

C-DOT DSS MAX

EXCHANGE OPERATION



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THIS C-DOT SYSTEM PRACTICE REFERS TO THE C-DOT DIGITAL SWITCHING SYSTEM MAIN AUTOMATIC EXCHANGE (ABBREVIATED AS C-DOT DSS MAX IN THE REST OF THIS PUBLICATION).

THE INFORMATION IN THIS SYSTEM PRACTICE IS FOR INFORMATION PURPOSES AND IS SUBJECT TO CHANGE WITHOUT NOTICE.

A COMMENT FORM HAS BEEN INCLUDED AT THE END OF THIS PUBLICATION FOR READER'S COMMENTS. IF THE FORM HAS BEEN USED, COMMENTS MAY BE ADDRESSED TO THE DIRECTOR (SYSTEMS), CENTRE FOR DEVELOPMENT OF TELEMATICS, 39, MAIN PUSA ROAD, NEW DELHI - 110 005

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Table of Contents

Chapter 1.	Introduction.....	5
	1.1. General	5
	1.2. Dialogue Procedure	5
	1.3. Commands	6
	1.4. Security.....	6
	1.5. Operating Procedure.....	6
Chapter 2.	Basic Operations	7
	2.1. Overview.....	7
	2.2. Software Loading in IOP	7
	2.3. Create a New Exchange Code	17
	2.4. Additional Operations for RSU	18
	2.5. Creation/Modification of Special Numbers/System Directory Numbers.....	19
	2.6. Modify System Parameters	20
	2.7. Set System Time	27
	2.8. Miscellaneous Operation Commands	28
	2.9. CCS7 Related Data Creation	29
Chapter 3.	Hardware Installation & Equipage Procedure	30
	3.1. General	30
	3.2. Equipping of Base Module (EQUIP-MOD).....	30
	3.3. Frame Equipping in Base Module (BM/LM Racks)	34
	3.4. Equipage/Initialisation of SS7 Unit Module (SUM)	37
	3.5. EQUIP/UNEQUIP Service Circuits.....	37
	3.6. Basic Interface/Terminal Cards Equipage	40
Chapter 4.	Subscriber Line Administration.....	44
	4.1. General	44
	4.2. Single Line Administration Commands	44
	4.3. Subscribers Facility/Services Administration.....	53
	4.4. Group Line Administration Commands	65
	4.5. Miscellaneous Administration Commands.....	72
Chapter 5.	Trunk and Routing Administration.....	77
	5.1. General	77
	5.2. Trunk Administration.....	86
	5.3. Display/Listing of Trunk Groups (DISPL-TGP-LIST)	92
	5.4. Route Administration	93
Chapter 6.	Traffic Administration	105
	6.1. General	105
	6.2. Activate Traffic Reports.....	105

6.3.	Modify Traffic Report Periodicity.....	107
6.4.	Modify Output Option for Specified Traffic Report(s)	107
6.5.	Modify Trunk Group Observation.....	108
6.6.	Modify Trunk Observation	109
6.7.	Modify Hunt Group Observation	110
6.8.	Modify route Observation.....	110
6.9.	Modify Subscriber Observation.....	111
6.10.	To Deactivate (STOP) One or More Traffic Reports	112
6.11.	Display a Specific Traffic Report for Specific Period from Disk	113
6.12.	Display Call Detailed Records.....	114
6.13.	Display Current Traffic Information for a Specified Subscriber	115
6.14.	Display Current Traffic Information on the Specified Trunk/Trunk Group.....	116
6.15.	Display MF Signalling Analysis Information	117
Chapter 7.	Billing Admin. and Billing Cycle/Billing Data Backup/Restoration Procedure.....	119
7.1.	General	119
7.2.	Billing Administration Display Commands	119
7.3.	Billing Administration Update Commands.....	128
7.4.	Billing Backup Procedure.....	134
Chapter 8.	Calendar, Password/Security & Back-up Operations.....	139
8.1.	Calendar Management	139
8.2.	Password and System Security Operations	146
8.3.	Exchange Data Backup and Restoration Procedures.....	153
Annexure - A	Patch Installation in Working Exchange	159
A.1	Assumptions	159
A.2	Pre installation Checks.....	159
A.3	Patch Installation Procedure	159
Annexure - B	Operation and Maintenance Related Guidelines.....	163
B-1	General	163
B-2	Do's and Don'ts.....	163
B-3	Routine Operational and Maintenance Precautions	166
Annexure - C	Recovery Procedure When 'BD' Backup is not Available	169

Chapter 1.

Introduction

1.1. GENERAL

Exchange operations involve not only the day-to-day operations such as placing new subscribers and trunks into service, changing subscribers service entitlements, modifying routing, implementing new tariffs, transferring of contents of subscriber individual charge meters onto the cartridge tape for post processing, but also Calendar Management, Backup Management, Software Installation, updation of software also called patch installation, '198' Service setup, modifying system parameters etc..

1.2. DIALOGUE PROCEDURE

Dialogue can be initiated either by an operator or by the switching system. When the operator wishes to enter a command the dialogue comprises the following phases :

- Phase 1: Entry of the command (e.g. modifying subscriber facilities) which specifies the action to be performed by the exchange for the entity (subscriber directory number) to which command relates, and additional parameters (list of facilities to be modified etc.).
- Phase 2: Acknowledgment by the exchange that the command has been accepted after syntax checking etc.
- Phase 3: Output of results after execution of command and release of the IOP terminal. The results of command execution include all information needed by the operator, indication of correct execution or incorrect parameter, list of previous and new values of data modified by the command (whenever necessary) and so on.

In some cases, the same operation can be repeated for several entities, for example, placing a whole group of subscriber lines into service. The number of characters that have to be entered by the operator can then be reduced by having a single command to cause several repetitions of the same action.

1.3. COMMANDS

The man-machine interface between an exchange and its operating staff is made up of two main flows of information. First, the input to the exchange (operator command) and then outputs from it.

Commands are entered by operators to modify the data in the exchange or to take any maintenance related action. The most frequently used commands are: subscriber data modification, routine line testing, in-servicing of terminals and switching units etc. The processing load represented by these commands is generally negligible in comparison with that represented by call processing, amounting to no more than a few dozen commands per day per operator terminal, but the commands are extremely varied (more than 100 different commands). Generally the commands are entered at visual display units (VDUs) and give rise to system responses in the form of acknowledgments and results of execution. Their validity, the consistency of parameters and correct execution are therefore checked by the system with great care, to avoid introducing errors such as inconsistencies between tables, which are very difficult to locate subsequently.

In the opposite direction, spontaneous messages are output by the exchange following the execution of functions that are permanently active: fault signalling, periodic update of local displays, etc. Depending on the degree of urgency, the corresponding messages are output to a printer, displayed at a VDU (OOD) or trigger an audible and/or visual alarm on ADP. The flow of messages are limited to avoid swamping operators with a mass of information they cannot possibly keep track of, and to make sure that they give due attention to really important events.

The second stream of information output by the exchange is data transferred to computer-compatible storage media for later off-line processing, e.g., billing and traffic data. Data output may be a permanent function, as in the case of itemized billing messages, or be initiated by an operator command, as in the case of detailed observation of traffic on selected subscriber lines.

1.4. SECURITY

Operators act on the exchange in real time. In certain cases, an operator's mistake could have disastrous consequences for the exchange. A secure environment has been provided in which only authorised operators can access the system and invoke only a set of authorised commands.

1.5. OPERATING PROCEDURE

This document broadly explains the procedure of software installation, assigning the exchange code, modifying system directory numbers/special directory numbers/system parameters, hardware installation, subscriber line administration, trunk and routing administration, traffic administration, billing and backup administration, calendar and password management and software patch installation in the working area.

Chapter 2.

Basic Operations

2.1. OVERVIEW

This chapter explains the basic operations required to initialise the exchange in the beginning. The operations are related to System Software Loading, System Initialisation, Basic Parameters related to system configurations etc. These operations are to be performed by the exchange administrator and may not be required to be part of routine O&M activities.

It is advised that "System Parameters" should be programmed carefully as some of them may have serious repercussions on performance of the exchange. In case of multiuser environment, the administrator should modify the password for "adm" and "root" account to avoid its misuse. For operators and other users, the terminals and users are to be added with restricted privileges to allow specific sets of "Admin" and "Maintenance" commands, as allowed by the Administrator.

2.2. SOFTWARE LOADING IN IOP

Before starting the software installation procedure, make sure that you have the following cartridges.

i) **UNIX Cartridge**

This cartridge contains the boot block, UNIX kernel, standard UNIX utilities and protocol software. This cartridge performs functionality of both minload and UNIX cartridge. Hence minload floppy is no longer required with this UNIX cartridge.

ii) **Exchange Software Base Link Cartridge (BAC)**

This cartridge has the downloadable modules for all switch units in which code is loaded. The executable modules for all IOP processes and the process data are also included in it. This cartridge has the base link over which patches need to be put. After loading this cartridge IOP can be rebooted from the winchester and should start running switch software in IOP.

iii) **Exchange Software Combined Patch Link Cartridge (CPC)**

This cartridge has source/hard patches for AP/BP/SSC/SU7 and IOP. The patches in this cartridge are installed and become operational automatically once the system is loaded and initialised.

iv) **Exchange Bare Minimum Data Cartridge (BMDC)**

The initial exchange data is brought to the site in this cartridge. In case of SBM, BMDC includes equipage of BM with its four terminal units equipped, charging tables, system parameters and limits, service circuits (like announcement, TTC and MFCs) equipped. Card slots in different frames are to be equipped as per site requirements. Similarly other exchange data like assigning exchange code, creation of lines, trunks and routes etc. can be built up over BMDC as per site requirements. In case of MBM exchange, only CM is equipped in BMDC. Other site dependent data like equipping of BMs, Frames in BMs, slots in frames, service circuits in BMs, assigning of exchange code, creation of lines, trunks and routes etc. can be built up over BMDC. This cartridge should be replaced with the latest exchange data cartridge being backed up daily in the exchange if a software re-installation is being done at site. Initially at least minimal data for the exchange exists in this cartridge. The site specific data is created at site itself.

2.2.1. Software Loading Procedure

The software can be installed by following the steps given below. The job can be aborted at any time by hitting DEL key on the IOP console. All the cartridges are write protected. DO NOT REMOVE WRITE PROTECTION unless mentioned explicitly in the procedure. Read through the entire procedure to make sure that you understand the procedure completely before entering any command.

Step 1:

Loading of UNIX Cartridge

Power ON the IOP by switching on from the back panel.

On the console following is displayed when the IOP-VH is powered ON.

```

ACIA Rx Test.Type character – "a".
Type the character "a" here. On typing a following prints will be displayed.
Abort flag status : cleared
Reset was due to Power On.
Version ID : 0
HEALTH TEST COMPLETE PLEASE CHECK RUN LED
Press any key to continue:
Now press the return key. On pressing Return key, following message will be displayed.
Power On Configuration .... PRESENT  ABSENT
VHC      :      IMP0      IMP1  IMP2  IMP3  IMP4  IMP5  RTC
SCSI     :      SCSI  DMA
On board Memory Size :      1000000H to 1FFFFFFH
DEVICE   NCRNO      ID      DEF  MODEL NO
-----
CART     0          2          c    TAN DBERG TDC 3600 = 08 :-
WINCH    0          6          W0   QUANTUM MAVERICK 5405 0905
VHC MONITOR© CDOT
M68040 VERSION X.X FEB' YY
VHC x.y>

```

VHC x.y represents the type of IOP and monitor version running on the IOP.

Insert the UNIX cartridge in the cartridge drive and input the following command on monitor prompt.

```
VHC x.y> bo c
```

The command '**bo c**' at the monitor prompt will display all the available options and will ask for user's choice. The display is as follows. Where x.y stands for UNIX release.

```

0    lm.x.y
1    ve.x.y
2    vh.x.y
3    xle.x.y

```

Enter kernel No. :

For example, in case of IOP-VH, option 2 should be specified. Do not press 'Enter-key" following the number. Once the selected choice is entered, system starts loading of files with various prints appearing on the screen. Wait for the message :

**For IOP-ML or IOP-VE or IOP-XLE or IOP-TMC or IOP-VH
(m / v / e / t / h) ?**

Now input your choice as **h** for IOP-VH (press return after typing h) and wait for the message (for other IOPs, give corresponding options). The system then

displays the system type and the device configuration on which the root file system is to be made. Wait for the display message :

Want to format the winch (s) (y or n)?



WARNING !

In case of IOP-VH/VL, only 'n' option should be used as formatting of disk is not required normally.

Now wait for following message.

winch capacity : xxxxx where xxxxx may vary from site to site.

Load the object (y/n) ?

The S/W loading operation will be aborted if 'n' is typed. If 'y' is typed the system will display different messages showing the current activity,

Making ROOT file system.over !

Transferring boot loader to root device

Loading the object

Single root file system found, positioning the cartridge.

Now the system will start copying from the UNIX cartridge. After the copy is over, an audit is conducted. Immediately after audit, a file system check will be performed automatically. After this the system will prompt with **Root File System Loading Complete 'Hit Reset and Reboot from Winchester'**. Reset the system and boot-up the IOP by giving 'bo' command.

VHCx.y>bo

The following queries are displayed only for the first time when the IOP is booted after unix loading.

Release 1_35_1_7(l3) or 1_4_1_3/1_4_1_4(l4) or 1_5_1_1/1_5_1_2/2_1_1_1(l5) (l3 or l4 or l5) ?

Select l5 for software release 2-1-1-1.

Load IOP SYSTEM (unit Hdlc)

[1.1-96/01/30]

System ! cdix-vh with 2063MB

Loading release 1_5_1_1/1_5_1_2/2_1_1_1/2_2_1_1

ROOT File System Present

Create file systems other than root (y/n) ?



WARNING !

If the exchange software data is already available and only UNIX is being loaded, then give option 'n'.

At the time of fresh installation, where the entire exchange software has to be loaded, option 'y' is to be used for complete loading of software link. If 'y' is given the system would keep indicating the file systems that it is creating. Wait till the system displays ("**over!**"). Specify the date and time in the specified format and proceed.

Note : In view of the fact of increased disk space, the booting/initialisation time may be 20 to 30 minutes.

When booting is complete **Console login** : prompt will appear on the console. If the 'n' option has been selected, subsequent steps 2,3 and 4 need not be executed.

Step 2:

Loading of Base Cartridge

To do this, login into 'root' account. The password for the root just after the UNIX cartridge installation is 'DSSroot'. After successful login, UNIX version will be displayed. And you will get #> prompt. Insert the exchange software base cartridge into the cartridge drive and type the commands

```
#cd /usr/cdot <RETURN>
```

```
#RESBC <RETURN>
```

The following message will be displayed :

```
CARTRIDGE RESTORATION UTILITY
FOR
BASE CARTRIDGE

Starting.....

Have you inserted cartridge ? (y/n)
```

Give 'y' to load the base cartridge to winchester else give 'n', abort the operation.

It will start loading from cartridge onto disk. Note down the block size and check with the blocks written on the base cartridge. After complete restoration of files, the system will ask for the IOP ID.

Give IOP-ID (0/1) :

Give proper copy id of IOP. It is '0' for IOP with unit-id 5C> and '1' for IOP 5D>.

The system will audit the files on the disk by comparing it against a master list and will display results followed by logging out, message.

After completion of successful audit, system will report the audit results as:

```
Audit Over !
Logging out...
Console login:
```

[If the audit gives some error, it concludes that the software installation is not successful. It has to be installed again].

Step 3:

Loading of Patch Cartridge

This procedure is to load the AP/BP/IOP patches from the patch link cartridge to the winchester disk. To do this, login into 'root' account. Password for 'root' account after software installation is 'DSSroot'. Insert the exchange software patch cartridge into the cartridge drive. Give the command.

#cd /code/audit <RETURN>

#killall <RETURN> it should be given when only patch cartridge is to be loaded.

#RESPC <RETURN>

The following message will be displayed :

```
CARTRIDGE RESTORATION UTILITY
FOR
PATCH CARTRIDGE

Starting.....
Have you inserted cartridge ? (y/n)
```

Give 'y' for loading the patches to winchester or give 'n' to come out.

All the patches required by the switch will be copied from the cartridge onto disk at proper places. Look for the number of blocks displayed after loading of patch cartridge is complete. Audit utility will also start automatically. Wait for audit to be over. Remove the patch cartridge.

Step 4:

Loading of Bare Minimum Data Cartridge

Insert the data cartridge into the cartridge drive

Give the commands

```
#cd /code/audit <RETURN>
```

```
#RESDC <RETURN>
```

The following message will be displayed.

CARTRIDGE RESTORATION UTILITY
FOR
DATA CARTRIDGE

Starting.....

Have you inserted cartridge ? (y/n)

Give 'y' if you want to load the data cartridge to winchester else give 'n' to comeout.

The minimum office data files are loaded from the cartridge onto disk at proper place. Check for the number of blocks displayed at the completion of data loading. Then 'audit' utility will start automatically. Check for extra files, files changed and files missing. Against these parameters the value should be 'None'. At the end of the audit, define the choice of Announcement Language, matching with the PROMs, used on the ANNC Card. Now UNIX prompt will be displayed. Remove the data cartridge.

Step 5:

Shutdown of IOP

On unix prompt (#), give following command and press 'RETURN' key only giving each command completely.

```
#> cd / <RETURN>
```

```
#> shutdown 0 <RETURN>
```

The following message will be displayed :

Do you want to continue ? (y or n) :

give 'y' and then wait for the following message to be displayed.

INIT : SINGLE USER MODE

Unix prompt (#) will also appear.

2.2.2. Initialisation of IOP to warm Level

On unix prompt, give 'init 2' and press 'RETURN' key.

#> **init 2**

Wait for the following messages to be displayed.

```
IOP INITIALISATION STARTS
      SIGNAL SETTING COMPLETE
      ENVIRONMENT SETTING COMPLETE
      SEMAPHORE SETTING COMPLETE
      SHARED MEMORY INIT. COMPLETE
      HDLC INITIALIZATION COMPLETE
      THE PROCESS GROUP = 8708 SET
IOP INITIALIZATION ENDS
System in warm start level (Multi User Mode)
Use INIT-IOP MMC command to go to INS-LEVEL
"Console login" :
```

Step 2:

Setting of Site id

Login into 'adm' account by giving 'adm' on "Console login:" prompt and press 'RETURN' key. Give **CDOTadm** against "password" and press 'RETURN' key. "iop 5C>" or "iop 5D>" prompt will be displayed as per IOP ID. Give 'crp' on iop5C> or iop 5D> prompt and press 'RETURN' key.

Wait for prompt sign '<' to appear on the screen at the bottom left hand side.

Give the following command on prompt <

<set-site-id <RETURN>

The parameters will be displayed as shown below :

<u>SET-SITE-ID</u>	<u>SET SITE ID</u>
SITE-ID :	
REPEAT/TERMINATE/EXECUTE (R/T/E) :	

Against parameter "**SITE-ID**", give the site identification name and then press 'RETURN' key. "REPEAT/TERMINATE/EXECUTE (R/T/E)" will be displayed by the system. Press 'E' to execute the command and wait for response to come. Old site-id and new site-id will be displayed in the response.

Press 'control D' keys to come out from 'crp', iop5C> or iop5D> prompt will be displayed. Give again 'crp' and press 'RETURN' key.

Now prompt '<' will come and new site-id will be displayed on the top of the screen.

Note : Site-id can be changed in warm-start level only

Step 3:

Bringing the IOP to Inservice Level

Give command

<init-iop: iop-lvl = INS-LEVEL, init-mod = FORCED;

Execute the command by pressing 'E' key.

file loading messages will come on the console. Now the exchange software is loading to the system from IOP disk.

"IOP initialization report"

IOP will go to INS-ACT state if it is the first IOP being booted.

2.2.3. Initialisation of the Exchange

Power up the AP module and all Base modules. The system initialization for all modules will start automatically. System software loading will start and the sequence of actions can be seen on console.

Step 1:

Assign New Passwords for Super user Admin & Admin Accounts

Accounts 'suadm' and 'adm' are highly privileged accounts which have permission to exercise any of the MMC commands. The first thing that should be done is to change the password for these accounts. Use

<set-pwd

command to attach new passwords for these accounts. The 'root', 'suadm' and 'adm' account passwords should be known only to system administrator. Make a note of the passwords as they are not to be forgotten. For normal day to day operations, separate account for each operator may be opened.

Now the IOP system is ready with all files and the C-DOT DSS software is running in the IOP.

Step 2:

To bring up the mate IOP, repeat Step 1 to 7 on the mate IOP. Note that the IOP-ID of the mate IOP needs to be different.

Check the level of the IOP by giving the following command

<DISPL-IOP- LEVEL;

It should be in **WARM-START** level.

Step 3:

The mate IOP is now running C-DOT DSS software but is not in sync with the master IOP. To bring it in sync with the master IOP, give the following two commands from inservice active IOP.

1. **PUT-SWU-OOS : MOD-NO = IOM, UNIT-ID = IOP-X;** (where X = 0 or 1, id of mate IOP & IOP-X should be at warm start level)
2. **PUT-SWU-INS : MOD-NO = IOM, UNIT-ID = IOP-X;** (X = 0 or 1 of mate IOP)

Step 4:

Collect all cartridges and store them at some safe place. It is suggested that the IOP consoles should be used by system administrator for monitoring the switch and should preferably be put in the IOP room.

Note :

The IOPs synchronisation should be done during the low traffic period. This can also be achieved by putting PUT-SWU-OOS & PUT-SWU-INS in calendar using ADD-CAL command.

2.3. CREATE A NEW EXCHANGE CODE

- i) For creating a new exchange code, key-in command "MOD-XCOD" and obtain the parameters on the screen as shown below:

MOD-XCOD	MODIFY EXCHANGE CODE
OPR-TYP	:
XCOD-TYP	:
X-COD	:
DGT-CNT	:
REPEAT/TERMINATE/EXECUTE (R/T/E)	

- ii) Against parameter "OPR-TYP" specify 'CRE' for creation of new exchange code.
- iii) Against parameter XCOD-TYP specify the exchange code type.
- Give XCOD-TYP = Unique if the exchange code is to be used only for Remote Base Module (RBM).
 - Give XCOD-TYP = SHARED if the exchange code is to be shared between main exchange BM's and RBMs
- iv) Against parameter "X-COD", specify the exchange code which is to be created. Exchange code cannot start with '0', '1' and '9'. Maximum 4 digit exchange code can be given.
- v) Against parameter "DGT-CNT", fill the number of digits required in the directory numbers for the exchange code being created.
- vi) Execute the command and get the response for creation of exchange code. Now subscribers can be created with the directory numbers of defined length starting with the newly defined exchange code.

Note :

- A maximum of 60 different exchange codes each catering to 1000 directory numbers or fewer number of exchange codes (say 6) each catering to 10,000 subscribers can be created in MBM. Any combination of exchange codes can be used with a upper limit of 60,000 directory numbers.

In case of SBM, maximum 16 different exchange codes each catering to 1000 directory numbers or 6 different exchange code of 1000 directory

numbers each and 1 exchange code of 10,000 lines can be created in the system.

2. It is not possible to create a 10,000 line exchange code of unique type as it is used only for RBM which cannot be of more than 2000 lines.
3. An RBM (Remote BM) can be assigned one shared exchange code and two unique exchange codes. One unique exchange code can be associated with one RBM only.
4. To create more than one exchange code this command has to be repeated.

2.4. ADDITIONAL OPERATIONS FOR RSU

For RBM the exchange code is to be associated with that remote BM using command MOD-RBM-XCOD. The subscribers can be created only after associating the exchange code with RBM. **Also refer 5.4.2.2 for detailed programming level 1 services in RSU.**

MOD-RBM-XCOD		MODIFY REMOTE BM XCODE	
OPR-TYP	:	CRE	
RBM-NO	:	XX	
[AREA-COD]*			
[MAIN-XCD]	:		
[RSU-XCOD]	:		

Specify "**Shared**" type exchange code against MAIN-XCD parameter and "**Unique**" type exchange code against RSU-XCOD parameter.

It is possible to associate 2 unique & 1 shared exchange code with one RBM. The subscriber for this RBM can be created corresponding to any one of the exchange codes. It is also possible to display the exchange codes associated with RBM using the following command, DISPL-RBM-XCOD for specific RBM Number.

Note :

The parameter [AREA-CODE] is valid only at the sites with S/W release C4.23 or higher. It is used only when the RSUs are installed in different SSA. For eg. the Main Exchange is installed in URAI (U.P) with STD code 05162. Its' RSU is installed in JALAUN, a different SSA with STD code 05168. The parameter AREA-COD should be defined for JALAUN as 05168. If there are more than one RSU, the same area code should be defined to all the RSUs, installed in JALAUN SSA.

2.5. CREATION/MODIFICATION OF SPECIAL NUMBERS/SYSTEM DIRECTORY NUMBERS

More than one directory numbers are programmed as Special Numbers/System Directory Numbers to support additional functions at exchange level e.g. answering circuit i.e. Tone Test Number (Answering Circuit Number) for junction testing, Alarm Monitoring Number to monitor the system health from remote place. Two different CRP commands are provided.

MOD-SPL-NUM

MOD-SYS-DIRNO

In some of the cases, the number should have been created as Normal Subscriber. In other cases, any free directory number can be programmed on System/Special Number in the exchange. The details are given below :

2.5.1. Create/Modify System Directory Number

- i) For adding or modifying the existing system directory number, key-in the command "MOD-SYS-DIRNO" and obtain the parameters on the screen as shown below:

MOD-SYS-DIRNO	MODIFY SYSTEM DIRECTORY NUMBER
OPR-TYP	:
DIR-TYP	:
DIRNO	:
[NEW-DIR]	:

- ii) Against parameter "OPR-TYP", specify the type of operation (i.e. CRE or DEL or MOD) which is to be performed. For creating or adding a new system directory number, fill 'CRE' and for modifying the existing system directory number, fill 'MOD'.
- iii) Against parameter "DIR-TYP", specify the type of the system directory number namely, operator (OPER) or Announcement (ANNC) or Line Monitoring (LIN-MON) which are to be created/modified.
- iv) Against parameter "DIRNO", fill the directory number to be created/modified as system directory number.

Note :

The directory number given as input should have already been created using "CRE-SUB" command.

- v) Against parameter "[NEW-DIR]", specify the new system directory number for modifying the existing system directory number otherwise give default value.
- vi) Execute the command and get the response for creation or modification of system directory numbers.

2.5.2. Create/Delete Special Directory Number

- i) For creating or deleting special directory number, key in command "MOD-SPL-NUM" & obtain the parameters on the screen as shown below :

MOD-SPL-NUM	CREATE/DELETE SPECIAL DIRECTORY NUMBER
DIR-OPR	:
DIR-TYP	:
DIRNO	:

- ii) Against parameter "DIR-OPR", specify type of operation (CRE-NUM or DEL-NUM) which is to be performed.
- iii) Against parameter "DIR-TYP", specify the type of directory number namely, Answering ckt. (ANS-CKT) or Alarm monitoring (ALM-MON) which are to be created or deleted.
- iv) Against parameter "DIRNO" fill the directory number to be created/deleted as system directory number. The directory number to be created should be free .
- v) Execute the command & get the response for Creation/Deletion of system directory numbers.

2.6. MODIFY SYSTEM PARAMETERS

Bare minimum Data Cartridge contains various system parameters and limits with their default values. Site dependent parameters can be modified at site while preparing the data as per that site requirement. Following are the important system parameters which needs to be taken care while preparing the data.

- i) For modifying a system parameter value, key-in command "MOD- SYS-PARAM" and obtain the parameters on the screen as shown below :

MOD-SYS-PARAM	MODIFY SYSTEM PARAMETER
PAR-NAME	:
PAR-VAL	:

- ii) Against parameter "PAR-NAME", specify the name to identify the parameter whose value has to be modified.
- iii) Against parameter "PAR-VAL", specify the value to be assigned to the specified parameter.
- iv) Execute the command and get the response for modification of specified system parameter.

2.6.1. Basic Call Processing Related Parameters

- i) XCHG-TYPE :

Exchange type (XCHG-TYPE) parameter as per the site should have following values for various type of C-DOT exchanges.

XCHG-TYPE = 2 (for MAX)
 = 4 (for TAX or ILT)

The values are in decimal. Default value for this parameter is 2.

Note :

It should be ensured that the parameter XCHG-TYPE is set to 2 in all the exchanges except the leading TAX/ILT of the LDCA which will be only one such exchange in a LDCA. For the TAX/ILT of the LDCA, the parameter should be set to 4.

- ii) PCO-MTR-LCL

This parameter governs the charging for intra exchange calls originating from CCB lines. The value given against this parameter indicates the charge rate number which may be given as per site requirement to govern the charging of intra exchange calls.

- iii) NON-MTR-LCL

This parameter governs the charging for intra exchange calls terminating on non-metered numbers.

- iv) MIN-SUBS-DIALS

This parameter indicates the minimum number of digits a subscriber should dial after which call can be processed. This parameter should have proper value as per site requirement. For example if at any site 4 digit numbering scheme is there and this parameter is set to 5 then no call will pass because minimum no. of digits required for processing of the calls will never be received. Hence in this case this parameter may have value equal to 3.

Note :

MIN-SUBS-DIALS value should always be greater than or equal to number of digits in exchange code but it should be less than the number of digits used in the DIRNO in the exchange. For example if exchange code = 548 [3 digits] and 6 digit numbering scheme is there then $MIN-SUBS-DIALS \geq 3 < 6$ (it may be 3 or 4).

v) SPL-RNG

This parameter enables/disables "distinctive Ringing" feature. This parameter indicates whether different type of ring is to be fed for local calls and STD/ISD calls if TTAX is defined on the incoming TGP. If SPL-RNG = 1 (enabled) then different ring is fed. If SPL-RNG=0 (disabled) same ring cadence is fed for all types of calls.



WARNING !

Please note that this parameter should be enabled only after ensuring that

- (i) PSU ECN is implemented ie. Ringer LED on the PSU is continuous.**
- (ii) Compatible software PROM is used on the TIC card.**

vi) CCB-CL-CNVRS

This parameter indicates that after how much time the calls originated from ORD-CCB lines are to be cut. In BMDC the value is set to be 1800 i.e. 3 min. So all the calls originated from ORD-CCB lines will get cut after 3 minutes.

vii) CALL-DUR-THR

This parameter defines the time duration threshold of a call after which a report will be generated and redirected to OOD and printer. The print will be generated for all the calls violating the call duration defined against this parameter after the completion of the call.

viii) CALL-CHRG-THR

This parameter governs the threshold for charge units of a single call. All the calls for which the charge units are more than the value specified will be printed and displayed on OOD after the completion of the calls. Default value is 100 units.

ix) PSWD-TAMP-THRS

This parameter indicates the number of wrong password attempts allowed for dynamic STD. If the consecutive wrong attempts exceeds the value defined against the parameter, the subscriber dynamic STD activation/deactivation is disabled and the subscriber is put under TEMPERED status. Default value is 10 in BMDC. Maximum Value is 20.

x) CSH-TAX-TM-OUT

This parameter is effective for those calls for which the exchange is working as leading TAX. This parameter governs the CSH timeout for the calls default values is 300 i.e. 30 sec. in BMDC.

xi) RING-TAX-TM-OUT

This parameter is also effective for the calls for which the exchange is working as TAX. This parameter decides the duration of the ring to be fed to the called party. Default value is 600 i.e. 60 Sec.

v) ROUTING

This is the minimum numbers of digits that must be received in the exchange whenever some one dials digits corresponding to a route having open numbering scheme. This value implies that after these many digits are received, an IDT would mean completion of dialling and the call would be handled on the basis of the digits dialled so far. If IDT occurs before receiving number of digits against routing parameter, the subscriber will be fed a parking tone.

vi) DNA-TMR

This parameter is effective for the feature Diversion on No Reply. The value against this specify that after how much time the call is to be diverted to the predefined number if no answer is received. Default value is 300 in BMDC i.e 30 sec.

