NATR & MANAGED SWITCHES

NATR, Network Address Translation Router

Simplified integration of machines into an existing network architecture

Features and Benefits

- Uses simple 1:1 Network Address Translation (NAT) to map IP addresses on the machine subnet to IP addresses on the control network (Support for up to 32 translation mappings)

- Support for Linear or Device Level Ring (DLR) topologies on the machine network

- Configurable via web page and/or Electronic Data Sheet (EDS) Add-on Profile (AOP)

- Simplified device backup and restore via SD card storing configuration

- Enables redirection of selected protocols, such as CIP, ICMP, HTTP, DNS for stable network connection

By simplifying configuration efforts, the 1783-NATR can reduce installation complexity for a more economical solution.

Wide deployment of EtherNet/IP in industrial automation means that there is a growing demand to properly manage machines on the network, while minimizing installation and configuration efforts associated with integrating hardware into an existing system.
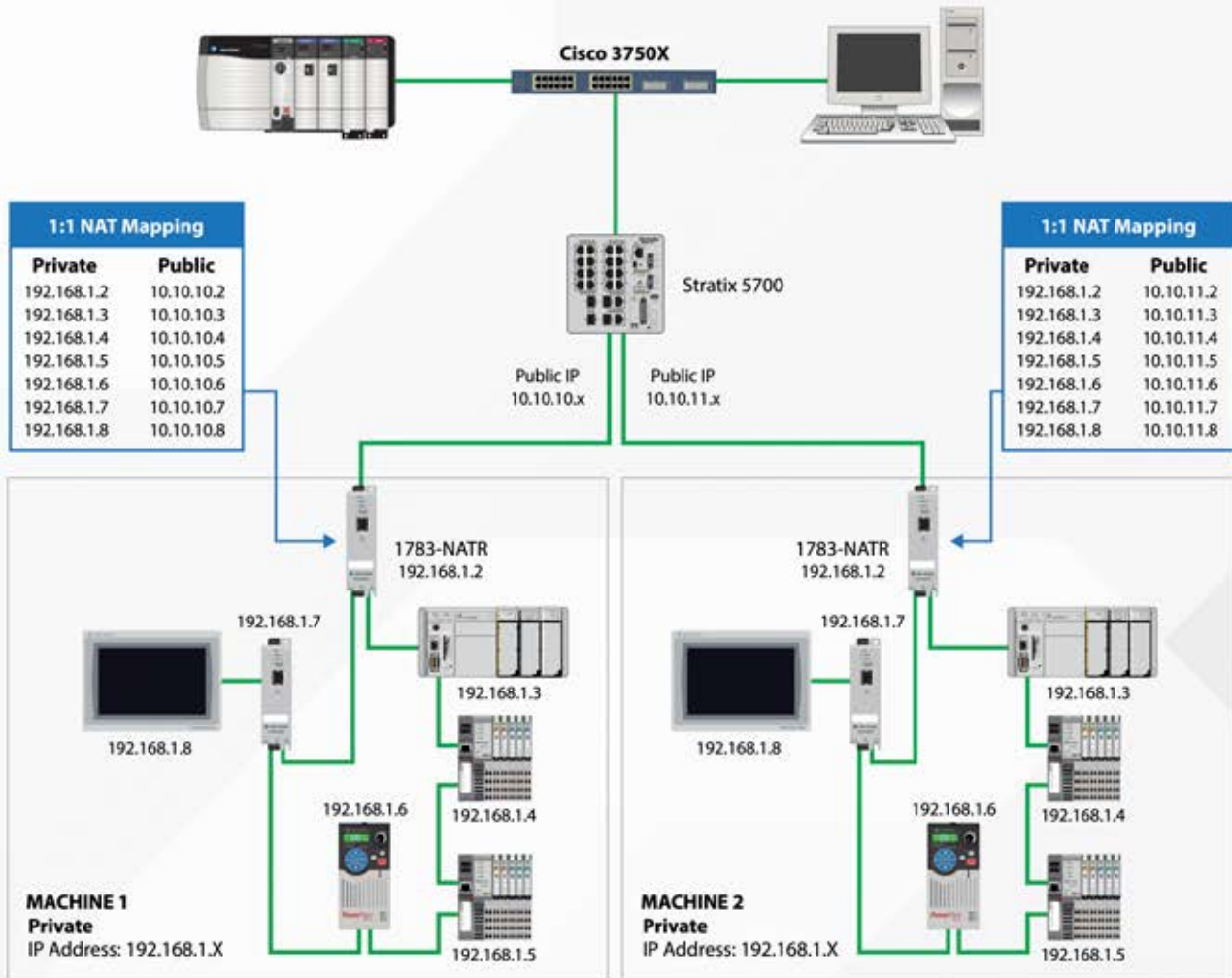
Machine builders can use the Allen-Bradley® 1783-NATR to deliver standard machines to end users without programming unique IP addresses. This enables machines to be added, moved, or replaced with little, to no configuration. By using 1783-NATR between the control network and the machine, it is configured once, which enables isolation of the machine's physical IP address from the control network to ease configuration efforts.

