

# Architecture of OCB-283

Venkata Videhi Balusupati, Pavani Velaga, A.Rama Krishna

**Abstract:** OCB 283 means Organ De Commande B2 Version 8300 Microprocessor. It is the latest electronics digital ISDN type switching technology being imported in INDIA, OCB 283 is a digital switching system which supports a variety of communication needs like basic telephony, ISDN, interface to mobile communication, data communication etc, it is a Digital Switching System (DSS) with single 'T' stage switch. A maximum of 2048 PCM's can be connected. It supports both analog and digital subscriber. Subscriber connected units (CSN) are so designed that they can be equipped with either analog subscriber or digital subscriber. Or both the cards for analog subscriber and digital are different, but can be equipped in any slot of the shelf. These provide facility to connect speech path from a subscriber's loop or circuits from an external PCM's and transfers these speech samples on to selected time slots called voice channels on a LR link (internal PCM). This provides access for Man Machine dialogues for the human operators to interact and command the working of exchange equipments.

**Keywords:** OCB (Organ de Commando with version B), DSS (Digital Switching System), CSN (Subscriber Connection Unit), PCM (Pulse Code Modulation).

## I. INTRODUCTION

The Alcatel OCB-283 is a network element manager that operator real-time servers and Alcatel switches.

It collects data from network elements and forward it to applications, enables basic remote access to network elements, and manages data security and integrity. Each probe works in a different way to acquire event data from its source, and therefore has specific features, default values, and changeable properties. Use this summary information to learn about this probe. Each probe uses a different method to acquire data which method the probe uses depends on the target system from which it receives data. The probe for Alcatel OCB-283 is a single headed socket-based client. It connects to a specified host and port. The probe performs a configurable chat in sequence before reading alarms. If the device is inactive for a period longer than that specified by the Connection Max Wait property, the probe sends a character to determine whether the devices is still running. If the device fails to respond within the time specified by the Timeout property, the probe exists. It can handle a maximum of 8lacs BHCA. It can handle traffic of 25,000 elands a maximum of 2lacs subscribers or 60,000 circuits can be terminated. It can work in different platforms viz. as local

MSU with RSU, transit, TAX, IN & mobile exchanges. It has a maximum of 35 types of cards (excluding subscriber racks).

### 1.1 Salient Features of the System

It is a digital switching system with single „T“ stage switch. A maximum of 2048 PCM“ s can be connected. It supports both analog and digital subscribers. The system supports all the existing signaling systems, likes decadic, MF (R2), CAS. It provides telephony, ISDN, Data Communication, cellular radio and other value added services. The system has automatic recovery feature. When a serious fault occurs in a control unit, it gives a message to SMM (O & M Unit). Subscriber“ s access unit CSND can be placed at place and connected to the main exchange through PCM links. Further, line concentrators can also be placed remote location and connected to the CSNL or CSND through PCM“ s.

### 1.2 Subscriber Facilities Provided by

OCB 283 OCB 283 provides a large number of subscriber facilities. Some facilities are available to only digital subscribers and as such they cannot be availed by analog subscribers. To avail these facilities subscriber numbers are given special categories by man machine commands. *1.3 Salient features of OCB-283* A line can be made only out going or incoming. Immediate hot line facility- the subscriber is connected to another predetermined subscriber on lifting the handset, without dialing any number. Delayed hot line facility- when subscriber lifts the handset, dial tone is provided he can dial any number. If he does not dial a number, within a predetermined time, he is connected to predetermined number. Abbreviated dialing- the subscriber can record a short code and its corresponding full number in the memory. Later to dial this number, he has to only dial short code. Call-forwarding- when activated, incoming calls to the subscriber gets transferred to the number mentioned by the sub while activating the facility. The facility is especially very useful for the people who are on the move. Conference between 4 subscribers- the subscribers A and B while in conversation can include two more subscribers by pressing flash button and dialing their numbers. Call waiting indication- when a subscriber is engaged in conversation and if gets an incoming call; an indication is given in the form of a tone. Hearing this, the subscriber has option, either to hold the subscriber in conversation and attend the waiting call or to disconnect this subscriber and attend to the waiting call. In the former case, he can revert back to the earlier subscriber.

## II. GENERAL ARCHITECTURE OF OCB-283

OCB-283 EXCHANGE IS ALSO CALLED ALCATEL 1000 E-10. Exchange has got three basic subsystems: -1) subscriber access subsystem 2) connection and Control subsystem 3) operation and maintenance subsystem.

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**2.1 SUBSCRIBER ACCESS SUBSYSTEM**

This is treated as an independent entity. Every subscriber connecting equipment rack is given a signaling point number to operate in common channel signaling mode with rest of the exchange sub systems. The subscriber connection units CSN, SMT and SMA are connected to switching network through PCM links. SMTA and SMTP which are connected through internal links o LISM. Both of them are connected to PCM interfaces as well as to MAS token rings. CSN are also designed that they can be equipped with either analog or digital subscriber or both. The cards for analog and digital subscribers are different, but can be equipped in any slot of the shelf.