Note : The Value for this parameter should always be less than 550 i.e. 55 sec.

2.6.2. Alarms and Reports Related System Parameters

i) COD-REC

This parameter is used for initialisation, overload and recovery reports. Following options are available for selecting the output device for these reports depending on the value of the parameter.

Value	Output Device
1	VDU only
2	Printer only
3	Both VDU & Printer

Note :

MOD-SYS-PARAM command can be used to modify the value of the parameter.

ii) COD-STC

This parameter is used for Terminal status change reports. Output device for these reports is selected based on the value of the parameter.

Value	Output Device
1	VDU only
2	Printer only
3	Both VDU & Printer

iii) COD-DAR

This parameter is used for Diagnostics, Routing and audits reports. Output device for these reports can be selected based on the value of the parameter. '1' is for VDU only, '2' for printer only and '3' for both VDU and Printer.

iv) COD-TRTN

This parameter is used for terminal routing and Answering ckt reports. Output device for these reports can be selected depending on the value of the parameter. '1' is for VDU only, '2' for printer only and '3' for both VDU and Printer.

v) HEAL-LOG-ENBL

The value of this parameter enables or disables the health logs. Normally the health logs should be disabled. The feature health monitoring is for designers. It can have the following values

0 = disabled

255 = enabled

vi) SML-TGP

The maximum number of trunks in a 'small' trunk group from a maintenance point of view. Default value in BMDC is 10.

vii) MED-TGP

The maximum number of trunks in a 'medium' size trunk group from a maintenance point of view. Default value is 20.

2.6.3. Calling Line Identity Related System Parameters

i) ARCD-LEN

This parameter indicates number of digits to be prefixed as area code while sending the CLI to the other exchange.

ii) ARCD-IN-CLLNG:

This parameter indicates whether Area code is to be prefixed to CLI or not. If this parameter is set to 0 it means area code is not to be prefixed. If this parameter is set to 1 then area code is to be prefixed to the CLI.

iii) ARCD-DGT'X' (where x can be from 1 to 8)

These parameters indicate the digits which are to be prefixed as area code. ARCD-DGT1 indicates the first digit, ARCD-DGT2 indicates the second digits & so on. Maximum eight digits can be defined.

Let us take an example of Area code for Delhi is 011 then ARCD-DGTX should have the following values:

ARCD-DGT1 = 10 (For digit 0)

ARCD-DGT2 = 1

ARCD-DGT3 = 1

Note :

'0' is defined as '10' in the system parameter and parameter ARCD-LEN should be set to 3.

iv) NUM-ANI

This system parameter indicates the total number of digits to be asked as CLI including the area code e.g. Area code = 011 & calling No = 5485001. If NUM-ANI is set as 5 then only first 5 digits will be asked as CLI. For receiving the full number (including area code) from preceding exchange in case of MOD-R2 signalling, NUM-ANI shall be set to 10 and need not be modified in "INDIAN TELECOM NETWORK".

v) CLI-INFO

If this parameter is set to 1 then CLI will be asked from the preceding exchange for the calls coming on the incoming trunk group on which 'CAMA' is set as 'Yes'. For the call coming on the trunk groups on which 'CAMA' is set as 'No', CLI will not be asked from the preceding exchange even if 'CLI-INFO' system parameter is set as 1.

If this system parameter (CLI-INFO) is set to '0' then CLI will not be asked from preceding exchange at all for any incoming trunk group even if 'CAMA' is set as 'Yes'.

This parameter is relevant in case of R2-R2 link by link signalling and R2-ISUP interworking.

2.6.4. Subscriber Category Related System Parameters

i) BM-01-CAT to BM-32-CAT

There are 32 system parameters which govern the category assigned to the Base Modules. All subscribers of the BM will have the same category. Any value in the range 1 to 64 can be given for these categories value. These parameters are used to define separate category for a RSU when it is being installed in different charging zone e.g., with different area code in other SDCA.

All colocated BMs can be given same category if routing & charging characteristics are to be kept same for all subscribers of those BMs.

2.6.5. Time Out Related Parameter for Automatic Recovery of PCMs

i) MNTBLK

This parameter indicates after how much time the DTKs which have gone to BLK-TRNS state have to be restored to INS state.

2.6.6. CCS7 Related System Parameters

i) INT_THR

This parameter defines the percentage of the total PHC terminals which can be used for C.85 links.

For non-SSP exchanges

No. of C.85 links = No. of BMs having CCS7 ckts/links +2

For SSP exchanges,

No. of C.85 links = No. of BMs + 1

ii) NO7_THR

This parameter defines the percentage of total PHC terminals which can be used for signalling to other nodes in a CCS7 network

$NO7_THR = 100 - (INT_THR)$

2.7. SET SYSTEM TIME

For changing system date and time, key-in the command "SET-SYS-TIM" and obtain the parameters on the screen as shown below :

SET-SYS-TIM	SET SYSTEM TIME
[NEW-DATE]	:
[NEW-TIM]	:

- i) Against parameter "NEW-DATE", specify the new date in the following format :

"DD- MM-YYYY"

where, MM = Month ; 01 to 12
 DD = Day ; 01 to 31
 YYYY = Year ; 1970 to 2036

- ii) Against the parameter "NEW-TIME" specify the new time with possible values as

HH = Hour ; 00 to 23
MN = Minute ;00 to 59

- iii) Execute the command and get the response displaying "SYSTEM TIME SET"

2.8. MISCELLANEOUS OPERATION COMMANDS

2.8.1. Display Exchange Codes

- i) For displaying all existing exchange codes for an exchange, key-in the command "DISPL-XCOD" and execute it. Obtain the response displaying all existing exchange codes for the exchange with the digit length of their directory numbers.

2.8.2. Display System Directory Numbers

For displaying all existing system directory numbers, key-in command "DISPL-SYS-DIRNO" and execute it. Obtain the response displaying 'type of system directory number' and corresponding 'system directory number'.

2.8.3. Display System Parameters

For displaying values of all system parameters, key-in command "DISPL-SYS-PARAM" and execute it. Obtain the response displaying all system parameters and their values. If the initials or some characters of the system parameter name are known then there is no need to see all the parameters. Against parameter [PAR-NAME] specify those characters suffixed or prefixed by *. e.g. if we want to see the value of system parameter PCO-MTR-LCL, then in [PAR-NAME] we can give as *MTR* & it will show all parameters in which MTR comes.

2.8.4. Display System Limits

- i) For displaying the values of system limits pertaining to a specified Base Module key-in command "DISPL-SYS-LIM" and obtain the parameters on the screen as shown below :

DISPL-SYS-LIM	DISPLAY SYSTEM LIMITS
MOD-NO	:

- ii) Against parameter "MOD-NO", indicate a number to identify a specific Base Module, whose data is to be displayed. Possible values are BM-01 to BM-32.
- iii) Execute the command and get the response displaying the system limits for specified Base Modules with maximum number of users and current number of users for each facility/circuit type.

2.9. CCS7 RELATED DATA CREATION

Each and every exchange with CCS7 signalling has its own unique point code. All the exchanges in the Indian Telecom Network, including that of private operators are allocated unique point codes. Before configuring the exchange for CCS7 signalling, the point code should be obtained from planning or any other decision making authority. The point code and other CCS7 related data creation for this exchange is programmed by using the programming details as specified in the document " CCS7 User Manual"..

Chapter 3.

Hardware Installation & Equipage Procedure

3.1. GENERAL

This chapter describes the procedure to equip the Base Module as basic building block of the exchange. Controller Cards/Frames along with Service Circuits and Terminal Cards are equipped in each base module. Before equipping new hardware, physical interconnection should be complete and the unit is powered on.

Note :

It is advised that in case of modules and frames, jumper settings must be verified as specified in "INSTALLATION DOCUMENT". The position of jumper settings also apply for some of the cards as TUI in ATU, DTU and SUM.

3.2. EQUIPPING OF BASE MODULE (EQUIP-MOD)

This command is not valid for SBM-RAX. It is assumed that before attempting the BM-addition activities, all the requirements of additional hardware are physically installed. The placement of Base Module should be such that two Line Modules (One on each side) can be connected with the BM to increase the capacity of switch upto 2000 Lines.

3.2.1. Equipping the New BM

There are two different procedures to equip the new base module in MBM exchange. The first procedure is the on-line equipage of the additional BM without any system down time. The other procedure is off-line procedure generally used at installation sites, where the BM is equipped and data is created in growth mode at warm-level IOP without updation in the exchange. After completing the data base creation at the IOP, it is updated to the exchange memory by low level (Part-Init) initialisation of the modules **AM** and **CM** which results in total system downtime of approximately 5 minutes.



WARNING !

INIT-SYS command shall never be used during any stage of BM equipage, being attempted in a working exchange as part of capacity expansion process.

3.2.1.1. On-Line Addition of Base Module (Procedure-1)

1. Ensure that space switch complex of CM is in duplex.
2. Make SS-1 INS-ACT and SS-0 INS-SBY. Also bring SBY-IOP to warm level by using command INIT-IOP : 2,1; on the standby IOP.
3. PUT-SWU-OOS : CM, SS-0;
4. Physically insert MUX cards in BTU (if required) in Bus-0 & Bus-1 and Switch cards in SSU for SS-0 (if required). Care should be taken to insert the card in right slots. Also ensure that MUX cards have the jumper settings as per the slot placement.
5. From CRP prompt, issue crp command EQUIP-MOD:

EQUIP-MOD	EQUIP-MODULE
CONFIG	:
MOD-NO	:
VER-NO	:
[MOD-TYP]	:
[DTK-ID]	:

In case of RSU, the BM has to be equipped with [MOD-TYP] as "Remote" and [DTK-ID] as 1,2,17,18 for 4PCMs or 1,2,3,4,5,6,7,8,17,18,19,20,21,22,23,24 for 16 PCMs.

- Wait for equip-module report on OOD and printer

6. Now issue the following command

<INIT-MOD:

MOD-NO = BM-NO.

[DEV-ID] = <Default>

INIT-TYP = equip

After the successful execution of this command, code loading for BM-X will start and critical alarm for this BM will be raised on ADP/OOD/Printer for the new BM.

After this, the SS-0 will become INS-ACT and SS-1 becomes OOS-SYS automatically.

7. Wait for load pass report of BM-X on OOD/PRINTER.
8. Now make SS-1 as OOS-OPR by using command
<PUT-SWU-OOS: CM, SS-1;
9. Physically insert PSS cards in SS-1 (if required) and
Put SS-1 inservice by using command
<PUT-SWU-INS: CM, SS-1;
10. Now quit 'CRP' and go to iop5x> prompt
iop5x>cd /u/admn/cmdfile
iop5x>conv_cmd 1
The following parameters input will be asked and to be defined one by one:
CONFIGURATION : 1
BM NUMBER [1 to 32] : BM NO.
NORMAL/REMOTE (n/r) : n

Note: Option `l' for MAX-L and `xl' for MAX-XL should be used.

11. From CRP prompt execute the following commands one by one
<exec-cmd-file: aefrm.cmdo,,,2;
<exec-cmd-file: amlpr.cmdo,,,2;
12. After the execution of each command file, see the log file to ensure that the command files are executed properly.
13. If the BM to be equipped is not a digital trunk BM, (i.e., the BM with one or more TUs as ATU) then equip ANNC and TTC cards in right slots. However, in case of Digital Trunk BM, only ANNC card is to be equipped.
14. Equip the MFC cards with required no. of MF-senders and MF receivers in case of TRUNK BM and DTMF circuits in case of Line BM. Put them INS-ACT one by one.
15. Create different TGPs and ROUTE related data for TRUNK BM and subscriber data for LINE BM.
16. Bring IOPs into synchronisation

3.2.1.2. Off-Line Addition of Base Module (Procedure-2)

1. Start with both IOPs in duplex
2. Bring SBY IOP to warm level using command INIT-IOP: 2, 1;
3. Follow step 10 as mentioned in 3.2.1.1.

4. Execute the following command file before executing the two command files mentioned in step 11, in GROWTH MODE.
Exec-cmd-file: aemod.cmdo;
5. Carry out 13 & 14 in GROWTH MODE as mentioned in 3.2.1.1.
Note : Repeate steps 3, 4 & 5 for next BM to be equipped..
6. Physically install new MUX cards in BTU and Switch cards in SSU (if required) in proper slots of BTU and SSU of CM.
7. Equip terminal cards in the right slots.
8. Create new subscribers and also Modify/Create the TGPs and route related data as explained subsequently in "Subscriber Line Administration" and "Trunk and Routing Administration" of this document.
9. Take ED backup from IOP in which BM has been added.
10. On active IOP, execute the command INIT-IOP: 2,1;
11. Critical alarm for IOP will appear on ADP.
12. Copy 'bd' from OOS-IOP to IOP in which data has been updated to ensure billing updation.
13. On IOP in which data has been updated, execute crp command <INIT-IOP:5, 1; to bring it to INS-ACT
14. Urgent alarm will be there on ADP for IOP instead of critical.
15. Now from this IOP (active now) do the following during low traffic hours (late night or early morning)
INIT-MOD:, AM, PART-INIT;
16. The AM will go for initialisation of PART-INIT level. CM and remaining BMs will go for STBL-CLEAR.
17. On ADP critical alarm will be raised for CM and all BMs. All alarms will get cleared except for the new added BMs.
 - i. New Base Modules will go for code loading along with message
"Code loading begins"
 - ii. Wait for the load pass report of the new BMs and then make all the MFC-Units INS-ACT.
 - iii. Verify for proper routing and charging as per network requirement. Verify for each route one by one.
18. Bring IOPs into synchronisation.

3.3. FRAME EQUIPPING IN BASE MODULE (BM/LM RACKS)

The different types of frames along with its functions are listed below:

- ATU : Analog Terminal Unit, used to terminate Analog Subscribers/trunks.
- DTU : Digital Terminal Unit, used to terminate 2 Mbps Digital PCM Links.
- SU : #7 Signalling Unit, used to support #7 Signalling. Only one signalling unit is used in the system irrespective of Exchange Configuration or Capacity.
- ITU : ISDN - Terminal Unit, used to terminate BRI and PRI Interfaces.

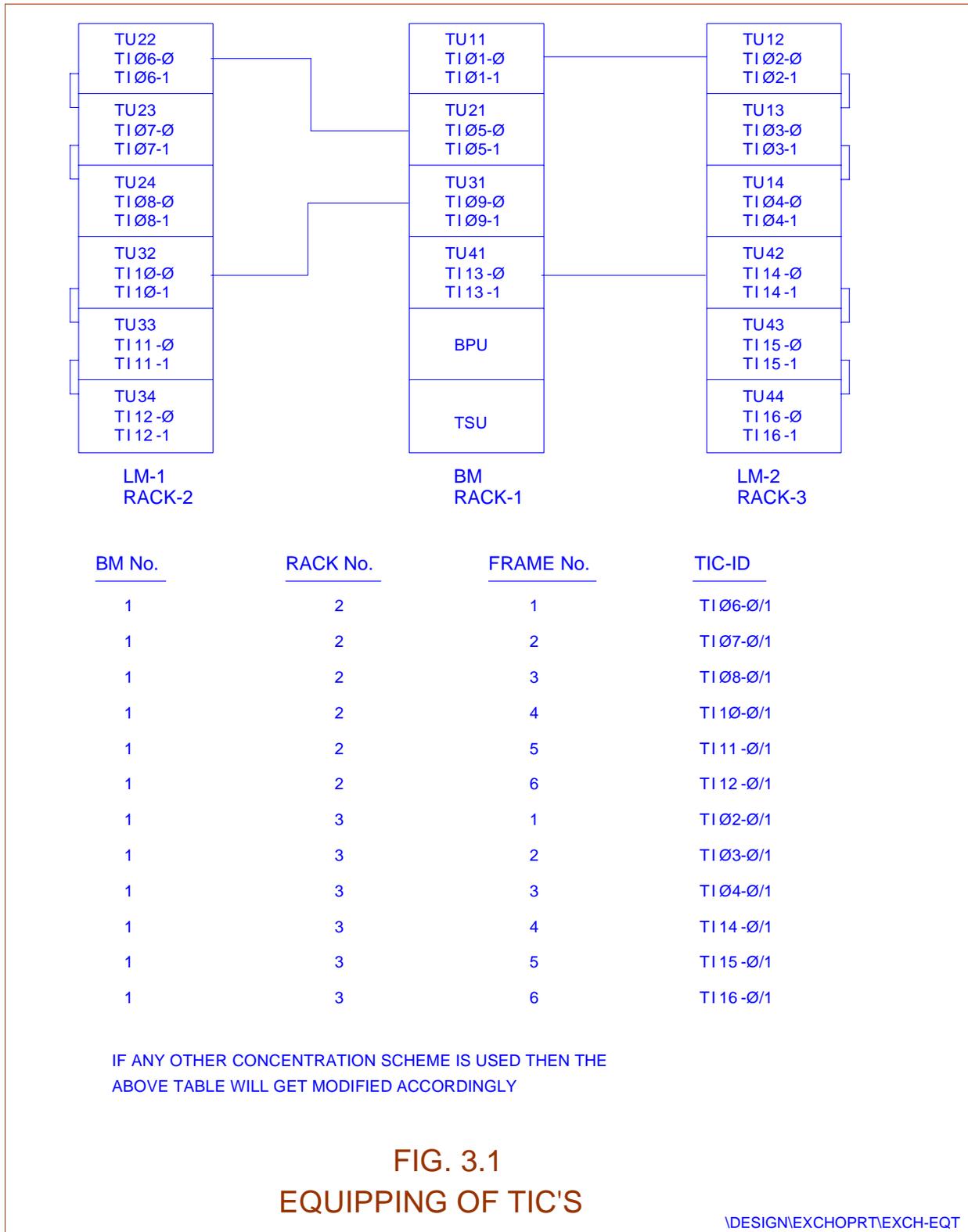
Depending on site specific configurations, a suitable combination of these frames are equipped in a Base Module.

To exploit full capacity of call handling and switching capacity of the Base Module, the concentration of traffic by sharing the time slot is also supported. A typical configuration with concentration is shown in Fig. 3.1. Depending upon the cabling/connection of a Terminal Unit (TU) to Time Switch Unit (TSU), a logical number in form of "TIC-id" is associated with each frame. It is important to note that "TIC-id" is allocated based on the cabling of TU and TSU and not due to physical placement of the frame in the rack. To avoid any confusion, the standard configuration, as shown in Fig. 3.1 will be referred throughout this document.

3.3.1. Equipping a Frame (EQUIP-FRAME)

This command is used to equip frames in Base Module/Line Module.

To equip a frame, key-in the command EQUIP-FRAME to obtain parameter entry form :



EQUIP-FRAME		EQUIP FRAME
MOD-NO	:	
RACK-NO	:	
FRAME-NO	:	
TIC-ID	:	
[FRM-TYP]	:	ATU

Rack-No and Frame-No. should be as per physical placement of the frame in the Exchange. As explained earlier, TIC-ID has to be defined based on the logical connection and its position in the concentration chain. The TIC-ids for the principal frames will be TI01, TI05, TI09 or TI13. The TIC-id of the frames in concentration will be Ti (xx+1), Ti (xx+2), Ti (xx+3) where 'xx' is the 'id' number for the frame directly connected to TSU and being concentrated along with the frames.

For example, in case of the frames 1, 2 and 3 of Rack '2', the TIC-ids will be TI06, TI07 and TI08 because they are being concentrated with TI05. The parameter FRM-TYP can be ATU, DTU, SU or ITU. At present, ETU is not implemented. As per design, ATU, DTU and SU can be part of the concentration chain sharing 128 slots towards TSU. **But any one of the above type of frames can not be concentrated to ITU.**

The following conditions will apply for SU and ISTU

1. The SUM and ISTU can not be equipped as Ti13.
2. If SUM and ISTU are equipped as Ti01, the ANNC has to be equipped in some other frame.
3. ISTU can be equipped only as 'PTU' (principal TU) and cannot be concentrated with any one of the three frame types as ATU, DTU or SUM.
4. In case of SUM, special initialisation procedure is required to make it INSERVICE. The procedure is explained in section 3.4 of this chapter.
5. In case of ISTU, in addition to Tixx, switch unit ICCxx is also equipped. The details are listed below:

Frame Type	TIC	ICC
ITU	Ti01	ICC1
ITU	Ti05	ICC2
ITU	Ti09	ICC3

In case of FRM-TYP as ITU, before making TIC inservice, corresponding ICC units have to be brought inservice first.

3.3.2. Unequipping a frame in Base Module (UNEQ-FRAME)

This command is used to unequip a frame, already equipped in the Base Module. This is required where the configuration of the equipped frame has to be modified. To unequip a frame, the following conditions should be met before executing the command UNEQ-FRAME.

- i) All the terminal slots should be unequipped.
- ii) Both the copies of TICs of the corresponding frame should be OOS-OPR. In case of FRM-TYP as ITU, the corresponding ICC units in both the copies should also be OOS-OPR.

To unequip the frame, key in the command UNEQ-FRAME and obtain parameter entry form:

UNEQU-FRAME	UNEQUIP FRAME
MOD-NO	:
RACK-NO	:
FRAME-NO	:

Successful execution of the command indicates that the frame has been unequipped and the same can be equipped with different H/W type after replacing it with new frame.

3.4. EQUIPAGE/INITIALISATION OF SS7 UNIT MODULE (SUM)

As explained earlier, only one SUM frame is equipped in the exchange irrespective of its configuration or capacity. A SU frame is equipped as explained in 3.3. However in MBM exchanges, SUM should always be equipped in Trunk BM. Also it is recommended to equip SUM in one of the BM pairs as colocated BM. For example, it is advised to equip the SUM in BM07 or BM08 as co-located BMs. In other words if BM08 is RBM, the placement of SUM should be avoided in BM07.

After equipping a frame as SU in one of the BMs, equip the terminal card in the SU frame with CARD-TYP as PHC (Refer section 3.6.1 of this chapter). Make the TICs INS-ACT and SBY. The SUM is initialised automatically when one of the TIC becomes INS-ACT. For detail operations, please refer "CCS7 User Manual".

3.5. EQUIP/UNEQUIP SERVICE CIRCUITS

To support core switching functions, some additional resources are provided in each BM as DTMF/MF, Announcements and Conference Circuits. Also one Terminal

Tester (TTC) card is provided in each BM to support automatic testing of Subscribers and Analog Trunks.

3.5.1. Equip MFC Card (EQUIP-MFC-CARD)

To equip a new MFC card, key-in command "EQUIP-MFC-CARD" and obtain the parameters on the screen by pressing 'RETURN' key. Fill the parameters values as shown below :

EQUIP-MFC-CARD		EQUIP MFC CARD
VER-NO	:	
CARD-SLT	:	
[BLK1-TYP]	:	DTMF
[BLK2-TYP]	:	DTMF
[BLK3-TYP]	:	DTMF
[BLK4-TYP]	:	DTMF

Note :

MFC1 and MFC3 are already equipped in Bare Minimum Data Cartridge (BMDC) for SBM exchange and hence are not required to be equipped at site. MFC2 and MFC4 may be equipped if required at site, using above procedure. In case of MBM exchange, all the MFC cards are to be equipped with all the four blocks as DTMF in case of Line BM and MF-SNDR/MF-RCVR in case of Trunk BM. The parameter VER-NO should always be defined as 1.

3.5.2. Equip Service Circuit Cards (Announcement, Conference and Terminal Tester Card) EQUIP-SRV-CARD

Equipping of ANNC & TTC Cards will not be required in SBM Exchanges as they are equipped in Bare Minimum Data Cartridge (BMDC) for SBM system. In case of MBM exchange, ANNC & TTC are to be equipped for each BM separately. For equipping service card such as an Announcement Card, key-in the command "EQUIP-SRV-CARD" and press 'RETURN' key to obtain parameters. Fill all the parameter values as shown below as per requirement.

EQUIP-SRV-CARD	EQUIP A SERVICE CARD UNIT
SRV-TYP	:
VER-NO	:
CARD-SLT	:

Note :

- i) The physical slot for TTC is fixed as X-1-4-24 where X is the BM-NO.
- ii) In case of Digital Trunk BM, TTC need not be equipped.
- iii) In case of equipage of Conference Card, next slot should be kept free as it consumes 16 time slots.

3.5.3. Unequip Service Card (UNEQ-SRV-CARD)

This command is used to unequip the service cards to facilitate the user to reconfigure the resources. Some of the requirements are:

- i) Reconfiguration of combination of DTMF/MF circuits
- ii) Change of slot of Announcement

Make the card OOS-OPR by using command "FRC-SRV-OOS". Key-in command "UNEQ-SRV-CARD" to obtain the parameter form on the screen by pressing 'RETURN' key.

Fill card slot of a service card (to be unequipped) against "CARD-SLT" parameter as shown below:

UNEQ-SRV-CARD	UNEQUIP SERVICE CARD
CARD-SLT	: 1-1-6-5

Execute the command by pressing 'E' and get the 'Unequip service card unit Report'. Successful execution of the command confirms the unequipping of a service card.

3.6. BASIC INTERFACE/TERMINAL CARDS EQUIPAGE

With the addition of new types of hardware to support CCS7 signalling, ISDN interfaces etc., suitable checks have been incorporated to reject the command where new terminal card cannot be equipped in the frame due to incompatibility. For e.g. even if the card slot for DTK-CAS or DTK-CCS is specified correctly in a frame, which is equipped with FRAME-TYP as any value other than DTU, the equipage of terminal card will fail with suitable error message. When the equipage of terminal card fails, any one of the following conditions may arise.

- i. Slot may be already equipped.
- ii. Frame may not be equipped.
- iii. As explained earlier, the frame type does not permit the equipage of new terminal card.

3.6.1. Equip Terminal Cards in the Frame (EQUIP-TRML-CARD)

- i) For equipping Terminal Cards (Line Cards, Trunk Cards or #7 Protocol Handlers) in a specific slot in the equipped frame, key-in "EQUIP-TRML-CARD" command and obtain the parameters on the screen by pressing 'RETURN' key. Fill the values against each parameter as shown below:

EQUIP-TRML-CARD	EQUIP TERMINAL CARDS IN THE FRAME
HW-TYP	:
VER-NO	:
CARD-SLT	:

- ii) Execute the command and get the output report. Proper execution of the command confirms the equipage of the terminal card in the given slot. Different slots in the frame can be equipped for specific HW-TYP as required. The "HW-TYP" parameter may take one of the values as:

ORD-CCB, SUB-LIN, DTK-CAS, DTK-CCS, 4W-E-M, TW-TRNK, PHC, BRI, PRI, or PRI-16.

All other variables are not implemented.

- iii) Equipage of different types of H/W cards are supported subject to the following limitations:
 1. For PRI Card, the slots 5,7,9,11 and 19,21,23,25 are valid positions. Next slot will be blocked in case the card is equipped as PRI.

2. Cards with different HW-TYP can be equipped only when specified HW-TYP is allowed in the frame. For e.g. if a frame is defined as DTU, the valid HW/TYP permitted, are DTK-CAS and DTK-CCS.
3. BRI, PRI and PRI-16 are valid only if the frame is equipped as ITU i.e. ISDN terminal unit.

3.6.2. Unequip a Terminal Card (UNEQ-TRML-CARD)

Unequipping of terminal card may be required in case the hardware configuration of the already equipped slot has to be modified. Some of the cases are :

- i) Modify the hardware type from SUB-LIN to ORD-CCB to enable creation of STD-PCOs with reversal and 16 KHz metering in the same slot.
- ii) Changing the configuration of the slot from DTK-CAS to DTK-CCS.
- iii) Changing of slot configuration from BRI to PRI-16 or PRI.

However the change in slot configuration should always be followed with change in compatible hardware card in the corresponding slot. The change in the slot configuration will be permitted subject to the valid combination of frame type and slot configurations as explained previously for EQUIP-TRML-CARD.

An already equipped terminal card can be unequipped only when all the ports corresponding to the slots are free. For example, to unequip LCC/CCM card, all the eight ports corresponding to the card should not be associated with directory number or Hunt Group. This will be true for BRI/PRI-Interfaces also. Similarly in case of Trunk Cards, all the ports corresponding to the card being unequipped, should not be part of any Trunk Groups (TGPs). If any one of the ports is not free, the command is rejected with suitable error message. In case, a trunk group is associated with one or more routes and all the trunks of the trunk group corresponds to the slot being unequipped, it becomes necessary to first free the TGP from all the routes either by deleting the route or modifying its characteristics and then follow the normal procedure to delete the TGP.

After ensuring that all the ports corresponding to the terminal card becomes free, key-in the command UNEQ-TRML-CARD to obtain the parameter entry form :

UNEQ-TRML-CARD	UNEQUIP A TERMINAL CARD
-----------------------	--------------------------------

```
CARD-SLT :
```

The successful execution of the command indicates that the card has been unequipped and the slot is free to be equipped with different hardware configuration subject to the limitations, permitted by the type of frame.

3.6.3. Display Information About Equipped Modules

To see how different modules are equipped (i.e. normal BM or RBM) and in each module how different frames are equipped (i.e. ATU, DTU or ITU), issue the command "DISPL-MOD-INFO" & press Return key to obtain parameter entry form.

```
DISPL-MOD-INFO          DISPLAY INFORMATION ABOUT EQUIPPED MODULES
[MOD-NO]                :      ALL
```

In the option either give default value which is "ALL" if you want information about all equipped modules or specify BM NO. if information about a particular BM is required.

3.6.4. Network Synchronisation

There are different configurations for C-DOT DSS. They are SBM-RAX, MAX-L and MAX-XL. In case of SBM-RAX and MAX-L, the synchronisation feature is supported by using add-on Network Synchronisation Equipment (NSE). For details, please refer "NSE User Manual". NSC feature is integrated in MAX-XL and may be exploited at the sites where reference clocks are available. The feature can be used at the sites with following prerequisites:

- ◆ New DTS card APC-DTS495/F-S00 is used for the PCMs, being used to derive the timing references.
- ◆ If the new DTS card is not available, the ECN on the existing cards APC-DTS066/T-S04 should be used to derive the timing references.

- ◆ The next level or same level TAX is already synchronised conforming to level 2 clock stability in conformance to the specification of DOT/TEC. It is desired that the through media (end to end) should be OFC.

For details of Operation and Maintenance functions related to "Network Synchronisation in MAX-XL", please refer "Maintenance Procedures for C-DOT DSS MAX". Depending on availability of one or more but maximum upto 3 references, one or more clock sources can be equipped and selected.

