CELL SITE MAINTENANCE, INITIALIZATION, AND RECOVERY

1A *ESS*™ SWITCH

AUTOPLEX™ SYSTEM 100

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1. GENERAL

This document contains nontrouble ˉand trouble analysis procedures for the AUTOPLEX System 100 cell site(s) and cell site data links as performed from the MTSO (Mobile Telephone Switching Office) or ACC (AUTOPLEX Control Center). When maintenance personnel perform tasks at a cell site location, additional documents are required. Cell site and data link maintenance is performed from the ACC/MTSO by sending data to the cell site(s) and receiving responses from the cell site(s). Maintenance performed at the cell site location is based upon data obtained at the ACC/MTSO. The maintenance control center (MCC) and maintenance terminal capabilities can be accessed through dial-up channels provided at the cell sites.

The appropriate maintenance task is determined after a given stimulus (terminal printout, update, light-emitting diode (LED) indicator, audible alarm, etc.), and is accessed through the Table of Contents. Procedures in each task are controlled and displayed via the MCC, terminals, frame controls, and so forth located at the MTSO, ACC or cell site. Maintenance software subsystems at the cell site return acknowledgement for all manual and automatic requests.

2. TROUBLE ANALYSIS

The trouble analysis procedures in this document are designed to locate and clear (if possible) faults when the automatic diagnostics fail to do so. At an appropriate point in the trouble analyzing process, manual diagnostic testing may be performed to obtain definite fault identification data. Most manual diagnostic requests should include the trouble locating procedure (TLP) option with the terminal input message. This option provides a printout of probable circuit packs (CPs) at fault. The CPs are printed in an order of most likely first to least likely last. Information obtained from these procedures will assist maintenance personnel who are dispatched to a cell site.

3. REMOVE CELL SITE FROM SERVICE

1. **Note:** This procedure removes a cell site from service without service interruption (sometimes called graceful removal).

   At MTCE terminal, type **INH:CELL a,CP!**

   where: a = 1-255 single cell site number

   Response: At MCC system status panel, **SYSTEM ALARMS -
   INTERRUPT INHIBITED** and **EQUIPMENT STATUS -
   CELL SITE** lamp keys light up

2. Obtain trunk group numbers (TGNs) to cell site from office records.

3. **Note:** **BTRK-GROUP-MB** input message will cause idle trunks in trunk group to become MTCE busy. Traffic busy trunks are camped on and made MTCE busy as they become idle.

   Type **TRK-GROUP- MB 0 0 aaaa.** once for each trunk group to cell site and wait several minutes for all trunk groups to become MTCE busy.

   where: aaaa = TGN

   Response: **PF** followed by **TN15 TRK GRP aaaa END** message for trunk
   group when all of its trunks have been made MTCE busy

   where: aaaa = TGN

4. Have all trunk groups to cell site been made MTCE busy?

   If YES, proceed to Step 5.

   If NO, proceed to Step 6.

5. **Caution: Service interruption could result if cell site is removed from service before all trunks to cell site are MTCE busy.**

   Type **RMV:CELL a, DL b!** once for each data link to cell site.

   where: a = 1-255 single cell site number

                b = data link number 0 or 1

   Response: **PF** followed by **RMV:CELL DL COMPLETED** once for each
   data link successfully removed

   END OF PROCEDURE

6. Is this second time waiting for trunks to become MTCE busy?

If YES, proceed to Step 7.

If NO, proceed to Step 8.

7. Notify higher maintenance of possible service interruption if cell site is removed from service.

END OF PROCEDURE

8. Wait several more minutes and repeat from Step 4.

4. RESTORE CELL SITE TO SERVICE

1. Obtain trunk group numbers (TGNs) and related trunk network numbers (TNNs) to cell site from office records.

2. At MTCE terminal, type **TRK-GROUP- LT 0 0 aaaa.** once for each trunk group to cell site.

   where: aaaa = TGN

   Response: **PF** followed by **TN15 TRK GRP aaaa ST** message showing each trunk state in each trunk group requested

   where: aaaa = TGN

3. Are any trunks in MTCE busy state (such as **DSBLD** or **LKDO**)?

   If YES, proceed to Step 4.

   If NO, proceed to Step 5.

4. Type **T-TNN-MI 0 0 aaaaaa.** once for every trunk in MTCE busy state that should be made idle.

   where: aaaaaa = 6 digit TNN

5. Type **RST:CELL a,DL b[;UCL]!** once for each data link to cell site.

   where: a = 1-255 single cell site number

   b = data link number 0 or 1

   Response: **IP** followed by **RST:CELL DL COMPLETED** once for each data link restored to service

6. Type **ALW:CELL a,CP!**

   where: a = 1-255 single cell site number

   END OF PROCEDURE

5. INITIATE MOBILE CALL TRACE (MCT) TO IDENTIFY TLN TERMINATION IN CALL PATH

1. **Note:** This procedure is for active mobile-to-land calls or mobile-to-mobile calls within the same MTSO.

   Construct **MCT** input message using Table A with known 6-digit TLN termination or mobile unit DN involved in call.

2. **Note:** Only **NE05** output message(s) is used in this procedure.

   At MTCE terminal, type **MCT** input message constructed in Step 1.

   Response: **NE05 T-T**

   　　　　　　　NE06 CL REG

3. **Note:** One **NE05** message is printed for mobile-to-land call. Two **NE05** messages (one for each half of call path) are printed for mobile-to-mobile call.

   Determine if call is mobile-to-land or mobile-to-mobile.

4. Is call mobile-to-land or mobile-to-mobile?

   If MOBILE-TO-LAND proceed to Step 5.

   If MOBILE-TO-MOBILE proceed to Step 6.

5. Identify TLN terminations using **NE05** output message and Fig. 1.

6. Identify TLN terminations using **NE05** output messages and Fig. 2.

   END OF PROCEDURE

Fig. 1 — MTSO Hardware TLN Terminations for Mobile-to-Land or Land-to-Mobile Call Using MCT Feature
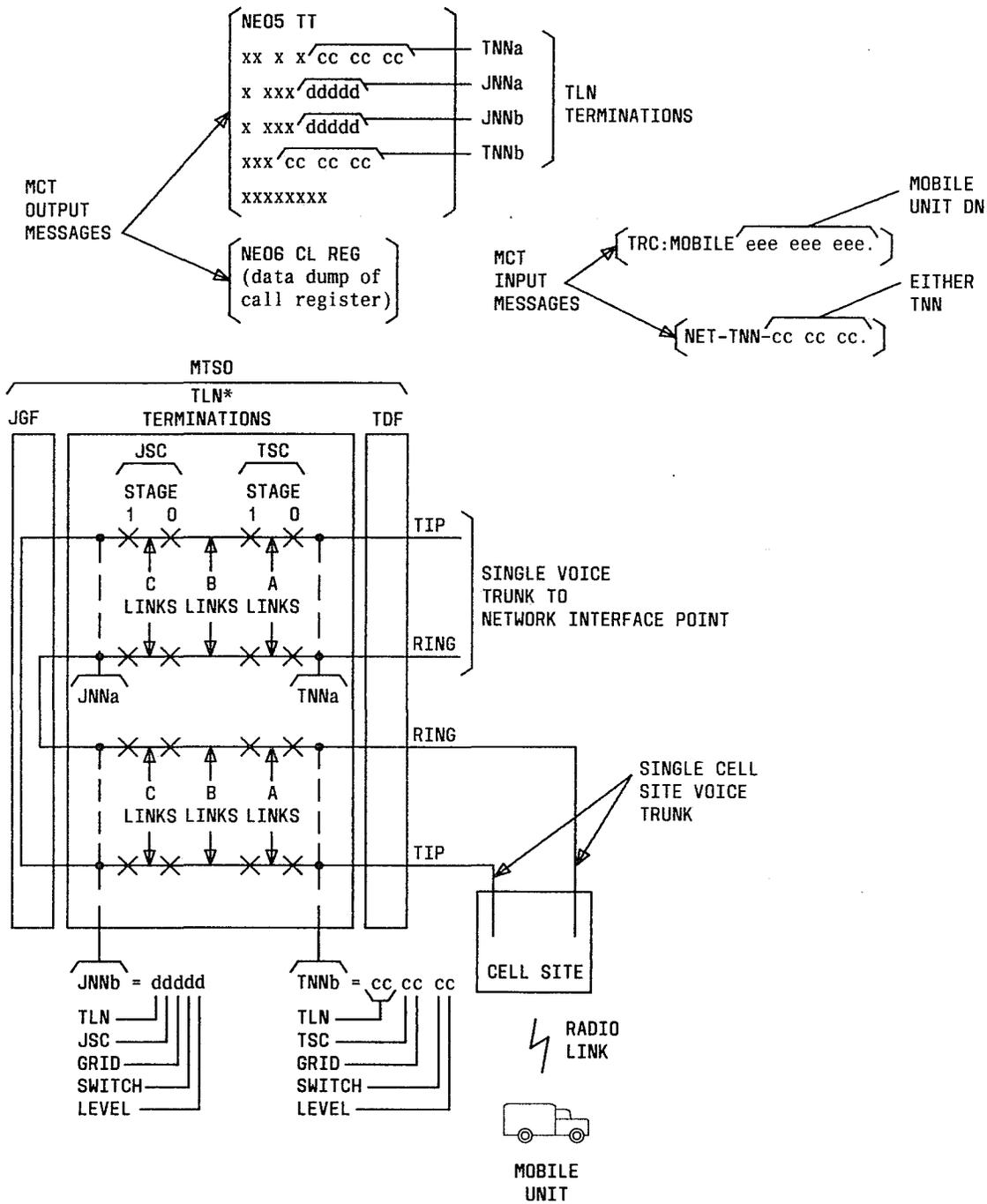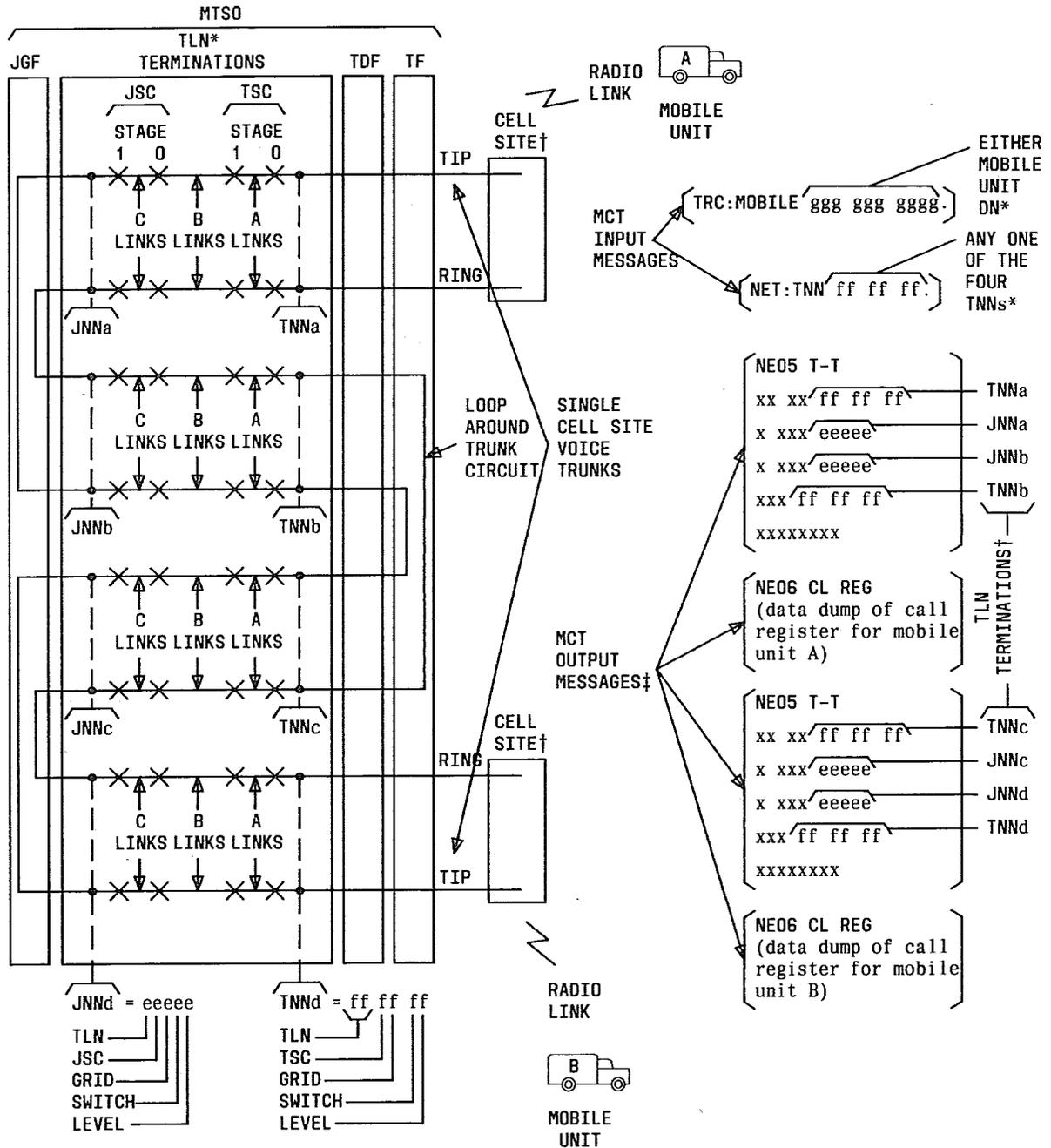
* CALL PATH MAY GO THROUGH ONE OR TWO TLNs

