MICROCYBER

NCS-BP107
APL Switch
User Manual

Warning

1. Users are prohibited from disassembling or installing the gateway on their own.
2. Please check whether the power supply voltage of the equipment meets the power supply voltage requirements in the user manual.

Version: V1.0

Disclaimer

This manual has been reviewed to ensure consistency with the hardware and software described. Since errors cannot be completely eliminated, absolute consistency cannot be guaranteed. However, we will regularly review the data in this manual and incorporate any necessary corrections in subsequent editions. Suggestions for improvement are welcome.

Technical data subject to change.

Company Profile

Microcyber is a high-tech enterprise founded by the Shenyang Institute of Automation, Chinese Academy of Sciences. Microcyber specializes in the development, production, and application of networked control systems, industrial communications, and instrumentation. Microcyber has undertaken numerous national science and technology projects, including major national science and technology projects, the National High Technology Research and Development Program (863 Program), and the Intelligent Manufacturing Equipment Development Special Project. Microcyber serves as a supporting organization for the National Engineering Research Center for Networked Control Systems.

Microcyber has successfully developed the first fieldbus protocol master stack in China that has passed international certification, the first fieldbus instrument that has passed national certification, and the first safety instrument in China that has passed German TÜV certification. Together with other units, Microcyber presided over the formulation of the first industrial Ethernet protocol standard EPA and the first industrial wireless communication protocol standard WIA-PA in China, which have become IEC international standards.

Microcyber's products and technologies have won two second-class National Science and Technology Progress Awards, one National Science and Technology Invention Award, one first-class Science and Technology Progress Award of the Chinese Academy of Sciences, and one first-class Science and Technology Progress Award of Liaoning Province. The products are exported to developed countries such as Europe and the United States. Top companies in the industry such as Emerson in the United States, Rotork in the United Kingdom, and Bifold in the United Kingdom have all adopted Microcyber's key technologies or key components in their products and successfully completed more than 200 large-scale automation engineering projects.

Microcyber is a member of FCG organization and a member of Profibus User Organization (PNO).

Microcyber has successfully passed ISO9001:2008 quality management system certification and ISO/TS16949 quality system certification for the automotive industry. Its outstanding R&D team, extensive experience in automation engineering design and implementation, industry-leading products, extensive market network, and excellent corporate culture have laid a solid foundation for the company's entrepreneurship and sustainable development. We strive to carry the aspirations of our employees, create customer value, and promote corporate development.

Carrying employees' ideals, creating customer value and promoting corporate development.

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Chapter 1Overview

The NCS-BP107 APL switch is an Ethernet-APL (Advanced Physical Layer) two-wire remote transmission switch independently developed, designed, and manufactured by Microcyber. It supports one 100M network port and six 10BASE-T1L network ports, enabling long-distance communication of up to 1000 meters. It uses the Linux operating system and supports custom development of user protocols.

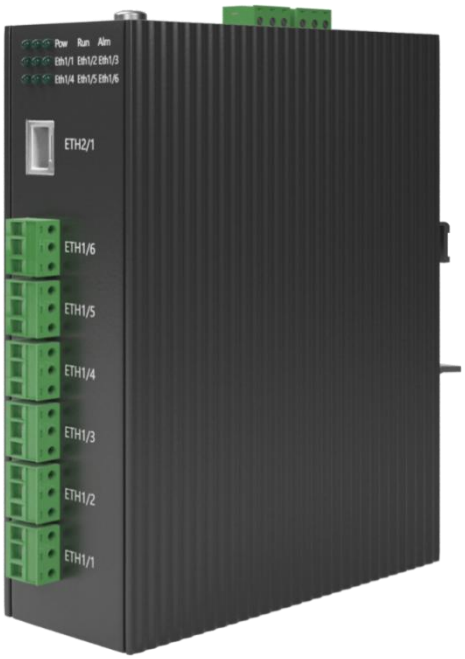

Figure 1 NCS-BP107 APL Switch diagram

Ethernet-APL is a two-wire (single-pair) Ethernet physical layer designed specifically for process industries. Based on the single-pair Ethernet specification extension of the IEEE802.3cg 10BASE-T1L (IEEE802.3cg-2019) standard, it achieves 10Mbps communication speeds and a communication distance of 1000 meters. This two-wire communication cable simultaneously transmits data and powers field devices, meets explosion-proof design specifications, and is suitable for use in hazardous production areas.