Chapter 4.

Subscriber Line Administration

4.1. GENERAL

This Chapter explains the procedure for creation and deletion of Analog as well as ISDN subscriber line, modification of its characteristics; that is, modifying the class of service of a subscriber line. The procedure to create/delete a hunt group, addition/deletion of lines to/from hunt group and modification/display of hunt group characteristics are also explained in this chapter.

The same set of commands are used for administration of Analog and ISDN subscribers with a set of parameters. Some of them are common to Analog/ISDN subscribers and remaining are exclusive for Analog or Digital Subscribers only. In case of exclusive parameters, a defensive check is performed to verify the type of H/W. The command is rejected in case some parameters are not supported by the type of hardware of the Port/TEN, being associated with the directory number. To simplify the procedure, the line administration commands have been grouped as:

- i) Single Line Administration Commands
- ii) Supplementary Services Admin Commands
- iii) Group Line Administration Commands
- iv) Miscellaneous Line Administration Commands

Note:

Through out the document, the term "subscriber" means a subscriber which may be Analog Subscriber or ISDN - Subscriber

4.2. SINGLE LINE ADMINISTRATION COMMANDS

Any subscriber data modification is possible only when the status of line is OOS-OPR. Also it is not possible to delete the subscribers unless the IOP is INS-ACT with AP/BP communication 'YES'. All the subscriber characteristics related commands are explained subsequently one by one in this section.

4.2.1. Create A Subscriber Line

To create a new subscriber line, the operator should have all the information about the characteristics of the new subscriber. A free Directory Number and Terminal Equipment Number are obtained by operating the commands DISPL-DIRNO and DISPL-TEN. A subscriber can be created with all its characteristics, defined at the time of its creation. It is also possible to create a subscriber with all other parameters as default and later on modify its characteristics as per specific requirement.

4.2.1.1. Obtain Free Directory Number & Free TEN

Type CRP command 'DISPL-DIRNO' to get the following, parameter entry form.

DISPL-DIRNO	DISPLAY DIRECTORY NUMBERS
[STATUS]	: Free
[DIR-TYP]	: All
DIRNO	: DIRNO

- To get a free subscriber directory number, fill in the value of [STATUS] : as "Free" which is default value. Give range of DIRNOs or a specific DIRNO against the parameter [DIR-NO]. Execute the command to display the free DIRNOs within the given range.
- To get a free terminal equipment number type the CRP-Command DISPL-TEN and get the parameter entry form:

DISPL-TEN	DISPLAY TERMINAL EQUIPMENT NUMBERS
BM-NO	:
[STATUS]	: Free
[HW-TYP]	: SUB-LIN

- Fill in the values for 'BM-NO' where new subscriber is to be created. Define the [STATUS] as "free" and [HW-TYP] as "SUB-LIN". Execute the command to display the list of free TENs in the given BM.

4.2.1.2. Create A Subscriber (CRE-SUB)

- Enter the CRP command 'CRE-SUB' to obtain the parameter entry form as shown below:

The same command is used for PSTN/Analog and ISDN subscribers.

CRE-SUB	CREATE A SUBSCRIBER
DIRNO	:
TEN	:
[LIN-TYP]	: ORD-LIN
[INS-TYP]	: DECAD
[SUB-PRI]	: 1
[CAL-MOD]	: NO-INT
[ORG-REG]	: NO-ORG
[TRM-REG]	: NO-TRM
[MTR-CLS]	: NRM-MTR
[DET-BLG]	: ORD-BLG
[ACC-BAR]	: INCMNG_NOT_BAR-OG_UPTO_LCL-ALL_BS
[LIN-CAT]	: 1
[SUB-CTG]	: 1
[CAB-ID]	: 1-1-1
[OPR-ACC]	: Yes
[BS]	: BS12
[B-SELECT]	: SEQ
[CHNL-BS]	: 1-ALL_BS
[CALL-BS]	: 1-ALL_BS
[ACS-OPT]	: NRML

- ii) Against parameter "DIRNO", specify a free Directory Number to a new subscriber line being created.
- iii) Against parameter "TEN", specify the free i.e. physical port where new subscriber will be terminated.
- iv) Except "DIRNO" and "TEN", all parameters under this command have default values. If a new subscriber line is to be created without having any specific facility, then it can be created with all parameters having default values. For doing this, after filling the values of "DIRNO" and "TEN", come to next parameter and press 'Control E' keys to reach the end of all parameters and then execute the command. **For creating a subscriber with specific characteristics/facilities, one or more parameters have to be defined as per the details given below:**
- v) Against parameter "[LIN-TYP]", specify the type of the line to be created. For example 'ORD-LIN', 'CCB', 'CCB-STD', 'PTP' and 'PTM'.

The default value for this parameter is 'ORD- LIN'. The parameter values of LIN-TYP as PTM and PTP are used only for ISDN - subscribers PTM is used as Basic Rate Interface and PTP is used on Primary Rate Interface.

- vi) Against parameter "[INS-TYP]", specify the type of the instrument to be used by the subscriber. The possible values are Decadic (DECAD) or DTMF for Analog Subscribers and Digital (DIGITL) for ISDN subscribers. The default value is 'DECAD'.
- vii) Against parameter "SUB-PRI", assign one of the eight priorities (1 to 8) to new subscriber line. For other lines like CCB, CCB-STD etc. as defined against 'LIN-TYP' parameter, the value given by the operator, is automatically changed by the system as

CCB (ordinary)	=	9
CCB-STD	=	10
CCB-CRD	=	11 (not implemented)
PBX	=	12
OPR (operator)	=	13
TST (Test Line)	=	14 (not implemented)

- viii) Against parameter "CAL-MOD", specify the mode of all incoming calls to new subscriber line being created as regards interception by operator. Presently this parameter does not have any significance.

The default value is 'NO-INT' i.e. the incoming calls are terminated on the subscriber line without operator's interception.

- ix) Against parameter "ORG-REG", specify the facilities for the new subscriber as originating facilities. More than one facility can also be given by using ' & ' as a separator between the values. The default value is 'NO-ORG'.

Note :

Some of these facilities need additional data input which is facility related. Such data is defined using corresponding administration commands as explained in Subscriber Service/Facility Administration section of this chapter.

- x) Against parameter "TRM-REG", specify the facilities for the new subscriber as terminating facilities. More than one facility can also be given by using ' & ' as a separator between the two values. The default value is 'NO-TRM'.

Note :

Some of these facilities need additional data input which is facility related. Such data is defined using corresponding administration commands as explained in Subscriber Service/Facility Administration section of this chapter.

- x) Against parameter "MTR-CLS", specify the metering class of the subscriber being created. This parameter can have anyone of the values as NRM-MTR; NO-MTR or CHK-MTR. Once defined as CHK-MTR, 16 KHz pulse is sent on subscriber line, which is used to display meter count for the call, under progress.

The default value is 'NRM-MTR', indicating that 16 KHz pulses towards subscriber is not sent.

- xii) Against parameter "DET-BLG", specify the type of the billing for the subscriber being created. The default value is 'ORD-BLG' which generates detailed billing for STD/ISD calls only.

Note :

For long distance national and international calls detailed billing records are generated by the system automatically. As such, the only other value is 'LCL-BLG', to generate detailed billing record even for local calls.

- xiii) Against parameter "ACC-BAR", specify the levels of access barring for outgoing and incoming calls. Keeping in view the requirement of ISDN subscribers, the parameter has three different fields, separated by character '-'. The three different fields are:

1st field : Incoming Barring status for BSj as specified in 1st field.

2nd field : Outgoing Barring status for BSj as specified in 2nd field.

3rd field : Bearer Service with default value as 1 for PSTN and possible values 1 (ALL-BS), 2 (BS12) or 3 (BS3) for ISDN subscribers.

The default value is INCMNG-NOT-BAR and 'OG-UPTO-LCL' i.e. the subscriber has access upto outgoing local calls. It is possible to create a line as incoming barred and outgoing upto a specific level of access i.e. INCMNG-BRRD & OG-UPTO-NAT.

It is possible to use '&' to define multiple values for ISDN subscribers so that different level of access barring can be subscribed for different "Bearer Services". For example a ISDN subscriber may ask for O/G

access upto LOCAL for voice services and O/G upto INTERNATIONAL for Data Services. In such cases, the parameter has to be defined as

INCMNG_NOT_BARRD-OG_UPTO_LCL-BS12 &

INCMNG_NOT_BARRD-OG_UPTO_INT-BS3

It is also possible to use equivalent numeric values instead of actual definitions. The equivalent input for the above parameters is 1-4-1 & 1-6-2.

Note :

Even though the subscribed access level is above local i.e. STD/ISD are allowed, but on granting the facility SUB-OG-BARR to the subscriber, the current access is modified to OG-UPTO-LCL. The subscriber has to select its current access level using the control procedures, defined for Dynamic Locking.

- xiv) Against parameter "LIN-CAT", specify the category of the subscriber line depending on the resistance and capacitance of the outdoor network (cable pair) from MDF to subscriber instrument.

This parameter can have one of the eight possible values from 1 to 8. The definition of category should match with the values defined in the data base which can be displayed using DISPL-LINE-PARAMS command.

- xv) Against parameter "CAB-ID", specify the identity of the outdoor cable to which the subscriber is connected. It consists of primary-id, secondary-id and tertiary-id. This parameter may have default value as 1-1-1, in the absence of cable pair details.

- xvi) Against parameter "OPR-ACC", indicate whether an operator has access to new subscriber line or not. The possible values are 'YES' or 'NO' with default value as 'YES'.

☞ THE FOLLOWING PARAMETERS SHOULD HAVE DEFAULT VALUE FOR ANALOG/PSTN SUBSCRIBERS AND NEED TO BE MODIFIED ONLY FOR ISDN SUBSCRIBERS.

- xvii) Against parameter "BS", indicate the bearer services offered to the subscriber. Possible values are BS12 (3.1 KHz Audio and Speech) and BS3 (64 Kbps unrestricted). Default value is BS12.

- xviii) Against parameter "B-SELECT", indicate the selection mechanism to be used for selecting a B-channel. Possible values are PROGRESSIVE and SEQUENTIAL with default value as SEQUENTIAL.

- xix) Against parameter "CHNL-BS", indicate the maximum number of B-channels that can be used for calls using a specific basic service. Possible values are Ni-BSj, where Ni indicates the no. of B-channels and BSj indicate the various type of Bearer Services.
- xx) Against parameter "CALL-BS", indicate the maximum no. of calls on the access that can use a specific Bearer Service. Possible values are Ni-BSi where Ni indicates the no. of calls on the access and BSj denotes the various type of the Bearer Service.
- xxi) Against parameter "ACS-OPT", indicate which access options are active. Default value is NRML. All the options have been explained subsequently.

4.2.2. Parameter Definitions for ISDN - SERVICES

The ISDN-Service specific parameters are being defined for its functions .:

Bearer Service (BSi) :

This parameter describes the bearer services, offered to the subscriber and can have any one of the following values:

- ◆ BS1 : Circuit mode 64 Kbps, 8KHz structured bearer service category usable for 3.1 KHz audio
- ◆ BS2 : Circuit mode 64 Kbps, 8 KHz structured bearer service category usable for speech information transfer
- ◆ BS3 : Circuit mode 64 Kbps unrestricted, 8 KHz structured.

A subscriber can be allocated one or more bearer service using '&' as separator. It is advised to create ISDN subscriber with all the three bearer services as BS12 & BS3 or BS123.

Bearer Channel Selection (B-SELECT) :

The selection mechanism to be used for selecting a B channel for the subscriber in case of HW-TYP as PRI or PRI-16.

Possible values are : UNIFORM (PROGRESSIVE) and SEQUENTIAL

In case of UNIFORM selection mechanism, selection of the new B-channel depends upon the last B-channel selected. In case of SEQUENTIAL, selection of the new B-channel is sequential from very 1st available free B-channel in the sequence starting from the 1st B-channel.

Maximum number of B-Channel for specific bearer service (CHNL-BS) :

The maximum no. of B channels that can be used for calls using a specific basic service.

Possible values are : Ni-BSj & Nj-BSj

Where Ni....Nj indicates the no. of B channels for an access.

Nj <= 2 for BRI interface, 30 for PRI interface and 16 for PRI-16 interface

The possible values of BSi are already explained earlier.

Number of Calls per Bearer Service (CALL-BS) :

The maximum no. of simultaneous calls that can use a specific bearer service

Possible values are : Ni-BSi & Nj-BSj

Where Ni....Nj indicates maximum number of calls for BSiBSj.

Access Option (ACS-OPT)

This indicates the access options active

Possible values are :

- PERM-DLCI - Permanent Data Links
- SIG-IE - Signal Information Element expected by user equipment
- TON-ANNC - Tones and Announcements provisioning expected by user equipment.
- STM-CPE - Stimulus customer Premises Equipment
- TEI-ALLC - TEI to be allocated.
- NRML - Denotes none of the above options are set.

The default value is NRML for PSTN subscribers. For ISDN subscribers, it should be set as TON-ANNC for tone/announcement switching in case of voice services.

4.2.3. Delete A Subscriber Line (DEL-SUB)

DEL-SUB	DELETE AN EXISTING SUBSCRIBER LINE
[DIRNO]	:
[TEN]	:
MODE	:

- Key-in the directory number of the subscriber to be deleted against 'DIRNO' parameter.
- Against parameter 'MODE', specify MODE of response to the parties who dial this no. after deletion. The options available are
 - Announcement (ANN),
 - Operator (OPER)
 - NU Tone (NU-TONE).

Mode should be given as Announcement. After some time say 2 months the MODE can be modified to NU by using MOD-ANN-MODE command. Once NU-TONE is specified, it cannot be changed to any other value.
- After deletion of the line, the associated DIRNO of the subscriber becomes a member of frozen list of DIRNOs and the TEN becomes free.

4.2.4. Modify Line Characteristics of A Subscriber (MOD-LIN-CHAR)

- The parameters which are associated with the line characteristics of a subscriber are :
 - Line type [LIN-TYP]
 - Instrument type [INS-TYP]
 - Line category [LIN-CAT]
 - Cable Identity [CAB-ID]
 - Access Option [ACS-OPT]
- Using the command MOD-LIN-CHAR, the line characteristic parameters for specified Directory Number is displayed after entering the value of DIRNO parameter. One or more parameter values can be modified by defining the new values.

4.2.5. **Modify Subscriber Characteristics (MOD-SUB-CHAR)**

This command is used to modify existing characteristics of the subscriber. In response to the above command, following form is displayed on the screen :

MOD-SUB-CHAR	MODIFY SUBSCRIBER CHARACTERISTICS
DIRNO	:
[SUB-PRI]	:
[CAL-MOD]	:
[DET-BLG]	:
[MTR-CLS]	:
[ACC-BAR]	:
[SUB-CTG]	:
[OPR-ACC]	:
[BS]	:
[B-SELECT]	:
[CHNL-BS]	:
[CALL-BS]	:

All the parameters have already been explained as part of CRE-SUB command. After valid entry of DIRNO, the existing characteristics of the subscriber are displayed, and can be modified by assigning new values to one or more parameters.

4.3. **SUBSCRIBERS FACILITY/SERVICES ADMINISTRATION**

4.3.1. **Modify Subscriber Facilities (MOD-SUB-FAC)**

The facilities for the subscriber, are grouped as "Originating Facilities" and "Terminating Facilities". These facilities can be provided to the subscriber while creating his line and can be modified by using the command 'MOD-SUB-FAC'. After specifying the directory number of the subscriber, the existing values against each parameter are displayed. One or more facilities can be modified by defining the new values against each parameter.

Note :

To retain some of the old facilities, the operator has to re-enter alongwith the new facilities separated by '&'.

Using the commands 'MOD-SUB-FAC' or 'CRE-SUB', the operator can only 'register' the facility to the subscriber. For granting some of the facilities to the subscriber, the operator has to use different grant commands.

The granting of a facility is required only when some additional data is required which cannot be given in the commands being used for registration. For example, in case of Hot line, the required destination DIRNO is to be given and hence a separate 'grant command' is required. In other cases, for example 'conference' facility, no additional data is required. Once registration of such facilities is done, they can be invoked by the subscriber himself.

4.3.2. Grant/Activate and Deactivate Subscriber Facilities

In some cases like, Dialling by Equipment Number, Conference, Called Party Clear, Intrusion Barring etc. the services are available to the subscriber on registration without any additional operation by the Exchange Administrator. Subscriber can invoke these facilities using the control procedure. Similarly in the case of Absentee to selected number facility, granting may be done by Admin command or by subscriber himself using control procedure.

This section deals with the administration (Grant/Withdrawal/Activation/Deactivation) of the services and features available to the subscriber. The terms "Supplementary Services" and "Subscriber Features" are used interchangeably. With implementation of a number of additional services alongwith standard control procedures, the facilities can be grouped into different categories :

- Facilities, which are activated by default on registration.
- Facilities, which are registered and required to be activated either by Administrator or the Subscriber.
- Facilities, which are registered and required to be activated by Administrator once and subsequently the subscriber can programme it e.g. Hotline with Timeout.
- Facilities, which are registered and can be activated only by Administrator e.g. Hotline without Timeout, Multiple Subscriber Number (MSN) etc.

A list of the subscriber facilities alongwith operation details are provided subsequently in Table 4.1. Wherever it is possible for the subscriber to activate/deactivate the facility, optional control has been provided to the Administrator to activate/deactivate the facility from the exchange, based on the subscriber request or due to administrative reasons. The CRP commands to activate or deactivate the facility are:

ACT-SUB-FAC and DEACT-SUB-FAC

There are a number of services which are required to be granted as the service require additional data e.g. Hot-Line requires destination number. The requirement for each services are different and therefore service specific commands are provided e.g.

GRNT-HTLN, GRNT-DIV, GRNT-OCR-SUB etc.

To grant a facility to a subscriber, facility must have been registered for directory number.

4.3.2.1. *Withdraw a Facility already Granted (WTD-SUB-FAC)*

It is possible to withdraw facility, already granted and being used by the subscriber. The facility is only withdrawn and can be re-granted again. Please note that the facility remains registered for the subscriber and to withdraw it permanently, the administrator has to remove the facility by using command MOD-SUB-FAC after withdrawing facility using command WTD-SUB-FAC.

To withdraw this facility give the command "WTD-SUB-FAC" and obtain the parameters on the screen as shown below :

WTD-SUB-FAC	WITHDRAW SUBSCRIBER FACILITY
DIRNO	:
[FAC-ORG]	:
[FAC-TRM]	:

- Fill in the DIRNO of the subscriber.
- Fill the desired facility against "FAC-ORG" or "FAC-TRM" parameter. Other parameters may have default values.
- Press 'e' to execute the command.
- Now the facility gets withdrawn.

Note :

A facility can be withdrawn only after de-activating it either by the subscriber or the administrator.

4.3.2.2. *Activation/Deactivation of a Facility (ACT-SUB-FAC/DEACT-SUB-FAC)*

At any instant, it is possible that the service may be activated/deactivated either by the administrator or by the subscribers. It is possible to activate or deactivate a facility by the administrator using the command. For

deactivating a subscriber facility, DEACT-SUB-FAC command is used with the same parameters.

Table 4.1

Operation Procedures for Supplementary Services in C-DOT

Number Identification Supplementary Services

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation	De-activation	Remarks
1.	CLIP		CLIP	NO	NO	In case of PSTN Subscriber , the corresponding port should be updated for ECN.
2.	CLIR	CLIR-PR		NO	NO	
3.	CLIRO		CLIP&CLIRO	NO	NO	
4.	MCID		MCID	See Note-1	NO	Subscriber is put under malicious observation using command MOD-SUB-OBS with OBS-TYP=MAL-OBS
5.	MSN		MSN	NO	NO	Only for ISDN
6.	DDI			NO	NO	Only for ISDN . Applicable to DDI groups , created using command CRE-HGP.
7.	SUB		SUB	NO	NO	Only for ISDN. GRNT-MSN to grant the facility and ADD-MSN-DN to add additional MSN Subscribers.
8.	COLP	COLP		NO	NO	Only for ISDN .
9.	COLR		COLR-PR	NO	NO	Only for ISDN
10.	COLRO	COLRO		NO	NO	Only for ISDN

Note-1 : The PSTN subscriber can invoke the service just by HSF. A ISDN subscriber can invoke the service by * 65 # after switching over to “Keypad Dialling Mode” from conversation stage. Procedure to switch over to “Keypad Dialling” is specific to the user’s equipment e.g for PHILIPS Phone, the keys < Memory > <Display> are to be pressed. The complete procedure for invocation of MCID service from PHILIPS ISDN Phone is : <Memory> <Display> *680# . In the absence of any procedure from TEC for ISDN Subscribers, the in built capability of PHILIPs telephone has been exploited to support the feature.

Call Offering Supplementary Services

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation	De-activation	Remarks
1.	LH			NO	NO	Applicable to HGP and DDI groups, created using command CRE-HGP.
2.	CFU (FXD)		ABSNT-FXD- NUM	*28#	#29#	GRNT-ABS-SRV command is used to grant this facility.
3.	CFU (SEL)		ABSNT-SEL- NUM	*14 B#	#15#	Subscriber has to activate the facility
4.	CFB (GRP)		DOB-SET- NUM	NO	NO	GRNT-DIV
5.	CFB (SEL)		DOB-SEL- NUM	*220 B#	#221#	Subscriber has to activate the facility
7.	CFNR (GRP)		DONA-SET- NUM	*224#	*225#	GRNT-DIV
8.	CFNR (SEL)		DONA-SEL- NUM	*222 B#	#223#	Subscriber has to activate the facility

Call Completion Supplementary Services

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation	De-activation	Remarks
1.	Call Waiting		CLD-CALL- WTNG	* 18 #	# 19 #	See Note-2
2.	Call Hold	CH-WR or CH-WOR		HOLD	NO	Only for ISDN
3.	Terminal Portability	TERMPORT		SUSPEND/ RESUME	NO	Only for ISDN
4.	Hot Line (Timed)	TMD-HT-LN		* 20 B #	# 21 #	GRNT-HTLN to activate the facility first time.
5.	Hot-Line (Un-timed)	UNTMD-HT- LN		NO	NO	GRNT-HTLN

Note-2 : Invocation procedure for ISDN and PSTN subscribers are different. A ISDN subscriber uses functional keys to put the existing call to wait to receive another call in waiting. The PSTN subscriber has to invoke the feature by HSF and can toggle between two subscribers repeatedly by using HSF.

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation / Usage Procedure	Remarks
1.	CNF-3PTY	CNF-3W		<p>HSF *250 B # to add B</p> <p>HSF *253# to toggle</p> <p>HSF * 254 B # to drop B</p> <p>HSF * 254 # to drop last party</p> <p>HSF * 252 # to activate</p>	Only for PSTN
2.	CNF-6PTY	CNF-6W		As above with difference that dial 251 in place of 250 to add a party B as conference member. Subsequently, before adding a new member into the conference, the procedure HSF * 252 # to activate the conference should be followed, before attempting to add a new party C using procedure HSF * 251 C # .	Only for PSTN

Dynamic Locking for Access Levels

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation / Usage Procedure	Remarks
1.	Dynamic STD Locking	SUB-OG-BRRD		<p>* 23 ABCD ABCD # to select the password</p> <p>* 23 ABCD PQRS # to change the password</p> <p>* 24 ABCD N # where 'N' is the current access</p>	<p>N=0 for all allowed</p> <p>N=1 for Local Access</p> <p>N=3 for STD Access</p> <p>N=4 for 10X Access</p> <p>N=5 for Regional i.e. 90 Access</p>

Note-3 : The values for 'N' are valid , subject to the condition that the access level, being selected, is allowed by registration.

Miscellaneous Supplementary Services

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation	De-activation	Remarks
1.	Alarm (Once)	ALRM-AUTO		* 16 hh mm #	#17 hh mm #	Alternatively, a subscriber can register an alarm call with help of OPERATOR. It is possible by registering the facility ALRM-SEMI and then granting it using command GRNT-ALARM.
2.	Queuing		QUING-NO-DCTV or	No	No	

Sl. No.	Facility	Registration as ORG-FAC	Registration as TRM-FAC	Activation	De-activation	Remarks
			QUING-DCTV			Only for PSTN (See Note-4)
3.	AOC-E AOC-D	AOC-END AOC-D		NO	NO	Only for ISDN .
4.	16 Khz for Home Meters			NO	NO	Only for PSTN. The subscriber should be created with MTR-CLS =CHK-MTR.

Note-4 : The facility is valid for ISDN interface when configured as Hunt Group. However for individual ISDN subscriber, more than one call can wait on an ISDN interface as specified/allowed by the administrator for that interface.

There are a number of services which are activated on registration by the exchange administrator and no procedure is required to be followed by the subscriber. The columns "Activation" and "Deactivation" for such services are marked as NO. For other services, the procedure specified in the table, should be followed by DTMF as well ISDN subscribers unless it is specified. The services are available for ISDN as well as PSTN interfaces unless specifically mentioned.

ACT-SUB-FAC	ACTIVATE SUBSCRIBER FACILITY
DIRNO	:
[FAC-ORG]	:
[FAC-TRM]	:

4.3.2.3. Interrogation of Current Status of a Facility (DISPL-INFO-FAC)

It is possible to know the current status of the facility as a subscriber interface. The input parameters for the command are :

DISPL-INFO-FAC	INFORMATION ABOUT GRANTED SUBSCRIBER FACILITY
DIRNO	:
[BS]	:
FAC-TYP	:

Depending on the input parameters facility status is displayed. The parameter BS has values BS-IND, BS12 & BS3. The value depend upon the

facility e.g. for SUB-OG-BARR its value should be BS-IND as this facility is independent of BS type while for Queing facility, its value should be BS12.

4.3.2.4. *Semi-auto Alarm*

To grant the semi automatic alarm, collect the following information from the subscriber :

- Check whether this facility has been registered by the subscriber using "DISPL-SUB" command. The response should display "SEMI-AUTO-ALARM" as one of the facilities against the parameter 'FAC-ORG' (Originating Facility) after Keying-in the directory number. If not subscribed, register the facility using the command 'MOD-SUB-FAC'.
- Give the command 'GRNT-ALARM' to get the parameters on the screen.

GRNT-ALARM	GRANT SEMI AUTOMATIC ALARM
DIRNO	:
ALRM-TIM	:
[ALRM-OCR]	:

ALRM-OCR has two possible values, ONCE & DAILY. ONCE means, alarm will mature only once. DAILY means, alarm will ring daily at the time specified in parameter ALRM-TIM. Also a given alarm can be deleted by command DEL-GVN-ALRM. Both the alarms i.e. booked by the subscriber or booked by the operator can be deleted by the operator.

4.3.2.5. *Hotline*

- Issue the command 'GRNT-HTLN' and obtain the parameters on the screen.

GRNT-HTLN	GRANT HOTLINE FACILITY
DIRNO	:
[HLIN-TYP]	:
TRM-DIR	:

- Fill in the type of Hot line required.
- The directory number corresponds to the subscriber who wish to avail this facility and Terminating Directory number (TRM-DIR) corresponds to a subscriber onto which the call should land if no digit is dialled.

- Press the key 'e' to execute the command and obtain the report. Check the report for the values as keyed-in against their respective parameters.

4.3.2.6. *Grant Absentee Services (GRNT-ABS-SRV)*

This command is used for granting diversion on absence (CFU) service to the fixed destination. In case of subscriber selected destination this command need not be executed. The input parameters are:

GRNT-ABS-SRV	GRANT ABSENTEE SERVICES
DIRNO	:
ABS-TYP	:
[BS]	: BS12
[ACTIVATE]	: NO
[CLNG-NTF]	: NO
[SRVD-NTF]	: NO
[SRVD-RMN]	: NO
[FWD-PRST]	: NO
DIV-DIR	:

- Key-in 'ABSNT-FXD-NUM' against the parameter "ABS-TYP".

Note :

- i) Key-in the subscriber directory number (DIRNO).
- ii) If activation of the desired facility is required immediately, 'YES' can be given against "ACTIVATE" parameter otherwise 'NO' as default value for this parameter is taken by the system on pressing 'RETURN' key.
- iii) Key-in the diversion directory number (DIV-DIR) as obtained from the subscriber and execute the command
- iv) Other parameters don't have any significance and should have default value.

4.3.2.7. *Grant Diversion on Busy/No Answer (GRNT-DIV)*

This command is used for two types of diversion on busy (CFB) and diversion on no answer (CFNR) with fixed destinations. In case of subscriber selected destinations, the command need not be executed. The input parameters are :

GRNT-DIV		GRANT DIVERSION ON BUSY/NO ANSWER
DIRNO	:	
DIV-TYP	:	
[BS]	:	BS12
[ACTIVATE]	:	
[CLNG-NTF]	:	NO
[CLNG-PRST]	:	NO
[SRVD-NTF]	:	NO
[FWD-PRST]	:	NO
[CFNR-TMR]	:	DEFAULT
DIV-DIR	:	

Note :

- i) DIV-TYP may be specified as any one of the four possible values as: DOB-SET-NUM, DONA-SET-NUM and REMOTE-ALM-RPT.
- ii) The facility can also be activated using the same command. If it is to be activated, key-in 'YES' against the parameter 'ACTIVATE', otherwise default value (i.e. 'NO') can be given.
- iii) DIV-DIR denotes the directory number to which the calls have to be diverted to in case the Called Number is busy or no answer is received. Check that the desired diversion type is granted and not activated yet.
- iv) Other parameters don't have any significance and should have default value.

4.3.2.8. *Grant Queuing Facility*

a) **Grant**

The types of 'Queuing' facilities are

- Queuing facility with deactivation (QING-DCTV)
- Queuing facility without deactivation (QING-NO-DCTV)

GRNT-QING-FAC	GRANT SUBSCRIBER QUEUEING FACILITY	
DIRNO	:	
[Q-LGT]	:	10
[ACTIVATE]	:	NO

- i) Second parameter denotes the 'Q' length for the terminating calls to the specified subscriber. This can be filled as desired by the subscriber. The limit for normal subscriber is 10 and for PBX it is 200.
- ii) The facility can also be activated using the same command. If it is to be activated, key-in 'YES' against the "ACTIVATE" parameter. Otherwise default value (i.e. 'NO') can be given.

4.3.2.9. Grant Multiple Subscriber Number (GRNT-MSN)

MSN is one of the most important facility, extends to ISDN subscriber which is very useful in Group or Business Environment. The resources of single ISDN interface i.e. 2B channels can be shared by more than one user with the advantage of its own directory number and service profile. For example, a subscriber 5481500 is created as ISDN subscriber. It is possible to add 6 other directory numbers 5481501, 5481555 etc. with the advantages as listed below:

- ◆ Each subscriber has its own directory number
- ◆ Each subscriber has its own service profile e.g. different access level for O/G calls, a set of facilities etc.
- ◆ Can have subscriber specific bearer service.
- ◆ Individual detail bill records for long distance calls as well as separate meter readings for each subscriber.