Fig. 2 — MTSO Hardware TLN Terminations for Mobile-to-Mobile Call Within Same MTSO Using MCT Feature

TABLE A
MCT MESSAGE FORMAT

KNOW TERMINAL IN CALL PATH	MCT INPUT MESSAGE FORMAT	DATA FIELD	EXPLANATION OF DATA FIELDS
A 10-digit DN of mobile unit involved in call within same MTSO	TRC:MOBILE aaabbbcccc! (use either DN if call is mobile to mobile)	a	3-Digit area code (000 if mobile unit is not a roamer).
Any 6-digit TNN of a Trunk Link Network involved in call (TGN*)	NET-TNN-dd ef gh.	b	3-Digit MTSO code.
		c	Last four digits of mobile unit DN.
		d	Trunk link network (TLN) 0—15.
		e	Trunk switch circuit (TSC) 0—7.
		f	Grid number 0—3.
		g	Switch number 0—7.
		h	Level number 0—7.
* To obtain TNN from TGN, refer to Form ESS 1202 of office records.			

6. PROGRAM 2096A DATA SET (DS) PORTS FOR RISE TIME

1. Measure distance (feet) between control or tributary DS and its data terminal equipment (Fig. 3).

2. Is data set to be located 0 to 50 feet or more from its data terminal equipment?

   If 0 to 50 feet proceed to Step 3.

   If More than 50 feet proceed to Step 4.

3. Set each rise time switch, at all four port locations, to open position for fast rise time (Fig. 4).

   END OF PROCEDURE

4. Set each rise time switch, at all four port locations, to closed position for slow rise time (Fig. 4).

   END OF PROCEDURE

CELL SITE DATA LINK 0 OR 1

```
CELL SITE                              MTSO
```

TRANSMISSION FACILITIES

```
+----------------+    +-----------+         +-----------+    +----------------+
| CELL SITE      |    |           |         |           |    | PERIPHERAL     |
| CONTROLLER     |<-> | TRIBUTARY |<-  )) ->| CONTROL   |<-> | CONTROLLER OF  |
| AND DATA LINK  |    | DATA SET  |         | DATA SET  |    | 1A INPUT/OUTPUT|
| INTERFACE*     |    |           |         |           |    | PROCESSOR*     |
+----------------+    +-----------+         +-----------+    +----------------+
```

DISTANCE TO MEASURE   DISTANCE TO MEASURE
IN FEET FOR TRIBUTARY   IN FEET FOR CONTROL
DATA SET   DATA SET
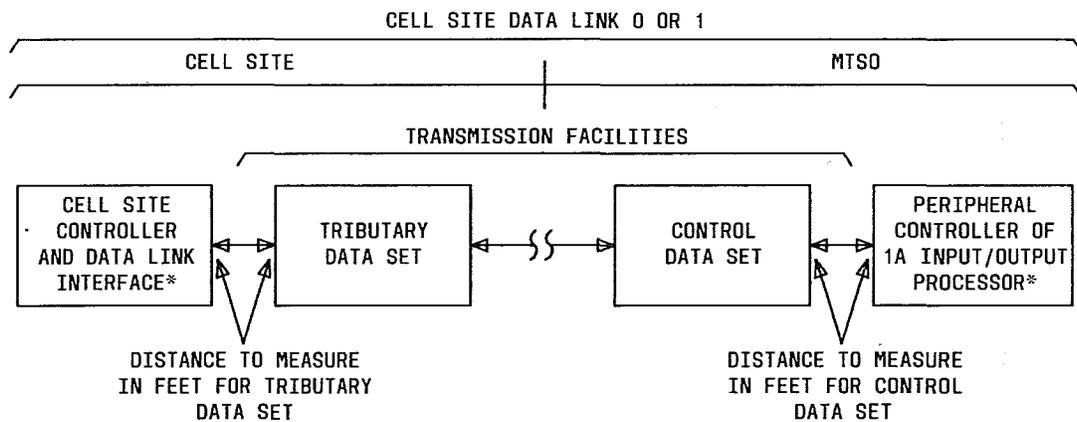
* DATA TERMINAL EQUIPMENT FOR DATA SET

Fig. 3 — Control and Tributary Data Sets With Associated Data Terminal Equipment

PORT 3

PORT 2

PORT 1

PORT 4

RISE TIME-SWITCH
(ONE SWITCH LOCATED
AT EACH PORT ON
DATA SET)
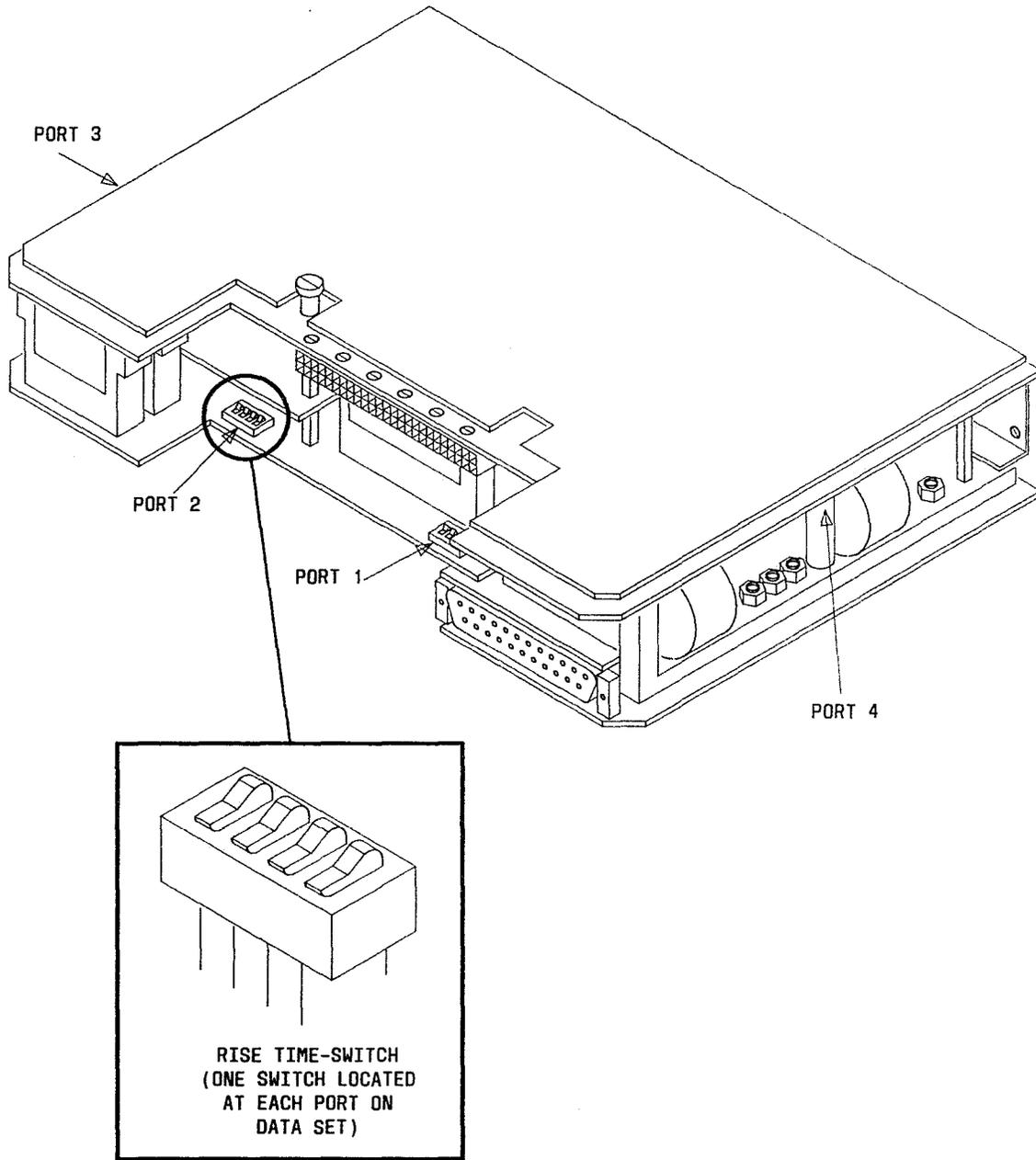
Fig. 4 — Rear View of 2096A Data Set and Port Locations

7. INSTALL MTSO/CELL SITE OPTIONS INTO 2096A DATA SET FOR DATA LINK OPERATION

1. **Note:** Control (located at MTSO) data sets require different options than tributary (located at cell site) data sets for cell site data link application.

   Identify options to install in control or tributary data set (Table B).

2. Hold -/+ switch in the - or + position to scroll through options and release switch when option to install appears in display.

3. **Note:** Check mark appears to left of option in data set display for installed option.

   Does display show option currently installed?

   > If YES, proceed to Step 5.

   > If NO, proceed to Step 4.

4. Depress **EXEC** pushbutton to install option.

   Response: Check mark appears beside option.

