



Telecommunication System of Malaysian Railways

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General

The Communication System was utilized the modern technology and be designed for safe, efficient and reliable operation and maintenance. The Communication System was robust against power interruption, capable of automatic recovery without losing the system configuration. The Communication System was fully integrated where possible in order to provide a cost effective solution. The system product information was submitted to SO for approval. The procurement of material will proceed upon obtaining the approval of SO. The product was compatible with KTMB existing equipment where possible. The system contractor submitted a list of all the material for procurement, FAT and the delivery dates were submitted to SO. The relevant Communication system was provided at the new Eleven (11) stations, existing Johor Bahru Sentral Station, Feeder Station, MPTSL and Depot, as stated below.

The Communication systems where applicable, provided in the stations and Depot are as follows.

□ DTS STM-64

□ 48 VDC Rectifier

□ Public Address System (PA)

□ Passenger Information System (PIS)

□ CCTV System

□ PABX System

□ Card Access System

□ Station Automation System (Station SCADA)

□ IT Network System (STAR & SPOT and INTRANET)

□ TETRA Radio Communication System

□ Master Clock System

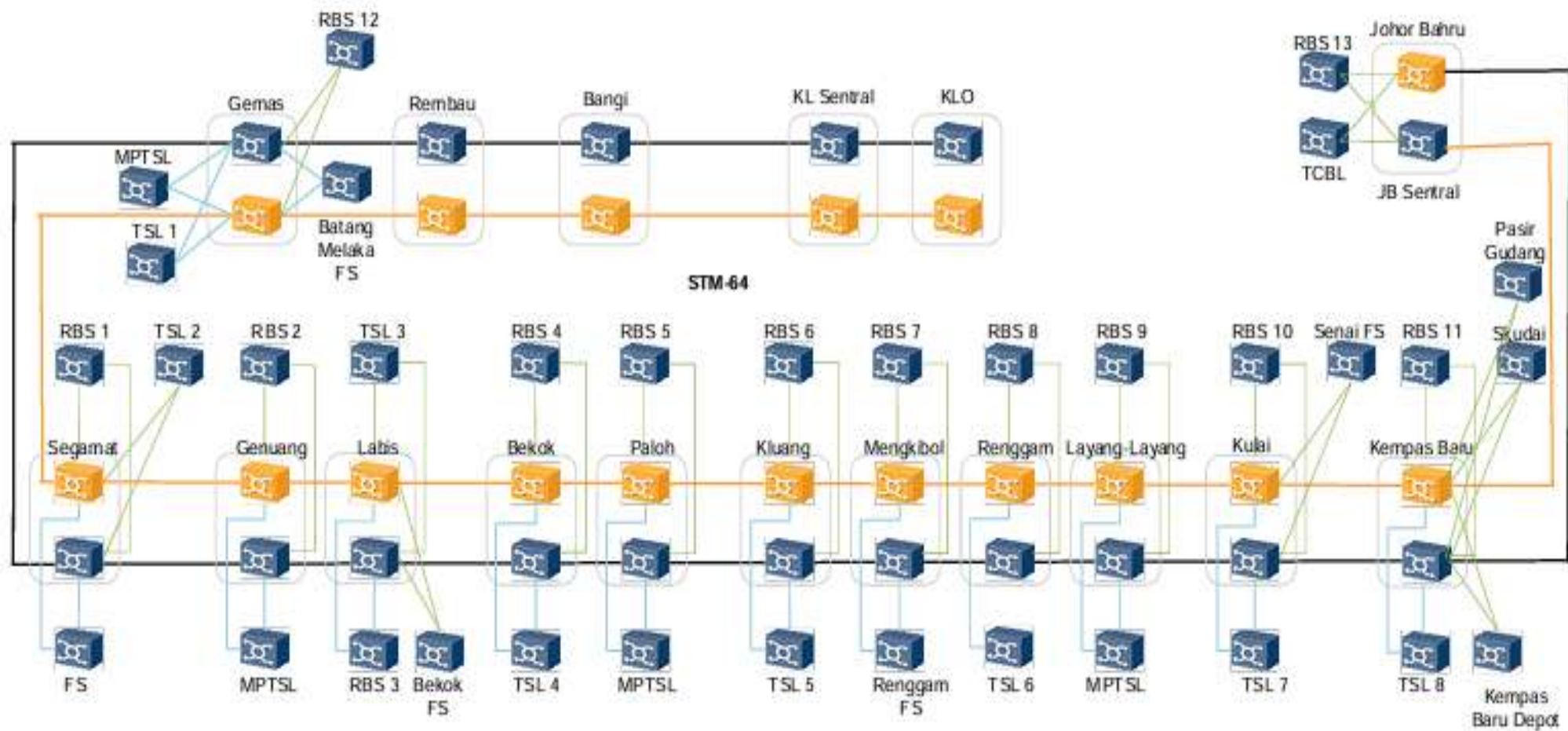


Figure 1: DTS System Architecture

48 VDC SWITCH MODE RECTIFIER (SMR) Date: 01/03/2019 Page: 16 The 48 VDC Switch Mode Rectifier for with 12-hours back-up power supply for DTS, STM-64 and will be provided for the Eleven (11) Stations, existing Johor Bahru Sentral Station, Feeder stations, MPTSL, TSL, TCBL, TETRA Remote Base Station and Kempas Baru Depot. The power supply for SMR is from the UPS/Battery system. The existing rectifier at JB Sentral station will be re-utilized if compatible for the PABX and DTN.

Scope of Works The scope of works about the Rectifier system will enable DTS equipment and PABX main node to be operated safely in the event of power failure of incoming supply. The complete Rectifier system will be installed at the following location:

All new stations

Existing Johor Bahru Sentral Station

Feeder Stations

Mid-Point Track Sectioning Locations (MPTSL)

Track Sectioning Location (TSL)

Tie Circuit Breaker Location (TCBL)

TETRA Remote Base Station Kempas Baru Depot

PUBLIC ADDRESS SYSTEM (PA) The PA system will be provided for new Eleven (11) stations, existing Johor Bahru Sentral Station and Depot. The complete PA system will be part of the Communication system. The system will comprise of necessary equipment required for the local and remote public address system. The existing speakers and cables at JB Sentral station will be re-utilized if compatible. Speakers will be provided within the station, Depot area and platforms and the type are as stated below. a) Ceiling speakers at the Main Entrances, Concourse level, paid & unpaid zone and Toilets. b) Horn speakers – Platforms c) Network Audio Controller (NAC) d) Mixer Pre-amplifiers e) Power amplifiers f) DVD Players g) DVD Changers h) Electronic Chime unit i) IP Microphone paging / Hand held emergency microphone paging j) FM Radio tuner k) Patching Panel l) Equipment rack m) Ceiling speaker with wall mounted volume controller at SMO & Ticketing room and M/F Surau n) Table top IP Microphone with zone Selector at SMO table

PA System

The PA system can will be operated from CTC Gemas and CTC KL Sentral for the Public address as follows. a) Automated Long Line Public Address (ALLPA) b) Real - Time Long Line Public Address (RLLPA) c) A Local Public Address

Passenger Information System

PASSENGER INFORMATION SYSTEM (PIS) The Passenger Information System (PIS) was provided at the new Eleven (11) stations and existing Johor Bahru Sentral Station and the system will be integrated to CTC KL Sentral and CTC Gemas for train information from Signaling. The display board will be type of LED/LCD of 46 inch (117cm). The display board type Single-sided will be located at the station Entrances and, waiting area (Paid and Unpaid area). The existing displays and cables at JB Sentral station will be re-utilized if compatible.