To programme the MSN in C-DOT DSS, an ISDN subscriber is created with MSN facility. If already created, the MSN facility can be assigned using command MOD-SUB-FAC. The facility should be granted using CRP command GRNT-MSN. The parameter MAPD-NO can be any coded sequence of digits with the option of retaining subscribers' own directory number as mapped number. Now one or more MSN subscribers can be added using command ADD-MSN-DN. The command provides the flexibility to define the service profile of the MSN subscribers with unique mapped number.

To grant MSN facility to a normal ISDN subscriber, input parameters for the command GRNT-MSN are :

GRNT-MSN	GRANT MULTIPLE SUBSCRIBER NUMBER
DIRNO	:
MAPD-NO	:

On successful execution of the command, type of DIRNO is changed from NRML to PMSN.

Note :

MSN service is activated only when the ISDN equipments being installed in the subscriber premises, is also programmed properly. For programming of PHILIPS ISDN phone and C-DOT TA 210, the user manual may be referred. However, the flexibility of receiving the call in broadcast mode if desired, may or may not exist in all the equipments.

4.3.2.10. Addition/Creation of more Directory Numbers on an ISDN Interface (ADD-MSN-DN)

This command will be used for adding MSN subscriber after MSN facility has been granted (through GRNT-MSN command).

ADD-MSN-DN	ADDITION/CREATION OF MORE DIRECOTORY NUMBERS
PMSN	:
MSN-DN	:
MAPD-NO	:
[SUB-PRI]	: 1
[CAL-MOD]	: NO-INT
[OPR-ACC]	: YES
[SUB-CTG]	: 1
[ORG-REG]	: NO-ORG
[TRM-REG]	: NO-TRM
[MTR-CLS]	: NRM-MTR
[DET-BLG]	: ORD-BLG
[ACC-BAR]	: INCMNG_NOT_BAR-OG_UPTO_LCL-ALL_BS
[B-SELECT]	: SEQ
[BS]	: BS12
[CHNL-BS]	: 1-ALL_BS
[CALL-BS]	: 1-ALL_BS

Note :

1. At most, six MSNDNs can be added through the repeated use of this command, for an access.
2. Subsequently the characteristics of MSNDN can be changed using MOD-SUB-CHAR, MOD-SUB-FAC, MOD-LIN-STA commands.

4.3.2.11. Modification of Number of Calls Waiting

For modification of no. of calls waiting per access, key in the command

MOD-CW	MODIFICATION OF NUMBER OF CALLS WAITING
DIRNO	:
[CW-BS]	:

- i) Against parameter DIRNO give the directory number for call waiting modification is required. The given dirno should be ISDN subscriber only.
- ii) Against parameter CW-BS specify the number of calls that can wait per BS. Number of call waiting given in input should not be more than the number of calls allowed for this directory number per bearer service. BS in CW-BS should not be repeated.

4.4. GROUP LINE ADMINISTRATION COMMANDS

This section deals with the command for group line administration. The common set of commands are organised to support DDI group as well as Hunt Group. The DDI group is used only for ISDN PBX and Hunt Group is used for PSTN as well as ISDN subscribers.

In case of ordinary Hunt Group, all the calls terminating on the HGP through its PDN, use the PDN's subscriber profile. Also all the calls originating by member TENs use the PDN's subscriber profile. Member DIRNOs of HGP have their own independent subscriber profile for the originating calls and also for the terminating calls, dialled by its directory no., instead of PDN of the hunt group. In case of DDI hunt group (applicable only to ISDN lines connected to ISPBX), subscriber profile associated with PDDI is used for all the originating as well as terminating calls on the group.

Note :

At the time of creation, the number of members should be ≤ 12 . In case of large HGPs it should be created with 12 members and additional members can be added using command ADD-LINE-TOHGP.

4.4.1. Creation of Hunt Group (CRE-HGP)

A hunt group is represented by one Principal Directory Number (PDN). All its members may be already created directory numbers as member directory numbers or free TENs as member-TENs or a combination of both.

Similarly, a DDI group is represented by its PDDI - Number and all its members as free directory numbers. The TENs of DDI group are used as pool of resources to carry the traffic between Local Exchange and ISPBX for DDI - Subscribers.

To create a Hunt Group, issue the command CRE-HGP and obtain the parameter entry form:

CRE-HGP	CREATION OF HUNT GROUP
[PDN]	:
[PDDI]	:
[NUM-DGTS]	: 1
[HNT-TYP]	: SEQ
[METER-NO]	: MET
[Q-LGT]	: 0
[MEM-DIRN]	: NONE
[TEN-BW]	: NONE
[TEN-IC]	: NONE
[LIN-TYP]	: PABX
[INS-TYP]	: DECAD
[SUB-PRI]	: 12
[CAL-MOD]	: NO-INT
[SUB-CTG]	: 1
[ORG-REG]	: NO-ORG
[TRM-REG]	: NO-TRM
[MTR-CLS]	: NRM-MTR
[DET-BLG]	: ORD-BLG
[ACC-BAR]	: INCMNG_NOT_BAR-OG_UPTO_LCL-ALL_BS
[LIN-CAT]	: 1
[OPR-ACC]	: YES
[BS]	: BS12
[B-SELECT]	: SEQ
[ACS-OPT]	: NRML

The parameters PDDI and NUM-DGTS are used for DDI - group and do not have any significance for Hunt Group. These parameters are explained in next section of creation of DDI group and can be left out by pressing <ENTER> at the time of creating a Hunt Group.

After obtaining the parameter entry form, the different parameters can be defined as per their functions, explained below:

i) **Principal Directory Number (PDN) :**

A free directory number is assigned to this parameter. When dialled to PDN, the call is terminated on any one of the free circuit (Member TEN or Member Directory Number) which is selected using progressive hunting procedure. However, when the call is made to member directory number, it is directly terminated on the dialled number if it is free. In case of dialled number is busy/faulty or access barred, the call fails.

ii) **Hunting Type (HNT-TYP) :**

Only one type of hunting procedure as "Progressive" is implemented. As such, this parameter has default value and need not be modified.

iii) **Queuing Length (Q-LGT) :**

This parameter decides the maximum number of calls that can wait in queue if dialled through PDN and all the circuits are already busy. The maximum value of this parameter is 200.

iv) **Member Directory Numbers (MEM-DIRN)**

One or more directory numbers can be member of the hunt group. The directory numbers should have been created and its status should be OOS-OPR before they become member of the hunt group.

Note :

All the member directory numbers of a hunt group should be either Analog Subscribers or ISDN-Subscribers. A mix of both the types in single hunt group is not allowed. This is also true for member TENs, defined as TEN-BW or TEN-IC. All the members of a hunt group should be same type i.e. PSTN or ISDN.

v) **Member TENs (TEN-IC/TEN-BW) :**

The member TENs may be defined as incoming only or both way or any combination of them. If one or more free TENs are defined as member TENs using parameter TEN-IC, these TENs are not used to terminate the call on the user. In other words, the exchange can not use these circuits to terminate the call. Only the calls are originated on these circuits by the user. For all the calls being received from the user, the common characteristics of the hunt group is used to route the call.

Similarly, one or more free TENs, defined as member TENs using parameters TEN-BW, these TENs are used to receive or terminate the call as per the characteristic of the hunt group.

vi) **Line Type (LIN-TYP) :**

This parameter may have any one of the values as PBX or PBX-REV for Analog lines and ISPBX-PTP or ISPBX-PTM for ISDN-lines.

When defined as 'PBX', on receipt of the answer from the called party, the reversal is driven towards the user for all originating calls from the member TENs, subject to the condition that the member TENs are equipped as 'HW-TYP' = CCB and 'CCB' card is physically present. In any one of the two cases as (i) the card is equipped as CCB but LCC is physically present in the card slot (ii) the card is equipped as "Normal Line", the reversal is not driven.

When defined as PBX-REV, in addition to the above functions, defined for the originating calls from the interface, the terminating calls on the interface is offered along with the reversal. A reversal is driven on the line before connecting the ring. It is sensed by the PBX as seizure of the circuit, avoiding dual seizure of the TENs when defined as BW.

For ISDN - interfaces, the parameter has to be defined as ISPBX-PTP or ISPBX-PTM. When the hunt group is terminated on the ISPBX, the parameter should be defined, keeping in view the configuration of the terminating interfaces on ISPBX. When defined as PTP, the call is offered on a B-channel and the user (CPE or ISPBX) has to accept the call on the selected B-channel. If the call is not accepted on the specified B-channel, it fails with suitable cause value. When defined as PTM, the call is offered on a B-channel with option to the user to accept the call on any other free B-channel.

All other parameters may have default values or modified values as explained previously as part of CRE-SUB command.

Note :

In case of the member directory nos., the characteristics of individual subscriber is valid for originating calls and also for the terminating calls when dialled through its own directory number. When dialled through PDN, the characteristic of the hunt group are valid for the terminating calls.

4.4.2. Creation of DDI Group for ISPBX

This is valid for ISDN - interfaces and same command CRE-HGP is used for this purpose as explained earlier for creation of Hunt Group. Only the

parameters having specific values for DDI are explained. For definition and its possible values of remaining parameters, the explanation given in part of CRE-HGP may be referred.

i) Principle Directory Number of the DDI Group (PDDI)

Any DDI group is recognised by its principle directory number (PDDI) for :

- i) The characteristics of the DDI users for originating as well as terminating calls.
- ii) Cumulative metering against PDDI for all the DDI - users.

Any free directory number can be defined as PDDI.

ii) Number of Digits (NUM-DGTS)

This parameter defines the number of DDI digits, to be sent towards ISPBX to terminate the call on the DDI-user, which is also an extension of ISPBX.

iii) Directory Number (DIRNO)

The directory number of the DDI users are allocated from the free list of directory numbers. It is preferred that such directory nos. should be derived in a block e.g. if 10,000 directory numbers are created on exchange code 548 and they are 548XXXX, the DDI users for one ISPBX may be reserved as 5481XXX to 5481YYY for XXX to YYY as DDI users. For example, 160 DDI users may be created as 5481520 to 5481680. However, any block of free directory numbers 548XXXX can be DDI users and depending on the value of the parameter "NUM-DGTS", the last digits are sent to the ISPBX.

4.4.3. Addition of Lines to an Existing Hunt Group (ADD-LINE-TOHGP)

This command is used to add member lines to hunt group/DDI group. The input parameters are :

ADD-LINE-TOHGP	ADD LINES TO HUNT GROUP
PRI-DIR	:
[MEM-DIRN]	:
[TEN-BW]	:
[TEN-IC]	:

4.4.4. Modify Hunt Group/DDI Group Characteristics (MOD-HGP)

This command is used to modify characteristics of HG/DDI group. The input parameters are

MOD-HGP	MODIFY HUNT GROUP CHARACTERISTICS
PRI-DIR	:
[HNT-TYP]	:
[METER-NO]	:
[Q-LGT]	:
[LIN-STA]	:
[CAL-MOD]	:
[ORG-REG]	: NO-ORG
[TRM-REG]	: NO-TRM
[MTR-CLS]	:
[DET-BLG]	:
[ACC-BAR]	: INCMNG_NOT_BAR-OG_UPTO_LCL-ALL_BS
[OPR-ACC]	:
[BS]	: BS12
[B-SELECT]	:
[SUB-CTG]	:

- Key-in the principal directory number of the hunt group for which the characteristics are to be modified against "PRI-DIR" parameter.
- On pressing 'return' key after entering the principal directory number of the hunt group, the system would display the existing characteristics of the specified hunt group.
- Move to the parameter(s) which is (are) to be modified and key-in the fresh value(s) and press 'e' to execute the command.
- After executing the command the system displays the modified characteristics of the specified hunt group. Check the values against each parameter as keyed-in.
- Put all the members of the hunt group into service by using the command 'FRC-TRM-INS'.

Thus the characteristics of a hunt group are modified.

4.4.5. Delete a Hunt Group (DEL-HGP)

This command is used to delete an existing hunt group/DDI group. The input parameters are :

DEL-HGP	DELETE A HUNT GROUP
PRI-DIR	:
MODE	:

Member TENS of deleted Hunt group become free and member directory numbers continue to exist as individual directory numbers.

Note :

If the HGP has more than 12 members, the command fails with error message, asking the administrator to reduce the number of members ≤ 12 . This can be done using command REM-LINE-FRMHGP.

4.4.6. Display the Characteristics of a Hunt Group (DISPL-HGP)

This command is used to display the HG/DDI group characteristics. The input parameters are :

DISPL-HGP	DISPLAY THE CHARACTERISTICS OF A HUNT GROUP
PRI-DIR	:

4.4.7. Remove Lines From A Hunt Group (REM-LINE-FRMHGP)

This command is used to remove lines from a hunt/DDI group. The lines to be removed, first must be made OOS-OPR. The input parameters are:

REM-LINE-FRMHGP	REMOVE LINES FROM A HUNT GROUP
PRI-DIR	:
[MEM-DIRN]	: NONE
[TEN]	: NONE

Note: One or more members can be removed simultaneously, but not more than 12 at a time.

4.5. MISCELLANEOUS ADMINISTRATION COMMANDS

There are some operations related to subscribers which are required to be performed. These operations are not related to subscriber profile but required for administrative reasons. The commands to support such operations are explained in this section.

4.5.1. Modify Line Status of a Subscriber Line

The status of a subscriber line may be in any of the following :

- ◆ Normal Line (NRM-LIN) for normal mode of operation.
- ◆ Bill not paid announcement (BNP-ANNC) to allow the subscriber only incoming calls. On going OFF-HOOK, instead of receiving dial tone, the subscriber is connected to "bill not paid" announcement. In this status, incoming calls will be allowed only for 15 days. After that the status can be modified to "BNP-DISC" if bill is still not paid.
- ◆ Bill not paid disconnect (BNP-DISC) to bar incoming as well as outgoing calls. The tone/announcement treatment for originating call is same as explained for BNP-ANNC.
- ◆ Anyone of the following transitions are possible through this command by specifying the required status against "CALL-STA" parameter.

NRM-LIN	to	BNP-ANNC
BNP-ANNC	to	NRM-LIN
BNP-ANNC	to	BNP-DISC
BNP-DISC	to	NRM-LIN

To modify the line status, key-in command "MOD-LIN-STA" and obtain the parameters on the screen as shown below :

MOD-LIN-STA	MODIFY LINE STATUS
DIRNO	:
[CALL-STA]	:
[MISC-STA]	:

- i) After valid entry of directory number of a subscriber against the "DIRNO" parameter, its current status is displayed against the

parameter CALL-STA and MISC-STA which can be modified to new value subject to the limitations of valid transition as mentioned above.

- ii) In case of MISC-STA as PSWDTAMP-ATMPTD, the dynamic lock is held up due to deliberate tampering attempt. It can be released by modifying the MISC-STA as NRM, retaining the same password.
- iii) In safe-custody and under shift status which can be specified against "MISC-STA" parameter, the calls can not be originated from the subscriber. All the calls getting terminated on these no. will be fed appropriate announcement/tones.

4.5.2. **Modify Subscriber Port/TEN (MOD-SUB-TEN)**

This command is used to change the PORT/TEN of the subscriber. This is required in case of hardware fault in the port, instead of changing the corresponding card, the subscriber is shifted to new free and healthy port. This needs modification in jumpers in MDF.

- i) Type the command MOD-SUB-TEN and obtain the following parameters on the screen.

MOD-SUB-TEN	MODIFY SUBSCRIBER PORT/TEN
DIRNO	:
NEW-TEN	:
LIN-CAT	:
CAB-ID	:

Specify the directory number and the new TEN. The other two parameters can have default value if specific details are not available. The old TEN will become free and new TEN specified will get assigned.

4.5.3. **Modify Announcement Mode (MOD-ANN-MODE)**

For all the incoming calls to the subscriber in frozen list (deleted directory numbers), there are three modes of conveying to the calling subscriber that the called subscriber has been deleted or its directory number has been changed. These modes are selected while deleting the subscriber directory number.

- a) Operator (OPER)
- b) Standard announcement (ANN)
- c) Number unobtainable tone (NU-TONE)

It is possible to modify already assigned mode using the command "MOD-ANN- MODE". Obtain the following on the screen.

MOD-ANN-MODE	MODIFY ANNOUNCEMENT MODE
DIRNO	:
MODE	:

On entry of valid directory number, its current mode is displayed which can be modified to new mode by assigning new value to the parameter MODE.

Note :

Once the mode is selected as NU-TONE, it cannot be changed to any other mode.

4.5.4. **Unfreeze the Deleted Directory Number (UNFRZ-DIRNO)**

When a directory number is deleted, its status is changed to frozen list. The directory numbers which have gone into frozen list upto a specific date can be unfrozen i.e. they become free directory numbers, to be allocated to any subscriber.

UNFRZ-DIRNO	UNFREEZE THE DELETED DIRECTORY NUMBER
[DATE]	:

Key in the date and execute the command. It is possible to unfreeze only 60 DIRNOS at a time. In case of more than 60 directory numbers are in frozen list, the latest 60 nos. are unfrozen. The command should be used repeatedly to unfreeze all the directory numbers in frozent list as on date.

4.5.5. **Unfreeze a Given (Deleted) Directory Number (UNFRZ-GVN-DIRNO)**

A particular directory number, which is in frozen state, can be unfrozen by using the command 'UNFRZ-GVN-DIRNO'.

UNFRZ-GVN-DIRNO	UNFREEZE A GIVEN DIRECTORY NUMBER
DIRNO	:

Key in the directory number and execute the command.

4.5.6. Listing of Subscribers with Specific Characteristics

This command is used to find out the list of subscribers, having specific characteristics. The command is valid for BMs and in case of MBM exchange, it has to be executed repeatedly to find out the complete list.

For example :

- List of subscribers with CNF facility
- List of subscribers under malicious observation
- List of subscribers with held up locks due to unauthorised/tampering attempts.
- List of subscribers having STD/ISD facility.

Command Mnemonic is

DISPL-SUB-LIST	DISPLAY SUBSCRIBER LIST
BM-NO	:
[LST-REQ]	:
[LIN-TYP]	:
[INS-TYP]	:
[LIN-OBS]	:
[SUB-PRI]	:
[FAC-ORG]	:
[FAC-TRM]	:
[MTR-CLS]	:
[DET-BLG]	:
[ACC-BAR]	:
[LIN-CAT]	:
[BS]	:
[MISC-STA]	:

On execution of the command, list of all subscribers are displayed with three parameters as :

Directory No.-	Terminal Equipment Number	TEN-TYPE
6701400	1-1-4-3-1	NRML-NUM

Note :

It is also possible to find out the list of subscribers, having a specific combination of characteristics.

Chapter 5.

Trunk and Routing Administration

5.1. GENERAL

This chapter deals with operating procedure of the creation/deletion of trunk groups, modifying the trunk group characteristics, addition/deletion of trunk circuits into trunk group and also the limitations while creating. The sequence of steps to be followed has been clearly given. The details of the command parameters, their possible values and types are explained in detail in the Trunk & Routing Administration document and this chapter covers the procedural part and therefore that document may be referred in case the details covered in this chapter are not clear. It is assumed that the operator who would be creating the trunk groups and Routes has a clear vision of what he is doing. This would help in performing the operations correctly and efficiently.

5.1.1. Trunk Circuit and Trunk Group

A trunk circuit interconnects one "Exchange" in network to the other Exchange for purpose of putting through calls.

A Trunk Circuit is identified by the Terminal Equipment Number (TEN) in hardware.

A Trunk group is a set of trunk circuits with common characteristics, like Signalling, Category, hardware types, traffic handling type (I/C, O/G or BW) etc. A Trunk Group may be identified by a number between 1 to 512. This number is called Trunk Group Number (TGP-NUM).

In SBM exchange, total number of trunk groups can be 100 whereas in MBM exchange this figure can be 512.

A Trunk Group can also be identified by 10 ASCII characters, to be defined in parameter TGP-NAME.

A Trunk Group characteristics are displayed in Table 5.1 and are explained subsequently.

Table 5.1

Trunk Group Number	:	
Trunk Group Name	:	
Trunk Group Status	:	IC
Line Signalling	:	
Register Signalling	:	
[MF-SIG]	:	
[CGS Number]	:	
[CGS Name]	:	
[Rank of Digits]	:	
[Trunk Priority]	:	
[Prefix Digits]	:	
[PAD-LEV]	:	
TGP-TYP	:	
[CAMA]	:	
[Trunk group facility]	:	
[DGT-SZFD]	:	
[RNG-DWN]	:	
Dial Tone Required	:	
AC-STA	:	
[AC-INFO]	:	
[Trunk group category]	:	
[HNT-TYP]	:	
[SIG-INF]	:	
[CONT-CHK]	:	
[ECHO-SUP]	:	
[SAT-IND]	:	
Terminal Equipment Nos.	:	
TEN-NO7	:	

Trunk Group Characteristics

Circuits in a Group have the following common characteristics.

a) **Trunk Group Status (TGP-STA)**

Status of Trunk group depends on the direction of traffic flow

- Incoming (IC) - Trunk Group used for calls coming into the exchange (terminating calls) and for putting through calls meant for some other exchange (incoming - outgoing calls).
- Outgoing (OG) - Trunk Group used by the exchange in reference for putting through calls to other exchanges. The exchange in reference is in full control of allocating any circuit for putting through a outgoing call.
- Both way (BW) - Combination of incoming & outgoing. This circuit always remains in incoming mode to receive the call. For making an outgoing call, its availability to the distant exchange is cut off and seizure is done. As such it may so happen that at any instant both may choose same circuit for putting through a call from their end to other end, resulting in 'collision'.

b) **Line Signalling (LIN-SIG)**

Line signals are essentially signals which deal with supervision of a circuit e.g., seizure of circuits and disconnection of communication on that circuit. The type of line signalling scheme used between exchanges for a trunk group may be one of the following:

- Loop Disconnect (LOOP-DSCT) - DC Loop disconnect signalling system (Total 2 wires per circuit)
- E & M (E-M) - EAR & MOUTH signalling system.

(Total no. of wires per circuit could be 4 or 6, but in both cases two wires -E Wire & M Wire are used for signalling purpose with ground as a reference) .

- Channel Associated Signalling (CAS) for digital lines.

(Time slot 16 is used for signalling with 4 signalling bits per channel in 'FORWARD' as well as 'BACKWARD' direction) .

DR2-CAS1
DR2-CAS2
DR2-CAS3

Generally, DR2-CAS3 is used in Indian Network.

- Common Channel Signalling No. 7 (DIG-CCS)

c) **Register Signalling (REG-SIG)**

Register signals accomplish the transmission of information pertaining to dialling and the nature and status of the trunks/subscriber lines. These signals are exchanged between register devices of the two (or more) involved exchanges during call set up phase. The register signalling scheme used over a trunk group may be specified as any one of the following:

- Decadic (DEC) - Decadic Loop Disconnect signalling system.
- MF signalling (MOD-R2) - Multi-frequency Tone Signalling for Indian Network.
- CCITT-R2 for standard International R2 Signalling.
- CCITT-R7 for CCS7 trunks

d) **MF Signalling (MF-SIG)**

The parameter is used for defining MF type of Register signalling.

If Reg-Sig is DEC or CCITT-R7 then it should have default value as INVALID. If Reg-Sig is MOD-R2 then this should be FULL-CMPLD.

e) **Rank of Digit (RNK-DGT)**

The position in the received digit sequence from which digits are outputted on an outgoing trunk. For example, if rank of digit is 2, the first digit is absorbed and the rest of the digits are sent out over the outgoing trunk. This parameter may have values between 1 to 13.

Note :

However, as per routing and numbering plan of DOT-Network, the TGPs are opened with ROD=1, in case the exchange is working as local exchange or originating TAX. In case of terminating TAX/ILT, this parameter may have any other value to absorb the STD code of the parent station.

f) **Trunk Priority (TRK-PRI)**

This priority is similar to the subscriber priority. Any value between 1 to 8 can be assigned. This can also be made use for putting the route restrictions. If a particular priority is not defined in the trunk group choices field for a particular route then subscriber/Trunk groups with that priority will not be allowed to go to that route.

g) **Prefix Digits (PFX-DGT)**

The digits to be prefixed to the sequence of digits received over an incoming trunk group, before analysing the total digits. It may be NIL or a single digit, double digit or triple digit or even four digit code.

This can be termed as what is popularly known as digit regeneration. It essentially tries to take care of digit absorption in the other exchange. If no prefix is required, default value 'NONE' should be used and '0' should not be entered at the time of creation of the TGP because it will be interpreted as prefix '0'.

h) **Pad Level (PAD-LEV)**

This parameter has no significance at present and should have default value.

i) **Trunk Group Type (TGP-TYP)**

This parameter may be defined as ORD or TTAX.

- For all the I/C TGPs from TAX in the network, it should be defined as TTAX
- For all the I/C TGPs from parented exchanges, for which C-DOT DSS is working as TAX, it should be defined as ORD.
- For all O/G TGPs, being associated to the route, for which C-DOT TAX is generating metering pulses, it should be defined as ORD.
- For the O/G TGPs, being associated to the routes, where pulses are being received from the next higher level TAXs, it should be defined as TTAX.

If the IC-TGP is defined as TTAX then distinctive ringing is given to the subscriber if system parameter SPL-RNG is set to 1 and other mandatory conditions are met.

j) **Trunk Group Facility (TGP-FCY)**

The operator's junction type depending upon the facility available:

- | | | |
|----------------|---|---|
| No Facility | - | Trunk group does not have any (NO-FCY) facility. |
| Trunk Offering | - | When this facility (TO) is assigned to a trunk group, operator may establish connection to a busy subscriber's line to announce a trunk call. |

Manual Hold - When this facility (MH) is assigned to a trunk group, system does not release the call, if the called party is still holding. This is achieved by ignoring the clear-forward sent by subscriber.

Generally, this parameter should have default value (NO-FCY).

k) **Minimum Digits for seize forward (DGT-SZFD)**

Minimum number of digits to be received either from the subscriber or on the I/C trunk, before proceeding to seize an outgoing trunk to put through the call. Normally, this parameter should have a minimum value as 3 or equal to the digit length of the route code whichever is higher.

l) **Ring Down Signalling (RNG-DWN)**

This parameter has no significance at present.

m) **Dial Tone (DIAL-TN)**

Whether dial tone is to be fed or not, over the incoming trunk group is indicated as YES to feed dial tone when seizure occurs and NO to avoid feeding the dial tone.

This parameter should have default value (NO) in DOT Network except in case of TRUNK OPERATORS.

n) **CAMA**

This parameter indicates whether CAMA information is required or not. This parameter is valid only for incoming trunk group. When a call is coming to C-DOT TAX on an incoming trunk of a trunk group for which 'CAMA' parameter is set as 'YES', the C-DOT TAX will ask for CLI from the originating exchange only if the system parameter "CLI-INFO" is also set to 1. Also incoming trunk group has another parameter "SIG-INF" which indicates whether call is to be failed or passed if CLI is not received.

o) **Answering Circuit Status (AC-STA)**

It should be defined as 2WP for E&M and TWT trunks.

p) **Answering Circuit Information (AC-INFO)**

This indicates the sequence of digits to be dialled on the outgoing or BW trunks to make calls to Answering Circuits of the distant exchange for testing of outgoing Trunks. The sequence of digit is the tone test number of the distant exchange INCLUSIVE of exchange codes, network access codes etc.

Note :

The answering number attached to an outgoing trunk group may belong to a "final destination exchange" which may not be the one immediately connected to the trunk group in question.

q) Trunk Group category (TGP-CAT)

This parameter is associated with routing restrictions and charging. If two exchanges having same routing restrictions and charging, for rest of the routes in the network, then incoming trunk groups from these two exchange can be assigned the same category. If the total number of exchanges being parented to C-DOT ILT is less than 63 a unique TGP category can be assigned to each TGP.

It is always recommended that TGP-CAT for I/C TGP which is coming from higher TAX should be unique and not equal to '1' to avoid rerouting of call from I/C TAX itself and other TAXs. The category of the local subscribers is kept as 1. For trunk groups, it should be defined `2' onwards.

r) Trunk Group Hunt Type (HNT-TYP)

This parameter has no significance.

s) Signalling Information (SIG-INF)

This should be given default value in all the cases except in case of the TGP type is CCS7 or filtering of calls is being enabled on the TGP based on CLI. In case the TGP type is CCS7, the parameter should define the type of charging method, used on the trunk group. In case of MOD-R2 signalling, where filtering of calls are required based on CLI in case of CAMA, the parameter should be set as CLI-N-FAIL. This value of parameter should not be set if the administrator is sure that the parented exchange is also connected to some 128P RAX/MILT not capable of sending CLI.

t) Continuity checks (CONT-CHK)

This should be given default value. Other values do not have any significance at present.

u) Echo suppression (ECHO-SUP)

This should be given default value.

v) Satellite Indicator (SAT-IND)

This should be given default value.

w) **Terminal Equipment No. (TEN)**

Trunk circuits should be given against this parameter.

v) **Terminal Equipment Number for CCS7 Circuits (TEN-NO7)**

This parameter is defined as numeric string of six subfields as:

B – R – F – S – P – C

B = BM-NO. with range of values as 1 to 32.

R = Rack-No. with range of values as 1 to 3

F = Frame-No with range of values as 1 to 6

S = Slot-No. with valid values as 3, 7, 17, 21

P = PCM-No. with range of values as 1 to 128

C = Circuit-No. for PCM No. P with range of values as 2 to 32.

Except 'P', all other five parameters are same as that of normal TENS. At the time of defining the values of 'P', care must be taken to ensure that the same value is also assigned at the other end i.e. next node. This is a mandatory requirement for one-to-one correspondence between SS7 trunk groups and Circuit Identification Codes of the CGS (Circuit Group Set) between two exchanges.

Note :

Depending upon the TGP type, only one of the two parameters TEN or TEN-NO7 is to be defined.

5.1.2. Routing Administration

Route is a path over which a call from a source can be put through to the required destination. Sometimes there may exist more than one route from a source to a destination. Those multiple routes are called alternate routes. The mechanism of putting through the call from a source to a destination is called routing. Route code is essentially a sequence of digits which are uniquely identifiable as 'the sequence' which identifies a particular route.

Thus, any sequence of digits is a route code as long as no other route is a subset or superset of it. For e.g. if 243 is a route, 24 or 2439 cannot be a separate route

This does not hold good in case of Exchange Code. If 54 is the exchange code with digit length 6, and the DIRNO ranges from 540000 to 549999. If 5468 is created as a route then it will get created as a DID route and all the DIRNOs

from 546800 to 546899 will go in the reserved category. Now one cannot create DIRNOs from 546800 to 546899.

5.1.2.1. *Route Characteristics*

A Route as designated in C-DOT DSS has the following characteristics :

- a) **Route Code (RUT-COD)** is sequence of digits upto 12 digit.
- b) **Route Flag (RUT-FLG)**

In this field, the subscriber category and incoming trunk group category is associated with the route restrictions. The category of the local subscribers is kept as 1.

If a particular route is not to be allowed from a specific Exchange, then the corresponding incoming trunk group category should not be filled while creating that route.

For example, there are six exchanges connected to MAX-ILT and are having different TGP-Category for the I/C Trunk Groups at C-DOT MAX-ILT. The different TGP categories are 2 to 7 for exchanges 2,3 7 respectively. It is desired that ISD calls from exchange – 4 is to be barred and allowed from other exchanges. The route flag for all ISD routes 00X or 00XX should be defined for the remaining categories except '4'.