Advanced industrial networks based on APL meet the specialized requirements of the automation field. Various TCP/IP-based industrial Ethernet protocols, such as Ethernet/IP, HART-IP, PROFINET, OPC UA, and EPA, can run on APL. APL-based control systems are widely used in industries such as mining, oil and gas, petrochemicals, and chemicals.

1.1 Features

- Support DC power supply 24VDC
- Support POE power supply, the power supply meets the intrinsic safety requirements and can support 9V-60VDC
- Supports one 100M network port and six 10BASE-T1L network ports, with a transmission distance of up to 1000 meters
- Support static aggregation to achieve link redundancy
- ASIC-based high-speed hardware data forwarding mechanism

- Support 10BASE-T1L network port disconnection detection
- Support link quality/packet loss test function
- Suitable for hazardous areas and supports intrinsic safety features

1.2 Software function

- Exchange function
- Support VLAN
- Support broadcast storm suppression

1.3 Security technology

- Support SSH

1.4 Service quality management

- Support QoS
- Supports strict priority queues and weighted priority queues
- Support storm suppression function

1.5 Management and maintenance

- Support CLI, SSH, WEB and other management methods
- Support LLDP automatic topology
- Support SNMPv1/v2
- Support TFTP/FTP upgrade, support log recording and upload

1.6 Product specifications

Table 1 product specifications

Interface	
Power interface	Dual power interface
Network port	one 100base-T
Network port	six 10BASE-T1L
Exchange properties	
priority queue	4
VLAN number	16
VLAN ID	1 ~ 4094
Number of multicast groups	256
MAC table	2 k
packet buffer	2 Mbit
Packet forwarding rate	9.5 Mpps
switching delay	< 5us
Indicator light	
Running indicator light	Run
Alarm indicator light	Alarm
Power indicator light	PWR

Interface indicator light	Link / ACT
Transmission distance	
10BASE-T1L	more than 1000 meters, and the longest distance can exceed 1700 meters.
Power	
Input voltage	24V/48VDC Broad power supply
Access terminal	3-core 5.08mm pitch plug-in terminal
Power	< 5W
Overload protection	support
Reverse connection protection	support
Redundancy protection	Dual power supply redundancy
Mechanical structure	
Protection level	IP40
Industrial grade	Industrial level four
Dimension (mm)	176H× 132W× 60D
Weight	1.3 Kg
Condition	
Working temperature	-40℃ ~ +80℃
Storage temperature	-40℃ ~ +85℃
Relative humidity	5 ~ 95% No condensation
Warranty	
MTBF	346889 h
Warranty period	5 years
Certification	
Domestic Grid Class A	
Implementation standards	
IEEE 802.3cg (10Base-T1L)	
IEEE 802.3i(10Base-T)	
IEEE 802.3u (100Base-T)	
IEEE 802.3ab(1000Base-T)	
IEEE 802.3ad(port aggregation)	
IEEE 802.3z(1000Base-SX/LX)	
IEEE 802.3x(flow control)	
IEEE 802.1p(priority)	
IEEE 802.1Q(VLAN)	
IEEE 802.1w(RSTP)	
IEEE 802.1x	
Reliability and security	
EMI	FCCCFR47 Part 15, EN55022/CISPR22, Class A
EMC	IEC61000-4-2(ESD) ±8kV(contact), ±15kV(air)
	IEC61000-4-3(RS) 10V/m (80MHz ~ 2GHz)
	IEC61000-4-4(EFT) Power Port: ±4kV; Data Port: ±2kV
	IEC61000-4-5(Surge) Power Port: ±2kV/DM, ±4kV/CM; Data Port: ±2kV
	IEC61000-4-6(CS) 3V(10kHz ~ 150kHz) ;10V(150kHz ~ 80MHz)
	IEC61000-4-8(Power frequency magnetic field) 100A/m(cont.),1000A/m(1s ~ 3s)
	IEC61000-4-9(pulsed magnetic field) 1000A/m
	IEC61000-4-10(Damped oscillation) 100A/m
	IEC61000-4-12(oscillating wave) 2.5kV/CM,1kV/DM
	IEC61000-4-16(Common mode conduction) 30V(cont.),300V(1s)

Mechanic	IEC60068-2-6(vibration) IEC60068-2-27(impact) IEC60068-2-32(free fall)
Industry	IEC61000-6-2
Electricity	IEC61850-3, IEEE1613
Rail	EN50155, EN50121-4
Traffic control	NEMA TS-2

1.7 Ordering information

Table 2 Ordering information

Optional models	Order number	Interface	Note
NCS-BP107			

Chapter 2 How to log in to the device

1.8 Serial port login switch

You can use SecureCRT software to log in through the serial port:

Figure 2 Use SecureCRT software to log in to the interface through the serial port

Select the serial port in the protocol section, select 1152000 for the baud rate, and set the port to COM6 for direct connection. Enter the serial port configuration interface and power on the device. After powering on, the HyperTerminal will display the Ethernet clock device startup information. After the startup is complete, the user will be prompted to enter a username.

