CHAPTER 2

Product Overview

This section describes the functionality and the features of the ONS 15305.

2.1 Functional Overview

The ONS 15305 is a traffic concentrator that supports different types of transmission media. It can be used in networks based on fiber and copper media.

The ONS 15305 concentrates both IP and TDM traffic and is able to interface to both TDM and IP backbone networks. The TDM portion of the ONS 15305 is a cross-connect that can work as a terminal mux, add and drop mux, or non-blocking cross-connect.The IP portion consists of a L2 switch.

The ONS 15305 is a small device with a high port density that is designed to be flexible and highly scalable. It is targeted for a number of different applications as shown in this chapter.

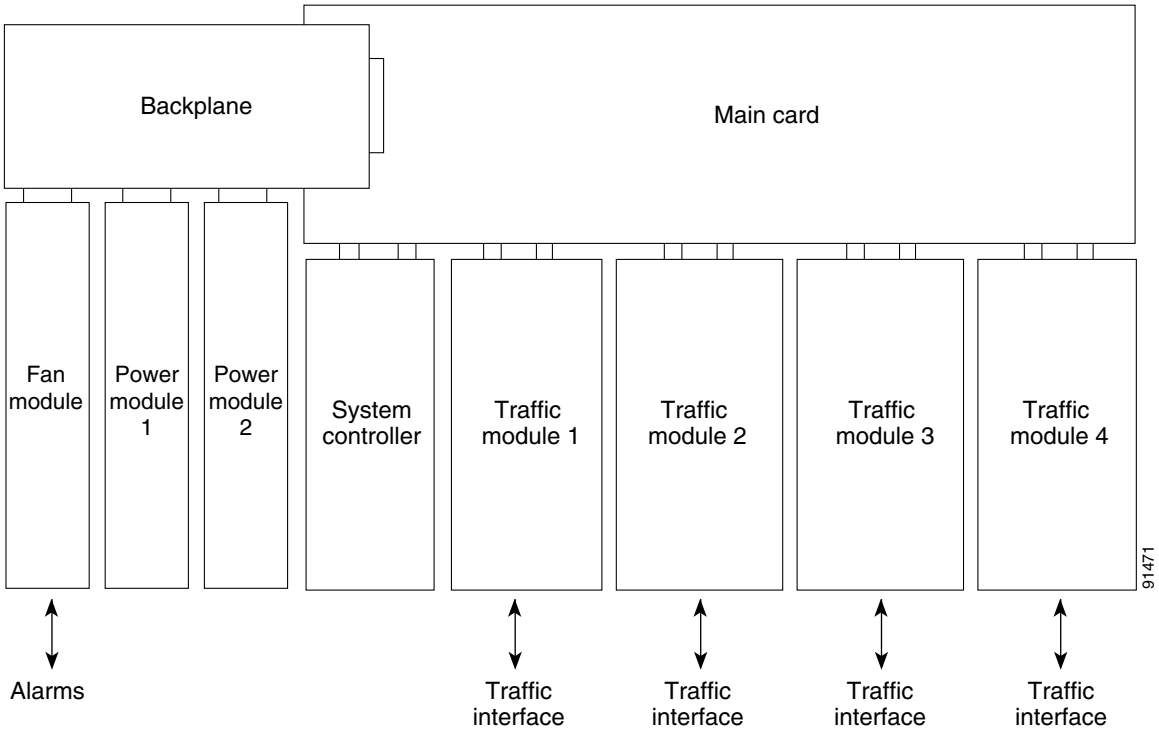
The ONS 15305 owes its flexibility to its modular design. The ONS 15305 consists of a chassis with a motherboard with room for up to eight plug-in modules. Four of the plug-in modules are used as interface modules. The remaining four modules are two redundant power supply modules, one fan module, and a system controller module.

The ONS 15305 can be used in star networks, ring networks, chained networks and meshed.

