using
a Type 1 MSF; or (3) mixed 16- or 32-kbps DTGs, using a Type
4B MSF. (See CJCSM 6231.04.)

        (1) AN/TTC-39 series CSs operating at a 32-kbps VDR
and interfacing with DTGs operating at either a 16- or mixed
16- or 32-kbps VDR have a call-rate control mechanism. This
mechanism adjusts, on a call-by-call basis, the rate at
which LKG, IMU A/D converters, digital operator terminals,
DSVT and DNVT subscriber terminals, and long-local loops
operate. Tandem calls that originate at a 16-kbps switch
and extend throughout the network are also handled by the
AN/TTC-39 series. Data calls that originate at a 16-kbps
subscriber cannot be terminated on an AN/TYC-39 MS that
operates at a 32-kbps data rate.

        (2) Individual DTG 16 kbps-circuits terminating on
a 32-kbps switch are implemented by processor strapping.
(See Figure IV-1.) The 16-kbps circuits terminating on the
TDMX are clocked with a 32-kbps clock (double-sampled). The
32-kbps circuits from the TDMX are clocked into the NCMD
with a 16-kbps clock (half-rate sampled). Signaling
information from the initiating 16-kbps switch has a rate-
change codeword that identifies the call as a 16 kbps. This
information is used to direct the appropriate terminating
device in the terminating switch to gear-shift to 16 kbps.
When the AN/TTC-39A(V)1/4 is operated as a 16-kbps switch,
the DSG must be replaced. A 16-kbps DSG is used instead of
a 32-kbps DSG.

        f.   TRI-TAC system design allows individual channels to
be universal and able to support any mode of transmission.
Both 16- and 32-kbps standard channel rates can be used.
Initially, the 32-kbps standard channel rate was to be used,
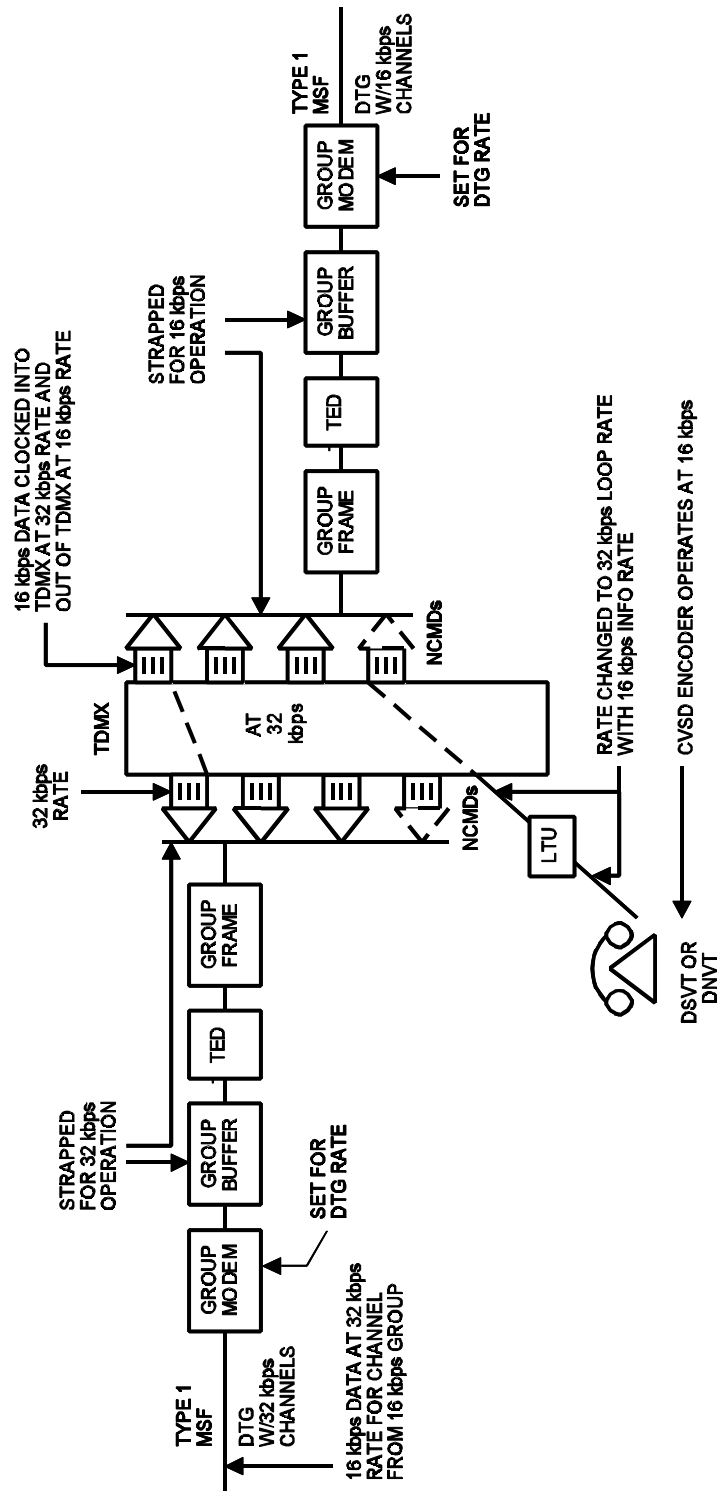
Figure IV-1. 32-kbps Switch Accommodating 16-kbps Circuits

later converting to 16 kbps. The NATO digital gateway
standard (STANAG 4206) for links between national formations
is based on the 16-kbps channel rate. This rate provides
adequate voice quality on poor channels with high error
rates. These 16-kbps channels require less bandwidth,
allowing more efficient use of the limited spectrum
available in the bands used by tactical multichannel radios.
The transitional use of 32 kbps supports hybrid deployments
that require multiple, tandem A/D conversions that would be
marginal at 16 kbps. This is not required by networks that
provide end-to-end digital service.

    g.   Trunks between AN/TTC-39 series CSs operate using
common-channel signaling. As a result, trunks using normal
classmarks cannot be run between AN/TTC-39 series CSs if
only one circuit is available. If this happens, each
AN/TTC-39 series CS should be classmarked as if it were
interfacing with a distant AN/TTC-38. This causes each
AN/TTC-39 series CS to use in-band signaling and operate as
if it were an AN/TTC-38. This type of trunk is not expected
to be encountered in practice.

11.   <u>Security Requirements</u>. The AN/TTC-39 series CS
provides subscribers with an enhanced capability for
securevoice calls through the switched network. When a
subscriber has the DSVT, end-to-end encryption is provided
through proper classmarking of subscriber lines and trunks
and through allocation and use of COMSEC keys. Classmarking
capabilities are discussed below. For more details on
security requirements and COMSEC keys, see CJCSM 6231.05A.

    a.   <u>Security Required</u>. The Security Required classmark
enables users to talk securely, provided (1) the call is
placed DSVT-to-DSVT, local; (2) the call is placed
DSVT-to-DSVT, and the connecting interswitch trunk is a
digital trunk; and (3) the call is placed DSVT to a local
analog telephone (such as a TA-341), properly classmarked as
an approved loop. Calls are routed over an analog trunk
group, classmarked AS, if and only if a digital trunk is not
available between the two switches. A Security Required
call can also be placed from a DSVT to a DNVT if properly
classmarked as an approved loop.

    b.   <u>Security Preferred</u>. The Security Preferred
classmark gives users the same security as the Security
Required classmark if--and only if--the conditions stated in
subparagraph 11a (above) are met. If a secure path is not
available, then the call is processed as a nonsecure call;
the user gets a nonsecure warning (NSW) tone.

c. <u>End-to-End Encryption Required</u>. The End-to-End Encryption Required classmark applies only to the DSVT. DSVT subscribers with this classmark are permitted to call other DSVT subscribers only. DSVT subscribers assigned this classmark and requiring use of the S-key, should refer to CJCSM 6231.05. The end-to-end encryption capability can be achieved using either a Security Required or Security Preferred classmark, and the appropriate dialing sequence as discussed in Chapter III.

d. <u>Dialed Prefix Digits</u>. Subscribers, based on their preassigned classmark, can dial security options as discussed in Chapter III.

12. <u>COMSEC</u>. COMSEC keys (keying material) must be allocated for each DSVT subscriber during planning. Normally, these keys are generated electronically within the AN/TTC-39 series CS, and they are distributed to local subscribers using the procedures discussed in CJCSM 6231.05A. Long-local DSVT subscribers and associated switch supervisors must use paper-tape keying material to establish secure access to the CS.

13. <u>CBCS Hybrid Network Planning Considerations</u>. In the following subparagraphs the key considerations in planning for the employment of CBCS switches in a hybrid network are discussed.

a. <u>Security Preferred (SP) DNVT Operation</u>. Within the Army, the standard security classmark is security preferred (SP) based on the security provided by a protected distribution system (PDS). The standard security classmark for DNVTs for the other Services and the joint community is nonsecure (NS) and a PDS is not normally installed. To allow an Army SP DNVT subscriber to be supported by a joint, Air Force, or Marine Corps switch or an Army switch to support a joint or other Service HQ, an additional classmark has been added to the ASI command. This permissive classmark will allow the assignment and use by the switch of the Security Preferred classmark as applied to DNVT loop profiles. The default condition will preclude the use of the Security Preferred classmark in the DNVT loop profile. (Note: The use of the "Security Required" as applied to DNVT loop profiles is not affected by the permissive classmark.)

(1) If allowed (PDS=Y), the software will allow the use of the Security Preferred classmark in conjunction with DNVT loops and process calls to and from such loops in

accordance with MSE call processing rules for DNVT loops
with Security Preferred in the loop profile.

(2)   If not allowed (PDS=N), DNVT loops, other than
those classmarked Security Required, will be:

(a)   Restricted to nonsecure call connections.

(b)   Cause the secure instrument at the other
end to be sent NSWT when in a call connection.

(c)   DNVTs profile for multimode will default
to voice, thus preventing data initiated calls.

b.   Use of LKGs in Circuit Switch Calls.   LKGs (KG-82 or
KG-112) are used in all circuit switch secure calls between
two DSVTs to pass the V-key to each subscriber terminal but
do not remain in the circuit during the traffic phase of the
call.   This paragraph covers cases where LKGs do remain in
the circuit for the duration of the call.

(1)   Calls between Non-CBCS Modified Switches

(a)   For secure calls within MSE no LKGs are
used.   For secure calls between two DNVTs where at least one
of the subscribers is in a TRI-TAC switch or the call is
routed through the TRI-TAC network, two LKGs remain online
for the duration of the call, one at each subscriber's
switch.

(b)   For secure calls between a DSVT and a
DNVT, one LKG remains in the circuit for the duration of the
call.   On calls within MSE, the LKG that remains online is
the one located at the switch nearest the called subscriber.
On calls within TRI-TAC, the LKG at the DNVT's parent switch
remains online.   Whenever an MSE subscriber calls a TRI-TAC
subscriber through a gateway (to a different area code), the
LKG at the calling party's switch remains online in order to
avoid overuse of LKGs at the gateway switches.   If a call is
made from an MSE or TRI-TAC DSVT to a DNVT in the other type
of network, the LKG at the DNVT's switch is kept in the
circuit.

(2)   Calls Between Switches When at Least One is a
CBCS.   The CBCS modification significantly reduces the
incidence of calls between area codes, reducing the number
of gateway calls between MSE and TRI-TAC switches.   These
calls, as well as all other calls routed within the CBCS
network, follow the LKG rules for calls formerly within the

TRI-TAC network described in subparagraph 13b(1). The only case in which the former MSE rules apply is if the call is made between two MSE subscribers and is never routed outside the local MSE network.

    c. <u>Satellite versus Terrestrial Transmission Algorithm</u>. The normal means of connectivity between the JTF HQ and Service components is by means of TACSAT. Using deterministic routing, it is possible to preselect routes to the switch where the TACSAT gateway is situated. With flood search routing the algorithm tends to bias routing over terrestrial trunks versus satellite trunks. The biasing effect comes from the inherent delay on satellite trunks, which is assumed to be nominally 270 ms. Additionally, the bias can result in the preemption of terrestrial trunks when idle TACSAT trunks are available. The original algorithm was designed to evenly distribute the traffic across an LOS-based, grid network. The use of TACSAT-based systems requires a change in the algorithm. The CSR TEP changed the algorithm to increase the interval between route request messages from 100 to 400 msec for TACSAT systems and then decrease the interval by 100 msec when the trunk group occupancy reaches 75 percent. During the TEP User Test, the revised algorithm was evaluated to demonstrate an equitable distribution of calls over completely available TACSAT and terrestrial links and the minimization of preemption of terrestrial links when a TACSAT link is available.

    d. <u>Single Thread Connectivity</u>. Non-TEP'd switches; e.g., ULCSs, are in effect PBXs, meaning they can only be accessed by way of the TEP'd switch to which it is connected.

    e. <u>16 or 32 kbps Operation</u>

        (1) CBCS switches can operate at either 16- or 32-kbps rates using CVSD.

        (2) A network can include both 16- or 32-kbps switches.

        (3) A hybrid 16-/32-kbps network has the following restrictions:

            (a) RAUs/MSRTS (MSE) operate with 16-kbps switches only.

            (b) Essential User Bypass (EUB) switches must operate at the same data rate.

(c) Some cards (Digital Signal Generator) are made to operate only at one data rate or the other and cannot be strapped for a different rate. Other cards must be strapped for 16/32 kbps.

(d) Calls that traverse 16- and 32-kbps paths are half-rated.

(e) Group level interfaces are standard TRI-TAC DTGs from 4 1/2 to 144 channels.

(f) A 32-kbps switch can have DTGs at either 16 or 32 kbps channels rate.

(g) A 16-kbps switch can have only DTGs at 16 kbps channel rate.

(h) Loop nest subscribers terminate in either internal loop nests or via standard DTGs to DGM multiplexers or LTUs.

f. Switch Codes

(1) The CBCS requires that each tandem, flood search switch in an area code be assigned a unique two-digit switch code. All tandem flood search switches are assigned an NN code of 82 followed by the unique 2-digit switch code. This limits the number of tandem flood search switches within an area code to 100, from 8200 to 8299.

(2) The CBCS also requires that each LEN switch (AN/TTC-46) in an area code be assigned a unique 2-digit switch code. All LENs are assigned an NN code of 83 followed by the unique 2-digit switch code. This effectively limits the number of LENs within an area code to 100, from 8300 to 8399, although there are not that many LENs in the inventory.

(3) The CBCS requires that each deterministic switch (e.g., SB-3865, AN/TTC-42, or SB-3614A) must be assigned a unique 4-digit switch code, i.e.; deterministic switches form telephone numbers as a subset of the switch's NNXX code. This 4-digit switch code cannot conflict with the 82XX or 83XX range assigned to CBCSs, nor can it conflict with the LNXX ranges assigned to other flood search subscribers in the Global Block Numbering Plan (GBNP). The NNXX codes for deterministic switches must be assigned within the ranges allocated in the GBNP.

(4)   Table IV-3 shows the recommended allocation of switch codes to the JTF and its components for flood search switches and the required ranges for the switch codes for deterministic switches.

Table IV-3.   Switch Codes and NNXX Allocations

Service	Recommended Flood Search Switch Codes	Required Ranges for Deterministic Switches
Joint	00-99	22XX-29XX
Marine Corps	10-19	32XX-39XX
Air Force	60-79	42XX-49XX
Army EAC	20-59 1/	Not Applicable
Navy	80-89	72XX
Spare	90-99	73XX-78XX & 790X-798X

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1/   20-44 for CBCS running TNS/MTA (TTC-39Ds, NCS, and FES).
     45-99 for LENS.
     50-59 for Non-TPN equipped CBCSs.

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CHAPTER V

CIRCUIT SWITCH PLANNING AND DATABASES

<u>General</u>

a. Planning military communications systems is frequently an iterative process. Equipment limitations or changes in requirements can result in major changes from the original plan. In the joint tactical arena, many communications requirements remain basically the same for each deployment. For example, telephone installation in such nodes as a TACC or a CTOC may resemble previous deployments. Telephone installation for a TAB, however, may be different, depending on the deployed units and physical configuration of the airfields.

b. Below, in sections A-B, are the steps a planner-engineer must take in planning a circuit switch database. Section A is devoted to CBCS planning, while Section B is devoted to ULCS planning. Each step is keyed to a database worksheet found in each section's subsection 2 (less Section B). These worksheets are suitable for database input, card selection, and card strapping. In general, the planner-engineer can use these worksheets to begin switch planning. In some instances this may not be feasible. In this case, information the planner-engineer must have before using these sheets is specified.

(INTENTIONALLY BLANK)

SECTION A

COMMON BASELINE CIRCUIT SWITCHES

SUBSECTION 1

PLANNING THE CBCS EMPLOYMENT

1. <u>General</u>. The database entries herein are applicable to
the AN/TTC-39A(V)3, TTC-39A(V)4, TTC-39D, TTC-46 (LENS),
TTC-47 (NCS), TTC-50 (FES), DS, CDS, and SMU. When creating
the CBCS database, follow the specified sequence of commands
depicted in Figure V-1. When assigning a database, follow
the arrows and steps down from the start symbol.   For
example, assign classmarks and transmission groups before
assigning routing. When making changes follow the arrows in
the reverse direction; for example, make changes in
transmission groups and classmarks after changes in routing.
Independent commands can be used at any time. The following
discusses the command assignments that follow the Figure V-1
sequence.

2. <u>Commands</u>

    a. <u>Step 1, Program Switch Parameters</u>

        (1) <u>Assign Switch Initialization (ASI)</u>. This
command is used to define the hardware configuration of the
switch, the current date and time, and the switch identifi-
cation code.

        (2)   <u>Assign Terminal Service (ATS)- Digital In-band
Trunk Signaling (DIBTS)</u>. This command is used to define the
DSBs required to support either the EAC AN/TCC-48 SENS or
the SB-3865.

        (3) <u>ATS - Digital Receivers (DRs)</u>. This command is
used to define the DRs required to support local subscri-
bers.

        (4)   <u>ATS - Remote Visual Display Terminal (RVDT)</u>.
This command is used to define the DSDI which allows calls
to the RVDT in the AN/TYQ-30 or AN/TYQ-31 CSCE. (Not
required for MSE switches, CDS, or SMU.)

        (5) <u>Assign Terminal Type (ATT) - Loop Key
Generations (LKG)</u>. This command is used to define the LKGs
in the CEQ database.
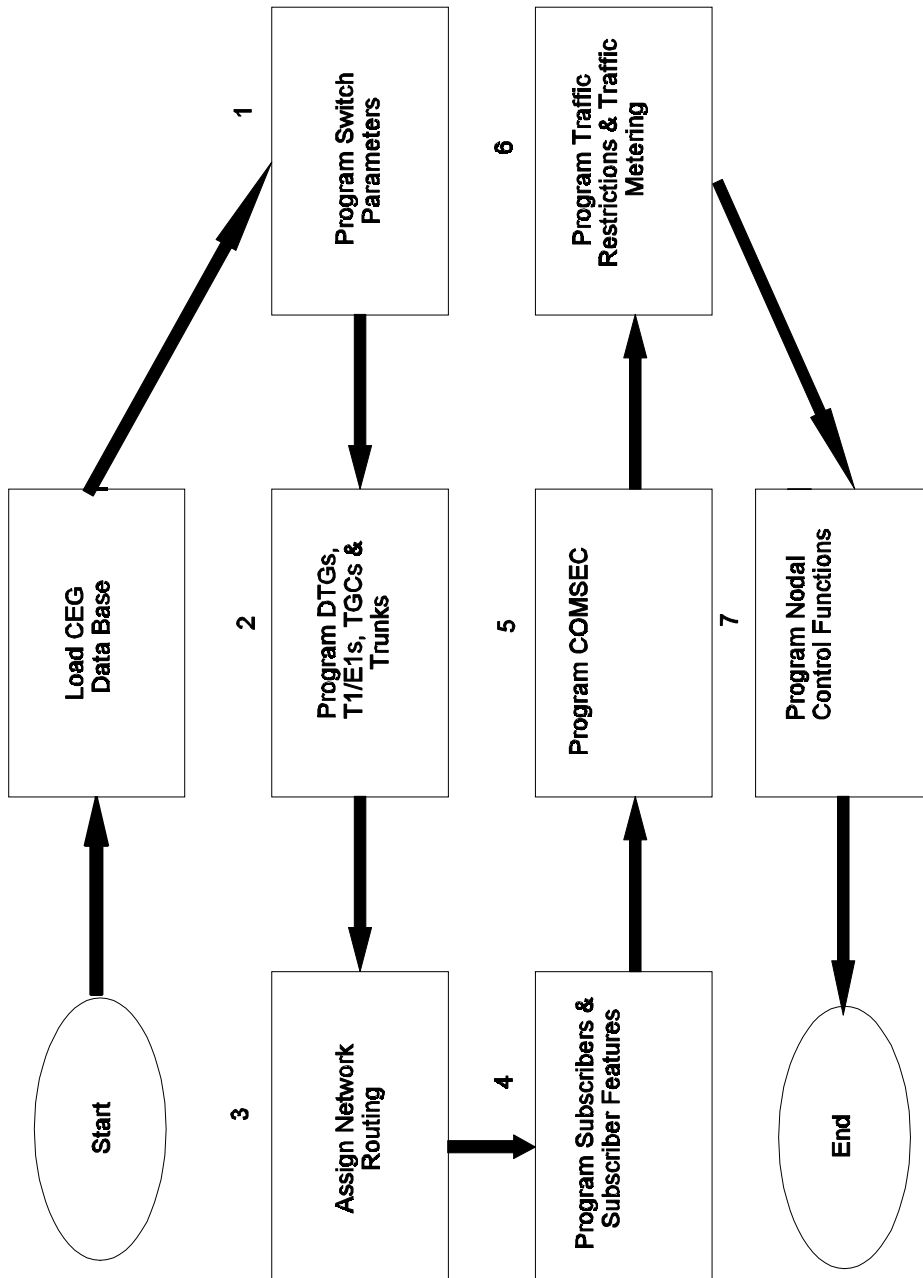
Figure V-1.   CBCS Data Base Programming Process

(6) <u>ATT - Local and Remote Call Service Positions (CSP)</u>. This command is used to define the local and remote CSP in the CEQ database.

(7) <u>ATT - Conference Bridge Units</u>. This command is used to define the conference bridge units in the CEQ database.

(8) <u>Assign Switch Classmarks (ASC)</u>. This command is used to assign the basic operating parameters or classmarks for the switch.

(9) <u>ATS - Loop Group Signaling Channels</u>. This command, not used by the CDS or SMU, is used to define the overhead channels for the loop multiplexers (LOOP MUXs) used for single channel terminations on the ALTG and TDSGMs used in the TDSGM-based CBCS baselines.

(10) <u>ATG - Commercial and Other TGC</u>. This command is used to assign TGCs to commercial and other switches. (In the AN/TTC-39D or other Army switches it is also used to define DTGs for the PS and gateway (GW) dialup ports.)

(11) <u>Assign Packet Switch (PS) Dialup (ADU)</u>. This command is used, by the AN/TTC-39D, AN/TTC-47, and AN/TTC-50 to define the PS dialup ports in the PS TGCs.

(12) <u>Assign Packet Switch Routing (APR)</u>. This command is used to define the routing for each of the TPN dialup ports.

b. <u>Step 2, Program DTGs, T1/E1s, and Trunks</u>

(1) <u>Assign Digital Transmission Group (ADT)</u>. This command is used to define the DTGs that carry trunks and/or loops.

(2) <u>ATS - Loop Group Signaling Channel</u>. This command is used to define the overhead channels (TT 119) for DTGs.

(3) <u>Assign T1CEPT (AT1)</u>. This command, used only by the CDS and SMU, is used to define T1 or E1 groups to be used as a direct digital interface to commercial networks or the DSN.

(4) <u>ATG - Interswitch Trunk Group Cluster (TGC)</u>. This command is used to assign TGCs for the CBCS.

(5) <u>ATS - Interswitch Trunks</u>. This command is used to define the terminal types for a CBCS.

(6) <u>ATG - SB-3865 TGC</u>. This command is used to define the TGCs for the interconnection to a SB-3865.

(7) <u>Assign SEN/RAU/SCC (ASR)TGC</u>. This command is used to assign TGCs to an EAC SEN (AN/TTC-48), RAU (AN/TRC-191A), and systems control center (SCC).

(8) <u>ATS - SEN, RAU, DIBTS, and Analog NATO</u>. This command is used to assign the trunks to SENs, RAUs, DIBTS-based switched, and analog NATO switches.

(9) <u>ATG - Commercial or Other TGC</u>. This command assigns TGCs to commercial and other switches.

(10) <u>ATG - Private Branch Exchange (PBX)</u>. This command assigns TGCs to PBX switches.

(11) <u>ATS - Extra Switch Trunks</u>. This command is used to define all extra switch trunks used in all commercial, other, or PBX TGCs.

(12) <u>ATG - NATO Digital TGC</u>. This command, applicable to AN/TTC-39D, NCS, or FES only, is used to define TGCs for a digital NATO interface.

(13) <u>ATS - Digital NATO Trunks</u>. This command, applicable to AN/TTC-39D, NCS, or FES only, is used to assign digital NATO trunks.

(14) <u>Assign Multiple Trunks (AMT)</u>. This command is used to assign multiple trunks based on a template or blueprint address.

c. <u>Step 3, Assign Network Routing</u>

(1) <u>Assign NYX Routing (ANY)</u>. This command is normally used only to define the home area codes for the network. (A NATO home area is defined using the ASC command.)

(2) <u>Assign Gateway and Commercial Office Routing (AGC)</u>. This command is used to define routing to all foreign area codes, to an NNXX code or range of NNXX codes within a foreign area code or within a foreign area code, and routing to a commercial network.

V-A-4

(3) <u>Assign Digit Translation (ADX)</u>. This command is used to enhance the routing to international country codes and a new NANP and to provide the required digit translations for digital T1 or E1 interfaces.

(4) <u>Assign Packet Switch Routing (APR)</u>. This command is normally used to assign deterministic routes to the dialup ports in the Army TPN.

(5) <u>Assign Alternate Area Routing (AAA)</u>. This command can be used as a deterministic routing table for NNXX, NNX, or NN codes within a foreign area code or for XX codes within a foreign NN code.

d. <u>Step 4, Program Subscribers and Subscriber Features</u>

(1) <u>Assign Preaffiliation List (APL)</u>. This command is used to add either a list of subscribers (PAL) or a single subscriber.

(2) <u>Assign Affiliation List (AAL)</u>. This command is used to add a list of subscribers to a switch.

(3) <u>Assign Profile (APF)</u>. This command is used to display the classmarks associated with a profile number.

(4) <u>Assign Bypass and Duplication (ABD)</u>. This command is used to identify a TGC to be duplicated to an adjacent switch either for duplication or bypass purposes.

(5) <u>Assign Bypass Reception (ABR)</u>. This command is used to activate or delete bypass for those VDTGs and TICS duplicated for bypass from a failed switch.

(6) <u>Assign Local Duplication (ALD)</u>. This command is used to activate or delete subscriber assignments for a specified switch code.

(7) <u>Assign DLTU Loop Strapping (ALS)</u>. This command automatically straps analog DLTUs to allow analog subscribers to operate.

(8) <u>Assign Manual Affiliation (AMA)</u>. This command is used by switch supervisors to affiliate or disaffiliate a subscriber.

(9) <u>Assign Blacklist Deletion (ABL)</u>. This command allows the operator to identify a group, which will be duplicated at a neighboring CBCS, NCS or LENS, for either

affiliation or bypass. RAU, SEN, and local subscriber groups can be identified for duplication. Local subscribers are grouped as specified in the EUB Plan.

      (10) <u>Assign Preprogrammed Conference List (APC)</u>. This command is used to define preprogrammed conferences for the switch.

      (11) <u>Assign Common Pool Compression Dial List (ACP)</u>. The command is used to define the common pool compressed dial lists for a switch.

      (12) <u>Assign Fixed Directory Routing (AFD)</u>. This command is used to define fixed directory unit and subscriber lists.

  e. <u>Step 5, Program COMSEC</u>

      (1) <u>Assign Variable Locations (AVL)</u>. This command is used to identify the COMSEC ID (HUS storage location) for any optional keys for the CS.

      (2) <u>Assign Transfer Lists (ATL)</u>. This command is used to identify the COMSEC ID of a specific key or a range of COMSEC IDs for a contiguous group of keys to be defined as a list for subsequent transfer to another CS using the ABT command.

      (3) <u>Assign Bulk Transfer (ABT)</u>. This command is used to activate a key or a list of keys, or transfer a key or a list of keys from one switch to another.