5. Are all required options installed in data set?

   > If YES, then END OF PROCEDURE.

   > If NO, proceed to Step 2.

TABLE B	
TRIBUTARY DATA SET OPTIONS	
OPTION	DESCRIPTION
MTSO (CONTROL) DATA SET LOCATION	
A1	Point-to-point control
B2	Slaved timing
C1	Continuous carrier, switched RS 1
C5	Continuous carrier, continuous RS
D7	Data auxiliary set not used
CELL SITE (TRIBUTARY) DATA SET LOCATION	
A2	Point-to-point tributary
B3	External timing port 1
C1	Continuous carrier, switched RS 1
C5	Continuous carrier, continuous RS
D7	Data auxiliary set not used

8. PROGRAM MTSO (CONTROL) 2096A DATA SET FOR DATA LINK OPERATION

1. **Note:** Battery switch is located on top and behind front panel for horizontally mounted data sets, and on right side for vertically mounted data sets.

   Set battery switch toward white dot (ON).

2. Set all four groups (one group at each port) of rise time switches for fast or slow rise time.

   Reference: 6. PROGRAM 2096A DATA SET PORTS FOR RISE TIME

3. Select command menu by setting **TEST/CMD** switch to **CMD**.

   Response: Display shows **MDCK**

4. Hold **BWD/FWD** switch in the **BWD** or **FWD** position to scroll through command menu and release switch when **MTCE** appears in display.

5. Depress **EXEC** pushbutton.

   Response: Display shows **MC/I** (unit in maintenance mode) or **MC/O** (unit out of maintenance mode)

6. Does display show **MC/O** or **MC/I**?

   If **MC/O** proceed to Step 7.

   If **MC/I** proceed to Step 8.

7. Depress **EXEC** pushbutton.

   Response: Display shows **MC/I**

8. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **CHOP** (change option) appears in display.

9. Depress **EXEC** pushbutton.

   Response: Display shows **CH**** with ****** flashing

10. Install MTSO (control) data set options (A1, B1, and C5).

    Reference: 7. INSTALL MTSO/CELL SITE OPTIONS INTO 2096A DATA
                  SET FOR DATA LINK OPERATION

11. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **CHPL** (change poll list) appears in display.

12. Depress **EXEC** pushbutton.

    Response: Display shows **PL**** with ****** flashing

13. Hold -/+ switch in the - or + position to scroll through current addresses on poll list and release switch when **01** appears in display.

14. Depress **EXEC** pushbutton.

    Response: Check mark appears to left of **01** in display

15. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **CHNA** (change network address) appears in display.

16. Depress **EXEC** pushbutton.

    Response: Display shows **NA**** with ****** flashing

17. **Note:** Network address is assigned by telephone company.

    Identify network address assigned to that particular data link from office records.

18. Hold -/+ switch in the - or + position and release switch when assigned network address appears in display.

19. Depress **EXEC** pushbutton.

    Response: Display flashes once

20. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **MTCE** appears in display.

21. Depress **EXEC** pushbutton two times.

    Response: Display shows **MC/I** and then **MC/O**

22. Set **TEST/CMD** switch to center (normal) position.

    Response: Display shows 1-96

END OF PROCEDURE

9. PROGRAM CELL SITE (TRIBUTARY) 2096A DATA SET FOR DATA LINK OPERATION

1. **Note:** Battery switch is located on top and behind front panel for horizontally mounted data sets, and on right side for vertically mounted data sets.

   Set battery switch toward white dot (ON).

2. Set all four groups (one group at each port) of rise time switches for fast or slow rise time .

   Reference: 6. PROGRAM 2096A DATA SET PORTS FOR RISE TIME

3. Select command menu by setting **TEST/CMD** switch to **CMD**.

   Response: Display shows **MDCK**

4. Hold **BWD/FWD** switch in the **BWD** or **FWD** position to scroll through command menu and release switch when **MTCE** appears in display.

5. Depress **EXEC** pushbutton.

   Response: Display shows **MC/I** (unit in maintenance mode) or **MC/O** (unit out of maintenance mode)

6. Does display show **MC/O** or **MC/I**?

   If **MC/O** proceed to Step 7.

   If **MC/I** proceed to Step 8.

7. Depress **EXEC** pushbutton.

   Response: Display shows **MC/I**

8. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **CHOP** (change option) appears in display.

9. Depress **EXEC** pushbutton.

   Response: Display shows **CH**** with ** flashing

10. Install cell site (tributary) data set options (A2, B3, C1, and C5).

    Reference: 7. INSTALL MTSO/CELL SITE OPTIONS INTO 2096A DATA
                   SET FOR DATA LINK OPERATION

11. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **CHNA** (change network address) appears in display.

12. Depress **EXEC** pushbutton.

    Response: Display shows **NA**** with ** flashing

13. **Note:** Network address variable is assigned by telephone company.

    Identify network address assigned to that particular data link from office records.

14. Hold -/+ switch in the - or + position and release switch when assigned network address appears in display.

15. Depress **EXEC** pushbutton.

    Response: Display flashes once

16. Hold **BWD/FWD** switch in the **BWD** or **FWD** position and release switch when **MTCE** appears in display.

17. Depress **EXEC** pushbutton two times.

    Response: Display shows **MC/I** and then **MC/O**

18. Set **TEST/CMD** switch to center (normal) position.

    Response: Display shows 1-96

END OF PROCEDURE

10. ESTABLISH CELL SITE MAINTENANCE CHANNEL DIAL-UP CONNECTION TO MTSO

1. **Note:** Procedures to power up, setting options, and physically connecting portable terminal depend on type of terminal being used.

   At cell site, connect terminal to appropriate telephone line, power up and set options.

2. **Note:** Dial-up data set at MTSO is assigned a directory number (DN) at local Network Interface Point (NIP).

   Dial or type DN of dial-up data set at MTSO.

   Response: MTSO answers by sending **?** as acknowledgment and prompt back
   to portable terminal

3. **Note:** Dial-up connection is terminated by MTSO if correct login is not sent within 2 minutes.

   Type **LOGIN:CELL a!**

      where: a = 1-255 single cell site number

   Response: MTSO sends **OK**

4. **Note:** Procedure to hang up connection depends on type of terminal being used.

   Hang up connection.

   Response: MTSO calls back with audible ringing (dial-up connection now
   acts like cell site MTCE channel)

   END OF PROCEDURE

11. REPLACE IOP CIRCUIT PACKS (CPS)

1. At power control unit of **IOP**, rotate **OFF** switch clockwise to **ROS** position.

   Response: **OFF NORM** lamp lights white

   ACK lamp
   flashes white once

   OS lamp lights yellow

2. Caution: Service interruption could occur if power is removed from IOP before system takes it out of service. OS lamp must be lighted before continuing with procedure.

   Depress **OFF** switch.

   Response: **PWR OFF** lamp lights red

   OFF NORM lamp still lighted white

   OS lamp still lighted yellow

3. Remove CP(s) from IOP and replace with same type.

4. Rotate **OFF** switch counter-clockwise to original position and depress **ON** switch.

   Response: **OS** lamp still lighted yellow

   ACK lamp lights steady white. Automatic diagnostics of IOUS
   are run by system. If IOP diagnostics ATP, then all power
   control unit lamps go off

   END OF PROCEDURE

12. DIAGNOSE ALARM INTERFACE

1. Construct **DGN:CELL TLP** input message per Table C to diagnose alarm interface.

2. At MTCE terminal, type **DGN:CELL TLP** message as constructed in Step 1.

    Response: IP (Indicates request has been accepted and sent to cell site. Output message will follow.)

3. Does **DGN:CELL** output message show **STF** or **ATP**?

    If **STF** proceed to Step 4.

    If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s) given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

    END OF PROCEDURE

6. Type **RST:CELL a,AL!**

    where: a = 1-255 single cell site number

    Response: **IP** followed by **RST:CELL AL COMPLETED ATP**

    END OF PROCEDURE

TABLE C		
ALARM INTERFACE FORMAT		
INPUT MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN:CELL a,AL[;[RPT b][,RAW] [,UCL]]:[PH c,]TLP!	a	Single cell site number (1—255.)
	b	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32, 767.
	c	Phase number (decimal 1 or 2). May use single number or range of numbers.

13. DIAGNOSE TEST GENERATOR

1. Construct **DGN:CELL TLP** input message per Table D to diagnose test generator at cell site.

2. At MTCE terminal, type **DGN:CELL TLP** message as constructed in Step 1.

    Response: **IP** (indicates request has been accepted and sent to cell site. Output message will follow.)

3. Does **DGN:CELL** output message show **STF** or **ATP**?

    If **STF** proceed to Step 4.

    If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s) given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

    END OF PROCEDURE

6. Type **RST:CELL a,RF!**

    where: a = 1-255 single cell site number

    Response: **IP** followed by **RST:CELL RF COMPLETED ATP**

    END OF PROCEDURE

TABLE D		
TEST GENERATOR MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN:CELL a,RF[;[RPT b][,RAW] [,UCL]]:[PH c,]TLP!	a	Single cell site number (1-255).
	b	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32,767.
	c	Phase number (decimal 1 through 6). May use single number or range of numbers.

14. DIAGNOSE MEASURING INSTRUMENTS

1. Construct **DGN:CELL TLP** input message per Table E to diagnose measuring instruments at cell site.

2. At MTCE terminal, type **DGN:CELL TLP** message constructed in Step 1.

   Response: **IP** (indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a,MI!**

   where: a = 1-255 single cell site number

   Response: **IP** followed by **RST:CELL MI COMPLETED ATP**

   END OF PROCEDURE

TABLE E		
MEASURING INSTRUMENTS MESSAGE FORMAT		
MESSAGE FORMAT	**DATA FIELD**	**EXPLANATION**
DGN:CELL a,MI[;[RPT b][,RAW] [,UCL]]:[PH c,]TLP!	a	Single cell site number (1-255).
	b	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32, 767.
	c	Phase number (decimal 1 through 5). May use single number or range of numbers.

15. DIAGNOSE SETUP RADIO

1. Construct **DGN:CELL TLP** input message per Table F to diagnose setup radio at cell site.

2. At MTCE terminal, type **DGN:CELL TLP** message constructed in Step 1

   Response: **IP** (indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a, SU b!**

   where: a = 1-255 single cell site number

                b = setup radio 0-3

   Response: **IP** followed by **RST:CELL SU COMPLETED ATP**

   END OF PROCEDURE

TABLE F		
SETUP RADIO MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN: CELL a, SU b[;[RPT c][,RAW] [,UCL]]:[PH d,]TLP [,CHANL e]!	a	Single cell site number (1-255).
	b	Setup radio 0-3.
	c	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32,767.
	d	Phase number (decimal 1 through 9). May use single number or range.
	e	Channel number (decimal 334 through 666). If channel is not specified, any available channel is picked. If the specified channel is not available, the request will be denied.