The following types of modules/boards exist:

- Alarm and fan module, FAN-ALARM
- Main card
- Back plane
- System controller module, SYSCONT-SD128-RJ45
- Power module, DC Power
- Service modules, up to four

Figure 2-1 System Overview



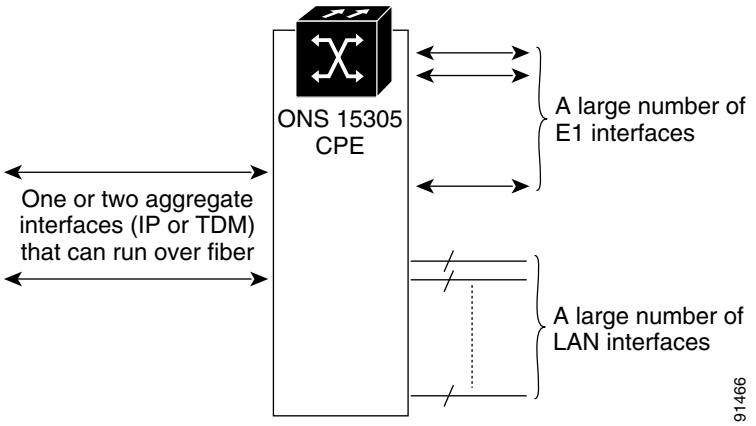
2.2 Applications

2.2.1 CPE Application

The ONS 15305 can be used as customer premise equipment (CPE). The unit has a large number of TDM interfaces (E1) and LAN interfaces (10/100/1000Base-T, 1000 Base-LX). This application is typically used for very large end customers or in a building with many smaller end customers.

The ONS 15305 can be connected towards the backbone network via fiber, radio, or copper. The application is shown in Figure 2-2.

Figure 2-2 CPE Application

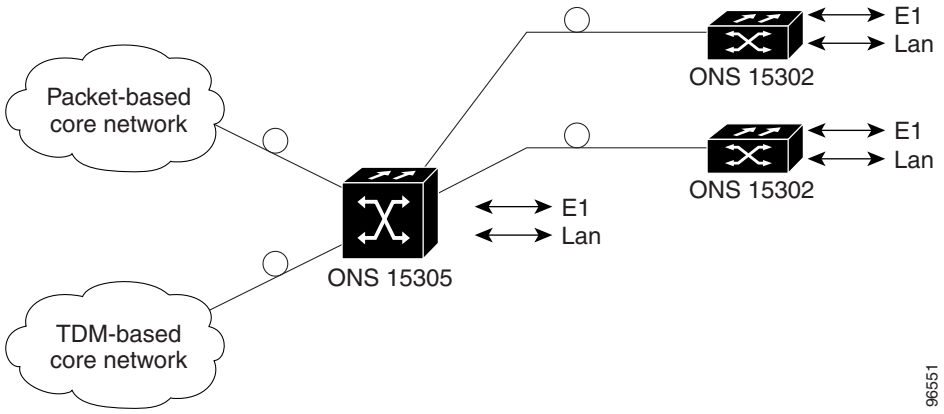


2.2.1.1 Small PoP Application

The ONS 15305 can also be used as a traffic concentrator in the point of presence (PoP) of the operator. The unit may support many different CPEs and may also support different types of transmission media. The unit is the interface between the core network and the access network. A typical application is shown in Figure 2-3.

In this application the ONS 15305 is used to connect up other Cisco products to the core SDH or IP network. It is also possible to connect equipment from other vendors to the ONS 15305.