1.9 Network port login clock device

The default IP address of the device is: panel port 1/1, 192.168.0.2.

If you cannot connect to the device, the IP address is most likely not the initial network configuration. You need to use packet capture software to obtain the IP address. Refer to the device IP address management method.

To connect to a clock device using SSH, the following conditions must be met: Ensure the clock device's port and terminal are on the same LAN, and their IP addresses must be configured in the same network segment. Connect the computer's Ethernet port to the clock device's electrical port using a network cable. Run the SSH program on the computer and enter the IP address of the management VLAN to which the Ethernet port connecting the clock device and the computer belongs, as shown in the figure below. The red portion indicates the IP address of the clock device to be accessed.

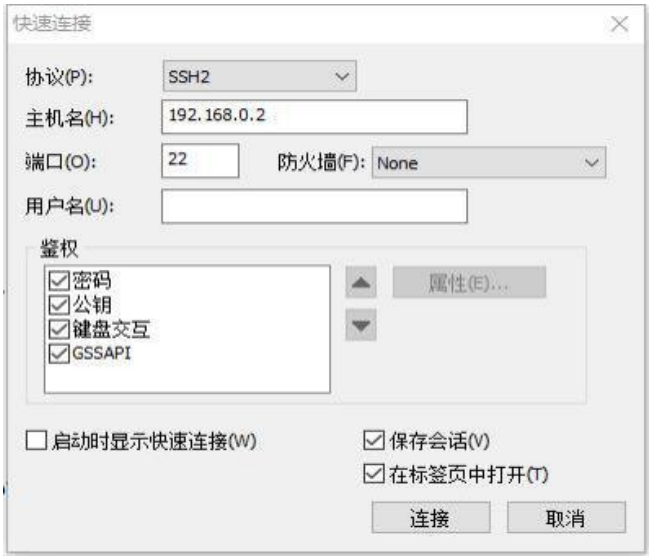

Figure 3 Log in to the clock device interface using SSH through the network port

- After confirmation, you need to enter the user name and password to enter the management interface
- The default username and password are: root, root
- Use relevant commands to configure and manage clock devices or view the operating status of clock devices. Type "?" at any time if you need help. For specific configuration commands, refer to the following chapters in this book

1.10 Command line interface

- Provides users with a command line interface and a series of configuration commands to facilitate user configuration and management
- Local configuration through the console port
- Configuration command hierarchical protection ensures that unauthorized users cannot configure clock devices
- Users can type "?" at any time to get online help
- Provides rich and detailed debugging information to help diagnose network failures
- The command line interpreter uses an incomplete matching search method for keywords. Users only need to type non-conflicting keywords for interpretation. For example, for the print command, just type pri

1.11 Device IP address management method

An IP address is a 32-bit address assigned to devices connected to the Internet. It consists of two fields: the network ID (net-ID) and the host ID (host-ID). To facilitate IP address management, IP addresses are divided into five classes. Class A, B, and C addresses are unicast addresses; Class D addresses are multicast addresses; and Class E addresses are reserved for future special purposes. Currently, the majority of IP addresses in use belong to Class A, B, and C. IP addresses are recorded in dotted decimal notation. Each IP address is represented as four decimal integers separated by decimal points, with each integer corresponding to one byte, such as 10.110.50.101.

- The IP address of the device can be queried and modified, and the MAC address can be queried and modified.

- CLI/SSH query: Print the running configuration of the clock device. Type print device information in user view.
  - YZOS> en
  - YZOS# print device information
  - device type: ICS-2018
  - default-gateway: 0.0.0.0
  - vlan-1 ip-address: 192.168.0.2/24
  - vlan-1 mac-address: a23e.4af8.0f1d
- Packet capture tool: Connect the clock device to the device and use the packet capture tool Wireshark to capture the LLDP message. The management address contains the device's IP and MAC address.