16. DIAGNOSE LOCATION RADIO

1. Construct **DGN: CELL TLP** input message per Table G to diagnose location radio at cell site.

2. At MTCE terminal, type **DGN:CELL TLP** message constructed in Step 1.

   Response: **IP** (Indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a, LC b!**

   where: a = 1-255 single cell site number

   b = location radio 0 or 1

   Response: **IP** followed by **RST:CELL LC COMPLETED ATP**

   END OF PROCEDURE

TABLE G		
LOCATION RADIO MESSAGE FORMAT		
MESSAGE FORMAT	**DATA FIELD**	**EXPLANATION**
DGN: CELL a, LC b[;[RPT c][,RAW] [,UCL]]:[PH d,]TLP [,CHANL e]!	a	Single cell site number (1-255).
	b	Location radio 0 or 1.
	c	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32,767.
	d	Phase number (decimal 1 through 6). May use single number or range of numbers.
	e	Channel number (decimal 334 through 666). If channel is not specified, any available channel is picked. If the specified channel is not available, the request will be denied.

17. DIAGNOSE CELL SITE DATA LINK

1. Is TLP tape mounted on TUC frame?

    If YES, proceed to Step 3.

    If NO, proceed to Step 2.

2. Obtain TLP tape for MTSO and mount onto tape transport of TUC.

    Reference: 28. MOUNT TAPE ON TAPE TRANSPORT

3. Construct **DGN:CELL DL TLP** input message per Table H to diagnose cell site data link.

4. At MTCE terminal type **DGN:CELL DL TLP** message constructed in Step 3.

    Response: **IP** (Indicates request has been accepted. Output message will follow.)

5. Does **DGN: CELL DL** output message show **STF** or **ATP**?

    If **STF** proceed to Step 6.

    If **ATP** proceed to Step 15.

6. Identify IOP frame number, circuit pack (CP) types, and CP location given by TLP list.

7. Are suspected CPs on TLP list located at MTSO or cell site?

    If MTSO proceed to Step 8.

    If cell site proceed to Step 19.

8. Obtain spare CP for each type on TLP list.

9. Locate physical IOP with lighted **OS** lamp that is related to failing data link.

10. Power IOP down, replace first CP on TLP list with spare, and power back up.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

11. Does **OS** lamp go off?

    If YES, proceed to Step 15.

    If NO, proceed to Step 12.

12. Is this last CP on TLP list?

    If YES, proceed to Step 17.

    If NO, proceed to Step 13.

13. Obtain original CP just replaced and spare of next CP on list.

14. Power IOP down, replace CP just installed with original, replace next CP on list with spare and power back up.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

15. Type **RST:CELL a, DL b!**

        where: a = 1-255 single cell site number

                     b = data link 0 or 1

    Response: **IP** followed by **RST:CELL DL COMPLETED**

16. Does diagnostic ATP and cell site data link restore to service?

        If YES, then END OF PROCEDURE.

        If NO, proceed to Step 17.

17. Identify PR number associated with failing phase number given by DGN output message and Table H.

18. Analyze failing phase (PH), segment (SEG) and test (TST) with PR document to clear problem. Trouble is beyond scope of this document.

    END OF PROCEDURE

19. Notify maintenance personnel that maintenance is required on data link at cell site location.

    END OF PROCEDURE

TABLE H		
CELL DATA LINK MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN: CELL a,DL b[;[RPT c][, RAW] [,UCL]]:[PH d,]TLP!	a	Single cell site number (1-255).
	b	Data link 0 or 1.
	c	Number of times diagnostic is to be repeated. Default is one time. Maximum is 255.
	d	Phase number (decimal 1 through 6). May use single number or range of numbers.

18. DIAGNOSE CELL SITE CONTROLLER (CSC)

1. Construct **DGN:CELL TLP** input message per Table I to diagnose CSC at cell site.

2. At MTCE terminal, type **DGN:CELL CSC TLP** message constructed in Step 1.

   Response: **IP** (indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL CSC** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a, CSC b!**

   where: a = 1-255 single cell site number

   b = CSC 0 or 1

   Response: **IP** followed by **RST:CELL CSC COMPLETED ATP**

   END OF PROCEDURE

TABLE I		
CELL CONTROLLER MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN: CELL a,CP b[;[RPT c][, RAW] [,UCL]]:[PH d,]TLP!	a	Single cell site number (1-255).
	b	Cell processor 0 or 1.
	c	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32,767.
	d	Phase number (decimal 1 through 29). May use single number or range of numbers.

19. DIAGNOSE REFERENCE GENERATOR

1. Construct **DGN:CELL TLP** input message per Table J to diagnose reference generator at cell site.

2. At MTCE terminal, type **DGN:CELL RG TLP** message constructed in Step 1.

   Response: **IP** (indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL RG** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a,RG b!**

   where: a = 1-255 single cell site number

   b = RG 0 or 1

   Response: **IP** followed by **RST:CELL RG COMPLETED ATP**

   END OF PROCEDURE

TABLE J		
REFERENCE GENERATOR MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN:CELL a,RG b [;[RPT c][,RAW] [,UCL]]:[PH d,]TLP!	a	Single cell site number (1-255).
	b	Reference generator 0 or 1.
	c	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32,767.
	d	Phase number (decimal 1 through 3). May use single number or range of numbers.

20. DIAGNOSE VOICE RADIO GROUP

1. Construct **DGN:CELL TLP** input message per Table K to diagnose voice radio group at cell site.

2. At MTCE terminal, type **DGN:CELL RC TLP** message constructed in Step 1.

    Response: **IP** (indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL RC** output message show **STF** or **ATP**?

    If **STF** proceed to Step 4.

    If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

    END OF PROCEDURE

6. Type **RST:CELL a, RC b, VG c!**

    where: a= 1-255 single cell site number

    b = radio frame 0-5

    c = voice radio group 0 or 1

    Response: **IP** followed by **RST:CELL RC COMPLETED ATP**

    END OF PROCEDURE

<table>
<tr><td colspan="3" align="center">TABLE K

VOICE RADIO GROUP MESSAGE FORMAT</td></tr>
<tr><td align="center">MESSAGE FORMAT</td><td align="center">DATA FIELD</td><td align="center">EXPLANATION</td></tr>
<tr><td rowspan="5">DGN:CELL a,RC b,VG c[;[RPT d]
[, RAW][, UCL]]:[PH e,]TLP!</td><td>a</td><td>Single cell site number (1-255).</td></tr>
<tr><td>b</td><td>Radio frame common equipment (0-5).</td></tr>
<tr><td>c</td><td>Voice group (0 or 1).</td></tr>
<tr><td>d</td><td>Number of times diagnostic is to be repeated. Default is one time. Maximum is 32, 767.</td></tr>
<tr><td>e</td><td>Phase number (decimal 1 through 3). May use single number or range of numbers.</td></tr>
</table>

21. DIAGNOSE VOICE RADIO

1. Construct **DGN:CELL TLP** input message per Table L to diagnose voice radio at cell site.

2. At MTCE terminal, type **DGN:CELL VF VG RA TLP** message constructed in Step 1.

   Response: IP (Indicates request has been accepted and sent to cell site. Output messages will follow.)

3. Does **DGN:CELL VF VG RA** output message show **STF** or **ATP**?

   If **STF** proceed to Step 4.

   If **ATP** proceed to Step 6.

4. Identify frame, circuit(s), level(s), and slot(s), given by the TLP list.

5. Notify maintenance personnel that maintenance is required at cell site.

   END OF PROCEDURE

6. Type **RST:CELL a, VF b, VG c, RA d!**

   where: a = 1-255 single cell site number

   b = voice radio frame 0-5

   c = voice radio group 0 or 1

   d = voice radio 0-7

   Response: **IP** followed by **RST:CELL VF VG RA COMPLETED ATP**

   END OF PROCEDURE

TABLE L		
VOICE RADIO MESSAGE FORMAT		
MESSAGE FORMAT	DATA FIELD	EXPLANATION
DGN:CELL a, VF b, VG c, RA d [;[RPT e][,RAW][,UCL]] :[PH f,]TLP[,CHANL g]!	a	Single cell site number (1-255).
	b	Voice radio frame (0-5).
	c	Voice group (0 or 1).
	d	Voice radio (0-7).
	e	Number of times diagnostic is to be repeated. Default is one time. Maximum is 32, 767.
	f	Phase number (decimal 1 through 3). May use single number or range of numbers.
	g	Channel number (decimal 334 through 666). If channel is not specified, any available channel is picked. If the specified channel is not available, the request will be denied.

22. ACTIVATE MOBILE CALLING LINE IDENTIFICATION (MCLID) FOR CALLS TERMINATING IN MTSO

1. At MTCE terminal, type **VFY-DN- 30 aaa aaaa.**

   where: aaa aaaa = 7 digit mobile DN to be monitored by MCLID

   Response: **TR01** (contains DN terminating translation information)

2. Determine if trace function (bit 9) of DNCL1 in **TR01** output message is active or inactive (Fig. 5).

3. Is trace function active or inactive?

   If ACTIVE then END OF PROCEDURE.

   If INACTIVE proceed to Step 4.

4. Type **ALW:RCCHAN LOC!**

   Response: **PF** (indicates message received)

   REPT: RC WARNING OFFICE RC CHANNEL-LOC

   Audible Alarm (spurt minor alarm)

5. **Note:** (CR) = Carriage return.

   Type **RC:MOBL;CHG:(CR)ORD aaa(CR)TN bbbbbbb(CR)TRC!**

   where: aaa = recent change order number in octal

   bbbbbbb = 7 digit mobile DN to be monitored by MCLID

   Response: **RC18 65 aaa ACPT**

   where: aaa = recent change order number

6. Type **VFY-DN- 30 aaa aaaa.**

   where: aaa aaaa = 7 digit mobile DN to be monitored by MCLID

   Response: **TR01** (contains DN terminating translation information)

7. Is trace function (bit 9) of DNCL1 set to 1?

   If YES, then END OF PROCEDURE.

   If NO, proceed to Step 8.

8. Is this first attempt to set trace bit?

   If YES, proceed to Step 5.

If NO, proceed to Step 9.

9. Report trouble to next higher maintenance. Trouble is beyond scope of this document.

END OF PROCEDURE

```
M 39 TRØ1 267 7615
       Ø Ø Ø Ø                                    7 DIGIT INPUT DN
       LEN Ø1 ØØ1 1Ø6              DNCL 1
      Ø1 ØØØ ØØ1 ØØØ ØØ1 ØØØ 4
      ØØ ØØØ ØØØ ØØØ ØØØ ØØØ ØØØ ØØØ
       Ø Ø Ø Ø
       Ø Ø Ø Ø Ø
       Ø Ø
       Ø Ø Ø Ø                               BIT POSITION 9 = 1 FOR ACTIVE TRACE
      ØØØ ØØØØ                                            = 0 FOR INACTIVE TRACE
       Ø Ø Ø Ø Ø ØØØ ØØØØ
       Ø Ø
       Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø
       Ø Ø Ø Ø
       Ø Ø Ø
       Ø ØØØ ØØØ ØØØØ
       Ø
       Ø ØØØØØØØØØØØ

       #361
```

Fig. 5 — Example of TR01 Output Message - DNCL 1 Active Trace Bit - DN Terminating Translations

23. ACTIVATE MOBILE CALLING LINE IDENTIFICATION (MCLID) FOR CALLS ORIGINATING FROM MTSO

1. At MTCE terminal, type **CI-LIST-.**

   Response: **CT06** listing any DNs active on CLID list

2. Does **CT06** output message show DN to be monitored (Fig. 6)?

   > If YES, then END OF PROCEDURE.