Master Clock System

MASTER CLOCK SYSTEM (MCS) The Secondary Master Clock will be provided in the new Eleven (11) stations and existing Johor Bahru Sentral Station was linked to primary master clock system in KLO station and existing JB Sentral. The display slave Clock will be installed at the appropriate station area for the and new stations. The Secondary Master Clock will be synchronized to the Primary Master Clock via the Network Time Protocol (NTP). In case of loss of synchronization pulses, the Secondary Master Clock will still function independently.

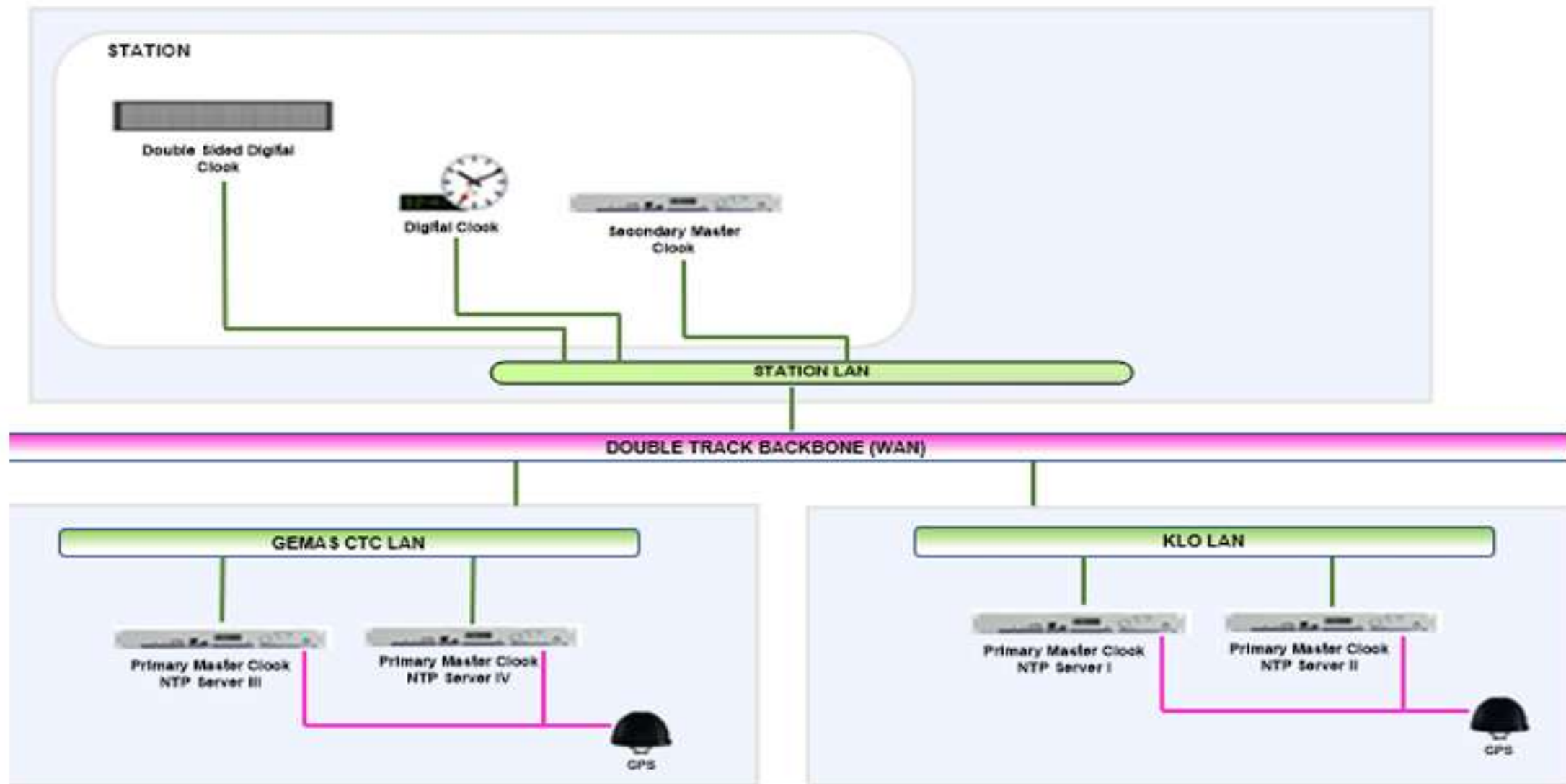


Figure 2: NTP Clock Architecture

CCTV SYSTEM

A Close Circuit Television System (CCTV) was provided to the new Eleven (11) stations, Feeder Stations, MPTSL, TSL, TCBL and at Depot will be provided for security and surveillance system and will be linked to CTC KL Sentral and CTC Gemas. The CCTV system, consist of Network Video Recorder (NVR), fixed cameras, PTZ Cameras will be at stations and Depots. Whereas at the FS, MPTSL, TSL and TCBL Fixed cameras and NVR will be provided and linked to the nearest station via DTS. The existing cameras, CCTV recordings, storage and cables at JB Sentral station will be re-utilized if compatible. 7.2 7.3 7.3.1 7.3.2 7.3.3 7.3.4 7.3.5 7.3.6 The CCTV system workstation with monitor, keyboard, joystick will be located at the station. The CCTV cameras will be provided at the entrances, concourse area (paid and unpaid area) and platforms. Workstation with Monitors and Keyboard where necessary will be provided in CTC Gemas and CTC KL Sentral for remote surveillance. A rack will be provided for the CCTV system equipment will be located in the communication room.