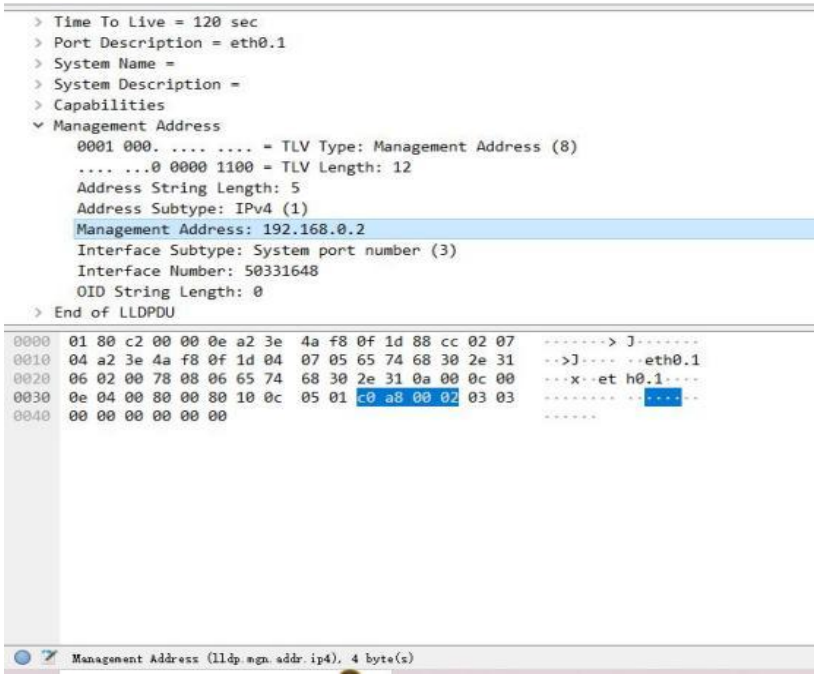

Figure 4 Management Address

- The Management Address is the device IP address
- Modify IP: You can modify the device IP address in configuration mode
- The device MAC address interface is not open to users. Generally speaking, users do not need to modify the device MAC address.
- The device has two interfaces, each with an IP address. The command to configure the IP address is as follows
  - interface ip-adress <A.B.C.D/M>, M stands for subnet mask.

【Configuration example】

- YZOS# en
- YZOS# config
- YZOS (config)# interface ethernet 1/1
- YZOS (config-if-eth1/1)# interface ip-address 1.1.1.1/8

【Modify default gateway】The default gateway must be configured to be in the same network segment as the IP address of any interface.

【Configuration example】

- YZOS# en
- YZOS# conf t
- YZOS (config)# default-gateway 10.0.0.2

Chapter 3 Interface management commands

1.12 Enable

This command is used to enter the management interface YZOS# in the YZOS> interface and enable this interface.

【command】enable

【view】user view

【example】

- YZOS> enable
- YZOS#

1.13 Disable

This command is used to exit from system view to user view.

【command】Disable

【view】user view

【example】

- YZOS# disable
- YZOS>

1.14 Exit

This command is used to exit the current interface and return to the previous interface.

【command】exit

【view】This command can be executed in any view of the logged-in clock device.

【example】

- YZOS# exit
- YZOS>

Or:

- YZOS (config)#
- YZOS#

1.15 End

This command is used to exit the current view and return to the system view.

【command】end

【view】Any view of the clock device management interface

【example】

- YZOS (config)# end
- YZOS#

Or:

- YZOS (config-if-eth1/1)# end
- YZOS#

1.16 Configure terminal

Command used to enter configuration view.

【command】configure terminal

【view】system view

【example】

- YZOS# configure terminal
- YZOS (config)#

1.17 Help

This command is used to help when the usage of clock devices is unclear.

【command】help

【view】any view

【Instructions for use】If you are not sure about the command format on the current interface, you can type help after the command and press Enter to display the help information for the current interface.

1.18 List

Used to view the command line list, showing all commands in the current interface.

【command】list

【view】any view

【Instructions for use】It is convenient for users to view the commands and input formats of the current interface, and can intuitively see the commands that need to be set.

Chapter 4 System commands

1.19 Reboot

The reboot command is used to restart the clock device.

【command】reboot

【view】system view

【example】

#Restart the clock device.

- YZOS> enable
- YZOS# reboot

1.20 YZOS

YZOS command is used to set the system name of the clock device

Use the no YZOS command to restore the default system name of the clock device.

【command】YZOS <name>、no YZOS <name>

【view】system view

【parameter】name：

【Instructions for use】Changing the system name of the clock device affects the prompt of the command line interface.