   > If NO, proceed to Step 3.

3. Type **CI-ENTER- a bbb ccc dddd.** to enter monitored DN onto CLID list.

   > where: a = 0-3 (0 is for no prefix, 1 is prefix 0, 2 is prefix 1, and 3 is for all prefixes)

   > bbb = area code

   > ccc = office code

   > dddd = station number

   Response: **OK** (DN is now added to list)

   NG (DN was not added to list; list was full)

4. Type **CI-LIST-.**

   Response: **CT06** listing any DNs active on CLID list

5. Is DN to be monitored listed by **CT06** output message (Fig. 6)?

   > If YES, then END OF PROCEDURE.

   > If NO, proceed to Step 6.

6. Is this first attempt to enter DN on CLID list?

   > If YES, proceed to Step 3.

   > If NO, proceed to Step 7.

7. Report trouble to next higher maintenance. Trouble is beyond scope of this document.

   END OF PROCEDURE

```
CT06 aaa
b bbb bbb bbbb ⎤
 •   •   •   •  ⎥
 •   •   •   •  ⎬──▷ LOOK FOR DN TO BE MONITORED
 •   •   •   •  ⎦
```

a = Quantity of DNs on CLID list (decimal)
b = DNs on CLID list

Fig. 6 — Example of CT06 Output Message Format

24. PROCESS CT04 OUTPUT MESSAGES

1. **Note:** The **CT04** output message helps identify and indicates that an incoming call from a NIP trunk has been placed to a monitored mobile directory number (DN).

   Obtain **CT04** output messages for monitored DN and log information into office records (Fig. 7).

2. Is mobile DN to remain in monitored status?

   If YES, then END OF PROCEDURE.

   If NO, proceed to Step 3.

3. At MTCE terminal, type **ALW:RCCHAN LOC!**

   Response: **PF** (indicates message received)

   REPT: RC WARNING OFFICE RC CHANNEL-LOC

   Audible Alarm (spurt minor alarm)

4. **Note:** (CR) = Carriage return.

   Type **RC:MOBL;CHG:(CR)ORD aaa(CR)TN bbbbbbb(CR) TRC NO!.**

   where: aaa = recent change order number in octal

   bbbbbbb = 7 digit mobile unit DN

   Response: **RC18 65 aaa ACPT**

   where: aaa = recent change order number

5. Type **VFY-DN- 30 aaa aaaa.**

   where: aaa aaaa = 7 digit mobile unit DN

   Response: **TR01** (contains DN terminating translation information)

6. Is trace function (bit 9) of DNCL1 in **TR01** output message active or inactive (Fig. 8)?

   If ACTIVE proceed to Step 7.

   If INACTIVE then END OF PROCEDURE.

7. Is this first attempt to remove trace function?

   If YES, proceed to Step 4.

   If NO, proceed to Step 8.

8. Report trouble to next higher maintenance. Trouble is beyond scope of this document.
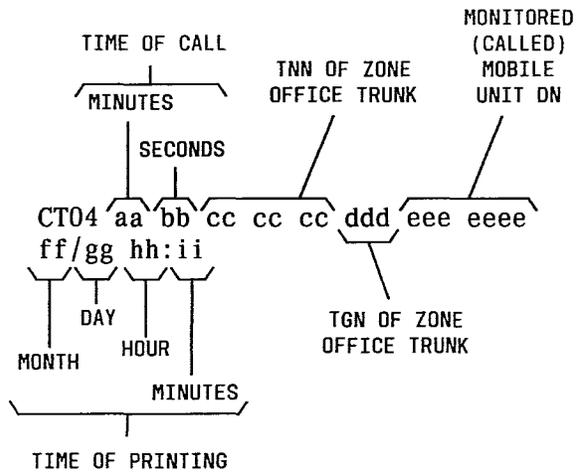
   END OF PROCEDURE

```
               TIME OF CALL                          MONITORED
                    |              TNN OF ZONE       (CALLED)
                /MINUTES\          OFFICE TRUNK       MOBILE
                                                     UNIT DN
                    | SECONDS
                    |   |                        /           /
         CTO4  aa  bb  cc cc cc  ddd  eee eeee
         ff/gg hh:ii
          \        |   |   |   \                 /
             |    DAY     |      \         TGN OF ZONE
             |            |       \        OFFICE TRUNK
          MONTH  HOUR     |
                      MINUTES
          \                   /
                    |
           TIME OF PRINTING
```

Fig. 7 — Example of CTO4 Output Message Format

```
M 39 TRØ1  267 7615
      Ø Ø Ø Ø                                  7 DIGIT INPUT DN
      LEN Ø1 ØØ1 1Ø6          DNCL 1
     Ø1 ØØØ ØØ1 ØØØ ØØ1 ØØØ 4
     ØØ ØØØ ØØØ ØØØ ØØØ ØØØ ØØØ ØØØ
      Ø Ø Ø Ø
      Ø Ø Ø Ø Ø
      Ø Ø
      Ø Ø Ø Ø                          BIT POSITION 9 = 1 FOR ACTIVE TRACE
     ØØØ ØØØØ                                        = 0 FOR INACTIVE TRACE
      Ø Ø Ø Ø Ø ØØØ ØØØØ
      Ø Ø
      Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø
      Ø Ø Ø Ø
      Ø Ø Ø
      Ø ØØØ ØØØ ØØØØ
      Ø
      Ø ØØØØØØØØØØØ

      #361
```

Fig. 8 — Example of TR01 Output Message -DNCL 1 Active Trace Bit - DN Terminating Translations

25. PROCESS CT03/CT05 OUTPUT MESSAGES

1. **Note:** The **CT03** and **CT05** output messages are printed when calls are placed to directory numbers (DNs) monitored at the MTSO and help identify the mobile DN placing the call.

   Obtain **CT03** or **CT05** output messages for monitored DN and log information into office records (Fig. 9).

2. Is monitored DN to remain in monitored status?

   If YES, then END OF PROCEDURE.

   If NO, proceed to Step 3.

3. At MTCE terminal, type **CI-LIST-.**

   Response: **CT06** listing any DNs active on CLID list

4. Does **CT06** output message show monitored DN (Fig. 10)?

   If YES, proceed to Step 5.

   If NO, proceed to Step 9.

5. Type **CI-REMOVE- a bbb ccc dddd.** for monitored DN to be removed.

   where: a = 0-3 (0 is for no prefix, 1 is prefix 0, 2 is prefix 1, and 3 is for all prefixes)

   bbb = area code

   ccc = office code

   dddd = station number

   Response: **OK**

6. Type **CI-LIST-.**

   Response: **CT06** listing any DNs active on CLID list.

7. Has monitored DN been removed from **CT06** output message?

   If YES, proceed to Step 9.

   If NO, proceed to Step 8.

8. Is this first attempt to remove monitored DN?

   If YES, proceed to Step 5.

   If NO, proceed to Step 16.

9. Type **VFY-DN- 30 aaa aaaa.**

   where: aaa aaaa = 7 digit monitored DN

   Response: **TR01** (contains DN terminating translation information)

10. Does **TR01** output message show trace function (bit 9) of DNCL 1 active or inactive (Fig. 11)?

    If ACTIVE proceed to Step 11.

    INACTIVE then END OF PROCEDURE.

11. Type **ALW:RCCHAN LOC!**

    Response: **PF** (indicates message received)

    REPT: RC WARNING OFFICE RC CHANNEL-LOC

    Audible Alarm (spurt minor alarm)

12. **Note:** (CR) = Carriage return.

    Type **RC:MOBL;CHG:(CR)ORD aaa(CR)TN bbbbbbb(CR) TRC NO!**

    where: aaa = recent change order number in octal

    bbbbbbb = 7 digit DN that needs to have trace function removed

    Response: **RC 18 65 a ACPT**

    where: a = recent change order number

13. Type **VFY-DN- 30 aaa aaaa.**

    where: aaa aaaa = 7 digit monitored DN

    Response: **TR01** (contains DN terminating translation information)

14. Has trace function bit changed to inactive state?

    If YES, then END OF PROCEDURE.

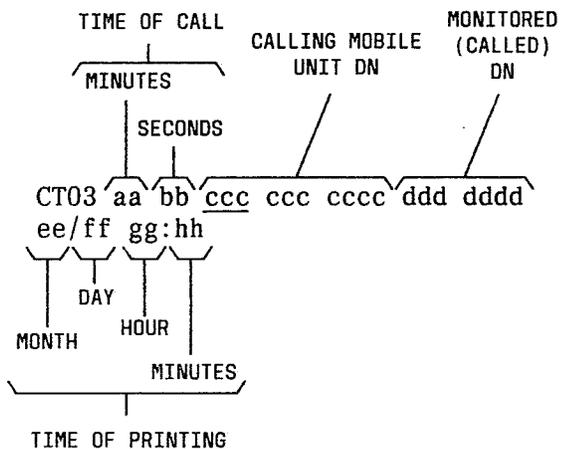   If NO, proceed to Step 15.

15. Is this first attempt to remove trace function?

    If YES, proceed to Step 12.
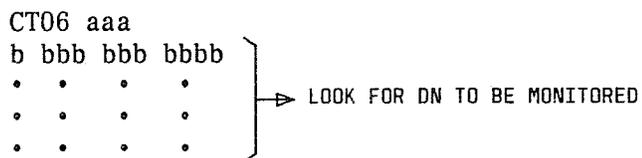
    If NO, proceed to Step 16.

16. Report trouble to next higher maintenance. Trouble is beyond scope of this document.

END OF PROCEDURE

CT05 (similar to CT03 but has 10 digit
          monitored DN in d field)

Fig. 9 — Example of CT03/CT05 Output Message Formats

a = Quantity of DNs on CLID list (decimal)
b = DNs on CLID list

Fig. 10 — Example of CT06 Output Message Format

```
M 39 TR01 267 7615
        0 0 0 0                                    ——— 7 DIGIT INPUT DN
        LEN 01 001 106            ——— DNCL 1
       01 000 001 000 001 000 4
       00 000 000 000 000 000 000 000
        0 0 0 0
        0 0 0 0 0
        0 0
        0 0 0 0                        BIT POSITION 9 = 1 FOR ACTIVE TRACE
       000 0000                                     = 0 FOR INACTIVE TRACE
        0 0 0 0 0 000 0000
        0 0
        0 0 0 0 0 0 0 0 0 0
        0 0 0 0
        0 0 0
        0 000 000 0000
        0
        0 00000000000

        #361
```

Fig. 11 — Example of TR01 Output Message - DNCL 1 Active Trace Bit - DN Terminating Translations

26. LOAD CELL SITE GENERIC UPDATE

1. At MTCE terminal, type **OP:OOSUNITS!** to verify all 1A processor units are in service.

   Response: **PF** followed by **OP:OOSUNITS** for any unit OOS

2. Any 1A processor units marked OOS?

   If YES, proceed to Step 3.

   If NO, proceed to Step 4.

3. Clear trouble with any 1A processor unit marked OOS, return unit to in service condition, and return to Step 1.

4. Is attached processor system (APS) active in another update?

   If YES, proceed to Step 5.

   If NO, proceed to Step 6.