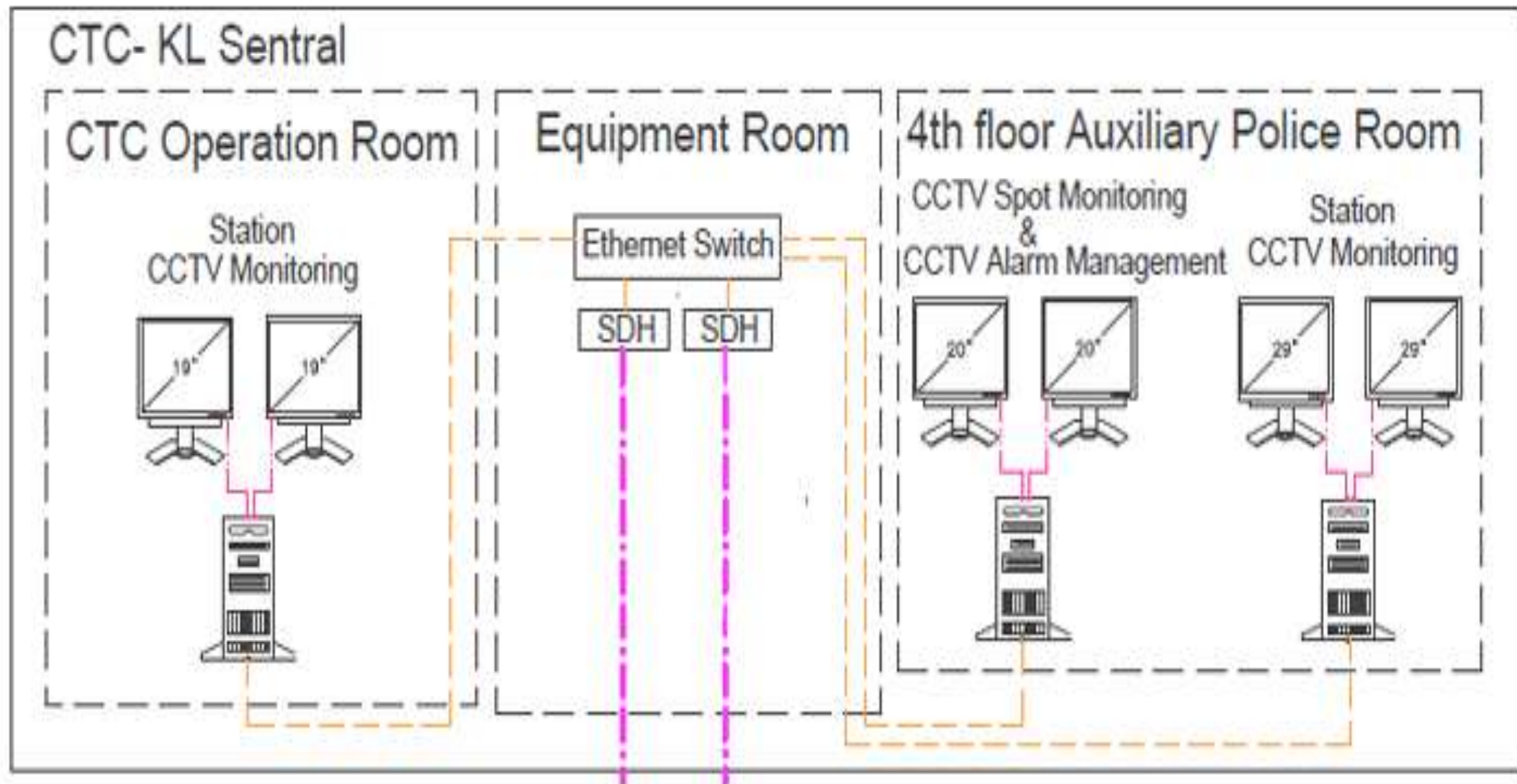


Figure 3: CTC KL Sentral System Overview Diagram

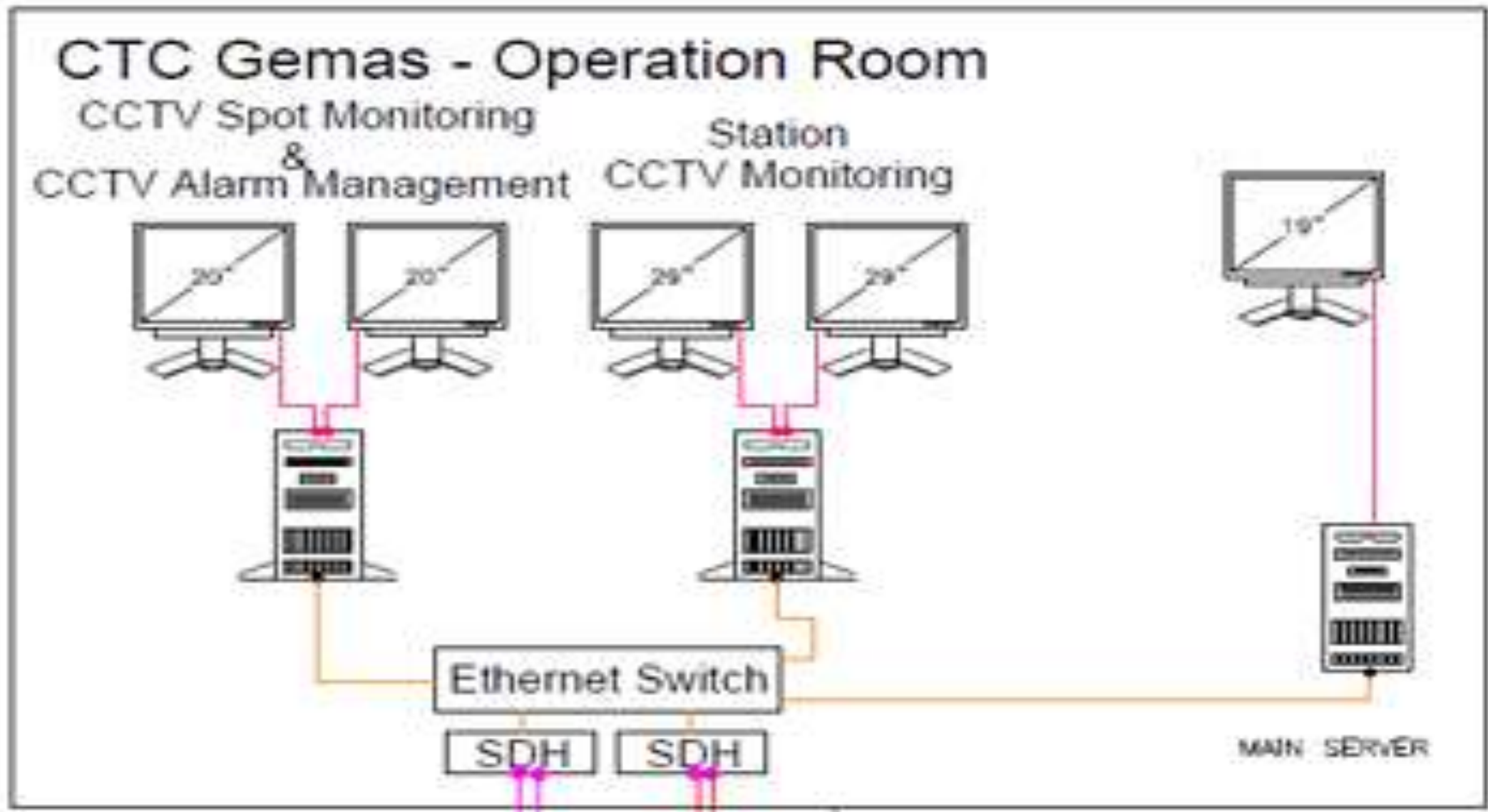


Figure 4: CTC Gemas System Overview Diagram

A few cameras will be associated for the GJBEDT project:- Fixed Camera Dome Camera PTZ Camera