Figure 2-3 PoP Application

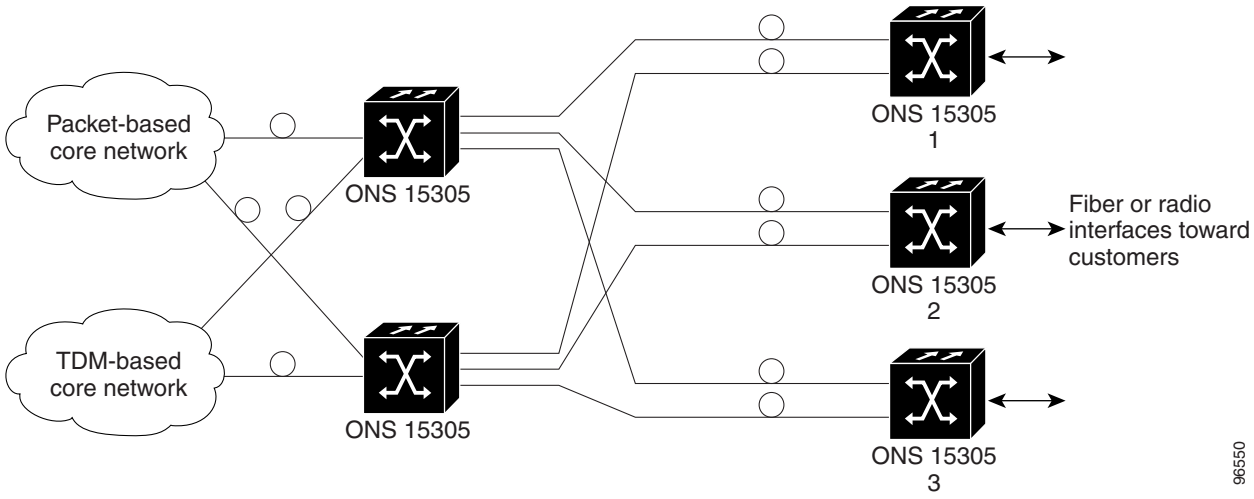


2.2.1.2 Large PoP application

If one ONS 15305 does not have enough performance or does not support enough interfaces, it is possible to stack a number of ONS 15305 nodes to create larger systems.

Typically an internal ONS 15305 is used to groom traffic from several ONS 15305s that are connected to the access network. The internal ONS 15305 is connected to the core network. Figure 2-4 shows a network where wo ONS 15305s are used for redundancy.

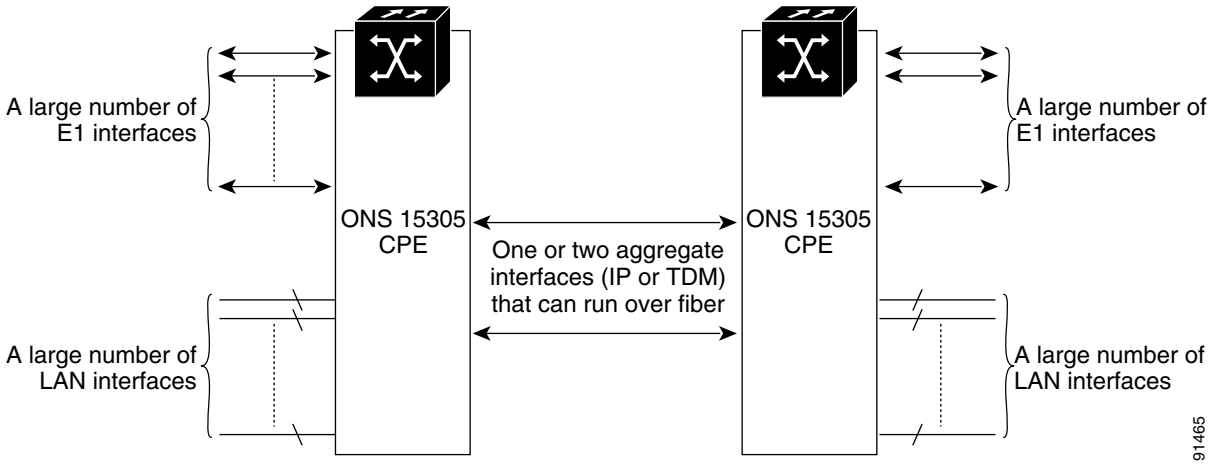
Figure 2-4 Large PoP Application



2.2.1.3 Campus Application

The ONS 15305 can also be connected back to back without any connection to external networks, as shown in Figure 2-5.