【example】

- erps-14# configure terminal
- erps-14 (config)# YZOS th-switch
- th-switch (config)#

1.21 Update

The update command is used to update the device software system.

The upgrade only supports the TFTP protocol. Before upgrading, you need to configure the directory of the TFTP server.

【command】update [usrfs] <server-ip> <file>

【view】user view

【parameter】

usrfs: File system for updating the device

Server-ip: Server IP address (tftp server)

file: File name used to update the system

【Instructions for use】If the device's operating system is upgraded, the file system needs to be upgraded.

1.22 Configuration file management commands

1.22.1 Print startup-config

View the system's startup configuration information:

【command】print startup-config

【view】user view

【example】

- print running-config

View the current system configuration information:

【command】print startup-config

【view】user view

【example】

- print running-config

1.22.2 Write file

write file save the current configuration of the system.

【command】write file

【view】user view

1.22.3 Reset configuration

Used to erase the configuration file stored in the clock device.

【command】YZOS <name>、no YZOS <name>

【view】system view

【Instructions for use】Changing the system name of the clock device affects the prompt of the command line interface.

1.23 Network test command

1.23.1 Ping

Use ping to check network connectivity.

【command】ping <target>

【view】system view

【example】

- YZOS# ping 127.0.0.1
- PING 127.0.0.1 (127.0.0.1): 56 data bytes
- 64 bytes from 127.0.0.1: seq=0 ttl=64 time=0.406 ms
- 64 bytes from 127.0.0.1: seq=1 ttl=64 time=0.280 ms
- 64 bytes from 127.0.0.1: seq=2 ttl=64 time=0.276 ms
- 64 bytes from 127.0.0.1: seq=3 ttl=64 time=0.278 ms

Chapter 5 Ethernet interface commands

1.24 Interface ethernet [slot/port]

Enter Ethernet port configuration view.

【command】Interface ethernet [slot | port]

【view】Configuration view

【default user role】network-admin

1.25 Print

Command used to display configuration information.

【command】print running-configuration

Print interface ethernet [slot/port]

【view】Ethernet interface view

【example】

1.26 Shutdown

shutdown command used to shut down the Ethernet interface

no shutdown command to open the Ethernet interface

【command】shutdown、no shutdown

【view】Ethernet interface view

【default】All Ethernet interfaces are enabled.

【default user role】network-admin

【instructions for use】In some special cases (for example, when modifying interface operating parameters), interface configurations may not take effect immediately and require you to shut down and then reopen the interface.

【example】

Shut down the Ethernet interface FortyGigE1/0/1 and then bring it up.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# interface ethernet 1/1
- YZOS (config-if-eth1/1)# shutdown
- YZOS (config-if-eth1/1)# no shutdown

1.27 Interface trunk

The interface trunk command is used to aggregate ports and enter the aggregated interface.

【command】Interface trunk <1-8>

【default】N/A

【view】Configuration view

【parameter】Specifies the number of the inbound aggregate interface.

【example】

#Enter aggregate interface 2

- YZOS (config)# interface trunk 2
- YZOS (config-trunk-2)#

Chapter 6 VLAN Configuration

1.28 VLAN Introduction

VLAN (Virtual Local Area Network) is a technology that implements virtual workgroups by dividing devices within a LAN into segments logically rather than physically.

VLAN technology allows network administrators to logically partition a physical LAN into different broadcast domains (also known as virtual LANs, or VLANs). Each VLAN contains a group of computer workstations with similar requirements and shares the same properties as a physical LAN. However, because the division is logical rather than physical, workstations within the same VLAN do not need to be placed in the same physical space; that is, they do not necessarily belong to the same physical LAN segment. Broadcast and unicast traffic within a VLAN is not forwarded to other VLANs, helping to control traffic flow, reduce equipment investment, simplify network management, and improve network security.

1.29 Interface vlan

Use the interface vlan vlan-id command to create a VLAN and enter its view. If the specified VLAN has already been created, this command directly enters the view of that VLAN.

Use the no interface vlan command to delete a VLAN.

【command】interface vlan vlan-id、no vlan [vlan-id| all]

【view】Configuration view

【default】The system has only one default VLAN (VLAN 1)

【default user role】network-admin

【parameter】

vlan-id: VLAN ID, ranging from 1 to 4094

all: All VLANs except reserved VLAN

【instructions for use】

- VLAN 1 is the system default VLAN and cannot be created or deleted by users.
- Reserved VLANs are VLANs reserved by the system for specific functions and cannot be created or deleted manually by users.
- You cannot use the no vlan command to directly delete dynamically learned VLANs, VLANs configured with QoS policies, or VLANs that are locked by other applications. You can delete the corresponding VLANs only after deleting the related configurations.

