

नाम Name _____

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अनुदेशक का अध्याक्षर Instructor Initial

STUDY STM-1 MULTIPLEXING EQUIPMENT (Make TEJAS model TJ100MC-1)

OBJECTIVE: To acquire familiarity with TEJAS STM-1 (TJ100MC-1) Hardware, Modules (cards), Functionality and interfacing wiring.

INTRODUCTION: Tejas TJ100MC-1 is compact STM-1 SDH multiplexer equipment designed to manage bandwidth and derive services from the optical core to access. The system is based on Multi-card Chassis (MC) system that provides flexibility in terms of expansion to support additional client interfaces by adding new modules..



Front View of TJ100 MC-1

PS		TRIBUTARY CARD					FAN TRY
PS		TRIBUTARY CARD					
PS		TRIBUTARY CARD					
Aggregate Interface	Diag.	EOW	Flash Disk	BITS	Alarm	Craft Modem	ETH NMS

Slot View diagram of TJ100 MC-1

TJ100MC-1 system consists of six slots for inserting the various modules:

- PSU (Power Supply Unit)(Slot 1&2)
- Lite Tributary Card (LTC)(Slot 3)
- 1 E3/DS3 Tributary Card (TE31)(Slot 4 or 5 or 6)
- E1 Tributary Cards (TET16, TET21, TET28))(Slot 4 or 5 or 6)
- STM-1 Aggregate/Tributary Cards (A011))(Slot 4 or 5 or 6)
- Ethernet Tributary Card (TP01))(Slot 4 or 5 or 6)
- Ethernet Tributary Card (TP01FT))(Slot 4 or 5 or 6)

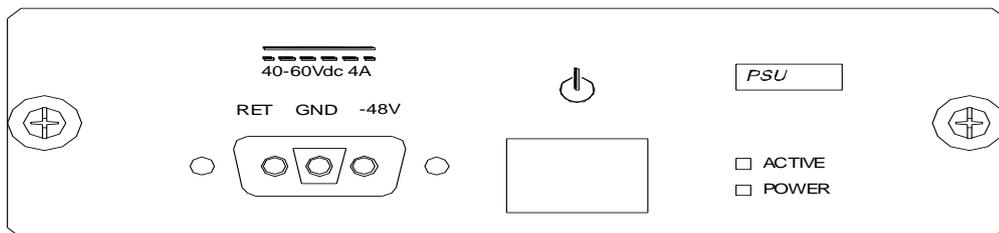
1. Power Supply unit (PSU)

The power supply units (PSU) are part of the base TJ100MC-1. The PSU forms one part of a redundant, load-sharing (not true current sharing) supply and provides a stable DC power to other cards in the system. The power dissipation of fully loaded configuration of TJ100MC-1 system is around 120 watts. TJ100MC-1 has redundant power supplies in its 2 slots. The unit is

fitted with a front panel that has a power connector, an ON/OFF switch and two LED indications. The 'power' LED turns green when the internal power converter is on and turns off if the converter is off. The 'Active' LED turns green when the outputs of the supply are working and within range. It turns red when an output voltage abnormality is detected.

Parameter	Specification
Input Tolerance	-40V to -60V
Power Consumption	120W Max.
Power Requirements	Suggested Source Fusing
Fuse Rating	6A slow, Blow
Power Cable Type	1.5mm ²
Power Connector Type	3-pin Power D-connector
Chassis Ground Connector Type	Ring Terminal.

Table 1- Power Supply Specifications for TJ100MC-1



Front view of PSU Module

Operating Parameters

- Input voltage: -40V to -60V d.c,
- +12 V d.c, 6.25A maximum
- Total output power: 75W

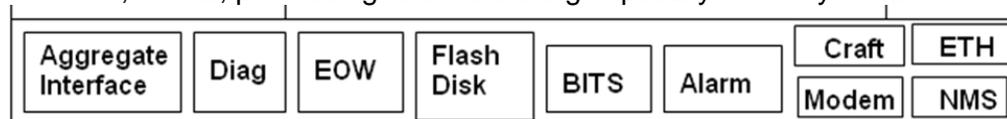
Functional Description

Power connection to the PSU is via a 3-pin power D-connector located on the front of the unit. For redundancy requirements, two separate units should be installed in the sub-rack and connected to each of the station power units. The power inputs should be fused or automatic circuit breakers should be installed.

The PSU is a single output isolated DC-DC convertor. The power input is applied via fuses, input protection and filtering circuitry to the DC-DC convertor. The convertor provides 12V D.C output. The output circuits have blocking diodes for protection when two PSUs are connected in parallel via the backplane.

2. Lite Tributary Card (LTC)

The system card (LTC) is the main module of the TJ100MC-1. It plugs into Slot 3 and provides the aggregate interfaces, clocks, processing and monitoring capability to the system.



The LTC provides the following interfaces

- Aggregate optical interfaces, SC-PC type
- Diag
- NMS
- Serial Port
- EOW
- BITS Data/Clock
- Alarm LEDs
- Alarm IN/OUT

Optical Interface

The LTC has two SC-PC STM-1 optical interfaces on the front panel. The type of the transceiver installed with the LTC will be indicated on the front panel and is also available via the web user interface

Optical Interface Specification

Specifications	S1.1	L1.1	L1.2
Minimum	-15 dBm	-5dBm	-5dBm
Maximum	-8 dBm	0 dBm	0 dBm
Receiver Sensitivity	-28 dBm	-34 dBm	-34 dBm
Receiver Overload	-8 dBm	-10dBm	-10dBm
Optical Path Penalty	1 dB	1 dB	1 dB
Section Loss	0 to 12 dB	10 to 28 dB	10 to 28 dB
Wavelength	1310 nm	1310 nm	1550 nm
Spectral Range	1261-1360 nm	1263-1360 nm	1480-1580 nm
Connector Type	SC-PC	SC-PC	SC-PC
Fiber Type	Single mode	Single mode	Single mode

Flash Disk

A non-volatile memory is used as a Flash Disk to store all details which are subjected to modifications like Ethernet IP, Router ID, Cross connections, Performance Monitoring parameters, Alarms etc.

