

# Intelligent Ethernet Access Chassis

## iEAC-16 Series



- Designed for high density Ethernet extender installations in central offices or enterprises
- Manageable chassis: WEB GUI, CLI
- Provides Fiber-Optic network traffic connection and conversion
- Multi-pair copper bonding for double or quadruple bandwidth
- Enables link layer OAM on the network and equipment
- Link Diagnostics with one push button
- Hot swappable for all cards, Redundant powers, and Green FAN available

TAINET's new Intelligent Ethernet Access Chassis – iEAC-16, is a 2U high 19-inch chassis containing a controller MCU-16, redundant AC/ DC power modules and 16 slots for various types of line cards. Including FNTU, ENTU and SNTU, all modules are hot swappable, managed through WEB GUI, CLI (Telnet and craft port). By using different types of line card, iEAC-16 can extend Fast/Gigabit Ethernet/ E1 traffics on 10/ 100/ 1000 Base-TX over 100 Base-FX/ 1000 Base-X optical fiber and G.SHDSL.bis line with 2W/ 4W/ 8W.

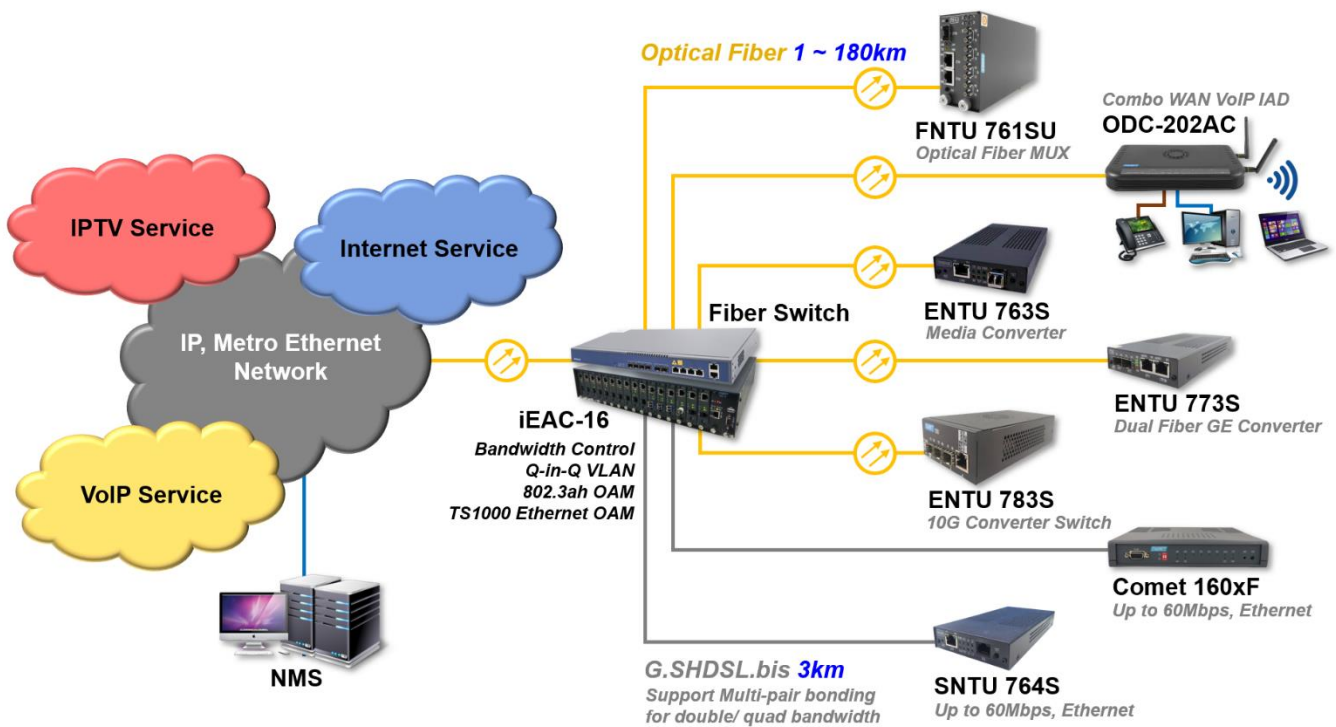
TAINET's FNTU 761, ENTU 763 series with Gigabit Ethernet allows the operator to reach customer over fiber, while still providing a standard Ethernet copper connection, and being part of the operator's network. FNTU series support E1 multiplexer with Ethernet converter functions. ENTU series support IEEE 802.3ah EFM link layer OAM and TS 1000 OAM management features and enable the converter to act as a demarcation point between the operator and the customer.