【example】

#Create VLAN 2 and enter its view.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# interface vlan 2
- YZOS (config-vlan-2)#

1.30 Description

The description command is used to configure the description of the current VLAN or VLAN interface.

Use the no description command to restore the default.

【command】description text, no description

【view】VLAN view/VLAN interface view

【default】The VLAN description is "VLAN vlan-id," where vlan-id is the VLAN ID. For example, the description of VLAN 100 is "VLAN 0100." The description of a VLAN interface is the interface name, such as "Vlan-interface1 Interface."

【default user role】network-admin

【parameter】text: Specifies a description string for the VLAN or VLAN interface. The string can contain case-sensitive letters, numbers, special characters (including ~ ! @ # $ % ^ & * ( ) - _ + = { } [ ] | \ : ; " ' < > , . /), spaces, and other characters and symbols that conform to Unicode. The description string for a VLAN or VLAN interface is 1 to 255 characters.

【instructions for use】When multiple VLANs are configured on a device, you can set specific descriptions for VLANs or VLAN interfaces based on their functionality or connectivity to facilitate management and memorization of these VLANs or VLAN interfaces.

【example】

Configure the description of VLAN 2 as sales-private.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# interface vlan 2
- YZOS (config-vlan-2) # description sales-private

1.31 Add port

Use the add port command to add a port member to a VLAN.

【command】add port <portlist> [tagged | untagged]

【view】VLAN view/VLAN interface view

【default】The VLAN description is "VLAN vlan-id," where vlan-id is the VLAN ID. For example, the description of VLAN 100 is "VLAN 0100." The description of a VLAN interface is the interface name, such as "Vlan-interface1 Interface."

【default user role】network-admin

【parameter】portlist: Port member list, 1/1-8; 1/9, 1/14

【example】

Configure the port members of VLAN 2.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# interface vlan 2
- YZOS (config-vlan-2) # add port 1/1-4 tagged

1.32 Delete port

Use the delete port command to add a port member to a VLAN.

【command】delete port <portlist> [tagged | untagged]

【view】VLAN view/VLAN interface view

【default】The VLAN description is "VLAN vlan-id," where vlan-id is the VLAN ID. For example, the description of VLAN 100 is "VLAN 0100." The description of a VLAN interface is the interface name, such as "Vlan-interface1 Interface."

【default user role】network-admin

【parameter】portlist: Port member list, 1/1-8; 1/9, 1/14

【example】

Configure the port members of VLAN 2.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# interface vlan 2
- YZOS (config-vlan-2) # delete port 1/1-4 tagged

Chapter 7 SNMP-AGENT Command

1.33 Snmp-agent community

The snmp-agent community command is used to set the read/write community access name for SNMPv1 and SNMPv2c.

【command】snmp-agent community [read | write] <community-name>、no snmp-agent community <community-name>

【view】Configuration view

【parameter】community-name: Specifies a community name, which is displayed in ciphertext when the configuration file is viewed. The value is a case-sensitive string with spaces not supported. The value range is 8 to 32 characters.

【instructions for use】

【example】

#Set the read-only group name to oraccess1

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# snmp-agent community read oraccess1

Chapter 8 LLDP Command

1.34 lldp enable

The lldp enable command enables LLDP on the device.

Use the lldp disable command to disable LLDP on a device.

【command】lldp [enable|disable]

【view】configuration view

【parameter】community-name: Specifies a community name character string, which is displayed in ciphertext when the configuration file is viewed. The value is a string of 8 to 32 characters, without spaces and case-sensitive.

【Instructions for use】

【example】

Enable LLDP globally

- YZOS> enable
- YZOS# configure termial
- YZOS (config)# lldp enable

1.35 lldp clear neighbor

The lldp clear neighbor command clears neighbor information discovered by LLDP.

【command】lldp clear neighbor

【view】configuration view

【Instructions for use】

【example】

Clear neighbor information for all interfaces on the device

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# lldp clear neighbor

1.36 lldp transmission delay

The lldp transmission delay command configures the delay time for LLDP to send packets.

The no lldp transmission delay command restores the default delay for sending LLDP packets.