Diag Facility

Diag is the Diagnostic port. Diag interface on the Network Element can be either a USB, RJ 45 or a DB-9 interface. DIAG interface is provided with the flash disk for logging on to it and retrieving the configuration details. With Diag, it is possible to retrieve Ethernet IP of the Network Element by connecting the Diag interface to the serial port of the PC and is accessed through HyperTerminal in Windows PC or Minicom in Linux PC.

NMS

It is a Network Management System port which has RJ 45 interface provided in all products. NMS port is useful in commissioning of a NE by connecting the NMS port to the LAN port of the PC using Straight or Cross cable, and GUI of NE can be opened with default IP of the NE ensuring PC and NE are on the same IP subnet.

By connecting the NMS ports of two Network Elements with a Cross Cable, Ethernet management can be achieved, ensuring both NE are on the same IP subnet.

Serial Port

Serial Port is used to establish serial communication between two Network Elements. It can be configured using F1 byte (in RSOH), F2 byte (in HOPOH) of the STM frame. Serial port can be configured for Data communication using UDC (User Data Channel) protocol.

Alarm Interfaces

Alarm IN Interface and Alarm OUT Interface

Alarm IN interface is used to report an external alarm (ambient temperature high, access door open, AC shutdown). Alarm IN interface can report a maximum of 2 external alarms or 7 external alarms.

Alarm OUT interface is used to take the contact which makes the Critical, Major, Minor LEDs glow, to a distant location (security room, control desk). These are available on a DB-15 connector.

Craft Interface

This is a RS232C connector. The default baud rate setting is 9600 bauds, 1 stop bit, no parity and no hardware/software flow control.

BITS interface

The LTC provides BITS data and clock interface on a 9 pin D connector. The BITS clock input/output is at 2.048MHz and can be nominated as a reference for node synchronization. Loss-of-Signal (LOS) is detected on the clock input and this alarm is used as a trigger to change over to the next synchronization reference. The LOS alarm is reported on the user interface.

External Alarm Interface

Two external alarm inputs and five alarm outputs ports are available from the system card.

Order-wire Interface

This is an operations communication channel that directly supports a 2-wire analog telephone. It has the full battery, over voltage, ringing, supervision, code, hybrid and test (BORSCHT) functions.

Network Element Reset

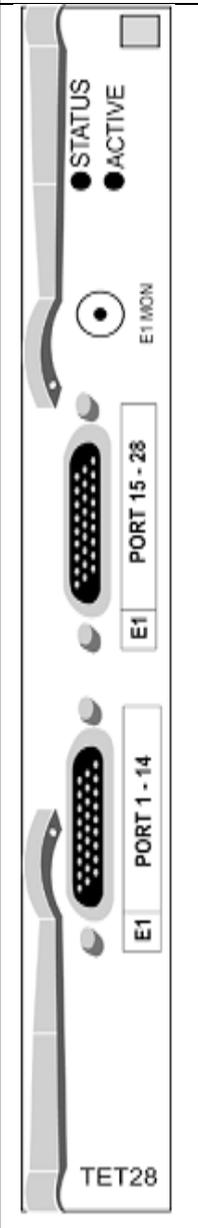
A push –to-reset button is provided on the front panel of the LTC. The reset button is recessed to prevent accidental operation.

Use a pointed object (such as the tip of a ball point pen or a pencil) to operate the switch.

This switch causes a processor reset and will force a reload of the operating system and the application software. This reset is service non-affecting. This reset is to be used in the case of a NE 'hang'. A 'hang' will get resolved within 1024 Seconds when the hardware timer expires and a service non-disruptive reset is triggered.

'Hang' is defined as a condition where the node does not respond to user commands, but provisioned traffic continues to work.

3.E1 TRIBUTARY CARD (TET16, TET21, TET28)

E1 Trib card	Description		
	Visual Indications		
	The visual indicators on the TET28 card includes two LEDs, the ACTIVE and the STATUS LEDs. The possible LED status and their significance is given below		
	LED	Color	Status
	ACTIVE	Amber	On insertion/power ON
		Green	Initialization complete/In use
		Red	Card Inactive/Admin Down
	STATUS	Amber	On insertion/power ON
		Green	Initialization Complete
		Red	Hardware error/Admin down
	Interfaces:		
This card provides line interface to 28 E1 channels in both, add and drop directions along with visual indicators. The E1 interface is provided through 62 way D-type connectors.			
The TET28 provides the following interfaces:			
E1 interfaces on 120 ohm 62 way D-type connectors			
Processor bus for control path communication to the other cards in the sub-rack (to/from the backplane)			
System clocks and timing signals (to/from the backplane)			
E1 Monitor Interface:			
Rev-2, E1 tributary cards have an E1 monitoring port that enables monitoring desired E1 port (software configurable) through a 75 Ohm BNC connector.			

Review questions:

1. What precautions are to be taken while handling PS module of TJ100MC-1 system?
2. What are the protections available in the power supply module of TJ100MC-1 system?
3. List the various interfaces provided in the LTC card of TJ100MC-1 system.
4. Give the functional description of E1 tributary interface card TET28 of TJ100MC-1 system.

Signature of the candidate