**ZTE EXCHANGE**

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**ZTE EXCHANGE**

ZTE is a Chinese telecommunication company that was founded in 1985.Initially it had its network limited in different cities of China later on ZTE extended its network to different countries of Asia and Africa.

Unlike EWSD, ZTE is modular based exchange and in each module we have its own control system, switching network and signaling network.

At IBA exchange a ZTE exchange named ZXJ10 is installed. It has capability of supporting 10000 lines. A detailed diagram of ZTE’s module is shown in the next page.

The main advantage of having a ZTE exchange is its low cost. The ZTE exchange costs almost eight times less than that of Siemens, Ericsson or Alcatel. That is the reason why ZTE is becoming so popular in the developing and poor countries of Asia and Africa.

The disadvantage of ZTE exchange is that it is not as reliable as EWSD, Ericsson, Alcatel or even Huawei. ZTE exchange suffers from more errors than other exchanges.

1

0

* ALARM
* -48
* +5
* -5
* ALARM
* -48
* +5
* -5

D

S

P

U

D

SPU

DSPU

DSPU

P

P

TSLC

TSLC

TSLC

TSLC

Master

Standby

Offline

Alarm

Power

Switch

Reset

On/off

Master

Standby

Offline

Alarm

Power

DT

D

T

D

T

D

T

DT

10

10

* ALARM
* -48
* +5
* -5

Switch

Reset

On/off

* ALARM
* -48
* +5
* -5

10

DSPU

DSPU

COMA

COMA

MPPP

MPPP

SLC

SLC

SLC

S

L

C

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P

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PP

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SLC

##  ZTE

##  ZXJ10 MODULE

CKG

NET

CKG

NET

**ZXJ10 (V10.0) SYSTEM DESCRIPTION**

**SYSTEM OVERVIEW**

The ZXJ10(V10.0) digital SPC switching system employs an open architecture with full distribution between modules, hierarchical control, inside modules & centralized administration. It is based on general purpose computers & is supported by local area network. It employs the client/server mode as its control structure, so that the system is flexible in networking & powerful in call handling with high reliability & good compatibility & expandability.

**HARDWARE CONFIGURATION**

Aided by a full contribution control system, ZXJ10 can hold one to several dozens of modules in accordance with the exchange capacity. Besides, in terms of services demands & geographical locations, this system can be expanded with different modules. Except the OMM module, each module consists of a pair of active/standby MPs ( Master processor ), several SPs ( Slave processor ) & some single boards, PSM SNM, MSM, RSM, RLM are the basic modules of the ZXJ10 foreground network, while OMM makes up the background network.

**PHM**

**PSM**

**VPM**

**MPM**

**OMM**

**MSM**

**IAM**

**PSM**

**RLM**

**RSM**

**RSM**

**RLM**

**PSM**

**PSM**

 **SNM**

**RLM**

**Figure: System structure diagram**

**OMM:** Operation & Maintenance Module **PSM:** Peripheral Switching Module

**RLM:** Remote Line Module **RSM:** Remote Switching Module

**SNM:** Switching Network Module **MPM:** Mobile Peripheral Module

**VPM:** Visitor Peripheral Module **MSM:** Message Switching Module

**IAM:** Internet Access Module **PHM**: Packet Handling Module

In the whole ZXJ10 system, all the important equipment is in active/standby mode, including MP, T net, NETD, COMM, FBI, clock equipment & subscriber unit processors, etc.

**PERIPHERAL SWITCHING MODULE (PSM)**

**Major functions of PSM:**

* In a single module office, it performs the PSTN, ISDN subscriber access & call handling
* In a multi-module office, it is connected into the central modules one of the module offices
* As the mobile switching system ( MSC ) , it is connected into the central exchange
* As the service switching point ( SSP ) of IN, it is connected into the SCP

**Hardware Structure of PSM**

The core of the TS switching network pf PSM module is of an active/standby non-blocking switching network of 8K\*8K or 32K\*32K, the peripheral interface units & the signaling units. The internal message paths are established through the intramodule communication boards (COMM) & the monitoring boards (MONI).The clock employs the loose-coupling method with its possible maximum accuracy of Stratum 2 & degree A. It can provide built-in Bits systems too.

The full system configuration is of 12480L ( 12480 subscriber lines) + 26700DT ( 26700 trunks) . In every group of 960 subscribers, it interchanges with 240 trunks. Each module holds 48 NO. 7 links or 24 V5.2 interfaces.

 **SWITCHING UNIT**

 **8K \* 8K**

 **8 Mb/s**

**Digital trunk unit**

 **MP1**

 **MP0**

 **COMM**

 **COMM**

 **V5.2**

 **NO. 7**

**TONE**

**DTMF**

**MFC**

**Subscriber unit**

**SIGNALING UNIT**

**8 Mb/s**

**SNM**

**2 Mb/s**

**2 Mb/s**

**Control unit**

 **2**

**Figure: PSM structure diagram**

PSM employs multiprocessor hierarchical control mode, consisting of the following basic units.