【command】lldp transmission delay <1-8192>、no lldp transmission delay

【view】configuration view

【parameter】The value is an integer ranging from 1 to 8192, in seconds. The default value is 2 seconds.

【Instructions for use】

【example】

Set the delay time for the device to send LLDP packets to 5 seconds

- YZOS >enable
- YZOS #configure terminal
- YZOS (config)# lldp transmission delay 5

1.37 lldp transmission hold

The lldp transmission hold command configures the time multiplier for device information to be retained on neighboring devices.

The no lldp transmission hold command restores the default value of the retention time multiplier for device information on neighboring devices.

【command】lldp transmission hold <2-10>、no lldp transmission hold

【view】configuration view

【parameter】By default, the retention time multiplier for device information on neighboring devices is 4.

【Instructions for use】

【example】

Adjust the device's message retention time multiplier to 5

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# lldp transmission hold 5

1.38 lldp transmission interval

The lldp transmission interval command configures the interval for LLDP to send packets.

The no lldp transmission interval command restores the default interval for sending LLDP packets.

【command】lldp transmission interval <5-32768>、no lldp transmission interval

【view】configuration view

【parameter】The value is an integer ranging from 5 to 32768, in seconds. The default value is 30 seconds.

【Instructions for use】

【example】

Set the LLDP packet transmission interval to 35 seconds.

- YZOS> enable
- YZOS# configure terminal
- YZOS (config)# lldp transmission interval 35

1.39 print lldp configuration

Check the LLDP configuration information.

【command】print lldp configuration

【view】system view

【example】

- YZOS# print lldp configuration
- Lldp status: enable
- Lldp transmission delay: 2
- Lldp transmission interval: 30
- Lldp transmission hold-multiplier: 4

1.40 print lldp neighbor

Check information about neighbor devices discovered by LLDP.

【command】print lldp neighbor

【view】system view

【example】

- YZOS (config)# print lldp neighbor
- LLDP Neighbor Info:
- Interface 'eth0.1' has Neighbor 1:
- Chassis ID: MAC Address - 00 e0 4d 68 04 31
- Port ID: MAC Address - 00 e0 4d 68 04 31
- Time To Live: 3601 seconds
- Organizationally Specific: 00 12 0f 01 03 00 01 00
- Organizationally Specific: 00 12 bb 01 00 01
- End Of LLDPDU:

Chapter 9 1588 Configuration commands

1.41 Ptp port

The ptp port <portlist> enable/disable command is used to enable or disable the PTP port. Only when it is enabled can 1588 synchronization messages be sent to the port.

【command】ptp port <portlis> enable、ptp port <portlis> disable

【view】1588 configuration view

【parameter】

<portlis> is the port number available for the device, depending on how many ports the device supports.

enable/disable: enable/disable

【default】All ports are disable

【describe】When we use a port to connect to a synchronization device such as a switch, we need to enable the connected port so that we can use the 1588 synchronization mechanism through this port.

【example】

- YZOS (config)# ptp port 1 enable
- YZOS (config)# print ptp protocol

1.42 Ptp mode master/slave cross-over-ethernet

After ptp mode is configured, clock synchronization can be achieved for devices across the network. The master clock is configured to enable master, and the slave devices are configured to enable slave.

【command】ptp mode master cross-over-ethernet [enable/disable]、ptp mode slave cross-over-ethernet [enable/disable]

【view】1588 configuration view

【describe】

- If cross-network clock synchronization is required, configure the master clock to enable, that is, configure the following in the master clock: ptp mode master cross-over-ethernet enable
- Configure the slave device to enable, that is, configure the slave clock as follows: ptp mode slave cross-over-ethetnet enable

1.43 Ptp announce-interval

The ptp announce interval configuration is divided into positive and negative. Positive represents a positive number, and negative represents a negative number. The values are different.

【command】ptp announce-interval positive <0-3>、ptp announce-interval negative <1-3>

【view】1588 configuration view

【parameter】

When announce-interval is set to a negative number, it means 2^n messages are sent per second.

When announce-interval is set to a positive number, it means that a message is sent every 2^n seconds.

【default】The announce-interval is usually 0 and does not need to be configured.

【describe】When you need to cross the network, try to set the value to a negative number to increase the speed of sending messages per second and improve the synchronization rate.

【example】

Set to a negative number:

- YZOS (config)# ptp announce-interval negative 3
- ulInterval = -3hostname(config)#

Set to a positive number:

- YZOS (config)# ptp announce-interval positive 0

1.44 Ptp sync-interval

The ptp sync-interval interval configuration is divided into positive and negative. Positive represents a positive number, and negative represents a negative number. The values are different.