5. Wait until APS is finished with other update before continuing with this procedure.

6. Record identifying data found on label of update tape for future reference.

   Comment: This information is used later to help verify correct update tape is being loaded into MTSO copy

7. Mount new cell site generic update tape on tape transport of unassigned TUC unit.

   Reference: 28. MOUNT TAPE ON TAPE TRANSPORT

8. Type **RST:TUC a:UCL!**

   where: a = member number of TUC 0-31

   Response: **RST:TUC a COMPLETED** is printed for successful TUC restoral

9. Type **SET:TUC a;FUNCTION UPD!**

   where: a = member number of TUC 0-31

Response: Update tape advances a few inches and stops

SET:TUC a;

TAPE MOUNTED ON TUC

TAPE TYPE: STANDARD LABEL

VOLUME SERIAL NUMBER: b

OK TO PROCESS TAPE?

where: a = member number of TUC 0-31

b = serial number read by TUC from tape volume level (example STL182)

10. Does TUC header printout agree with label information copied down in Step 6?

If YES, proceed to Step 12.

If NO, proceed to Step 11.

11. Demount update tape from TUC unit and obtain correct cell generic update and repeat from Step 6.

Reference: 29. DEMOUNT TAPE ON TAPE TRANSPORT

12. Type **ALW:TUC a:RO!**

where: a = member number of TUC 0-31

Response: Prints **OK** at end of input message

13. Type **UPD:CELL:GENERIC aaaaaaaaa!**

where: aaaaaaaaa = cell generic ID, for example 1AMPS100 (with the two far right digits indicating the version number)

Response: The remainder of update tape is loaded into the MTSO copy and after 8 to 9 minutes **UPD:CELL GENERIC UPDATE COMPLETE** is printed

14. Are **REPT:SAWS AUDIT** output messages printing during loading of the cell generic?

If YES, proceed to Step 15.

If NO, proceed to Step 16.

15. Rewind update tape and repeat from Step 8.

16. Demount update tape from TUC unit when **UPD:CELL GENERIC UPDATE COMPLETE** message is printed.

Reference: 29. DEMOUNT TAPE ON TAPE TRANSPORT

17. Are there any cell sites that are not to be downloaded with new cell generic?

    If YES, proceed to Step 18.

    If NO, proceed to Step 19.

18. Type **INH:CELL a:BOOT!** once for each cell site to be inhibited from download.

    where: a = 1-255 single cell site number

19. Type **INIT:CELL a:BOOT!** for only one cell site to be downloaded with new cell generic.

    where: a = 1-255 single cell site number

    Response: (minimum response time is 6 minutes)
                  REPT:CELL a FULL BOOT FINISHED

20. Allow soak period (per local practice) for cell site to operate with new generic and observe for trouble.

21. Is call processing interrupted during soak period due to the new generic update?

    If YES, proceed to Step 22.

    If NO, proceed to Step 26.

22. Obtain last reliable cell generic update tape, repeat loading procedures into MTSO copy, and download to troubled cell site.

23. Does cell site return to normal operation?

    If YES, proceed to Step 25.

    If NO, proceed to Step 24.

24. Obtain last reliable system reinitialization (SR) tape and perform system reboot.

25. Notify higher maintenance of trouble with loading new cell generic update.

    END OF PROCEDURE

26. Type **INIT:CELL a:BOOT!** once for each remaining cell site to be downloaded.

    where: a = 1-255 single cell site number

    Response: (minimum response time for each **INIT:CELL** input message is
                  6 minutes)
                  REPT:CELL a FULL BOOT FINISHED

27. Is new SR tape to be made for backup?

    If YES, then Prepare new SR tape using AT&T Practice 231-368-011.

    If NO, then END OF PROCEDURE.

27. PERFORM DOWNLOAD OF CELL SITE GENERIC

1. At MTCE terminal, type **OP:MTSO CG!** and determine from output message if cell generic currently in MTSO copy is the one to be down loaded to cell site(s).

    Response: **OP:MTSO CG**

    CELL GENERIC aaaaaaaaa

    UPDATE NUMBER (1-99)

    CELL GENERIC IS (VALID or INVALID)

    where: aaaaaaaaa = cell generic ID, for example 1AMPS100 (with the two far right digits indicating the version number)

2. Is MTSO copy the cell generic to be down loaded?

    If YES, proceed to Step 8.

    If NO, proceed to Step 3.

3. Obtain correct cell generic tape and mount onto tape transport of unassigned TUC unit.

    Reference: 28. MOUNT TAPE ON TAPE TRANSPORT

4. Type **RST:TUC a:UCL!**

    where: a = member number of TUC 0-31

    Response: **RST:TUC a COMPLETED** is printed for a successful TUC restoral

5. Type **SET:TUC a; FUNCTION UPD!**

    where: a = member number of TUC 0-31

    Response: Tape advances a few inches and stops

    SET:TUC a;

    TAPE MOUNTED ON TUC

    TAPE TYPE: STANDARD LABEL

    VOLUME SERIAL NUMBER: b

    OK TO PROCESS TAPE?

where: a = member number of TUC 0-31

b = serial number read by TUC from tape volume level (example STL182)

6. Type **ALW:TUC a:RO!** to set TUC in " Read Only" mode.

where: a = member number of TUC 0-31

Response: **OK** at end of input message

7. Type **UPD:CELL:GENERIC aaaaaaaaa!**

where: aaaaaaaaa = cell generic ID

Response: The remainder of tape is loaded into the MTSO copy and after 8 to 9 minutes **UPD:CELL GENERIC UPDATE COMPLETE** is printed

8. Type **INIT:CELL a:BOOT!** once for each cell site to be down loaded

where: a = 1-255 single cell site number

Response: (minimum response time for each **INIT:CELL** input message is 6 minutes)

REPT:CELL a FULL BOOT FINISHED

9. Demount cell generic tape from tape transport of TUC.

Reference: 29. DEMOUNT TAPE ON TAPE TRANSPORT

END OF PROCEDURE

28. MOUNT TAPE ON TAPE TRANSPORT

1. Open tape transport door; at upper right of tape unit, pull interlock switch plunger outward to interlock position (Fig. 12).

2. Operate **LOCAL/REMOTE** switch to obtain **LOCAL** lighted condition.

3. Verify that empty lower (take-up) tape reel is same size as (or larger than) tape reel to be mounted.

4. Rotate hub (knob) of upper tape reel to maximum counterclockwise position.

5. Mount reel (with tape) on reel holder.

6. Rotate hub (knob) of upper reel clockwise to detent to lock tape reel securely.

7. Depress and hold **BRAKE RELEASE** key (Fig. 12).

8. Unwind (manually) approximately 5 feet of tape.

9. Release **BRAKE RELEASE** key.

10. **Warning: Do not touch tape head surface; body oils will contaminate tape.**

    Thread tape through tape path indicated on tape unit.

11. Start tape end on lower (take-up) reel making sure tape is not twisted.

12. Depress and hold **BRAKE RELEASE** key.

13. Wind (manually) lower (take-up) reel clockwise until tape slack is taken up.

14. Release **BRAKE RELEASE** key.

15. Depress **ARMS NORMAL** key

    Response: Arms apply tension to tape.

16. Depress **FORWARD** key

    Response: Tape winds forward and stops at **BOT**.

17. Depress **FORWARD** key (again) and then **STOP** key.

    Response: Tape winds forward and stops past **BOT**

18. Depress **REVERSE** key.

    Response: Tape rewinds and stops when **BOT** marker is reached

19. Operate **5 IPS/25 IPS** key to obtain **25 IPS** lighted condition.

20. Operate **LOCAL/REMOTE** key to obtain **REMOTE** lighted condition.

21. Close tape transport door.

    END OF PROCEDURE

UPPER REEL
HUB (KNOB)

TAPE ARMS

INTERLOCK SWITCH
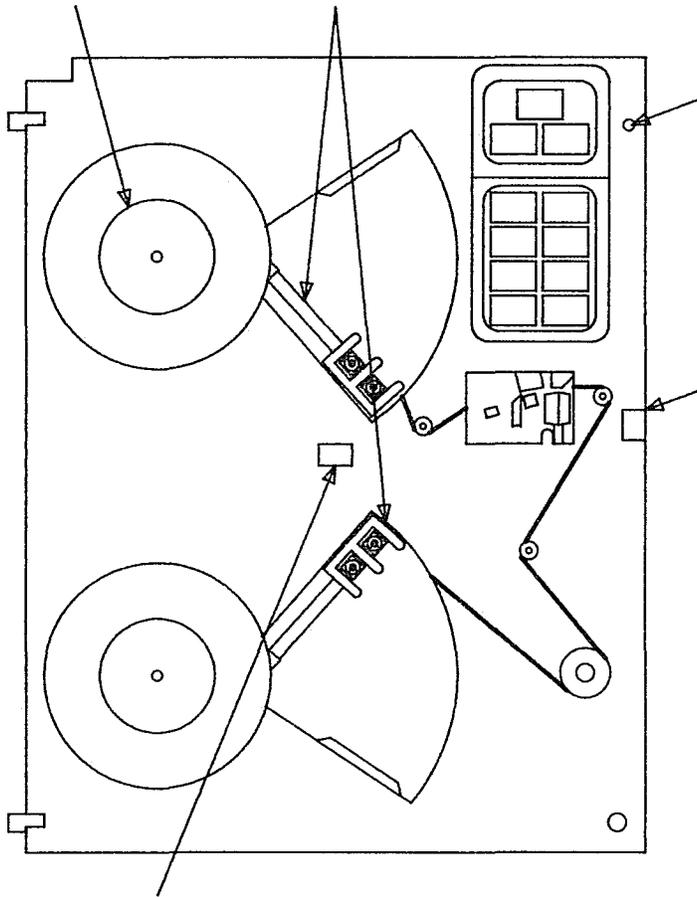PLUNGER

TRANSPORT
DOOR LATCH

BRAKE RELEASE KEY

Fig. 12 — Tape Transport (Door Not Shown)

29. DEMOUNT TAPE ON TAPE TRANSPORT

1. On tape unit controller (TUC), depress **REQ DMT** key.

    Response: **ACK DMT** and **OK DMT** lamps light

2. Open tape transport door; at upper right of tape transport, pull interlock switch plunger outward to interlock position (Fig. 13).