The SNTU 764/ 765 series takes advantage of the latest ITU-T G.991.2 G.SHDSL.bis standard and enables the transport of traffics from Ethernet interface with speed 5.7/ 11.4/ 22.8Mbps over EFM bonded 2/ 4/ 8 wires G.SHDSL.bis link or Ethernet and E1 EFM/ TDM dual bearer mode over 2/ 4 wire G.SHDSL.bis link as defined in IEEE 802.3ah EFM 2Base-TL. SNTU series line cards can interoperate with TAINET Comet 160x series at customer premises, it supports high-speed dedicated symmetrical data transmission and utilizes DSL bandwidth.

The various line cards enhance the flexibility and ability of iEAC-16 to provide EFM (Ethernet First Mile) service over fiber and copper at the same time and provide Ethernet in the Local Loop to reduce carrier expenses, since Ethernet ports are far less expensive than other options. TAINET's cost-effective, remotely-managed NTU series with iEAC-16 is an ideal solution for every carrier's Local Loop because it provides access regardless of the backbone technology, and cost saving which can be passed on by the carrier to consumers. It is an ideal product to provide high density Ethernet extender installation in central offices or enterprises.



# Intelligent Ethernet Access Chassis



## System Feature

- 2U high, 19" chassis with 16 slots for line cards
- Real Time Clock and Reset button
- Power and Fan alarm LED indicators
- Dual Hot-Swappable AC/DC power for redundancy
- Green Fan facility, turns ON and OFF with internal temperature
- Auto detection on available line cards and chassis
- All plug-in cards are hot swappable

## System cards

- iEAC-16 : Intelligent Ethernet Access Chassis
- MCU-16 : Controller of iEAC-16 with NMS/WEB agent
- iEAC-AC : AC Power Module
- iEAC-DC : DC Power Module
- iEAC-FAN : FAN Module

## Line cards

- FNTU 761C, 761CU
  - Optical Fiber MUX, Gigabit Media Converter with 4 Balanced/ Unbalanced E1
- ENTU 763C/GE
  - 1000Base-X SFP to 10/ 100/ 1000Base-T Ethernet
- SNTU 764C/2W, 764C/4W, 764C/8W
  - G.SHDSL.bis 2/ 4/ 8-wire RJ-45 to 10/ 100 Base-T Ethernet
- SNTU 765C/4W
  - G.SHDSL.bis 4-wire RJ-45 to 10/ 100Base-T Ethernet and E1 interface
- SNTU 764FC/2W, 764FC/4W, 764FC/8W
  - G.SHDSL.bis 2/ 4/ 8-wire RJ-45 to 10/ 100 Base-T Ethernet
- ENTU 773C
  - Dual optical link Gigabit Ethernet NTU
- ENTU 783C (Up to 8 Cards in iEAC-16)
  - Triple optical link 10G Ethernet NTU

## Management & OAM Functions

- Management with user privilege
  - Web GUI
  - CLI: Telnet, RS-232 craft port
- Management IP can be set as static or dynamic IP
- Supports VLAN for 802.1Q tagging/ un-tagging
- System logs and SNTP time synchronize to RTC
- Built-in non-volatile memory to store line cards, remote units, PM data and chassis configurations
- DSL/ Optical Link status on web management
- SNMP alarm trap
- Alarm LED indicator monitoring
- Firmware upgradable for system and Line cards

## LED Indicators

- MCU-16 : MAJ/ MIN ALM, FAN, FAN ON, PWR1, PWR2, LAN LNK/ SPD
- FNTU 761C : PWR, LNK, TST, ALM, E1, LAN LNK/ SPD
- ENTU 763C : PWR, CO, LNK, TST, RF, TP, LAN LNK/ SPD
- SNTU 764C : PWR, CO, ALM, TST, L1, LAN LNK/ SPD
- SNTU 765C : ALM, TST, DSL1~2, E1, LAN LNK/ SPD
- ENTU 773C : PWR, ALM, LNK1, LNK2, UTP LNK/ SPD, DPX
- ENTU 783C : PWR/ ALM · Link 1 ~ 4

## Power Requirement

- Hot Swappable Redundant Power Modules
  - iEAC-AC : AC Power Input: 100 ~ 240V, 50/60Hz (160W)
  - iEAC-DC : DC Power Input: -36 ~ -72V (160W)

