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# TIC-EOS02

User Manual

VER 1.2

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## I. Overview

**Ethernet /STM-1 Converter (TIC-EOS02 in short hereafter)** takes SDH technology as its core to provide access, convergence, transmission and management functions of TDM services and broadband IP services, and is a device for comprehensive access conversion in the applications of conventional telecommunicating services and broadband data services.

**TIC-EOS02** is an interface conversion equipment supplied with one STM-1 electric interface and one optical Ethernet interface. All daughter boards of the interfaces support online hot swap.

**TIC-EOS02** carries data services via the container in SDH.

**TIC-EOS02** applies a rack with height 1U and width 19", can be set on the desk or mounted in a cabinet or rack of height 2.2 m or 2.6 m.

There are three optional types of power supply for the equipment: ~220V AC, -48V DC, ~220V AC with -48V DC standby, which is determined as per the actual situation.

The design of **TIC-EOS02** complies with ITU-T and the relevant SDH specifications issued by Ministry of Information Industry, China.

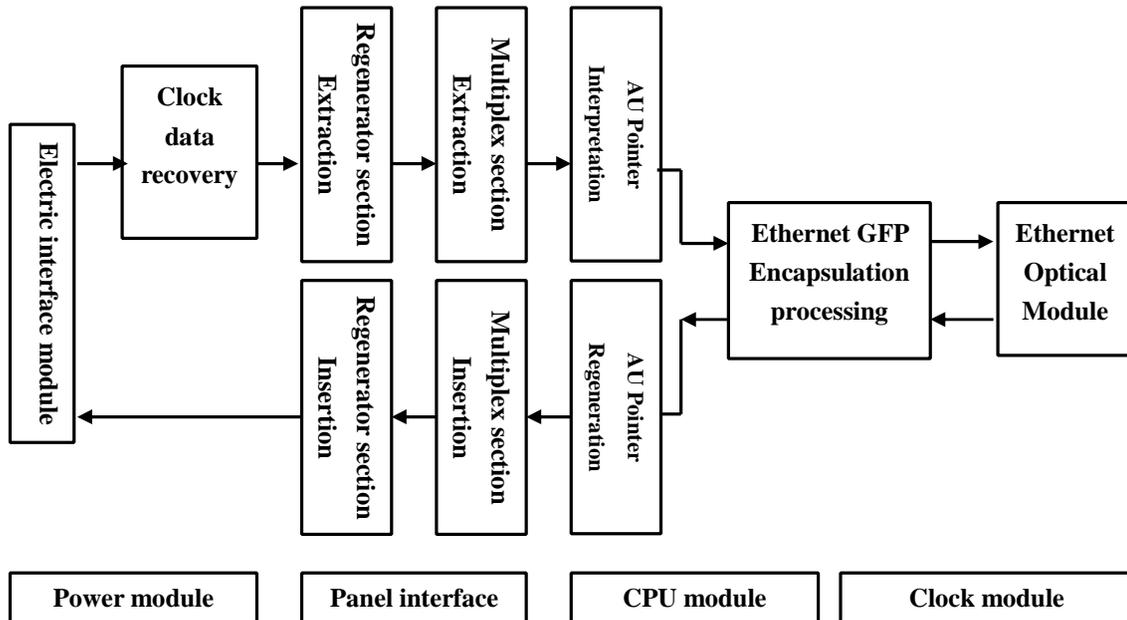
## II. Product Features

The features of **TIC-EOS02** equipment include:

- ◆ Providing standard STM-1 electric interface that complying with G.664 standard;
- ◆ Providing an optical Ethernet interface;
- ◆ Of excellent synchronous characteristics;
- ◆ With DC-48V/AC220V optical for power supply.

### III. Description of Equipment

#### §3.1 System Block Diagram and Working Philosophy



The working philosophy is described as follows:

1. Utilizing optical module to realize optical-electric switching.
2. Realizing signal processing of SDH levels within the chip, e.g. processing of regenerator section, multiplex section, and AU pointer, etc.
3. Ethernet package applies the public GFP encapsulating format, to realize the loading of Ethernet package onto VC4 at Ethernet receiving terminal, and the unloading of Ethernet package at Ethernet transmitting terminal.
4. The main function of CPU module is to manage the equipment.
5. Clock module: to realize clock tracing and local free oscillation function. Wherein there are three optional clock sources: one local oscillation, one clock source of 155M electric interface, and one clock source of optical Ethernet tributary board.