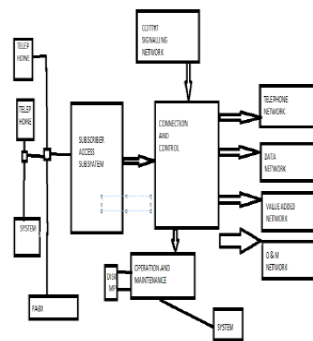
**2.2 CONTROL AND CONNECTION SUB SYSTEM**

It is the block consisting of control functions, connection switching equipments. Control functions comprise of common control equipments which; process, monitor, control the call setup and release. Connection and switching block comprises of switching matrix equipment for performing digital time switching of speech path. Connection equipments for connecting PCM (digital) junctions from: Other exchanges and RSUs. Auxiliary equipments for tones, frequencies and other auxiliaries for signaling protocol handling. The subscribers are now in surveillance of calling and called sub to respective CNS and releases. Connection sub systems comprises of switching matrix station, trunk multiplex station, auxiliary equipment station and all associated LR links. Since all the control units like MR, MQ, TX, TR, etc... And SMA are implemented on a common type of hardware architecture known as station. It is worthwhile to understand architecture and the concepts of station. There can be one principal processor (PUP) and 4 secondary processors (PUS) in a station. Similarly there can be one main coupler and up to 4 secondary couplers. Specific couplers can be equipped for specific purposes. CONTROL UNITS: These units provide control of calls on stored programs. They process the calls on reception of dialed digits from calling subscriber or circuit and take part in handling of call setup and release.

**2.3 OPERATION AND MAINTAINENCE SUBSYSTEM**

For operation and maintenance of exchange by operators or remote NMC. In an electronic stored program control digital exchange like OCB-283, all operation and maintenance activities are performed by a unit called O&M unit or OMC (operation and maintenance center). This provides access for man machine dialogues for the human operators to interact a command the working of exchange equipments. The exchange can be managed either locally or through NMC of 64kbps link.. The OCB-283 system is made up of only 35 different types of cards. This exclude cards required for CSM. The system has very modular structure. The expansion

can be carried out very easily by adding necessary hardware



and software.

**III. OCB-283 SWITCHING SYSTEM**

Any automatic switching system comprises in general of following distinct subsystems. 1).Subscriber access sub system. 2) Connection and control sub system-which comprises of 2.a) Switching network units 2.b) Circuit connection units 2.c) common control function unit. 3) Operation and maintenance sub system. In OCB-283 we can classify various units into following types according to the nature of their functions: 2.a) CONNECTION UNITS-These provide facility to connect a subscribers loop are circuits from an external PCM and transfer these speech samples on to the selected time slots called voice channels on a LR link (internal PCM) towards switching matrix and vice versa.

These units are:

| NAME  | FUNCTIONAL NAME                      |
|---|--------------------------------------|
| Subscriber connection units   | CSNL, CSND,                          |
| Circuit Connection Units  | CSED                                 |
| Frequency Generator, Sender & receiver and common channel signaling protocol handler. | SMT (URM)<br>SMA (ETA)<br>SMA (PUPE) |

B) Switching network – These provides facility for connecting the LRs (internal PCMs) coming from connection units and performs switching operation for calling subs TS onto called subscriber TS and vice versa for a two-way connection per call of telephony. 2. c) Control Units – These units provide control of calls on the basis of stored programs. They process the calls on reception of dialed digits from release by processing, monitoring, measuring.

Calling subscriber and handles the call setup and calls and all other common control functions needed for working of an automatic Common control exchange. These control units can comprise of following functions. 3) O&M Units and maintenance peripherals: In an electronic stored program control digital exchange like OCB-283, all operation and maintenance activities are performed by a unit called O&M unit or OMC (operation and maintenance centre). This provides access for man machine dialogues for the human operators or interacts and commands the working of exchange equipments.



**IV. OCB-283 HARDWARE ARCHITECTURE**

An OCB-283 exchange comprises of following hardware units: Subscriber access units (CSNL, CSND, and CSED), trunks and junction and connection units (SMT), switching matrix (SMX), auxiliary equipments (SMA), control units (SMC), communication multiplexes, the base generator (STS), operation and maintenance unit (SMM). The subscriber connection units CSN, SMT, SMA are connected to switching network through PCM links. The interchange of messages between SMT, SMX, SMA and SMCs takes place on MAS token rings.