## Dimension

- iEAC-16 : 440 (W) x 390 (D) x 89 (H) mm

## Operating Environment

- Operation Temperature : 0 °C ~ 50 °C
- Storage Temperature : -20 °C ~ 70 °C
- Humidity : 90%, non-condensing



# Intelligent Ethernet Access Chassis

## FNTU 761 Line Card

### Model

- FNTU 761C, Optical Fiber MUX, 2 GE + 4 E1 (RJ-48C)
- FNTU 761CU, Optical Fiber MUX, 2 GE + 4 E1 (BNC)

### Network Interface - Optical Ethernet

- Connector type: SFP-LC
- 1000 Base-X SFP modules
- Support SFP DDM (Digital Diagnostic Monitoring)
  - Temperature, Voltage, Current, Tx Power, Rx Power
- For detailed wavelength and distance of SFP modules, please refer to SFP Transceivers datasheet

### Ethernet Interface

- Ethernet Connector: 2 x RJ-45, 10/100/1000 Base-T
- Support Ethernet cable diagnostics features
- Auto-MDI/MDIX detection, Full duplex / Half duplex support
- Auto-negotiation for speed and duplex
- Support 802.1d transparent bridge function
- Support 802.3x flow control, and 2K MAC learning address
- Bandwidth control and support 9K Jumbo frames
- Provide 802.1q Tag VLAN (including Q-in-Q)
- Support QoS by 802.1p priority queue control
- Support IGMP Snooping

### Timing Source Function

- Adaptive, Internal, Receive

### E1 interface

- Comply with G.703 Standard
- Bit Rate: 2,048 Kbit/s  $\pm$  50 ppm
- Frame Format: G.704 Framing with CRC or Unframe mode
- Line Code: HDB3
- Jitter performance: Meet ITU-T G.823.
- Line Impedance: 120  $\Omega$  (RJ-45 / RJ48C) or 75  $\Omega$  (BNC)
- DS0 Bypass On/Off

### System Function

- Complies with IETF draft standard for CESoPSN (IETF RFC5086) and SAToP (IETF RFC4553); Metro Ethernet Forum MEF8 IA
- Configuration via DIP switch, Telnet CLI, WEB GUI or SNMP
- TFTP/HTTP firmware upgrade
- RMON counters
- Front panel test button for easy loop healthy testing
- Reset button back to factory default
- Ethernet port mirror
- Support IEEE 802.3ah Link Layer OAM
  - Remote loopback test
  - Link Fault Reflection
  - Dying Gasp

### LED Indicators

- PWR, LNK, TST, ALM, E1, LAN LNK/ SPD

### Dimension

- 84 (W) x 172 (D) x 48 (H) mm

### Operating Environment

- Operation Temperature : 0 °C ~ 50 °C
- Storage Temperature : -20 °C ~ 70 °C
- Humidity : 90%, non-condensing

## ENTU 763 Line Card

### Model

- ENTU 763C/GE, Gigabit Ethernet NTU, Media Converter

### Network Interface - Optical Ethernet

- Connector type: SFP-LC
- ENTU 763C/GE: 1000 Base-X SFP modules
- Support SFP DDM (Digital Diagnostic Monitoring)
  - Temperature, Voltage, Current, Tx Power, Rx Power
- For detailed wavelength and distance of SFP modules, please refer to SFP Transceivers datasheet

### User Interface

- ENTU 763C/GE: 10 Base-T/ 100 Base-TX/ 1000-Base-T
- Connector: 1 x RJ-45
- Auto-MDI/ MDIX detection
- Auto-negotiation for speed and duplex
- Full duplex / Half duplex support
- Support copper line cable diagnostics feature
- Complies with IEEE 802.1q Tag VLAN (including Q-in-Q)
- Ethernet bandwidth control and support Jumbo frame

### Management & OAM Functions

- Configuration via craft port VT-100 and WEB GUI
- Console: RJ45 connector (RS232C)
- HTTP firmware upgrade
- RMON counter
- Front panel test button for easy loop healthy testing
- Reset button back to factory default
- Support IEEE 802.3ah Link Layer OAM
  - Auto discovery
  - Link monitoring
  - Remote loopback test
  - Remote fault detection
    - Link Fault Reflection
    - Dying Gasp
    - Critical Event
- Support TS-1000 OAM
  - Loopback test
  - Reset remote device
  - Get remote device information
  - Remote port setting

### LED Indicators

- PWR, LNK, CO, TST, TP, RF, LAN LNK/ SPD

### Dimension

- 84 (W) x 172 (D) x 24 (H) mm

### Operating Environment

- Operation Temperature : 0 °C ~ 50 °C
- Storage Temperature : -20 °C ~ 70 °C
- Humidity : 90%, non-condensing