* Control unit: MP, COMM, & MONI, Namely, a single COMM board can process 32 64Kb/s HDLC, with 8K-byte & dual-port RAM. It can serve as MP-PP, MP-MP COMM, no.7 signaling boards, V5.2 C channel board & 30b + D D channel board. Moreover, it can monitor the power supply, synchronization unit, & FBI ( fiber interface ), for instance, the MONI & the PEPD( peripheral environment parameter detection ) boards
* Switching unit: 8K DSN ( digital switching network ) & some DSNIs
* Synchronization unit: clock reference card CKI ( if the bits interface required ), synchronous oscillator SYCK
* Peripheral interface unit: DTI, FBI, as well as subscribers & analog trunk boards
* Signaling unit: ASIG ( analog signaling board ), TONE, MFC, DTMF, & CID
* ( caller identification ) board
* Subscriber unit: in every 960 subscribers lines, there are 40 ASLCs ( or DSLC ), each containing 24 analog subscriber lines ( or 12 digital subscriber lines for each DSLC ). Each unit is equipped with 4 analog subscriber test boards MTT ( or digital subscriber test boards DMTT ). ASLC & DSLC boards can be inter-inserted, so can the MTT/DMTT. All the single boards have processors. The subscriber unit is monitored by two active/standby SPs
* Analog trunk unit: the analog trunk unit is controlled by two active/standby SPs with 22 trunk boards, including the single frequency trunk ( SFT ), the loop trunk ( TRT ), the A/B wire trunk ( ABT ), & the magnetic trunk ( MT )

**THE REMOTE SWITCHING MODULE ( RSM )**

The internal structure of RSM module is exactly the same as that of PSM except more TSs from PSM to the central network & their fixed no. is of 2040. However the no. of TSs from RSM to the central network is comparatively smaller & can be increased at the rate of every 32 TSs, flexible as well as adjustable.

**MESSAGE SWITCHING MODULE ( MSM )**

SNM usually employs 4\*8K planes, with the maximum expansion capability of 8 \* 8K. Its switching TSs amount to 64K, applicable to various sorts of markets. The HWs from RSM, PHM are averagely distributed to 8 planes. Considerably the configuration flexibility of RSM , the PCM links from RSM can be connected to the multi-plane via the switching of a single T net. Since the connection of each plane can be controlled through a pair of MPs & two COMM boards with the 256 Kb/s HDLC link, that pair of MPs in SNM can also be connected with NT server of OMM via Ethernet so as to serve the message transmission between OMM & other related modules.

**MSM**

**MP1**

**MP0**

**...........**

**COMM**

**COMM**

**COMM**

**COMM**

**n \* 64Kb/s**

**COMM**

**COMM**

**MP1**

**MP0**

 **Figure: MSM structure diagram**

**PSM+**

**CENTRAL SWITCHING NETWORK MODULE ( SNM )**

The major function of SNM is to perform not only the TS switching between PSM & PSM but also the B-channel connection between PSM & PHM.

**Multi-Plane**

**S net**

 **S T**

 **S T**

 **S T**

 **PSM**

 **( Tn )**

 **PSM**

 **( Tn )**

 **PSM**

 **( Tn )**

 **PSM**

 **( Tn )**

 **PSM**

 **( Tn )**

 **PSM**

 **( Tn )**

**.**

**.**

**.**

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**Figure: Multi-module Test connection diagram**

After the semi-permanent connection, SNM will transmit the TSs from the multi-module to MSM to support the n \* 64kb/s switching. It can be applied to the ISDN H0 channel transmission, making the alternation of the communication bandwidth n \* 64kb/s ( n≤32 ) become possible. It can also provide the background with the information channel.

 **Built-in**

 **fiber**

 **E3**

 **E1**

**SNM**

**COMM**

 **MSM**

**512 Kb/s**

**512 Kb/s**

**.**

**.**

**16 \*** **8Mb/s**

**Built-in fiber**

**Built-in fiber**

 **PSM**

 **s**

 **PSM**

**COMM**

**COMM**

**MP0**

**MP1**

**RSM**

**Single T net**

 **8K \* 8K**

 **Single T net**

 **8K \* 8K**

**COMM**

**RSM**

**32 \*** **8Mb/s**

**32 \*** **8Mb/s**

**16 \*** **8Mb/s**

SingleTnet8K\*8K

SingleTnet8K\*8K

**LAN**

**2 Mb/s HDLC**

**Figure: SNM structure diagram**

SNM usually employs 4 \* 8K planes,with the maximum expansion capability of 8 \* 8K planes. Its switching TSs amount to 64K, applicable to various sorts of markets. The HWs from RSM, PHM are averagely distributed to 8 planes. Considering the configuration flexibility of RSM, the PCM links from RSM can be connected with the multi-plane via the switching of a single T net. Since the connection of each plane can be controlled through a pair of MPs & two COMM boards with the 256Kb/s link, that pair of MPs in SNM can also be connected with NT server of OMM via Ethernet so as to serve the ,message transmission between OMM & other relevant modules.