Configuration of the device is done using a module web page and/or EDS AOP using Studio 5000 Automation Engineering & Design Environment™. Both options provide product details, configuration of NAT mapping and Ethernet ports and network diagnostics.

Network Address Translation

Accessing real-time data is becoming more important to manufacturers, requiring machine builders to build smarter machines that can collect and forward data. To produce and provide data, machines need to be integrated into the broader plant network, where the information can be analyzed and sent to the right place at the right time.

Network Address Translation, or NAT, provides flexibility to segment or isolate network traffic by determining which devices are exposed to the larger network. By limiting access to certain devices, they are isolated from unnecessary network traffic, which can help optimize network performance at the local level.

Cisco 3750X

Stratix 5700

1:1 NAT Mapping	
Private	**Public**
192.168.1.2	10.10.10.2
192.168.1.3	10.10.10.3
192.168.1.4	10.10.10.4
192.168.1.5	10.10.10.5
192.168.1.6	10.10.10.6
192.168.1.7	10.10.10.7
192.168.1.8	10.10.10.8

1:1 NAT Mapping	
Private	**Public**
192.168.1.2	10.10.11.2
192.168.1.3	10.10.11.3
192.168.1.4	10.10.11.4
192.168.1.5	10.10.11.5
192.168.1.6	10.10.11.6
192.168.1.7	10.10.11.7
192.168.1.8	10.10.11.8

Public IP
10.10.10.x

Public IP
10.10.11.x

1783-NATR
192.168.1.2

1783-NATR
192.168.1.2

192.168.1.7

192.168.1.7

192.168.1.3

192.168.1.3

192.168.1.8

192.168.1.8

192.168.1.6

192.168.1.4

192.168.1.6

192.168.1.4

MACHINE 1
Private
IP Address: 192.168.1.X

MACHINE 2
Private
IP Address: 192.168.1.X

192.168.1.5

192.168.1.5

The 1783-NATR is a network device with Embedded Switch Technology capable of doing Network Address Translation (NAT) for applications using Device Level Ring (DLR) or linear topologies. The 1783-NATR device can be used to connect a small private network (for example, a machine network) to a larger plant-wide network without changing IP addresses on the private network.

The 1783-NATR device serves as a default gateway for the private network. It translates private IP addresses to unique public IP addresses (1:1 NAT). If a device on the private network must be accessible from the public network, a translation is created on the 1783-NATR device.

NATR Managed Switches

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Figure 2 - Network Implementation Example with 1783-NATR Device and Stratix 8300