      (4) <u>Assign Net Rekeying (ANR)</u>. This command is used to identify a specific net or group of nets for a rekeying cycle or to initiate a COLD START for the SB-3865.

  f. <u>Step 6, Program Traffic Restrictions/Metering</u>

      (1) <u>Assign Zone Restriction (AZR)</u>. This command is used to identify a zone restriction list and the specific area code, range of area codes, switch code, and/or ranges of switch codes for traffic restriction.

      (2) <u>Assign Traffic Metering (ATM)</u>. This command identifies the specific loops, destination codes, and combinations of TGCs and destination codes which will be monitored for the traffic metering reports.

(3) <u>Assign and Display Frequency of Reporting</u>
<u>(AFR)</u>. This command displays the current reporting interval
and allows redefinition of this interval.

g. <u>Step 7, Program Nodal Control Functions--Assign</u>
<u>Channel Reassignment (ACR)</u>. This command identifies
reassigned numbers and channels or groups of channels
requiring electronic patches at the node.

SUBSECTION 2

CBCS DATABASE

3. <u>General</u>

a. <u>Data Entry Commands</u>. Table V-1 is a data-entry
index for the commands available to the CBCS VDT. Included
are the paragraphs and figures that explain these commands.

b. <u>TDMX Format</u>. Each loop, trunk, or piece of equip-
ment associated with the TDMX is connected to a specific
matrix terminal. This terminal is identified by a matrix
address. The TDMX address is in the form XX(TDMM = 01-15)XX
(TDMM terminal = 00-63), TDMM terminal values 00 through 07,
62, and 63 are illegal for trunks, regardless of the TDMM
value).

4. <u>AAA</u>. See Figure V-2.

a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

b. <u>Alternate Area Code</u>. Enter NYX or NN.

c. <u>Switch Code or NAC</u>. Enter switch code (1) for
NYX = NNXX, NNX, or NN; (2) for subarea codes NN = XX; or
(3) NATO Area Codes 9YX = XXX.

d. <u>First TGC and Second TGC</u>. Enter 1-16 or 41-127 for
a first- and second-preferred TGC for each switch code or
subarea code. One switch code and the first TGC are
required entries. Second TGC entries are optional. Each
switch code must have at least a first TGC.

5. <u>AAL</u>. The AAL command allows the user to add, modify, or
delete up to 50 lists of 10 subscribers each (Figure V-3).
Subscribers added with AAL are stored in the CBCS database.
The command also allows a list of subscribers to be

Table V-1. VDT Data Entry Index, CBCS

Command	Paragraph	Figure
AAA, Assign Alternate Area Routing	4	V-2
AAL, Assign Affiliation Lists	5	V-3
ABD, Assign Bypass and Duplication Transfer	6	V-4
ABL, Assign Blacklist Deletion	7	V-5
ABR, Assign Bypass Reception	8	V-6
ABT, Assign Bulk Transfer	9	V-7
ACP, Assign Compressed Dial Lists	10	V-8
ACR, Assign Channel Reassignment	11	V-9
ADB, Assign Database Transfer	12	V-10
ADE, Assign Digit Editing Lists	13	V-11
ADT, Assign Digital Transmission Group	14	V-12
ADU, Assign Packet Switch Dialup	15	V-13
ADX, Assign Digit Translation	16	V-14
AFD, Assign Fixed-Directory Routing	17	V-15
AFR, Assign Frequency for Network Reporting	18	NA
AGC, Assign Gateway and Commercial Office Routing	19	V-16
AIL, Assign Interswitch Link Initilization	20	V-17
ALD, Assign Local Duplication	21	V-18
ALS, Assign Analog Loop Signaling	22	V-19
AMA, Assign Manual Affiliation	23	V-20
AMT, Assign Multiple Trunks	24	V-21
ANR, Assign Net Rekeying	25	V-22
ANY, Assign NYX Routing	26	V-23
APC, Assign Preprogrammed Conference List	27	V-24
APF, Assign Profile	28	V-25
APL, Assign Preaffiliation List	29	V-26
APR, Assign Packet Switch Routing	30	V-27
ASC, Assign and Display Switch Classmarks	31	V-28
ASI, Assign and Display Switch Initialization	32	V-29
ASR, Assign SEN and RAU	33	V-30
ATG, Assign Trunk Group Clusters	34	V-31
ATL, Assign Transfer and Activation Lists	35	V-32
ATM, Assign Traffic Metering	36	V-33
ATS, Assign Terminal Service	37	V-34/35/36
ATT, Assign Terminal Type	38	V-37
AT1, Assign T1CEPT	39	V-38
AVL, Assign Variable Location	40	V-39
AZR, Assign Zone Restriction Lists	41	V-40

preaffiliated or preaffiliated and affiliated to a TDMX
address. The AAL command can be used by any CBCS, but **must**
be used to define subscribers for a standalone CDS and SMU
equipped with a PIC card. If the CDS or SMU has network
connectivity, PALs supporting their subscribers can be
loaded by another CBCS. If the CDS or SMU is equipped with

Alternate Area Code	Switch Code/ NAC	1st TGC	2nd TGC	Alternate Area Code	Switch Code/ NAC	1st TGC	2nd TGC	Alternate Area Code	Switch Code/ NAC	1st TGC	2nd TGC

AAA Worksheet

AAA	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-2. AAA, Alternate Area Routing Worksheet

Action	List Number	Affiliation Action	Prefix	Directory Number	Personal Code	Terminal Address	Profile	Eliminate Mark

AAL WORKSHEET

AAL	PRSL/NNXX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-3. AAL, Affiliation Lists Worksheet

a WIC card, PALs can be loaded with the APL command with the list option.

    a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

    b. <u>List Number</u>. Enter 1-50, the number of lists to be entered.

    c. <u>Affiliation Action</u>. Enter P = Preaffiliation, A = Preaffiliation/Affiliation, or N = No Action.

        (1) Entering a P will cause the list to be added to the preaffilitiation VTGCs (37-40).

        (2) Entering an A will cause the subscriber to be preaffiliated and then affiliated on the specified TDMX address.

        (3) Entering an N will not affiliate or preaffiliate the list and is used when creating the list.

    d. <u>Prefix</u>. Enter up to 4 digits to specify the common prefix for all subscribers on the list. If all subscribers in this list share a common prefix, enter it here to preclude having to enter it for all directory numbers on the list.

    e. <u>Directory Number</u>. Enter 3-7 digits. Up to 10 subscribers can be defined for each list. If a prefix is defined, then enter only the remainder of the number.

    f. <u>Personal Code</u>. Enter the three-digit personal code for each subscriber. If this list is to be affiliated, ensure that a standard code is used to allow subscribers to reaffiliate their terminal in a new location if required.

    g. <u>Terminal Address</u>. If the list is to be affiliated, enter the TDMX address for each subscriber.

    h. <u>Profile</u>. Enter 1-255.

    i. <u>Eliminate Mark</u>. Enter E = Eliminate.

6. <u>ABD</u>. This worksheet (Figure V-4) identifies a group to be duplicated at an adjacent switch (CBCS, NCS, or LENS) for either duplication or bypass.

    a. <u>Action</u>. Enter A = Add or D = Delete.

Action	Local Group Number	Interswitch Group Number	Duplicate for Bypass

ABD Worksheet

ABD	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-4. ABD, Alternate Bypass and Duplication Worksheet

b. <u>Local Group Number</u>. Enter 1-40, as follows:

    (1) 1-16 = RAU, SEN or SCC.

    (2) 17-31 = groups accepted for bypass.

    (3) 32-40 = virtual trunk groups.

    c. <u>Interswitch Group Number</u>. Enter 1-16.

    d. <u>Duplicated for Bypass</u>. Enter Y = Yes or N = No.
(Leave blank for a virtual trunk group = 32-35.)

7. <u>ABL</u>. This worksheet (Figure V-5) is used to delete either a single subscriber from the blacklist or the entire blacklist.

    a. <u>Action</u>. Enter 1 = Entire List or 2 = Single Entry.

    b. <u>Directory Number (for Single Entry)</u>. Enter LNXXXXX, where L = 1-7 and N = 2-9.

8. <u>ABR</u>. This worksheet (Figure V-6) activates bypass for a particular switch and deletes a bypass list from the database.

    a. <u>Action</u>. Enter 1 = Activate or 2 = Delete.

    b. <u>Switch Code</u>. Enter XX = other (CBCS or NCS) or LXX = LENS.

9. <u>ABT</u>. This worksheet (Figure V-7) is used to perform bulk transfer operations: variable generation, variable activation, and bulk transfer.

    a. <u>Action</u>. Enter G = Generate, A = Activate, T = Transfer, S = Stop, or R = Receive Authorization.

    b. <u>List Number or COMSEC ID</u>. Enter 1-8 for List Number, or COMSEC ID (1-222, 224-107 for HGX-83; 1-222, 224-255, 257-478, 480-511 for KGX-83).

    c. <u>Transfer Number</u>. Enter 1-8.

    d. <u>Destination Switch</u>. Enter LXX = LEN or XX = Other

    e. <u>Authorization to Accept Bulk Transfer</u>. Enter Y = Yes or N = No.

Action	Directory Number	Action	Directory Number

ABL Worksheet

ABL	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-5. ABL, Blacklist Deletion Worksheet

Action	Switch Code	Action	Switch Code	Action	Switch Code

ABR WORKSHEET

ABR	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-6. ABR, Bypass Reception Worksheet

Action	List Number or COMSEC ID	Transfer Number	Destination Switch	Authorization to Accept Bulk Transfer

ABT WORKSHEET

ABT	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-7. ABT, Bulk Transfer Worksheet

10. ACP. This worksheet (Figure V-8) is used to assign compressed dial numbers (CDN) and the corresponding directory numbers to a common-pool compressed dial list.

   a. Action. Enter A = Add, M = Modify, or D = Delete.

   b. List Number. Enter 1-5.

   c. Start Address. Optional entry.

   d. CDN. Enter 20-99.

   e. Directory Number. Enter up to a 13-digit number for each CDN: KNXXXXX or MYX-KNXXXXX or 9YX-WYX-XXXXXXX.

11. ACR. This worksheet (Figure V-9) is used to add or delete a channel reassignment. The reassignment can involve either a pair of single channels or a pair of channel groups.

   a. Action. Enter A = Add or D = Delete.

   b. Reassignment Number. Enter 1-64.

   c. From. See Table A-12 for valid ACR entries.

      (1) DTG Number. Enter 1-30.

      (2) Subgroup Number. Enter 1-4.

      (3) Start Channel. Enter 1-144.

      (4) End Channel. Enter 1-144.

      (5) TDMX Address. Enter the TDMX address (format XX-XX), where XX = 01-15 (TDMM) and - XX = 00-63 terminal (TDMM port).

   d. To. See Table V-2 for valid ACR entries.

      (1) DTG Number. Enter 1-30.

      (2) Subgroup Number. Enter 1-4.

      (3) Start Channel. Enter 1-144.

      (4) End Channel. Enter 1-144.

Action	List Number	Start Address	Compressed Dial Number	Directory Number

ACP WORKSHEET

ACP	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-8. ACP, Common-Pool Compressed Dial Lists Worksheet

Action	Reassignment Number	From:					To:			
		DTG Number	Subgroup Number	Start Channel	End Channel	TDMX Address	DTG Number	Subgroup Number	Start Channel	End Channel

ACR WORKSHEET

ACR	PRSL/NNXX	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-9. ACR, Channel-Reassignment Worksheet

Table V-2. Valid ACR Combinations

Assignment	From	To
Subgroup to Subgroup	DTG Number & Subgroup Number	DTG Number & Subgroup Number
Subgroup to Range of Channels	DTG Number & Subgroup Number	DTG Number & Start & End Channels
Range of Channels to Subgroup	DTG Number & Start & End Channels	DTG Number & Subgroup Number
Range in Group to Range in Group	DTG Number & Start & End Channels	DTG Number & Start & End Channels
Single Channel to Single Channel	DTG Number& Start Channel or TDMX Address	DTG Number& Start Channel

12. ADB. This command (Figure V-10) is used to copy the entire database onto a "scratch" magnetic tape or disk, to read the entire tape or disk into the database, to erase the entire tape or disk, or to respool the tape.

   a. Logical Action: Enter 1 = Read, 2 = Write,3 = Erase, 4 = Format, or 5 = Respool.

   b. Target Device. Enter 1 = Load Disk, 2 = Floppy1, 3 = Floppy2, 4 = MTT1, or 5 = MTT-2 or 6 = E2PROM.

13. ADE.   This worksheet (Figure V-11) is used to control the editing of specific portions of the NYX NNXXXXX number. Up to 100 NYX, NNX, and NNXX codes may be edited. By deleting or substituting digits compatibility with line and trunk types and other network numbering plans can be provided.

   a. Action. Enter A = Add, M = Modify, or D = Delete.

   b. Code. Enter NYX, NNX, or NNXX.

   c. Edit Type. Enter D = Delete or P = Prefix.

   d. Prefix Code. Enter up to three digits in the form NYX, NNX, or NNXX.

Logical Action	Target Device	Logical Action	Target Device

ADB Worksheet

ADB	PRSL/NNX	SW TYPE	SW LOCATION	REV#	DATE	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-10. ADB, Database Worksheet

Action	Code	Edit Type	Prefix Code	Action	Code	Edit Type

ADE WORKSHEET

ADE	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-11. ADE, Digit Editing Lists Worksheet

14. <u>ADT</u>. This worksheet (Figure V-12) is used to assign (add), modify, or delete a DTG. Note: If the switch is configured for a 16-kbps switch rate, the 32-kbps channel rate and 4,608 group rates are not valid. When the switch is configured for 32 kbps, group rates 72 and 128 are not valid. (Note: ASI command must be entered first.)

    a. <u>Action</u>. Enter A = Add, M= Modify, or D = Delete

    b. <u>DTG Number</u>. Enter 1-30. (As range of values varies by configuration, see Table V-3 for DTG selection criteria.)

    c. <u>Start NCMD Number</u>. Enter 1-36 (for TDSGM-based CBCSs only). See Table V-4 for the relationship between DTG number and the NCMDs and TEDs available for assignment.

    d. <u>End NCMD Number</u>. Enter 1-36 (for TDSGM-based CBCSs only)

    e. <u>Starting Address</u>. For CDS and SMU only. Enter terminal address of first channel = XX-XX. See Table V-5 for the assignments available for assignment.

    f. <u>Number of Channels</u>. Enter 1-144 (for CDS and SMU only).

    g. <u>TED</u>. Enter 0-15. See Table V-3.

    h. <u>Sync Delay</u>. Enter Y = Yes or N = No. Enter Y = Troposcatter transmission, otherwise set to N.

    i. <u>DTG Channel Rate</u>. Enter 16 or 32 (kbps).

    j. <u>Group Rate</u>. Enter 72 - 4096 kbps. Modulo 9 rates are recommended: 72, 144, 288, 576, 1152, 2304, or 4608.

    k. <u>MSF</u>. Enter 1, 2, 3A1, 3A2, 3A3, 3B, 3C, or 4. (Use of MSF 3A2 will result in wasted channels.) See Table V-6 for the interleave patterns for available MSF patterns.

    l. <u>Subgroup Rate</u>. Only Subgroup 1 can contain a flood search TGC.

      (1) <u>Subgroup 1</u>. Enter the rate of the first subgroup. Required when MSF specified is 3A1, 3A2, 3A3, 3B, or 3C, otherwise leave blank.

Action								
DTG Number								
Start NCMD								
End NCMD								
Starting Address								
No. of Channels								
TED								
SYNC Delay								
DTG Channel Rates								
Group Rate								
MSF								
Subgroup 1 Rate								
Subgroup 2 Rate								
Subgroup 3 Rate								
Subgroup 4 Rate								

ADT Worksheet

ADT	PRSL/NNX	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-12. ADT, Digital Transmission Group Worksheet

In/Out of Service									
Modulator Cable Length									
Demodulator Cable Length									
Modulation									
DTG Repeater Mode									
OCU-II									
RED Group Clock									
Recover Timing									
DTG Release Timer									
Output Type									
Mode									

ADT WORKSHEET

Figure V-12. (Cont'd)

Table V-3. DTG Selection Criteria

Criteria	Type of Switch	DTGs Available	Comment
Alternate or Slave Timing Source Required	TTC-39A(V)3 TTC-39A(V)4 TTC-39D	DTG 1, 2, 16, or 17	Timing Source Select Switch (1, 2, 3. and 4)
TED Required	TTC-39A(V)3 TTC-39A(V)4 TTC-39D CDS	Normal Thru DTG 1 to TED 1 DTG 2 to TED 2 DTG 3 to TED 3 DTG 4 to TED 4 DTG 5 to TED 5 DTG 6 to TED 6 DTG 7 to TED 7 DTG 8 to TED 8 DTG 9 to TED 9	TEDs can be used for other DTGs but patching is required
	TTC-39A(V)3 TTC-39A(V)4 TTC-39D	DTG 16 to TED 10 DTG 17 to TED 11 DTG 18 to TED 12 DTG 19 to TED 13 DTG 20 to TED 14 DTG 21 to TED 15	
	TSC-143	DTG 2 to TED 1 DTG 3 to TED 2 DTG 4 to TED 3	
DTG to SMU Loop Nest	SMU	DTG 1	
DOW Telemetry Required	TTC-39A(V)3 TTC-39A(V)4 TTC-39D	DTGs 1 thru 7 and DTGs 16 thru 30	DOW telemetry only available for these DTGs
Digital NATO Interface (DNI)	TTC-39D	DTGs 15 and 30	DNI DTGs
Multiplexed Orderwire DTG	TTC-39A(V)3 TTC-39A(V)4 TTC-39D	DTG 14	DTG 14 can be used as a normal DTG

(2) Subgroup 2. Enter the rate of the second subgroup. Required when MSF specified is 3A1, 3A2, 3A3, 3B, or 3C, otherwise leave blank.

(3) Subgroup 3. Enter the rate of the third subgroup. Required when MSF specified is 3A1, 3A2, 3A3, 3B, or 3C, otherwise leave blank.

Table V-4. DTG to NCMD and TED Relationships

TDSGM	DTG	NCMD	TED
1	1-8	19-36	1-9
	9-15	1-8 [1/] 9-12 13-18 [2/]	
2	16-23	19-36	10-15
	24-30	1-8 [1/] 13-18	

1/ NCMDs 1-8 allocated for TDSGM - 26 PR Loops
2/ NCMDs 13-18 allocated for ALTG cables 6, 7, and 8.

Table V-5. CDS/SMU DTG to Address Relationship

BS (TDMM)	LA First - Last Address	Data Bus	Valid DTG Nos	Function
01	00-63	A	Odd	64 - DTG Channels
02	00-63	A	Odd	64 - DTG Channels
03	00-63	A	Odd	64 - DTG Channels
04	00-63	A	Odd	64 - DTG Channels
05	00-63	A	Odd	64 - DTG Channels
06	00-63	A	Odd	64 - DTG Channels
07	00-31	A	Odd	32 - DTG Channels
08	04-63	B	Even	60 - DTG Channels
09	00-63	B	Even	64 - DTG Channels
10	00-63	B	Even	64 - DTG Channels
11	00-63	B	Even	64 - DTG Channels
12	00-63	B	Even	64 - DTG Channels
13	00-15	B	Even	16 - DTG Channels

(4) Subgroup 4. Enter the rate of the fourth subgroup or 0. Required when MSF specified is 3A1, 3A2, 3A3, 3B, or 3C, otherwise leave blank.

m. In or Out of Service. Enter I = In, O = Out, normally set to I.

Table V-6. MSF and Subgroup Ratios

MSF	Group Type or Ratio of Subgroups
1	Single Group
2	RLGM (Direct cable to CBCS)
3A1	1 : 1
3A2	1 : 1 : 1
3A3	1 : 1 : 1 : 1
3B	2 : 1 : 1
3C	4 : 2 : 1 : 1

    n. Modulator Cable Length. Enter 0-5. 0 = 100 feet or less, 1 = 1/4 mile, 2 = 1/2 mile, 3 = 3/4 mile, 4 = 1 mile, or 5 = 3 miles. Entry must be 4 for TDSGM-based CBCSs and 5 for CDS and SMU.

    o. Demodulator Cable Length. Enter 0 = 7. 0 = 100 feet or less, 1 = 1/4 mile, 2 = 1/2 mile, 3 = 3/4 mile, 4 = 1 mile, or 5 = 1 3/4 miles, 6 = 2 miles, or 7 = 3 miles. The range of values for TDSGM-based CBCSs is 0-4.

    p. Modulation. Enter 1 = Diphase, 2 = Dipulse, 3 = Unmodulated. The CDS and SMU do not support dipulse modulation. If DTG 14 is used for a multiplexed orderwire group, the modulation must be 1, diphase.

    q. DTG Repeater Mode. Enter Y = Yes or N = No.

    r. OCU II Modem. For DTG 14 With OCU, enter Y = Yes. For all other modes, enter N = No. Entry must be N for all DTGs except 14. It should be set to Y only if DTG 14 is supporting a multiplexed orderwire group.

    s. Red Group Clock. Enter Y = Yes or N = No. If TED equals 0, enter Y.

    t. Recover Timing. Enter Y = Yes or N = No. CDS and SMU only.

    u. DTG Release Timer. Enter 0-60, CDS and SMU only.

    v. Output Type. Enter 0 = Coaxial, 1 = Radio,2 = MDTG (Master). CDS and SMU only.

    w. Mode. Enter 0 = Normal, 1 = MDTG, or 2 = MDTG Subgroup (CDS and SMU only).

15. ADU. This command is used in the AN/TTC-39D PS only to define the PS dialup ports in the three TGCs (see Figure-V-13 and Table V-7).

a. Action. Enter M = Modify.

b. Packet Switch Port Number. Enter the PS or Gateway number and Port number in the form H-XX, see Table V-7.

Table V-7. AN/TTC-39D PS TPN Dialup Ports, Addresses, and TGC Entries

Device	Port #	ADU (H-XX)	TGC #	NN Code
Packet Switch 1	4	1-4	84	84
Packet Switch 2	1	2-1	85	85
T/20 Gateway	2	3-2	86	86

c. TDMX Address of Host User. Used only to a host which cannot dial.

d. TGC Number. Enter 84, 85, or 86, see Table V-7.

16. ADX. This command (Figure V-14) combines a gateway routing function with a full digit translation capability. It was designed as a flood search routing table for gateways into commercial networks. It was developed to provide enhanced capabilities to route to international country codes and to the new NANP and to provide the required digit translations for digital T1 or E1 interfaces.

a. TGC Number. Enter the TGC number for this routing and translation action.

b. Subscriber Route. Enter up to four digits or wild card (*) symbols used to route this call. The CBCS network will flood search route to commercial interfaces and use these digits to discriminate between multiple commercial interfaces.

c. Subscriber Digits In. Enter up to 0-16 digits or symbols; i.e., wild card (*) or pound (#) symbols, representing the actual digits dialed by the subscriber.

Action	Packet Switch Port Number	TDMX Address of Host User	Trunk Group Cluster Number

ADU WORKSHEET

ADU	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-13. ADU, Packet Switch Dialup Worksheet

TGC Number	Subscriber Route	Subscriber Digits In	Modify to Outpulse	Maximum Precedence	Network Digits In	Modify to Inpulse

ADX WORKSHEET

ADX	SW CODE	SW TYPE	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-14. ADX, Digit Translation Worksheet

(1) If no digit translation is required for outgoing calls, leave this field and the Modify to Outpulse field blank.

(2) If digit translation is required for outgoing calls, enter up to 0-16 digits or symbols; i.e., wild card (*) or pound (#) symbols.

(3) To add a digit or pause to the dialed digit string, use the pound (#) symbol as a placeholder and add the digit or comma (,) symbol in the Modify to Outpulse field.

   d. <u>Modify to Outpulse</u>. Enter from 0-16 digits or symbols; i.e., wild card (*), commas (,) or minus (-) symbols to represent the translated digit string for transmission to the commercial network.

(1) If no digit translation is required, leave this field blank.

(2) To delete digits, enter a minus (-) symbol in the position of the digit to be deleted.

(3) To add a digit, enter a pound (#) symbol in the appropriate position of the Subscriber Digits In field and enter the new digit in this field.

(4) To add a pause in the digit outpulsing, enter a pound (#) symbol in the appropriate position of the Subscriber Digits In field and enter a comma (,) symbol in appropriate position in this field.

   e. <u>Maximum Precedence</u>. Enter R = Routine, P = Priority, I = Immediate, F = Flash, or FO = Flash Overide.

   f. <u>Network Digits In</u>. Enter up to 0-16 digits or symbols; i.e., wild card (*) or pound (#) symbols, representing the actual digits received from the commercial network. This field provides the same functionality for incoming calls that the Subscriber Digits In field provides for outgoing calls.

(1) If no digit translation is required for incoming calls, leave this field and the Modify to Inpulse field blank.

(2)   If digit translation is required for incoming calls, enter up to 16 digits or symbols, i.e., wild card (*) or pound (#) symbols, representing the received digit string.

(3) To add a digit or pause to the incoming digit string, use the pound (#) symbol as a placeholder and add the digit or comma (,) symbol in the Modify to Inpulse field.

g.   Modify to Inpulse.   Enter from 0-16 digits or symbols; i.e., wild card (*), commas (,), or minus (-) symbols, to represent the translated digit string for transmission into the tactical network.

(1)   If no digit translation is required, leave this field blank.

(2) To delete digits, enter a minus (-) symbol in the position of the digit to delete.

(3) To add a digit, enter a pound (#) symbol in the appropriate position of the Network Digits In field and enter the new digit in this field.

(4)   To add a pause in the digit outpulsing into the tactical network, enter a pound (#) symbol in the appropriate position of the Network Digits In field and enter a comma (,) symbol in the appropriate position in this field.

17.   AFD.   This worksheet (Figure V-15) assigns the current locations of fixed-directory subscribers.   The worksheet stores 5-digit fixed-directory index codes and their FDSL directory numbers.

a.   Action.   Enter A = Add, M = Modify, or D = Delete.

b.   Start Address.   Optional entry.

c.   Index Code.   Enter PXJXZ, where:

(1)   P = 7-9.

(2)   X = 0-9.

(3)   J = 7-9.

(4)   Z = 0-3

Action	Start Address	Index Code	Directory Number	Signal Forward

AFD WORKSHEET

AFD	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-15. AFD, Fixed-Directory Routing Worksheet

d. Directory Number. Enter up to a 10-digit number in the format NYX-NNXXGXX or NYX-NNXGXXX.

e. Signal Forward. Enter F = Forward Fixed- Directory Number or S = Forward System Directory Number, Blank = S.

18. AFR. This command is used to indicate the frequency of reporting switch operation. Enter the Time Interval = 60, 120, 180, 240, 480, or 720 minutes to designate the time interval for the six switch reports: R1-Switch Traffic Report; R2-Node Pair Traffic Report; R3-Summary for TGCs; R4-Precedence Report for TGC; R5-Loop Traffic Report, and R6-DTG Bit Error Rate Report. Periodic printouts must be requested on the ASC worksheet. The TGC to be monitored must be identified on the ATM worksheet. (No special worksheet is required.)

19. AGC. This worksheet (Figure V-16) is used to assign, modify, or delete one primary route and up to two alternate routes to a commercial network, an NNXX code, or range of NNXX codes within a foreign area code or the home area code.

a. Action. A = Add, M = Modify, or D = Delete.

b. Interface ID Code. Enter 999999 = commercial office or 9YXWXX = Otherwise.

c. NNXX Range: Start NNXX. Enter the NNXX code.

d. NNXX Range: End NNXX. Enter the NNXX code.

e. NATO Designator. Required only for foreign NATO area codes, leave blank for all others.

(1) Enter S to indicate the NATO switch routes using a 6-digit prefix numbering system (9YX-NYX).

(2) Enter T to indicate NATO switch routes using a 3-digit prefix numbering system (9YX).

f. Primary TGC Number. Enter 1-16 or 41-127.

g. Alternate TGC Numbers. Enter (up to two alternate TGCs) 1-16 or 41-127.

20. AIL. This worksheet (Figure V-17) is used to either initialize or disable interswitch trunk groups (ITG) that were previously assigned.