**THE OPERATION & MAINTENANCE MODULE ( OMM )**

According the size of modules, SNM can be such types as of 32K, 64K, 128K, 256K, of which 13K network can be employed to connect with 13 PSMs & 35 RSMs.

 The ZXJ10 SPC exchange follows the centralized maintenance management mode. Its maintenance management network has applied not only the client/server structure which is based on the TCP/IP protocol, but also the WINDOWSNT4.0 operation system. Its contents contain such things as data, statistical traffic, billing, system measurement, system alarm, etc, which are substantial for the management & the maintenance of the exchange. The handling of the software & the data of the whole system is executed in OMM. Then SNM transmits the results to each peripheral module, & can be under remote operation as well as maintenance management.

**NT client**

**NT client**

**NT client**

 **MP**

 **DDN PSTN/PSPDN**

**NT Server**

**NT client**

**NT client**

**router**

**..............**

**Figure: OMM connection diagram**

The main processor of MSM ( or other PSM modules ) can be connected into Ethernet via the standard TCP/IP protocol. As a result, the message interworking between OMM & the foreground processor is available.

**MOBILE PERIPHERAL MODULE ( MPM ) & VLR MODULE VPM**

MPM & VPM are developed on the advanced ZXJ10 ( V10.0 ) platform by adding mobile switching modules MSC & VLR modules, forming the core of the ZXG10 mobile switching network.

 The major function pf MPM is to realize the relevant functions of MSC, that is, providing the voice trunk, the signaling link to BSS, the tone trunk to PSTN, providing the link interface to PLMN, at the same time, supporting the message interaction among the VPMs. In addition , MPM is similar to pure wired trunk module. Within 8KTSs ( eg. 2KTSs to SNM, 2KTSs to BSS ), 4K TSs are for the incoming & outgoing office trunks, supporting approximately 20 thousand mobile subscribers.

 Except the absence of the ASIGF board, the rest of the VPM structure is the same as that of MPM, & their functions are generally the same. Unlike MPM module , the single T network of VPM module does not control the connection of the speech channels. Instead it only performs the connection of the internal control, & the communication signaling, VPM mainly carries out the functions related to VLR, providing the actual storage & management in such temporary resources as TMSI, MSRN etc. It also controls the communication with other network entities eg, VLR, HLR, VPM itself can manage NO.7 signaling handling**.**

**Charging center**

 **NMC**

 **BSC**

**OMC-R**

**HLR/AUC**

 **BTS G900**

 **BTS D1800**

 **PSTN**

 **ISDN**

 **PSPDN**

 **PLMN**

 **VPM**

 **MPM**

 **PSM**

 **MSM**

 **SNM**

**X.25**

**TCP/IP**

**OMC-S**

 **TCP /IP**

**BSS**

**TCP/IP**

**BSS:** base subsystem **MSC:** mobile switching center

**MSM:** message switching module **SNM:** switching network module

**MPM:** mobile peripheral module **VPM:** visitor peripheral module

**PSM:** peripheral switching module (cable) **HLR:** homing location register

**AUC:** authorization center

**Figure: ZXG10 mobile communication system structure diagram**

**PACKET HANDLING MODULE (PHM)**

With PSM as its platform, the physical architecture of PHM employs X.25 protocol to support two call types, namely Case A & Case B**.**

**Case A:** B channel packet data are handled by COMM & MP in PHM**.**

**Case B:** The switching network transmits B channel packet data to AU (access unit) at PSPDN side for handling.

**INTERNET ACCESS MODULE (IAM)**

IAM is developed on the ZXJ10 platform, consisting of the call signaling handling module, the MODEMPOOL module & the protocol handling module with the purpose of increasing relevant IP services for ZXJ10. The present services focus on the internet access, IP telephone/fax: & the provision of remote network access for the subscribers. Via the common lines, ISDN lines & other private lines, the remote subscribers can get access to the networks. Furthermore, IAM also provides such services as network subscriber account management, subscriber authorization & access authorization control, ensuring the subscribers network access validity. The access capability can be of n\*30 lines. The extension capability can be smoothly achieved by over 20,000 lines

**ROUTER**

 **WWW**

**SERVER**

**DNS SERVER**

**AAA SERVER**

 **OAM**

 **IAM**

 **ZXJ10**

**Internet FBI**

**E1/DDN**

**PRI/FR**

**M**

**PC terminal**

**Figure: Internet access diagram**

Telecommunication operators can add internet services effectively & smoothly. This plays the part of the “data bypass” objectively & consequently reduces the pressure caused by internet on modern telecommunication networks.

Additionally IAM can be employed to establish not only the large capacity internet access point so as to make construction of the service groups very flexible, but also the enterprises INTRANET. Or it can build the VPN network for clients. Meanwhile as the IP telephone/fax network gateway. IAM can provide internet telephone/fax services for the end-users, for eg. IPPHONE, IPFAX, internet incoming/outgoing call, analog access & postal box services.