The control units interchange messages with one another and with SMM on MIS token rings. SMM is O&M function unit and is duplicated as SMMA and SMMB. These work in pilot/standby mode. The SMCs are the units which hold control functions MR, TR, TX, MQ, PC, GX. These functional units are in software form and are duplicated except MR which can be more than two. The duplicated functions work in load sharing mode hence SMCs can be minimum 2 and maximum 32 as per design. SMA stations hold the ETA and PUPE functions and these are also minimum 2 and maximum SMT station for the external PCMs is made of duplicated hardware and can handle either 32 PCMs if SMT1G or 128 PCMs if 2G. The hardware is fully duplicated and functions P/R mode.

THE BREIF DESCRIPTION HARDWARE UNITS ARE:-

**4.1 SUBSCRIBER ACCESS SUB SYSTEM**

Subscribers in OCB-283 are connected on “DIGITAL SUBSCRIBER CENTER” (CSN). CSN can be local or distant. Local CSN is called as CSNL. Distant CSN is called as CSND. Subscriber connection units (CSN) are so designed that they can be equipped with either analog or digital subscriber. Or both the cards for analog subscriber and digital subscriber are different but can be equipped in any slot of the shelf. This is treated as an independent entity. Every subscriber connecting equipment rack as got its signaling point number to operate in CCS mode with rest of the exchange sun systems.

| NAME OF THE FUNCTION |   | FUNCTION  |
|----------------------|---|---|
| MR:                  | Multi register                              | Call handler SETUP AND RELEASE OF CALL  |
| TR:                  | Translator                                  |   |
| MQ:                  | Marker                                      | Translation of digit, data bank of subs and circuits in files.  |
| TX:                  | Charger                                     | Message distribution between common control and connection units.   |
| GX:                  | Matrix system handler                       |   |
| PC:                  | Common channel signaling network controller | Computing the charge of a call, keeping meters<br>Processes and makes connections in switching matrix on the orders from MR/MQ<br>Manage the CCS7 network for signaling |

**4.2 CONNECTION SUBSYSTEMS**

Connection subsystem comprises of switching matrix station (SMX), trunk multiplex station, auxiliary equipment station and all associated LR links.

**4.3 SWITCHING MATRIX STATION (SMX)**

SMX is the station which two weeks TS switching is done. SMX holds a software logical machine (MLCOM). SMX are provided in duplicate for the duplicated speech path as switching is fully duplicated in OCB-283. **4.4 TRUNK MULTIPLEX CONTROL STATION:** SMT SMT is the hardware station where the external PCM” s are terminated. Logical function of SMT is URM. SMT converts external PCM” s (HDB3) to binary & vice versa & makes LR links towards SMX for switching. SMT can connect PCM” s from (a) CSND (RSU) or (b) CSED (RLU) or (c) PCM” s from a distant exchange.

**4.5 AUXILIARY EQUIPMENT UNITS: SMA**

SMA is the hardware station which supports following auxiliary equipment functions: 1. ETA: provides tones, frequency sender and receiver.

**4.6 CONTROL SUBSYSTEM**

Control subsystem supports all the common control functions of exchange which setup and release a call. Common control functions are:- MR, TR, TX, MQ, GX, and PC.

**4.7 OPERATION & MAINTENANCE SUBSYSTEM**

**O & M** comprises of duplicated hardware station SMM & software machine OM. It is the processor for operation & maintenance of exchange by man machine commands. SMM provides access to operator through peripherals like TTY, VDU, and SMM also has magnetic tape & disks for storage this subsystem can be accessed from remote NMC (Network Management Center) or TMN (Telecom Management Network).

**4.8 COMMUNICATION MULTIPLEX**

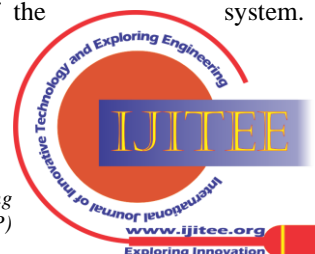
Communication multiplex is the highway of communication between various hardware stations of OCB 283. It works on the principle of Token Ring. There are two types of multiplexes: MIS (Interstate multiplex), MAS (Station Access Multiplex).

**4.9 SYNCHRONIZATION & TIME BASE**

Time base is used to synchronize the LR links. Time base is generated in OCB by STS equipment. It comprises of 3 oscillator cards providing Triplicate Time Base. It is mounted in SMM rack.

**4.10 LR LINKS**

LR links are speech carrying PCM links working internally in the exchange between connection units & switching matrix. Connection units are CSNL, SMT, and SMA. LR” s are pair of unidirectional digital time division multiplexed paths. These carry 32 time slots in a time frame of 125 micro seconds with 16bits per time slot. LR” s work on 4.096 megabits per second rate. **CONCLUSION** In this whole architecture of OCB 283 we have finally learnt all the functions and subsystems of the system.



The subscriber connection units CSN, SMT, SMA are connected to switching network through PCM links. The interchange of messages between SMT, SMX, SMA and SMCs takes place on MAS token rings. The control units interchange messages with one another and with SMM on MIS token rings. And also the general and hardware with functional architecture also has been learnt in this OCB.

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