Figure 13: IP Dome Camera



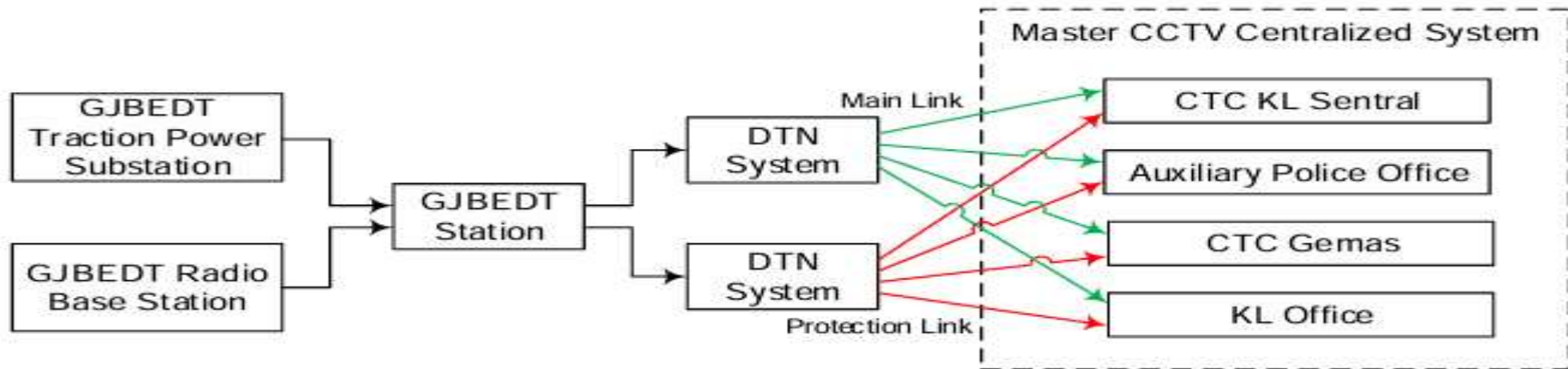
Figure 14: IP Fixed Camera



Figure 15: PTZ Camera

Interface System

CCTV system for GJBEDT shall interface with Digital Transmission Network (DTN) to provide centralized system at CTC and all GJBEDT station, traction power substation & TETRA Remote Base Station. The Digital Transmission Network (DTN) architecture shall consist of all GJBEDT station which will be relay back to CTC.



CARD ACCESS SYSTEM (CAS)

CARD ACCESS SYSTEM (CAS) The Card Access System (CAS) will be provided in the new Eleven (11) stations, Depot and TETRA Remote Base Station and will be linked to CTC Gemas. The existing card access equipment and cables at JB Sentral station will be re-utilized. 8.2 8.3 8.3.1 8.3.2 8.3.3 8.3.4 8.4 8.4.1 8.5 8.5.1 Power supply for CAS system is from UPS/Battery system.

Interfacing with Fire Alarm System

The CAS will integrate with Fire Alarm System for emergency door release. In the event of fire, the door controller will receive the fire signal via hardwire connection from fire alarm panel and automatically release the door. When alarm is triggered, the buzzer in the controller will sound. The interfacing diagram for CAS and Fire Alarm System is illustrated in Figure 18.