Action	Interface ID Code	NNXX Range Start	NNXX Range End	NATO Designation	Primary TGC	Alternate 1	Alternate 2

AGC WORKSHEET

AGC	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ of __

Figure V-16. AGC, Gateway and Commercial Office Routing Worksheet

Action	Interswitch TGC Number	Satellite Link	Glare	Initialize or Disable	Packet Switch	PS Bypass	Destination Switch Code	PS Port Number

AIL WORKSHEET

AIL	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF__

Figure V-17. AIL, Interswitch Link-Initialization Worksheet

a. <u>Action</u>. A = Add, M = Modify, or D = Delete.

b. <u>ITG Number</u>. Enter 1-16.

c. <u>Satellite Link</u>. Enter Y = Yes or N = No.

d. <u>Glare</u>. Enter A = Accept or R = Reject.

e. <u>Initialize</u>. Enter 1 = Initialize or 2 = Disable.

f. <u>Packet Switch</u>. Enter Y = Yes, N = No, or G = Gateway, may be blank.

g. <u>PS Bypass</u>. Enter Y = Yes, N = No, or may be blank to define the four PS trunks as Essential Users.

21. <u>ALD</u>. This worksheet (Figure V-18) is used to activate or delete duplicate subscriber assignments for a specified switch code.

a. <u>Action</u>. Enter 1 = Activate or 2 = Delete.

b. <u>Switch Code</u>. Enter LXX = LENS or XX = Other.

22. <u>ALS</u>. This worksheet (Figure V-19) is used to automatically strap DLTUs for analog subscriber affiliation.

a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

b. <u>Terminal Address</u>. Enter XX-XX.

c. <u>Line Type</u>. Enter 1, 7, 8, 9, 12, or 13.

d. <u>Phantom Loop Power</u>. Enter Y = Yes or N = No (default = N).

e. <u>ADOCU Home Code</u>. Enter 0-15 to specify the Air Defense Orderwire Control Unit (ADOCU) home code, or Blank = Not OCU.

23. <u>AMA</u>. This worksheet (Figure V-20) is used to manually affiliate or disaffiliate a subscriber directory number. It is used when a subscriber is unable to affiliate or disaffiliate automatically or has neglected to disaffiliate.

a. <u>Action</u>. Enter 1 = Affiliate, 2 = Disaffiliate, or 3 = Delete.

Action	Switch Code	Action	Switch Code	Action	Switch Code

ALD WORKSHEET

ALD	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-18. ALD, Local Duplication Worksheet

Action	Terminal Address	Line Type	Phantom Loop Power	ADCOU Home Code

ALS SIGNALING

ALS	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-19. ALS, Analog Loop Signaling Worksheet

Action	Directory Number	Personal Code	Terminal Address	SCC Trunk

AMA WORKSHEET

AMA	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-20. AMA, Manual Affiliation Worksheet

b. <u>Directory Number</u>. Enter a 7-digit directory number in the format LNXXXXX, where L = 1-7 and N = 2-9.

c. <u>Personal Code</u>. Enter XXX.

d. <u>Terminal Address</u>. Enter XX-XX.

e. <u>SCC Trunk</u>. Enter L = Local, B = Bypass, or Blank=-No SCC.

24. <u>AMT</u>. This worksheet (Figure V-21) assigns classmarks for multiple trunks, using a blueprint trunk and a TGC. The blueprint trunk classmarks are preassigned using the ATS command, and the TGC is preassigned using ATG.

a. <u>Blueprint Address</u>. Enter the terminal address of the trunk to be used as a template for the trunks to be created by this assignment in the form XX-XX for a TDSGM terminal.

b. <u>TGC Number</u>. Enter 1-127.

c. <u>Trunk Start Address</u>. Enter or XX-XX.

d. <u>Number of Trunks</u>. Enter 1-255.

e. <u>Trunk Start Number</u>. Enter 1-255.

f. <u>Adapter Number</u>. Enter 1-36. Used only for Terminal Types 44 and 45 (commercial office).

25. <u>ANR</u>. This worksheet (Figure V-22) is used to automatically rekey up to 15 COMSEC nets of the same type. (See Notes in subparagraph 3-7v, TM 11-5805-778-12-2-2.)

a. <u>Method</u>. Enter G = Generate or M = Merge.

b. <u>Rekey Cycle Number</u>. Enter 00-99 or 00 = Cold Start (must be used when initializing a link to an SB-3865).

c. <u>Current Net Number</u>. Enter 2-98.

d. <u>New Net Number</u>. Enter 2-98.

e. <u>Cold Start of an SB-3865</u>. To, initiate a COLD START of an SB-3865, enter G, 00, and the New Net Number.

Blueprint Address	TGC Number	Trunk Start Address	Number of Trunks	Trunk Start Number	Adapter Number

AMT WORKSHEET

AMT	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-21. AMT, Multiple Trunks Worksheet

Method	Rekey Cycle Number	Current Net Number	New Net Number

ANR WORKSHEET

ANR	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-22. ANR, Net Rekeying Worksheet

26. <u>ANY</u>. This worksheet (Figure V-23) is used to define all required area codes within the network, with the exception of the NATO home area.

    a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

    b. <u>NYX Code</u>. Enter a 3-digit code, where N = 2-9 and Y = 0 or 1, and X = 0-9.

    c. <u>Home or Foreign Classmark</u>. Enter H = Home or F = Foreign.

    d. <u>NATO Designation</u>. Entry required only for foreign NATO area codes, otherwise leave blank. If F is entered, enter S or T. (Enter S = 6-digit (9YX-NYX) NATO routing prefix, T = 3-digit (9YX) NATO routing prefix.)

    e. <u>Primary TGC</u>. Enter 1-127.

    f. <u>Alternate TGCs</u>. Enter 1-127 for up to 4 alternates.

27. <u>APC</u>. This worksheet (Figure V-24) is used to assign subscribers to a preprogrammed conference group, to mark which subscribers can initiate a conference, and to delete or modify conference lists. Up to 14 subscribers can be assigned to a list.

    a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete. (Repeat Steps b-f for each preprogrammed conference member.)

    b. <u>Preprogrammed Group Number</u>. Enter 20-99.

    c. <u>Start Number for Modify</u>. Enter up to 10 digits.

    d. <u>Security Required</u>. Enter Y = Yes or N = No.

    e. <u>Directory Number</u>. Enter up to 10 digits.

    f. <u>Initiate Classmark</u>. Enter Y = Yes or N = No.

28. <u>APF</u>. This worksheet (Figure V-25) is used to assign classmarks to a profile index number.

    a. <u>Action</u>. Enter A = Add, M = Modify or D = Delete.

    b. <u>Profile Number</u>. Enter 1-255.

    c. <u>Terminal Type</u>. Enter DSVT = 3, DTA = 15, LG-1 16, or DLTU = 248.

Action	NYX Code	Home Foreign	NATO Designation	PRI TGC	ALT 1	ALT 2	ALT 3	ALT 4

NYX Routing Worksheet

ANY	SW CODE	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-23. ANY, NYX Routing Worksheet

Action	Preprogrammed Group Number	Start Number	Security Required	Directory Number	Initiate Classmark

APC WORKSHEET

APC	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-24. APC, Preprogrammed Conference-List Worksheet

Action							
Profile Number							
Terminal Type							
Traffic Load Control							
Security							
Maximum Precedence							
Terminal Characteristics							
MS Compatible							
NRI							
Progressive Conference							
Call Forwarding							
Commercial Network Access							
Essential User							
Compressed Dial List							
Zone Restriction							
Direct Access							

APF WORKSHEET

APF	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-25. APF, Profile Worksheet

Net ID-A							
Net ID-B							
Barred Trunk Access							
Barred Call							

APF WORKSHEET

Figure V-25. (Cont'd)

d. Traffic Load Level. Enter 1-5.

e. Security. Enter P = Preferred, R = Required, N = Nonsecure, or E = End-to-End Required.

f. Maximum Precedence. Enter FO, F, I, P, or R.

g. Terminal Characteristics. Enter V = Voice, D = Data, or M = Multimode.

h. MS Compatible. Enter Y = Yes or N = No.

i. Net Radio Interface (NRI). Enter Y = Yes or N = No.

j. Progressive Conference Allowed. Enter Y = Yes or N = No.

k. Call Forwarding. Enter Y = Yes or N = No.

l. Commercial Network Access. Enter Y = Yes or N = No.

m. Essential User. Enter Y = Yes or N = No.

n. Compressed Dial List. Enter 0-5.

o. Zone Restriction. Enter 0-8.

p. Direct Access. Enter Y = Yes or N = No.

q. Rekey Identification. Enter 1-25. (These entries may be left blank as they are valid only in conjunction with DSVTs.)

r. Net ID-A. Enter 2-26. (May be left blank.)

s. Net ID-B. Enter 27-51. (May be left blank.)

t. Barred Trunk Access. Enter Y = Yes or N = No.

u. Barred Call. Enter 1 = Origination, 2 = Termination, or Blank = None.

29. APL. This worksheet (Figure V-26) is used to preaffiliate a single subscriber or a list (PAL).

a. Action. Enter 1 = List or 2 = Single Subscriber.

b. List Number (For List). Enter 1-999.

Action	List Number	Directory Number	Profile Index	Load Disk	Target Device		MTT
					Floppy Disk 1	Floppy Disk 2	

APL WORKSHEET

APL	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ of __

Figure V-26. APL, Preaffiliation Worksheet

c. Directory Number (For Single Subscriber). Enter LNXXXXX, where L = 1-7 and N = 2-9. To be consistent with GBNP (see Chapter III), use format NNXXXXX.

d. Profile Index (For Single Subscriber). Enter 1-255.

e. Target Device. Enter 1 = Load Disk from internal hard disk, 2 = load from floppy disk 1, 3 = load from floppy disk 2, or 4 = load from MTT. (For CBCSs the entries are limited to 1 to 3.)

30. APR. This command (Figure V-27), applicable to the AN/TTC-39D PS only, is used to assign routing for each of the three TPN dialup ports.

a. Action. Enter A = Add.

b. NN Code. (See Table V-7.)

c. Home/Foreign Classmark. Enter F = Foreign.

d. Primary TGC. Enter 84, 85, or 86. (See Table V-7.)

e. Alternates 1-5. Leave Blank.

31. ASC. This worksheet (Figure V-28) is used to assign classmarks applicable to the CBCS.

a. Alternate Routing. Enter Y = Yes or N = No, normal entry is Y.

b. Gateway Classmark. Enter Y = Yes or N = No.

c. Satellite Links. Enter 1-4, normal entry is 4.

d. NATO Area Code. Enter 9YX, normal entry is 914.

e. CSCE Auto Call. Enter Y = Yes or N = No. For a CDS and SMU the entry should be N since they do not support a RVDT.

f. CSCE Periodic Traffic Meters. Enter Y = Yes or N = No. For a CDS and SMU the entry should be N.

g. CSCE Alarms Category. Enter 0 = No Alarms; 1 = Cat 1; 2 = Cat 1 and 2; or 3 = Cat 1, 2, and 3. For a CDS and SMU the entry should be N.

Action	NN Code	Home/Foreign Classmark	Primary TGC	ALT 1	ALT 2	ALT 3	ALT 4	Alt 5

APR Worksheet

APR	SW CODE	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-27. APR, Packet Switch Routing Worksheet

Alternate Routing							
Gateway Classmark							
Satellite Links							
NATO Home Area							
CSCE Auto Call							
CSCE Periodic Traffic Meters							
CSCE Alarms Category							
Periodic Report Print							
Password for Remote Access							
Clock Recovery							
Automatic Database Save							
Time Interval Between Saves							
Automatic Database Filename							

ASC WORKSHEET

ASC	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ of __

Figure V-28. ASC, Switch Classmarks Worksheet

h. Periodic Print Report. Enter Y = Yes or N = No.

i. Password for Remote Access. Enter a 5-digit Password for access to a RTTY or RVDT. For the CDS or SMU, leave Blank.

j. Clock Recovery. Enter 0 = Rubidium, 1-48 = DTG Timing Slave. (Display only for SMU and CDS.)

k. Automatic Database Save. Enter Y = Yes, N = No or Blank = No.

l. Time Interval Between Saves. Enter 15-999 (minutes).

m. Automatic Database File Name. Enter DB + up to six (6) characters or numerals.

32. ASI. This worksheet (Figure V-29) is used to assign and display classmarks that apply to the entire switch. These classmarks should not be altered after initialization.

a. Switch Type. Enter 1 = TTC-39D, 2 = TTC-39A(V)3, 3 = TTC-39A(V)4, 4 = NCS, 5 = LENS, 6 = FES, or 7 = DS.

b. Switch Identification. Enter LXX = LENS or XX = Other.

c. CSP. Enter the number for the type call service position used by the switch: 1 = 39 -standard style CSP used in TTC-39D and TTC-39A(V)4, 2 = Workstation; MSE-style CSP used in NCS, LENS, and FES, 3 = console used with most CDS and SMU configurations, and 4 = downsized CSP used in TTC-39A(V)3.

d. Protected Distribution System. Enter Y = Yes or N = No to specify if the switch uses a PDS. (If Y, Security Preferred (SP)DNVTs will be treated as secure instruments. If N, SP DNVTs will be treated as nonsecure and receive NSWT for all calls.) No = MSE 63 profile matrix.

e. Expanded Profiles. Enter Y = Yes or N = No.

f. CDS Hardware. Enter Y = Yes or N = No.

G. 16/32 kbps Switch. Ent 16 or 32. (Any switch supporting a RAU must operate at 16 kbps.

h. Dual LKG. Enter Y = Yes or N = No.

Switch Type								
Switch Identification								
CSP								
PDS								
Expanded Profiles								
CDS Hardware								
16/32 kbps Switch								
Dual LKGs								
AKDC								
Packet Switch								
Packet Switch Gateway								
Conference Bridge Size								
Day Hour Minute Tenths of Minutes								
Workstation Configuration								

ASI WORKSHEET

ASI	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ of __

Figure V-29. ASI, Switch Initialization Worksheet

i. <u>AKDC</u>. Enter 1 = HGX-83 or 2 = KGX-93.

j. <u>Packet Switch</u>. Enter Y = Yes or N = No.

k. <u>Packet Switch Gateway</u>. Enter Y = Yes or N = No.

l. <u>Conference Bridge Size</u>. Enter 5 or 10. Enter a 5 for all switches except those based on CDS or SMU hardware.

m. <u>Day and Time</u>. Enter:

   (1) <u>Day</u>. Enter 1-366.

   (2) <u>Hour</u>. Enter 0-23.

   (3) <u>Minute</u>. Enter 0-59.

   (4) <u>Tenths of Minutes</u>. Enter 0-9.

n. <u>Workstation Configuration</u>. Enter 0 = No Workstation, 1 = ESOP-Sun Sparc 20 workstation, or 2 = Cetia- UYK-86 Workstation used in NCS, LENS, and TTC-39D.

o. <u>Local Subscriber Code (NNXX)</u>. Display only. (Switch code where 82XX = tandem flood search switch, 83XX = LENS.)

33. <u>ASR</u>. This worksheet (Figure V-30) is used to assign (add), modify, or delete classmarks related to SEN and RAU trunk groups.

a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

b. <u>Trunk Group Cluster Number</u>. Enter 1-31. SEN TGCs should be assigned TGC numbers between 7-16.

c. <u>Type</u>. Enter 1 = RAU, 2 = SEN, or 3 = SCC.

d. <u>Absent</u>. Enter Y = Yes or N = No.

e. <u>Packet Switch</u>. Enter Y = Yes or N = No. Set to Y for TGCs from a PS-equipped CBCS to a SEN only.

f. <u>Packet Switch Port Number (Display Only)</u>. If set to Y = Yes, the PS port assigned to this TGC will be displayed.

34. <u>ATG</u>. This worksheet (Figure V-31) assigns, modifies, or deletes TGC characteristics or completely deletes a TGC.

Action	Trunk Group	Type	Absent	Packet Switch	Packet Switch Port Number

ASR WORKSHEET

ASR	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-30. ASR, SEN, and RAU Worksheet

	Action											
Screen 1 **All TGCs** and **Commercial** and **Other**	TGC Number											
	TGC Type											
	Spill Forward											
	Destination Code											
	Zone Restriction											
	Access Trunk Group											
	Traffic Limitations											
	F											
	I											
	P											
	R											
Interswitch	Glare											
	TSB Type											
	TSB Number											
	TSB Rate											

ATG WORKSHEET

ATG	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-31. ATG, Trunk Group Cluster Worksheet

Interswitch (Cont'd)	Trunk Rate									
	TDMX Address of TSB									
	TDMX Address- Primary Signaling Channel									
	TDMX Address - Secondary Signaling Channel 1									
	TDMX Address- Secondary Signaling Channel 2									
	TDMX Address- Secondary Signaling Channel 3									
	TDMX Address of RSS Signaling Channel									
	RSB Number									
	TDMX Address of RSB									
	Packet Switch									
	Packet Switch Bypass									
	Packet Switch Port Number									
PBX	Number of Outgoing Digits									
	Maximum Level of Precedence									
	Switch Code (NNXX)									
	TLC Level									

Figure V-31.   (Cont'd)

SB-3865 (DIBTS)	Maximum Level of Precedence									
	Traffic Load Level									
	Glare									
	Switch Code									
	Commercial Network Access									
NATO Digital	NSB Number									
	TDMX Address of NSB									
	TDMX Address of Framing Channel (First Channel)									
	TDMX Address of Signaling Channel (Second Channel)									
	NSB Block Step Parameter 1: BSSP = 4 2: BSSP = 6 3: BSSP = 0									

Figure V-31. (Cont'd)

a. <u>Interswitch DTG</u>

(1) <u>Action</u>. Enter A = Add, M= Modify, or D = Delete.

(2) <u>TGC Number</u>. Enter 1-16 or 41-127.

(3) <u>TGC Type</u>. Enter I = Interswitch, P = PBX, D = SB-3865, N = NATO Digital, or O = Other. Enter I.

(4) <u>Spill Forward</u>. Enter Y = Yes or N = No. Entry must be Y for all CBCS TGCs.

(5) <u>Destination Code</u>. Enter NYX.

(6) <u>Zone Restriction</u>. Enter 0-8.

(7) <u>Access Trunk Group</u>. Enter Y = Yes or N= No.

(8) <u>Traffic Limitations</u>. Enter Y = Yes or N = No. If Yes, enter number of trunks (0-255) for F, I, P, and R.

(9) <u>Glare</u>. Enter A = Accept or R = Reject. The CBCS must be set to A for a TGC from a CBCS to a TYC-39.

(10) <u>TGC Type</u>. Enter 1 = Flood Search, 2 = Adjacent Area, 3 = Non-Flood, or 4 = Message Switch. Use 1 for all flood search TGCs from a CBCS to other CBCSs within the home area code. Use 2 for TGCs from a CBCS to other CBCS outside of the home area code. Use 3 for nonflood search TGCs from a CBCS to a TTC-39A(V)1 or TTC-42, area code. Use 4 for TGCs from a CBCS to a TYC-39.

(11) <u>TSB Number</u>. Enter 1-30 = Digital or 3-4 = Analog.

(12) <u>TSB Rate</u>. Enter 16 or 32 (kbps)-digital only.

(13) <u>Trunk Rate</u>. Enter 16 or 32-digital only.

(14) <u>TDMX Address of TSB</u>. Enter XX-XX.

(15) <u>TDMX Address of Primary Signaling Channel</u>. Enter XX-XX.

(16) <u>TDMX Address of Secondary Signaling Channel 1</u>. Enter XX-XX.

(17) TDMX Address of Secondary Signaling Channel 2.
Enter XX-XX.

(18) TDMX Address of Secondary Signaling Channel 3.
Enter XX-XX.

(19) RSB Number. Enter 1-30.

(20) Packet Switch. Enter Y = Yes, N = No, or
G = Gateway.

(21) Packet Switch Bypass. Enter Y = Yes, N = No,
or leave blank. For the AN/TTC-39D PS, always enter N for
TGC Type 1.

(22) PS Port Number (Display Only). For AN/TTC-39D
PS only, displays the PS port when the TGC is active.

   b. PBX TGC

(1) Action. Enter A = Add, M= Modify, or
D = Delete.

(2) TGC Number. Enter 1-16 or 41-127.

(3) TGC Type. Enter C = Commercial,
I = Interswitch, P = PBX, D = SB-3865, N = Digital NATO, or
O = Others. Enter P.

(4) Spill Forward. Enter Y = Yes or N = No.

(5) Destination Code. Enter NYX = 200-919.

(6) Zone Restriction. Enter 0-8.

(7) Access Trunk Group. Enter Y = Yes or N = No.

(8) Traffic Limitations. Enter Y = Yes or N = No.
If Yes, enter number of trunks (0-255) for F, I, P, and R.

(9) Number of Outgoing Digits. Enter 0-10.

(10) Maximum Level of Precedence. Enter FO, F, I,
P, or R.

(11) PBX Switch Code. Enter NNXX for 3-digit PABX.

(12) TLC. Enter 1-5.

c. <u>DIBTS SB-3865 TGC</u>

(1) <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

(2) <u>TGC Number</u>. Enter 1-16 or 41-127. For the CBCS it is recommended that the SB-3865 TCGs be assigned from 41-127.

(3) <u>TGC Type</u>. Enter D = SB-3865.

(4) <u>Spill Forward</u>. Enter Y = Yes or N = No. Entry should be set to Y for trunks from a SB-3865.

(5) <u>Destination Code</u>. Enter NYX.

(6) <u>Zone Restriction</u>. Enter 0-8.

(7) <u>Access Trunk Group</u>. Enter Y = Yes or N = No.

(8) <u>Traffic Limitations</u>. Enter Y = Yes or N = No. If Yes, enter number of trunks (0-255) for F, I, P, and R. (Not normally used for DIBTS trunking.)

(9) <u>Maximum Level of Precedence</u>. Enter number of trunks for FO, F, I, P, or R.

(10) <u>TLC Level</u>. Enter 1-5.

(11) <u>Glare</u>. Enter A = Accept or R = Reject. Enter R for a CBCS to SB-3865 TGC.

(12) <u>Switch Code</u>. Enter NNXX of the SB-3865.

(13) <u>Commercial Network Access</u>. Enter Y = Yes or N = No.

d. <u>NATO Digital TGC</u>

(1) <u>Action</u>. Enter A = Add, M= Modify, or D = Delete.

(2) <u>TGC Number</u>. Enter 1-16 or 41-127. For the CBCS it is recommended that the Digital NATO TCGs be assigned from 41-127.

(3) <u>TGC Type</u>. Enter N = Digital NATO.

(4) <u>Spill Forward</u>. Enter Y = Yes or N = No. Entry should be Y for Digital NATO TGCs.

(5) <u>Destination Code</u>. Enter 9YX.

(6) <u>Zone Restriction</u>. Enter 0-8.

(7) <u>Access Trunk Group</u>. Enter Y = Yes or N = No.

(8) <u>Traffic Limitations</u>. Enter Y = Yes or N = No. If Yes, enter number of trunks (0-255) for F, I, P, and R. (Not normally used for Digital NATO trunking.)

(9) <u>Maximum Level of Precedence</u>. Enter FO, F, I, P, or R. Entry required only if traffic limitations is set to Y.

(10) <u>NSB Number</u>. Enter 1-30.

(11) <u>TDMX Address of NSB</u>. Enter XX-XX.

(12) <u>TDMX Address of Framing Channel</u>. Enter XX-XX of the first channel.

(13) <u>TDMX Address of Signaling Channel</u>. Enter XX-XX of second channel.

(14) <u>NSB BSBP</u>. Enter: 1: BSBP = 4 (terrestrial link < 100 km), 2: BSBP = 6 (terrestrial link $\geq$ 100 km), or 3: BSBP = 0 (satellite link).

e. <u>Commercial or Other TGCs</u>

(1) <u>Action</u>. Enter A = Add, M= Modify, or D = Delete.

(2) <u>TGC Number</u>. Enter 1-127. For the CBCS it is recommended that the Commercial or Other TGCs be assigned from 41-127.

(3) <u>TGC Type</u>. Enter C = Commercial or O = Other. Other is the default category and includes trunking to SB-3614As or analog interfaces to DSN or commercial office switches.

(4) <u>Spill Forward</u>. Enter Y = Yes or N = No. Entry should be Y for from most analog switches.

(5) <u>Destination Code</u>. Enter Area Code = NYX.

(6) Zone Restriction. Enter 0-8.

(7) Access Trunk Group. Enter Y = Yes or N = No to indicate if this TGC is the only network access to the destination switch.

(8) Traffic Limitations. Enter Y = Yes or N = No. If Yes, enter number of trunks (0-255) for F, I, P, and R. (Not normally used for Digital NATO trunking.)

(9) Maximum Level of Precedence. Enter FO, F, I, P, or R. Entry required only if traffic limitations is set to Y.

(10) Maximum Level of Precedence. Enter FO, F, I,P, or R. Entry required only if traffic limitations is set to Y.

35. ATL. This worksheet (Figure V-32) assigns (add), modifies, or deletes up to eight lists of COMSEC IDs (HUS locations).

a. Action. Enter A = Add, M = Modify. or D = Delete.

b. List Number. Enter 1-8.

c. Start ID for Modify. Enter HUS location = 1-222, 224-1007 or Blank.

d. COMSEC ID Range Start and End. Enter up to 4 digit HUS location (COMSEC ID)- 1-22, 224-1--7 or Blank = HGX-83; 1-222, 224-255, 257-478, 480-511 or Blank = KGX-93.

e. Eliminate. Enter E.

36. ATM. This worksheet (Figure V-33) allows the switch or CSCE operator to specify which loops, destinations, and TGCs or terminations will be monitored for periodic traffic reports.

a. Modify. Enter 1 = Loops, 2 = Destinations, 3 = TGCs/Terminations, or 4 = All.

b. Loops (Terminal Address). Enter the XX-XX address = TDSGM terminals, of the loop for which statistics are to be collected for the R5 report.

Action	List Number	Start ID For Modify	COMSEC ID Range Start	COMSEC ID Range End	Eliminate Mark

ATL WORKSHEETS

ATL	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-32. ATL, Transfer and Activation Lists Worksheet

Modify	Loops (Terminal Address)	Destinations	TGCs/Terminations

ATM Worksheet

ATM	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-33. ATM, Traffic Metering Worksheet

c. <u>Destination</u>. Enter destination codes, up to 10, to be monitored in the format NNX, NYX, NYX-NNXX, or NNXX, reported in the R2 report.

d. <u>TGCs/Terminations</u>. Enter TGC = 1-127 and the associated destination codes in the format NNX, NYX, NYX-NNXX, or NNXX. Up to 28 combinations of TGCs and destination codes can be defined for metering, R3 and R4 reports.

37. <u>ATS</u>. This worksheet (Figures V-34, V-35, and V-36) assigns classmarks to a specified terminal. These classmarks include the type of equipment, its character-istics, and the available services. It also assigns loops, trunks, and signaling equipment and their associated classmarks.

a. <u>ATS-DIBTS Buffers, TT 99, 110, 113-115</u>. (Figure V-34.)

(1) <u>Action</u>. Enter A = Add, D = Delete, or M = Modify.

(2) <u>Terminal Address</u>. Enter XX-XX.

(3) <u>Terminal Type</u>. Enter 110 = DSB. RSBs, TSBs, and NSBs do not have to be defined.

(4) <u>Unit Number</u>. Enter 1-30.

(5) <u>In/Out of Service</u>. Enter I = In or O = Out.

b. <u>ATS, Digital Receivers TT 113</u>. (See Figure V-34.)

(1) <u>Action</u>. Enter A = Add, D = Delete, or M = Modify.

(2) <u>Terminal Address</u>. Enter XX-XX.

(3) <u>Terminal Type</u>. Enter 113 = DR

(4) <u>Unit Number</u>. Enter 1-30.

(5) <u>In/Out of Service</u>. Enter I = In or O = Out.

c. <u>ATS, Loop Group Signaling Channel</u>. See Figure V-34. If the DTG carries DIBTS trunks or subscriber loops, then the loop group signaling channels must be assigned as Terminal Type 119.