# Intelligent Ethernet Access Chassis

## SNTU 764/765 Line Card

### Model

- SNTU 764C/2W, 2-wire G.SHDSL.bis, 1 FE
- SNTU 764C/4W, 4-wire G.SHDSL.bis, 1 FE
- SNTU 764C/8W, 8-wire G.SHDSL.bis, 1 FE
- SNTU 765C/4W, 4-wire G.SHDSL.bis, 1 FE+ 1 E1 (RJ-48)
- Interoperable with standalone Comet 16xx series

### Network Interface - G.SHDSL.bis

- Type: 2/4/8-wire
- Standard: ITU-T G.991.2, ETSI 101 524
- Bonding protocol: IEEE 802.3ah EFM 2Base-TL
- Line rate:  $n \times 64\text{Kbps}$ ,  $n=3\sim 89$  (2w),  $6\sim 178$  (4w),  $12\sim 356$  (8w)
- Connector: 1xRJ-45
- Line coding: TC-PAM 16/32/64/128
- Impedance:  $135 \Omega$
- ITU K.21 compliant

### Ethernet L2 function

- Support 802.1d transparent bridge function
- Supporting Bridge filter function based on source MAC addresses
- Scalable per port bandwidth control (Step = 64K, up to 100M)
- Support 802.3x flow control, and 2K MAC learning address
- Ethernet packet length up to 1664 bytes
- Provide 802.1q VLAN tagging, support 802.1p QoS facility

### Timing Source Function

- Synchronous and Plesiochronous dual clock mode
- Internal clock, Received clock from DSL line

### E1 interface

- Comply with G.703 Standard
- Bit Rate:  $2,048 \text{ Kbit/s} \pm 50 \text{ ppm}$
- Frame Format: Unstructured or Structured framing, field selectable
- Line Code: High Density Bipolar of Order 3 (HDB3)
- Impedance: Normal  $120 \text{ ohms} \pm 5\%$  resistive, symmetrical pair
- Jitter performance: Meet ITU-T G.823 requirements
- Line Interface:  $120 \Omega$  (RJ-45/ RJ48C) balanced,  $75 \Omega$  (BNC)
- Physical Connection Type: Standard RJ-48C/RJ-45 jack (Balance) or BNC (Unbalance)
- Signal of input port was defined as above and can be modified by the characteristics of the interconnecting pair. The insertion loss of this pair at a frequency of 1024 kHz is in the range of 0 to 6 dB
- Minimum Return Loss at the Input Port: 12 dB for 51 to 102 kHz, 18 dB for 102 to 2,048 kHz 14 dB for 2,048 to 3,072 kHz

### LED Indicators

- SNTU 764C: PWR, CO, ALM, TST, L1 ~ L4, LAN LNK/ SPD
- SNTU 765C: ALM, TST, DSL1 ~ 2, E1, LAN LNK/ SPD

### Dimension

- 84 (H) x 172 (D) x 24 (W) mm

### Operating Environment

- Operation Temperature :  $0 \text{ }^\circ\text{C} \sim 50 \text{ }^\circ\text{C}$
- Storage Temperature :  $-20 \text{ }^\circ\text{C} \sim 70 \text{ }^\circ\text{C}$
- Humidity : 90%, non-condensing

## ENTU 773 Line Card

### Model

- ENTU 773C, Dual link Gigabit Ethernet NTU Card Type

### Network Interface: Optical SFP

- Connector type: Two SFP-LC
- 100Base-FX or 1000Base-X SFP port
- 100BASE-FX with the transmission speed of 100Mbps, 1000BASE-X with the transmission speed of 1000Mbps
- Automatic Laser Shutdown (ALS)
- IEEE 802.3ad Port Trunking: Bandwidth Aggregation by join the trunk hash
- Support SFP DDM (Digital Diagnostic Monitoring)
- For detailed wavelength and distance of SFP modules, please refer to SFP Transceivers datasheet

### User Interface: Ethernet

- Connector type: Two shield RJ-45 jacks
- Auto-negotiation 10/100/1000Base-T for speed and Half/ Full duplex
- Auto-MDI/ MDIX detection and Manual setting
- Support cable diagnostics feature for copper wires