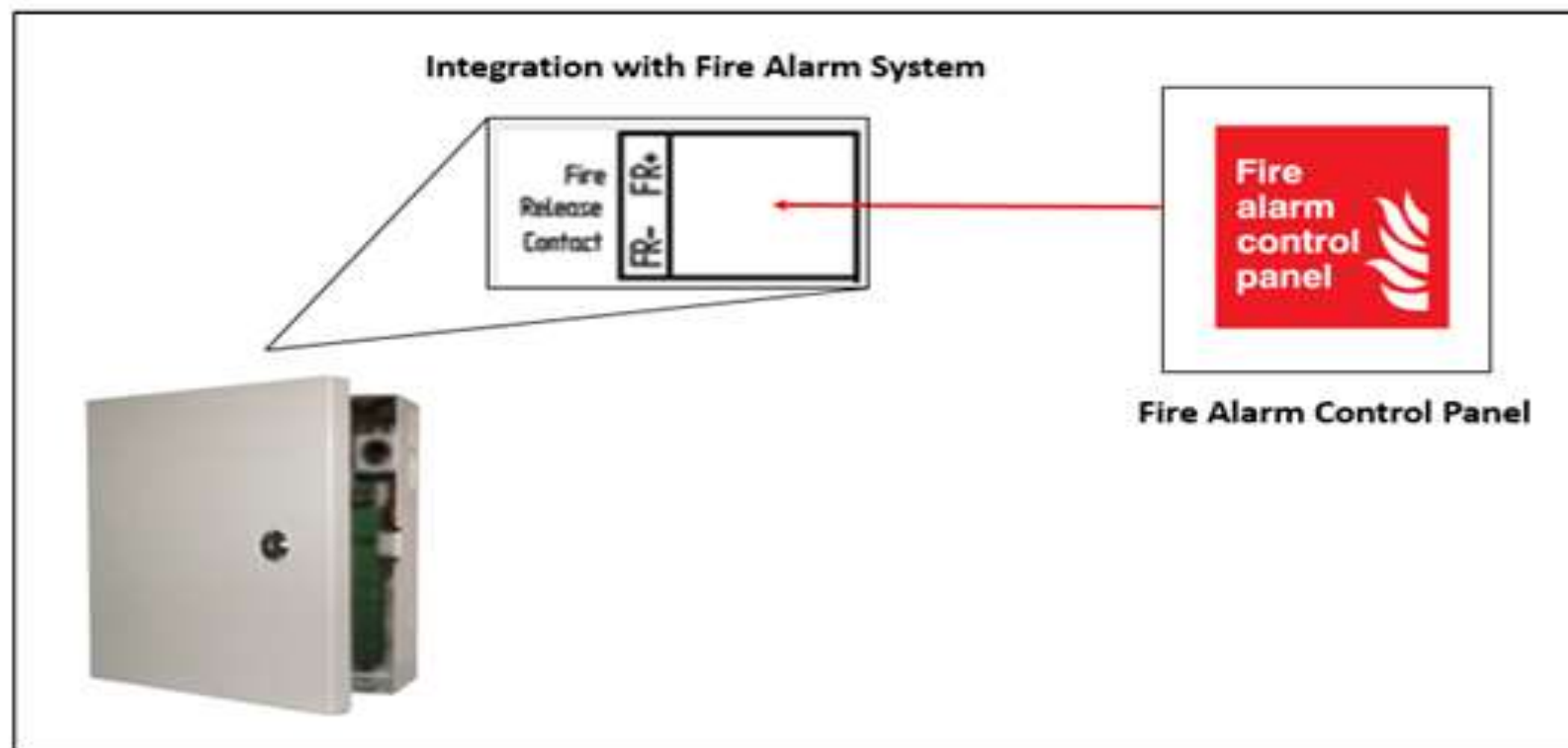


Figure 18: Card Access Interface Diagram with Fire Alarm System

Integration with Building SCADA System

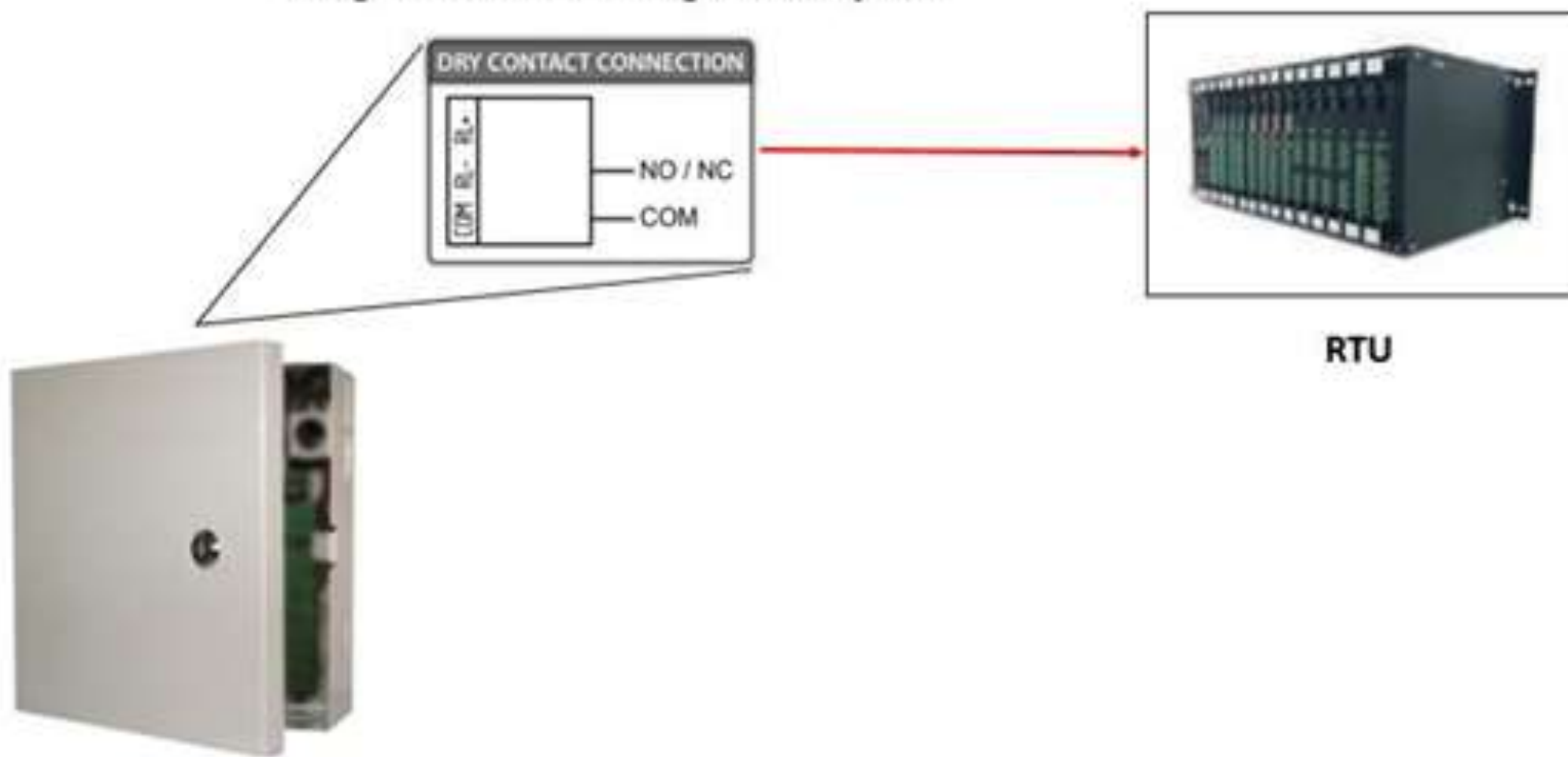


Figure 19: Card Access Interface Diagram with BSCADA

Location of CAS System

Installation Location The CAS system provided at the stations rooms are as stated below: a) Security room

b) Signaling Equipment room (SER)

c) Communication system room

d) UPS/Battery room

e) Fiberail room

f) LV room

g) Generator room

h) Station Master Room

i) Ticketing Office

PRIVATE AUTOMATIC BRANCH EXCHANGE SYSTEM (PABX)

The PABX lines will be provided in the new Eleven (11) stations and existing Johor Bahru Sentral Station will be integrated to the existing PABX exchange at CTC Gemas. The PABX lines with IP Phone sets will be provided. The PABX lines and IP Phone will be provided in the Line Side Cabinet (LSC) and TETRA Remote Base Station. The PABX lines for Depot will be provided and linked to the Johor Bahru Sentral PABX node. The existing telephones and cables at JB Sentral station will be re-utilized if compatible. 9.2 9.3 9.4 9.4.1 9.4.2 9.4.3 9.4.4 The PABX new node will be in a rack and location in the Johor Bahru Sentral. The PABX lines will provided for Feeder stations (FS), MPTSL, TSL and TCBL will linked to the PABX node at Johor Bahru Sentral. The PABX lines with phone will be provided in FS, MPTSL, TSL ,TCBL and TETRA Remote Base Station. The PABX lines for the quarters will be provided and linked to the PABX node at Johor Bahru Sentral. The PABX lines with phone will be provided for the quarters Power supply for PABX system is from UPS/Battery system.

Installation Location The PABX points and IP Phone will be provided at the stations are as stated below:

a) Booking Office

b) Station Master Room

c) Security Room

d) Telecommunication Room

e) Signaling Equipment Room (SER)

f) UPS/Battery Room

g) Genset Room

h) Fiberail Room

i) Surau (Male)

j) Surau (Female)

k) Kiosk

l) Café

m) VIP Room

STATION AUTOMATION SYSTEM (BSCADA)

Station Automation System will be provided in the eleven (11) stations to monitor and linked to CTC KL Sentral and CTC Gemas. The Station Automation RTU will be installed all stations and will be linked to CTC KL Sentral and CTC Gemas. Station Automation System I/O are stated below:-

- a) Lift & Escalator – General Alarm and Status
- b) Ground floor and First Floor Concourse Lightings (Essential & Normal supply) – OFF/ON Status
- c) Platform Lightings (Essential & Normal supply) – OFF/ON Status
- d) Booking Office, Security Room, Station Master Office, VIP Room, UPS/Battery Room, Signal Room, Telecommunication Room, Fiberail Room, LV Switch Room & Standby Genset Room, – Door Intruder Alarm
- e) Main Fire Alarm Panel – Fire Common alarm and Panel fault alarm
- f) Telecommunication Room & UPS/Battery Room – High Temperature Alarm
- g) Main Incoming Power Supply Status (UPS, TNB and Genset) – ON/OFF Status
- h) Rectifier Status – ON/OFF Status and General Alarm Status.

Interface between BSCADA and other System

Interface

Station Automation System RTU will be interfacing with other system to monitor/control the equipment as shown in Figure 21. The cable will be connected through terminal block / connector / relays.