	Action									
	Terminal Address									
	Terminal Type									
TT	Terminal Type									
110, 113	Unit Number									
119	I/O of Service									
	Controller Directory Number									
TT 143	Data Compression									
	RVDT Number									
	Auto Call									

ATS Worksheet

ATS	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-34. ATS, Terminal Service Worksheet (Signaling and RVDT Equipment)

	Action							
	Terminal Address							
	Terminal Type							
	TGC Number							
	Path Delay							
	Satellite Trunk							
	In/Out of Service							
Interswitch	Trunk Number							
	16 kbps Trunk							
	MS Characteristics							
	Net Number							
	COMSEC ID							
	Transmission Type							
	Packet Switch Trunk							

ATS Worksheet

ATS	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-35. ATS, Trunk Terminals Worksheet (Interswitch)

SEN, RAU, SCC, DIBTS and NATO Analog	Trunk Number							
	Transmission Type							
	Packet Switch							
	DLTU							
Extraswitch	Transmission Type							
	Carrier Mode							
	Adapter Number							
	T Digit							
	Bar Indialing to Network Subscribers							
NATO Digital	Trunk Number							
	16 kbps Trunk							

Figure V-35. (Cont'd)

Loop Terminals TT 3, 13, 15 & 16	Action							
	Terminal Address							
	Terminal Type							
	Directory Number							
	Line Hunting Group							
	DAS Called No.							
	Traffic Load Control							
	Secure Call Privilege							
	Maximum Precedence							
	In/Out of Service							
	Terminal Characteristics							
	16 kbps HDPLX							
	MS Compatible							

ATS WORKSHEET

ATS	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-36. ATS, Terminal Service, Analog/Digital Loops Worksheet

All Terminals	ADOCU Home Code							
Non-DAS Only	Progressive Conference Allowed							
	Call Transfer Allowed							
	Compressed Dial							
	Comp Dial List							
	Zone Restriction List							
	Calls Limited to Prerog Conf							
	Commercial Network Access							
Dedicated Line Only	Dedicated Line Call							
	Dedicated Line Channels Needed							

Figure V-36. (Cont'd)

    d. <u>ATS Remote Visual Display Terminal (RVDT) TT 143</u>.
(See Figure V-34.)

        (1) <u>Action</u>. Enter A = Add, D = Delete, or
M = Modify.

        (2) <u>Terminal Address</u>. Enter XX-XX.

        (3) <u>Terminal Type</u>. Enter 143 = RVDT (DSDI).

        (4) <u>RTTY/RVDT Control Directory Number</u>. Enter
NNXXXXX, number dialed by CSCE to access the CBCS.

        (5) <u>Data Compression</u>. Enter Y = Yes or N = No.

        (6) <u>RVDT Number</u>. Enter 7 to 13 digits in the form
9YX-MYX-NNXX-XXX.

        (7) <u>Auto Call Precedence</u>. Enter F = Flash,
I = Immediate, P = Priority, or R = Routine.

    e. <u>ATS, Interswitch Terminal Types 28,29</u>. (See
Figure V-35.)

        (1) <u>Action</u>. Enter A = Add, D = Delete, or
M = Modify.

        (2) <u>Terminal Address</u>. Enter XX-XX.

        (3) <u>Terminal Type</u>. Enter 28 = Analog Interswitch
Trunk or 29 = Digital Interswitch Trunk.

        (4) <u>TGC Number</u>. Enter 1-16 or 41-127.

        (5) <u>Path Delay</u>. Enter 0-40, normal entry 0.

        (6) <u>Satellite Trunk</u>. Enter Y = Yes or N = No.

        (7) <u>In/Out of Service</u>. Enter I = In Service or
O = Out of Service.

        (8) <u>Trunk Number</u>. Enter 1-225.

        (9) <u>16 kbps Trunk</u>. Enter Y = Yes or N = No. If
the channel rate of the supporting DTG is 32 kbps, this
entry must be N. If the channel rate is 16 kbps, entry
is Y.

        (10) <u>MS Trunk</u>. Enter Y = Yes or N = No.

(11) <u>MS Trunk Characteristics</u>. Enter 0, 3-5, 7-12, 14-15 = Analog or 0 = Digital. Required only if MS trunk.

(12) <u>Transmission Type</u>. Enter AN = Analog Non-Secure, AS = Analog Secure, or DN = Digital Non-Secure. For digital trunks entry is DN.

(13) <u>Packet Switch Trunk</u>. Enter Y = Yes or N = No.

f. <u>ATS, SEN, RAU, DIBTS, and Analog NATO Terminal Types 85, 86, 27, 87</u>. (See Figure V-35.)

(1) <u>Action</u>. Enter A = Add, D = Delete, or M = Modify.

(2) <u>Terminal Address</u>. Enter XX-XX.

(3) <u>Terminal Type</u>. Enter 86 = SEN, 85 = RAU,27 = SB-3865, 39 = NATO Analog Trunks if CV-3487, or 87 = if NILTU or CV-4002. SCC interfaces are defined using the ACC command.

(4) <u>TGC Number</u>. Enter 1-16 or 41-127.

(5) <u>Path Delay</u>. Enter 0-40, normal entry 0.

(6) <u>Satellite Trunk</u>. Enter Y = Yes or N = No.

(7) <u>In/Out of Service</u>. Enter I = In Service or O = Out of Service.

(8) <u>Trunk Number</u>. Enter 1-255.

(9) <u>Transmission Type</u>. Enter S = Secure, N = Non-Secure (for NATO trunks only).

(10) <u>Packet Switch Trunk</u>. If this trunk is between a PS-equipped CBCS and a SEN and supports a TPN link, enter Y = Yes for the 14th trunk in the SEN TGC and enter a N = No for all other trunks in the TGC, otherwise enter N.

(11) <u>DLTU</u>. For analog NATO trunks using a NATO Interface Line Termination Unit (NILTU), enter Y = Yes, otherwise enter N = No.

g. <u>ATS, Trunk Terminals, Type Terminals 25, 26, 30-32, 34, 36-46, 66, 82-83 (Extraswitch)</u>. (See Figure V-35.)

(1) <u>Action</u>. Enter A = Add, D = Delete, or M = Modify.

(2) <u>Terminal Address</u>. Enter XX-XX.

(3) <u>Terminal Type</u>. Enter 25, 26, 30-32, 34, 36-46, 66, or 82-83.

(4) <u>TGC Number</u>. Enter 1-16 or 41-127.

(5) <u>Path Delay</u>. Enter 0-40, normal entry 0.

(6) <u>Satellite Trunk</u>. Enter Y = Yes or N = No.

(7) <u>In/Out of Service</u>. Enter I = In Service or O = Out of Service.

(8) <u>Transmission Type</u>. Enter S = Secure N = Non-Secure.

(9) <u>Carrier Mode</u>. Enter Y = Yes or N = No. For TTs 46, 82, and 83 only. Generally set to N unless two CBCS are directly connected for testing, then set one to Y and the other to N.

(10) <u>Adapter Number</u>. Enter 1-36, for Terminal Types 44 and 45 only.

(11) <u>T Digit</u>. Enter Y = Yes or N = No. For SB-3614A trunks, entry must be Y.

h. <u>ATS, Digital NATO Trunks, Terminal Type 88</u>. (See Figure V-35.)

(1) <u>Action</u>. Enter A = Add, D = Delete, or M = Modify.

(2) <u>Terminal Address</u>. Enter XX-XX.

(3) <u>Terminal Type</u>. Enter 88.

(4) <u>TGC Number</u>. Enter 1-16 or 41-127.

(5) <u>Path Delay</u>. Enter 0-40, normal entry 0.

(6) <u>Satellite Trunk</u>. Enter Y = Yes or N = No.

(7) <u>In/Out of Service</u>. Enter I = In Service or O = Out of Service.

(8) <u>Trunk Number</u>. Enter 2-15.

(9) <u>16 kbps Trunk</u>. Enter Y = Yes.

   i.. <u>ATS, Terminal Service, Analog/Digital Loops,
Terminal Types 3, 13, 15, 16</u>. (See Figure V-36.)

   (1) <u>Loop Terminals Types 3, 13,15, and 16</u>.

      (a) <u>Action</u>. Enter A = ad, M = Modify, or
D = Delete.

      (b) <u>Terminal Address</u>. Enter X-XX.

      (c) <u>Terminal Type</u>. Enter 3, 13, 15, or 16

      (d) <u>Directory Number</u>. Enter LNXXXXX.

      (e) <u>Line Hunting Group</u>. Enter 0-32 or
0 =None.

      (f) <u>DAS Called Number</u>. Enter P 9YXNYXXXXXXX
   or Blank = No DAS.

      (g) <u>Traffic Load Control</u>. Enter 1-5.

      (h) <u>Secure Call Privilege</u>. Enter
R = Required, P = Preferred, E = End-to-End, or
N = Non-Secure.

      (i) <u>Maximum Precedence</u>. Enter FO, F, I, or R.

      (j) <u>In/Out of Service</u>. Enter I = In or

      (k) <u>Terminal Characteristics</u>. Enter D = Data
Only, V = Voice, M = Multi.

      (l) <u>16 kbps HDPLX</u>. Enter Y = Yes or N = No.

      (m) <u>MS Compatible</u>. Enter Y = Yes or N = No.

   (2) <u>Loop Terminals</u>

      (a). <u>All Terminals- ADOCU Home Code</u>. Enter 0-
13 or Blank = No ADCOU.

      (b) <u>Non-DAS Only</u>

<u>1</u>. <u>Progressive Allowed</u>. Enter Y = Yes or N = No

<u>2</u>. <u>Call Transfer Allowed</u>. Enter Y = Yes or N = No.

<u>3</u>. <u>Compressed Dial</u>. Enter Y = Yes or N = No.

<u>4</u>. <u>Compressed Dia List</u>. Enter 1-5 = CD is Yes or 0 = if CD is No.

<u>5</u>. <u>Zone Restriction List</u>. Enter 0-8 or 0 = None.

<u>6</u>. <u>Calls Limited to Preprog Conf</u>. Enter Y = Yes or = No.

<u>7</u>. <u>Commercial Network Access</u>. Enter Y = Yes or = No.

(c) <u>Dedicated Line Only</u>

<u>1</u>. <u>Dedicated Line Call</u>. Enter 1 = Setup or 2 = End.

<u>2</u>. <u>Dedicated Line Channels Needed</u>. Enter 1-52.

38. <u>ATT</u>. This worksheet (Figure V-37) is used to enter data describing common equipment: a conference bridge, CSP, or LKG (Terminal Types 120, 121, 123).

a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

b. <u>Equipment Type</u>. Enter 120, 121, or 123.

c. <u>Unit Number</u>. Enter 1-64.

d. <u>ATT, Conference Bridge (Terminal Type 120)</u>

(1) <u>Unit Number</u>. Enter 1-6.

(2) <u>In/Out of Service</u>. Enter I = In or O = Out. Normally set to I.

(3) <u>Matrix Location</u>. Enter XX-XX for Ports 1-10.

e. <u>ATT, CSP (Terminal Type 121)</u>

	Equipment Type						
	Unit Number						
Conference Bridge	Unit Number						
	In or Out of Service						
	Matrix Location						
CSP	Unit Number						
	In or Out of Service						
	Matrix Location -Voice Port 1						
	Matrix Location-Voice Port 2						
	TDMX Terminal Location Signaling						
	Directory Number						
	Digital Receiver Unit Number						
	DTLU Classmark						
LKG	Unit Number						
	In or Out of Service						
	Cipher Terminal Address						
	Plain Terminal Address						

ATT WORKSHEET

ATT	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-37. ATT, Terminal Type Worksheet, Conference Bridge, CSP, and LKG

(1) <u>Unit Number</u>.   Enter 1-4.

(2) <u>In/Out of Service</u>.   Enter I = In or O = Out.

(3) <u>Matrix Location Voice Port 1</u>.   Enter XX- XX.

(4) <u>Matrix Location Voice Port 2</u>.   Enter XX-XX.

(5) <u>TDMX Terminal Location for Signaling</u>. Enter XX-XX.

(6) <u>Directory Number</u>.   Enter LNXXXXX.

(7) <u>Digital Receiver Unit Number</u>.   Enter 1-5.   By convention, DR Unit 1 is used for CSP Unit 1 and DR Unit 2 is used for the remote CSP Unit 2.

(8) <u>DTLU Classmark</u>.   Enter Y = Yes, N = No, or Blank = N

f.   <u>ATT, LKG (Terminal Type 123) KG-82</u>

(1) <u>Unit Number</u>.   Enter 1-64.

(2) <u>In or Out of Service</u>.   Enter I = In or O = Out.

(3) <u>Cipher Terminal (Address)</u>.   Enter XX-XX.

(4) <u>Plain Terminal (Address)</u>.   Enter XX-XX.

39.   <u>AT1</u>.   This command (Figure V-38) is used by the CDS and SMU only to define T1 or E1 groups.   The T1 and E1 groups can be used for a direct digital interface to commercial networks or the DSN or to use the commercial or DSN switch to extend a tactical interface.

a.   <u>Action</u>.   Enter A = Add, M = Modify, or D = Delete.

b.   <u>TGC Number</u>.   Enter 1-24.

c.   <u>Starting Address</u>.   Enter XX-XX (see Table V-8 for the available addresses based on the group number selected in the CDS or SMU).

d.   <u>Number of Channels</u>.   Enter T1 = 1-25, E1 = 1-31, or DTG CXR Mode = 1-120.   (See Table V-9.)

e.   <u>Operating Mode</u>.   Enter 0 = T1, 1 = E1, 2 = T1 - DTG CXR, or 3 = E1 - DTG CXR.

Action								
TGC Number								
Starting Address								
Number of Channels								
Operating Mode								
Frame Mode								
T1 Ones Density								
Channel Rate								
PCM Format								
First Loop Channel Number								
Cable Length (Feet)								
Group Output								
Recover Clock Timing								
DSN Supervision								
Signaling Type								
Start Type								
Digit Delay								
Digit On/Off Cadence								
Number of Satellite Links								
In/Out of Service								

ATI Worksheet

Figure V-38. AT1, T1CEPT Interface Worksheet

Table V-8. CDS and SMU DTG to Address Relationship

BS (TDMM)	LA First- Last Address	Data Bus	Valid DTG Nos	Function
01	00-63	A	Odd	64-DTG Channels
02	00-63	A	Odd	64-DTG Channels
03	00-63	A	Odd	64-DTG Channels
04	00-63	A	Odd	64-DTG Channels
05	00-63	A	Odd	64-DTG Channels
06	00-63	A	Odd	64-DTG Channels
07	00-31	A	Odd	32-DTG Channels
08	04-63	B	Even	60-DTG Channels
09	00-63	B	Even	64-DTG Channels
10	00-63	B	Even	64-DTG Channels
11	00-63	B	Even	64-DTG Channels
12	00-63	B	Even	64-DTG Channels
13	00-16	B	Even	16-DTG Channels

Table V-9. T1 and E1 Group Composition

Maximum Channels for T1 and E1 Groups		
Group Type	With Signaling	DTG MUX Mode
T1	25 Traffic Channels (24 + 1 OH)	96 CHNLs at 16 kbps 48 CHNLs at 32 kbps
E1	31 Traffic Channels (30 + 1 OH)	120 CHNLs at 16 kbps 60 CHNLs at 32 kbps

    f. Frame Mode. Enter 0 = T1 SF or E1 Normal,
1 = T1 ESF or E1 CRC.

    g. T1 Ones Density. Enter 0 = B8ZS or 1 = B7. Entry
must be set to 0 for T1-DTG CXR Mode. Leave blank for E1
group.

    h. Channel Rate. Enter 0 = 16 kbps or 1 = 32 kbps.

    i. PCM Format. Enter 0 = mu (μ)-law (T1) or 1 = a-law
(E1). Leave blank for DTG CXR modes.

    j. First Loop Channel Number. Enter 2-25 or
Blank = No Loops.

k. Cable Length. Enter 0-6 to reflect distance in feet between CDS or SMU and Channel Service Unit (CSU). 1 = 0 to 110 ft, 2 = 111 to 220 ft, 3 = 221 to 330 ft, 4 = 331 to 440 ft, 5 = 441 to 550 ft, or 6 = 551 t0 600 feet.

l. Group Output. Enter 0 = Standard T1/AMI or E1/HDB3, 1 = NRZ, or 2 = NRZ/TED (this is used to directly interface to a military multiplexer or carrier system when a TED is used).

m. Recover Clock Timing. Enter Y = Yes or N = No to specify if a CDS or SMU is to use this group as the source for recovered clock.

n. DSN Supervision. Enter Y = Yes (for DSN interfaces requiring MLPP) or N = No (for commercial interfaces).

o. Signaling Type. Enter 1 = DTMF, 2 = MF, or 3 = Dial Pulse. Leave blank for DTG CXR modes.

p. Start Type. Enter 0 = Wink (for DSN interfaces), 1 = Delay Dial, or Blank = DTG CXR modes.
3 = 170, 4 = 190,

q. Digit Delay. Enter 0 = No Delay, 1 = 70, 2 = 150, 3 = 170, 4 = 190,.5 = 200, 6 = 300, 7 = 500 (delay in milliseconds (ms)), or blank = DTG CXR modes and Wink Start interfaces.

r. Digit On/Off Cadence. Enter 0 = 50/50, 1 = 60/60,2 = 70/70, or 3 = 100/100 = 100/100 (Msecs). Leave blank for DTG CXR modes and standard DSN interfaces.

s. Number of Satellite Hops. Enter 0 = None, 1 = 1 hop, or 2 = 2 hops.

t. In/Out of Service. Enter I = In Service or O = Out of Service.

40. AVL. This worksheet (Figure V-39) is used to assign the COMSEC ID (HUS) locations for any optional key in the CBCS.

a. Start or Stop. Enter Start or Stop.

b. Rekey Cycle Number. Enter 00-99 or leave Blank.

c. Start Code (COMSEC ID). Optional entry, enter 1-1007 or leave Blank.

Start/Stop	Rekey Cycle Number	Start Code	COMSEC ID	Directory Number	Type	Net Number

AVL WORKSHEET

AVL	SW CODE	SW TYPE	SW LOCATION	DATE	REV #	PREPARED BY	CHECKED BY	PAGE __ OF __

Figure V-39. AVL, Variable Location Worksheet

d. <u>COMSEC ID</u>. Enter 1-1007 or blank. See Table V-10
for the recommended storage location or range of locations
for each variable type.

Table V-10. CBCS Optional Keys--Recommended Values

Key	Recommended Storage Locations		Dir No./BS-LA	Key Type	Net No.
	HGX-83A	KGX-93A			
Area Interswitch Rekeying Key	130-150	130-150	NYX	AIRK	N/A
CSS Keys SB-3865 - Home Net - Home Rekeying Key TDC Option 11 - SEN Net - SEN Rekeying Key	902-911 151-159 902-911 160-169	202-211 151-159 202-211 160-169	NYX-NNX(X) NYX-NNX(X) NYX-NNX(X) NYX-NNX(X)	HN HRV SN SRV	2-11 <u>1/</u> 1-9 <u>2/</u> 2-11 <u>1/</u> 60-69 <u>2/</u>
Message Switch - MS LKG Net Key - MS LKG Rekeying Key	902-911 170-198	202-211 170-198	XX-XX XX-XX	MSNV MSRV	2-11 <u>1/</u> 70-98 <u>2/</u>

<u>1/</u> Use last two digits of storage location as Net Number.
<u>2/</u> Use last digit of storage as Net Number.

e. <u>Directory Number/BS-LA Entry</u>. Enter the required
data to uniquely identify each key. The field is left blank
for the CIRV and RH keys. See Table V-10 for the format of
this entry for each key type.

f. <u>Type</u>. Enter two to four letters to designate the
type of key being stored; see Table V-10.

g. <u>Net Number</u>. Enter 02-98. See Table V-10 for the
variables that require a net number.

41. <u>AZR</u>. This worksheet (Figure V-40) is used to assign
(add), modify, or delete zone restrictions that indicate
allowable calling areas. Each loop and trunk is classmarked
for one of eight zone restriction lists or for global (no
restrictions). Two of the lists (1 and 2) can have up to
101 entries; the other 6 up to 33 entries.

Action	List Number	Permissive/ Restrictive Classmark	Start Code	End Code	Eliminate

AZR WORKSHEET

AZR	SW CODE	SW TYPE	SW LOCATION	DATE	REV#	PREPARED BY	CHECKED BY	PAGE ___ OF ___

Figure V-40. AZR, Zone Restriction Worksheet

a. <u>Action</u>. Enter A = Add, M = Modify, or D = Delete.

b. <u>List Number</u>. Enter 1-8.

c. <u>Start Code for Modify Display</u>. Enter up to six digits, optional entry.

d. <u>Permissive or Restrictive Classmark</u>. Enter P = Permissive or R = Restrictive.

e. <u>Start Code</u>.   Enter up to a six-digit code in P = the format NN, NYX, NNX, NYXNN, NYXXX, or NYXNNX.

f. <u>End Code</u>. Optional entry, entries same as Start Code.

g. <u>Eliminate</u>. Enter E to delete an entry when modifying.

SECTION B

UNIT LEVEL CIRCUIT SWITCH PLANNING

SUBSECTION 1

UNIT LEVEL CIRCUIT SWITCH PLANNING WORKSHEETS

1. General. This section provides the ULCS network planner
with a set of worksheets to record the circuit switch
network design. They serve as a guide and a record for the
network planner. These worksheets are not provided to
switch personnel to enter a database into the switch.
Generally, the information on these worksheets applies to
two or more switches in the network. Subordinate network
planners and switch planners use this information to extend
the network design and as a basis for switch configuration.
(See Subsection 2 for the AN/TTC-42 switch planning
worksheets.) The data elements required on the worksheets
and the accepted range of legal values are provided on the
worksheets.

2. General Instructions. This worksheet (Figure V-41)
contains information on the network data rate, designation
of timing master and alternate master devices, internetwork
interfaces (interarea, NATO, DSN, and commercial), and
guidance for patching circuits and providing direct access
service.

3. Digital Trunk Group Assignments. This worksheet
(Figure V-42) contains the information required to establish
all of the digital trunk groups in the network.

4. Analog Trunk Group Assignments. This worksheet
(Figure V-43) contains the information required to establish
all of the analog trunk groups in the network.

5. COMSEC Switch Designations. This worksheet
(Figure V-44) contains the information necessary to
establish COMSEC relationships among all of the digital
switches in the network. It establishes the COMSEC Parent,
COMSEC Alternate Parent, and COMSEC Subordinate Switch
designations.

6. Network Orderwire Assignments. This worksheet
(Figure V-45) lists the interswitch orderwire requirements
for the network.

NETWORK DATA RATE (kbps): 16/32						
NETWORK TIMING MASTER (NNXX):				ALT MASTER (NNXX)		

AREA CODE ASSIGNMENTS		HOME AREA CODE (MYX)				
DIRECT INTERFACE SWITCH (NNXX)	CALLED AREA CODES	SWITCHES USING THIS INTERFACE				
	(MYX) | (MYX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)

NATIONAL IDENTIFIER CODE ASSIGNMENTS		HOME NATO CODE (9YX):				
DIRECT INTERFACE SWITCH (NNXX)	CALLED NATO CODES	SWITCHES USING THIS INTERFACE				
	(9YX) | (9YX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)

GENERAL INSTRUCTIONS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-41. General Instructions Worksheet

EXIT SWITCH CODE (NNXX):				ALT EXIT SWITCH CODE (NNXX):		
DSN CODE ASSIGNMENTS						
DIRECT INTERFACE SWITCH (NNXX)	CALLED DSN CODES		SWITCHES USING THIS INTERFACE			
	(NYX)	(NYX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)
COMMERCIAL ACCESS						
DIRECT INTERFACE SWITCH (NNXX)	DIRECTLY CONNECTED COMM OFC (NAME)		SWITCHES USING THIS INTERFACE			
			(NNXX)	(NNXX)	(NNXX)	(NNXX)	(NNXX)

GENERAL INSTRUCTIONS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-41. (Cont'd)

PATCHING				
TYPE (TK GP/HOTLINE)	DESIGNATION (TG NO/TITLE)	FROM SWITCH CODE (NNXX)	TO SWITCH CODE (NNXX)	VIA SWITCH CODE (NNXX)

DIRECT ACCESS SERVICE (DAS)				
SWITCH CODE (NNXX)	DIR NUMBER (GXX)	LOOP TYPE	DAS DIR NUMBER (MYX NNXX GXX)	E-E SEC (REQD/PREF)

GENERAL INSTRUCTIONS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-41. (Cont'd)

1ST TRUNK GP NO (001-254)				
1ST SWICH CODE (NNXX)				
1ST SWITCH TYPE				
2D TRUNK GP NO (001-254)				
2D SWITCH CODE (NNXX)				
2D SWITCH TYPE				
TRANSMISSION MEDIA				
TRUNK GP TYPE (DIBTS/CCIS)				
NO OF TRUNKS (1-71)				
OVERHEAD CHANNEL NO (00-36)				
ORDERWIRE (A/D/N)				
TED REQUIRED (Y/N)				
SEC CALLS ONLY: 1ST SW (Y/N)				
2D SW (Y/N)				
ACCEPT GLARE: YES (NNXX)				
NO (NNXX)				

DIGITAL TRUNK GROUP ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-42. Digital Trunk Group Assignments Worksheet

SPILL FWD IN: 1ST SW (Y/N)				
2D SW (Y/N)				
SPILL FWD OUT: 1ST SW (Y/N)				
2D SW (Y/N)				
SATELLITE LINK (Y/N)				
SEARCH ORDER: DOWN (NNXX)				
UP (NNXX)				
MK FOR INTERCEPT: 1ST SW (Y/N)				
2D SW (Y/N)				
TERMINATION (MODEM/SINGLE LINE)				

DIGITAL TRUNK GROUP ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-42. (Cont'd)

1ST TRUNK GP NO (001-254)				
1ST SWITCH CODE (NNXX)				
1ST SWITCH TYPE				
2D TRUNK GP NO (001-254)				
2D SWITCH CODE (NNXX)				
2D SWITCH TYPE				
TRANSMISSION MEDIA				
TRUNK GP TYPE				
NO OF TRUNKS (1-24)				
MAX PREC 1/ (FO/F/I/P/R)				
ZONE REST 2/ (0/1-8)				
TRUNK BARRING 3/ (Y/N)				
CONFERENCE PRIV 3/ (Y/N)				

ANALOG TRUNK GROUP ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-43. Analog Trunk Group Assignments Worksheet

SUBSCRIBER TYPE 4/ (2W/4W)				
SPILL FWD OUT-ULCS 4/ (Y/N)				
SATELLITE LINK 4/ (Y/N)				
SEARCH ORDER: DOWN (NNXX)				
UP (NNXX)				
MK FOR INTERCEPT 5/ (Y/N)				
DIAL MODE 6/ (DTMF/PULSE)				
DSN AREA CODE 7/ (NYX)				

ANALOG TRUNK GROUP ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

1/ SB-3614/CV-1919/DSN
2/ ULCS to ULCS/AN/TTC-38/AN/TTC-30
3/ SB-3614/CV-1919
4/ ULCS to ULCS/AN/TTC-38/AN/TTC-30/SB-3614/CV-1919
5/ ALL EXCEPT DSN
6/ DSN/2-WIRE
7/ DSN

Figure V-43. (Cont'd)

COMSEC PARENT (NNXX, NAME)	COMSEC SUBORDINATES (NNXX, NAME)		ALT PARENT (NNXX, NAME)	COPARENT (NNXX, NAME)

COMSEC SWITCH DESIGNATIONS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-44. COMSEC Switch Designations Worksheet

FROM SWITCH CODE (NNXX)	TO SWITCH CODE (NNXX)	ORDERWIRE TYPE (AVOW/CVDOW)	DOC PATCH REQUIRED (NNXX)	PATCH DOC TO MUX GP TERM NO (YXXX)

NETWORK ORDERWIRE ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-45. Network Orderwire Assignments Worksheet

7. <u>Network COMSEC Keying Plan</u>. This worksheet
(Figure V-46) lists all the circuit switch COMSEC key
requirements for the network and the source (key tape) and
segment number) for each key. This report is classified
when completed.

8. <u>Zone Restriction List Assignments</u>. The network planner
uses this worksheet (Figure V-47) to establish and
distribute zone restiction lists to other members of the
network.

9. <u>Network Timing</u>. This worksheet (Figure V-48) is used to
establish the source (trunk group number) of slave timing
for each digital switch in the network.

10. <u>Network Routing</u>. This worksheet (Figure V-49) lists
the primary and alternate traffic routes from every switch
to every other switch in the network.

11. <u>Fixed Directory Assignments</u>. The network planner uses
this worksheet (Figure V-50) to specify the fixed directory
numbers that will be used throughout the network.

12. <u>Equipment Requirements</u>. This worksheet (Figure V-51)
lists the circuit switch and transmission equipment required
to establish the network.

This form is CONFIDENTIAL when filled in.

KEY TYPE	KEY TAPE NO	SEGMENT NO	REMARKS
CISRV 1/ ( )			
AISRV 2/ (,)			
AISRV 2/ (,)			
AISRV 2/ (,)			
AISRV 2/ (,)			
AISRV 2/ (,)			
UISRV 3/ (,)			
UISRV 3/ (,)			
TED 3/ (,)			
TED 3/ (,)			
TED 3/ (,)			
TED 3/ (,)			
TED 3/ (,)			
TED 3/ (,)			
PNERK			

NETWORK COMSEC KEYING PLAN	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-46. Network COMSEC Keying Plan Worksheet

This form is CONFIDENTIAL when filled in.