Because there are Public and Private ports on the 1783-NATR device, the ports are used for different purposes.
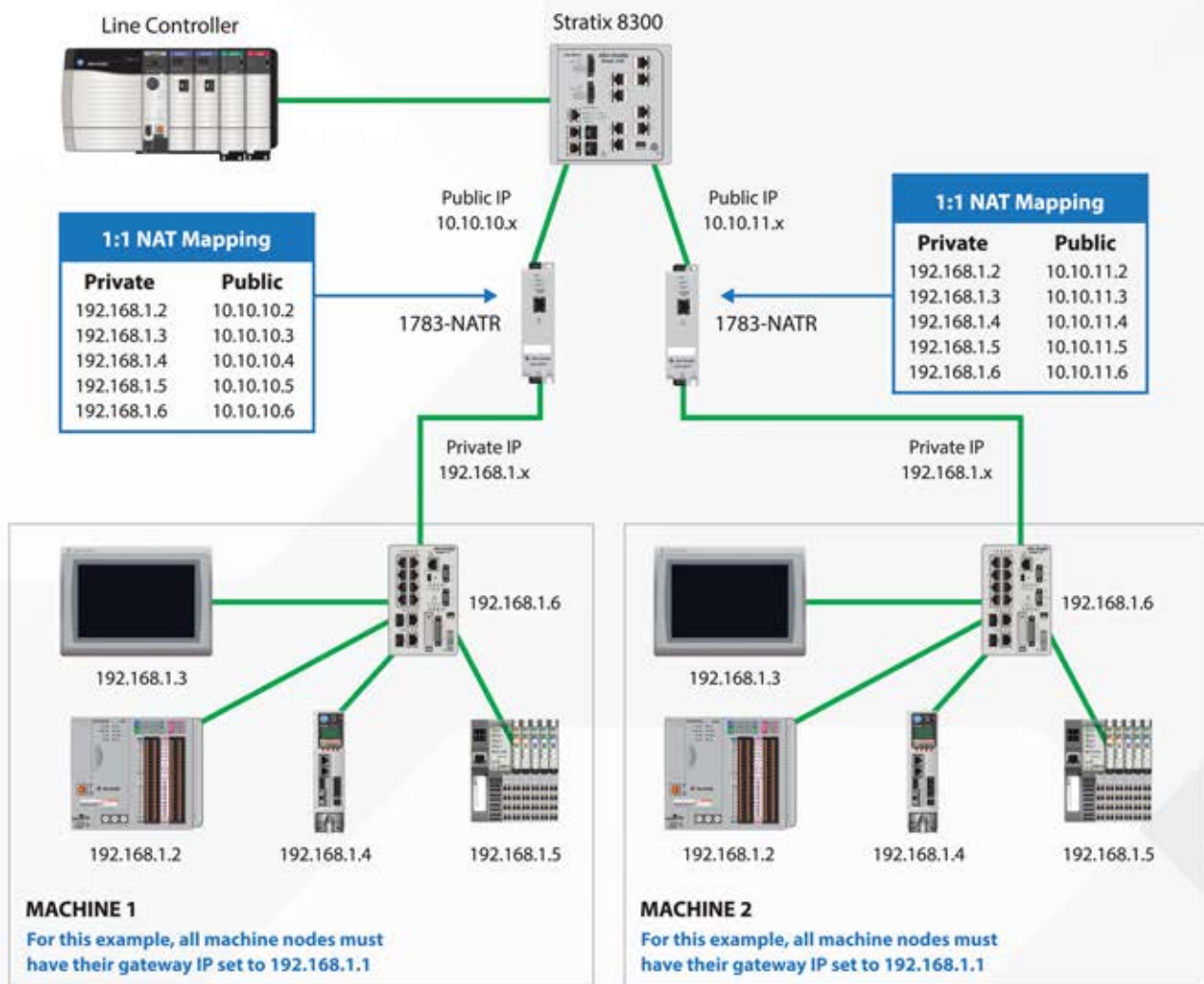
Public Port

The Public port is used to connect the device to the Public (Outside) network. The public network can be a plant-wide network with unique IP addressing scheme. The MAC address of the Public port differs from the MAC address of the Private ports. The IP address of the Public port also differs from the IP address of the Private ports. The Public port is in standard Ethernet configuration in the Star topology.

Private Ports

The Private ports are used to connect the device to the Private (Inside) network. The private network can be a small network for a machine or process area where IP addresses can be reused throughout the plant. The Private ports share MAC addresses, which differ from the MAC address of the Public port. The Private ports share IP addresses, which differ from the IP address of the Public port. The Private ports can be used in the Linear or Ring topology. In Ring topology, the ports comply with the ODVA DLR specification. In Linear topology, the ports operate as standard Ethernet in daisy-chain or star topology

NATR Managed Switches

INDUSTRIAL MANAGED SWITCHES

Stratix 5400 Industrial Managed Switch

The Stratix 5400TM industrial managed switch supports layer 2 switching and layer 3 routing with additional Gigabit (GE) Power over Ethernet (PoE) and GE fiber ports, which can help increase flexibility in designing robust, future-ready network architectures.