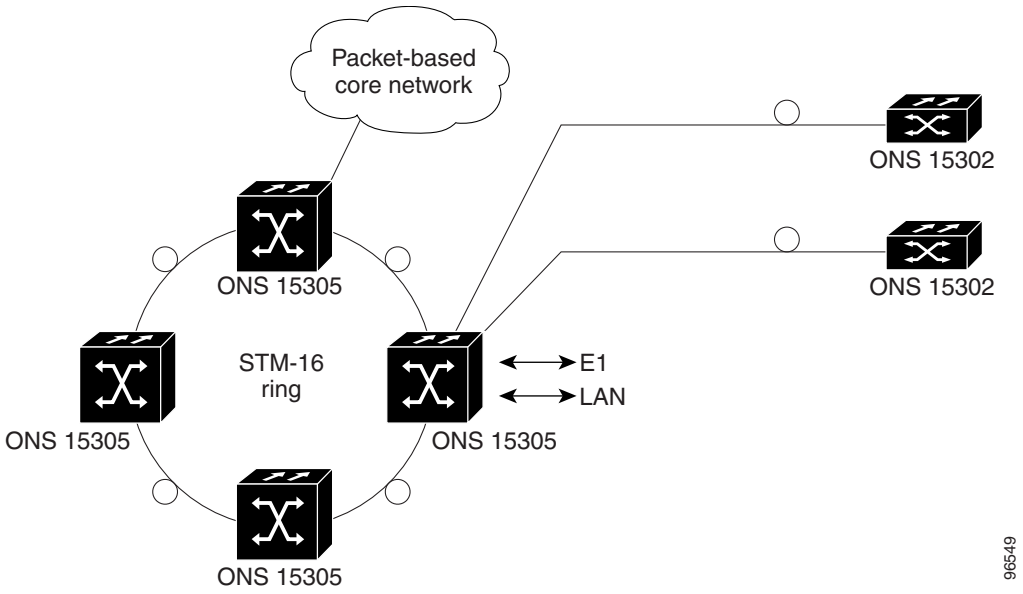
Figure 2-5 Campus Application



2.2.1.4 ADM Application

The ONS 15305 can be used as a standard ADM that supports TDM tributaries and IP tributaries, as shown in Figure 2-6.

Figure 2-6 Typical ADM Application for the ONS 15305



2.3 Alarm and Fan Module, 4xFAN-ALARM-DSUB9

The fan unit ventilates the 19-inch 1U cabinet used for ONS 15305.

The fan unit is a plug-in device consisting of a circuit board with four fans. The air is sucked in via four circular openings in the left sidewall and emerges via holes in the right side cabinet wall. Four fans are used to improve reliability.

2.3.1 Protection

The fan unit consists of four fans. These act as the main and standby fans. The “main” and “stand-by” designations are swapped every 24 hours to evenly distribute wear on the fans.

In case of an abnormal temperature rise, all fans will operate simultaneously.

The fans operate in pairs; there are two standby fans and two main fans. The maximum temperature measured in the ONS 15305 controls the fans. The only modules not containing temperature sensing are the fan unit itself, the power modules, and the system controller card. The FAN module is connected to the main card through the backplane.

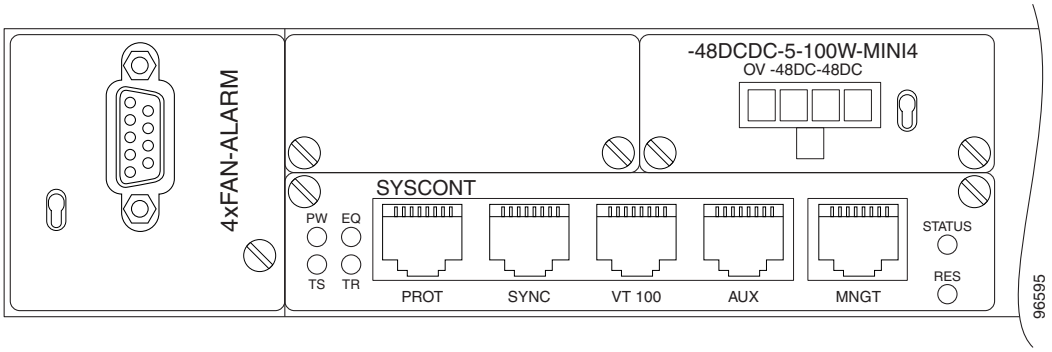
The O_TEMP_ALM alarm is detected on the main card when the temperature rises above 85 ^{o}C. The alarm, specific for each fan, is processed and presented as a Fan Failure Alarm.