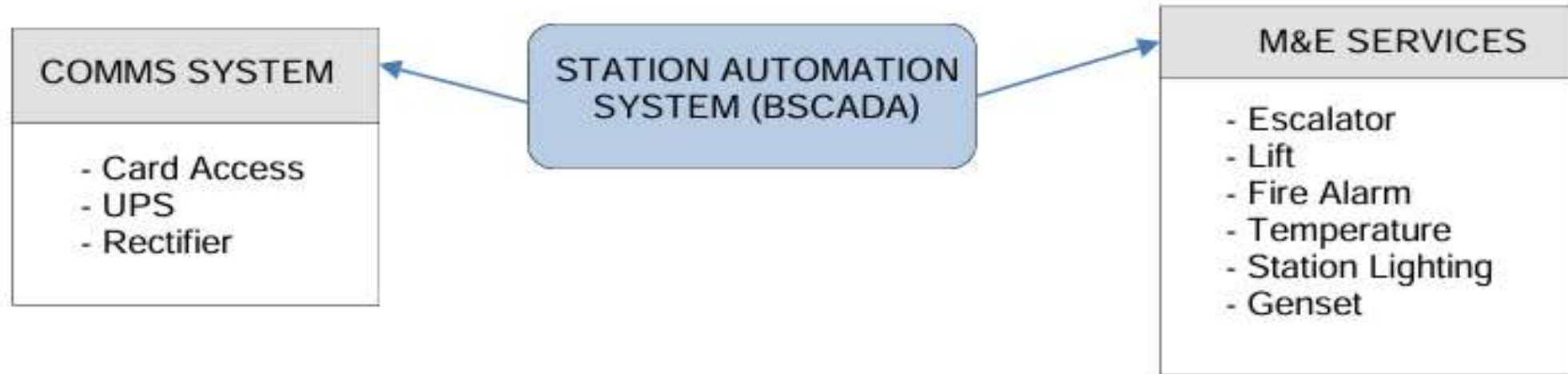


Figure 21: Interface between BSCADA and Other Systems

TETRA RADIO SYSTEM

TETRA radio system will be provided for radio coverage between Gemas to Johor Bahru Sentral Station. The TETRA Remote Base Station shall be linked to the nearest station via 12 core fiber optical cable. The TETRA radio system will be of a 380 – 400 / 410 – 430 MHz Terrestrial Trunked Radio communication system based on TETRA standards. The TETRA radio system will be linked to KLO and CTC Gemas. The TETRA radio system will be powered by UPS/Battery System.

12.2 12.3 12.4 12.5 The TETRA radio system will consist of the following:

- a) System Management Operation / Central Control Unit (MSO/CCU)
- b) System features and services
 - i. Voice services
 - ii. iii. iv. Data services
- c) Advanced Resource Management Features
- d) Advanced Safety and Security Features
- e) TETRA Remote Base Station
- f) Network Management System (NMS)
- g) Computer Aided Dispatch (CAD)
- h) Subscriber Radios
- i) Digital Voice Recording System (DVRS)

The system configuration of the proposed system is shown in the figure below.