## §3.2 Equipment Configuration

### §3.2.1 Equipment function units

The main function units of the equipment include:

- SYS system mainboard
- Electrical interface board



- Ethernet interface board



- PWR power supply board (DC type or AC type)
- Rack

## §3.3 Panel Identification and Operating Description

### §3.3.1 Outline structure

The equipment applies a standard 19" rack of height 1U, for which the outline diagram is shown as Figure 4.3.1, the back panel is shown as Figure 4.3.2.

The front panel consists of power switch (POWER), STM-1 electric interface, RS232

interface, and indicators, etc.



**Figure 3.3.1 Outline Diagram of TIC-EOS02 Equipment**

The back panel consists of power switch, Ethernet port and the protect GND connector (⊖).



**Figure 3.3.2 Back Panel of TIC-EOS02 Equipment**

### §3.3.2 Description of panel

The equipment panels include the front panel and the back panel. The front panel control can be divided into the following parts:

#### 1. Buttons

**MASK key:** used as mask control. Push it down to close the sound. The sound will be triggered again in the case of a new alarm.

Six LED lights can be self-tested if you press the “MASK” button for a long time (about 5-6 seconds).

**MUTE key:** used to enable/disable the alarm sound. Push it down to close the sound, in which the sound of alarm will be mute. The default status is pushed in.

**RS232 key:** The default status is pushed in. It is used in network manage system.

**POWER key:** power switch. The PWR indicator indicates the working state.

“+” should be connected with high voltage point of DC48V. “-” should be connected with low voltage point of DC48V. “⊖” usually is connected with work GND.

#### 2. LED indicators

LED indicators are provided at the right of the front panel of the equipment, and used to indicate the working state and alarm state of the equipment.

The state indication of these indicators will be described in details in the following

text.

### §3.3.3 Description on front panel operation

#### 1. RS232

It is used in network manage system.

#### 2. Electric 155M interface(STM-1 electronic port)

STM-1 electric interface applies standard SMB interface. Tx refers to the output of electric signal, and Rx refers to the input of electric signal. The output complies with G.703 standard, and the input allows a loss reaching 12.7dB.The 75ohm copper cable can be transmitted about 80 meters.

## IV. Alarm Indication

The equipment is supplied with plenty of alarm indication messages, which are divided into audio alarms and indicator alarms. The indicator alarms can be further divided into the front panel indicators and the back panel indicators. With both the **MASK** key (used as mask control; Push it down to close the sound; The sound will be triggered again in the case of a new alarm) and the **MUTE** key (used to enable/disable the alarm sound; Push it down to close the sound, in which the sound of alarm will be mute) are raised, when an alarm occurs on the equipment, the buzzer will emit an audio alarm, at the same time an indicator alarm is triggered.

The alarm functions of the indicators are described in details as follows.

### §4.1 Indicators on Front Panel

The row of indicators represents various equipment states. Refer to Table 5.1 for the detailed designations.

**Table 4.1 Represented Sates of Indicators on Front Panel**

| Indicators | State Description  |                          |                                  |
|------------|--------------------|--------------------------|----------------------------------|
|            | Green light ON     | Red light ON             | Both lights OFF                  |
| SYS RUN    | The system runs    | /                        | The system fails to run orderly. |
| SYS ALARM  | Urgent alarm: e.g. | Important alarm: e.g. no | The system works in              |

|              |  |   |  |
|--------------|--|---|--|
|              | hardware damage, and the chip unable to read/write normally etc. | input of DC power supply / loss of system clock           | order.   |
| STM-1E RUN   | STM-1E runs  | /   | STM-1E interface is mispositioned or damaged         |
| STM-1E ALARM | Urgent alarm: e.g. receiving LOS, LOF and etc.                   | Important alarm: e.g. AU-AIS                              | STM-1E works in order.                               |
| FE RUN       | The optical interface FE is enabled and runs                     | /   | The optical interface FE is mispositioned or damaged |
| UTP ALARM    | Urgent alarm: e.g. optical receiving LOS and so on.              | Important alarm: e.g. incorrect FE-negotiated parameters. | FE works in order.                                   |

#### §4.2 Indicators on Optical Ethernet Board

The optical Ethernet board has three indicators. Refer to Table 5.4 for the detailed indicating states.

**Table 4.2 Designation of Optical Ethernet Board Indicators on Back Panel**

| Indicators | State Description   |  |
|------------|---|--|
| SPEED      | Green light ON, representing 100M speed                     | Green light OFF, representing not 100M speed (negotiation error) |
| LINK       | Yellow light ON, representing the LINK is in order          | Yellow light OFF, representing LINK failed                       |
| REC OK     | Green light ON, representing the receipt of optical signals | Green light OFF, representing receiving LOS of optical signals   |

**Note:** If you plug out and plug in the Ethernet board, you must wait for the “UTP RUN” led is off. When you plug in the Ethernet board, if the “UTP RUN” led is on, the device will not work or work abnormally.