MOBILE COMSEC SUBORDINATE SWITCH NET REENTRY KEYS

KEY TYPE	KEY TAPE NO	SEGMENT NO	REMARKS
REENTRY 4/ ( )			
U 5/ (,)			
U 5/ (,)			
U 5/ (,)			

NETWORK COMSEC KEYING PLAN	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

1/   Home area code (MYX)
2/   Home area code, adjacent area code (MYX, MYX)
3/   Switch code, switch code (NNXX, NNXX)
4/   CPS switch code (NNXX)
5/   Mobile CSS switch code and rekey ID# (NNXX, RKID#)

Figure V-46. (Cont'd)

LIST NO (1-8)	LIST TYPE (P/R)	ENTRY TYPE (S/M)	CODES 1/ (NYX/NYX-NNX(X)/NNX(X)/NNXXXXX)				

ZONE RESTRICTION ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

1/   Maximum 32 per list

Figure V-47. Zone Restriction Assignments Worksheet

SWITCH TYPE	SWITCH CODE (NNXX)	SLAVE TIMING TRK GROUP NO (0/001-254)	ALT SLAVE TIMING TRK GROUP NO (0/001-254)	MASTER TIMING SOURCE (NNXX/EXT)	ALT MASTER TIMING SOURCE (0/NNXX/EXT)

NETWORK TIMING	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-48. Network Timing Worksheet

FROM SWITCH CODE (NNXX)	TO SWITCH CODE (NNXX)	PRIMARY TRUNK GROUP (001-254)	1ST ALT TRUNK GROUP (000-254)	2ND ALT TRUNK GROUP (000-254)

NETWORK ROUTING	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-49. Network Routing Worksheet

SUBSCRIBER/UNIT DESIGNATION (NAME)	FIXED DIRECTORY NUMBER (XXXXX)	CURRENT DIRECTORY NUMBER (MYX-NNX(X) GXX(X))

FIXED DIRECTORY ASSIGNMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-50. Fixed Directory Assignments Worksheet

SWITCH CODE (NNXX)	SWITCH TYPE	CARRIER TYPE	QUANTITY REQUIRED

EQUIPMENT REQUIRMENTS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-51.   Equipment Requirements Worksheet

SUBSECTION 2

AN/TTC-42 CONFIGURATION WORKSHEETS

13. <u>General</u>. The worksheets in this section are used by
planning personnel to convey AN/TTC-42 database and hardware
configuration information to switch personnel. Data entered
on these worksheets are based on the network planning
worksheets (Section 1) and the subscriber configuration and
service requirements specified by the switch planner. The
worksheets include an index (IDX) number at the start of
each database section. Switch personnel enter the IDX
number into the switch database to retrieve the data entry
screens that correspond to that section of the worksheet.
The worksheets are presented in a logical order for data
entry. The data elements required on the worksheets and the
accepted range of legal values are provided on the
worksheets.

14. <u>COMSEC 1</u>. This worksheet (Figure V-52) contains
information that is required to initialize the switch. It
also specifies the COMSEC nets that the AN/TTC-42 being
configured will control.

15. <u>COMSEC 2</u>. This worksheet (Figure V-53) contains the
interswitch COMSEC key requirements and defines the COMSEC
subordinate switches.

16. <u>COMSEC 3</u>. This worksheet (Figure V-54) defines the
lateral COMSEC subordinate switches and the storage
locations for COMSEC keys that are not accessed by the
switch processor (external variables).

17. <u>Trunk Assignment 1</u>. This worksheet (Figure V-55)
contains the information necessary to establish the
configuration of the MUX modems and define overhead channels
and sole user patches.

18. <u>Trunk Assignment 2</u>. This worksheet (Figure V-56) is
used to break patches and to define AN/TTC-30, AN/TTC-38,
and SB-3614/SB-3614A trunk groups.

19. <u>Trunk Assignment 3</u>. This worksheet (Figure V-57) is
used to define CV-1919, 2-wire commercial, DIBTS, CCS, and
DSN trunk groups.

20. <u>Trunk Assignment 4</u>. This worksheet (Figure V-58) is
used to delete trunk groups and to define DIBTS and analog
trunks.

PSWD	DATE (YYMMDD)	DATE (HHMM)	SWITCH RATE	DIRECTORY SET (NEW/CURRENT)	HOME SWITCH CODE (NNXX)	HOME AREA CODE (MYX)	HOME NATO CODE (9YX)

IDX: 2,4,1,1   ADD/CHANGE SWITCH AFFILIATION

ALT PARENT SWITCH (NNXX/000)	COPARENT SWITCH (NNXX/000)	EXIT SWITCH (NNXX/000)	ALT EXIT SWITCH (NNXX/000)

IDX: 1, 1, 1, 1   ADD/CHANGE NET LOCATION (NORMAL NET)

TYPE (NORM NET)	NET ID (02-98)	XVS (224-253)	STATUS (VALID/INVALID)
NORM NET			
NORM NET			

IDX: 1,1,1,1   ADD/CHANGE NET LOCATION (RE-ENTRY)

TYPE (REENTRY)	STATUS (VALID/INVALID)
REENTRY	VALID

IDX: 1,1,1,1   ADD/CHANGE NET LOCATION (POST NUCLEAR)

TYPE (POST NUCLEAR)	STATUS (VALID/INVALID)
POST NUCLEAR	INVALID

IDX: 1,1,1,2   DELETE NET LOCATION

NET ID (02-98)	AFFILIATION (HOME/LATERAL)	NET ID (02-98)	AFFILIATION (HOME/LATERAL)	NET ID (02-98)	AFFILIATION (HOME/LATERAL)

COMSEC SWITCH DESIGNATIONS	NETWORK DESIGNATIONS	PREPARED BY
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-52. COMSEC 1 Worksheet

IDX: 1,1,3,1　　　ADD/CHANGE ISRV (SWITCH)

ISRV ID (SWITCH)	SWITCH CODE (NNXX)	UVS (007-070)	STATUS (VALID/INVALID)
SWITCH			
SWITCH			
SWITCH			

IDX: 1,1,3,1　　　ADD/CHANGE ISRV (COMMON)

ISRV ID (COMMON)	STATUS (VALID/INVALID)
COMMON	VALID

IDX: 1,1,3,2　　　DELETE ISRV

SWITCH/AREA CODE (NNXX/MYX)	SWITCH/AREA CODE (NNXX/MYX)	SWITCH/AREA CODE (NNXX/MYX)	SWITCH/AREA CODE (NNXX/MYX)

IDX: 1,1,4,1 ADD/CHANGE SUBORDINATE SWITCH (HOME) (SWITCH ALREADY ASSIGNED AS HOME CSS)

SWITCH CODE (NNXX)	AFFIL (HOME)	REKEY ID (1-9)	UVS (301-348)	REKEY ID (1-9)	UVS (301-348)	REKEY ID (1-9)	UVS (301-348)
	HOME						

Figure V-53.　COMSEC 2 Worksheet

IDX: 1,1,4,1 ADD/CHANGE SUBORDINATE SW (HOME) (SWITCH NOT ALREADY ASSIGNED)

SWITCH CODE (NXXX)	AFFIL (HOME)	PRE-ASSIGN "NEW" NET (Y/N)	"NEW" NET ID (02-98)	REKEY ID (1-9)	UVS (301-348)	REKEY ID (1-9)	UVS (301-348)	REKEY ID (1-9)	UVS (301-348)
	HOME								

COMSEC SWITCH DESIGNATIONS	NETWORK DESIGNATION:	PREPARED BY:
DATE:	EFFECTIVE DTG:	PAGE OF PAGES

Figure V-53.   (Cont'd)

IDX: 1,1,4,1 ADD/CHANGE SUBORDINATE SWITCH (LATERAL)

SWITCH CODE (NNXX)	AFFIL (LATERAL)	SWITCH CODE (NNXX)	AFFIL (LATERAL)	SWITCH CODE (NNXX)	AFFIL (LATERAL)
	LATERAL		LATERAL		LATERAL

IDX: 1,1,4,2 DELETE SUBORDINATE SWITCH

SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)

IDX: 1,1,4,3 DELETE SUBORDINATE REKEY

SWITCH CODE (NNXX)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)	REKEY ID (1-9)

IDX: 1,1,5,1 ADD/CHANGE EXTERNAL VARIABLE

EXT VAR ID (01-60)	UVS (071-100) OR (256-285)	STATUS (VALID/INVALID)

Figure V-54. COMSEC 3 Worksheet

IDX: 1,1,5,2 DELETE EXTERNAL VARIABLES

EXT VAR ID (01-60)	EXT VAR ID (01-60)	EXT VAR ID (01-60)	EXT VAR ID (01-60)	EXT VAR ID (01-60)	EXT VAR ID (01-60)

COMSEC SWITCH DESIGNATIONS	NETWORK DESIGNATION:	PREPARED BY:
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Figure V-54. (Cont'd)

IDX: 2,2,1,1 ADD/CHANGE MULTIPLEX GROUP

DATA BASE ENTRIES							EQUIPMENT CONFIGURATION			
MUX GRP NO (1-7)	MODEM TYPE (DIPHASE)	INB (Y/N)	NO OF CHNLS (1-71)	TED NO (0-6)	FLYWHEEL DELAY (Y/N)	ORDERWIRE (A/D/NONE)	CABLE LENGTH (MI)	SLAVE TIMING (Y/N)	SWITCH CABINET (B/R)	TRUNK GRP NO (001-254)
1	DIPHASE	-----								
2	DIPHASE	Y						-----		
3	DIPHASE	-----						-----		
4	DIPHASE	-----						-----		
5	DIPHASE	Y						-----		
6	DIPHASE	-----						-----		
7	DIPHASE	-----								

IDX: 2,2,1,2 ADD/CHANGE OVERHEAD CHANNEL

GROUP NUMBER (1-7)	CHANNEL NUMBER (01-09, MODEMS 1-6; 01-36 MODEM 7)	CHANNEL TYPE (OVERHEAD OR ASSIGNABLE)

IDX: 2,2,1,3 DELETE MULTIPLEX GROUP

GROUP NUMBER (1-7)	GROUP NUMBER (1-7)	GROUP NUMBER (1-7)	GROUP NUMBER (1-7)

Figure V-55.   Trunk Assignment 1 Worksheet

IDX: 2,2,2,1 ADD PATCH (SOLE USER)

PATCH TYPE (SOLE USER)	FIRST TERM NO. (YXXX)	POWER REQD (Y/N)	SECOND TERM NO. (YXXX)
SOLE USER			
SOLE USER			
SOLE USER			
SOLE USER			

IDX: 2,2,2,1 ADD PATCH (DOC)

PATCH TYPE (DOC)	TERM NO. (YXXX)
DOC	

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Figure V-55.   (Cont'd)

IDX: 2,2,2,2 BREAK PATCH (SOLE USER)

PATCH TYPE (SOLE USER)	FIRST TERM NO. (YXXX)
SOLE USER	

IDX: 2,2,2,2 BREAK PATCH (DOC)

PATCH TYPE (DOC)

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (AN/TTC-38/3614A TYPE)

TRK GRP NO. (001-254)	TRK GRP TYPE (TTC-38)	CONN SWTCH TYPE	DIR CONN SW CODE (NNXX)	ZONE REST (0-8)	SUB TYPE (2W/4W)	SPILL FWD OUT (Y/N)	SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-24)	SRCH ORDER (D/U)	MARK FOR INT (Y/N)
	TTC-38										
	TTC-38										

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (AN/TTC-30)

TRK GRP NO. (001-254)	TK GRP TYPE (TTC-30)	DIR CONN SW CODE (SL)	ZONE REST (0-8)	SUB TYPE (2W/4W)	SPILL FWD OUT (Y/N)	SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-24)	SRCH ORDER (D/U)	MARK FOR INT (Y/N)
	TTC-30									
	TTC-30									

Figure V-56. Trunk Assignment 2 Worksheet

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (SB-3614)

TRK GRP NO. (1-254)	TRK GRP TYPE (3614)	CONN SWITCH CODE (NNXX)	MAX PREC	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	SUB TYPE (2W/4W)	SPILL FWD OUT (Y/N)	SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-24)	SRCH ORD (D/U)	MRK FOR INT Y/N
	3614												
	3614												

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Figure V-56. (Cont'd)

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (CV-1919)

TRK GRP NO. (001-254)	TRK GRP TYPE	CONN SWITCH CODE (NNXX)	MAX PREC	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	SUB TYPE (2W/4W)	SPILL FWD OUT (Y/N)	SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-3)	SRCH ORD (D/U)	MRK FOR INT (Y/N)
	1919												
	1919												

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (2-WIRE)

TRK GRP NO. (001-254)	TRK GRP TYPE (2-WIRE)	DIAL MODE (PULSE/DTMF)	SRCH ORDER (D/U)	MARK FOR INT (Y/N)
	2-WIRE			
	2-WIRE			

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (DIBTS)

TRK GRP NO. (001-254)	TRK GRP TYPE	CONN SWITCH CODE (NNXX)	SEC CALLS ONLY (Y/N)	ACCPT GLARE (Y/N)	SPILL FORWARD IN OUT (Y/N)	SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-18)	SRCH ORDER (D/U)	MARK FOR INT (Y/N)
	DIBTS									
	DIBTS									

Figure V-57. Trunk Assignment 3 Worksheet

IDX: 2,3,1,2 DELETE TRUNK GROUP

TRUNK GP NO (001-254)	TRUNK GP NO (001-254)	TRUNK GP NO (001-254)	TRUNK GP NO (001-254)	TRUNK GP NO (001-254)

IDX: 2,3,1,3 ADD TRUNKS (DIBTS - RANGE)

TRUNK GROUP NO. (001-254)	TRK ASSIGN MODE (RANGE)	START TERM NO. (YXXX)	END TERM NO. (YXXX)	STATUS
	RANGE			
	RANGE			
	RANGE			
	RANGE			
	RANGE			
	RANGE			

IDX: 2,3,1,3 ADD TRUNK (DIBTS - INDIVIDUAL)

TRUNK GP NO. (001-254)	TK ASSIGN MODE (INDIV)	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT
	INDIV								
	INDIV								
	INDIV								
	INDIV								

Figure V-58. Trunk Assignment 4 Worksheet

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (CCS)

TRK GRP NO. (001-254)	TRK GRP TYPE	DIR CON SWITCH CODE (MYXNNXX)	TSB (1-6)	DAMA EXIT (NO)	SEC CALLS ONLY (Y/N)	ACCPT GLARE (Y/N)	SPILL FORWARD IN OUT (Y/N)		SAT LINK (Y/N)	INHB RTNG (Y/N)	T HOLD (1-71)	SRCH ORDER (D/U)	MARK FOR INT (Y/N)
	CCIS			NO									
	CCIS			NO									
	CCIS			NO									
	CCIS			NO									
	CCIS			NO									
	CCIS			NO									

IDX: 2,3,1,1 ADD/CHANGE TRUNK GROUP (DSN)

TRK GRP NO. (001-254)	TRK GRP TYPE (DSN)	DSN AREA CD (NYX)	MAX PREC OUT	INCOMING DIAL MODE (PULSE/DTMF)	INHB RTNG (Y/N)	T HOLD (1-24)	SRCH ORDER (D/U)
	DSN						

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Figure V-58.   (Cont'd)

IDX: 2,3,1,3 ADD TRUNK (ANALOG)

TRUNK GP NO. 001-254)	TK ASSIGN MODE (INDIV)	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT	TERM NO. (YXXX)	STAT
	INDIV										
	INDIV										
	INDIV										
	INDIV										
	INDIV										

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Figure V-58. (Cont'd)

21. <u>Trunk Assignment 5</u>. This worksheet (Figure V-59) is used to define CCS trunks and delete all types of trunks.

22. <u>Trunk Assignment 6</u>. This worksheet (Figure V-60) is used to change interface parameters and establish interoffice and area code routing.

23. <u>Trunk Assignment 7</u>. This worksheet (Figure V-61) is used to delete area code routing and establish NATO and fixed directory routing.

24. <u>Trunk Assignment 8</u>. This worksheet (Figure V-62) is used to define zone restriction lists.

25. <u>Trunk Assignment 9</u>. This worksheet (Figure V-63) is used to establish DSN and unstaffed operator routing.

26. <u>In-Traffic COMSEC</u>. This worksheet (Figure V-64) is used to rekey nets and switches and transfer and purge net, rekey, and subordinate switch variables.

27. <u>Loop Assignment 1</u>. This worksheet (Figure V-65) is used to assign DSVT voice terminals to the switch.

28. <u>Loop Assignment 2</u>. This worksheet (Figure V-66) is used to assign DSVT data and dual terminals to the switch.

29. <u>Loop Assignment 3</u>. This worksheet (Figure V-67) is used to assign DNVT terminals to the switch.

30. <u>Loop Assignment 4</u>. This worksheet (Figure V-68) is used to assign analog terminals to the switch.

31. <u>Loop Assignment 5</u>. This worksheet (Figure V-69) is used to delete loop assignments, change terminal numbers, and establish loop groups.

IDX: 2,3,1,3 ADD TRUNK (CCS – RANGE)

TRUNK GP NO (001-254)	OVERHEAD CHANNEL (YXXX)	TRK ASSIGN MODE (RANGE)	START TERM NO. (YXXX)	START TK NO. (001-225)	END TERM NO. (YXXX)	STATUS
		RANGE				
		RANGE				
		RANGE				
		RANGE				
		RANGE				
		RANGE				

IDX: 2,3,1,3 ADD TRUNK (CCS – INDIVIDUAL)

TRUNK GP NO. (001-254)	OVERHEAD CHANNEL (YXXX)	TK ASSIGN MODE (INDIV)	TERM NO	TK NO.	STAT	TERM NO.	TK NO	STAT	TERM NO.	TK NO.	STAT
		INDIV									
		INDIV									
		INDIV									
		INDIV									
		INDIV									

Figure V-59. Trunk Assignment 5 Worksheet

IDX: 2,3,1,4   DELETE TRUNK

TERM NO (YXXX)	TERM NO (YXXX)	TERM NO (YXXX)	TERM NO (YXXX)	TERM NO (YXXX)	TERM NO (YXXX)	TERM NO (YXXX)

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Figure V-59. (Cont'd)

IDX: 2,4,1,2   CHANGE INTERFACE PARAMETERS

SATELLITE THRESHOLD (1, 2, 3, NO REST, NO SAT)	TTC-30 PREFIX (NN/00)	TTC-38 PREFIX (MYX/000)	COMMERCIAL INTERFACE (Y/N)	DIRECT CONNECT (Y/N)	TG NO. (001-254)/CODE (NNXX OR MYX)

IDX: 2,4,2,1   ADD/CHANGE NNXX ROUTING

SWITCH CODE (NNXX)	SWITCH TYPE (CPS,CSS,OTHER)	PRIMARY TRUNK GROUP (001-254)	FIRST ALT TRUNK GROUP (000-254)	SECOND ALT TRNK GROUP (000-254)

IDX: 2,4,2,2 DELETE NNXX ROUTING

SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)

Figure V-60. Trunk Assignment 6 Worksheet

IDX: 2,4,3,1 ADD/CHANGE MYX ROUTING

AREA CODE (MYX)	PRIMARY TRUNK GROUP (001-254)	FIRST ALT TRUNK GROUP (000-254)	`SECOND ALT TRUNK GROUP (000-254)

IDX: 1,1,3,1   ADD/CHANGE ISRV (AREA)

ISRV ID (AREA)	AREA CODE (MYX)	STATUS (VALID/INVALID)
AREA		
AREA		
AREA		
AREA		

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Figure V-60. (Cont'd)

IDX: 2,4,3,2 DELETE MYX ROUTING

AREA CODE (MYX)	AREA CODE (MYX)	AREA CODE (MYX)	AREA CODE (MYX)

IDX: 2,4,4,1 ADD/CHANGE NATO ROUTING

NATO CODE (9YX)	NO. OF DIGITS (10,11,12,13)	SECURITY REQ (Y/N)	DATA CALLS (Y/N)	END-TO-END ENCRYPTION (Y/N)	DIGITAL XMIT REQ (Y/N)

IDX: 2,4,4,2 DELETE NATO ROUTING

NATO CODE (9YX)	NATO CODE (9YX)	NATO CODE (9YX)	NATO CODE (9YX)	NATO CODE (9YX)	NATO CODE (9YX)	NATO CODE (9YX)

Figure V-61. Trunk Assignment 7 Worksheet

IDX: 2,4,5,1   ADD/CHANGE FIXED DIRECTORY ROUTING

FIXED DIR NO. (XXXXX)	SUBS NO. / SWITCH CODE (NYX NNXXGXX)	FIXED DIR NO. (XXXXX)	SUBS NO/SWITCH CODE (NYX NNXXGXX)	FIXED DIR NO. (XXXXX)	SUBS NO/SWITCH CODE (NYX NNXXGXX)	FIXED DIR NO. (XXXXX)	SUBS NO/SWITCH CODE (NYX NNXXGXX)

IDX: 2,4,5,2 DELETE FIXED DIR ROUTING

FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)	FIXED DIR NO. (XXXXX)

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Figure V-61. (Cont'd)

IDX: 2,4,6,1 ADD/CHANGE ZONE RESTRICTION (SINGLE ENTRY)

ZONE REST LIST (1-8)	LIST TYPE (PERM/REST)	ENTRY TYPE (SINGLE)	CODE	CODE	CODE	CODE	CODE	CODE	CODE	CODE
		SINGLE								
		SINGLE								
		SINGLE								

IDX: 2,4,6,1 ADD/CHANGE ZONE RESTRICTION (MULTIPLE ENTRY)

ZONE REST LIST (1-8)	LIST TYPE (PERM/REST)	ENTRY TYPE (MULTIPLE)	1ST SW CODE	LAST SW CODE	1ST SW CODE	LAST SW CODE	1ST SW CODE	LAST SW CODE
		MULTIPLE						
		MULTIPLE						
		MULTIPLE						
		MULTIPLE						
		MULTIPLE						
		MULTIPLE						
		MULTIPLE						

Figure V-62. Trunk Assignment 8 Worksheet

IDX: 2,4,6,2 DELETE ZONE RESTRICTION (ENTRY)

ZONE REST LIST (1-8)	HOW MANY (ENTRY)	CODE	CODE	CODE	CODE	CODE	CODE	CODE	CODE	CODE	CODE
	ENTRY										
	ENTRY										
	ENTRY										
	ENTRY										
	ENTRY										

IDX: 2,4,6,2 DELETE ZONE RESTRICTION (LIST)

ZONE REST LIST (1-8)	HOW MANY (LIST)	ZONE REST LIST (1-8)	HOW MANY (LIST)	ZONE REST LIST (1-8)	HOW MANY (LIST)	ZONE REST LIST (1-8)	HOW MANY (LIST)

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Figure V-62. (Cont'd)

IDX: 2,4,7,1 ADD/CHANGE DSN ROUTING

DSN CODE (MYX)	PRIMARY TRUNK GROUP NO. (001-254)	FIRST ALT TRUNK GROUP NO. (000-254)	SECOND ALT TRUNK GROUP NO. (000-254)

IDX: 2,4,7,2 DELETE DSN ROUTING

DSN CODE (MYX)	DSN CODE (MYX)	DSN CODE (MYX)	DSN CODE (MYX)	DSN CODE (MYX)	DSN CODE (MYX)	DSN CODE (MYX)

IDX: 2,4,1,3   CHANGE UNSTAFFED OPERATOR ROUTING

UNSTAFFED OPERATOR ROUTING (NNXXXXX/0000000)

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Figure V-63. Trunk Assignment 9 Worksheet

IDX: 1,2,1   REKEY NET

PRESENT NET ID (O2-98)	NEW NET ID (02-98)	PRESENT NET ID (O2-98)	NEW NET ID (02-98)	PRESENT NET ID (O2-98)	NEW NET ID (02-98)

IDX: 1,2,2   REKEY SWITCH

SWITCH CODE (NNXX)	NEW NET ID (02-98)	SWITCH CODE (NNXX)	NEW NET ID (02-98)	SWITCH CODE (NNXX)	NEW NET ID (02-98)	SWITCH CODE (NNXX)	NEW NET ID (02-98)

IDX: 1,3,1,1   TRANSFER NET VARIABLE

NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)

IDX: 1,3,1,2   PURGE NET VARIABLE

NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)	NET ID (02-99)

IDX: 1,3,2,1   TRANSFER REKEY VARIABLE

SWITCH CODE (NNXX)	REKEY ID (1-9)	SWITCH CODE (NNXX)	REKEY ID (1-9)	SWITCH CODE (NNXX)	REKEY ID (1-9)

Figure V-64. In-Traffic COMSEC Worksheet

IDX: 1,3,2,2 PURGE REKEY VARIABLE

SWITCH CODE (NNXX)	REKEY ID (1-9)	SWITCH CODE (NNXX)	REKEY ID (1-9)	SWITCH CODE (NNXX)	REKEY ID (1-9)

IDX: 1,3,3,1 TRANSFER CSS VARIABLES

SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)

IDX: 1,3,3,2 PURGE CSS VARIABLES

SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)	SWITCH CODE (NNXX)

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Figure V-64. (Cont'd)

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DSVT VOICE)

TERM NO (YXXX)	LOOP TYPE (1)	DIR NO (GXX)	MAX PREC	DAS PRV (N)	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	CALL XFER (Y/N)	NS 1/ SVC (Y/N)	MODE	RK ID	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT (Y/N)
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												
	1			N												

1/ Default = NO, Option = YES

Figure V-65. Loop 1 Worksheet

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DSVT VOICE - DAS)

TERM NO (YXXX)	LOOP TYPE (1)	DIR NO (GXX)	MAX PREC	DAS PRIV (Y)	DAS DIR NO	SCTY (R/P)	NS SVC (Y/N)	MODE	REKEY ID (1-9)	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTN G (Y/N)	OP ST	MK INT (Y/N)
	1			Y										
	1			Y										
	1			Y										

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Figure V-65. (Cont'd)

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DSVT DATA)

TERM NO (YXXX)	LOOP TYPE (2)	DIR NO. (GXXX)	MAX PREC	DAS PRIV (N)	ZONE REST (0-8)	TRK BAR (Y/N)	CALL XFER (Y/N)	DATA TYPE	MODE	RK ID	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT (Y/N)
	2			N											
	2			N											
	2			N											
	2			N											
	2			N											
	2			N											

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DSVT DATA - DAS)

TERM NO (YXXX)	LOOP TYPE (2)	DIR NO. (GXXX)	MAX PREC	DAS PRIV (Y)	DAS DIR NO	DATA TYPE	MODE	RK ID	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT (Y/N)
	2			Y									
	2			Y									
	2			Y									
	2			Y									
	2			Y									
	2			Y									

Figure V-66. Loop 2 Worksheet

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DSVT DUAL)

TERM NO (YXXX)	LOOP TYPE (3)	DIR NO (GXXX)	MAX PREC	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	CALL XFER (Y/N)	NS SVC (Y/N)	DATA TYPE	MODE	RK ID	PWR REQ	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT Y/N
	3															
	3															
	3															
	3															
	3															

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Figure V-66. (Cont'd)

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DNVT)

TERM NO (YXXX)	LOOP TYPE (DNVT)	DIR NO. (GXX)	MAX PREC	DAS PRIV (N)	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	CALL XFER (Y/N)	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT (Y/N)
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									
	DNVT			N									

Figure V-67. Loop 3 Worksheet

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (DNVT - DAS)

TERM NO (YXXX)	LOOP TYPE (DNVT)	DIR NO (GXX(X))	MAX PREC	DAS PRIV (Y)	DAS DIR NO	PWR REQ (Y/N)	EMER PWR (Y/N)	INHB RTNG (Y/N)	OP ST	MK INT (Y/N)
	DNVT			Y						
	DNVT			Y						
	DNVT			Y						
	DNVT			Y						

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Figure V-67. (Cont'd)

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (ANALOG)

TERM NO. (YXXX)	LOOP TYPE (ANALOG)	DIR NO. (GXX(X))	MAX PREC	DAS PRIV (N)	ZONE REST (0-8)	TRK BAR (Y/N)	CONF PRIV (Y/N)	CALL XFER (Y/N)	OP ST	MK INT (Y/N)
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						
	ANALOG			N						

Figure V-68. Loop 4 Worksheet

IDX: 2,3,2,1 ADD/CHANGE LOOP ASSIGNMENT (ANALOG - DAS)

TERM NO. (YXXX)	LOOP TYPE (ANALOG)	DIR NO. (GXX(X))	MAX PREC	DAS PRIV (Y)	DAS DIR NO.	OP ST	MK INT (Y/N)
	ANALOG			Y			
	ANALOG			Y			
	ANALOG			Y			
	ANALOG			Y			

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Figure V-68. (Cont'd)

IDX: 2,3,2,2 DELETE LOOP

TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)	TERM NO. (YXXX)

IDX: 2,3,2,3 CHANGE TERMINAL

NEW TERM NO. (YXXX)	PRES TERM NO. (YXXX)	NEW TERM NO. (YXXX)	PRES TERM NO. (YXXX)	NEW TERM NO. (YXXX)	PRES TERM NO. (YXXX)	NEW TERM NO. (YXXX)	PRES TERM NO. (YXXX)

IDX: 2,3,3,1 CHANGE LOOP GROUP

LOOP GRP NO. (1-8)	DIR NO (GXX(X))	DIR NO (GXX(X)	DIR NO GXX(X))	DIR NO GXX(X))	DIR NO GXX(X))

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Figure V-69. Loop 5 Worksheet

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CHAPTER VI

TELEPHONE SUBSCRIBER/CS INTERFACES

1. General. This chapter provides the planner with information on telephone equipment interfaces with AN/TTC-39 series CSs. Paragraphs 2 through 7 discuss specific interfaces. These paragraphs also provide specific instructions for establishing these interfaces. Interface information includes LTU and special adapter requirements, types of equipment terminals, and suggestions for database entries. The interfaces are indexed in Tables VI-1 and VI-2 by interface type.