3. Depress **LOCAL/REMOTE** key.

    Response: **LOCAL** control lamp lights

4. Depress **REWIND** key to rewind tape to **BOT** marker. Depress **ARMS UNLOAD** key.

    Response: **ARMS UNLOAD** lamp lights until tape arms retract

5. Depress and hold **BRAKE RELEASE** key (Fig. 13).

6. Wind tape (manually) onto upper reel.

7. Release **BRAKE RELEASE** key.

8. Rotate hub (knob) of upper reel counter clockwise to unlock and then remove tape reel.

    END OF PROCEDURE

UPPER REEL
HUB (KNOB)

TAPE ARMS

INTERLOCK SWITCH
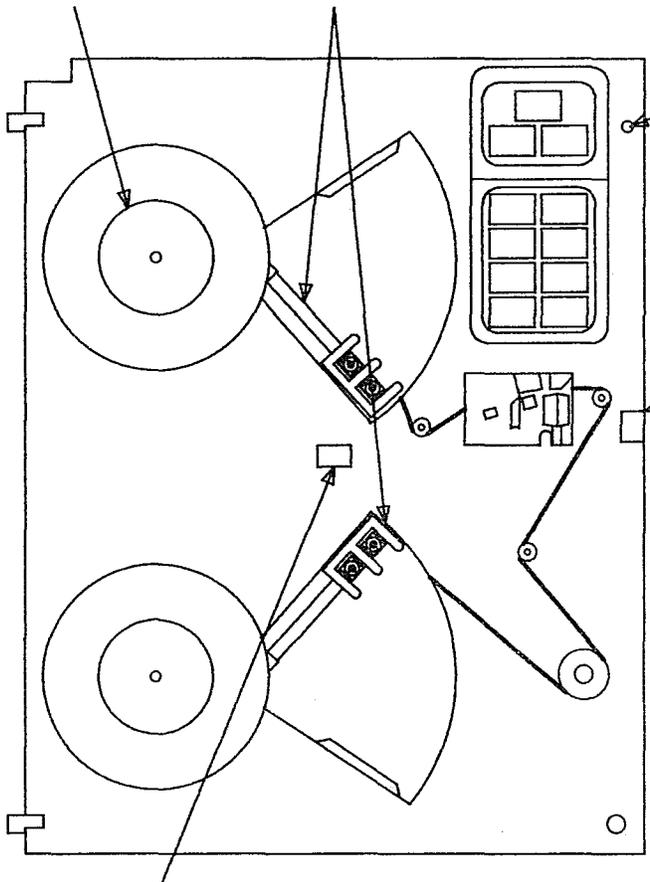PLUNGER

TRANSPORT
DOOR LATCH

BRAKE RELEASE KEY

Fig. 13 — Tape Transport (Door Not Shown)

30. ANALYZE SECONDARY FUNCTIONAL TEST FAILURE

1. **Note:** Secondary FT failures indicate trouble with cell site antenna. Failures with setup (SU) radio indicate a transmit and/or receive antenna, and failures with locating (LC) radio indicates receive antenna trouble.

   Obtain cell site number, radio number and type from secondary functional test (FT) failure message (Fig. 14).

2. At MTCE terminal, type **RMV:CELL** message for radio (Fig. 15).

3. Type **DGN:CELL** message with RAW option for radio (Fig. 15).

4. **Note:** Diagnostic results should be allowed to print before manually restoring radio to service.

   Type **RST:CELL** message with the UCL option for radio (Fig. 15).

5. Determine failing antenna from diagnostic output message and to what extent it will adversely effect call processing.

6. Can the antenna disrupt call processing if left in service?

   If YES, proceed to Step 7.

   If NO, proceed to Step 8.

7. Type **RMV:CELL** message for each radio using failing antenna (Fig. 15).

8. Notify maintenance personnel that service is required at cell site.

   END OF PROCEDURE

```
                          RADIO
          CELL SITE       TYPE AND      SECONDARY FT FAILURE
          NUMBER          NUMBER        OF SETUP RADIO
                 /              |               /
A 4Ø REPT : CELL 1  PEAR ERROR, SU Ø  FT    FT2SU
     ØØ3 ØØØ ØØØ ØØ2 Ø16 ØØ2 1ØØ 113 114 ØØØ Ø4Ø 241 ØØ7 ØØØ 126 ØØ1 377 377
     377 377 1ØØ ØØ6 ØØ1 ØØØ 1ØØ ØØ6 136 ØØØ 3ØØ 121 164 ØØ5 16Ø 121 32Ø 227
     ØØ3 ØØ1 32Ø 226 311 ØØØ 14Ø 14Ø
     IOOMAMPS.AC+1Ø6
     #2Ø8
```
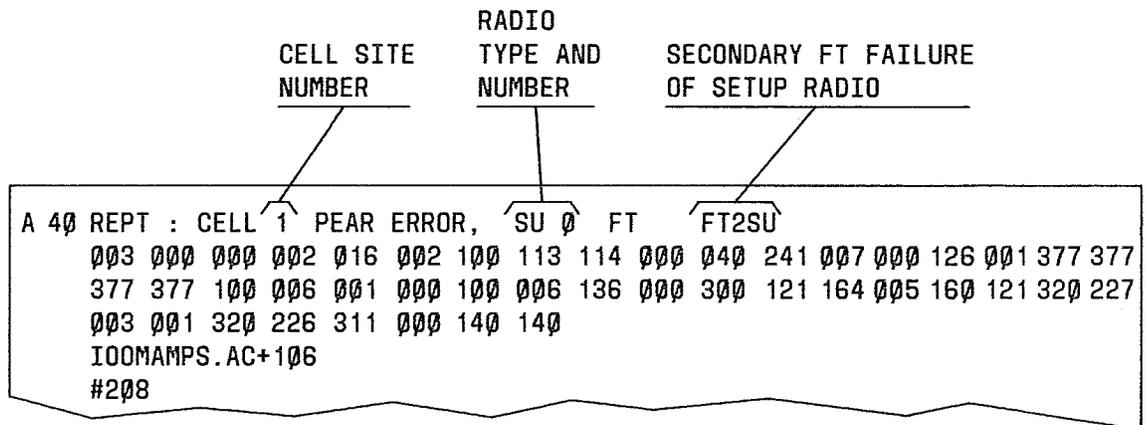
Fig. 14 — Example of Secondary FT Output Message for Setup Radio 0

```
┌─────────────────────────────────┐
│  aaa:CELL b,cc d[;eee]!          │
└──┐        ┌──┐      ┌────────────┘
   └────────┘  └──────┘
```

aaa = OPERATION
        (RMV or DGN or RST)
  b = CELL SITE NUMBER (1-255)
 cc = RADIO TYPE (LC or SU)
  d = RADIO NUMBER
eee = OPTION [UNCONDITIONAL (UCL),
        TROUBLE LOCATING PROCEDURE* (TLP)
        or RAW DATA* (RAW)]
  * USED WITH DGN OPERATION

Fig. 15 — Format of Input Message to Remove, Diagnose, and Restore Cell Site Units

31. CLEAR DATA LINK FAULT AS REPORTED BY REPT: F-LEVEL (PFLR) AND DGN: IOUS STF OUTPUT MESSAGES

1. **Note:** The data link trouble causing the printing of a **REPT: F-LEVEL** output message should be located inside an expanded IOP frame or towards the 1A processor area of MTSO. The **REPT: F-LEVEL** message is followed by a printing of related **DGN:IOUS** test results.

   Identify **DGN:IOUS** output messages related with **REPT:F-LEVEL** output message per Fig. 16.

2. **Note:** This procedure requires at least one data link, 0 or 1, be in service.

   At MTCE terminal, type **DGN:IOUS a, IOMP 1!** to determine if fault is solid.

   where: a = IOUS member number 8-63

   Response: **PF** followed by **DGN:IOUS** output message results

3. Does **DGN:IOUS** output message **ATP** or **STF**?

   If **ATP** proceed to Step 4.

   If **STF** proceed to Step 5.

4. Analyze **REPT: F-LEVEL** message per AT&T Practice 254-251-020.

   END OF PROCEDURE

5. Is failing phase number of **DGN: IOUS STF** output message listed in Table M?

   If NO, proceed to Step 6.

   If YES, proceed to Step 7.

6. Analyze **DGN: IOUS STF** output message per AT&T Practice 254-251-020.

   END OF PROCEDURE

7. Using Table M , identify circuit pack (CP) type and location in IOP frame related to failing phase number.

8. Obtain new spare CP type identified and locate physical IOP.

9. Power IOP down, replace original CP with new spare and power back up.

   Reference: 11. REPLACE IOP CIRCUIT PACKS

10. Type **DGN: IOUS a, IOMP 1!**

    where: a = IOUS member number 8-63

11. Does **DGN:IOUS** output message **ATP** or **STF**?

       If **ATP** proceed to Step 12.

       If **STF** proceed to Step 6.

12. Type **RST: IOUS a, IOMP 1;UCL!**

     where: a = IOUS member number 8-63

     Response: **PF** followed by **DGN:IOUS** and **RST: IOUS IOMP**
                      COMPLETED.

END OF PROCEDURE

```
*11 REPT:  F-LEVEL  @16721030  MENUM=00000173  MICON=00000021
    LV=0040  D0-40000002  D1=00000000  D2=40000000  D3=00000000
    PFLR  REQUESTS  REMOVAL  IOUS  21
    PFLR  RMVD  &  DGN  IOUS  21
    DLMS  RMVD  &  DGN  CELL  1  DL  1
    DLMS  RMVD  &  DGN  CELL  13  DL  1
    DATA:   F-LEVEL
```

```
**  DGN:  IOUS  21  TERMINATED  AT  PH  1  ADR  74  AFTER  TEST  3     MSG  STARTED
    #790
                                    ———————— FAILING  IOP  DIAGNOSTIC
                                             PHASE  NUMBER

**  DGN:  IOUS  21  PH  1  STF    (1,00000000 00000000)    MSG  IP
        TEST      MISMATCH       SUPPLEMENTARY  DATA
          3       04000000
      #791


**12 DGN:  IOUS  21  STOPPED  STF  (1,1,00000006)    MSG  COMPL
    06/09/83   09:11:59
    #795
```

DIAGNOSTIC OUTPUT MESSAGES RELATED
TO REPT: F-LEVEL PRINTOUT

Fig. 16 — Typical F-Level Recovery Output Message With IOUS Diagnostic Messages

TABLE M				
FAILING PHASE NUMBER OUTPUT IDENTIFIERS				
FAILING PHASE NUMBER	PC NUMBER	IOUC NUMBER	CIRCUIT PACK TYPE	FRAME AND UNIT LOCATION IN IOP FRAME
51	20	8	TN82	(050 or 020) — 108
52	21	9	TN82	(050 or 020) — 100
53	22	10	TN82	(050 or 020) — 092
54	23	11	TN82	(050 or 020) — 084
55	30	12	TN82	(050 or 020) — 048
56	31	13	TN82	(050 or 020) — 040
57	32	14	TN82	(050 or 020) — 032
58	33	15	TN82	(050 or 020) — 024

32. ANALYZE AUTOMATIC HIGH LEVEL INITIALIZATION

1. Obtain cell site number from **REPT:CELL PHASE** output message.

2. At MTCE terminal, type **OP:CELL a!** to obtain list of all out-of-service (OOS) units at cell site.

   where: a = 1-255 single cell site number

3. Does **OP:CELL** output message list any OOS units?

   If YES, proceed to Step 5.

   If NO, proceed to Step 4.

4. Notify next higher maintenance of cell site automatic recovery action and that service is required at cell site level. Trouble is beyond scope of this document.

5. Does the **OP:CELL** output message show **CFRDGN** as reason for any OOS cell site unit?

   If YES, proceed to Step 6.

   If NO, proceed to Step 9.

6. Wait 12 minutes and then type, **OP:CELL a,b!** for any unit listed as **CFRDGN** for reason of OOS.

   where: a = 1-255 single cell site number

   b = OOS unit

7. Are any units still listed as **CFRDGN**?

   If YES, proceed to Step 8.

   If NO, proceed to Step 9.