RUT-FLG = 1-cnb-na-ga & 2-cnb-na-ga & 3-cnb-na-ga &
5-cnb-na-ga & 6-cnb-na-ga & 7-cnb-na-ga
(No definition for category 4)



WARNING !

The I/C TGP categories from higher level TAX should have a unique value (e.g. 64) and while creating route towards same TAX or any other TAXs, this should not be allowed.

- c) **Charge Rate Info (CRG-RTN)**
 - All the category defined in RUT-FLG should be given appropriate charge-rate nos.
 - Except for the charge rate number used against CAT=1, all other charge rate nos. should have INI-CRG=0.

**WARNING !**

The CRG-RTN against I/C TGP category of trunk groups coming from TAXs should be defined as explained in B.2.10 (Annexure-B).

d) **TGP Choice (TGP-CHC)**

- For 0XXX routes towards other TAXs, Priority 1 (for own subs), Priority 2 (for priority subscribers), 10 (for CCB-STD) & 12 (for PBX) should be allowed.
- For 0XXX routes, towards parented exchange to MAX/ILT, priority. 13 should also be allowed to put through incoming international calls.
- For normal routes, if ordinary CCB and Trunk Operators are to be allowed then additional priorities such as 9 (for CCB) and 13 (for operator) should also be allowed, in addition to 1, 2, 10 and 12.

e) **Digit Length (DGT-LGT)**

- For all '0' routes, digit length should be 20, (i.e. for all the route codes towards TAX).
- To avoid the revenue leakage due to reverse routing, the concept of closed numbering should be implemented only for parented SSAs.

5.2. TRUNK ADMINISTRATION

The trunk groups are mainly categorised as incoming, outgoing and bothway

5.2.1. Creation of an Incoming Trunk Group (CRE-TGP)

To create an incoming trunk group the following parameters are applicable. Other parameters should have default value as they do not have any relevance for an incoming trunk.

CRE-TGP	CREATION OF TRUNK GROUP
TGP-NUM	:
TGP-NAME	:
TGP-STA	: IC
LIN-SIG	:
REG-SIG	:
[MF-SIG]	:
[CGS-NUM]	:

Contd...

[CGS-NAME]	:
[TRK-PRI]	:
PFX-DGT	:
TGP-TYP	:
[TGP-FCY]	:
[DIAL-TN]	:
[TGP-CAT]	:
[CAMA]	:
[SIG-INF]	:
AC-STA	:
[AC-INFO]	:
[TEN]	:
[TEN-NO7]	:

Note :

1. Not more than 40 TENs should be given for creation of a trunk group. The rest of the TENs, if any, can be added by "ADD-TRK" command.
2. To create an Incoming trunk group free Terminal Equipment Numbers of the required number and of required 'HW-TYPE' equipage should be known and the free Trunk group number should also be known. Issue the command 'DISPL-TEN' and obtain the parameters on the screen. Key-in 'status as FREE' and 'key-in the required "HW-TYP" and execute. Then the system will display the list of free Terminal Equipment Numbers. Note the TENs of the required number for the Trunk Group. To check for a new trunk group number (to be created), issue "DISPL-TGP-ROUT" command with default value against "TGP-NUM" and "TGP-NAME" parameter and obtain the report of command execution. Report will display all the existing trunk groups in the system. Check that new trunk group number (to be created) is not existing in this report.
3. How to assign the proper incoming trunk group category against the parameter [TGP-CAT] while creating an I/C trunk group :
 - a) The category for I/C trunk groups should never be assigned 1 as all local subscribers are having category 1 which can not be changed. Another fact is that I/C trunk groups can not be assigned the same category as subscribers because different charge rate numbers are to be used for "ORG-OG" calls (i.e. calls originated from subscribers) and "IC-OG" calls (i.e. calls coming

on I/C trunks). Even in cases where pulse rate is same, the initial charge will always be different for "ORG-OG" calls and "IC-OG" calls. For "ORG-OG" calls (i.e. OG calls originated from C-DOT exchange subscribers), initial charge in the charge rate number should be 1 to ensure that subscriber is charged 1 unit on receipt of answer. For "IC-OG" calls (i.e. transit calls), initial charge is kept 0.

- b) In case when C-DOT exchange has to work as group dialling centre, ILT or TAX, ideally incoming trunk groups in C-DOT meant for different exchanges (i.e. incoming directions) connected to C-DOT exchange are to be assigned different categories. In other words, each station (exchange) connected to C-DOT exchange is to be given different category.
4. How to assign the trunk group priority against 'TRK- PRI' parameter in CRE-TGP command while creating an I/C trunk group ?

I/C trunk group priority basically is used to select an O/G trunk group through which 'IC-OG' calls coming on this I/C trunk group passes to a specific route.

In case of decadic signalling, I/C trunk groups priority overrides the subscriber priority but in case of MF signalling, priority is treated as follows:

- i) In MF signalling if call is coming from an operator on the IC trunk with Trunk Offer (TO) facility of C-DOT exchange and it has to go to a specific O/G route then whatever priority is given to I/C trunk, this call will pass to O/G route only when trunk group choices are defined for priority 13 which is operator priority.
- ii) Similarly in MF signalling, if calling line category/priority indicates that I/C call to C-DOT exchange is coming from an priority subscriber then in C-DOT exchange priority 2 is mapped for this I/C call for selecting an O/G trunk group to pass this call via C-DOT to outgoing route.
- iii) In MF signalling, if calling line identity indicates that I/C call to C-DOT exchange is coming from ordinary subscriber then in C-DOT exchange priority of I/C trunk group on which this call is coming will be mapped for selecting an O/G trunk group to pass this call via C-DOT to outgoing route.

Confirm the status of the trunks in the group by issuing the command 'DISPL-TGP-STATUS' and keying the freshly created TGP-NO. The status of each trunk circuit of the TGP should be in-service free. In

case some circuits are out of service force those trunks INSERVICE using the command 'FRC-TRM-INS'. If they continue to remain out of service when trunk group status is displayed, then check the corresponding trunk card. It may be faulty.

5.2.2. **Creation of Outgoing Trunk Group (CRE-TGP)**

To create a trunk group the following information should be made available with the operator. Even though some more parameters are displayed on the screen, they may have default value as they are not relevant for O/G Trunk Group.

CRE-TGP	CREATION OF OUTGOING TRUNK GROUP
TGP-NUM	:
TGP-NAME	:
TGP-STA	: OG
LIN-SIG	:
REG-SIG	:
[MF-SIG]	:
[CGS-NUM]	:
[CGS-NAME]	:
[RNK-DGT]	:
TGP-TYP	:
[TGP-FCY]	:
[DGT-SZFD]	:
[SIG-INF]	:
AC-STA	:
[AC-INFO]	:
[TEN]	:
[TEN-NO7]	:

Note :

1. Not more than 40 TENs should be given for creation of a trunk group. The rest of TENs should be made part of the trunk group by "ADD-TRK" command. (This is true for bothway trunk group also).
2. To create an outgoing trunk group, free trunk group number and terminal equipment numbers of the required hardware type equipage should be known. The procedure is same as followed in creation of incoming trunk group.

3. RNK-DGT parameter should be given a value which should indicate the digit number from which onwards all digits available for the call will be outpulsed. For example, if '2' is given against this parameter then from 2nd digit onwards (including 2nd digit) all digits available for the call will be outpulsed on this O/G trunk.
4. "TGP-FCY" parameter should be given proper value. The only valid facility which can be assigned to O/G trunk group is manual hold (i.e. MH).
5. For creation of an O/G trunk group, AC-INFO parameter should have answering circuit numbers of distant exchange to which these O/G trunks are connected.

Note:

Outgoing trunk groups can only be made operational when they are associated with routes. The same trunk group can be associated to many routes.

5.2.3. Creation of Bothway Trunk Group (CRE-TGP)

The information as required for incoming and outgoing trunk group both should be made available for creating bothway trunk group.

- ◆ To create a bothway trunk group, free trunk group number and terminal equipment numbers (TENs) of required hardware type equipage should be known. Bothway trunk group should not be created for Digital trunk hardware.
- ◆ The procedure is same as creation of I/C or O/G trunk group. For SS7 (ISUP) trunks, which are bothway trunks, the parameters [CGS-NUM], [CGS-NAME], [SIG-INF], and TEN-NO7 are to be specified in addition to other parameters.

5.2.4. Add a Trunk Circuit in a Trunk Group (ADD-TRK)

- ◆ To add a trunk circuit into a trunk group, the operator should know the following details :
 - Trunk group number to which the trunk circuit has to be added
 - Free Terminal Equipment Number of the trunk circuit to be added.
- ◆ To know a free TEN issue the command 'DISPL-TEN' and key-in required hardware type based on line signalling type used in the existing trunk group to which this circuit is to be added.
- ◆ One or more than one trunk circuits can be added to a trunk group only if the hardware type of the circuits is compatible with the trunk group characteristics.

- ◆ Note more than 40 trunks can be added by a single command.

5.2.5. Delete a Trunk Circuit from a Trunk Group (DEL-TRK)

- ◆ To delete a trunk circuit from a trunk group the operator should have the following details :
 - Trunk group number from which the trunk circuit has to be deleted.
 - Terminal Equipment Number of the trunk circuit to be deleted from the trunk group.
- ◆ Not more than 40 TENs (Trunks) can be deleted from a trunk group by a single command.
- ◆ The trunk circuit has to be put out of service before it is deleted from the trunk group. Issue the command 'FRC-TRM-OOS' and key-in the TEN(s) of the trunk circuit to be deleted. Multiple values can be given against the parameter 'TEN'. Key-in 'TRK' against "TML-TYP" parameter. This command should get executed successfully.

5.2.6. Delete a Trunk Group (DEL-TGP)

- ◆ To delete the trunk group the operator should know the following details
 - Trunk group number of the trunk group to be deleted
 - Whether it is an incoming trunk group or outgoing trunk group. If it is an outgoing trunk group then the route(s) to which it is associated should also be known. Knowing the trunk group number, and using the command 'DISPL-TGP', you can find out whether the trunk group is incoming, outgoing or bothway.
- ◆ The trunk circuits existing in that trunk group should be forced out of service. Issue the command PUT-TGP-OOS from the terminal and key-in the Trunk group number of the trunk group which is to be deleted.
- ◆ After deleting the trunk group, its trunks will become free and trunk group number will also become free which can be used further.
- ◆ In case of outgoing trunk group, the route(s) to which it is associated with, should also be deleted or trunk group should be removed from the route(s). For knowing the route(s) to which this trunk group is associated, give "DISPL-TGP-ROUT" command. Key-in the trunk group number and execute the command. The report will display all the routes to which specified trunk group is associated.
- ◆ Now either delete all routes using "DEL-ROUT" command or remove this trunk group from all the routes using "MOD-ROUT-CHAR" command. In the command MOD-ROUT-CHAR, do not specify this trunk group as trunk group choices against "TGP-CHC" parameter. Other parameters can have their old values. This trunk group can be removed from all the

routes one by one using this "MOD-ROUT-CHAR" command for each route.

5.2.7. **Modify the Characteristics of Trunk Group (MOD-TGP-CHAR)**

- ◆ Before modifying trunk group characteristics, the trunk group is to be put out of service using 'PUT-TGP-OOS' or 'FRC-TRM-OOS' for all the trunks of the trunk group.
- ◆ To modify the trunk group characteristics, key- in command "MOD-TGP-CHAR" and obtain the parameters on the screen. Key-in the trunk group number of which characteristics are to be modified against "TGP-NUM" or TGP-NAME parameter. On pressing 'Return' key after entering the trunk group number, the system would display the existing characteristics of the specified trunk group.
- ◆ Move to the parameter(s) which is (are) to be modified and key-in the fresh value(s) and press 'e' key to execute the command. One or more parameters can be modified by entering the valid/desired new values as defined in different sections as 5.1.X.
- ◆ Put the trunk group in service using 'PUT-TGP-INS' or 'FRC-TRM-INS' for all the trunks in the trunk group.

Note ① : In few exceptional cases, the modification command may fail with error message "Trunks are not out of Service". In such cases, they should be made out of service repeating the command FRC-TRM-OOS. In case of more than 40 trunks, the command has to be repeated more than once, ensuring that all the TENs are covered.

- ② In case of more than 100 trunks, the no. of trunks in the trunk group should be reduced to less than 100 by deleting the trunks. After successful modifications of trunk group, the trunks should be added.

5.3. **DISPLAY/LISTING OF TRUNK GROUPS (DISPL-TGP-LIST)**

The List Command is used to display the list of TGPs of the BM with specified characteristics. For example, it is possible to get the listing of all the TGPs with R2 signalling.

DISPL-TGP-LIST	DISPLAY/LISTING OF TRUNK GROUPS
BM-NO	:
[LST-REQ]	:
[TGP-STA]	:
[LIN-SIG]	:
[REG-SIG]	:
[MF-SIG]	:
[TRK-PRI]	:
[TGP-TYP]	:
[CAMA]	:
[TGP-FCY]	:
[DET-BLG]	:
[RNG-DWN]	:
[DIAL-TN]	:
[AC-STA]	:
[TGP-CAT]	:
[SIG-INF]	:
[SAT-IND]	:
[CONT-CHK]	:
[ECHO-SUP]	:

The output of the command will list down the number and name of the TGPs with the matching characteristics, as specified.

5.4. ROUTE ADMINISTRATION

The routes are of two types :

- i) Normal routes, which are used to designate the destination for an outgoing call.
- ii) Special routes, which terminate within the exchange. Such routes may terminate on an alternate directory number or on a time announcement equipment connection or to provided internet nodes or serve as an ILT (integrated local and TAX exchange) or to serve as an alternate route for digit translation to route the Call for 9xx routes.

- ◆ To create a normal route the operator should be provided with the following information.
 - Route Code
 - Route Flag
 - Charge Rate Number
 - Digit Length
 - Trunk Groups

5.4.1. Create a Normal Route (CRE-ROUT)

CRE-ROUT	CREATE A ROUTE
RUT-COD	:
[DGT-LGT]	: 20
RUT-FLG	:
CRG-RTN	:
TGP-CHC	:

- ◆ The following care should be taken while creating a normal route or while modifying route characteristics:
 - All trunk group numbers mentioned in "TGP- CHC" parameter should have been created. There should be no repetition of trunk group numbers for a particular subscriber/trunk priority. Only outgoing or bothway trunk groups should be given in "TGP-CHC" parameter.
- ◆ Route Flag is an alphanumeric string with four fields, defining the routing restrictions for each incoming trunk group category.

A – XXX – YYY - ZZZ

A is the category of the subscriber or I/C or BW trunks.

The calendar restriction is the second field XXX which can be made barred (CB) or no barred (CNB). Normally this field is kept as `CNB`.

The third field YYY is normal call restriction which can also be made allowed (NA) or not allowed (NNA) by which all the normal calls on this route may be allowed or not. Here normal calls means calls having digits such that digit immediate to route code is not 1. For example, if route code is '60' then calls with digits 600xxxx, 602xxxx, 603xxxx and so on are normal calls which may be either allowed or not allowed based on 3rd field value as 'NA' or 'NNA', respectively.

The fourth field ZZZ is level 1 calls, also called Global calls (i.e. route code followed by 1 e.g. if route code is 020 then level 1 calls are 0201xx) which can be defined as allowed (GA) or not allowed (GNA) or globally partially allowed (GPA). For example, 020198 may not be allowed but 020161 may be allowed.

- ◆ Charge rate number is a two field parameter with first field is routing category (this is same as the first field defined for Route flag) and the second field is charge rate number for that category.
- ◆ Digit length is the maximum number of digits required by that route to put the call through. [Default value for this parameter is 20].

In case this parameter is assigned default value i.e. 20 digits then call will be analysed only after receiving digits defined in the system parameter "ROUTING".

- ◆ Trunk group choices are the numbers of those outgoing trunk groups which are associated with this route. It is a maximum 8 field parameter with first field is the subscriber/trunk priority and the second field to eighth fields are outgoing trunk group numbers for various alternate choices.

There can be maximum seven trunk group choices for a given priority.

To create a new route give the command CRE-ROUT and key-in the values of each parameter as required and press 'e' to execute the command.

5.4.1.1. *Level 1 Call Restrictions (MOD-GPA)*

It is required to allow calls to some level 1 numbers for TAX route but restrict calls to other level 1 numbers for the same TAX route. For example it may be desirable to allow 161 calls to be made from Delhi to Bombay but disallow 198 calls. This can be done in the following manner :

- ◆ Create a normal route 022 with route-flag parameter with GPA option in the fourth field [1-cnb-na-gpa].
- ◆ Issue the command 'MOD-GPA' and give

```
LVL 1-RUT = 161
GPA-RES = Allowed
```

- ◆ Execute the command

Now 161 calls are allowed from route 022.

- ◆ Issue the command 'MOD-GPA' and give

```
LVL1-RUT = 198
GPA-RES = BLOCKED
```

- ◆ Execute the command. Now 198 calls will be barred from 022 routes i.e. 022198 calls will fail.

5.4.2. Create Special Route

In C-DOT DSS, special routes are created to meet any one of the following requirements:

i) Level-1 & Level 9 Service Positions:

The level-1 & 9 routes are created with alternate directory numbers. When the routes are dialled, the call is terminated on the directory number which may be individual subscriber or Principal Directory Number (PDN) of a Hunt Group. As explained in case of ordinary routes, the parameters RUT-FLG and CRG-RTN can be defined for different categories with option to make the route as metered or non-metered. It is possible to create "six digit" special route to facilitate the creation of application specific routes e.g. 172222 & 172223 for INTERNET access. Also, it is possible to create the special routes for digit translation i.e. on receipt of digits 911264, the call can be routed to 01264.

ii) Integrated Local cum Transit (ILT) Routes:

The networking is activated by two different functional element as Local Exchange and TAX. In some of the cases, to optimize the resources, the functioning of Local Exchange and TAX is merged into a single exchange. In such cases, few levels (may be within the exchange or that of parented exchanges of the same SSA) are dialled directly without STD code if being accessed by the subscribers of the same SSA. However, the distant network subscriber access them through STD code. To put through the calls in both the cases, the concept of ILT routs are implemented in C-DOT DSS. Alternatively, this also meets the requirement of "Rank of Digit (ROD) for Route Codes".

In case of ILT routes, the parameter STD-LEN is very important. The value of STD-LEN parameter is defined as number of digits in TAX code of ILT. Depending upon the STD code length i.e. STD-LEN, the digits are stripped i.e. removed and then the call is processed to look like as it has been originated from the same SSA. By using RUT-FLG and CRG-RTN, routing and charging for different categories can be defined as in case of normal routes.

5.4.2.1. *Create Special Route for '198' (Complaint) Position*

Key-in the command "CRE-SPL-ROUT" to create a new special route and obtain the parameters on the screen as shown below:

CRE-SPL-ROUT	CREATE SPECIAL ROUTE
RUT-COD	:
RUT-TYP	:
RUT-FLG	:
CRG-RTN	:
[ALT-CODE]	:
[SPL-INF]	:
[STD-LEN]	:

- ◆ As the level 198 is to be terminated on an alternate directory number within the exchange, define the parameter "RUT-TYP" as ALT-NUM.
- ◆ Define the RUT-FLG and CRG-RTN as explained in previous section for creation of "Normal Route". Key-in charge rate number against 'CRG-RTN' parameter. The charge rate number should have been defined as non metered. This can be confirmed by displaying the characteristics of charge rate number using 'DISPL-CRG-RTN' command. In response of this command, charge mode (CRG-MOD) parameter should indicate 'NO-MET' value and 1st field of 'RUT-INFO' parameter should have 'NON-MTRD' value. Normally charge rate number '24' which is already defined as non metered, may be used.
- ◆ Key-in already created non metered DIRNO (which has been created using 'CRE-SUB' command with MTR-CLS = NO- MTR) against 'ALT-CODE' parameter. For example 542198 can be created as non-metered number where '54' is exchange code.
- ◆ If more than one telephone position is needed for attending complaints (198 calls), then a hunt group having 2 or 3 member - TENs (as per requirement) can be created with a standard complaint number as a principal directory number. (Refer Hunt Group creation procedure given in this document). For example 542198 (free directory number) which is a standard complaint number, can be given as a principal number of the hunt group. Now key-in the principal number of this hunt group as alternate number against 'ALT-CODE' parameter if more than one telephone positions are needed for complaint.

5.4.2.2. *Creation of Emergency and Special Service Positions for RSU*

When all the PCMs between RSU and Main Exchange fail, the RSU functions in RBM-SA (standalone) mode. In this mode, certain level 1 emergency services can be accessed like 100 or 198 etc. This is achieved by using additional data creation for distributed RSUs. For any level 1 service position there may be following considerations :

1. The calls are routed to the same number in both the cases as

- i) RSU is connected to main exchange with one or more PCMs as INSERVICE
 - ii) RSU is in standalone mode with the all the PCMs as out of service.
2. The calls are routed to the centralised positions when RSU is up and connected to the main exchange. However when RSU is in 'standalone' mode, the call is routed to one of the RSU number.

To take care of above requirements the data is created in two different steps as explained in 5.4.2.2.1 and 5.4.2.2.2.

5.4.2.2.1. ***Creation for Stand Alone Special Service Positions***

In this mode, the calls to special numbers can not be routed to centralised position in Main Exchange as all the PCMs have failed. In case it is desired that few of such services as 100, 101, 131, 198 etc. are to be routed to the DIRNOs of the RSU, this can be achieved by programming the data using command : CRE-RBMSA-CONFIG :

CRE-RBMSA-CONFIG :		CREATE/MODIFY RBM CONFIGURATION
RBM-NO	:	BM-04
EMRG-NO	:	100
ALT-NUM	:	5421220
CRG-RTN	:	1-2 & 2-3 & 3-6

The output will be displayed as follow

CREATE/REMOVE BM CONFIGURATION		
RBM-NO	=	BM-04
Service	=	100
ALT-NO	=	5421220
CRG-RTN	=	1-2 & 2-3 & 3-6.

Note :

1. This command should be executed for each RSU separately.
2. The DIR-NO being specified against the parameter ALT-NUM should be the DIRNO of the same RSU

5.4.2.2.2. Creation of Special Service Positions for “Normal Mode”

The step may not be required at all the sites. It is required only when the RSUs are distributed across the SSAs. For e.g. the Main Exchange is installed in Nagarcoil and its RSUs are in Kanyakumari. The special service number 100 is already created for the main exchange in Nagarcoil. Now, it is required that on dialling 100 from RSU subscriber, the call should land on the DIR NOs of the Police Station of Kanyakumari itself. The following command is to be used.

MOD-RBMNRM-CONFIG	CREATE/MODIFY RBM CONFIGURATION
OPR-TYP	:
RBM-NO	:
RUT-COD	:
ALT-NUM	:

- i) Against parameter OPR-TYP, the option CRE, MOD or DEL can be used as required. The option MOD is used to modify the ALT-NUM.
- ii) The RBM-NO and RUT-COD should be defined. The RUT-COD e.g. 100 should have been created for the Main Exchange.
- iii) ALT-NUM should be DIRNO of the same RSU. However, in case of RSU clusters when more than one RSUs are installed in the same area, the DIRNO of a RSU can be associated as ALT-NUM for all the RSUs of the same area.

Note :

1. The command should be executed for each RSU separately.
2. The feature can be exploited for 198 as localised complaint position or any other similar requirement.

5.4.2.2.3. Display the RBM-SA Configurations (DISPL-RBMSA-CONFIG)

To display the details of standalone configuration i.e when RBM is in standalone operation, execute the command.

The output is displayed as follows

DISPL-RBM-CONFIG		DISPLAY REMOTE BM CONFIGURATION	
RBM-NO	:	BM-04	
Service No	:	100	
ALT-NUM	:	6421220	
CRG-RTN	:	1-2 & 2-3 & 3-6	
Service No	:	101	
ALT-NUM	:	5421220	
CRG-RTN	:	1-2 & 2-3 & 3-6	

5.4.2.3. *Create Special Route for ILT*

- ◆ These routes are required to be created when C-DOT exchange has to work as ILT (Integrated Local Trunk Tandem). In ILT there will be one local exchange code (for example, say '54') and there will be one TAX code (for example, say 01793) through which national network will have access to the subscribers, of ILT or exchanges connected to it. For processing an incoming call from national network to ILT subscribers, an ILT route with route code **0179354** is to be created with RUT-TYP = 'ILT' using 'CRE-SPL-ROUT' command.
- ◆ Normal routes are created for all those exchanges which are connected to C-DOT ILT and directly dialled without any access level or area codes. For processing of incoming calls coming from national network (via TAX code of C-DOT ILT) for the subscribers of such exchanges, ILT special routes are to be created in C-DOT ILT for each of the exchanges. For example, ILT route codes say 0179360, 0179370 etc, where 60 or 70 are the exchange codes of the exchanges connected to C-DOT ILT and 01793 is the TAX code of C-DOT ILT. Thus, corresponding to each normal routes created in C-DOT ILT for all those exchanges connected to C-DOT ILT, as many number of special routes are also created with RUT-TYP = 'ILT' using 'CRE-SPL-ROUT' command. The route codes will be equal to TAX code of ILT followed by normal route codes (e.g. 0179360, 0179370 where 01793 is TAX code of ILT and 60 & 70 are normal routes created for 60 & 70 exchanges which are connected to C-DOT ILT).
- ◆ Routing restrictions are to be given as per site requirement against 'RUT-FLG' parameter in 'CRE-SPL-ROUT' command and in case metering is to be done by C-DOT ILT for calls coming through TAX code of C-DOT ILT (i.e. through ILT special routes) proper charge rate number as per requirement is to be defined against 'CRG-RTN' parameter in 'CRE-SPL-ROUT' command. Other parameters may have default values. Thus ILT

special routes are created in C-DOT ILT for all those exchanges which are connected to C-DOT ILT.

- ◆ For processing of incoming calls coming through TAX code of C-DOT ILT (i.e. through ILT special route codes), to the subscribers of C-DOT ILT or to the subscribers of exchanges connected to C-DOT ILT, define the parameter namely 'STD-LEN' equal to 'number of digits in TAX code of C-DOT ILT, (i.e. 5 in this case when TAX code is assumed to be of 5 digits i.e. 01793).

How an Incoming Call coming from National Network (i.e. through TAX code of ILT) gets processed in C-DOT ILT?

- ◆ When incoming calls are coming from national network to ILT (i.e. through TAX code of ILT), then digits 0179354xxx or 0179360*** etc., may come on I/C trunks of C-DOT ILT.

Where,	01793	is assumed as TAX code of C-DOT ILT
	54	is assumed as Local exchange code of C-DOT ILT
	60	is assumed as exchange code of other exchange connected to C-DOT ILT
	xxx	are last three digits of ILT subscribers
	***	are last three digits of other exchange subscriber which is connected to C-DOT ILT

- ◆ On receiving the above digits on incoming trunks of C-DOT ILT, initial few digits will be matched with one of the special ILT route codes created in C-DOT ILT, after that it will see that RUT-TYP = 'ILT' is set. Then it will read the value of 'STD-LEN' parameter (in present assumption it will find value as '5'). After that it will mask initial 5 digits from the digits received on incoming trunks of C-DOT ILT (i.e. 01793 will be masked from the total digits 0179354xxx or 0179360***). Out of remaining digits, few initial digits will be matched with local exchange code of ILT (i.e. 54), if few initial digits are matching with local exchange code of ILT, then I/C call will be processed as I/C terminating call to be terminated on the required local subscriber of ILT. This will happen when digits 0179354xxx will be received on incoming trunks of ILT.
- ◆ If out of remaining digits (after masking of initial 5 digits 01793 from digits received on Incoming trunks of ILT i.e. from 0179360***), few initial digits are not matching with local exchange code of ILT then rerouting is done for these digits (60***) on normal routes (i.e. 60) available in C-DOT ILT and the incoming call will be routed to other exchange (60) via C-DOT ILT through normal route (60).
- ◆ Note that if "Route Flag" definition, due to which a call which is to be 'barred', shall not pass beyond the initial routing itself. Even if the first 'round' of routing is successful, the call may fail if 'RUT-FLG' restrictions at next round of routing indicate 'BARRING'. The 'Charge Rate Number'

indicated under the routing in first round (i.e. in ILT route code) will be applicable.

5.4.2.4. *Digit Translation for Routing the Call for 9XX Routes :*

As per the new guidelines of T.E.C., the subscribers of one SDCA should be able to have access to the subscribers of another SDCA in the same LDCA through non-STD access code. The whole idea of this implementation is that a local subscriber having local access with access level as "Local" should be able to make a call to the neighbouring SDCA which is connected through STD route.

For example, a subscriber in Delhi can access another subscriber in Sonipat through STD code '01264'. Now the same subscriber can be accessed in Sonipat by a local subscriber in Delhi using 91 as access code instead of 0. i.e dialling 911264 <DIRNO>. It will be done as follows :

CRE-SPL-ROUT Command is executed with following input parameters :

CRE-SPL-ROUT	CREATE SPECIAL ROUTE
RUT-COD	: 911264
RUT-TYP	: ALT-RUT
RUT-FLG	: 1-cnb-na-ga
CRG-RTN	: 1-31 (For 3 minutes with initial charge 1)
[ALT-CODE]	: 01264
[SPL-INF]	: <Default>
[STD-LEN]	: <Default>

On receiving the digits 91 1264, the type of special route as "ALT-RUT" will result in translation and replacement of 91 1264 with the digits 01264 as specified in the parameter "ALT-CODE". After this, the call is routed to 01264 <DIRNO> as it is being done in case of a normal STD call.

Note : In such cases, for routing and charging of the calls, the characteristics of translated route i.e., 01264 is valid and the calls are routed accordingly. In few cases where different routing guidelines are decided e.g., instead of 91 followed by area code ie.91 1264, the access code 91X is followed. In such cases, the subscriber will be dialling 91 X <DIRNO> . To ensure that all such calls are routed successfully in the Network, all the route codes 0xxx should be open routes i.e., created with DGT-LGT = 20.

5.4.3. Modify Route Characteristics

The parameters which are associated with the route characteristics are :

- Route flag (RUT-FLG)
- Charge rate number (CRG-RTN)
- Digit length (DGT-LGT)
- Trunk group choices (TGP-CHC)

To modify the route characteristics, key-in the command "MOD-ROUT-CHAR" and obtain the parameters on the screen as shown below :

MOD-ROUT-CHAR	MODIFY ROUTE CHARACTERISTICS
RUT-COD	:
[RUT-FLG]	:
[CRG-RTN]	:
[TGP-CHC]	:
[DGT-LGT]	:

- ◆ Key-in the route code, of which characteristics are to be modified, against "RUT-COD" parameter.
- ◆ On pressing 'RETURN' key after entering the route code, the system would display the existing characteristics of the specified route code.
- ◆ Move to the parameter(s) which is (are) to be modified and key-in the fresh value(s) and press 'e' key to execute the command.
- ◆ After executing the command, the system displays the modified characteristics of the specified route code. Check the values in the report of "MODIFIED ROUTE CHARACTERISTICS" against each parameter as keyed- in.