Table VI-1. Analog Loop Interfaces to the SDSG or ALTG by Interface Type

Equipment	Paragraph	Interface
WECO 2500 TA-838 TA-938 STU-III STSVT 1/	2	2 -wire, dc supervision, DTMF signaling
TA-838	3	4-wire, ac supervision, DTMF signaling
TA-341 TA-838 TA-720	4	4-wire, dc supervision, DTMF signaling

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1/ When operating in the STU-III mode.

Table VI-2. Digital Loop Interfaces to the TDSG by Interface Type

Equipment	Paragraph	Interface
TA-954 TA-1035 TA-1042 TA-838 1/ TA-720 1/	5	4-wire, digital unencrypted loop
KY-68	6	4-wire, digital encrypted loop
TA-838	7	4-wire, CVSD-converted, ac supervised, DTMF signaling, analog loop

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1/ When operating in the DNVT mode.

2. <u>Two-Wire Analog Loop, DC Supervision, DTMF Signaling</u>.
This interface can be used with such sets as the WECO 2500,
the TA-838, or TA-938. It is also typically used with the
STU-III, STE, and STSVT (STE and STVST only when operating
in the STU-III mode).

   a. <u>AN/TTC-39 Series Interface</u>. Terminate this loop in
a common-battery LTU or 2WLTU (AN/TTC-39A(V)4/D). (See
Figure VI-1.) Connect the subscriber to the transmit pair.
These cards have no strapping options. The common-battery
LTU card terminates two circuits, while the 2WLTU terminates
four. The adjacent loop(s) also must use a common-battery
LTU or 2WLTU.

   b. <u>AN/TTC-39 Series Database</u>. Classmark the terminal
as Type 8.

3. <u>Four-Wire Analog Loop, Local Battery, AC Supervision,
DTMF Signaling</u>. This interface can be used with analog sets
such as the TA-838. It is normally used to support long
locals over a radio system. (The interface described in
paragraph 4 is normally used if the terminals are directly
connected to the switch by wire.)

   a. <u>AN/TTC-39 Series Interface</u>. Terminate this loop in
a normal wideband LTU or 4WLTU (AN/TTC-39A(V)4/D). (See
Figure VI-2.) The LTU should be strapped for ac
supervision. The normal wideband LTU card terminates two
circuits. The 4WLTU terminates four circuits. The
adjacent circuits also must use a normal wideband LTU or
4WLTU.

   b. <u>AN/TTC-39 Series Database</u>. Classmark the terminal
as Type 1.

4. <u>Four-Wire Analog Loop, DC Supervision, DTMF Signaling</u>.
This interface can be used with the TA-838. These terminals
normally operate on local battery power. For this
application, the TA-838 may be operated on local battery or
common battery. This interface is used when the terminals
are connected directly to the switch by wire. Use the
interface in paragraph 3 when the terminals are connected
through a radio link. This interface is not available in
the AN/TTC-39A(V)4/D.

   a. <u>AN/TTC-39A(V)1 Interface</u>. Terminate this loop in a
normal wideband LTU. (See Figure VI-3.) The normal
wideband LTU should be strapped for dc supervision. The
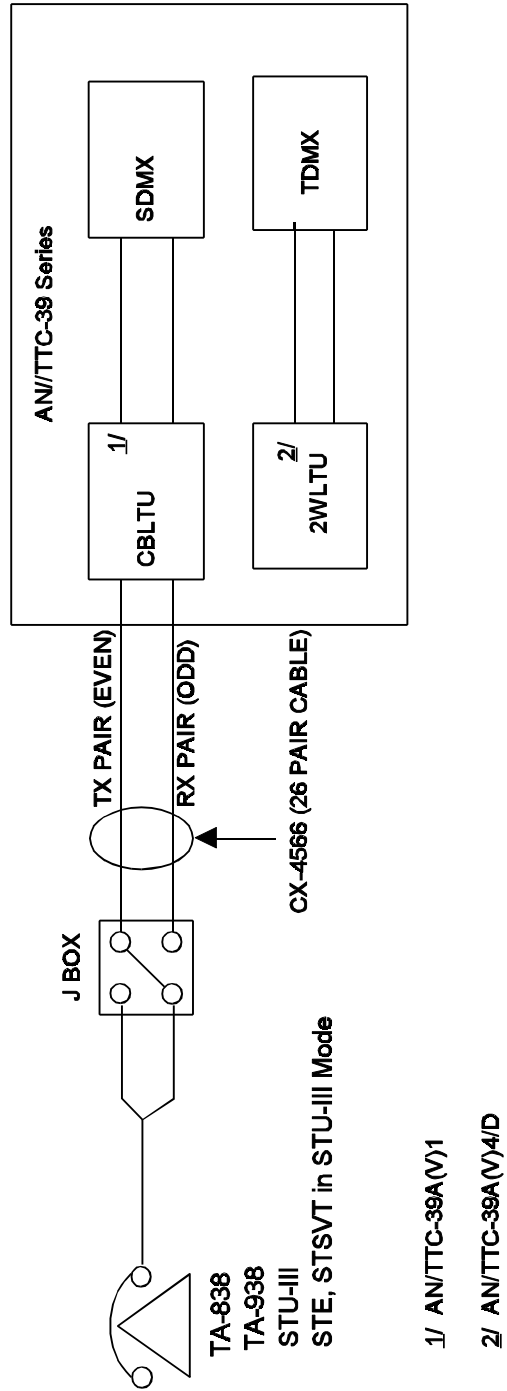
Figure VI-1. Two-Wire Analog Loop, DC Supervision, DTMF Signaling
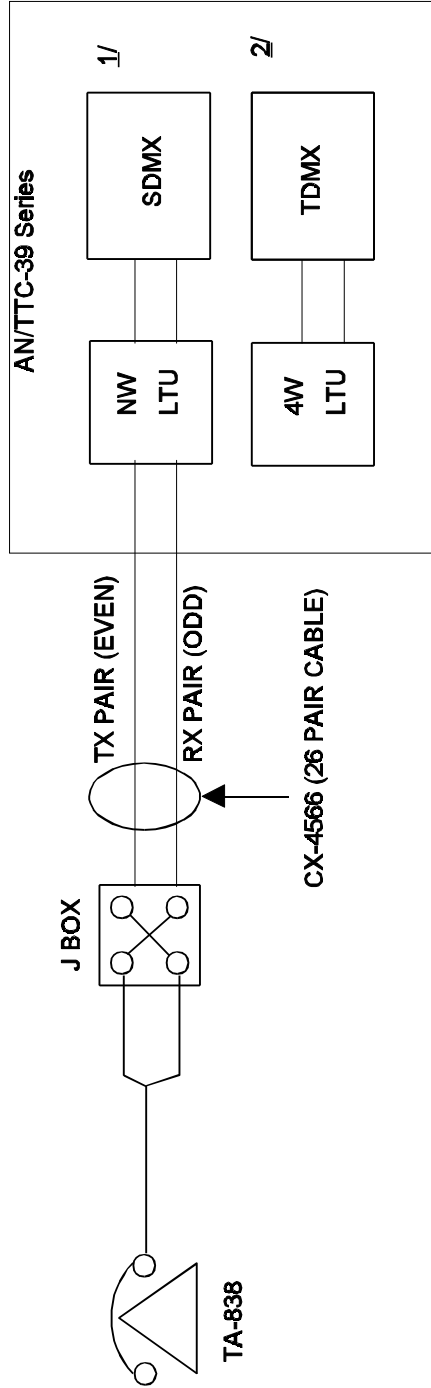
1/ AN/TTC-39A(V)1

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

Figure VI-2. Four-Wire Analog Loop, Local Battery, AC Supervision, DTMF Signaling
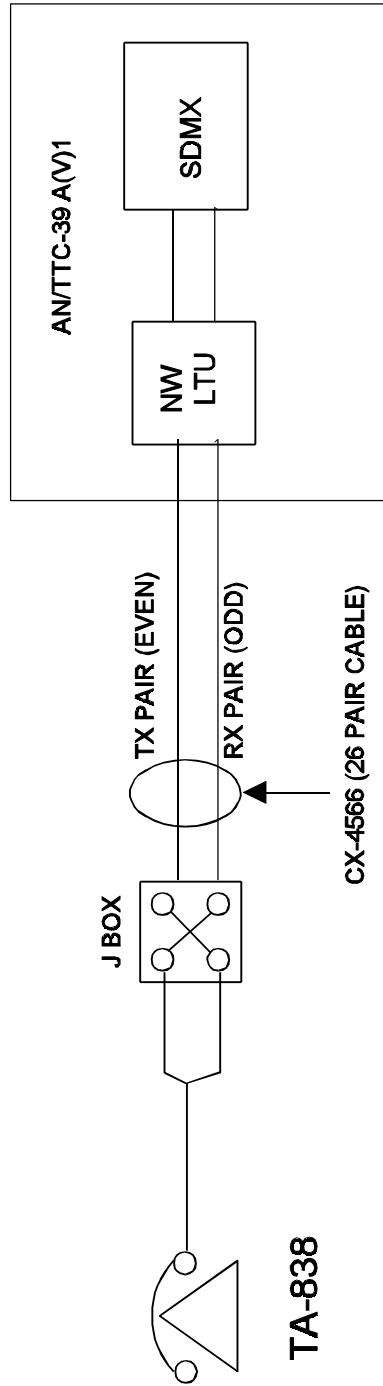
Figure VI-3. Four-Wire Analog Loop, DC Supervision,
DTMF Signaling

normal wideband LTU terminates two circuits. One adjacent circuit also must use a normal wideband LTU.

   b. <u>AN/TTC-39A(V)1 Database</u>. Classmark the terminal as Type 2.

5. <u>Four-Wire Digital Unencrypted Loop</u>. This interface can be used with the DNVT (TA-954, TA-1042, TA-1035, STE, or STSVT, STE and STSVT only in DNVT mode). (See Figures VI-4 and VI-5.)

   a. <u>AN/TTC-39 Series Interface Using Field Cable</u>. Terminate the loop into a DLPMA LTU. (See Figure VI-4.) The AN/TTC-39 series CS DLPMA card terminates four circuits. The DLPMA must be strapped to provide power to the DNVT. The DLPMA is not strapped to provide power to the STE and STSVT since they require their own power at all times.

   b. <u>AN/TTC-39 Series Interface Using Multiplex Equipment</u>. For this configuration, terminate the subscriber telephone at the multiplexer equipment. (See Figure VI-5.) Terminate the group from the multiplexer into a GPMDM card. The GPMDM must be strapped (by processor strapping) to be compatible with incoming group characteristics. If the DGM MUX does not provide power, a power supply must be provided.

   c. <u>AN/TTC-39 Series Database</u>. Classmark the terminal as Type 13.

6. <u>Four-Wire, Digital-Encrypted Loop, KY-68</u>. This interface is used with the DSVT. The terminal may be operated in local battery or common battery. If used as a long local over a radio or cable link, auxiliary power (local battery) is required.

   a. <u>AN/TTC-39 Series Interface Using Field Cable</u>. Terminate the loop into a DLPMA LTU. (See Figure VI-4.) The DLPMA should be strapped to provide power to the DSVT if it is connected directly to the switch by wire and operated from a common battery. If the DSVT is connected to the switch by radio link or operated from local battery, the DLPMA should be strapped for Power Off. The DLPMA can terminate four circuits.

   b. <u>AN/TTC-39 Series Interface Using Multiplex Equipment</u>. This interface is identical to the interface discussed in paragraph 5b above. (See Figure VI-5.)
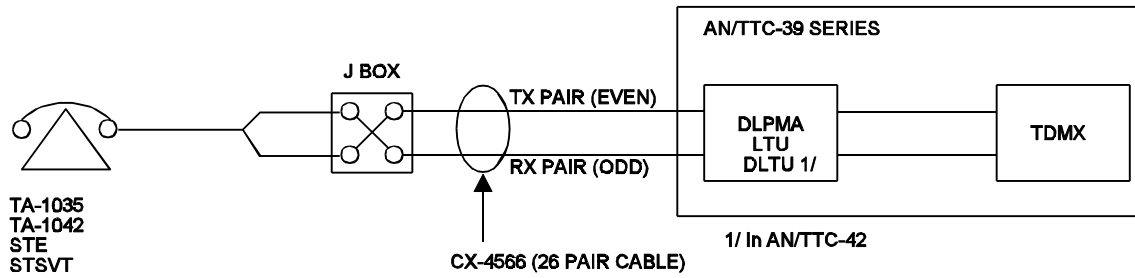
Figure VI-4. Four-Wire Digital Loop (AN/TTC-39 Series)
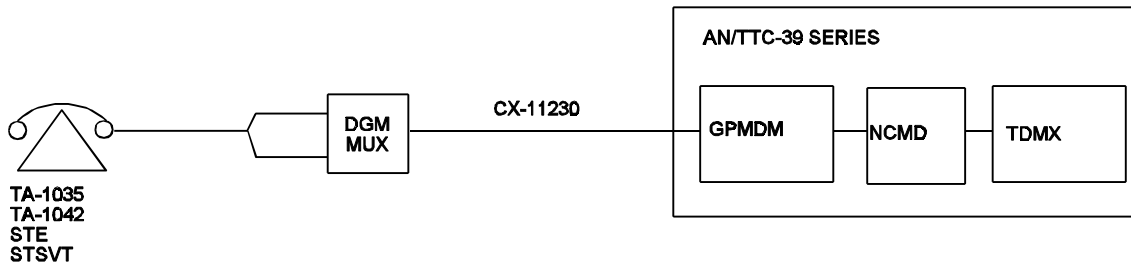
Figure VI-5. Four-Wire Digital Loop (Group Entry Into
AN/TTC-39 Series)

c.   AN/TTC-39 Series Database. Classmark the terminal as Type 3.

7.   Four-Wire, Analog-Converted-to-Digital Loop, via AVDTG Function, (AN/TTC-39A(V)1 only) Local Battery, AC Supervision, DTMF Signaling. This interface can be used with the TA-341, the TA-838, or the TA-720 when the terminal is using the local battery operation.

a.   AN/TTC-39 Series Interface. This interface must be accomplished using the AVDTG capability of the AN/TTC-39A(V)1. (The AVDTG function is not available in the AN/TTC-39(V)4 or AN/TTC-39D.) The analog telephone must be terminated on a DGM multiplexer (RLGM, RMC, and LGM) using an AAU card. (See Figure VI-6.) The group from the multiplexer is terminated on a GPMDM, which must be strapped to be compatible with the characteristics of the incoming group.

b.   AN/TTC-39 Series Database. Classmark the terminal as Type 1.

8.   Telephone Interface Planning. Table VI-3 is a matrix listing the interfaces between telephone sets and circuit switches/switchboards. It will assist the planner in determining which telephone instruments can be used with the various circuit switches. Tables VI-4 through VI-8 provide details for interfacing the TA-838, TA-938, DSVT, DNVT, and STU-III respectively, as well as the STSVT and STE in the DNVT and STU-III modes.

Table VI-3. CS Telephone Interfaces

Telephone Terminal	TTC-39 Series	TTC-42	SB-3865	SB-3614	Commercial
STU-III 1/	Yes	No 2/	No 2/	Yes	Yes
TA-838	Yes	Yes	Yes	Yes	Yes
TA-938 (WECO 2500)	Yes	--	--	Yes	Yes
KY-68 (DSVT)	Yes	Yes	Yes	--	--
TA-954, TA-1035, TA-1042, STE, STSVT 1/	Yes	Yes	Yes	--	--

_____

1/ Interfaces also apply to STE and STSVT when operating in the STU-III and DNVT terminal modes respectively.
2/ Interface under development.
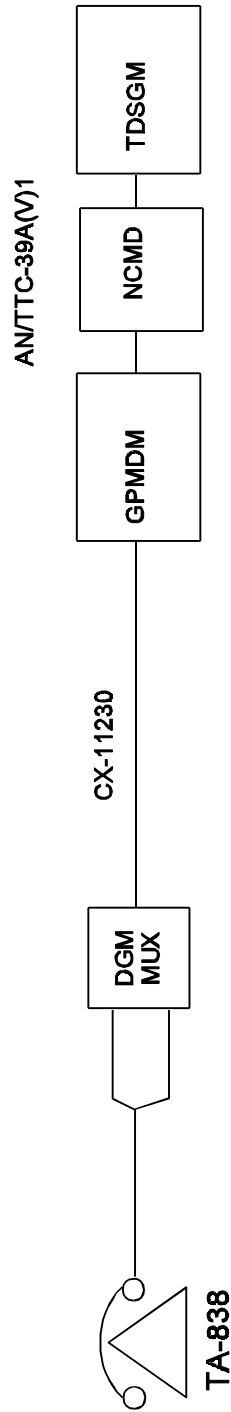
Figure VI-6. Four-Wire Analog Loop Converted to Digital Loop, Local Battery, AC Supervision, DTMF Signaling (AN/TTC-39A(V)1)

Table VI-4. Telephone Interface Planning, TA-838

Type of Operation	Analog, circuit switch, or point-to-point
Power Requirements	CB or LB (four BA-42 batteries)
2-/4-Wire	2-wire or 4-wire selectable
Supervision	2-wire: dc/CB or dc/LB 4-wire: dc/CB, dc/LB, ac/LB, ac/CB, or point-to point Seize: 2,250 Hz (-4dBm) Release: 2,600 Hz (-4dBm)
Signaling	DTMF
Ringing	2-wire, 20 Hz, 4- wire: 570 Hz
Transmit Level	--
Maximum Loop	3.2 km (2 mi)
Extensions	Can be bridged by three additional TA-838
Security	None

Circuit Switch	Loop Terminating Device	Circuits per PCB	Loops per Switch
AN/TTC-39A(V)1	CBLTU NWLTU	2 2	96 96
AN/TTC-39A(V)1 (AVDTG) 1/	GPMDM (TDSGM)	1	60
AN/TTC-39A(V)4	4WLTU 2WLTU	4 4	56 20
AN/TTC-42	4WALTU 2/	2	24
SB-3865	4WALTU 2/ 3/	2	8
SB-3614/A	Type II	2	30

1/ TA-838 must be operated in LB mode.
2/ Analog terminal cards replace digital terminal cards.
3/ Six analog terminations reduce total terminations by two; eight analog terminations reduce total terminations by four.

Table VI-5. Telephone Interface Planning, TA-938 (WECO 2500)

Type of Operation	Analog, Circuit Switch
Power Requirements	CB
2-/4-wire	2-wire
Supervision	dc loop
Signaling	DTMF (12-button)
Ringing	20 Hz, 90V rms
Transmit Level	-4 dBm
Maximum Loop	8 km (5 miles)
Extensions	None
Security	None

Circuit Switch	Loop Terminating Device	Circuits per PCB	Loops per Switch
AN/TTC-39A(V)1	CBLTU	2	96
AN/TTC-39A(V)4	2WLTU	4	20
AN/TTC-39D	2WLTU	4	20
SB-3614/A	Type II	2	30

Table VI-6. Telephone Interface Planning (STU-III)

Type of Operation	Analog, Circuit Switch
Power Requirements	Approximately 90-270 Vac, nominal 60 Hz. Some models operate nonsecure without ac power.
2-/4-Wire	2-wire
Supervision	dc loop
Signaling	Tone (DTMF) or dial pulse
Ringing	20 Hz
Transmit Level	0 to 12 dBm, adjustable
Maximum Loop	--
Extensions	RS-232 data port
Security	Provides security on STU-III to STU-III calls

Circuit Switch	Loop Terminating Device	Circuits per PCB	Loops per Switch
AN/TTC-39A(V)1	CBLTU	2	96
AN/TTC-39A(V)4	2WLTU	4	20
AN/TTC-39D	2WLTU	4	20
SB-3614/SB-3614A	Type II	2	30
Commercial	CO Line	--	--

Note: Interfaces also apply to STSVT and STE when operationg
      in the STU-III and STE terminal modes respectively.

Table VI-7. Telephone Interface Planning, KY-68 (DSVT)

Type of Operation	Digital uses CVSD modulation, 16 or 32 kbps FDX & 16 HDX, CS, or back-to-back.
Power Requirements	CB (24 to 56 Vdc) or HYP-71 auxiliary power supply (115/220 Vac 45-420 Hz and/or primary and secondary batteries) or HYP-78 battery eliminator (115 Vac 60 Hz).
2-/4-Wire Supervision	4-wire, conditioned diphase or baseband (depending on which module is plugged in).
Supervision	Digital code words (8-bit cyclically permutable).
Signaling	Digital code words (16-button pad).
Ringing	Digital code words (voice or data).
Transmit Level	3 V_{p-p} conditioned diphase into 125 ohms.
Maximum Loop	4 km (2.5 miles).
Extensions	Connector for data device.
Security	Secure service.

Circuit Switch	Loop Terminating Device	Circuits per PWB	Loops/ Switch	Maximum Loops per Switch
AN/TTC-39 Series	DLPMA [1]	4	144 [2]	648 [3]
AN/TTC-39 Series (DTG)	GPMDM	NA	648 [3,4]	648 [3,4]
AN/TTC-42	DLTU	4	96	
AN/TTC-42 (DTG)	DTG diphase modem	NA	120	120
SB-3865	DLTU	4	32	32
SB-3865 (DTG)	DTG diphase modem	NA	32	32
SB-3614/SB-3614A	NA			
AN/TTC-46	DLPMA		164	164
AN/TTC-47	DLMPA		24	24
AN/TTC-48 (V)	Type VII card		26/41	26/41

[1]   Refer to CS TM-11-5805-681-12 or TM 11-5805-747-12 for strapping information.
[2]   240 single-channel loops per AN/TTC-39A(V)4/D.
[3]   708 per AN/TTC-39A(V)4/D.
[4]   Multiplexed by the switches' 30 DTGs.

Table VI-8. Telephone Interface Planning, TA-954/TA-1035/TA-1042

Type of Operation	Digital using CVSD modulation, 16 or 32 kbps FDX. (16 kbps, TA-1035)
Power Requirements	CB, 24 to 56V (1.5W off hook, 30mW on hook).
2-/4-Wire Supervision	4-wire
Supervision	Digital code words (eight-bit cyclically permutable).
Signaling	Digital code words (16-button pad).
Ringing	Digital code word.
Transmit Level	3 V_{p-p} conditioned diphase into 125 ohms.
Maximum Loop	4 km (2.5 miles) of WF-16 field wire.
Extensions	TA-1035 and TA-1042 have a digital data port.
Security	Nonsecure

Circuit Switch	Loop Terminating Device	Circuits per PWB	Loops per Switch	Maximum Loops/ Switch
AN/TTC-39 Series	DLPMA [1]	4	144 [2]	648 [3]
AN/TTC-39 Series (DTG)	GPMDM	NA	648 [3] [4]	648 [3] [4]
AN/TTC-42	DLTU	4	96	
AN/TTC-42 (DTG)	DTG diphase modem	NA	120	120
SB-3865	DLTU	4	32	32
SB-3865 (DTG)	DTG diphase modem	NA	32	32
SB-3614/SB-3614A	NA			
AN/TTC-46	DLMPA		164	164
AN/TTC-47	DLMPA		24	24
AN/TTC-48 (V)1,(V)2	Type VII card		26/41	26/41

[1] Refer to TM 11-5805-747-12-2-2 or TM-5805-778-12-3 or for strapping information.
[2] 240 single channel loops per AN/TTC-39A(V)4/D.
[3] 708 per AN/TTC-39A(V)4/D
[4] Multiplexed by the switches'30 DTGs.

Note: Interfaces also apply to STSVT and STE when operating in the DNVT mode.

CHAPTER VII

AN/TTC-39 SERIES CS TRUNK INTERFACES

1. <u>General</u>. This chapter provides the planner-engineer
with trunk interface information applicable to the AN/TTC-39
series CS. Paragraphs 3 through 20 discuss specific trunk
interfaces between the AN/TTC-39 series switches, as well as
between the AN/TTC-39 series CS and other digital and analog
CSs, MSs, and switchboards. These paragraphs also provide
specific instructions for establishing the interfaces.
Figure VII-1 is a block diagram of the internal connectivity
for AN/TTC-39A(V)1 analog and digital trunks. The inter-
faces are indexed by type in Tables VII-1 and VII-2.
Additional details on the AN/TTC-39D and AN/TTC-39A(V)4
trunk interfaces can be found in Chapter II and Appendix D.
The CSIPG (see Appendix E) gives the planner-engineer
information on tactical switch and switchboard interfaces.

2. <u>Analog Trunk Entry</u>. Analog trunks requiring use of
special circuit adapters must be connected to the
AN/TTC-39A(V)1 by field cables 1, 2, or both. In the
AN/TTC-39A(V)4 and AN/TTC-39D, the ALTG provides the
interface capabilities for analog interfaces using the
DLTUs.