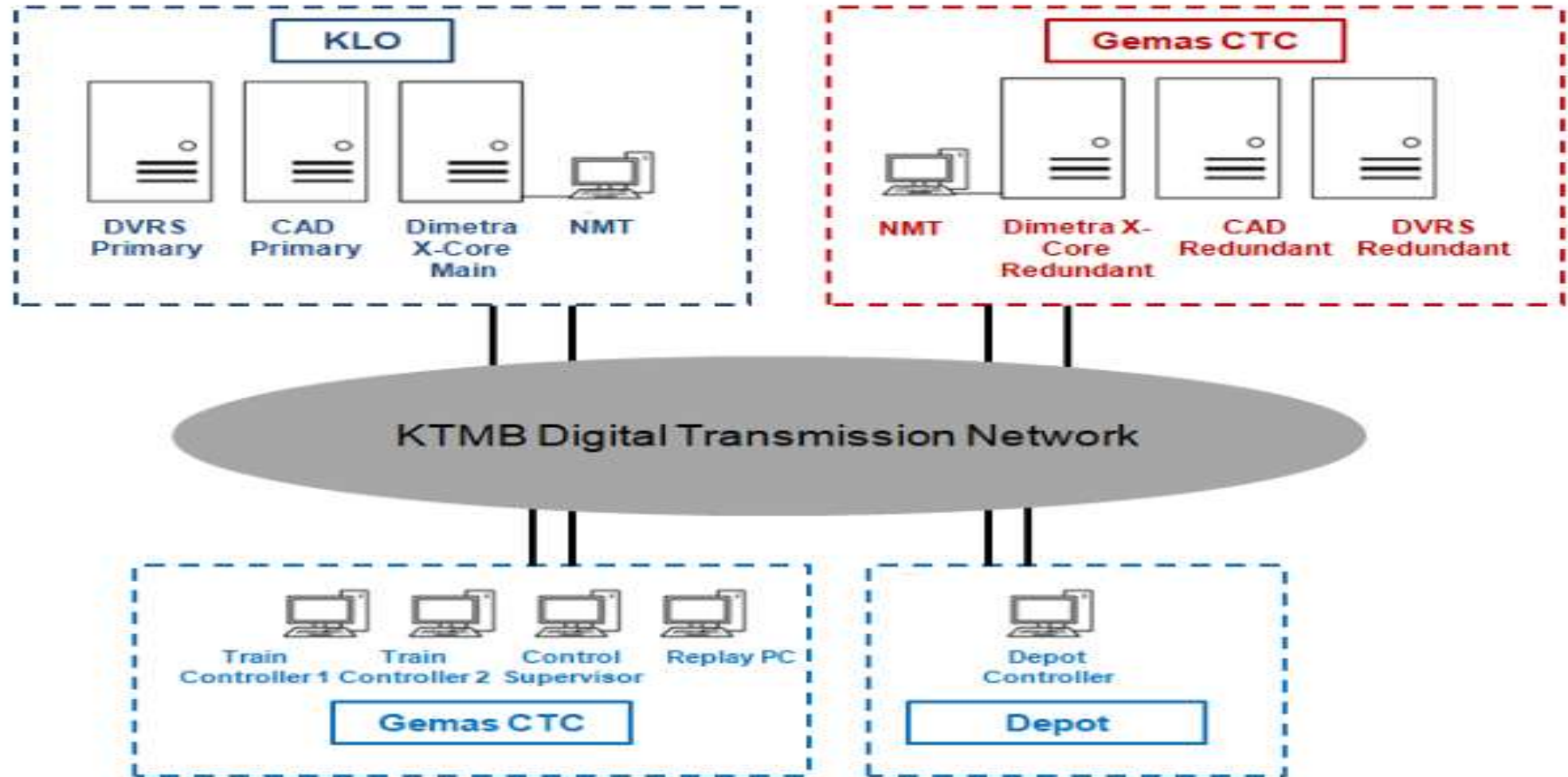


Figure 23: Overall System Configuration Block Diagram

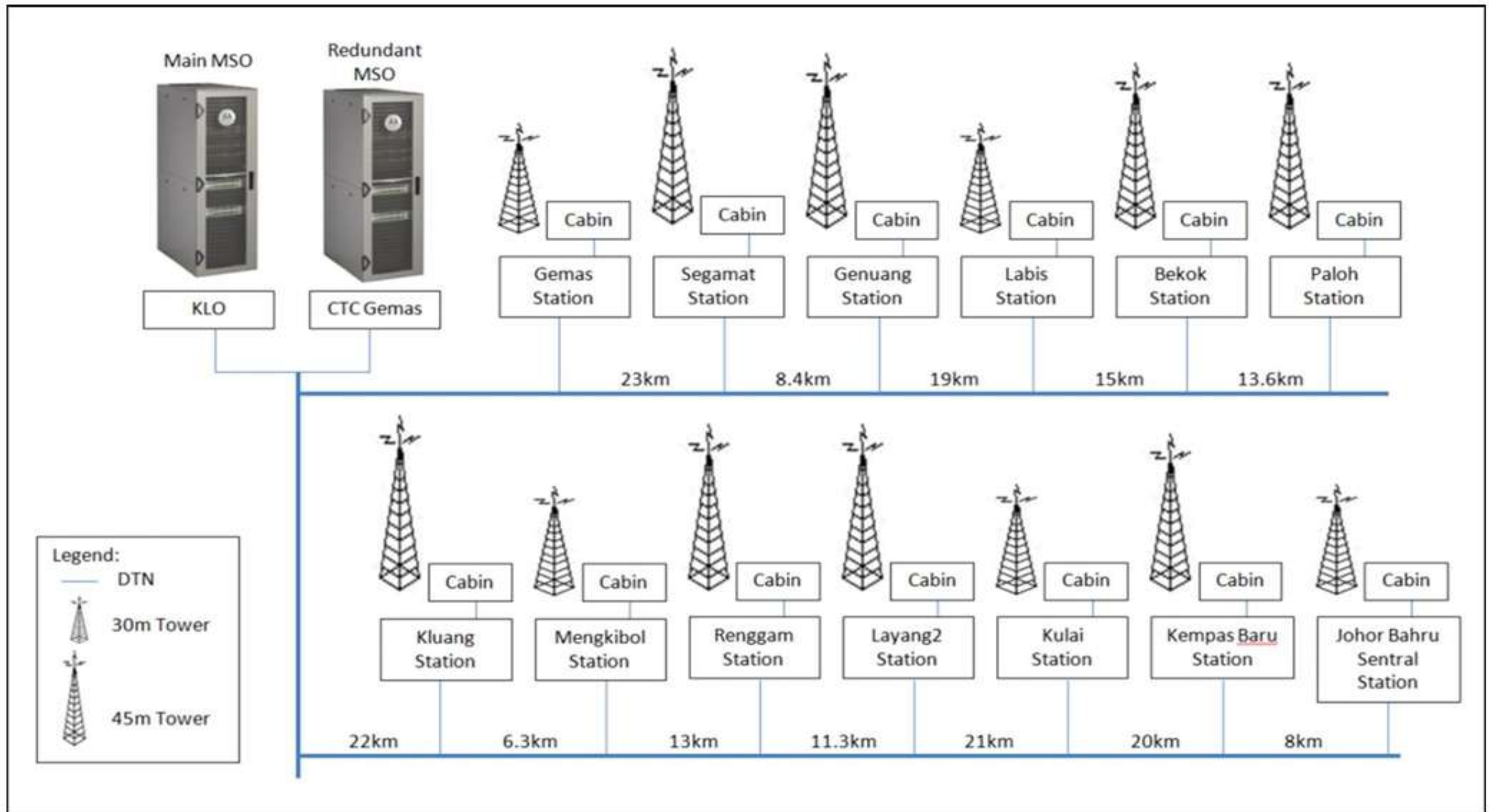


Figure 25: TETRA Radio System Architecture Diagram



Figure 26: Dispatch Console Configuration

Network Management Terminal (NMT)

The Network Management Terminal (NMT) is a standard PC running the Windows operating system. Network Managers use the NMT to access the network management applications. The client applications run on the PC and access data stored in the network management database at the MSO.



Figure 27. Network Management Terminal

Radio Frequency Distribution System

Radio Frequency Distribution System (RFDS)

- The Radio Frequency Distribution System comprises of the transmitter combiner and receiver multi-coupler. It accepts inputs from the transmitters in the TETRA remote base station, and combines these to allow the transmitters to feed into the antenna(s). Receiver multi-coupler is provided to support the receive path for multiple BR operation.