2.3.2 External Alarms

The ONS 15305 provides facilities to report four auxiliary alarm inputs for associated equipment, for example power module failure, a battery condition, or an open cabinet door.

It also supports two alarm outputs used to signal equipment alarms and traffic related alarms. The alarm input/output connector is placed on the fan unit front cover, as shown in Figure 2-7.

Figure 2-7 Location of Alarm and Fan Module, FAN-ALARM



2.3.3 POWER MODULE, 48DCDC-5-100W-MINI4

2.3.3.1 Introduction

The main feature of the power module is to convert and isolate primary power, 48 VDC, to 5,25 volts for the modules in the product.

The module has features that allow power sharing and hot plugging.

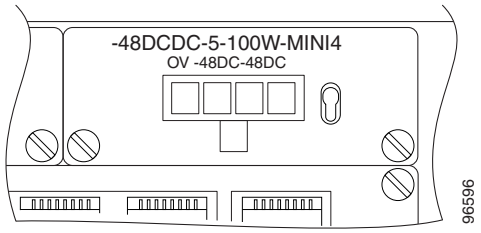
The module has separate alarms for two independent primary supplies (< 40 volts) and alarm for the secondary output (< 4,65 volts).

The secondary current is short circuit proof and the average s.c. current is less than 1 amp.The maximum secondary current is limited to ab. 26 amps.

A 3m long power cable is also provided with a Mini-fit connector in one end and no connector in the other end. This cable connects the ONS 15305 to the internal 48V power-rails inside the rack.

The cable and the power supply meet the safety requirements of the EN 60950 specification.

Figure 2-8 Location of DC Power



2.3.3.2 Technical Overview DC/DC

The -48V DC Power supply (-48DCDC-5-100W-MINI4) covers the -40,5 VDC to -57 VDC range, also referred to as -48 VDC.

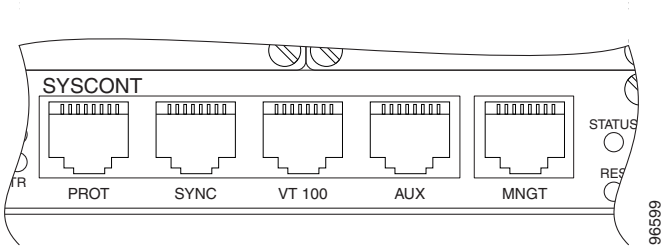
The module generates +5.25 VDC; all other voltages necessary are generated on each module. If two power modules are used, the current sharing between the two modules is between 40% and 60%.

2.3.4 System Controller Module (SYSCONT-SD128-RJ45)

2.3.4.1 Introduction

The system controller module contains the processor system for the ONS 15305, as shown in Figure 2-9.

Figure 2-9 Location of SYSCONT-SD128-RJ45



The ONS 15305 software runs in 128 MB SDRAM. The amount of memory can be configured at the factory from 64 MB to 512 MB.

The software is stored in Flash memory devices. The ONS 15305 uses a Compact Flash card as the storage medium. The 32 MB CompactFlash is mounted in a connector on the system controller. The size of the Compact Flash cards can be from 8MB to 128MB; this is determined by the application.

The module supports a serial RS-232/VT.100 interface used by the craft terminal. The module also supports a 10Base-T LAN interface used for management purposes.

The module contains the local synchronization interface for the ONS 15305. This interface is directly connected to the SETS functionality on the motherboard.