3. <u>Two-Wire Analog Trunk, DC Closure Outgoing Supervision,
Dial-Pulse Signaling, 20-Hz Incoming Supervision</u>. This
interface is used with commercial switches.

   a. <u>AN/TTC-39 Series Interface</u>. Terminate this trunk in
a dc closure adapter, normal wideband LTU combination
(TCLTU, AN/TTC-39A(V)4/D). (See Figure VII-2.) Entry to
the SDSG (ALCG patch panel, AN/TTC-39D/A(V)4) should be
through field cables 1 and 2. Connect the switch to the
transmit pair. The LTU should be strapped for ac
supervision. The normal wideband LTU and TCLTU cards each
terminate two circuits. The adjacent circuit must also use
a normal wideband LTU/TCLTU. For the AN/TTC-39D and
AN/TTC-39A(V)4, this trunk is terminated on the TCLTU.

   b. <u>AN/TTC-39 Series Database</u>. Classmark these trunks
as Type 44. For commercial trunks, assign the TGC as
Type C.

   c. <u>Incoming Trunk Calls</u>. Incoming trunk calls are
intercepted at the attendant's position. The attendant
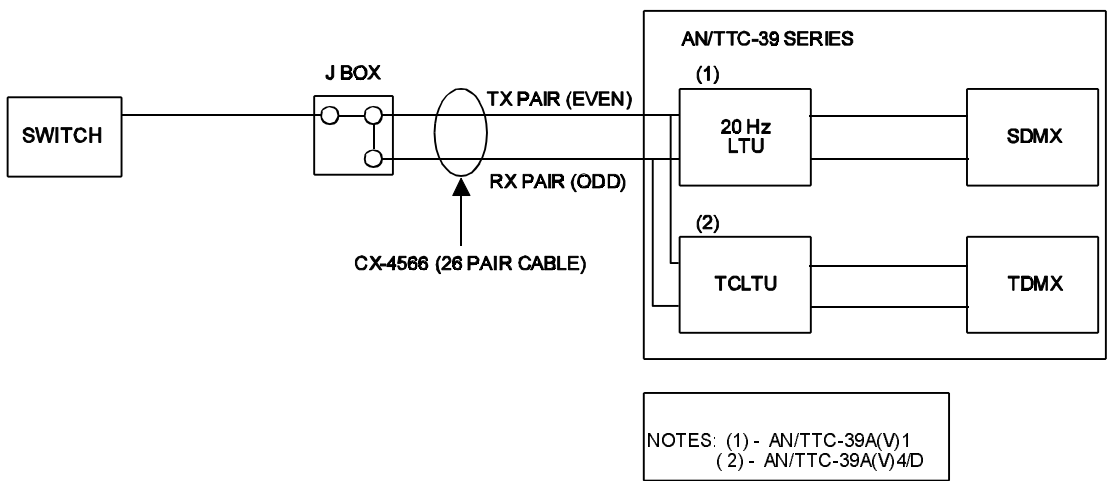extends the call to the called party.
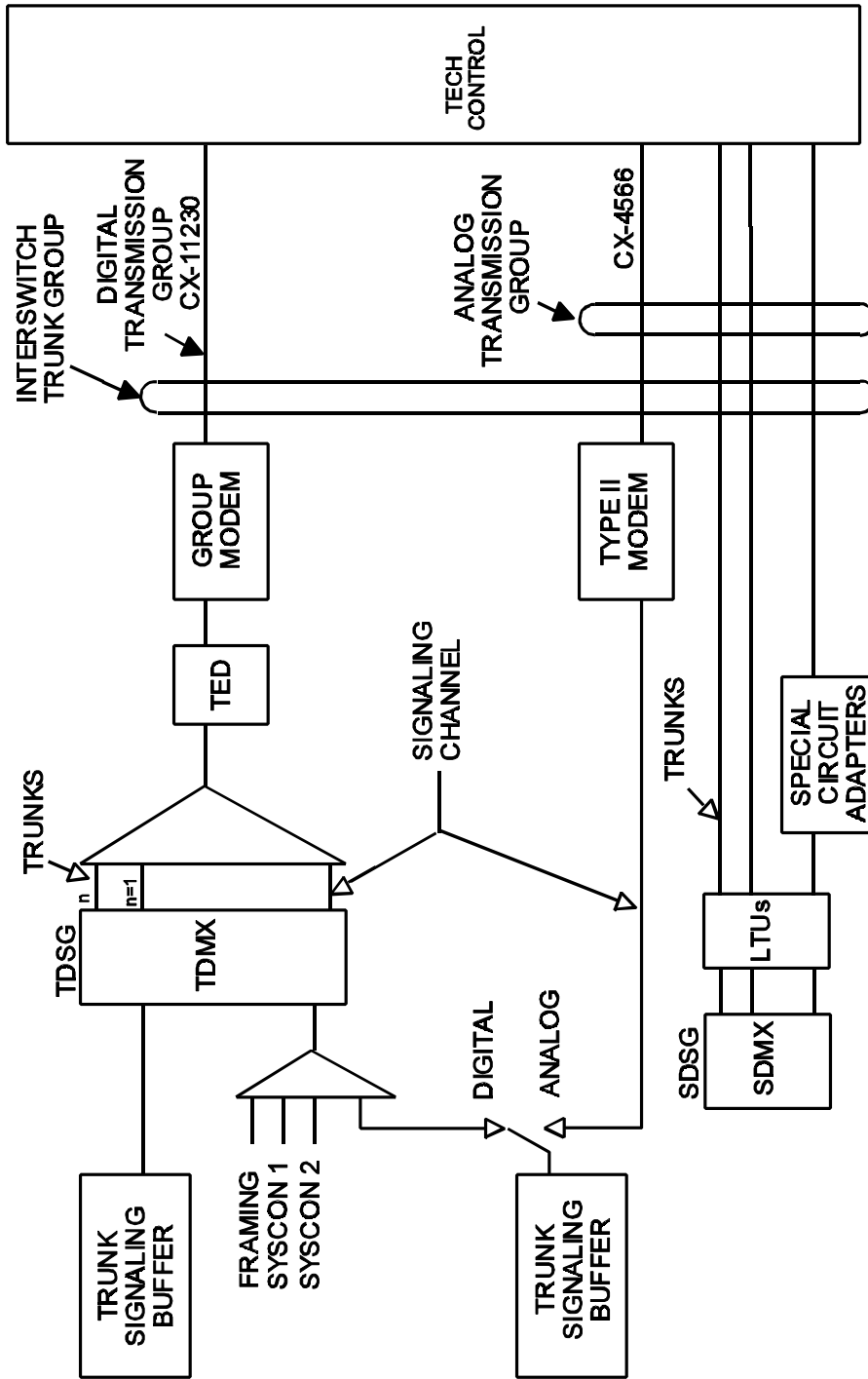
Figure VII-1. CS Interswitch Trunk (AN/TTC-39A(V)1)
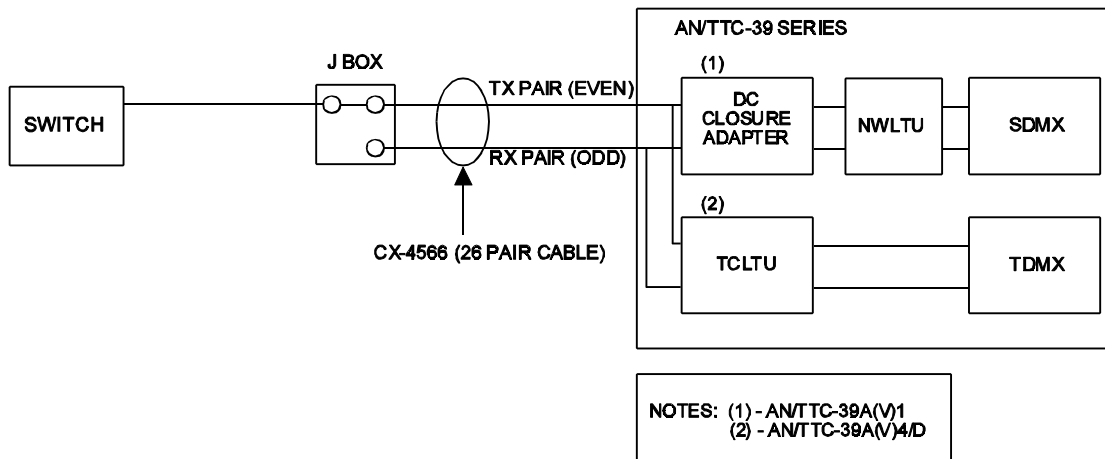
Figure VII-2. Two-Wire Analog Trunk, DC Closure Outgoing
Supervision, Dial-Pulse Signaling, 20 Hz Incoming Supervision

Table VII-1.   Analog Trunk Interface to the SDSG
by Interface Type

Equipment	Paragraph	Interface
Commercial Switches	3	2-wire analog trunk, dc closure outgoing supervision, dial-pulse signaling, 20-Hz incoming supervision.
SB-3614 SB-3614A	4	2-wire analog trunk, 20-Hz supervision.
AN/TTC-4/5 AN/TTC-7 AN/TTC-10	5	2-wire analog trunk, common-battery supervision, dial-pulse signaling, inward automatic, outward ring-down.
DSN	6	DSN PNID PBX access line, 4-wire, SF supervision, dial-pulse in, DTMF out, wink start.
DSN	7	DSN Interswitch trunk, SF supervision, MF 2/6 non-confirmation, wink start.
DSN	8	DSN Gateway Access Using the CV-4180 at the Gateway
DSN	9	DSN, PNID PBX trunk, MF 2/6 non-confirmation, wink start.
AN/TTC-38	10	4-wire analog trunk, tone-supervision, DTMF confirmation signaling.
AN/TTC-38	11	4-wire analog trunk, tone-supervision, DTMF tone-burst signaling.
AN/TTC-28 WECO 400	12	4-wire analog trunk, SF supervision, dial-pulse signaling.
SB-3614 SB-3614A	13	4-wire analog trunk, ac supervision, DTMF tone burst signaling.
CV-1918 CV-1919	14	4-wire analog converter type trunk, ac supervision, DTMF signaling.
Commercial Switches	15	4-wire analog trunk, E&M supervision, MF or dial pulse signaling, wink or timed start.
AN/TTC-39 Series	16	4-wire analog trunk, AN/TTC-39 series CCS
NATO	17	4-wire analog trunk, 2,600-Hz supervision, dial pulse signaling.

Table VII-2. Digital Trunk Interfaces to the TDSG

Equipment	Paragraph	Interface
AN/TTC-39 Series AN/TTC-42 AN/TTC-46 AN/TTC-47	18	AN/TTC-39 Series (CCS)
SB-3865 AN/TTC-48	19	DIBTS
AN/TYC-39	20	Common-channel signaling

d. Outgoing Trunk Calls. The AN/TTC-39 series CS subscriber dials 5C and is connected to a commercial trunk. After receiving a dial tone from the commercial switch, the subscriber keys the address digits (7, 10, or 13 digits) followed by C. The subscriber is then automatically connected to the called party.

4. Two-Wire Analog Trunk, 20-Hz Supervision. This interface can be used with switchboards such as the SB-3614 and SB-3614A. Both switchboards use a Type I terminal card.

a. AN/TTC-39 Series Interface. Terminate the trunk in a 20-Hz LTU (TCLTU, AN/TTC-39D/A(V)4). (See Figure VII-3.) Connect the switch to the transmit pair. The 20-Hz LTU and TCLTU cards both terminate two circuits. The adjacent circuit also must use a 20-Hz LTU/TCLTU.

b. AN/TTC-39 Series Database. Classmark the trunk as Type 43. Assign the TGC as Type O (other). If specifying a maximum precedence and imposing traffic-load-control measures, classmark the TGC as follows:

      (1) TGC type, P (PBX).

      (2) Number of outgoing digits, O.

      (3) PBX switch code, Leave blank.

c. Incoming Trunk Calls. Incoming calls are intercepted at the operator's position. The operator extends the call to the called party.

Figure VII-3. Two-Wire Analog Trunk, 20-Hz Supervision

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series CS
subscriber dials P+9+NNX+GXXX. The call is intercepted
by the operator at the called switch. The operator then
extends the call to the called party.

5. <u>Two-Wire Analog Trunk, Common-Battery Supervision, Dial-
Pulse Signaling, Inward Automatic, Outgoing Ring-Down</u>. This
interface can be used with the AN/TTC-4, AN/TTC-5, AN/TTC-7,
AN/TTC-10, AN/TTC-22, and commercial PBXs. This interface
is automatic for incoming calls and ring-down for outgoing
calls.

    a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk on
a common battery LTU (2WLTU, AN/TTC-39D/A(V)4). Connect the
switch to the transmit pair. The common battery LTU card
terminates two circuits; the 2WLTU terminates four circuits.
The adjacent circuit(s) also must use a common battery
LTU/2WLTU.

    b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as
Type 40. Assign the TGC as Type O (other) or C (commercial)
(if the trunk is to a commercial office). If specifying a
maximum precedence and imposing traffic-load-control
measures, classmark the TGC as follows:

        (1) TGC type, P (PBX).

        (2) Number of outgoing digits, O.

        (3) PBX switch code, Leave blank.

(The use of Type P is not recommended for commercial trunks,
because it would change the escape code to reach the trunk.)

    c. <u>Incoming Trunk Calls</u>. The call is automatically
routed to the called party.

    d. <u>Outgoing Trunk Calls</u>. The subscriber dials
P+9+NNX+GXXX, and the call is intercepted by the distant
switch operator. The operator extends the call to the
called party. (If the trunk is classmarked as a commercial
trunk, the subscriber dials 5C rather than the escape code
(9)).

6. <u>DSN PNID PBX Access Line, 4-Wire Analog Trunk, SF
Supervision, Dial-Pulse Incoming, DTMF Signaling Outgoing,
Wink Start</u>. This interface is used by the AN/TTC-42,
SB-3865, and SB-3614A to access DSN.

a. <u>AN/TTC-39 Series Interface</u>. Terminate this trunk in an SF adapter, normal wideband LTU combination (MFLTU, AN/TTC-39D/A(V)4). (See Figure VII-4.) Entry to the SDSG (ALCG patch panel, AN/TTC-39D/A(V)4) must be through field cables 1, 2, or both. The LTU should be strapped for ac supervision. The adjacent circuit must also use a normal wideband LTU/MFLTU.

b. <u>AN/TTC-39 Series Database</u>. Classmark these trunks as Type 34. Assign the TGC as Type O (other).

c. <u>Incoming Trunk Calls</u>. Incoming calls, including precedence calls, are automatically connected to the called party.

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series switch subscriber dials P+9+NYX+NNX+GXXX and is automatically connected to the called party.

7. <u>Four-Wire Analog Interswitch Trunk, SF Supervision, MF 2/6 Nonconfirmation Signaling, Wink Start</u>. This is the recommended type of DSN interface for use by the AN/TTC-39 series CS.

a. <u>AN/TTC-39 Series Interface</u>. Terminate this trunk in an SF adapter, normal wideband LTU combination (MFLTU, AN/TTC-39D/A(V)4). (See Figure VII-5.) Entry to the SDSG (ALCG patch panel, AN/TTC-39D/A(V)4) must be through field cables 1, 2, or both. The LTU should be strapped for ac supervision. The adjacent circuit also must use a normal wideband LTU/MFLTU.

b. <u>AN/TTC-39 Series Database</u>. Classmark this trunk as Type 36. Assign the TGC Type as O (other).

c. <u>Incoming Trunk Calls</u>. Incoming trunk calls are automatically connected to the called party.

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series CS subscriber dials P+9+NYX+NNX+GXXX and is automatically connected to the called party.

8. <u>DSN Gateway Access Using the CV-4180 at the Gateway</u>. The following information pertains to interconnecting an AN/TTC-39 series switch with the DSN using a CV-4180 (LTU) at the DSN STEP. (See CJCSM 6231.04, Chapter I, Section B for detailed information on the CV-4180.)

J BOX

SWITCH

DSN

TX PAIR (EVEN)

RX PAIR (ODD)

CX-4566 (26 PAIR CABLE)

AN/TTC-39 SERIES

(1)

SF ADAPTER

NWLTU

SDMX

(2)

MFLTU

TDMX

NOTES: (1)- AN/TTC-39A(V)1
(2) - AN/TTC-39A(V)4/D
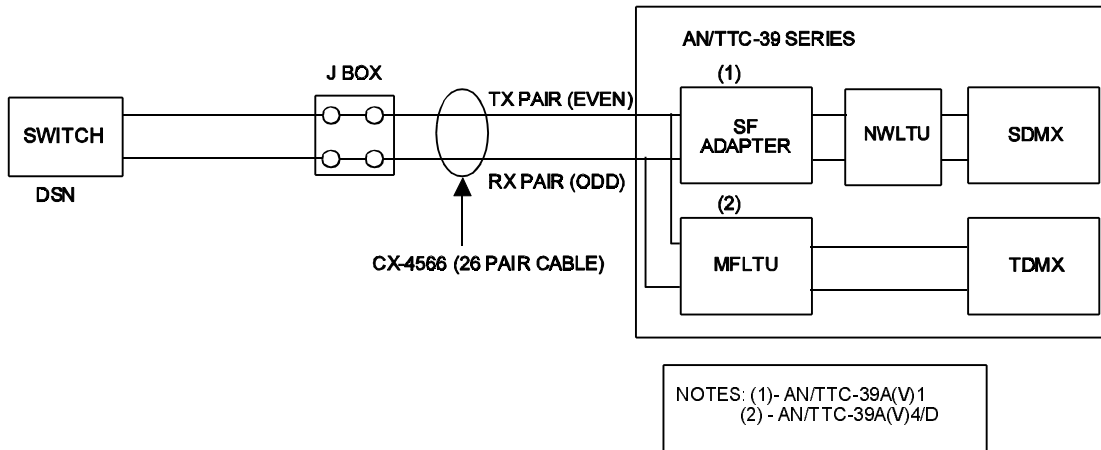
Figure VII-4. DSN PNID PBX Access Line (4-Wire
Analog Trunk), SF Supervision Dial-Pulse Incoming,
DTMF Outgoing, Wink Start
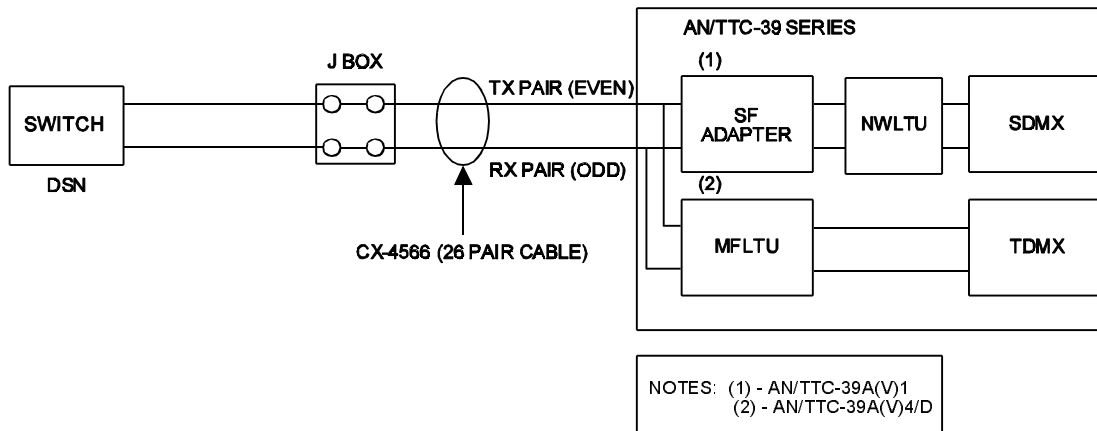
Figure VII-5. Four-Wire DSN Interswitch Trunk, SF
Supervision, MF 2/6 Nonconfirmation Signaling, Wink Start

a. <u>General</u>. Terminal Type 36 is the recommended type of interface using the CV-4180. The CV-4180 will multiplex up to 35 single terminations into a DTG. The terminations can be analog or digital, loops or trunks. (See Figure VII-6.)

b. <u>Interface</u>

(1) <u>AN/TTC-39 Series CS</u>. (See Chapter V for detailed information on database entries.)

(a) <u>ADT</u>

<u>1</u>. <u>DTG Number</u>. Enter the number of channels authorized on the Satellite Access Authorization/GMF Gateway Authorization.

<u>2</u>. <u>DTG Channel Rate</u>. Must be the same as the switch rate (16 or 32 kbps).

<u>3</u>. <u>MSF</u>. Enter 1.

(b) <u>ATG</u>

<u>1</u>. <u>Type of DTG</u>. Enter O = Other.

<u>2</u>. <u>Spill Forward</u>. Enter Y = Yes.

<u>3</u>. <u>Destination Code</u>. Enter 312 or 314 normally.

(c) <u>ATS Terminal Type</u>. Enter TT 119 for first channel of DTG. Assign other channels as TT 36.

(2) <u>CV-4180</u>

(a) <u>Common Card Settings</u>

Card Slot	Setting
A14	2
A12	Slave
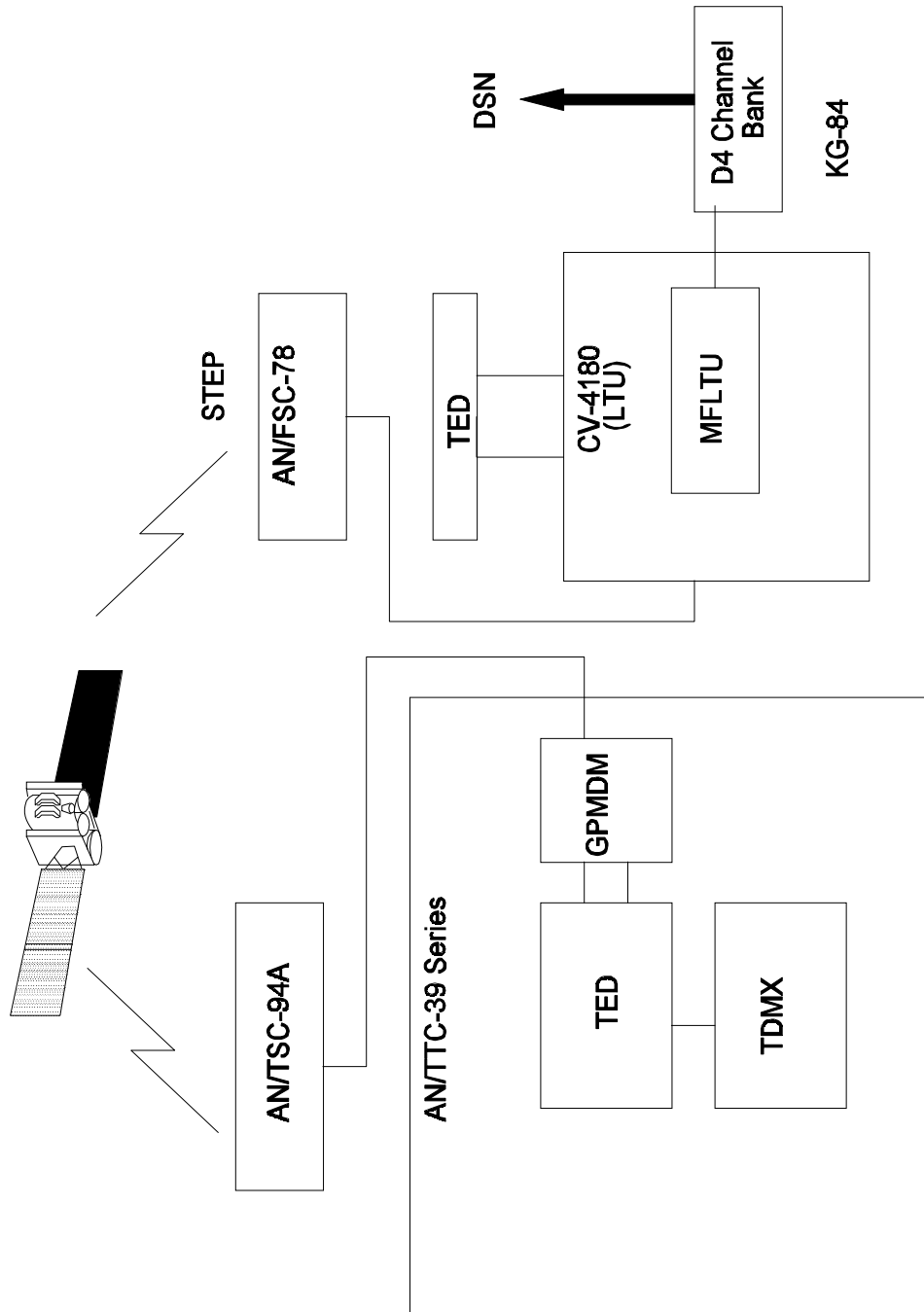
Figure VII-6. DCS Gateway Access Using the CV-4180 at the STEP Gateway

(b) Group Modem

1. Cable Length. Enter 1-5, corresponding to the length of the cable from the LTU to the supporting radio assemblage.

2. Group Rate. Enter 1-9, corresponding to the rate of the DTG. Entry must be the same as the Group Rate classmark on the ADT screen.

3. Channel Rate. Enter 16 or 32 (kbps). Entry must be same as the connected CS.

4. DVOW Receive Ring or Home Code. Not normally used in a DSN STEP entry.

5. DLTUs. DSN trunks terminated on MFLTU cards.

9. Four-Wire Analog DSN PBX Trunk, SF Supervision, MF 2/6 Nonconfirmation PNID, Wink Start. This interface is used to support a USCINCPAC requirement for the 7th AF hardened tactical command center. It is not recommended for use by other subscribers.

a. AN/TTC-39 Series Interface. Terminate this trunk in an SF adapter, normal wideband LTU combination (MFLTU, AN/TTC-39D/A(V)4). (See Figure VII-7.) Entry to the SDSG and ALCG patch panel (AN/TTC-39A(V)4/D) must be through field cables 1 and 2. The LTU should be strapped for ac supervision. The adjacent circuit also use a normal wideband LTU/MFLTU.

b. AN/TTC-39 Series Database. Classmark this trunk as type 66. Assign the TCG as O (other).

c. Incoming Trunk Calls. See subparagraph 6c above.

d. Outgoing Trunk Calls. See subparagraph 6d above.

10. Four-Wire Analog Trunk, Tone Supervision, DTMF Confirmation Signaling. This type of interface can be used with the AN/TTC-38. (For links over a satellite, see paragraph 11.) The distant-end AN/TTC-38 uses terminal Type 8 for originating office control and Type 11 for spill-forward control.
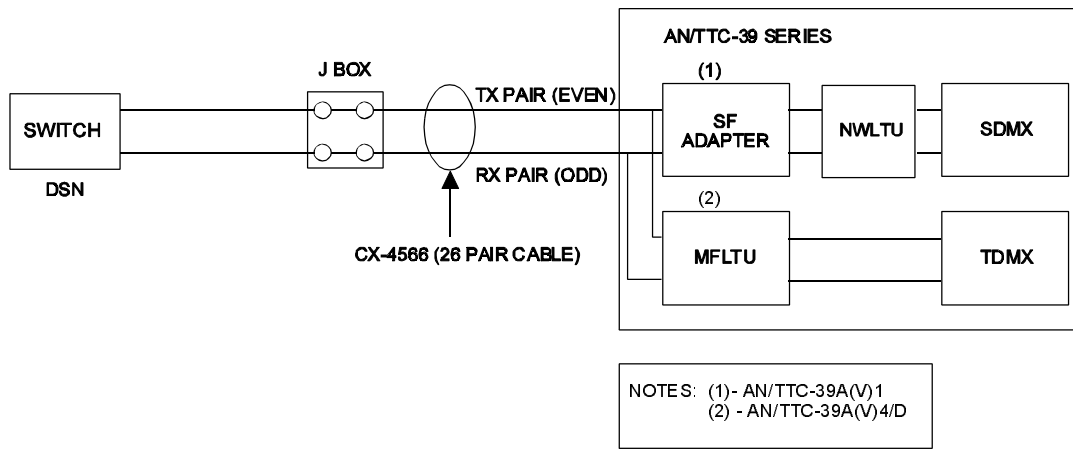
Figure VII-7. DSN, Four-Wire PBX Trunk, MF 2/6, Nonconfirmation
PNID, Wink Start

a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk in a normal wideband LTU (4WLTU, AN/TTC-39D/A(V)4). Strap the LTU for ac supervision. The normal wideband LTU card terminates two circuits; the 4WLTU terminates four circuits. The adjacent circuit also must use a normal wideband LTU/MFLTU.

b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as Type 25. The TGC should be Type O (other). To prevent signaling difficulties on trunks tandeming through the AN/TTC-38, these trunks should be marked for spill-forward control.

c. <u>Incoming Trunk Calls</u>. The call is automatically routed to the called party.

d. <u>Outgoing Trunk Calls</u>. The subscriber dials the desired party P+9+NNX+GXXX and is connected without operator intervention.

11. <u>Four-Wire Analog Trunk, Tone Supervision, DTMF Tone-Burst Signaling</u>. This interface can be used with the SB-3614A. Normally, this interface is used over satellite links. The distant-end SB-3614A uses a Type VI card.

a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk in a normal wideband LTU (4WLTU, AN/TTC-39D/A(V)4). Strap the normal wideband LTU for ac supervision. The adjacent circuit also must use a normal wideband LTU/4WLTU.

b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as Type 26. The TGC should be Type O (other).

c. <u>Incoming Trunk Calls</u>. The call is automatically routed to the called party.

d <u>Outgoing Trunk Calls</u>. The subscriber dials the desired party P+9+NNX+GXXX and is connected without operator intervention.

12. <u>Four-Wire Analog Trunk, SF Supervision, Dial-Pulse Signaling</u>. This interface can be used with the AN/TTC-28 and the WECO 400.

a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk in an SF adapter, normal wideband LTU combination (MFLTU, AN/TTC-39D/A(V)4). (See Figure VII-8.) The LTU should
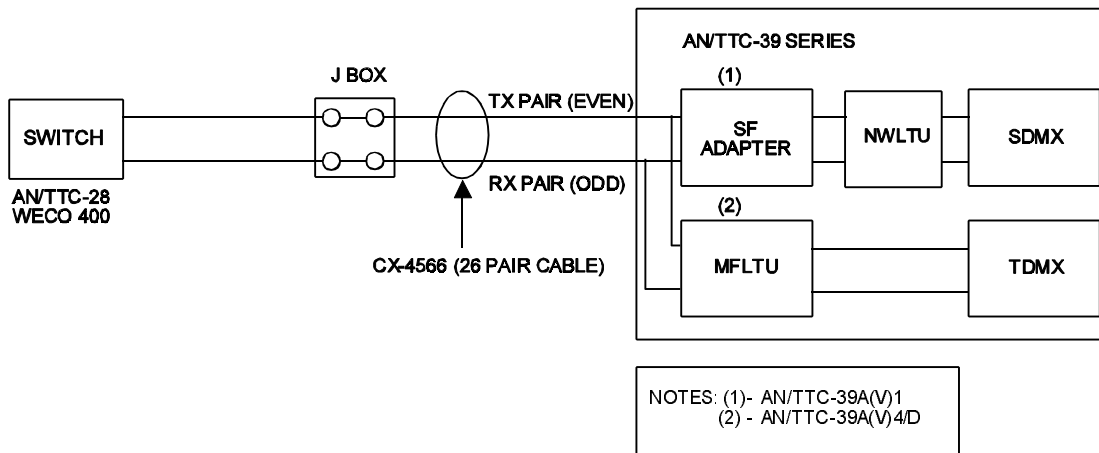
Figure VII-8. Four-Wire Analog Trunk, SF Supervision, Dial
Pulse Signaling

be strapped for ac supervision. The normal wideband LTU
card and MFLTU both terminate two circuits. The adjacent
circuit also must use a normal wideband LTU/MFLTU. Entry to
the SDSG (ALCG patch panel, AN/TTC-39D/A(V)4) must be
through field cables 1 and 2.

   b. AN/TTC-39 Series Database. Classmark the trunk as
Type 37. The TGC should be Type P (PBX) with three outgoing
digits.

   c. Incoming Trunk Calls. Upon receiving a dial tone
from the AN/TTC-39 series CS, the AN/TTC-28 or WECO 400
subscriber dials LNXXXXX and is automatically connected to
the called party.

   d. Outgoing Trunk Calls. The AN/TTC-39 series CS
subscriber dials P+9+NNX+GXXX and is connected without
operator intervention.