The characteristics of a route are modified after successful execution of the command.

Note:

It is not possible to modify the characteristics of "special route". If it is required, the special route has to be deleted and recreated with desired characteristics.

5.4.4. Delete Route (DEL-ROUT)

- ◆ To delete an existing route one has to confirm its existence. Issue the command DISPL-ROUT-CHAR and then key-in the route code. If the route is existing, the system would display the characteristics of the route.
- ◆ Now exit from the display mode and then key-in DEL-ROUT to delete it.
- ◆ The route code becomes free and can be used. The trunk groups associated with this route do not get deleted.

5.4.5. Display of TGP-Route Relationship (DISPL-TGP-ROUT)

To find out the total number of created trunk groups (whether it is Bothway, Outgoing or Incoming) and association of outgoing trunk group with routes 'DISPL-TGP-ROUT' command is used. If all the parameters in this command are given default value (by pressing 'RETURN' key against the parameters), it will display all created incoming, outgoing and bothway trunk groups alongwith the route codes associated with outgoing trunk groups and bothway trunk groups.

A specific trunk group number can also be specified against 'TGP-NUM' parameter to know the corresponding route codes with which this trunk group is associated.

5.4.6. Display of all Existing Route Codes (DISPL-ALL-ROUT)

To display all existing route codes (normal as well as special routes) 'DISPL-ALL-ROUT' command is used. There is no parameter in this command.

5.4.7. Display of Route Characteristics (DISPL-ROUT-CHAR)

To display the characteristics of a specific route (whether it is normal or ILT), 'DISPL-ROUT-CHAR' command is used.

Chapter 6.

Traffic Administration

6.1. GENERAL

This Chapter describes the procedure to generate various traffic reports and observe the exchange performance. The observations can be on subscribers, huntgroups, trunks or on routes.

6.2. ACTIVATE TRAFFIC REPORTS

For starting the desired traffic reports, the following sequence of actions are followed :

- i) Check that desired traffic reports are not already active. For this, key-in "DISPL-TRF-OBS" command and obtain the parameter on the screen.

DISPL-TRF-OBS	DISPLAY TRAFFIC OBSERVATION
OBS-TYP	: REPORT
REPEAT/TERMINATE/EXECUTE(R/T/E) : E	

Fill in the value 'report'. The system would then display the active reports, periodicity and output options.

- ii) In case the desired traffic report is not active, then activate it by issuing the command "START-TRF-RPT" and obtain the following parameter on the screen.

START-TRF-RPT	START TRAFFIC REPORTS
RPT-TYP	: TRK-REP
REPEAT/TERMINATE/EXECUTE(R/T/E) = E	

Fill the value (say, you are interested in trunk report TRK-REP) and press 'e' to execute the command.

The successful execution of command confirms the activation of the specified traffic report.

The other types of traffic reports that can be started or activated by specifying them against the "RPT-TYP" parameter are :

- 1) Line Reports (LNE-REP)
- 2) Processor Reports (PRO-REP)
- 3) Hunt Group Report (HNT-REP)
- 4) Daily Report (DLY-REP)
- 5) Trunk Group Reports (TRK-REP)
- 6) Route/ Destination code Report (RUT-REP)
- 7) Service Circuit Reports (SRV-CKT)
- 8) DTK Reports (DTK)
- 9) Link Report (LNK-REP) for CCS7 signalling links
- 10) Route Set for ISDN services report for CCS7 route sets (RTSET-REP)
- 11) Bearer Service Report (BER-SRVC) for ISDN services
- 12) Special facilities report (SPL-FAC)
- 13) Switching Network Report (SWT-NET)

Note :

- a) Multiple reports can be initiated through this command.
- b) The system would taken up default periodicity and the output option for the activated traffic report.
- c) To know these default values issue the command DISPL-TRF-OBS and key in 'Report' against the parameter 'OBS- TYP'.
- d) To modify the periodicity issue the command MOD-RPT- PERDTY.
- e) To modify the output option issue the command MOD-OUT- OPT.
- f) The traffic reports for trunks, routes, hunt group will be generated only for those TGP, trunks, routes and hunt group which are under observation. Refer 6.5 onwards for putting them under observation for traffic generation report.

6.3. MODIFY TRAFFIC REPORT PERIODICITY

- i) For modifying the periodicity of traffic report(s), key- in command "MOD-RPT-PERDTY" and obtain the parameters on the screen.

MOD-RPT-PERDTY	MODIFY REPORT PERIODICITY
RPT-TYP	:
TIM-UNT	:
RPT-PRD	:

- ii) Against the "RPT-TYP" parameter, fill the value(s) of desired traffic report(s) for which periodicity is to be modified.
- iii) Fill unit of the time (e.g. Hrs., Min.) against "TIM- UNT" parameter.
- iv) Against the parameter "RPT-PRD" fill the periodicity of the report as per specified 'Unit' in "TIM-UNT" parameter.
- v) Execute the command and obtain the response of command execution. Response will show the old periodicity as well as new periodicity.

6.4. MODIFY OUTPUT OPTION FOR SPECIFIED TRAFFIC REPORT(S)

- i) For modifying the output option of traffic report(s), key-in command "MOD-OUT-OPT" and obtain the parameters on the screen as shown below.

MOD-OUT-OPT	MODIFY OUTPUT OPTIONS FOR TRAFFIC REPORTS
RPT-TYP	:
[OPTION]	:

- ii) Against "RPT-TYP" parameter, fill the value(s) of desired traffic report(s) for which output option is to be modified. Output option can be modified for multiple traffic reports through a single command.
- iii) Fill output option as required ('VDU' or 'PRINT' or 'VDU and PRINT' or 'NONE') against "OPTION" parameter. Default value of this parameter is 'NONE' which means the report will be prepared and will be dumped on to 'disk' at the specified periodicity.

6.5. MODIFY TRUNK GROUP OBSERVATION

The trunk groups can be put under observation:

- i) For getting traffic reports of the trunk groups

The trunk groups can be added/removed to/from the observation list using the same command "MOD-TGP-OBS". Also using the same command some trunk groups can be added and some can be deleted simultaneously.

- ii) Now for putting the desired trunk groups under observation and/or removing desired trunk groups from observation, key-in "MOD-TGP- OBS" command and obtain the following parameters on the screen.

MOD-TGP-OBS	MODIFY TGP OBSERVATION
[ADD-TGP]	:
[DEL-TGP]	:
[DEL-ALL]	:
TGP-OBS	:
[OBS-PRD]	:
[STP-DTE]	:
[STP-TME]	:

- iii) Fill against [ADD-TGP] parameter, the desired trunk group numbers which were not in the observation list but are existing and are to be put now under observation.
- iv) Against parameter "DEL-TGP", fill the trunk group numbers which are to be removed from observation list. Multiple values of trunk group numbers or range of trunk group numbers or both can be given against this parameter as per requirement.
- v) Against parameter "DEL-ALL", fill the value 'YES' if all trunk groups under observation are to be removed from observation otherwise default value (i.e. 'NO') can be assigned to this parameter.

Note :

Value 'YES' should be filled against this parameter only when default values are given against "ADD-TGP" and "DEL-TGP" parameters and atleast one trunk group is already under observation.

- vi) Against parameter "TGP-OBS", fill the value "TGP-RPT". This parameter value means that the trunk groups have been put under observation or

removed from observation for trunk group reports. Presently only this value (i.e. "TGP-RPT") is applicable for this parameter.

- vii) "OBS-PRD" parameter is a four field parameter represented as Month: Days: Hrs: Min. each of 2 digit.

Note :

The "Observation period/stop date and time" given in the command should not be less than 15 minutes.

- viii) Fill the desired values (same valid values or default values) as per requirement against "STP-DTE" & "STP-TME" parameters for stopping the observation.

"STP-TME" parameter is a two field parameter. 1st field indicates 'Hour' having values 1 to 23 and 2nd field indicates 'minutes' having values 1 to 59.

6.6. MODIFY TRUNK OBSERVATION

The individual trunk circuit of a trunk group can also be put under observation for CER (Call Event Record) dump for a given period of time. On putting a trunk under observation, CERs for all calls landing on that trunk would be dumped onto the disk. CERs are dumped for all types of calls whether successful or not. The execution of this command is similar to that of MOD-TGP-OBS command.

- i) For putting the desired trunk in observation and/or removing desired trunk from observation, key-in 'MOD-TRK-OBS' command in the following format.

MOD-TRK-OBS	MODIFY TRUNK OBSERVATION
[ADD-TRK]	:
[DEL-TRK]	:
[DEL-ALL]	:
TRK-OBS	: CER-DUMP/MF-SIG-ANA
OBS-FILT	: NONE/ALL/SETUP-FAILURE
[OBS-PRD]	:
[STP-DTE]	:
[STP-TME]	:

- ii) Fill against [ADD-TRK] parameter the desired trunk circuit which was not in the observation but are existing and are to be put now under observation.
- iii) Against parameter 'DEL-TRK' fill the trunk circuit numbers which are to be removed from the observation list.

- iv) Against parameter "DEL-ALL" fill the value 'yes' if all trunks under observation are to be removed from observation otherwise default value (i.e. 'No') can be assigned to this parameter.
- v) Against parameter TRK-OBS either of option CER-DUMP or MF-SIG-ANA is chosen.
- vi) Against parameter OBS-FILT option "None" should be used for CER-DUMP. The options 'All' or "Setup-failure" is used only for MF-SIG-ANA. Rest parameters are self-explanatory.

6.7. MODIFY HUNT GROUP OBSERVATION

Command MOD-HGP-OBS is used to modify hunt group observation :

MOD-HGP-OBS		MODIFY HUNT GROUP OBSERVATION
[ADD-HGP]	:	
[DEL-HGP]	:	
[DEL-ALL]	:	
OBS-TYP	:	TRF-OBS/SPE-OBS
[OBS-PRD]	:	
[STP-DTE]	:	
[STP-TME]	:	

6.8. MODIFY ROUTE OBSERVATION

Similarly command MOD-ROUT-OBS is used to modify rout observation. The parameters are as follows :

MOD-ROUT-OBS		MODIFY ROUT OBSERVATION
[ADD-ROUT]	:	
[DEL-ROUT]	:	
[DEL-ALL]	:	
[OBS-PRD]	:	
[STP-DTE]	:	
[STP-TME]	:	

6.9. MODIFY SUBSCRIBER OBSERVATION

The subscribers can be put under observation for 'originating calls', for 'terminating calls' or for both types of calls or for malicious call observation. When a subscriber is put under a specific observation (say for originating calls for a specific period, then Call Detail Records (CDRs) are made for that subscriber for each call of specific type (i.e originating) for which the period the subscriber has been put under observation. Such records are stored in the disk and can be displayed using MMC command (DISPL-CDR). The subscribers can be removed from the observation list using the same command. Both the functions (putting a subscriber under observation and removing another subscriber from observation) can be achieved simultaneously using the same command.

Against parameter "SUB-OBS", fill the type of observations under which the new subscriber line is to be put. The subscriber line can be put under observation for "Originating Calls", "Terminating Calls" and "Malicious Calls". This parameter can have multiple values, using '&' as a separator between two values. It is advised to create the subscriber without any type of observation as "NO-OBS" which is the default value. If a line is put under observation as ORG-OBS/TRM-OBS then call detail records are made for all such calls. These records can be displayed using "DISPL-CDR" command. Similarly if a line is put under observation for malicious calls and the subscriber invokes the facility during conversation, a malicious report, indicating the calling line is printed and also displayed on OOD.

MOD-SUB-OBS	MODIFY SUBSCRIBER OBSERVATION
[ADD-DIR]	:
[DEL-DIR]	:
[DEL-ALL]	:
SUB-OBS	:
[OBS-PRD]	:
[STP-DTE]	:
[STP-TME]	:

- i) Fill against [ADD-DIR] parameter, the desired DIRNOs which are to be put under observation.

Multiple values of DIRNOs can also be given against this parameter

- ii) Against [DEL-DIR] parameter, fill the DIRNOs which are to be removed from observation list.

- iii) Against parameter [DEL-ALL], fill the values 'YES' if all the DIRNOs under observation are to be removed from the observation otherwise default value (i.e. 'NO') can be given against this parameter.
- iv) Against parameter "SUB-OBS" fill the value 'OBS-ORG' or 'OBS- TRM' or 'MAL-OBS' as per requirement. This parameter is essential parameter.
- v) "OBS-PRD" parameter is a four field parameter represented as Month:Days:Hrs:Min. each of 2 digit.

On issuing the "MOD-SUB-OBS" command for putting the new subscribers under observation or for removing the subscribers from observation for specified observation period, the observation period has to be defined.

- vi) Fill the desired values (some valid values or default values) as per requirement against "STP-DTE" and "STP-TME" parameters for stopping the observation. "STP-DTE" parameter is a three field parameter in the format DD-MM-YYYY.

"STP-TME" parameter is a two field parameter in the form HH:MM where HH taking values from 1 to 23 and MM from 1 to 59 e.g. 16:10 which indicates (4:10 PM).

Note : In some cases, where it is desired that the caller should be identified in all the cases irrespective of the fact that subscriber has flashed or not, the terminating subscriber has to be put TRM-OBS & MAL-OBS. The call under detail record can be analysed for callers' identity.

6.10. TO DEACTIVATE (STOP) ONE OR MORE TRAFFIC REPORTS

If desired traffic reports are active, then for deactivating key- in "STOP-TRF-RPT" command and obtain the parameters on the screen.

STOP-TRF-RPT	STOP TRAFFIC REPORTS
RPT-TYP	:

Fill the desired traffic report(s) (which are to be deactivated) against "RPT-TYP" parameter.

6.11. DISPLAY A SPECIFIC TRAFFIC REPORT FOR SPECIFIC PERIOD FROM DISK

- i) For displaying the specific Traffic Report(s) for specific period, key-in "DISPL-TRF-RPT" command and obtain the parameters as shown below :

DISPL-TRF-RPT	DISPLAY TRAFFIC REPORT
RPT-ID	:
[FRM-DATE]	:
[TO-DATE]	:
[FRM-TIME]	:
[TO-TIME]	:
[MOD-NO]	:

- ii) Against parameter "RPT-ID", fill the desired value of traffic report which is to be displayed from the disk. Multiple values of Traffic Reports can also be given

The various values of RPT-ID include

- Switching network report for BM - This report gives information about the ICC (ICC-ITC) slots along with the TSC (TSC-ICC) slots for a BM having ISDN subscribers.
 - Bearer service report - This report includes information about the usage of various bearer services by ISDN subscribers.
 - Exchange performance report - Other values of RPT-ID parameter would be same for a both PSTN/ISDN subscribers and hence the output reports would be same.
- iii) Against parameter "FRM-DATE", fill the starting date from which specified traffic reports are to be displayed with the format dd-mm-yyyy. This parameter is optional. It takes the current date as default value when return key is pressed against this parameter.

Note :

Future date should not be given against this parameter.

- iv) Against parameter "TO-DATE", fill the desired value of date upto which information is required in the same format as from date. This parameter is also optional and it also takes current date as default value.

Note :

- a) "TO-DATE" should be greater or equal to "FRM-DATE".
- b) Future date should not be given against this parameter.
- v) Against parameter "FRM-TIME", fill the desired time since when traffic reports are to be displayed from disk.
- vi) Against parameter "TO-TIME", fill the desired value of time upto which traffic report(s) are to be displayed from the disk.
- vii) Fill the desired value(s) of module number(s), for which the traffic reports are to be displayed, against the "MOD-NO" parameter.

Note: In case of Trunk group reports, module number should be specified as "AM" (Admin. Module) as TGPs are assumed to belong to the exchange rather than module.

Note :

Unequipped/non-existing BM-Numbers should not be given.

- viii) Execute the command.

6.12. DISPLAY CALL DETAILED RECORDS

- i) For displaying the call detail records of specific type for a specific period, key-in "DISPL-CDR" command and obtain the parameters as shown below :

DISPL-CDR	DISPLAY CALL DETAILED RECORD
DIRNO	:
[CDR-TYP]	:
[FRM-DATE]	:
[TO-DATE]	:
[FRM-TIME]	:
[TO-TIME]	:

- ii) Against parameter "DIRNO", give the directory number of the subscriber whose call detailed records are to be displayed.
- iii) Against parameter "CDR-TYP", fill the types of CDRs which are to be displayed. Multiple values of CDR types can also be given.

Note :

While filling the value of "CDR-TYP" parameter, care should be taken that the given subscriber DIRNO should have been put under observation for preparing the same type of CDR as mentioned in "CDR-TYP" parameter.

- iv) Against parameter "FRM-DATE", fill the starting date from which specified types of CDRs are to be displayed. The value should be in format dd-mm-yyyy.
- v) Against parameter "TO-DATE", fill the desired value of date upto which information is required.
- vi) Against parameter "FRM-TIME", fill the desired time since when Call Detailed Records (CDRs) are to be displayed.
- vii) Against parameter "TO-TIME", fill the desired value time upto which CDRs are to be displayed.
- viii) Execute the command.

6.13. DISPLAY CURRENT TRAFFIC INFORMATION FOR A SPECIFIED SUBSCRIBER

- i) For displaying the current traffic information for a particular subscriber, key-in the command "DISPL-SUB-TRFINF" and obtain the following parameters.

DISPL-SUB-TRFINF	DISPLAY SUBSCRIBER TRAFFIC INFORMATION
[DMP-OPT]	:
[DIRNO]	:
[TEN]	:

- ii) Against parameter "DMP-OPT", fill the value 'YES' if traffic information being displayed is to be dumped onto the disk, otherwise default value 'NO' can be given on pressing 'RETURN' key. This is an optional parameter.
- iii) Against "DIRNO" parameter, fill the directory number of a subscriber for which current traffic information is required. This is an optional parameter. Default value can also be given if desired.

Note :

The DIRNO should have been created and it should not be in the frozen list.

- iv) Against parameter "TEN", fill the value of desired TEN for which current traffic information is to be displayed.

Note :

Either 'DIRNO' or 'TEN' must be given. Both parameters should not be assigned with default/non-default values. It is possible to give a range or multiple values for DIRNO and TENS.

- v) Execute the command.

After displaying this current traffic information for specified subscriber, the counters used for displaying the traffic information are reset to zero. The traffic information in these counters is getting accumulated till this command "DISPL-SUB-TRFINF" is issued again. These counters are getting reset at 00:00 hrs. automatically.

6.14. DISPLAY CURRENT TRAFFIC INFORMATION ON THE SPECIFIED TRUNK/TRUNK GROUP

- i) For displaying current traffic information on a specific trunk in a trunk group or on all trunks in a specified trunk group, key-in "DISPL-TRK-TRFINF" command and obtain the parameters as shown below :

DISPL-TRK-TRFINF	DISPLAY TRUNK TRAFFIC INFORMATION
[DMP-OPT]	:
[TGP-NUM]	:
[TEN]	:

- ii) Against parameter "DMP-OPT", fill the value 'YES' if traffic information being displayed is to be dumped on to the disk, otherwise default value 'NO' can be assigned.
- iii) Against "TGP-NUM" parameter, fill the trunk group number on whose trunks current traffic information is required.

Note :

The trunk group number should have been created.

- iv) Against parameter "TEN", fill the value of TEN of a desired trunk in a trunk group for which traffic information is to be displayed.

Note :

Either "TGP-NUM" or "TEN" must be given. Both parameters should not be left for taking default values. In case both are mentioned then TEN value should be member of the trunk group stated.

After displaying this current traffic information for specific trunk or for all trunks of a specified trunk group, the counters displaying the traffic information are reset to

zero. The traffic information in these counters is getting accumulated till this command "DISPL-TRK-TRFINF" is issued again. These counters are getting reset at 00:00 hrs automatically.

6.15. DISPLAY MF SIGNALLING ANALYSIS INFORMATION

For displaying MF signalling analysis report of trunks which are under MF signalling analysis observation. Key in the command DISPL-MFSA-INF and obtain parameters on the screen as shown below.

DISPL-MFSA-INF	DISPLAY MF-SIGNALLING ANALYSIS INFORMATION
[TEN]	:
[TRK-OBS]	:
[OBS-FILT]	:
[FRM-DATE]	:
[TO-DATE]	:
[FRM-TIME]	:
[TO-TIME]	:

Note:

For MF-signalling analysis report of a trunk, the trunk should be in MF signalling observation. For that use command "MOD-TRK-OBS"

- i) Against parameter TEN give the terminal equipment number which is under MF signalling observation. Range/multiple TEN as also allowed.
- ii) Against parameter TRK-OBS give the default value i.e. MF-SIG-ANA.
- iii) Against parameter OBS-FILT give the default value i.e. ALL.
- iv) Against parameter FRM-DATE specify the date from which MF signalling analysis report is required. The format to this input parameter is

"DD-MM-YYYY"

where DD indicates day number

MM indicates month in a year

YYYY indicates year

Note:

- i) Future dates are not accepted.
- ii) Against parameter TO-DATE specify the date upto which MF signalling analysis report is required. The format of this parameter is same as FRM-DATE. This is default parameter having default value as current date.

Note:

- 1. TO-DATE should be greater or equal to FRM-DATE
- 2. Future dates are not accepted.
- iii) Against parameter FRM-TIME specify the time from which MF signalling analysis report is required. This is default parameter having default value as 00:00 which when given means that MF signalling information will be displayed from 00 hrs of the specified date. The format to input this parameter value is HH:MM

where HH indicates Hours

MM indicates Minutes

- iii) Against parameter "TO-TIME" specify the time (in the same format as specified in FRM-TIME) upto which MF signalling analysis is to be displayed. This is also default parameter having current time as default value.

Chapter 7.

Billing Admin. and Billing Cycle/Billing Data Backup/Restoration Procedure

7.1. GENERAL

This chapter describes the procedure to set the system time, day type, like Sunday, Weekday etc., type of the day i.e. setting tariffs at various periods of the day, tariff rates for various routes and special services and obtain a detail billing record of the subscribers.

It also deals with the format of the billing cycle, commercial billing record which are to be generated and sent for post processing. Backup and Restoration procedure for Billing Cycle (bc) and Billing Data (bd) are also mentioned in this chapter.

7.2. BILLING ADMINISTRATION DISPLAY COMMANDS

7.2.1. Charge Meter Display of Subscriber (DISPL-SUB-MTR)

To know the current meter reading of a particular subscriber, issue the command 'DISPL-SUB-MTR' and obtain the parameters shown below

DISPL-SUB-MTR	DISPLAY SUBSCRIBER'S LATEST METER INFORMATION
[DIRNO]	:
[TEN]	:

Key in the subscriber directory number or the Terminal equipment number. It will display the following details.

Display Subscriber's Latest Meter Information		
Directory Number	=	
Terminal Equipment Number	=	
DIRECTORY NUMBER TYPE	=	NRML
Local Counter	=	
STD Counter	=	
STD Calls	=	
ISD Counter	=	
ISD Calls	=	
BULK CNTR	=	

7.2.2. Charge Meter Display of Trunk Group (DISPL-TGP-MTR)

By using this command, the meter counters of a TGP is displayed. The output display gives the information about Local Calls, STD Calls and ISD Calls. Multiple values are not accepted for the parameter TGP-NO and the command is to be used repeatedly to display the meter counters for each trunk groups. Flexibility is provided to know the TGP-meter at any past date also.

7.2.3. Display of Revenue Generated by the Exchange (DISPL-XCHG-MTR)

It is possible to monitor the revenue generation by the exchange for a specific duration. The monitoring of revenue generation is possible for each type of revenue as:

- i) Revenue generated by its own subscribers when used as Local Exchange (LCL)
- ii) Revenue generated by satellite ie. parented exchanges when used as TAX Exchange (TAX)
- iii) Revenue generated by the exchange when used as ILT exchange (ILT) (i) and (ii).

The report also gives the break up of each type of revenue as Local, STD and ISD calls.

DISPL-XCHG-MTR	DISPLAY EXCHANGE METER
FRM-DATE	:
TO-DATE	:
[REV-TYPE]	:

The command is executed successfully only when formatted files are available for the two dates being specified.

Note :

The command operates on the formatted files, available in the Active IOPs. If the command FMT-BLG-CNTR is being executed through calendar (see note in section 8.1), the command should be executed from INS-ACTIVE IOP.

7.2.4. Billing Observation for Trunk Groups

For adding/removing the trunk group under detail billing observation, key in the respective command ADD-TGP-BLG/REM-TGP-BLG and obtain the parameters on the screen as shown below:

REM-TGP-BLG	REMOVE TRUNK GROUP FROM DETAILED BILLING
[TGP-NUM]	:
[TGP-NAME]	:

ADD-TGP-BLG	ADD TRUNK GROUP UNDER DETAILED BILLING
[TGP-NUM]	:
[TGP-NAME]	:

- i) Against parameter TGP-NUM give number of the TGP which is to be added/deleted from billing observation
- ii) Against parameter TGP-NAME give the name of the TGP which is to be added/deleted from billing observation.

Note : Either TGP-NUM or TGP-NAME should be given not both.

iii) Execute the command.

7.2.5. **Format Billing Counters (FMT-BLG-CNTR)**

To format the billing counter dumps before they are transferred onto the tape, issue the command 'FMT-BLG-CNTR'. Give the input value for FMT-TYPE : ALL or SUB or TGP and then press 'e' to execute the command. In the report the system would display the list of files formatted and the files that cannot be formatted. This command should be given daily in the exchange.

7.2.6. **Report Billing Counter (REPORT-BILL-CNTRS)**

To generate the report of the billing counters for a set/range of subscribers or a single TGP, issue the command 'REPORT-BILL-CNTRS' and obtain the following format on the screen.

REPORT-BILL-CNTRS	GENERATE BILLING COUNTER REPORT
REP-TYP	:
[DIRNO]	:
[TGP-NO]	:
[TGP-NAME]	:

- ◆ REP-TYP is having two options (1) SUB (2) TGP. Give one of values which is required.
- ◆ [DIRNO] : if 'SUB' is given in REP-TYP, give the DIRNO or range of DIRNOs.
- ◆ [TGP-NO] : If 'TGP' option is given in REP-TYP, give the required TGP-NO for which report is required. Range of TGP Nos is not allowed.
- ◆ [TGP-NAME] : If TGP-NO is given default value, give the TGP-NAME. Both default values of TGP-NO and TGP-NAME is not allowed if TGP option is given in REP-TYP. Both values TGP-NO and TGP-NAME are also not allowed.

7.2.7. **Interrogate Detailed Billing Record (DISPL-BILL-REC)**

This command is used to display the information related to detail billing records for subscribers of its own exchange, subscribers of other smaller exchange (CAMA records) or for trunk groups. Only one type of records can be displayed at a time by selecting the parameter DBLG-TYP with possible

values as SUB, TGP or CAMA. It is also possible to filter out the billing records, crossing the charge units, specified in parameter CHG-THRS. It is possible to display the records for less than 60 days by executing the command once. To display it for 60 or more days, the command has to be executed repeatedly.

Also it is possible for the administrator to display the billing records (subscriber or CAMA) for one subscriber or all the subscribers of a particular level. This is possible by using the parameter DIR-DGTS, specified as 54815*. In this case, all the records for subscribers 548150 to 548159 are displayed assuming the numbering plan as 548XXX. Similarly, in case of CAMA records, if the parameter is defined as 0XXXX683* then all the records of exchange with area code 0XXXX for subscribers 68300 to 68399 will be displayed.

It is recommended not to use more than 100 calling numbers at a time. Also if it is selected for 100 numbers, the period should be limited to 15 days to avoid large response time.

Note : CAMA records and detail bill records for TGP are generated only when TGP is under billing observation using ADD-TGP-BLG command.

DISPL-BILL-REC	DISPLAY BILLING RECORD OF A SUBSCRIBER/ TRUNK GROUP
FDATE	:
[TDATE]	:
FRM-TIME	:
[TO-TIME]	:
DBLG-TYP	:
[CHG-THRS]	:
[DIR-DGTS]	:
[TGP-NUM]	:

A sample output report is listed below :

Directory Number = 5483086

Normal Billing Record

DATE	TIME (hh:mm:ss)	CALLED PARTY	CHRG DURN (mm:ss)	CHRG UNITS	BS
14-5-1997	10:55:00	0224723451	00:30	22	BS1
14-5-1997	11:00:00	0445325410	00:15	10	BS3
14-5-1997	11:50:00	0334056130	00:42	35	BS2

Diverted Calls Billing Record

DATE	TIME hh:mm:ss	CALLED PARTY	CHRG-DURN (mm:ss)	CHRG-UNITS	BS
14-5-1997	11:55:10	4723453		22	BS1

Special Services Billing Record

DATE	TIME hh:mm:ss	DIALLED DGTS	ACT-TYP	FAC-TYP	CHRG UNITS
14-5-1997	11:55:10	1161230	ACT	ALARM	2

7.2.8. Interrogate Commercial Billing Records

To interrogate the contents of all commercial billing records corresponding to a specific time, issue the command DISPL-COM-BILL and obtain the following parameters on the screen.

DISPL-COM-BILL	DISPLAY COMMERCIAL BILLING RECORD
FDATE	:
[TDATE]	:
COM-TYP	:
[DIRNO]	:
[TGP-NUM]	:
[TGP-NAME]	:

- i) COM-TYP : This field is having two options (1) SUB and (2) TGP.
- ii) DIRNO : If the COM-TYP is given as SUB, give the DIRNO for which commercial billing record is required.

- iii) [TGP-NUM] : If the TGP option is given in 'COM-TYP' give the value of TGP-NO for which commercial billing is required.
- iv) [TGP-NAME] : TGP-NAME or TGP-NUM give one of the values if COM-TYP = TGP.

In response to successful execution, the system will display the following details for a commercial bill records of a subscriber. The information will be different for a commercial bill record of TGP.

Display Commercial Bill Report	
Date	:
User Name	:
Time	:
Operation Type	:
Operation Mode	:
Directory Number	:
Terminal Equipment Number	:
Facility Originating	:
Facility Terminating	:
Local Counter	:
STD Counter	:
STD Calls	:
ISD counter	:
ISD Calls	:
Bulk CNTR	:

7.2.9. Interrogate Day Types of the Year (DISPL-DAY-TYP)

To know the day types of the year issue the command DISPL-DAY-TYP. The output will be displayed as follows :

DISPLAY DAY TYPES REPORT																
DAYNUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TYPE OF DAY	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2
DAY NUMBER	352	354	355	356	357	358	360	361	362	363	364	365	366			
TYPE OF DAY	2	2	2	2	1	2	2	2	2	2	1	2	-1			

7.2.10. Interrogate the Traffic Zones for a Day Type (DISPL-TYP-DAY)

- ◆ Issue the command DISPL-TYP-DAY to display the time periods and corresponding Tariff classes for all types of days. The output will be displayed as follows :

DISPLAY TYPE DAY INFORMATION			
TYPE OF DAY = 1			
START TIME	END TIME	TARIFF CLASS	ROUTING INF
0000	0600 hrs	4	NOT BARRED
0600	0700 hrs	3	NOT BARRED
0700	2030 hrs	2	NOT BARRED
2030	2300 hrs	3	NOT BARRED
2300	2400 hrs	4	NOT BARRED
TYPE OF DAY = 8			

7.2.11. Interrogate the Information on Charge Rate Number (DISPL-CRG-RTN)

- ◆ To display various charging parameters associated with the given charge rate number for all the eight Tariff classes give the command 'DISPL-CRG-RTN'
- ◆ Key in the charge rate number e.g. '6' and press 'e' to execute the command. The output will be displayed as follows :

CHARGE RATE NUMBER = 6

CHARGE BAND NUMBER = 16

SRV-TYPE = BS1

TRF CLS	INI CRG (units)	CRG PRD (hms)	PRD CRG (units)	CRG MODE	MET INFO	ANS INFO	RING INFO	BEEP-INFO
1	1	20	1	PRD-LCL	MTRD	ANS-XP	NMR-RING	NO-BEEP
2	1	40	1	PRD-LCL	MTRD	ANS-XP	NMR-RING	NO-BEEP
3	1	60	1	PRD-LCL	MTRD	ANS-XP	NMR-RING	NO-BEEP
4	1	80	1	PRD-LCL	MTRD	ANS-XP	NMR-RING	NO-BEEP

Note:

Only one BS1 is displayed here but the charge rate number displays the information for BS2 and BS3 also.