## V. Technical Specifications

### STM-1 Electric Interface

|                             |   |
|-----------------------------|---|
| Electric interface velocity | 155520kbit/s (Electric STM-1, G.703, Frame structure G.707) |
| Interface code type         | In accordance with the codes stipulated in G.703            |
| Digital signals             | In accordance with G.707 and G.958                          |

**Optical Ethernet Interface**

|                                |   |
|--------------------------------|---|
| Interface type                 | 100M Base-Fx  |
| Port specification             | In accordance with IEEE802.3 10/100M Base-T/Fx standard |
| Transmitting code speed        | 100Mbps   |
| Power supply                   | LD  |
| Max Input Power                | -3dBm   |
| Output Power                   | -14dBm  |
| Receiver type                  | PINFET  |
| Receiving sensitivity          | -25dBm (BER $10^{-11}$ )                                |
| Type of optical connector      | SC  |
| Central wavelength             | 850 nm  |
| Optional transmitting distance | 0~2km   |

**Power Supply**

|                     |             |
|---------------------|-------------|
| Input voltage       | DC48V       |
| Voltage fluctuation | 36VDC~72VDC |
| Power consumption   | <10W        |
| Power cable current | <0.5A       |

**Physical Parameters**Standalone Type (19"):

|            |                                  |
|------------|----------------------------------|
| Dimensions | 440mm (W) x43.5mm (H) x227mm (D) |
| Weight     | <4.0 kg                          |
| Rack type  | EIA 19" rack                     |

**VI. Environment Requirement**

The complete appliance is able to work in a wide range of environmental temperature and operate normally and steadily in environmental extremes.

|                       |              |
|-----------------------|--------------|
| Operating Temperature | -5 ~ +40     |
| Storage Temperature   | -25 ~ +55    |
| Relative Humidity     | 85% (30 )    |
| Atmospheric pressure  | 70 ~ 106 kPa |

No corrosive and solvent gas, and free from flying dust and magnetic-field interference.

## VII. Common Faults and Diagnosis

The common faults of the equipment include:

1. **Fault:** Red light turns on for the optical interface indicator;

**Diagnosis:** To check whether the fiber connection of the optical interface is correct.

2. **Fault:** With the equipment power on, all indicators on the panel turn off;

**Diagnosis:** Above all, check whether the fuse of the equipment is broken or not, if normal (no broken), check whether the DIP switch ADDR is all dialed to down (if the ID number of the equipment is 0, all indicators will also turn off).

3. **Fault:** The buzzer on the equipment keeps buzzing;

**Diagnosis:** Above all, check whether the MUTE key is pushed down or not; if yes, there may be the internal fault for the equipment.

4. **Fault:** The service test of the equipment is normal, but the corresponding indicators don't turn on;

**Diagnosis:** The indicators of the equipment may be damaged.

**Appendix 1. An Illustrated 75 Ω 155M Electrical Interface Coax Connector Fabricating Method**



A. Tools: Press Line Pliers, Scissors, Electric Iron, and Soldering Tin Wire, etc.



B. Micro Coax Connector SMB-75K2A including 4 parts: 1. Outer bushing, 2. Tight loop, 3. Connector fitting, and 4. Rubber Cap



C. Steps: Set 1. Outer bushing and 2. Tight loop in turn on the slender coax cable SYV-75-2-1, and then strip off the dressing of cable with scissors in a length of about 10mm. Pay attention not to damage the shielded copper grid.



D. Turn over the shielded copper grid, remove the plastic filling outside the inner core by about 5mm, then cut the inner core evenly, and expose the plastic filling outside by about 3mm. Afterwards, insert the connector fitting carefully, with inner core inserted into the flume hole of connector fitting, and weld it with electric iron and soldering tin wire. **Pay attention that false welding is not allowed, nor the outer wall of connector fitting to be touched.**



E. Back set the coax wire shielded copper grid at the tail of connector fitting, and tighten the tight loop around its outside. Clip off excessive burrs of the shielded copper grid with scissors.



F. Place part of the tight loop into the suitable teeth hole (such as 151 marked) of the press line pliers to be tightly pressed. If there is no way to set outer bushing on the connector fitting, press it once more after the press line pliers is turned by 90 degrees.



G. Set the outer busing on the connector fitting.



H. Now a coax connector is fabricated.



I. Insert it into SMB-75JWHD connector of electrical 155M interface board.

***Attention: Operation and maintenance of network equipments requires professional technology, knowledge and experience. We recommend the equipment to be managed only by qualified technicians. Therefore, if you have any technical problems, please consult your provider.***

***Thank you for reading this manual !***