【command】ptp sync-interval positive <0-3>、ptp sync-interval negative <1-6>

【view】1588 configuration view

【parameter】

When sync-interval is set to a negative number, it means that 2^n messages are sent per second.

When sync-interval is set to a positive number, it means that a message is sent every 2^n seconds.

【default】Sync-interval generally does not require special settings. When crossing networks, the packet sending speed can generally be set to be faster.

【describe】Indicates the rate of sending synchronization messages.

【example】

- YZOS (config)# ptp sync-interval negative 5
- ulInterval = -5
- YZOS (config)#

1.45 Ptp delay-request-interval

The delay-request-interval interval configuration is divided into positive and negative. Positive represents a positive number, and negative represents a negative number. The values are different.

【command】ptp delay-request-interval positive <0-3>、ptp delay-request-interval-negative <1-5>

【view】1588 configuration view

【parameter】

When sync-interval is set to a negative number, it means that 2^n packets are sent per second.

When sync-interval is set to a positive number, it means that a message is sent every 2^n seconds.

【default】No configuration by default

【describe】Setting the interval for calculating the delay message rate.

1.46 Ptp delay-response-interval

The ptp delay-response-interval interval configuration has positive and negative values. Positive represents a positive number, and negative represents a negative number. The values are different.

【command】ptp delay-response-interval positive <0-3>、ptp delay-response-interval positive <1-5>

【view】1588 configuration view

【parameter】

When sync-interval is set to a negative number, it means that 2^n messages are sent per second.

When sync-interval is set to a positive number, it means that a message is sent every 2^n seconds.

【default】No configuration by default

【describe】Delay message rate interval setting.

1.47 Ptp adjust frequent/offset factor

【command】ptp adjust frequent factor 0, ptp adjust offset factor 0

【default】No configuration by default

1.48 Ptp adjust offset/freq

【command】ptp adjust offset 0, ptp adjust freq 0

【default】No configuration by default

1.49 Ptp clock stratum

The ptp clock stratum sets the level of the clock. The smaller the value, the higher the priority.

【command】ptp clock stratum <128-254>

【view】1588 configuration view

【parameter】Only 128 to 254 are supported. The smaller the value, the greater the chance of being selected as the master clock.

【describe】The clock level configuration generally does not need to be set. If there is GPS, the GPS switch will be selected as the main clock.

【example】

- YZOS (config)# ptp clock stratum 129
- YZOS (config)# print ptp protocol

1.50 Ptp clocktype

The ptp clocktype setting selects boundary clock, p2p clock, and e2e clock.

【command】ptp clocktype [boundary/e2e/p2p]

【view】1588 configuration view

【parameter】

boundary: boundary clock

p2p: Calculate point-to-point clock error

e2e: Calculate end-to-end clock error

【default】Usually boundary clock

【describe】Configure the clock type to implement various clock synchronization calculations. The offset calculation methods are different.

【example】

- YZOS (config)# ptp clocktype p2p
- YZOS (config)# print ptp running-config

View clock configuration information

1.51 Ptp dealy-mechanism

The ptp delay-mechanism command sets the delay mechanism, which includes peer-to-peer and request-response.

【command】ptp delay-mechanism [peer-to-peer/request-response]

【view】1588 configuration view

【parameter】

peer-to-peer: peer-to-peer network delay synchronization mechanism

request-response: Delayed request response mechanism

【default】N/A

【describe】Set up delay mechanism.

【example】

- YZOS (config)# ptp delay-mechanism request-response
- set ptp deleay mechanism failed
- YZOS (config)#

1.52 Ptp packet-type

The ptp packet type setting is the message type, which is divided into 802.3 and udp message formats.

【command】ptp packet-type udp/802.3

【view】1588 configuration view

【parameter】802.3/udp

【describe】Two message sending methods are selected, with different formats.

【example】

- YZOS (config)# ptp packet-type 802.3

1.53 Ptp subdomain

The domain name value is configured.

【command】ptp subdomin domain-number <0-255>

【view】1588 configuration view

【parameter】[0~255]

【default value】Generally the default value is 0

【describe】Switches that are synchronized with each other must be set within the same threshold in order to transmit messages to each other and achieve synchronization.

【example】

The values of the master and slave clocks should be set to the same:

- YZOS (config)# ptp subdomain domain-number 2

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