The module contains the local user interface for the ONS 15305, the AUX port. The interface supports a framed E1 interface. It is possible to select different overhead bytes from all SDH interfaces to the 30 available time slots.

The physical connectors of the five interfaces are of the RJ-45 type.

The module also provides four LEDs to indicate the status of the ONS 15305. The LEDs are visible from the rear of the ONS 15305. The LEDs have the same functionality as the LEDs in the chassis. The fifth LED indicates the status of the management port.

Power consumption for the system controller module is 23 W maximum.

2.3.4.2 Technical Overview

A local Ethernet port (10/100BaseT), called the Management Port, is available for connecting to a management DCN.The management signals go to an Ethernet Controller in the MPC8265 processor situated on the module.

The ONS 15305 offers a VT100 interface for connection of AXXCRAFT Terminal/CLI interface. The interface is running at a data rate of 19.200 baud.

The synchronization port is used for SETS functionality on the main card. The 2 Mbps AUX signals go to the SETS FPGA.

The proprietary protection interface will be used for equipment protection in a future release.

The voltages are generated on board with the exception of the +5.2 V that comes directly from the power modules. The power consumption should not exceed 23W.

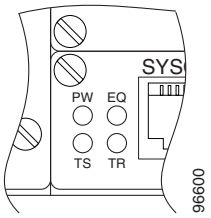
The module is equipped with a reset circuit that resets the card in case of a fault in one of the voltages.

Note The reset switch that is accessible in front of the system controller module will reset the ONS 15305.

A special tool such as a small screwdriver or a pencil may be used to activate the switch.

Visual indicators (LEDS) are provided to indicate an ONS 15305 failure condition. These LEDs are placed on the System Controller Unit front cover and the front of the ONS 15305, as shown in Figure 2-10.

Figure 2-10 Locations of LEDs on the System Controller Front



The LEDs on the main card have the same functionality as the LEDs on the system controller card. The color and functionality of the LEDs are described in Table 2-1.

Table 2-1 System Controller Module LEDs

Identity	Color	Function
Power	Green	Indicates that power is present and the unit is operating correctly
Equipment	Red	Indicate that an error is present with the equipment
Traffic	Red	Indicates that a traffic alarm is present at one of the interfaces
Test	Yellow	Indicate that test-loops are activated on the unit

The LEDs are controlled by the SETS FPGA and are not affected by the external alarms.

A fifth, green LED is also mounted in the front of the system controller card. This LED indicates the link status of the management port.

2.4 Service Modules

2.4.1 Introduction

The ONS 15305 consists of a unit with a main card with space for up to four plug-in service modules. The plug-in modules support a number of different external interfaces and different transmission medias. The internal interface with the main card is identical for all service modules.

2.4.2 Common Functions

2.4.2.1 Memory

All modules store inventory data in non-volatile memory, e²prom.

2.4.2.2 FPGA Configuration

The modules containing one or more FPGAs also contain a local flash used to store FPGA configuration data in two banks.

The FPGA configuration is automatically loaded from the active flash bank after power-up. New FPGA files can be downloaded from the management system. The flash bank selection is controlled by the management system.

2.4.2.3 Processor Interface

The modules are connected to the main card via a 16-bit wide time multiplexed address and data bus. The DXC devices on the main card are responsible for generating module chip select and the translation from a time multiplexed bus towards the modules to a separate data and address bus towards the processor.

2.4.2.4 DCC

The modules terminating one or more STM-N lines are able to terminate both the DDC-R (192 Kbps) and DCC-M (576 Kbps) channels.

2.4.2.5 G.Link

All modules with IP switching capability are interconnected with a high-speed link to a central switch on the main board. The link is called G-link.

2.4.2.6 TDM

The mapping of IP traffic into VC12 containers is performed at service module level. There is no connection between the IP and SDH traffic on the main card (in the base unit).

All modules with IP switching capability are interconnected with a high-speed link to a central switch on the main' card. All modules with TDM functionality are connected to the cross-connect on the main board.