Simplified Setup and Maintenance

Common Configuration and Support Tools

Configure, Manage and Diagnose your network with familiar tools

- **Automation (OT) Professionals**
  - FactoryTalk Services tightly integrateinto the Integrated Architecture system

- **IT Professionals**
  - Cisco CNA, CLI, Cisco Works tightly integrate into joint Cisco and Rockwell Automation Converged Plantwide
  - Ethernet (CPwE) Reference Architectures

NATR Managed Switches

Simplified Setup and Maintenance

Built-in SD Card and DHCP per Port

Built-in SD Card stores switch configuration and (IOS) FW

- Simplifies switch replacement transferring switch configuration and operating system to new HW
- Quickly duplicate and manage configurations on multiple cards or store and copy on a personal computer

Store and restore configuration as part of Studio 5000® project

- DHCP per Port
- Assigns a specific IP address to end devices providing easy end device replacement
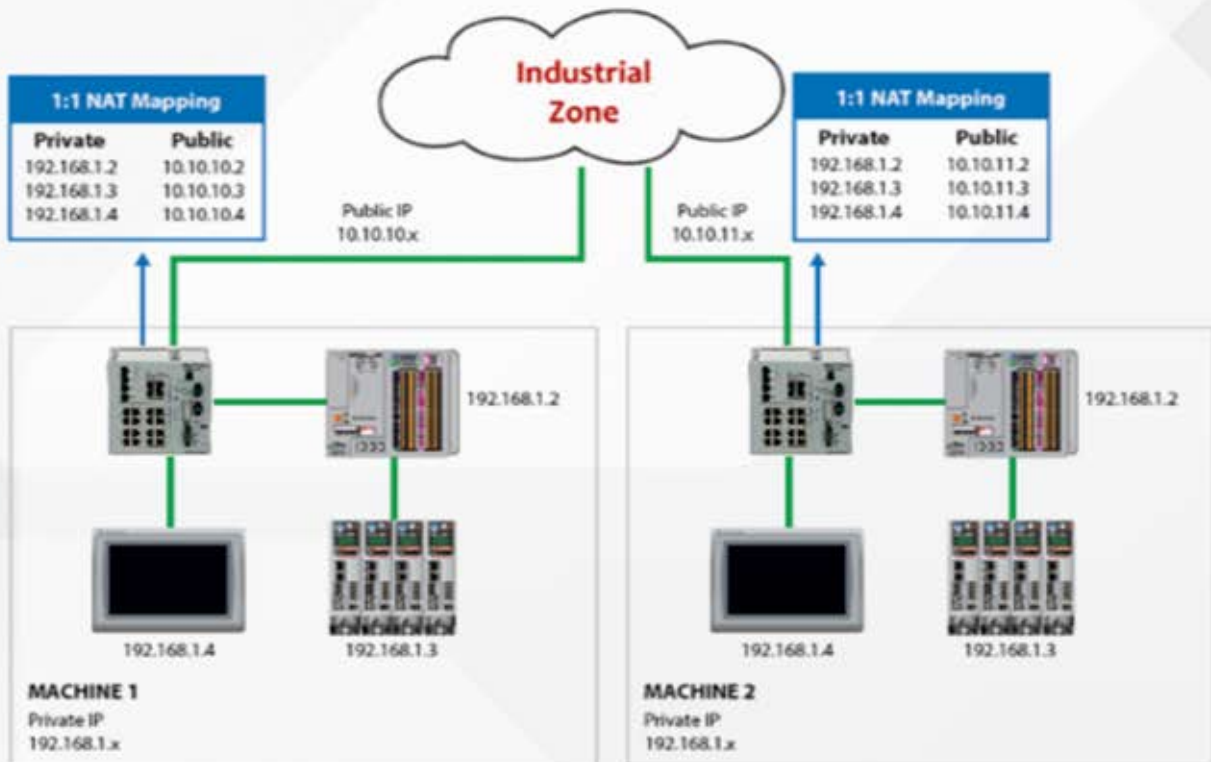

DHCP Server

10.10.2.1
10.10.2.2
10.10.2.3
10.10.2.4
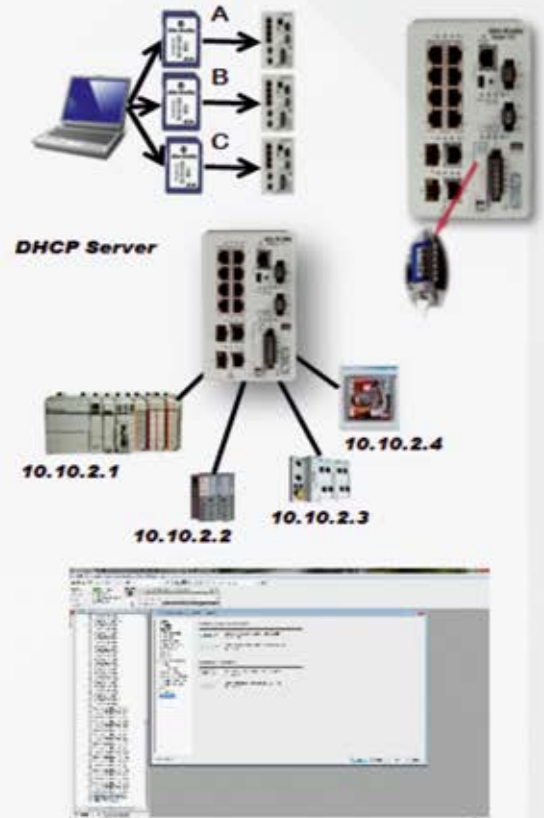
Advanced Features