### Networking Function

- Link Transparent in Media Data Converter (MDC) mode
- IEEE 802.3x Flow Control
- Ethernet bandwidth control
- RMON counter
- Ethernet Port Mirror
- Maximum frame size up to 9k byte (Jumbo Frame)
- Complies with IEEE 802.1p QoS
- DHCP & SNTP Client
- VLAN Translation
- IEEE 802.1q Tagged and Port based VLAN
- IEEE 802.1ad Q-in-Q
- Ethernet Loop detection and prevention
- IEEE 802.1d STP, IEEE 802.1w RSTP

### Management & OAM Functions

- Quick setup MDC or Ethernet Switch mode via DIP switch
- Configure via craft CLI, Telnet (SSH), WEB (HTTPs) or SNMP V1/ V2c/ V3
- RJ45 connector (RS232C): Craft or Serial over IP selectable
- TFTP/ HTTP firmware upgrade
- Reset button back to factory default
- Support warning threshold for setting the upper and lower limit of optical parameters to send a warning message
- Support syslog standard for message logging
- Support IEEE 802.3ah Link Layer OAM
  - Auto discovery
  - Link monitoring
  - Loopback test
  - Dying Gasp
  - Reset remote device
  - Change remote IP address
- Enhanced Login security check
  - Three access levels for administrator, operator, user, and operation log
  - Support login password complexity of 6 characters, lower and uppercase letters, digits, special symbols
  - Anti-camouflage attack mechanism: lock IP and delay login

### LED Indicators

- PWR, ALM, LNK1, LNK2, UTP LNK/ SPD, DPX

### Dimension

- 84 (H) x 172 (D) x 24 (W) mm

### Operating Environment

- Operation Temperature :  $0 \text{ }^\circ\text{C} \sim 50 \text{ }^\circ\text{C}$
- Storage Temperature :  $-20 \text{ }^\circ\text{C} \sim 70 \text{ }^\circ\text{C}$
- Humidity: 90%, non-condensing



## ENTU 783C \*\*

### Model

- ENTU 783C : Triple optical link 10G Ethernet NTU card type

### Network Interface : Small Form-factor Pluggable

- Connector type : Three SFP+
- Auto detection for 100 Base-FX, 1000 Base-X, 10G Base-R, SFP-1000 Base-T, SFP-10G Base-T
- Allow for 10G Base-SR, 10G Base-LR, 10G Base-ER and 10G Base-ZR in different transmission distance
- Automatic Laser Shutdown (ALS)
- IEEE 802.3ad Port Trunking: Bandwidth Aggregation by join the trunk hash
- Support SFP DDM (Digital Diagnostic Monitoring)
- For detailed wavelength and distance of SFP+ modules, please refer to SFP+ Transceivers datasheet

### User Interface : Ethernet

- Connector type : One shield RJ-45 jack
- Auto-negotiation 10M/ 100M/ 1G/ 2.5G/ 5G/ 10G six speed
- Auto-MDI/ MDIX detection
- Support cable diagnostics feature for copper wires

### Networking Function

- Link Transparent
- IEEE 802.3x Flow Control
- Rate Limit for Ethernet bandwidth control
- RMON counter
- Maximum frame size up to 12k byte (Jumbo Frame)
- Complies with IEEE 802.1p QoS
- DHCP & SNTP Client
- IEEE 802.1q Tagged based VLAN
- IEEE 802.1ad Q-in-Q
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- Ethernet Loop detection and prevention
- Ingress and Egress Port Mirror (Duplicate traffics)

### Management & OAM Functions

- Quick setup port-Trunking and protection mode via DIP switch
- Configure via craft CLI, Telnet (SSH), Web (Https), SNMP V1/ V2c/ V3
- RJ45 connector (RS232C) : Craft port
- Web/ HTTP firmware upgrade
- Reset button back to factory default
- Support warning threshold for setting the upper and lower limit of optical parameters to send a warning message
- Support IEEE 802.3ah Link Layer OAM
  - Auto discovery
  - Link monitoring
  - Loopback test
  - Dying Gasp
  - Fully remote-control device
- Enhanced Login security check
  - Three access levels for administrator, operator, user, and operation log
  - Support login password complexity of 6 characters, lower and uppercase letters, digits, special symbols
  - Anti-camouflage attack mechanism: lock IP and delay login

### LED Indicators

- PWR/ ALM · Link 1 ~ 4

### Dimension

- 84 (H) x 172 (D) x 24 (W) mm

### Operating Environment

- Operating temperature : 0 °C ~ 50 °C
- Storage Temperature : -20 °C ~ 70 °C
- Humidity : 90%, non-condensing

\*\* Using one single card type, iEAC-16 can only insert up to 8 cards