7.2.12. Interrogate Charge Units for Special Service (DISPL-SSRV-CRG)

- ◆ Issue the command 'DISPL-SSRV-CRG' to know the charge units for different modes of a given service code e.g. activation, deactivation verification.
- ◆ Key in the service type e.g. for a facility for which charge rate units are to be displayed for different modes.
- ◆ The system would display in the following format. The output will display the units to be charged for activation/deactivation or as usage for that facility. For example;

DISPLAY SPECIAL SERVICE CHARGE			
SERVICE NAME	ACT-CRG	DCT-CRG	USE-CRG
DNA-FIXED-NUM-ACT	2	0	1

7.2.13. Interrogate Charge Band Number to Charge Rate No. Association (DISPL-CHB-CRG)

- ◆ Issue the command 'DISPL-CHB-CRG' to know the charge rate numbers associated with a given charge band number.
- ◆ Key in the charge band number & execute the command.
- ◆ System would display the charge rate no. associated with the given charge band no. in the following format.

DISPLAY CHB-CRG ASSOCIATION	
CHARGE BAND NUMBER	CHARGE RATE NUMBER
1	0
	2
	4
	5

7.3. BILLING ADMINISTRATION UPDATE COMMANDS

7.3.1. Modify Day Type (MOD-DAY-TYP)



WARNING

This command should be executed on 1st January and 1st July of every year.

To modify or initialise "day typ" of one or more days of the year key in the command

MOD-DAY-TYP	MODIFY DAY TYPE
DAY-TYP	:
[WEEK-DAY]	:
[DAY-NUM]	:

- i) Against parameter day type (DAY-TYP) key in the desired value between 1 to 8. This value will define the type of days.
- ii) Against parameter days of week (WEEK-DAY) give the required value. Possible values are ALL/SUN/MON/TUE/WED/THU/FRI/SAT/NONE.

- iv) Against parameter number of the day (DAY-NUM) give value 1 to 366. This will define the number of the day e.g. January 1 is the day number 1 & February 3 will be day number 34.
- v) Execute the command. Response will display parameter values as inputted.

7.3.2. **Modify Type Day (MOD-TYP-DAY)**

To initialise or modify time schedules and corresponding tariff – class for a given type of day, key in the command

```
MOD-TYP-DAY      MODIFY TYPE DAY

DAY-TYP =1
PRD-TRF = 0000-4-NB&0600-3-NB&0700-2-NB &0900-1-NB&1900-2-NB&2030-3-NB&23-
4-NB
E/R/T
```

- i) Against parameter day type (DAY-TYP) key in the desired value between 1 to 8. The value will define the type of day.
- ii) Parameter PRD-TRF has 3 fields
 - i) Start time of a period. (It may have any value between 0000 to 2359)
 - ii) Tariff class applicable during the period. (It may have any value between 1 to 16)
 - iii) Routing information : Calls during this period to be barred or not to be barred (possible values are B or NB) on some routes.
 - iv) Multiple values can be given to `PRD-TRF' parameter for defining various tariff classes corresponding to different time zones. `&' can be given between two values.
 - v) Execute the commands

The output will be displayed as follows :

MODIFY TYPE DAY INFORMATION			
TYPE OF DAY	=	1	
[
START TIME	END TIME	TARIFF CLASS	ROUTING INF
0000 hrs	0600hrs	4	NOT-BARRED
.	.	.	.
.	.	.	.
.	.	.	.
]

7.3.3. Modify Existing Charge Rate Number/Creation of New Charge Rate Number (MOD-CRG-RTN)

To modify the charge rate number for a given Tariff class issue the command MOD-CRG-RTN and obtain the following parameters on the screen.

MOD-CRG-RTN	MODIFY CHARGE RATE NUMBER
CRG-RTN	:
TRF-CLS	:
[SRV-TYP]	:
INI-CRG	:
PRD-CRG	:
CRG-PRD	:
CRG-MOD	:
RUT-INF	:

- ◆ Key in the charge rate number for which the definition has to be modified, and press 'return'.
- ◆ Key in the tariff class for which change rate number definition has to be modified.
- ◆ Key in the modified values and press 'e' to execute the command.

Note :

- ◆ A Charge Rate Number can be modified only after breaking its association with Charge Band Number using command MOD-CHB-CRG.
- ◆ If charge rate number definition is to be modified for all the tariff classes, then command is to be executed separately for all tariff classes one by one. In one command execution, the charge rate number definition can be modified for one tariff class only.

7.3.4. Modify Charge Rate to Charge Band Association (MOD-CHB-CRG)

For modifying the charge rate and charge band association key in the command

MOD-CHB-CRG	MODIFY CHARGE BAND-CHARGE RATE NUMBER ASSOCIATION
OPR-TYP	:
CRG-BND	:
[CRG-RTN]	:

- i) Against parameter Operation Type (OPR-TYP) give value of operation e.g. creation of Charge Band (CRE-CHB), association of Charge Rate Number (ASSCT-CRN), Disassociation of Charge Rate Number (DASSCT-CRN) or Deletion of Charge Band (DEL-CHB).
- ii) Against parameter Charge Band (CRG-BND) give the value of desired charge band number for which the mentioned operation is to be done.
- iii) Against parameter Charge Rate Number (CRG-RTN) give the value of desired Charge Rate Number for which the mentioned operation is to be done.

7.3.5. Modify Special Service Charge (MOD-SSRV-CRG)

To modify the special service charges issue the command

MOD-SSRV-CRG	MODIFY SPECIAL SERVICE CHARGE
SERVICE	:
[ACT-CRG]	:
[DCT-CRG]	:
[USE-CRG]	:

- i) Against parameter service, define the service for which service charge is required to be modified.
- ii) Against parameter activation charge (ACT-CRG) give no. of charge units which are to be charged on activation of facility.
- iii) Against parameter deactivation charge (DCT-CRG) give the no. of charge Units which are to be charged on deactivation of facility.
- iv) Against parameter use charge (USE-CRG) give the no. of charge units which are to be charged on use of the facility.

7.3.6. Defining Charging for Local Calls (MOD-SUB-CRG)

In Bare Minimum Data Cartridge (BMDC) the fixed charging is defined corresponding to all the calling category (1 to 64) and called category (1 as the subscriber category is 1). This can be displayed using DISPL-SUB-CRG command. The value can be modified to 3 min, 5 min metering or any pulse rate decided by the administrator using the command MOD-SUB-CRG by defining the various parameters as follows:

MOD-SUB-CRG	MODIFY SUBSCRIBER CRG-RTN
CLNG-CAT	: 1
CLLD-CAT	: 1
[CRG-RTN]	: Desired charge Rate Number of specific pulse rate as required.

Note :

The command has to repeated for all the combinations of calling and called categories, one by one if different charge rate number is required for these categories.

7.3.7. Local Calls Barring between RSU and Main Exchange Subscribers

If RSUs & main exchange are at different area codes (STD codes) then provision exists to bar subscribers of main exchange to dial RSU subscribers through local exchange code of RSU. They can dial through area code of RSU only. The same is the case when subscribers of RSUs dial subscribers of the main exchange.

This provision can be made applicable by programming the proper data in the exchange. When calls from main exchange subscribers with local access are to be barred to RSU subscribers and vice versa then "INVALID" is to be specified against the Charge Rate Number (CRG-RTN) parameter for desired calling category and called category using MOD-SUB-CRG command.

For this, RSU BMs are to be assigned different categories as compared to main exchange BMs. For example, if all the BMs of main exchange has been assigned category 1 and RSU BM has been assigned category 2 then use following command:

```
MOD-SUB-CRG
CLNG-CAT      =      1
CLLD-CAT      =      2
[CRG-RTN]     =      INVALID
```

With the execution of above command, the calls from main exchange subscribers to RSU subscribers will not be allowed by dialling through local exchange code.

Similarly with the execution of following command, the calls from RSU subscribers to main exchange subscribers will not be allowed by dialling through local exchange code.

MOD-SUB-CRG			
CLNG-CAT	=	2	
CLLD-CAT	=	1	
[CRG-RTN]	=	INVALID	

7.3.8. Charging for ORD-CCB lines ie., Local PCOs

The charging of calls originated from CCB lines are governed by the system parameter PCO-MTR-LCL. In BMDC fixed charging is defined against this parameter. The calls from Local PCOs are disconnected after a predefined period as specified by system parameter "CCB-CALL-DUR". This parameter

(CCB-CALL-DUR) can be set to 3 min. or 5 min. or any other desired value using MOD-SYS-PARAM command.

7.3.9. Charging for Non-Metered Lines

The charging of calls getting terminated on non-metered lines are governed by the system parameter NON-MTR-LCL. Default value is defined in the BMDC which can be modified by the Exchange Administrator.

7.3.10. Charging for Incoming Terminating (IC-TRM) Calls

Normally the charging responsibility is of the originating exchange but if originating exchange is not an intelligent exchange and can not generate periodic pulses locally then in that case the terminating exchange has to generate periodic pulses as desired and are sent to originating exchange for incrementing the meter of originating subscribers. In such cases for charging incoming terminating calls, desired charge rate number can be specified using MOD-SUB-CRG command by specifying "Calling Category" as the category of the incoming trunk on which the incoming terminating calls are coming and "Called Category" as the category of the terminating subscriber. The category of a subscriber is same as that of a BM to which he belongs. In this case the charge rate number should have "initial charge" as `0' because originating exchange will increment the meter of the calling subscriber by 1 unit on receiving the ANSWER.

7.3.11. Charging for Transit (IC-OG) Calls

In case of transit calls if periodic pulses are to be generated by transit exchange and are to be sent to originating exchange then desired charge rate number having "initial charge = 0" should be specified in the desired route against the category of the incoming trunk on which transit calls are coming.

7.3.12. Charging for Outgoing (ORG-OG) Calls

For outgoing calls originated from C-DOT SBM/MBM exchange, the desired charge rate number having "initial charge = 1" should be specified in the desired route against the category of the subscribers.

7.4. BILLING BACKUP PROCEDURE

The files related to billing which should be backedup are:

- a) Counter Dumps
- b) Formatted billing Counter files
- c) Commercial Billing Record files
- d) Call Detail Billing Record files

There are two types of backups

- i) Billing Cycle (bc)
- ii) Billing Data (bd)

During Billing Cycle backup, following files are backed up

- a) Formatted billing counter files
- b) Commercial billing record files
- c) Call detail billing record files

During Billing Data backup, following files are backed up

- a) Counter dumps
- b) Commercial billing record files
- c) Call detail billing record files

Billing cycle backup is taken every 15 days, i.e. on 16th & 1st of every month. Formatted billing counter files are generated by giving the command "FMT-BLG-CNTR" on 15th & last day of the month. If billing cycle is of two months then on 16th backup is taken from 1st to 15th day of the month and on 1st of 2nd month, backup is taken from 1st day to last day of 1st month and 16th of 2nd month, backup is taken from 1st of 1st month to 15th day of 2nd month and on 1st day of 3rd month, backup is taken from 1st day of 1st month to last day of 2nd month (i.e. complete billing cycle of two months). Two copies will be made for the cartridge in which backup is taken for complete billing cycle. One cartridge will be sent to billing centre and other cartridge will be kept at exchange. The command used for 'bc' backup is explained in section 7.4.2.

Billing data backup is taken daily. Command used is explained in 7.4.1.

7.4.1. Billing Data Backup Procedure (Daily Backup of Billing Data)

Billing Data backup is taken everyday. This is essentially required only in case of exchange crash. The last billing data is then loaded in the system to start afresh.

Three cartridges are required to keep billing data backup to ensure that on any day billing data for the previous three days is available. Let us call these cartridges as A, B and C. For taking billing backup on 14th May, 1999, issue the command COPY-OUT and obtain the following parameters on the screen:

COPY-OUT	COPY SPECIFIED FILES AND FILE GROUPS ONTO TAPE	
VOL-NAME	:	bd1405
EXP-DATE	:	16-5-1999
[PROT]	:	NO-PROT
[BACK-OPT]	:	NO-OPT
[FILE]	:	NIL
[FGP]	:	bd {1-5-1999 -> 14-5-1999}

- ◆ Against the parameter volume name, **bd** stands for Billing Data and 1405 represents day and month.
- ◆ Against the parameter [Expire date] EXP-DATE, 16th May is given so that the tape is not over written on or before that date.
- ◆ The parameters protection [PROT], [BACK-OPT] and [FILE] should have default value.
- ◆ Against the parameter [FGP] file group, the details should be input in the format shown above. The **bd** stands for Billing Data. The other entry {1-5-1999->14-5-1999} is the starting and end dates. This will copy the latest counter dump, detail billing files for 1-5-1999 to 14- 5-1999 and commercial billing records as on the 14th May 1999
- ◆ On 15th May 1999, using cartridge B for backup and with FGP = bd {1-5-1999 -> 15-5-1999} 'issue the command' 'COPY-OUT'. On 16th May 1999, using cartridge C for backup and with FGP = bd {1-5-1999 -> 16-5-1999} 'issue the command' 'COPY-OUT'.
- ◆ This procedure is to be followed upto 16th of every month. From 17-5-1997 onward backup is to be taken with FGP bd {16-5-1999 -> 17-5-1999}. This will continue till the 1st of next month, so on 1-6-1999, FGP will be bd {16-5-1999 -> 1-6-1999}

This procedure is repeated for subsequent billing cycles to ensure that

- i) The meter counters are available for previous three days.
- ii) Detail bill records are always available for all the days of current billing cycle.

7.4.2. Billing Cycle Back Up Procedure

Normally Billing Cycle (bc) backup is taken after every 15 days as per procedure explained in this section. Here command used for 'bc' backup is explained for taking the back of complete billing cycle of two months.

Billing cycle is of 60 days (say from 1st April 99 to 31st May 99). Three cartridges are required to keep billing cycle backup for six months. Let us call these cartridges as A, B and C.

- ◆ For taking billing backup on 1st April, 1999, issue the command COPY-OUT and obtain the following parameters on the screen :

COPY-OUT	COPY SPECIFIED FILES AND FILE GROUPS ONTO TAPE
VOL-NAME	: bc0104
EXP-DATE	: 01-10-1999
[PROT]	: NO-PROT
[BACK-OPT]	: NO-OPT
[FILE]	: NIL
[FGP]	: bc {1-2-1999 -> 31-3-1999}

- ◆ Keyin the values against the parameters as shown above which means as follows :
- ◆ Against the parameter volume name, **bc** stands for Billing Cycle and 0104 represents day and month.
- ◆ Against the parameter [Expire date] EXP-DATE 1st Oct. is given so that the tape is not over written before that date, which is also the due date for its usage.
- ◆ Against the parameter protection [PROT], [BACK-OPT], [FILE] press 'return' to take default value.
- ◆ Against the parameter [FGP] file group, details should be keyed in the format shown above; in which **bc** stands for Billing Cycle. The other entry {1-2-1999→ 31-3-1999} is the starting and end dates.
- ◆ Press 'e' to execute the command. This will copy the detail billing files for 1-2-1999 to 31-3-1999 and commercial billing record file as on the 31st March 1999 and formatted counters files as 31st March 99.
- ◆ On 1st June 1999, using cartridge B for backup and with fgp **bc** {1-4-1999 - > 31-5-1999} 'issue the command' COPY-OUT'.
- ◆ On 1st Aug 1999 using cartridge C for backup and with fgp **bc** {1-6-1999 -> 31-7-1999} 'issue the command' 'COPY-OUT'.
- ◆ This procedure is continued. depending upon the decision of the exchange administrator and availability of the cartridge, if it is required to keep the back for 6 latest months. On 1st Oct 99, cartridge A can be used to take the backup from 1-8-99 to 30-9-99.

Note :

- Above example is for a billing cycle of 60 days. If the billing cycle is of 30 days, the dates are modified accordingly.
- It should be ensured that FMT-BLG-CNTR is executed one day before taking the backup.

7.4.3. **Billing Restoration (COPY-IN)**

In case of disk crash, the billing data which has been backed up is to be restored back. This will lead to loss of some information depending upon how old the backed up data is. The procedure to be followed is as follows

- Before restoring the Billing data, the exchange data should have been restored from the backup.
- The Billing daily backup is to be used and the tape to be used is of previous day backup or backup of current day if available.
- To restore the billing data from backup of 15th APRIL, issue the command and values as shown below :

< copy-in: vol-name=BD1504, files=*

This command will restore all files copied on the tape. As the vol- name is bd1504 the command should restore system to the counter file copied onto tape will be the counter file to be loaded on next system data initialization. The detail record from 1 to 15th APRIL will be restored.

- On next system initialization, the billing data of system will be same as on 15th APRIL when this backup was taken.

Chapter 8.

Calendar, Password/Security & Back-up Operations

8.1. CALENDAR MANAGEMENT

Some commands like generation of traffic reports, testing of lines and trunk circuits etc. needs to be performed at regular intervals of time. To perform such activities the command can be put in the calendar - mentioning the name of the command, filling its parameters, such as details of the periodicity, number of times the command has to be executed and form of the output - and obtain the reports. This chapter details the procedure of using these commands.

Note :

If the command FMT-BLG-CNTR is executed through calendar, the formatted counter files are always generated **only** on INS-ACT IOP irrespective of the IOPs where calendar entry command is executed.

8.1.1. Add an Entry in the System Calendar

- i) For adding an entry into the system calendar, key-in the command "ADD-CAL" and obtain the parameters on the screen as shown below by pressing 'RETURN' key :

ADD-CAL	ADD AN ENTRY INTO SYSTEM CALENDAR
ST-DATE	:
ST-TIM	:
[PER-DAY]	:
[PER-TIM]	:
[ON-WEEKS]	:
[ON-DAYS]	:
[NO-TRIG]	:
[EN-DATE]	:
[EN-TIM]	:
COMMAND	:

- ii) Against parameter "ST-DATE", fill the date on which first trigger is to be given. It is a three field parameter in the format DD- MM-YYYY.

Note :

Start date can be given maximum upto one year in advance. For example, if current date is 21-05-1995 then maximum value of start date which can be given is 20-05- 1996.

- iii) Against parameter "ST-TIM", fill the value of start time at which first trigger is to be given. It is a two field parameter in the format HH:MM where HH takes the values form 0 to 23 and MM from 0 to 59.

Note :

If 'Start date' is current date then start time (ST-TIM) given should be greater than the current time by at least a gap of 5 minutes.

- iv) Against parameter "PER-DAY", fill the interval (in days) at which trigger is to be given. This is an optional parameter. Default value (i.e.'0') can also be given by pressing 'RETURN' key against this parameter. The procedure for giving 'default value' is same for each parameter.

- v) Against parameter "PER-TIM", fill the interval (in Hour: Minutes) at which trigger is to be given.

Note :

The effect of parameters "PER-DAY" & "PER-TIM" is combined to decide the periodicity at which triggers are to be given.

For example, if "PER-DAY" is given as '1' and "PER-TIM" is given as '0:10', then periodicity for sending triggers will be one day+10 minutes (i.e. 1450 minutes).

- vi) Against parameter "ON-WEEK", fill the weeks of a month during which the trigger is to be given. For multiple values, '&' is to be used as separator between the two values. Default value (i.e. 'ALL') can also be assigned if desired. Weeks are numbered as 1, 2, 3, 4 and 5.

- vii) Against parameter "ON-DAYS", fill the days of a week during which the trigger is to be given. Multiple values can also be given by using '&' as a separator between the two values. Default value (i.e. 'ALL') can also be given if desired.

- viii) Against parameter "NO-TRIG", fill the number of times the trigger is to be given. The maximum value which can be given is 32,000. The default value for this parameter is '1' which can also be given if desired.

Note :

Either the number of triggers are to be defined or End date and time. If both are defined then 'End date' overrides the number of triggers

and in this case number of triggers are calculated based on 'start date & time', and 'end date & time' and the periodicity.

- ix) Against parameter "EN-DATE", fill the date on which last trigger is to be given. The structure for this parameter is same as of "ST-DATE" parameter. This is an optional parameter.
- x) Against parameter "EN-TIM", fill the time at which last trigger is to be given. The structure of this parameter is same as of "ST-TIM" parameter. This is an optional parameter. Default value can also be given if desired.
- xi) Against parameter "COMMAND", give the "CRP" command which is to be executed by the calendar.
- xii) Press 'e' to execute the command. After execution the format of the command which is being put in the calendar, will be displayed on the screen. Fill all the parameters of the command as desired and execute this command. Get the response of the 'ADD-CAL' command after successful execution. During execution of command, system assigns "USER-ID", "SES-ID" and "JOB-ID" which will be displayed in the response. 'USER-ID', 'SES-ID' and 'JOB-ID' can be noted down for modifying and deleting these entries. The entry in the calendar will be identified by session and job identification numbers.

8.1.2. Modify an Entry in The System Calendar

- i) For modifying an entry in the calendar, key-in command "MOD- CAL" and obtain the parameters on the screen as shown below :

MOD-CAL	MODIFY AN ENTRY IN SYSTEM CALENDAR
SES-ID	:
JOB-ID	:
ST-DATE	:
ST-TIM	:
[PER-DAY]	:
[PER-TIM]	:
[ON-WEEKS]	:
[ON-DAYS]	:
[NO-TRIG]	:
[EN-DATE]	:
[EN-TIM]	:

- ii) The entry in the system calendar is identified by the session and job identification numbers which has been assigned during addition of an

entry into the system calendar. So against parameter "SES-ID", key- in the session identification number of the entry which is to be modified.

- iii) Against parameter "JOB-ID", key-in the job identification number of the entry which is to be modified.
- iv) Other parameters are having same structure as in "ADD-CAL" command. They can be filled as per requirement. Execute the command and get the response as inputted.

8.1.3. Delete an Entry in the System Calendar

- i) For deleting an entry in the system calendar, key-in the command "DEL-CAL" and obtain the parameters on the screen as shown below :

DEL-CAL	DELETE AN ENTRY FROM SYSTEM CALENDAR ENTRY
SES-ID	:
JOB-ID	:

- ii) Against parameter "SES-ID", fill the session identification number (assigned by system during addition of the entry in the calendar) of the entry which is to be deleted from the calendar.
- iii) Similarly against parameter "JOB-ID", fill the job identification number (assigned by the system during addition of the entry in the calendar) of the entry to be deleted from the calendar.
- iv) Execute the command and get the detailed information about the deleted entry in the response.

8.1.4. Display Entries in Calendar

- i) For displaying entries made in the calendar on specific date, key- in command "DISPL-CAL" and obtain the parameter on the screen as shown below :

DISPL-CAL	DISPLAY AN ENTRY OF SYSTEM CALENDAR
[DATE]	:

- ii) Against parameter "DATE", fill the date corresponding to which entries made in the calendar are to be displayed. Future dates are not accepted.

- iii) Execute the command and get the response. Response will display all the entries made in the calendar on the specified dates along with the user identification, session identification numbers.

8.1.5. Display the List of All Commands Scheduled for Specified Period

- i) For displaying the list of all commands that are going to be issued from the calendar between specified dates and times, key-in the command "DISPL-CAL-LIST" and obtain the parameters on the screen as shown below :

DISPL-CAL-LIST	DISPLAY LIST OF COMMANDS TO BE EXECUTED
FRM-DATE	:
[TO-DATE]	:
[FRM-TIME]	:
[TO-TIME]	:
[USER-ID]	:

- ii) Against parameter "FRM-DATE" and "TO-DATE", fill dates between which commands to be issued from calendar are to be displayed. The structure of these parameters is same as in "ADD-CAL" command. "TO-DATE" is an optional parameter. It takes 'current date' as default value.
- iii) Against parameters FRM-TIME and TO-TIME, fill the times between which commands to be issued from the calendar are to be displayed. These are optional parameters. "FRM-DATE" and "FRM-TIME" constitutes the start of period and "TO-DATE" and "TO-TIME" indicates the end of period.
- iv) Against parameter "USER-ID", fill the user identification against which commands to be issued from calendar between the specified period are to be displayed. This is an optional parameter. If default value (i.e. 0) is given then commands to be issued from calendar between the specified period will be displayed for all users.
- v) Execute the command and get the response. Response will display the detailed information about all the entries from which commands are going to be issued from the calendar between the specified period. It will display first trigger date & time, total no. of triggers and remaining triggers along with other details.

8.1.6. Display Calendar Log

- i) Calendar log contains the response of commands executed through calendar. For displaying all the entries in the calendar log file between the specified dates, key-in command "DISPL-CAL-LOG" and obtain the parameters on the screen as shown below :

DISPL-CAL-LOG	DISPLAY CALENDAR LOG
FDATE	:
[TDATE]	:
[SES-ID]	:
[JOB-ID]	:
[USER-ID]	:

- ii) Against parameter 'FDATE', fill the date from which calendar log is to be displayed. The structure of this parameter is same as of 'ST-DATE' in "ADD-CAL" command.
- iii) Against parameter 'TDATE', fill the date upto which calendar log is to be displayed. The structure of this parameter is same as of 'EN-DATE' in "ADD-CAL" command. This is an optional parameter. It takes '0-0-0' as default value which means the current date.
- iv) Define the parameters "SES-ID", "JOB-ID", and "USER-ID" as assigned by the system at the time of adding the entry for which calendar log is to be displayed. These parameters may have default value as '0' where all the logs for specified period will be displayed.
- v) Execute the command and get the response. The response will display calendar log between the specified dates as per job-id, session-id & user-id specified as input parameters.

8.1.7. Display OOD Log File

- i) For displaying all the entries in 'OOD' log file between specified dates & times, key-in command "DISPL-OOD-LOG" and obtain the parameters on the screen as shown below :

DISPL-OOD-LOG	DISPLAY OOD LOG
[FDATE]	:
[ST-TIM]	:
[TDATE]	:
[EN-TIM]	:
[LAST-REP]	:
[REP-INF]	:
[REP-NAME]	:

- ii) Against parameter "FDATE", fill the date from which 'OOD' log is to be displayed. This is an optional parameter. It takes current date as default value. This is three field parameter in the format DD-MM-YYYY.
- iii) Against parameter "ST-TIM", fill the time from which 'OOD' log is to be displayed. This is also an optional parameter in the format HH:MM.
- iv) Against parameter "TDATE", fill the date upto which 'OOD' log is to be displayed. This is also an optional parameter. It takes current date as default value. The structure is same as of "FDATE" parameter.
- v) Against parameter "EN-TIM", fill the time upto which 'OOD' log is to be displayed. This is also an optional parameter and structure is same as of "ST-TIM" parameter. It takes current time as default value.
- vi) Against parameter "LAST-REP", fill the number of last reports which are to be displayed from 'OOD' log of specified period. This is an optional parameter. It takes '1' as default value. If '0' is given then all the reports from 'OOD' log of specified period will be displayed.
- vii) Against parameter "REP-NAME", fill the report name to be displayed from 'OOD' log of specified period. This is an optional parameter. When default value (i.e. ALL-REP) is given, all the reports from 'OOD' log of specified period will be displayed.
- viii) Execute the command and get the response as desired.

8.2. PASSWORD AND SYSTEM SECURITY OPERATIONS

In C-DOT DSS MAX a secure environment has been provided in which only authorised operators can access the system to invoke a set of authorised commands. For further security, the specific terminals may be allocated for specific set of functions, as a means of protection against inadvertent operation. This section describes the procedure for giving information on password, operator's identity and commands set which he is authorised to use. It also deals with assigning identity to the terminals and restriction on the commands that can be operated. The operation is classified in two different sections as:

- i) Commands for Exchange Administrators
- ii) Commands for Exchange Operators

8.2.1. Commands for Exchange Administrator

The following functions are performed by Exchange Administrator from Console:

- Adding a new terminal(s) to the exchange.
- Adding a new operator(s) to the exchange.
- Deleting/Removing an existing operator in the exchange.
- Deleting existing terminal(s) in the exchange.
- Modifying operator characteristics
- Modifying any operator's Password without knowing his old password.
- Modifying the characteristics of a terminal
- Setting/Modifying his own password

8.2.1.1. Add A New Terminal

- i) For connecting a new terminal to the system, key-in the command "ADD-TRM" and obtain the parameters on the screen as shown below :

ADD-TRM	ADD TERMINALS TO THE EXCHANGE
TRM-NAME	:
A-CLASS	:
M-CLASS	:

- ii) Against parameter "TRM-NAME", fill the name of the terminal/port as configured in UNIX of the type /dev/icc_ x where x varies from '0' to '15' for IOP-LM & IOP-XL and '0' to '7' for IOP-VL & IOP-VH.
- iii) Against parameter "A-CLASS", fill the single admin command class or set of admin command classes (separated by '&' or range option 'to') that are to be allowed from this terminal.
- iv) Against parameter "M-CLASS", fill the single maintenance class or set of maintenance command classes (separated by '&' or range option 'to') that are to be allowed from this terminal.
- v) Execute the command and get the response for addition of a new terminal device. Now after physically connecting this terminal device to the system, the operator can log into this terminal and specified commands can be issued from this terminal.

8.2.1.2. Delete A Terminal Device (DEL-TRM)

- i) For disconnecting any serial communication terminal port, key-in the command "DEL-TRM" and obtain the parameters on the screen as shown below :

DEL-TRM	DELETE TERMINALS
TRM-NAME	:

- ii) Define the parameter "TRM-NAME", as explained in ADD-TRM.
- iii) Execute the command and get the response for terminal deletion. Now the port can not be used for any type of operation.

8.2.1.3. Modify Terminal Characteristics (MOD-TRM-CHAR)

- i) For modifying the Administration and Maintenance command classes that are allowed to be invoked from the specified terminal, key-in the command "MOD-TRM-CHAR" and obtain the parameters on the screen as shown below:

MOD-TRM-CHAR	MODIFY TERMINAL CHARACTERISTICS
TRM-NAME	:
[A-CLASS]	:
[M-CLASS]	:

- ii) Against parameter "TRM-NAME", fill the terminal device name for which administration and maintenance command classes (to be allowed from this terminal) are to be modified.
- iii) Execute the command and get the response for modification of Terminal characteristics along with the details of modified set of administration and maintenance command classes.

8.2.1.4. **Add an Operator (ADD-OPR)**



WARNING !