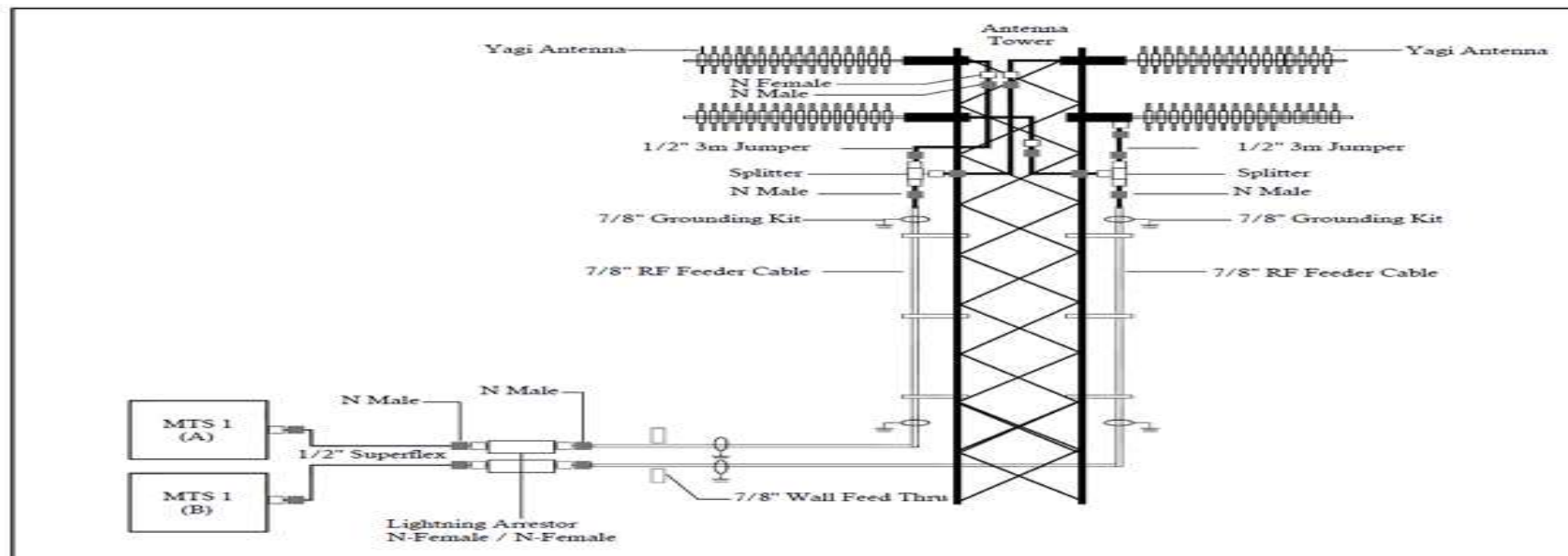


Figure 30: Dual MTS1 Configuration

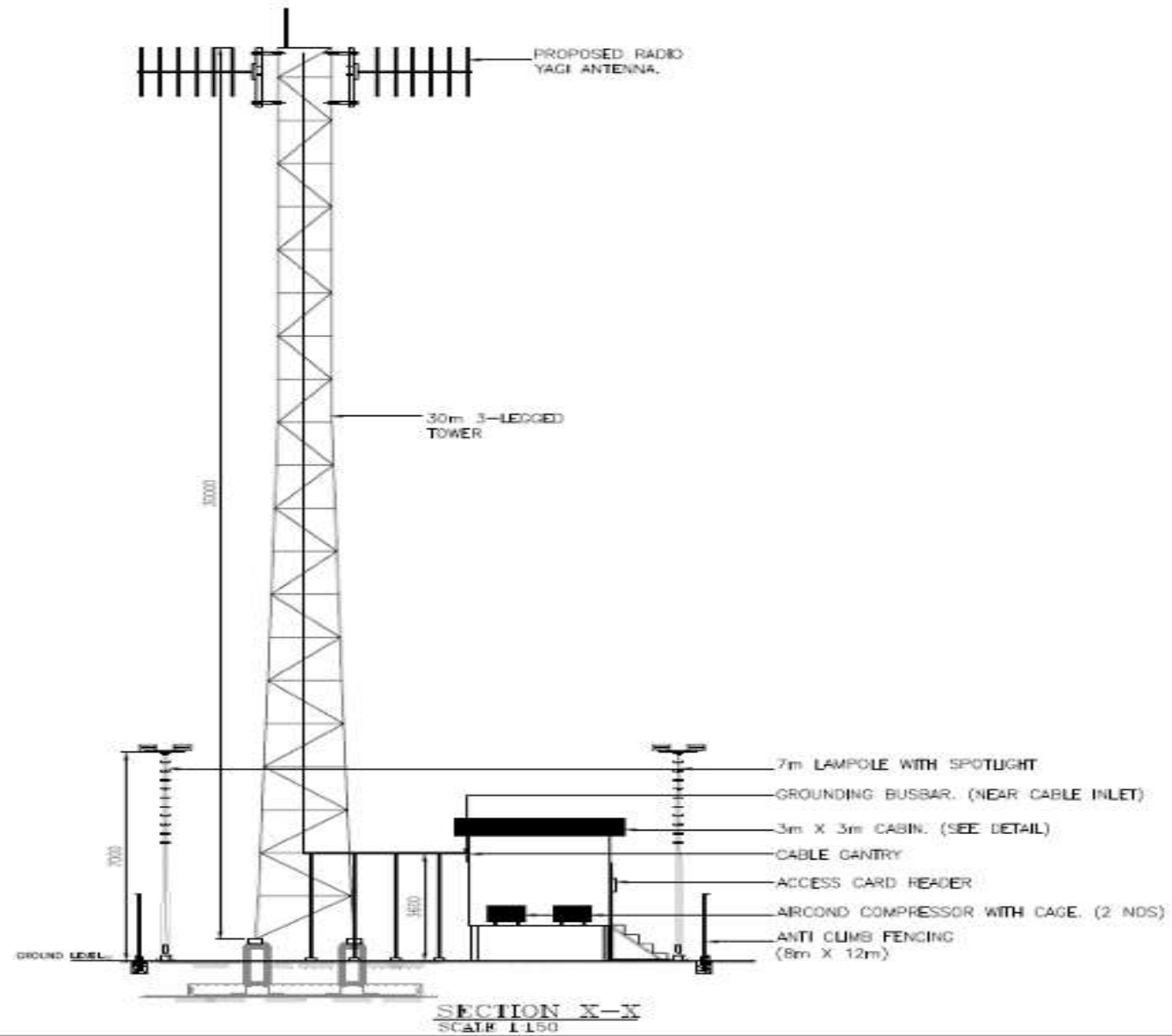


Figure 31: Typical Drawing of TETRA Cabin and Tower (30 m)

Mobile Radio ,Twenty Six (26) MTM5200 mobile radios were provided under the fixed station configuration. Two (2) fixed station units will be installed in each station; one (1) in the Station's Master room and one (1) in the "Police Bantuan" room. Each unit will be equipped with the following: MTM5200 Mobile Radio with Control Head Desk Microphone Desktop Tray External speaker Power Supply Antenna system Enclosure



Figure 35: MTP3550 Portable Radio



Figure 36: MTM5200 Fixed Station

Mobile Radio and Walkie talkie



Figure 43: Dual Microphone and Speakers



Figure 45: MTM5200 Mobile Radio

Tetra Radio System Configuration

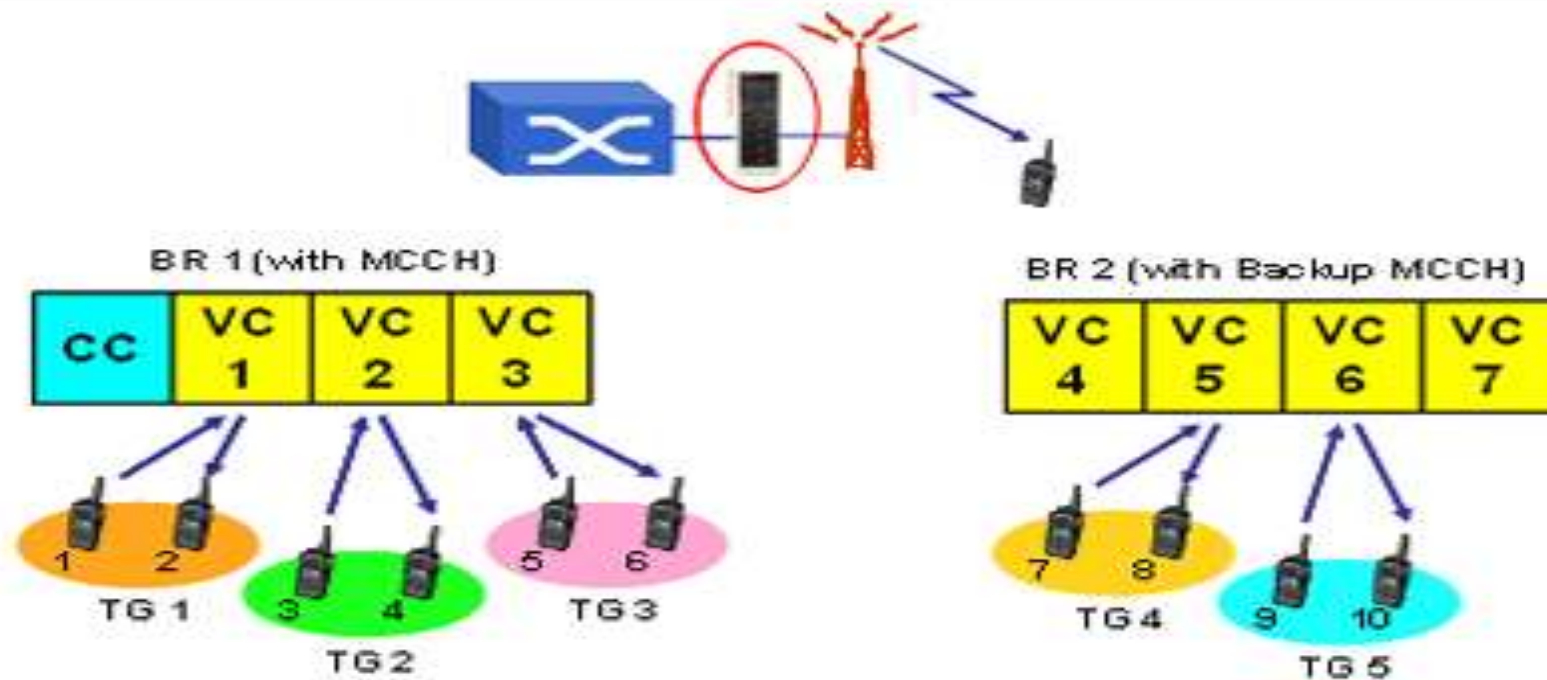


Figure 55: Normal Operation with Main MCCH

Thank You, So Much

For your Kind Attention