SPECIFICATION T- 2099 A

TECHNICAL SPECIFICATION OF FIBER OPTIC TERMINAL AND MULTIPLEXER EQUIPMENTS

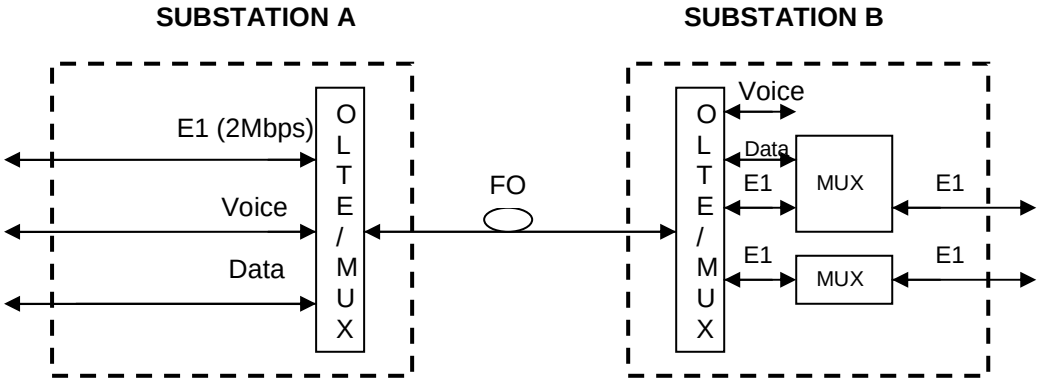
1. SCOPE

This specification covers the minimum required technical characteristics for the Fiber Optic Terminal and Multiplexer equipments (System) (OLTE/MUX) (SDH), the Network Management System and the technical topics related to equipment training, commissioning and technical support.

2. SYSTEM DESCRIPTION

The required equipments will be installed in the IPTO High Voltage substations and Energy Control Centers to expand the existing telecommunication network over PLC links, 2Mbps links and optical fibers.
The required equipments must featuring the characteristics of “flexible digital multiplexer” and comply with the relevant ITU-T recommendations. They must support Synchronous Digital Hierarchy (SDH) technology and also should be able to support Plesiochronous Digital Hierarchy (PDH) technology.
The equipments must enable the formation of a freely configurable transmission network using a Network Management System.
They must combine the functions of “64kbps cross–connect switch” and “drop insert” that are currently used in the existing network.
It must be permitted free selection of port assignment, channel modules and time slots.
It must be ensured the reliable, secure and with no data loss operation.
The equipments must be capable to operate in multivendor network together with Nx64kbps systems from other manufacturers which are currently installed in the network (e.g. LOOP Telecom AM3440 MUX) and must allow the interconnection with similar equipments.
The equipments/cards/boards must have the ability of upgrading and updating of the software and hardware (e.g. firmware, flash programming, updating of hardware, CPUs, EPROMs, PROMs, etc). Expansion capability of the system with the additional boards/cards. Centralised O&M Administration and Network Management.
The following diagram is an example of possible use in the existing telecommunication network.

Application Example:



OLTE/MUX: Requested Equipments
MUX: Existing MUX Equipments in the network
FO: Optical Fiber

3. NETWORK MANAGEMENT SYSTEM (Operation and Maintenance O&M) AND NMS

The Network Management System must include the following functions:

3.1. Initial setup and modification of configuration data.
3.2. Storage and maintenance of configuration data.
3.3. Monitoring, logging of the equipment status and history files.
3.4. Line, module and equipment testing to validate the condition of the lines and modules.
3.5. Ability to maintain system back up/restore and configuration back up/restore files.
3.6. Alarm display and events log, also through SNMP.

All the above listed functions should be able to be managed remotely and local via Ethernet (Telnet, SNMP, etc) or serial ports (e.g. RS232, V.24/V.28) and via modem through the offered Management System Software by the supplier.

All the required Hardware and Software for the connection and the operation of the Network Management System must be counted as part of the offered equipments.

4. TECHNICAL CHARACTERISTICS

4.1. Each equipment must be equipped with interface modules to provide the following:

4.1.1. One (1) optical port for dual uni-directional fiber

4.1.2. Two (2) E1 ports (interface type G703 electrical)

4.1.3. Eight (8) channels voice 2w/4w E&M

4.1.4. Four (4) channels 64 Kbps V.24 (submultiplexed at least 4 channels per 64 kbps)

It must be provided that the equipment will be open to expansion of the above listed interfaces at least 50%.

4.2. Equipment operation

The basic topology of the existing network that will be expanded with requested equipments requires to operate as “drop-insert” but it must be ensured that the equipments will operate as “cross-connect” at 64 kbps level.

4.3. Alarms Indication

Each equipment/module/board will be equipped with alarm indication LEDs.

4.4. Power supply

Power supply: -48VDC.

The offered equipments will be provided with redundant power supply (dual power supply).

The equipments will be installed in IPTO sites will be supplied by – 48VDC.

4.5. Mechanics-Dimensions

Standard 19" design ETSI.

4.6. EMC conditions

EN 55022, CL.B.

The equipments must comply for industrial environment and especially for High Voltage Substations sites.

4.7. Environmental conditions

The equipments will be installed in IPTO High Voltage substations with:

- Temperature: from -5º C to + 45º C
- Humidity from: 5% to 95%.