Integrated NAT

Provides **1:1 IP address mapping** from a set of local, machine-level IP addresses to the end user's broader plant network

- Can help OEMs deliver standard machines to end users without programming unique IP addresses
- More simplified machine integration into end users' networks

1:1 NAT Mapping

Private	Public
192.168.1.2	10.10.10.2
192.168.1.3	10.10.10.3
192.168.1.4	10.10.10.4

Industrial Zone

Public IP
10.10.10.x

Public IP
10.10.11.x

1:1 NAT Mapping

Private	Public
192.168.1.2	10.10.11.2
192.168.1.3	10.10.11.3
192.168.1.4	10.10.11.4

192.168.1.2

192.168.1.4   192.168.1.3

MACHINE 1
Private IP
192.168.1.x

192.168.1.2

192.168.1.4   192.168.1.3

MACHINE 2
Private IP
192.168.1.x

Reduce commissioning time with Network Address Translation

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Advanced Features

DLR Connectivity

- Integrated DLR with support for 3 rings simultaneously
  - Available on all catalog items as a FW upgrade
- Offers consolidation of ring information for a single point of management for retrieving network machine-level diagnostics and DLR status (in supervisor mode)
- Provides redundant gateway capability providing support for two switches on a single ring connected together on the network for increased resiliency
- Enables DHCP IP address assignment to end devices on the DLR network for simplified device replacement

Stratix 5400 Switch

VLAN 100

VLAN 100

VLAN 100
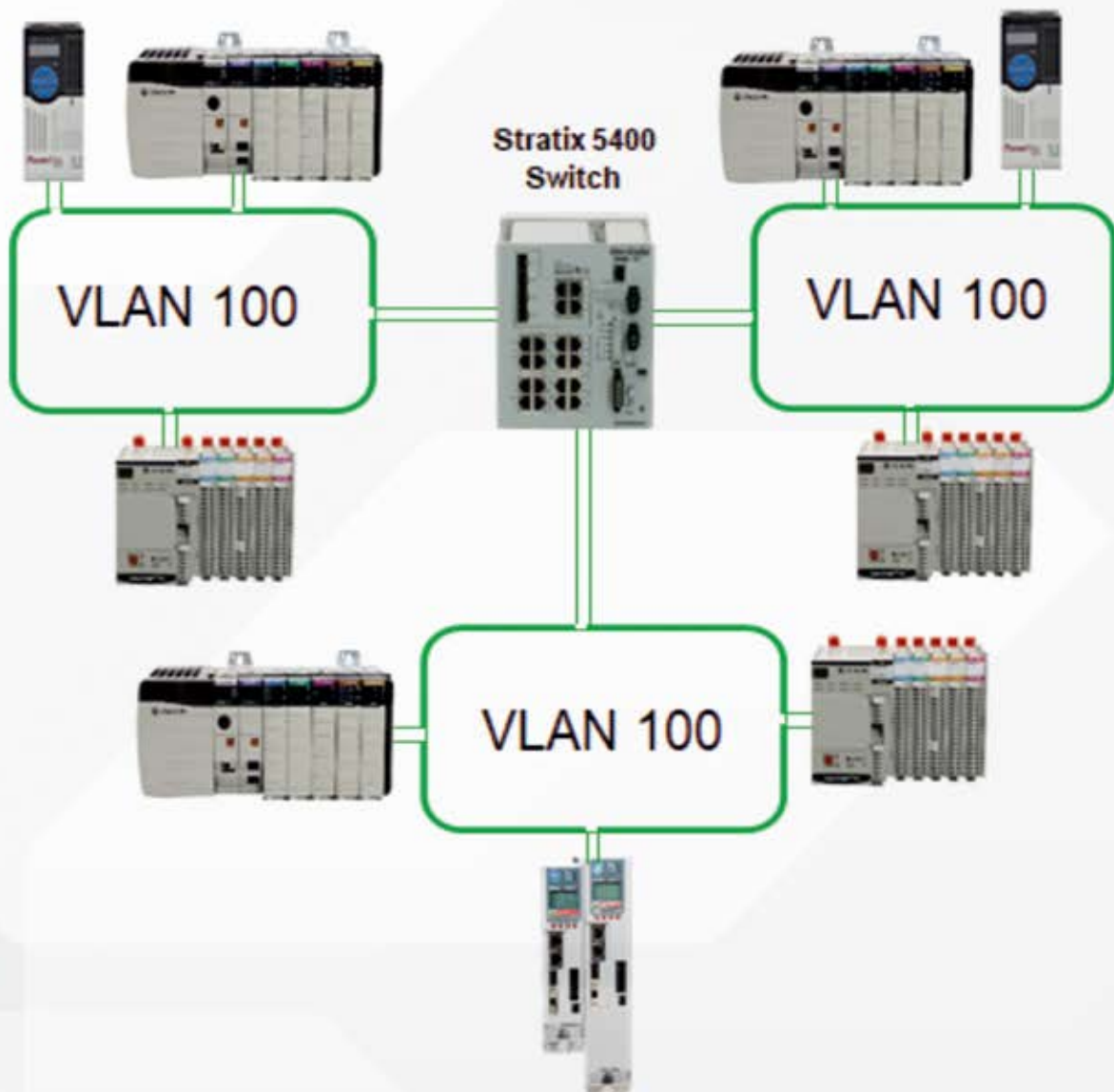
Extending DLR beyond 50 devices on a single ring