1. It should be ensured that the operator is added in both the IOPs at the same time i.e. execute the command ADD-OPR in both the IOPs separately. This should be done even if other IOP is not INSERVICE.
2. As and when the software is loaded in one IOP, all the operator accounts should be deleted in the INS-ACT IOP. The listing of operator accounts can be obtained using command DISPL-ALL. After ensuring that there is no operator in both the IOPs, the STEP-1 should be followed.
 - i) For creating a new operator in the exchange, key-in the command "ADD-OPR" and obtain the parameters on the screen as shown below :

ADD-OPR	ADD OPERATOR
OPR-NAME	:
GRP-NAME	:
NEW-PWD	:
VER-PWD	:
A-CLASS	:
M-CLASS	:

- ii) Against parameter "OPR-NAME" fill the name of the operator as desired. It will be used as login name to identify an operator to the system.
- iii) Against parameter "GRP-NAME", fill "Admin" as group name.
- iv) Against parameter "A-CLASS", fill the set of admin command classes that are allowed to be used by the operator. Single command class or any combination of command classes separated by '&' and 'to' can be given. If we want to allow all the commands then we can mention 1 to

64 [full range]. The details of the commands grouped in 'A' class can be obtained by typing MENU 1 from CRP prompt.

- v) Against parameter "M-CLASS", fill the set of maintenance command classes that are to be allowed, using the same structure as that of "A-CLASS" parameter and specify 1 to 32 for full range. The details of the commands grouped in 'M' class can be obtained by typing MENU 2 from CRP prompt.
- vii) Execute the command and get the response for creation of a new operator in the system. Now operator can login into the system with the defined name and password given at the time of creation of this operator.

Note :

A given command from an operator on a given terminal can be executed only if the command is allowed from the terminal as well as to that operator. If any one does not have the privilege to execute the command, the command execution will fail because of insufficient privileges.

8.2.1.5. Delete An Operator (DEL-OPR) :



WARNING !

The operator accounts should be deleted from both the IOPs i.e. the command DEL-OPR should be executed on both the IOPs, separately.

- i) For deleting/removing the account of an operator, key-in the command "DEL-OPR" and obtain the parameters on the screen as shown below :

DEL-OPR	TO DELETE/REMOVE AN EXISTING OPERATOR
OPR-NAME	:

- ii) Against parameter "OPR-NAME", fill the name of the operator (used for logging into the system) to be deleted.
- iii) Execute the command and get the response for deletion of the operator account. This operator cannot login to the system.

8.2.1.6. Modify Operator Characteristics (MOD-OPR-CHAR)

- i) For modifying Administration and Maintenance command classes, currently being used by a particular operator, key-in the command "MOD-OPR- CHAR" and obtain the parameters on the screen as shown below:

MOD-OPR-CHAR	MODIFY OPERATOR'S CHARACTERISTICS
OPR-NAME	:
[A-CLASS]	:
[M-CLASS]	:

- ii) Against parameter "OPR-NAME", fill the name of the operator account. The existing characteristics of the operator is displayed which can be modified by defining new set of values against parameters [A-CLASS] and [M-CLASS].
- iii) Execute the command and get the response for modification of operator's account along with details of modified set of admin. and maintenance command classes allowed for the operator.

8.2.1.7. *Modify Operator's Password (MOD-OPR-PWD)*

- i) An operator's Password can be modified only by the Administrator from his console. For modifying the password of an operator without knowing his/her old password, key-in command "MOD-OPR-PWD" and obtain the parameters on the screen as shown below :

MOD-OPR-PWD	MODIFY OPERATOR'S PASSWORD
OPR-NAME	:
NEW-PWD	:

- ii) Against parameter "OPR-NAME", fill the name of the operator account for which password is to be changed,
- iii) Against parameter "NEW-PWD", fill the new password as desired.
- iv) Execute the command and get the response for modification of operator's password. Now specified operator can log into the system by using modified password only.

8.2.2. *Commands for Exchange Operators*

8.2.2.1. *Display the Terminal (Port) Status (DISPL-TRM-ASSGN)*

- i) For finding out the name and characteristics of the terminal (Port) being used by the operator, first key-in the command "DISPL-TRM-ASSGN" and execute the command. In response to the command, the system displays terminal (Port) being used by the operator. This

terminal name can inturn be used for knowing the characteristics of the terminal used by the operator.

Note :

To know the terminal (Port) identity, one has to key in the command from the same terminal; whereas, to know the characteristics of a terminal, the command can be issued from any terminal.

8.2.2.2. *Display the Characteristics of Terminals (DISPL-TRM-CHAR)*

- i) For displaying the characteristics of one or more terminals, key-in the command "DISPL-TRM-CHAR" and obtain the parameter on the screen as shown below:

DISPL-TRM-CHAR	DISPLAY TERMINAL CHARACTERISTICS
[TRM-NAME] :	

- ii) Against parameter "TRM-NAME", fill the name of terminal device of which characteristics are to be displayed. If you intend to know the characteristics of more than one terminal, against the parameter 'TRM-NAME', keyin the names of the terminals. '&' can be used as a separator between the two values if more terminal names are defined.

Terminal names if not known can be found out by executing "DISPL-TRM-ASSGN" command on that terminal whose device name is not known.

- iii) Execute the command and get the response displaying the characteristics of the specified terminal(s).

8.2.2.3. *Display Operator's Characteristics (DISPL-OPR-CHAR)*

- i) For displaying the characteristics of an operator, key-in the command "DISPL-OPR-CHAR" and obtain the screen as shown below :

DISPL-OPR-CHAR	DISPLAY OPERATOR CHARACTERISTICS
[OPR-NAME]	:

- ii) Key in the name of the operator whose characteristics are to be displayed. The default value for this parameter is 'ALL' which when given will display the characteristics of all the existing operators in the system.
- iii) Execute the command and get the response displaying various characteristics (which include group name to which operator belongs and allowed administration and maintenance command classes from this operator account) of the specified operator.

8.2.2.4. *Modification of its own Password by the Operator (SET-PWD)*

This command is required by the operator to change its own password periodically, to maintain its secrecy.

- i) For changing its own password, key-in the command "SET-PWD" and obtain the parameters on the screen as shown below :

SET-PWD	SET PASSWORD
[OLD-PWD]	:
NEW-PWD	:
VER-PWD	:

- ii) Against parameter "OLD-PWD", input its own password (not echoed) which is to be modified.
- iii) Against parameter "NEW-PWD" and "VER-PWD", input the new password (not echoed).
- iv) Execute the command and obtain the response saying "Password changed successfully".

8.2.2.5. *Display Transaction File*

- i) For displaying log of recent change commands and its results given to CRP for specified period, key-in command

DISPL-TRANS and obtain the parameters on the screen as shown below:

DISPL-TRANS	DISPLAY TRANSACTION FILE INFORMATION
FDATE	:
[FRM-TIME]	:
[TDATE]	:
[TO-TIME]	:
[USR-NAME]	:
[APP-NUM]	:
[DSP-ORD]	:
[SES-ID]	:
[JOB-ID]	:
[CMD-NAME]	:
[REP-INF]	:

- ii) Against parameter CMD-NAME give the CRP command for which transaction log is required.
- iii) Against parameter REP-INF give yes or no i.e. whether report information is required or not.
- iv) All other parameters have their usual meaning as described earlier.

8.3. EXCHANGE DATA BACKUP AND RESTORATION PROCEDURES

In an exchange, backup procedures have to be adopted for the following reasons

- a) Backup of files for restoration purposes in the event of exchange crash.
- b) Backup of files for post-processing purposes
- c) Backup of files for cleaning disk space

This section briefly brings out the backup and restoration procedures to be followed in C-DOT DSS. Firstly, the various types of files used by the DSS are discussed with their backup requirements. This is followed by the procedures to be adopted to take backup.

Exchange Data Files :

- These files come in the installation cartridges and can not be modified/deleted. These files are in '/data/exdata/prcdata', '/data/exdata/glbdata'. These are backed up daily in daily backup procedure.

Files Keeping Data about health of the System

- These files have the data about the health of the system unitwise, cardwise, linkwise, modulewise and terminal-wise. These files should be deleted only when there is acute disk space deficiency. All these files are backed up daily in daily backup and when the restoration is done the system will be restored to the status when the backup was taken.

Data Dumps by the Exchange

- In a running exchange, lot of data is generated for traffic and billing purposes. All these dumps are stored in files in '/data/dump' directory with names which tell the date/time for which the dump was done and the type of information in the file. These dumps should be taken for post processing onto tape. The backup procedures for these are discussed under traffic backup procedure and billing backup procedure.

Files Generated by Operator

- These files are generated by the operator for ease of operation. These include file groups, command files, parameter lists and command file logging. Individual operator should take backup of these files through 'copy-in' and 'copy-out' commands if required. At system level, a backup of all files created by all operators can be taken. These files can be restored as and when required using 'copy-in' command.

8.3.1. Exchange Data Backup & Restoration Procedure

The exchange data comprises of the subscriber line, trunk and routing related data. To take care of day to day changes by the exchange administration, daily backup of the data is recommended. In addition to daily exchange data backup, on 1st of every month, a monthly backup should be taken and stored. The monthly backup is same as daily backup but is to be stored for full year.

Seven tapes will be required to keep exchange data backup. At any instant, the exchange will have data existing for the last seven days. Let us call the tapes to be MON, TUE, WED etc. The tapes will be used in following sequence :

Insert tape with proper day of week label in cartridge drive and issue the command and parameter as shown below:

COPY-OUT	COPY SPECIFIED FILES AND FILE GROUP ONTO TAPE
VOL-NAME	:
EXP-DATE	:
[PROT]	:
[BACK-OPT]	:
[FILE]	:
[FGP]	:

Vol-name should have **ed** to indicate exchange data backup and then day and month of backup. As the tape is not to be overwritten for seven days, expire date should be seven days more than the current date. Fgp =ed stands for exchange data file group. `Copy-out' command can be used to take the backup.

Note:

- i) During `copy-out' operator should not give any update command in the exchange.
- ii) `Copy-out' should not be done during peak traffic hours.

Exchange Data Restoration

If one wants the exchange data to be restored to a state on 8th JAN, Choose the exchange data backup tape of 8th JAN.

- a) Bring the IOPs in simplex by using INIT-IOP:2,1; command on standby IOP.
- b) Insert tape into the cartridge drive of active IOP.
- c) Give following MMC command on terminal of active IOP.
`< copy-in: vol-name=ED0801, files=*`
- d) Give "PART-INIT" to the system using "INIT-SYS" command. The state of system will be same as on 8th JAN when this backup was taken.
- e) Bring IOPs in Duplex using standard procedure as mentioned in Chapter 2.

8.3.2. Traffic Backup & Restoration Procedures

The traffic data generated by the exchange is of two types

- periodic reports
- Reports for the subscribers on per call basis.

To take Daily as well as fortnightly traffic backup, the procedure is same as that of exchange data backup except that after the fortnightly backup, unwanted files should be removed. Six tapes in all will be required for daily as well as fortnightly backup.

- i) Delete traffic files which have been backed up by issuing the command.
`<del-fgp-file: fgp=tf{1-1-1997->15-1-1997};`

8.3.3. Backup for Operators

In C-DOT DSS, each operator has some characteristics associated with him. Also he can create some files for his own purposes. For example, he can create some command files, corresponding log files, parameter lists etc. These files need to be backed up periodically, so that if disk crashes, they can be retrieved.

The operator files can be backed up using C-DOT DSS backup management commands. For using these commands, the system administrator who is creating account should follow a procedure.

The backup of this file group may be taken weekly at system level. To take backup, use copy-out command as follows:

```
<copy-out: vol-name=OP0101, exp-date=7-1-1997,  
prot=U-RD & U-WR & G-RD & W-RD,  
back-opt=RECUR-DIR, fgp=op;
```

Backup option has been given as RECUR-DIR so that all sub directories of all operator directories are also backed up.

The following convention may be used to name the operator backup cartridge:

VOLUME NAME = OPddid

where OP stands for operator backup

dd is the day number of date on which backup is taken

id is 00 for backup done on IOP-0 and 01 for backup done on IOP-1

Operator Backup/Restoration Procedure

- i) Procedure to Add/Delete an Operator in the list of operators for which backup is to be done:

Generally whenever a new operator account is opened (new operator added to system), to take backups of the files of that operator, the 'op.grp' (standard file group) in \$GRP directory needs to be modified. The format of the op.grp file is as follows :

```
/u/admn  
/u/OPER_ACC/*
```

where the '/etc/passwd', 'u/admn', entry is the standard entry and should not be changed. For each operator one entry of the type '/u/OPER_ACC/*' should exist where OPER_ACC is the operator account name (e.g. 'admn' for 'admn' operator).

To add any operator account, EDIT the file 'op.grp' in \$GRP directory and add '/u/OPER_ACC/*' entry at the end of the file where OPER_ACC is replaced with the operator account name.

To delete any operator account from this list, just delete the entry corresponding to the operator account from the above file.

- ii) Procedure to take backup of files for operator accounts.

Use MMC commands COPY-OUT or BACKUP for taking backup. Choose expire date as desired. For volume name follow the conventions mentioned above. Again note that the backup needs to be taken on both IOPs.

```
< COPY-OUT : VOL-NAME=OPddid, EXP-DATE=exp_date, FGP=op;
```

- iii) Procedure to restore files for operators accounts from backup

The need for the restoration of operator files may arise after reinstallation of software on IOP or some operator has deleted some file by mistake and wants to restore it from backup. In case a few files need to be restored, just copy these files from backup as follows

```
< COPY-IN : VOL-NAME=OPddid, FILE=filename(s);
```

In case all operator accounts need to be reopened and all files restored from backup for these accounts (i.e. after reinstallation) use

```
< COPY-IN: VOL-NAME=OPddid, FGP=op;
```

8.3.4. Backup Procedure for History File

The transaction file and history file keep on growing with time as all transactions are logged in transaction file and all modifications are logged in history file. The transaction files can not be deleted. Latest 20,000 records are always protected.

For History file :

Backup can be taken periodically using "Copy-out" command with fgp = ioh.

After backup, history file can be made null using following command.

```
< DEL-FGP-FILE: FGP=ioh;
```

Annexure - A

Patch Installation in Working Exchange

A.1 ASSUMPTIONS

It is assumed that both the IOPs are in DUPLEX and Synchronised. Make one of the IOP, say IOP-0, out of service by using command INIT-IOP:2,1; on IOP-0.

A.2 PRE INSTALLATION CHECKS

1. From the available deliverables at the site, it is known that the current patch release is **C4.XX** where XX will vary from site to site. It is very important as the installation procedure to be followed, will depend on the current, working patch release at the site with Software Release 2_1_1_1.
2. It is desired that the incremental Software Deliverables in the form of PROM and Cartridges are available as per list which may vary from site to site, depending upon the current working release. The details are :
 - i) S/W Release Note for the release, being planned for patching
 - ii) EPROMs on the Controller Cards.
 - iii) RPC & CPC Cartridge of the release, being planned for patching
 - iv) UNIX if required to be changed .
 - v) "Patch Retrofit Utility "
3. All the modules i.e. BM, AM, CM and SUM (if CCS7 is equipped) in the Exchange are available i.e. initialised and are INS-ACT. **No module should be in OOS-INI state.**

A.3 PATCH INSTALLATION PROCEDURE

A.3.1 STEP-1 : Procedure for Patch Installation in one IOP :

- 1) Copy the RPC cartridge in INS-ACT (say IOP-1), using the following procedure
 - a) Come to IOP5D > prompt by using the two keys "Control "& "D" simultaneously.

- b) Come out of current working account by using command "exit".
- ```
IOP5D> exit
```
- c) Login into the **root** account. Now insert the cartridge marked as "RPC Cartridge for C4.ZZ" in the cartridge drive and copy the cartridge using the command as :
- ```
# cd /
# cpio -icvdu < $TAPE
```
- 2) Repeat step b as explained above and login into **adm**n account.
- 3) Go into the /code/wpch directory using the following command
- ```
IOP5D>cd $HPCHP and go to CRP prompt .
```
- 4) Now give the following command
- ```
<exec-cmd-file : vlpf4.YYcom;  where YY is XX+1
```
- 5) Repeat the step (4) for different values of YY as YY=XX+2 , YY=XX+3 etc. till YY becomes equal to ZZ which is also the latest patch release, being retrofitted.
- 6) Now give the following command
- ```
< exec-cmd-file : inst4.YYcom; where YY is XX+1
```
- 7) Repeat the step (6) for different values of YY as YY=XX+2 , YY=XX+3 etc. till YY becomes equal to ZZ which is also the latest patch release , being retrofitted.
- 8) Bring the IOP-1 to cold-start level using the following commands one by one :
- ```
<INIT-IOP:2,1;
<INIT-IOP:1,1;    and wait for the login : prompt.
```
- 9) Login to **root** account and execute the command :
- ```
#> init 2 and wait for the initialisation to be over and login to admn
account and go to crp .
```
- 10) Bring the IOP into **INSERVICE** level using the command **INIT-IOP:5,1;**

### A.3.2 STEP-2 ( Optional ) : Procedure for Patch Retrofit Utility :

This procedure is optional and may not be required at all the sites. The requirement is based on the information of the current working patch release

and the latest patch release being planned for retrofit. For example, for all the sites with S/W release 2\_1\_1\_1 and Patch Release C4.11 or lower, "Patch Retrofit Utility C4.12" should be run as per the procedure given below:

Copy the Cartridge marked "Patch Retrofit Utility" in the active IOP in any Directory using command

```
IOP5D> cpio -icv < $TAPE
```

Execute the following written commands one by one on the IOP5D Prompt

```
IOP5D> chmod 777 adind.sh
```

```
IOP5D> adind.sh
```

### A.3.3 **STEP-3 (Optional) : Procedure for changing the PROMs on the Controller Cards**

This procedure is optional and may not be required at all the sites. The requirement is based on the information of the current working patch release and the latest patch release being planned for retrofit. The EPROMs can be changed by making the Controllers OOS-OPR and making them INS one by one after changing the PROMs and successful diagnostics.

### A.3.4 **STEP-4 : Procedure for Installation of Patch in other IOP-0**

1. Insert the CPC cartridge of the release C4.ZZ in the drive of IOP-0.
- 2) Use the following commands to login to root account :  
IOP5C> **exit** and login into root account
- 3) Change the directory using the command # > **cd /code/audit**
- 4) Load the CPC using the command  
# > **RESPC**
- 5) Load the BMDC using the following command after inserting the BMDC cartridge of the release C4.ZZ :  
#> **RESDC**
- 6) Now shutdown the IOP-0 using commands :  
#> **cd /**  
#> **shutdown 0** and wait for the **INIT: SINGLE-USER** mode to be displayed
- 7) Now execute the command from the prompt # >

#> ***init 2*** Wait for the initialisation to be over. Now login to admn account and go to crp .

- 8) Bring the IOP-0 in INS-SBY by using the following command from IOP-1 :

***<put-swu-oos:iom,iop-0;***

***<put-swu-ins:iom,iop-0;***

After execution of the above commands the IOPs will come in duplex which can be verified by the command "DISPL-IOP-LEVEL".

## **Annexure - B**

# **Operation and Maintenance Related Guidelines**

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### **B-1 GENERAL**

This software release has been generated and being released to field after field trials are successfully completed. The release supports most of the requirements, raised from time to time. This has resulted in restructuring of some of the user commands and precautions should be taken in day to day operations of the exchange.

### **B-2 DO'S AND DON'TS**

A number of basic operation and maintenance guidelines are listed which should be carefully studied and followed during day to day operations.

#### **B-2.1 Restoration of BMDC**

The BMDC cartridge should never be restored in day to day operation. Restoration of BMDC is required only when complete software is being loaded in the exchange. The restoration of "ed" backup does not require restoration of "BMDC". In case of data corruption when restoration of old exchange data is required, only "ed" backup restoration using command "COPY-IN" is sufficient. As and when BMDC has been restored in working exchange, "ed" as well "bd" must be copied. Get around is given in Annexure-C to recover the exchange in case of failure.

#### **B-2.2 Restoration of Unix Cartridge**

Whenever only unix is to be restored following precautions should be taken

1. All operator accounts with their privileges must be noted. The total no. of operator accounts can be listed using DISPL-ALL command.
2. The characteristics of Individual OPRs can be obtained using command DISPL-OPR-CHAR.
3. Delete all the operator accounts using DEL-OPR command.

4. Load unix cartridge.
5. Create all the operator accounts with the noted characteristics.

### **B-2.3 Restoration of Base, CPC & BMDC**

In exceptional cases whenever the above s/w cartridges are loaded following precautions should be taken.

1. All operator accounts with their privileges can be noted. The total no. of operator accounts can be listed using DISPL-ALL command.
2. The characteristics of Individual OPRs can be obtained using command DISPL-OPR-CHAR.
3. Delete all the operator accounts using DEL-OPR command.
4. Restore Base, CPC, BMDC and copy in ED, BD.
5. Create all the operator accounts with the noted characteristics.

### **B-2.4 Programming Trunk Groups in C-DOT DSS**

Keeping in view the complexity of the network and multiple features being supported in the common software release for different configurations/applications of C-DOT DSS, the following requirements should be met at the time of creating a trunk group :

- All the incoming trunk groups from TAX or ILT should be programmed as TTAX with the unique category (TGP-CAT) other than 1 and not allocated to any other TGP.
- All the incoming trunk groups from the parented exchanges should be defined as ORD.
- If C-DOT DSS is configured as TAX/ILT, all the O/G trunks should be defined as ORD.

### **B-2.5 Calendar Programming in C-DOT DSS**

To maintain consistency of alarms and reports for lines, trunks and service circuits, AUDIT with AUDIT-SET=12 should be programmed in the calendar with daily triggers for all the days in the current year. This programming is required to be done only once in a year every time, a software is loaded in the exchange.

### **B-2.6 Use of TSC PROM s in Different Exchange Configurations**

When BMs of MAX-L are being integrated with MAX-XL or BM-XL are being integrated with MAX-L, then following care should be taken for use of TSC PROM.

- The checksum for TSC PROM will be same for BM-L as well as for BM-XL if used as SBM-RAX or as colocated BM/RSU of MAX-L.
- The checksum for TSC PROM will be same for BM-L as well as for BM-XL if used as colocated BM or RSU of MAX-XL.

Alternatively we can conclude that the PROMs on TSC will depend on the type of CM i.e. CM-L or CM-XL and it is independent of BM-type.

**B-2.7 TIC Cards with Compatible Software EPROMs**

The C-DOT DSS supports distinctive ringing in all the new exchanges with retrofit option for existing sites. The software has been designed to take care of compatibility related problems. The exchange is defined to support “Distinctive Ringing” by setting the system parameter “SPL-RNG” to 1. At these sites, all the PSUs should be updated for ECNs. Also the TIC cards should be updated for compatible software EPROM. The TIC unit will not become INS unless compatible software EPROM is not used.

**B-2.8 Mandatory Execution of MOD-DAY-TYP**

It should be ensured that in 1<sup>st</sup> week of January & July of every year, the command is executed to define the day type.

**B-2.9 Programming for Routing of Priority Subscriber's Call**

In all the routes, priority 2 should be allowed by defining the trunk group choice against priority 2.

**B-2.10 Defining Charge Rate Number for Transit Calls**

- i) The category of incoming trunk group coming from TAX should be different from the category of other incoming trunk groups and local subscribers.
- ii) The charge rate number defined in all outgoing routes to parented exchanges other than TAX for category of incoming trunk group coming from TAX should have following definition for all tariff classes.

|                    |   |         |
|--------------------|---|---------|
| Charge Rate Number | = | 4 (say) |
| TRF-CLS            | = | 1       |
| INI-CRG            | = | 0       |
| CRG-PRD            | = | 0       |
| PRD-CRG            | = | 0       |
| CRG-MOD            | = | NO-MET  |
| MET-INFO           | = | METERED |
| ANS-INFO           | = | ANS-XP  |
| RING-INFO          | = | NRM-RNG |

BEEP-INFO = NO- BEEP

This can be displayed using DISPL-CRG-RTN command. In BMDC of software release 2-1-1-1, this CRG-RTN is defined as 4.

**B-2.11** For all the existing MBM sites of S/W release 2-1-1-1, the command MOD-ANNC-TONE should be executed for all the BMs with parameter values :

MOD-ANNC-TONE  
[BM-NO] : ALL  
[SW-MAP] : 10-9  
[OOS-MAP] : <Default>

Also, it should be ensured that the command is executed for every new BM at time of expansion.

**B-2.12** It should be ensured on 1<sup>st</sup> day of every month that there is no ncbrrx and tgcbrxx files for the current month xx in \$DUMPP. This should be verified on the both the IOPs separately.

### **B-3 ROUTINE OPERATIONAL AND MAINTENANCE PRECAUTIONS**

In addition to critical DO's and DON'T's, some more precautions are to be taken to avoid any problem during O & M functions.

#### **B-3.1 Precautions to be Taken While Handling Various Hardware Cards**

- i) With the introduction of "Distinctive Ringing" in C-DOT DSS, there are two different versions of PSU used in Analog Terminal Unit. One with blinking LEDs to indicate the ringing cadence which is used at the existing sites. The modified PSU is identified with continuous LED and used only at the sites where "Distinctive Ringing" feature is offered. The two PSUs can not be used interchangeably. Also in one exchange, only one version of Power Supply can be used.
- ii) All desired ECNs should be ensured at the time of replacement of a spare card..
- iii) The SHM cards cannot be used interchangeably with BPC and HPC in SUM. To use SHM cards at the sites where HPC has been used as processor in SUM, ECN in the form of firmware changes are mandatory on SHM cards.
- iv) For 32 signalling links, BPC is used as processor in CCS7 Signalling Unit. For more than 32 signalling links but upto 64 signalling links, only HPC is to be used as processor.
- v) In case of 800K BHCA as well as new SBM and MAX-XL configurations being released with S/W 2-1-1-1, HMS is used in all the

---

BMs. HMS and MSC/MSD are not pin to pin compatible and can not be used interchangeably.

- vi) While changing any TUI card, proper jumper settings as mentioned in “**Installation Document**” should be ensured. The same is valid for BME cards used in CCS7 signalling unit (SUM) with HPC. Otherwise, it is same for BM, AM, CM and SUM with BPC.
- vii) While changing any Processor Card in BM, CM & AM, the jumper settings and EPROM status should be ensured.
- viii) At the time of changing any controller card from some other site, PROMs of correct software version should be ensured before jacking the card into the system.

### **B-3.2 Known O&M Changes as a Result of Feature Enhancements**

- (i) A subscriber data can be modified only after making it OOS-OPR.
- (ii) It is not possible to delete the subscribe in growth mode.
- (iii) All the “**Hunt Group**” related CRP commands are possible only when IOP is ONLINE.
- (iv) Due to enhanced disk partitioning, to utilise the full capacity of the disk, the boot up time for IOP has been increased to 30 minutes or even more depending upon the IOP and disk types, used.
- (v) It is not possible to go to growth mode, when IOPs are in DUPLEX. This has been done to avoid data inconsistencies.
- (vi) In case of TAX or ILT, the system has to be defined for TAX functioning by setting the system parameters XCHG-TYPE = 4 and CLI-INFO = 1. If it is not so, the exchange will not support CLI for TAX functions in case of R2-R2 and R2-ISUP transit calls. In addition to exchange configurations, the incoming R2 trunk groups from parented stations should have CAMA=YES with TGP-TYP=ORD.
- (vii) For ISDN subscribers, even if the subscriber has subscribed for CW facility, "Call-Hold" should also be subscribed as the facility works through "HOLD" and "RETRIEVE" messages.

### **B-3.3 Other Precautions to be taken during Operation & Maintenance of the Exchange**

- i) When it is required to make IOP out of service, INIT-IOP:2,1; should be used. It is advised not to make the IOP out using command PUT/FRC-SWU-OOS unless IOP is being synchronised.

- ii) Check the status of the system daily by using CRP command DISPL-SYS-ALL; take corrective action for the faulty units.
- iii) Do not give TST-TRM for different type of trunks (OG,IC & BW) at the same time in the same command..
- iv) For incoming calls (Terminating as well as Transit), the charge rate number should have initial charge as `0'.
- v) Take ed & bd backups daily and tf & bc back up by weekly.
- vi) The system parameter MIN-SUBS-DIALS should have value greater than or equal to the length of exchange code but less than the digit length in DIRNO. e.g., if the exchange code is 7262, the parameter value should be at least '4'.
- vii) While displaying traffic reports related to hunt groups, trunks & routes, the entry against `MOD-NO' parameter in "DISPL-TRF-RPT" command should be `AM'.

#### **B-3.4 Known Constraints and Possible Alternatives**

- i) While creating a trunk group, more than 40 trunks should not be given at a time. If more than 40 trunks are required in a trunk group, trunks can be added using ADD-TRK commands in the existing trunk group.
- ii) The status of more than 40 trunks cannot be displayed at a time in the same command. The range of terminals given in DISPL-TRM-STATUS should not be more than 40. Alternatively, the command DISPL-TRCNT-OOS can be used to know the breakup of more than 40 trunks. After that, DISPL-TRM-ALL can be used to find out the listing of trunks with a specific status.
- iii) In case of more than 100 trunks, MOD-TGP-CHAR does not work. Command is rejected with suitable error message. To modify the characteristics, the no. of trunks should be reduced to  $\leq 100$ . After modification, the deleted trunks should be added.
- iv) In few cases, modification commands for subscriber or Trunk Group Characteristics may fail with suitable error message, prompting the user for corrective measures. In such cases, the subscriber or trunks should be attempted once again to make them out of service.

## Annexure – C

# Recovery Procedure When 'bd' Backup is not Available

---

**Note :** *These commands should be given preferably from any icc port except console.*

*Counter readings of all the subscribers will become zero with this procedure*

**STEP 1 :** Load the BMDC. This contains the counter files for one dummy BM.

**STEP 2 :** *Generation Of Counter Files For All Other BMs :*

1. Take the list of equipped modules from other IOP.  
Login into admin account
2. Go to directory \$DUMPP by giving command :  
IOP5X>cd \$DUMPP and issue the following command  
IOP5X> cp \$GLBDATAP/stdctr3200.dat stdctr0000.dat  
IOP5X> cp \$GLBDATAP/stdctr3295.dat stdctr0095.dat  
IOP5X> cp \$GLBDATAP/locctr3200.dat locctr0000.dat  
IOP5X> cp \$GLBDATAP/locctr3295.dat locctr0095.dat
3. Now make the corresponding counter files for each BM No = YY using procedure given below :  
Iop5x> cp stdctr0000.dat stdctrxx00.dat  
Iop5x> cp stdctr0095.dat stdctrxx95.dat  
Iop5x > cp locctr0000.dat locctrxx00.dat  
Iop5x> cp locctr0095.dat locctrxx95.dat  
Where xx = YY-1

4. Repeat the above step for all the BMs one by one.
5. Take the `bd' backup.

***STEP 3 : Restoration of the Exchange :***

Restore the `bd' backup in INS-ACT IOP. Allow the exchange to recover by downloading the relevant billing files.



**System  
Practices**

## COMMENTS

The following comments pertain to:

Document Name

CSP Section

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Issue/Draft

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