5. INTERFACE TECHNICAL SPECIFICATIONS

The following interfaces should be supported:

5.1. Optical Fiber Interface:

5.1.1. Fiber Type : Single Mode Optical Fiber as per ITU-T G.652/G.655
5.1.2. Optical port for dual uni-directional fiber
5.1.3. Wavelength : 1310 ±50 nm, 1550 ±40 nm
5.1.4. Attenuation at 1310 nm : ≤ 0,35 db/km
5.1.5. Attenuation at 1550 nm: ≤ 0,28 db/km
5.1.6. Connector Type : SC optical connector
5.1.7. Maximum optical length : 70 km

5.2. 2Mbps interfaces (ports), for the transmission of E1 signals:
5.2.1. Line Rate : 2.048Mbps±50ppm
5.2.2. Line Code : HDB3 or AMI
5.2.3. Input/Output Signal : ITU-T G.703
5.2.4. Framing : ITU-T G.704
5.2.5. Clock supply : internal , external G.703 , recovered
5.2.6. Line Impendence 120Ω twisted pair, 75 Ω coaxial
5.2.7. Connector : RJ48C or BNC
5.2.8. Synchronization : CRC4 G.706
5.2.9. Jitter /wander : ITU-T G.823

5.3. Analogue telephone subscriber 2w/4w with E&M:
5.3.1. F2 Line port 4 wire balanced
5.3.2. Connector: RJ45
5.3.3. Impedance at F2in/F2out: 600 Ohms
5.3.4. Reflection loss at F2in/F2out: from 300 Hz to 3400 Hz > 20db
5.3.5. Operating relative levels adjustable at F2in and F2out:
F2in: -17 dbr to +6 dbr
F2out: +6 dbr to –17 dbr
Signaling characteristics:
5.3.6. Line impedance of signal lines connected: 0 to 200 Ohms
5.3.7. Load circuit switching voltage : -60 V

5.4. Data channels V.24 for asynchronous transmission:
5.4.1. Number of channels per 64 Kbit/s: 8 min 4
5.4.2. Connector : DB25S
5.4.3. Maximum signal distortion: ≤ 25%
5.4.4. Data bit rate : 0 to 9.600 bit/s transparent

5.5. System clock
System sync:
5.5.1. Local (internal)
5.5.2. External sync (Master – Slave)

6. TECHNICAL DOCUMENTATION

System and technical manuals, including all available interfaces/subsystems, Installation and configuration instructions, Operation and Maintenance instructions must be provided for the offered equipments, in English or Greek language.

7. INSTALLATION

Installation, commissioning, programming and the integration of the equipments to the existing network and the initialisation of the NMS system will be performed by IPTO technicians. The supplier must provide full technical support for the commissioning of one pair of equipment at XALKIDA I Substation and GIS ALIBERIOY sites and the NMS system.
The supplier must provide technical support for resolving technical issues may arise during installation/commissioning.

8. TECHNICAL SUPPORT - MAINTENANCE

The supplier should submit Support contract proposal for the offered equipments and the NMS system that will include at least the following for duration of three (3) years:

- At least six (6) on site visits flat free per year for fault resolving (in addition to the initial installation of the equipment). Maximum resolve time six (6) hours from the fault announcement.
- Continuous on call technical support.
- Replacement/Repair damaged modules and boards.
- Firmware upgrades, system patches, updates, etc.

In the Support contract that will be signed between the IPTO and the supplier, the terms of the technical support issues and the contact point for referring technical problems will be clearly defined. The payment of the support services will be segmented (every 6 six months) and it will start six (6) months after the successful installation and operation of the first pair of equipment.

9. WARRANTY

Two (2) years warranty must be provided for all offered equipment. During this period the supplier will replace or repair damaged equipment or software within six hours from the problem announcement.
The guarantee period will start after the successful installation and operation of the first pair of equipment.
After the warranty period the supplier must provide repair or replacement of damaged modules thought Support contract.

10. SPARE PARTS

For every type of module of the system e.g.:

- chassis
- power supply module,
- central processor module (CPU),
- optical fiber interface module,
- 2Mbps (E1) interface module,
- subscriber (E&M) interface module,
- data V.24 (64Kbps) interface module, etc,

two (2) spare modules/boards must be offered.
The final amount of the spare modules/boards that will be purchased will be defined by the IPTO.
Moreover the contractor must guarantee the availability of spare parts for at least ten (10) years.

11. TRAINING

Operation and configuration training must be offered for the provided equipments and management system to a team of ten (10) IPTO technicians, for a period of 5 days at IPTO premises.
For the training needs the supplier should install a small simulated network from at least four live equipments that will be managed by the NMS.
Two of these equipments will be later installed by IPTO in XALKIDA I substation and GIS ALIBERIOY sites as described in chapter 7.

12. TECHNICAL EVALUATION

For the purpose of evaluation the suppliers should arrange a presentation of the offered equipments in a defined time and place. During the presentation a pair of the offered equipments in operation must be available to technical evaluation committee.

13. TECHNICAL OFFER FORMAT

Every offer must be accompanied by the following:

13.1. Complete set of Technical documentation.
13.2. Compliance list stating the compliance or no compliance with all the relative requirements of the specification.
13.3. Full break down list of all offered materials (Full list of materials).
13.4. The supplier must provide a customer list with brand names, address, fax, e-mail of utility companies where has installed and successfully operate similar equipment at least 10 pieces the last 4 years.