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Stratix 5400 Hardware

- 18 catalog items supporting
  - 4 gig port versions (8 to 20 ports)
  - All gig versions (12 to 20 ports)
- Single HW form factor (6.12H x 6.12 W x 5.09D in.)
- SecureDigital (SD) flash card (included)
  - Stores configuration and IOS of switch
- Power over Ethernet (PoE)
  - Up to 8 ports of PoE or PoE+
- Up to 12 ports of gig fiber
- Dual power inputs (9.6 to 60 VDC)
- Expanded temp range (-40 to 70 C)
- 2 alarm inputs and one output
- Rj45 or Mini-USB console port
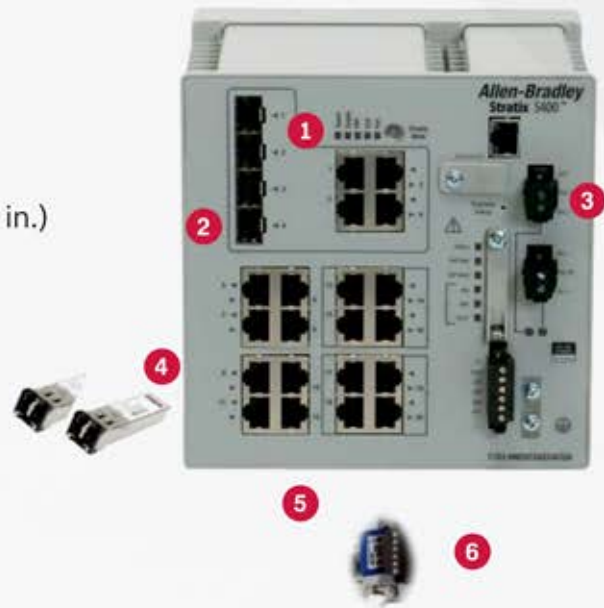
1. LED mode selector
2. Minimum four Combo ports for either copper or SFP
3. Dual power inputs including PoE power
4. SD card for backup
5. Alarm input/outputs

Stratix 5400 Firmware

- Supports Layer 2 or 3 firmware (FW) images
- Includes full FW feature set (including DLR) plus IEEE 1588 PTP and NAT in all versions
  - Expanded L2 NAT (four ports)
  - 3 ring DLR support
- Routing (IPServices image) layer 3 firmware optional on all gig versions
- Common configuration and support tools as Stratix 8000 and Stratix 5700
- CIP interface (Studio 5000® AOP, predefined Logix tags, View faceplates)
- Crypto image standard (non-crypto version available)

NATR Managed Switches

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