13. Four-Wire Analog Trunk, AC-Supervision, DTMF Tone-Burst
Signaling. This interface is used with the SB-3614 and
SB-3614A or AN/TTC-41. The SB-3614 uses a Type III card,
set to PBX. The SB-3614A uses a Type VI card set to tone
burst.

   a. AN/TTC-39 Series Interface. Terminate the trunk on
a normal wideband LTU (4WLTU, AN/TTC-39D/A(V)4). (See
Figure VII-9.) Strap the LTU for ac supervision. The
adjacent circuit(s) also must use a normal wideband
LTU/4WLTU.

   b. AN/TTC-39 Series Database. Classmark the trunk as
Type 31. The TGC should be Type P (PBX) with three outgoing
digits and spill-forward marked Yes.

   c. Incoming Trunk Calls. The SB-3614/A DTMF subscriber
dials precedence plus 9SL. Upon receiving a second dial
from the AN/TTC-39 series switch, the caller dials 7 to 13
digits and is automatically connected.

   d. Outgoing Trunk Calls. The AN/TTC-39 series CS
subscriber dials P+9+PRSL+XXX and is connected without
operator intervention.

14. Four-Wire Analog Converter Type Trunk, AC Supervision,
DTMF Signaling. This interface can be used with converters
CV-1918 and CV-1919 to interface with manual switchboards;
e.g., AN/MTC-1 and AN/MTC-9.

AN/TTC-39 SERIES

(1)

J BOX

SWITCH

TX PAIR (EVEN)

RX PAIR (ODD)

CX-4566 (26 PAIR CABLE)

NWLTU

SDMX

(2)

4WLTU

TDMX

NOTES: (1) - AN/TTC-39A(V)1
(2) - AN/TTC-39A(V)4/D
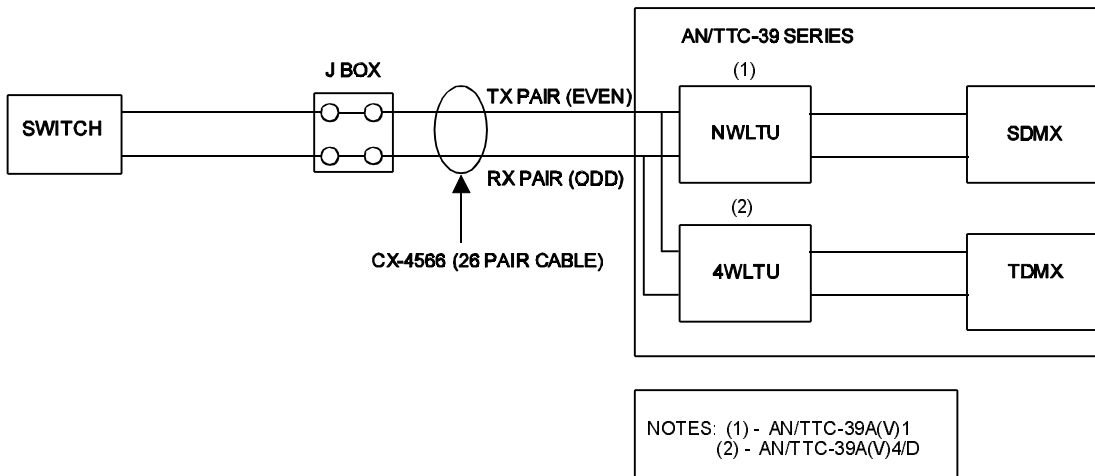
Figure VII-9.   Four-Wire Analog Trunk, AC Supervision, DTMF
Tone-Burst Signaling

a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk on a normal wideband LTU (4WLTU, AN/TTC-39D/A(V)4). Strap the LTU for ac supervision. The adjacent circuit(s) also must use a normal wideband LTU/4WLTU.

b. <u>AN/TTC-39 Series Database</u>. Classmark this trunk as Type 30. Assign the TGC as Type O (other). If specifying a maximum precedence and imposing traffic-load-control measures, classmark the TGC as follows:

(1) TGC type, P (PBX).

(2) Number of outgoing digits, O.

(3) PBX switch code, leave blank.

c. <u>Incoming Trunk Calls</u>. The call is placed by the converter attendant and is automatically connected to the called party.

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series CS subscriber dials P+LNXXXXX, and the call is intercepted by the operator at the called switch. The operator extends the call to the called party.

15. <u>Four-Wire Analog Trunk, E&M Supervision, MF or Dial-Pulse Signaling, Wink or Timed Start</u>. This trunk is used with a commercial office.

a. <u>AN/TTC-39 Series Interface</u>. Terminate this trunk in an E&M adapter, normal wideband LTU combination (EMLTU, AN/TTC-39D/A(V)4). (See Figure VII-10.) Entry to the SDSG (ALCG patch panel, AN/TTC-39D/A(V)4) must be through field cables 1, 2, or both. The LTU should be strapped for ac supervision. The normal wideband LTU card and EMLTU card each terminates two circuits. The E lead is on the ring side and the M lead is on the tip side. The E&M adapter card terminates two circuits.

b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk in accordance with the following:

(1) MF nonconfirmation signaling, wink start: Type 46.

(2) Dial-pulse signaling, wink start: Type 82.
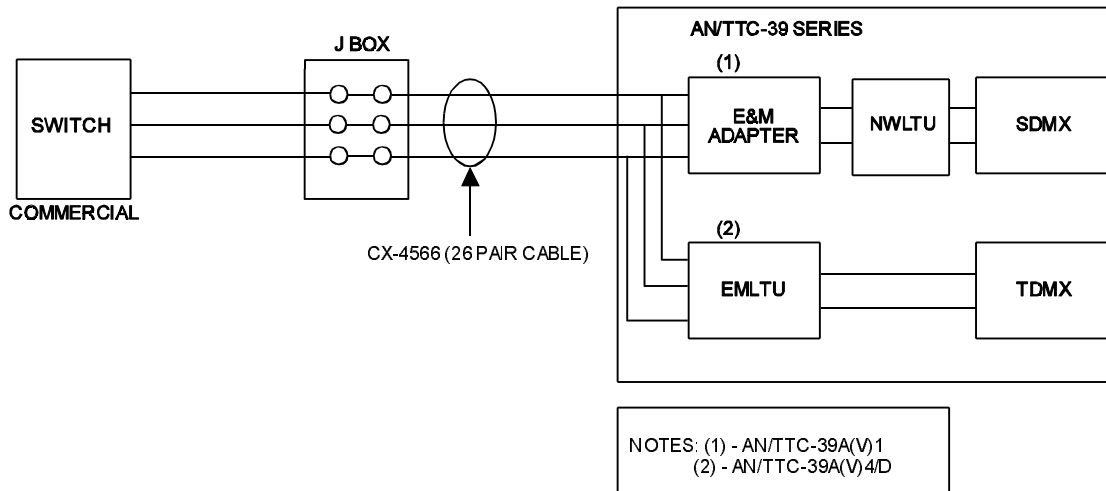
Figure VII-10. Four-Wire Analog Trunk, AC Supervision, MF or
Dial Pulse Signaling, Wink or Timed Start

(3) Dial-pulse signaling, timed start: Type 83.

(4) Assign the TGC as Type C.

c. <u>Incoming Trunk Calls</u>. Incoming trunk calls are automatically connected to the called party.

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series CS subscriber dials (P+5C), waits for the dial tone, and then dials the commercial number plus C and is connected automatically with the called party.

16. <u>Four-Wire Analog Trunk, AN/TTC-39 Series Common-Channel Signaling</u>. This interface is used between AN/TTC-39 series CSs only if analog circuits are available and required.

a. <u>AN/TTC-39 Series Interface</u>. Terminate the trunk in a normal wideband LTU (4WLTU, AN/TTC-39A(V)4/D). The normal wideband LTU should be strapped for ac supervision. (See Figure VII-11.) The LTU card terminates two circuits; the 4WLTU terminates four circuits. The adjacent circuit(s) also must use a normal wideband LTU/4WLTU. A separate channel must be used for common-channel signaling. If only analog channels are available, the TSB is used in the analog mode with a Type-II modem. TSBs 3 and 4 are hard wired to Type II modems in the AN/TTC-39 series switches.

b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as Type 28.

c. <u>Incoming Trunk Calls</u>. Calls are automatically routed to the called party.

d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series subscriber dials P+NNX+GXXX and is automatically connected to the called party.

17. <u>NATO Analog Interface Trunk</u>. This is a 6-wire, E&M supervision and dial pulse signaling trunk in accordance with STANAG 5040. The AN/TTC-39 series switches interface with NATO systems using the NIU (CV-3478), NAI (CV-4002), or NILTU and CV-4180 (LTU) combination.

a. <u>AN/TTC-39 Series Interface</u>. For The AN/TTC-39A(V)1, terminate this trunk in an SF adapter and NWLTU combination. Entry to the AN/TTC-39A(V)1 SDSG (ALCG patch panel, AN/TTC-39D must be through field cables 1, 2, or both, to J1 of the SDSG. The LTU should be strapped for ac supervision.
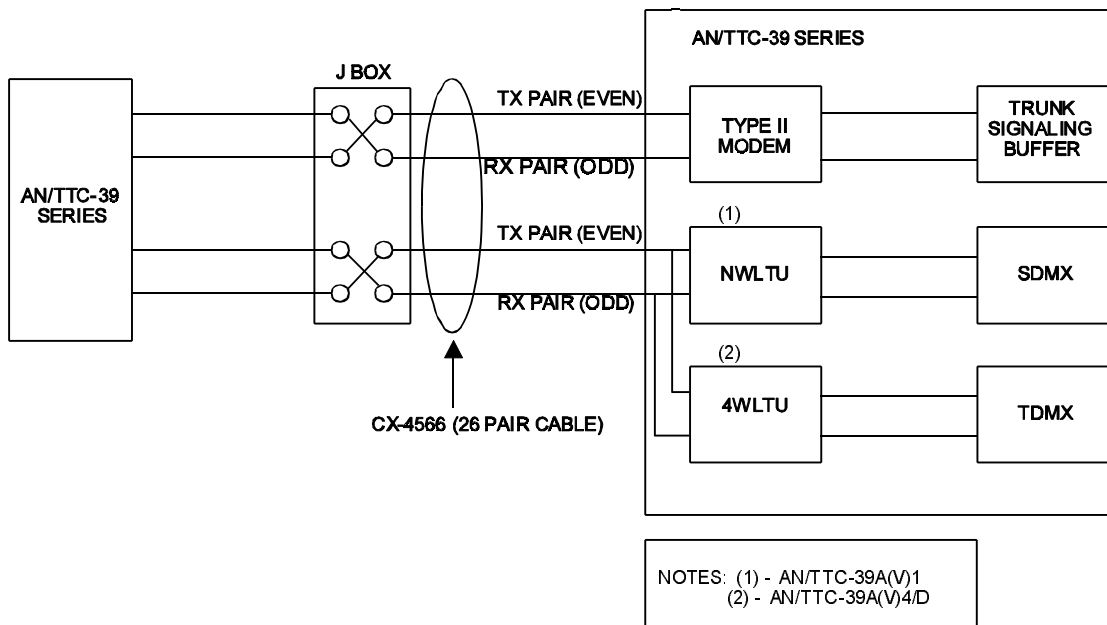
Figure VII-11. Four- Wire Analog Trunk, AN/TTC-39 Series,
Common Channel Signaling

One adjacent circuit must use a normal wideband LTU. In the AN/TTC-39A(V)4, the NATO interface trunks are terminated via a DTG using CX-11230 cable. At the CV-4180 LTU, an SM-D-811235 stub cable is connected to a J-Box. The circuit is a 6-wire connection from the J-Box into the NILTU card in the CV-4180. It interfaces with the TDSGM SEP on the line side of each circuit as two channels in a DTG. The NILTU channels interface the TDMX through the group mux/demux on the switch side. In the AN/TTC-39D, to connect the MFLTU cards in the CS, the NIU is normally connected to J1 through J4 on the ALTG SEP. The channels associated with field cables 1 and 2 are routed through the ALCG patch panel and the ALTG patch panel, and are applied to the MFLTU cards. The channels associated with field cables 3 and 4 are routed directly through the ALTG patch panel and then applied to the MFLTU cards. (See Figure VII-12.)

   b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as Type 39. For the AN/TTC-39D/A(V)4, classmark the trunk as Type 87.

   c. <u>Incoming Trunk Calls</u>. An incoming call is automatically connected to the called party.

   d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series CS subscriber dials P+9YX+WXX+XXXXXXX.

18. <u>Four-Wire Digital Trunk, AN/TTC-39 Series Common-Channel Signaling</u>. This is the normal interface used between AN/TTC-39 series CSs. (See Figure VII-13.)

   a. <u>AN/TTC-39 Series Interface</u>. Terminate this interface in a GPMDM in the AN/TTC-39 series CS. The GPMDM is strapped via processor control to meet the modulation (diphase or dipulse) requirement of the transmission equipment available. It also is strapped via processor control for the desired group size. Diphase groups can have channel capacities ranging from 4 1/2 to 144 channels, depending on the group modularity (modulo 8 or 9) used. Dipulse groups can have channel capacities ranging from 9 to 72 channels (modulo 9). Common-channel signaling from the TSB is carried in the overhead channel of the digital group.

   b. <u>NCMD</u>. NCMDs, which are part of the TDMF, are used to multiplex/demultiplex individual channels into a single data stream. If for some reason the full traffic-channel capacity of a DTG is not required, the use of NCMDs to terminate all of the channels in a DTG is unnecessary. The unassigned channels must appear as contiguous channels at

NATO ANALOG NETWORK

Figure VII-12. NATO Analog Interfaces
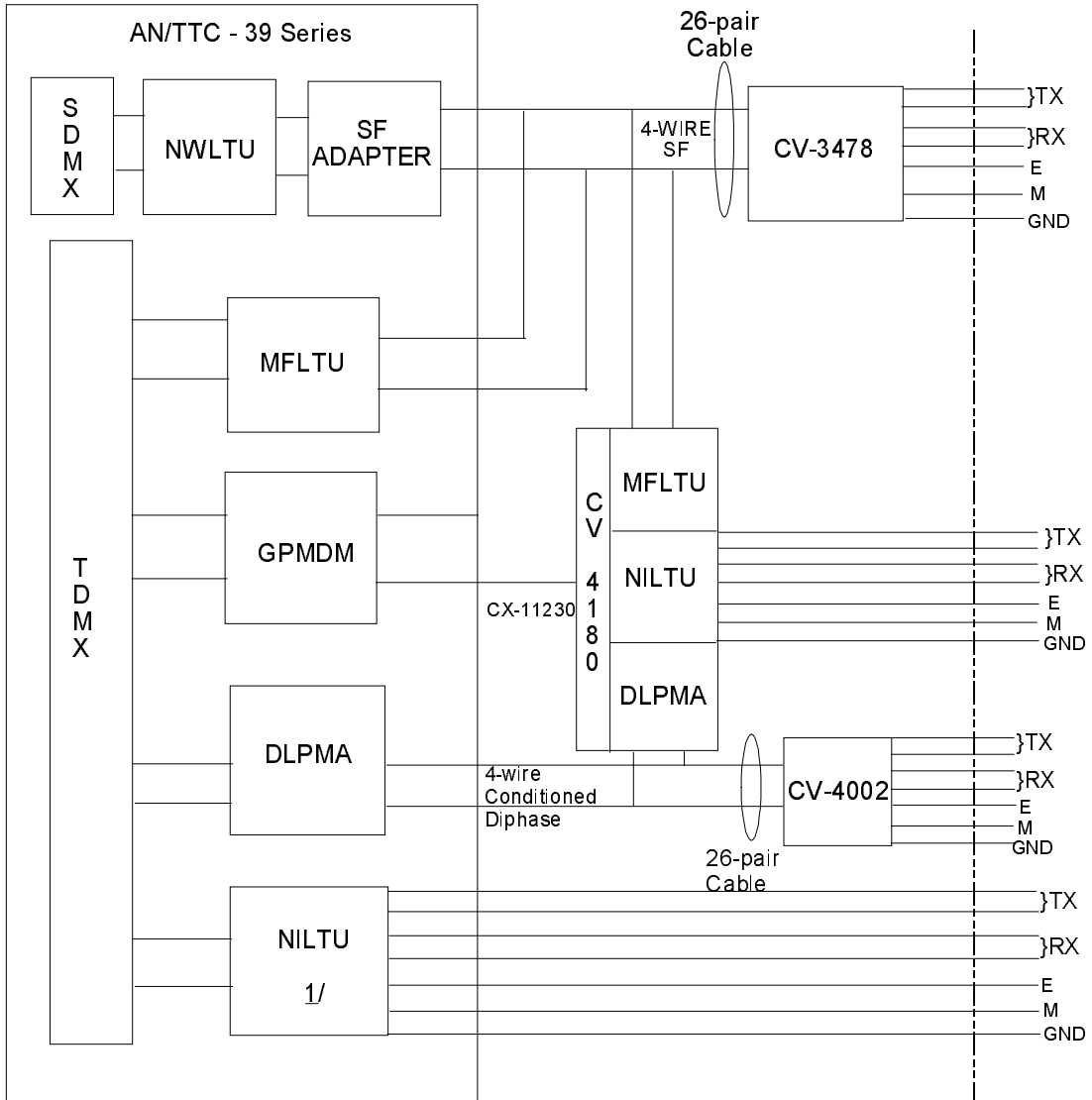
1/ When the NILTU is used in the switch, the second channel of the NILTU is not usable
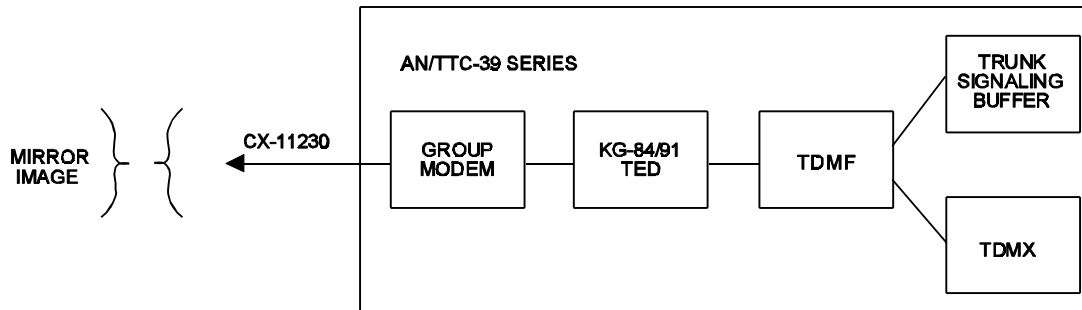
Figure VII-13. Four-Wire Digital Trunk, AN/TTC-39 Series,
Common Channel Signaling

the end of the group. For example, if a 36-channel DTG were established when only 18 channels (1 overhead and 17 traffic) were needed, only 2 NCMDs would be assigned to that DTG. The remaining 18 channels in the group would be unassigned.

    c. <u>AN/TTC-39 Series Database</u>. Classmark these trunks as Type 29.

    d. <u>Incoming Trunk Calls</u>. The call is automatically routed to the called party.

    e. <u>Outgoing Trunk Calls</u>. The subscriber dials P+NNX+XXXX and is automatically connected to the called party.

19. <u>Four-Wire Digital Trunk, AN/TTC-39 Series Digital In-band Trunk Signaling (DIBTS)</u>. This 4-wire trunk is used to interface the AN/TTC-39 series with the SB-3865 and the AN/TTC-48.

    a. <u>AN/TTC-39 Series Interface</u>. The interface is accomplished using the DSB. (See Figure VII-14.) The AN/TTC-39A(V)1 DSB is discussed in Annex A, Appendix A. The AN/TTC-39D/A(V)4 has six DSB cards, with two circuits per card, which can be substituted for TSBs in any of the 28 signaling buffer locations.

    b. <u>AN/TTC-39 Series Database</u>. Classmark the trunk as Type 27.

    c. <u>Incoming Trunk Calls</u>. Calls are automatically routed to the called party.

    d. <u>Outgoing Trunk Calls</u>. The AN/TTC-39 series subscriber dials the desired party (precedence digit, special-feature digit (if required), and 7-digit address) and is connected without operator intervention.

20. <u>Four-Wire, Digital Interswitch Trunk, AN/TTC-39 Series to AN/TYC-39 Message Switch</u>. This interface is via a DTG of up to 36 channels, using CCS. These trunks provide switched data subscriber service to those CS subscribers having compatible terminals such as the AN/UGC-144. All signaling between the AN/TTC-39 series CS and its associated AN/TYC-39 is done over the signaling subchannel of the connecting trunk group. Figure VII-15 depicts the typical CS-MS interface.
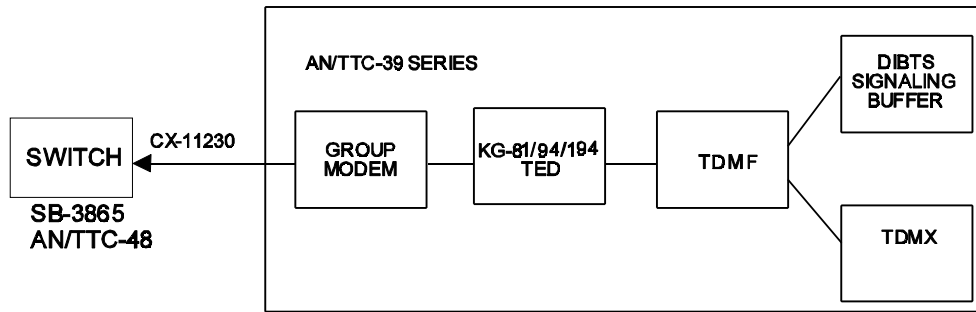
Figure VII-14. Four-Wire Digital In-Band Trunk Signaling,
AN/TTC-39 Series

a. <u>AN/TTC-39 Series Interface</u>. Terminate the interface on a GPMDM in the AN/TTC-39 series switch. The GPMDM must be configured for conditioned diphase operation and a group size that is compatible with the connected AN/TYC-39.

b. <u>AN/TTC-39 Series Database</u>. Classmark these trunks as Type 29. Under the MS Trunk characteristics, enter 0 (zero). Assign the TGC as a MS TGC using the ATG command. (See Chapter V.)

c. <u>Incoming Trunk Calls</u>. The connected MS maintains a telephone number and routing indicator (RI) for every CS subscriber it services. MS traffic addressed to a CS data subscriber is addressed by a RI, which is translated by the MS to a predetermined telephone number. Trunk selection is performed by the MS and control of the call is spill forward to the connected CS. Upon receipt by the CS, the data call is routed with the selected precedence, with preemption being exercised as appropriate for normal telephone calls. Once the connection is made, all further supervision is between the MS and the data terminal, AN/UGC-144, operating in the data adapter control mode.

d. <u>Outgoing Trunk Calls</u>. AN/UGC-144s (or any comparable data terminal with the DACB functionally) that are connected to DSVTs classmarked for Data or Multimode can place data calls to an AN/TYC-39 over a connecting trunk group. The connected MS is assigned a unique telephone number. When a data subscriber dials the MS number, the AN/TTC-39 series switch checks the subscriber's classmark to ensure that it is a data-capable terminal authorized to call the MS. Once translation is performed, an MS trunk is selected; and the call is routed in accordance with normal procedures. Once the call processing is complete, all further supervision and coordination are between the AN/UGC-144 and the data adapter termination unit (DATU) in the AN/TYC-39 MS.
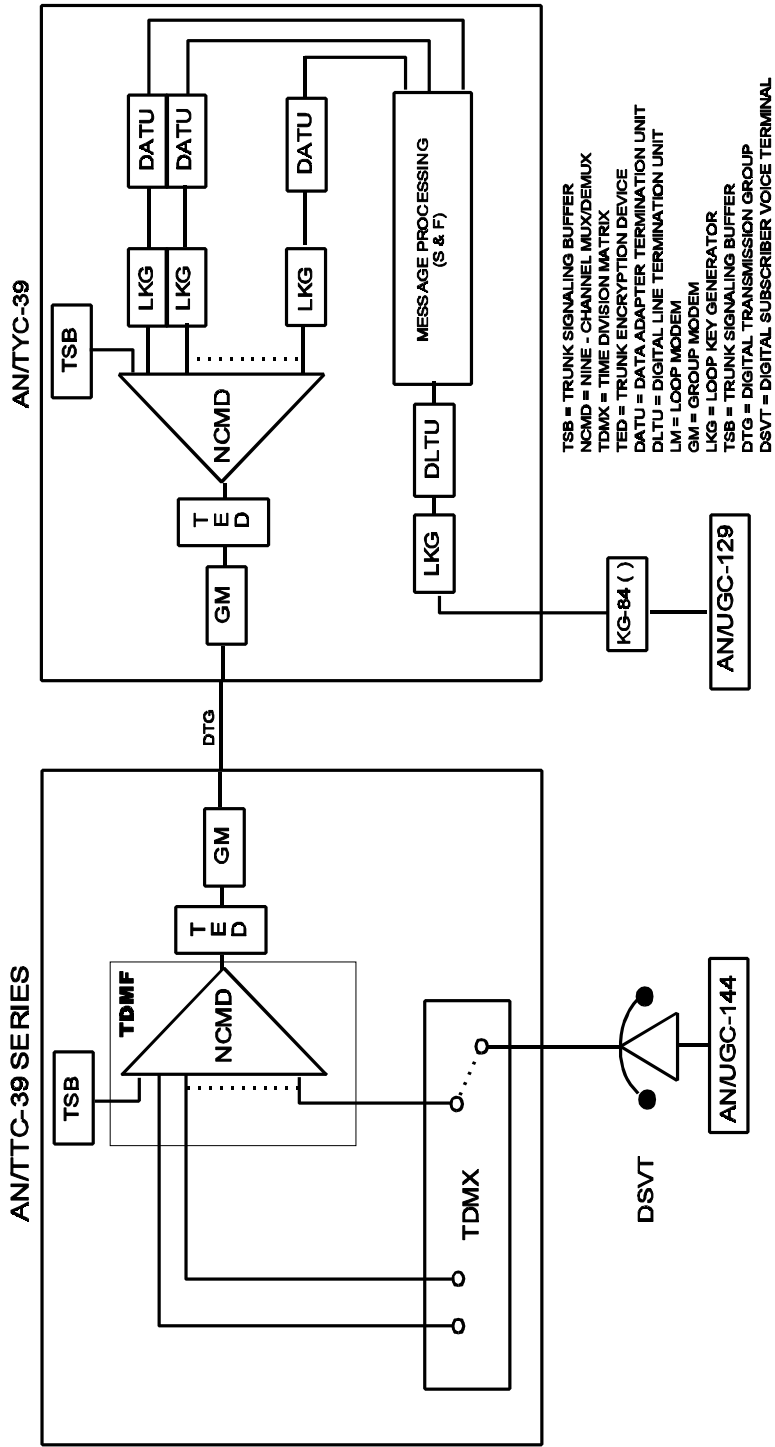
Figure VII-15. Circuit Switch to Message Switch Connectivity

TSB = TRUNK SIGNALING BUFFER
NCMD = NINE - CHANNEL MUX/DEMUX
TDMX = TIME DIVISION MATRIX
TED = TRUNK ENCRYPTION DEVICE
DATU = DATA ADAPTER TERMINATION UNIT
DLTU = DIGITAL LINE TERMINATION UNIT
LM = LOOP MODEM
GM = GROUP MODEM
LKG = LOOP KEY GENERATOR
TSB = TRUNK SIGNALING BUFFER
DTG = DIGITAL TRANSMISSION GROUP
DSVT = DIGITAL SUBSCRIBER VOICE TERMINAL

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