8. Type, **STOP:DGN a,b.** for any OOS unit still listed as **CFRDGN**.

   where: a = 1-255 single cell site number

   b = OOS unit

9. Type, **RST:CELL a,b!** for any unit listed as **FR:CELL** or **ROUTIN** as reason of OOS by **OP:CELL** output message.

   where: a = 1-255 single cell site number

   b = OOS unit

10. Does **RST:CELL** output message ATP for all OOS units diagnosed?

    If YES, proceed to Step 11.

    If NO, proceed to Step 4.

11. Notify next higher maintenance of automatic cell site recovery and units initialized.

    END OF PROCEDURE

33. ANALYZE DGN:IOUS STF OUTPUT MESSAGE

1. Identify IOUS member number from diagnostic test failure printout (Fig. 17).

2. Is TLP tape mounted on tape transport of TUC frame?

    If NO, proceed to Step 3.

    If YES, proceed to Step 4.

3. Mount TLP tape on tape transport of available TUC frame.

    Reference: 28. MOUNT TAPE ON TAPE TRANSPORT

4. At MTCE terminal, type **SET:TUC a; FUNCTION TLP!**

    where: a = TUC member number 0 - 31

    Response: **OK**

5. Type **ALW:TUC a:RO!**

    where: a = TUC member number 0 - 31

    Response: **OK**

6. Identify IOUS member number from diagnostic test failure printout (Fig. 17).

7. At MTCE terminal, type **DGN:IOUS a, TLP!** for IOUS identified in Step 1.

    where: a = IOUS member number

    Response: **DGN:IOUS**

8. Is TLP list printed with **DGN:IOUS** output message?

    If YES, proceed to Step 9.

    If NO, proceed to Step 17.

9. **Note:** The printout of TLP lists suspected faulty circuit packs (CPs) by type and location. They are presented from top to bottom in an order of most likely first to least likely last.

    Identify CP types on TLP list and obtain new spares for each CP.

10. **Note:** Each physical IOUS is identified by an equivalent IOP number panel stamping on the power switch of the IOUS.

    Locate physical IOUS and replace suspected CPs per Steps 11 through 16.

11. Obtain new spare of first CP type on TLP list.

12. Power IOUS down, replace suspect CP with new spare and power back up.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

13. Does **OS** lamp go off?

        If YES, then END OF PROCEDURE.

        If NO, proceed to Step 14.

14. Is this last CP on list?

        If YES, proceed to Step 17.

        If NO, proceed to Step 15.

15. Obtain original CP just replaced and new spare of next CP on list.

16. Power IOUS down, replace CP just installed with original, then replace next CP on list with new spare and power backup and repeat from Step 13.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

17. Identify PR number associated with failing phase numbers per Fig. 17 and Table N.

18. Identify functions being performed during each test listed under failing phases in PR document to clear problem. Trouble is beyond scope of this document.

END OF PROCEDURE

```
                          IOUS
                      MEMBER NUMBER
                            /
         ┌ M 52 DGN: IOUS 1Ø PH 2 STF-BOF  (57,ØØØØØØØØ ØØØØØØØØ)  MSG STARTED
         │          TEST    MISMATCH     SUPPLEMENTARY DATA
         │               ┌ 4    ØØØØØØ15
         │         FAILING│ 8    77777777
         │         TESTS │13    ØØØ1ØØØØ
  PHASE  │               │14    ØØØØØ4ØØ
  2      │               └15    ØØØØ1ØØØ
         │          #Ø41
         │
         │
         │
         │  M 52 DGN: IOUS 1Ø PH 2 STF  (73,ØØØØØØØØ ØØØØØØØØ)   MSG IP
         └     #Ø42


         ┌ M 52 DGN: IOUS 1Ø PH 3 STF-BOF  (6Ø,ØØØØØØØØ ØØØØØØØØ)  MSG IP
         │          TEST    MISMATCH     SUPPLEMENTARY DATA
         │               ┌ 4    ØØØØØØ17
         │         FAILING│ 5    ØØØØØØØ2
         │         TESTS │ 8    77777777
  PHASE  │               │11    2ØØØØØØØ
  3      │               └12    4ØØØØØØØ
         │          #Ø43
         │
         │
         │
         │  M 52 DGN: IOUS 1Ø PH 3 STF  (74,ØØØØØØØØ ØØØØØØØØ)   MSG IP
         └     #Ø46


         ┌ M 52 DGN: IOUS 1Ø PH 4 STF  (18,ØØØØØØØØ ØØØØØØØØ)  MSG IP
         │          TEST    MISMATCH     SUPPLEMENTARY DATA
         │               ┌ Ø    4ØØØØØØØ
         │         FAILING│ 1    2ØØØØØØØ
         │         TESTS │ 3    4ØØØØØØØ
  PHASE  │               │ 4    2ØØØØØØØ
  4      │               └ 7    Ø2ØØØØØØ
         │          #Ø47
         │
         │
         │
         │  M 52 DGN: IOUS 1Ø COMPLETED STF (3,165,3Ø534134)  MSG COMPL
         │     ØØ/ØØ/ØØ  ØØ:52:56
         └     #Ø48
```

Fig. 17 — Example of IOUS Diagnostic Test Failure Printout

TABLE N
DATA LINK IOP DIAGNOSTIC PHASES

PHASE NUMBER	UNIT TESTED	PROGRAM LISTING NUMBER
DMAC & BUS		
0	TASK Routines	PR 5A780
1	DMAC Power	PR 5A789
2	PU Bus 0 Interface	PR 5A790
3	PU Bus 1 Interface	PR 5A791
4	DMAC Logic	PR 5A792
3B GROWTH UNIT		
41	Fanout Board	PR 5A428
42	Fanout Board	PR 5A429
PC DIAG		
51	PC 20 (IOUC 8)	PR 5A430
52	PC 21 (IOUC 9)	
53	PC 22 (IOUC 10)	
54	PC 23 (IOUC 11) IOMP	
55	PC 30 (IOUC 12) IS	
56	PC 31 (IOUC 13) OOS	
57	PC 32 (IOUC 14)	
58	PC 33 (IOUC 15)	
61	PC n	PR 5A431
* 91	PC Send Frames	PR 5A449
* 92	PC Manual Local, Remote Loop	PR 5A450
* 93	PC Automatic Local Loop	PR 5A451
* 94	PC Automatic Remote Loop	PR 5A452
* 99	BUS EXERCISE	PR 5A825
* Demand phases (must be requested manually)		

34. CLEAR DATA LINK FAULT AS REPORTED BY REPT: BASE LEVEL MAINT OUTPUT MESSAGE

1. **Note:** The data link trouble causing the printing of a **REPT: BASE LEVEL MAINT** (BLM) output message may be located in the MTSO, the cell site or the transmission facilities connecting the two. This procedure requires at least one data link to cell site be in active state.

   Identify left most octal number of channel status register (CSR) word in BLM output message (Fig. 18).

2. **Note:** A 1 or 2 appearing as left most octal number of CSR word indicates trouble is located within MTSO. A 4 indicates trouble located outside MTSO.

   Is octal number a 1, 2, 4 or some other number?

   > If 1 or 2, proceed to Step 3.

   > If 4, proceed to Step 19.

   > If other number, proceed to Step 18.

3. Is TLP tape mounted on TUC frame?

   > If NO, proceed to Step 4.

   > If YES, proceed to Step 7.

4. Mount TLP tape on tape transport of available TUC frame.

   Reference: 28. MOUNT TAPE ON TAPE TRANSPORT

5. At MTCE terminal, type **SET:TUC a; FUNCTION TLP!**

   where: a = TUC member number 0-31

   Response: **OK**

6. Type **ALW:TUC a;RO!**

   where: a = TUC member number 0-31

   Response: **OK**

7. From BLM output message, identify IOUS, IOUC numbers removed and diagnosed by DLMS.

8. Type **DGN:IOUS a, IOUC b:TLP!**

where: a = IOUS number

              b = IOUC number

Response: **DGN:IOUS, IOUC**

                  ANALY:TLP FILE (with list of suspect circuit packs)

9. Is TLP list printed with **ANALY:TLP FILE** output message?

    If YES, proceed to Step 10.

    If NO, proceed to Step 18.

10. **Note:** Each physical IOUS is identified by equivalent IOP number panel stamping on IOUS power switch.

    Identify CP types on TLP list and obtain new spares for each.

11. Locate physical IOUS and replace suspected CPs per Steps 12 through 17.

12. Power IOUS down, replace suspect CP with new spare and power back up.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

13. Type **RST:IOUS a, IOUC b!**

    where: a = IOUS number

              b = IOUC number

    Response: **DGN:IOUS, IOUC MSG COMPL**

                      RST:IOUS, IOUC

14. Did **DGN:IOUS, IOUC** output message **ATP** and cell site data link restore successfully?

    If YES, then END OF PROCEDURE.

    If NO, proceed to Step 15.

15. Is this last CP on list?

    If YES, proceed to Step 18.

    If NO, proceed to Step 16.

16. Obtain original CP just replaced and new spare of next CP on list.

17. Power IOUS down, replace CP just installed with original, then replace next CP on list with new spare and power back up and repeat from Step 13.

    Reference: 11. REPLACE IOP CIRCUIT PACKS

18. Analyze **DGN:IOUS, IOUC STF** or **BLM** output messages per AT&T Practice 254-251-020. Trouble is beyond scope of this document.

    END OF PROCEDURE

19. From BLM output message, identify cell site number and data link number removed and diagnosed by DLMS.

20. Type **DGN:CELL a, DL b:TLP!**

    where: a = 1-255 single cell site number

    b = data link number

    Response: **DGN:CELL DL**

    DGN:CELL DL TLP

    RST:IOUS, IOUC

    RST:CELL DL

21. Did **DGN:CELL DL** output message show **ATP** or **STF**?

    If ATP proceed to Step 22.

    If STF proceed to Step 23.

22. Type **RST:CELL a, DL b!**

    where: a = 1-255 single cell site number

    b = data link number

    Response: **IP** (indicates output messages follow)

    OP (indicating ACTIVE status)

    RST (indicating COMPLETED ATP)

    END OF PROCEDURE

23. Is TLP list printed with **DGN:CELL DL TLP** output message?

    If YES, proceed to Step 24.

    If NO, proceed to Step 18.

24. Obtain TLP list and notify maintenance personnel that maintenance is required at cell site locations.

    END OF PROCEDURE

```
28 REPT: BASE LEVEL MAINT 010350424 MENUM=00000116 MICON=00000000    COMPLETED
   LV=1000 DO=00000002 D1=00000000 D2=20000000 D3=00000000
   DLMS RMVD & DGN IOUS 10 IOUC 8
   DLMS RMVD & DGN CELL 1 DL 0
   DATA:   MAC CONTROL MEMORY
   40130006 00000000 15362203 15033256 40000000 00024000
   00000000 00000000 00000000 00000000 00023473 00000000
   00000000 00000000 00000000 00000000 00000000 00000000
   00000000 00000000 00000000 00000000 00000000 00000000
   00000000 00000000 00000000 00000000 00000000 00000000
   DATA:   DATA LINK STATUS AND INTERNAL DATA - MAINTENANCE REQUEST
   01134463 00000004 22543644 22705304 41041204 40000200
   06/09/83  15:28:08
   #083
```

CHANNEL STATUS REGISTER WORD

LEFT MOST OCTAL NUMBER

Fig. 18 — Example of REPT:BASE LEVEL MAINT Output Message From Data Link Maintenance Diagnostic