Lantech

Pioneering Industrial and IP Networks

Coupling Ring Instruction Guide

Coupling Ring Application

Coupling Ring Backup Path

Coupling Port

Coupling Port

Backup path

Switch 1

Switch 3

Coupling Ring Group

Control Port

Control Port

Pro-Ring Group A

R.T. < 10ms

Pro-Ring Group B

R.T. < 10ms

Switch 2

Switch 4

Coupling Port

Backup path
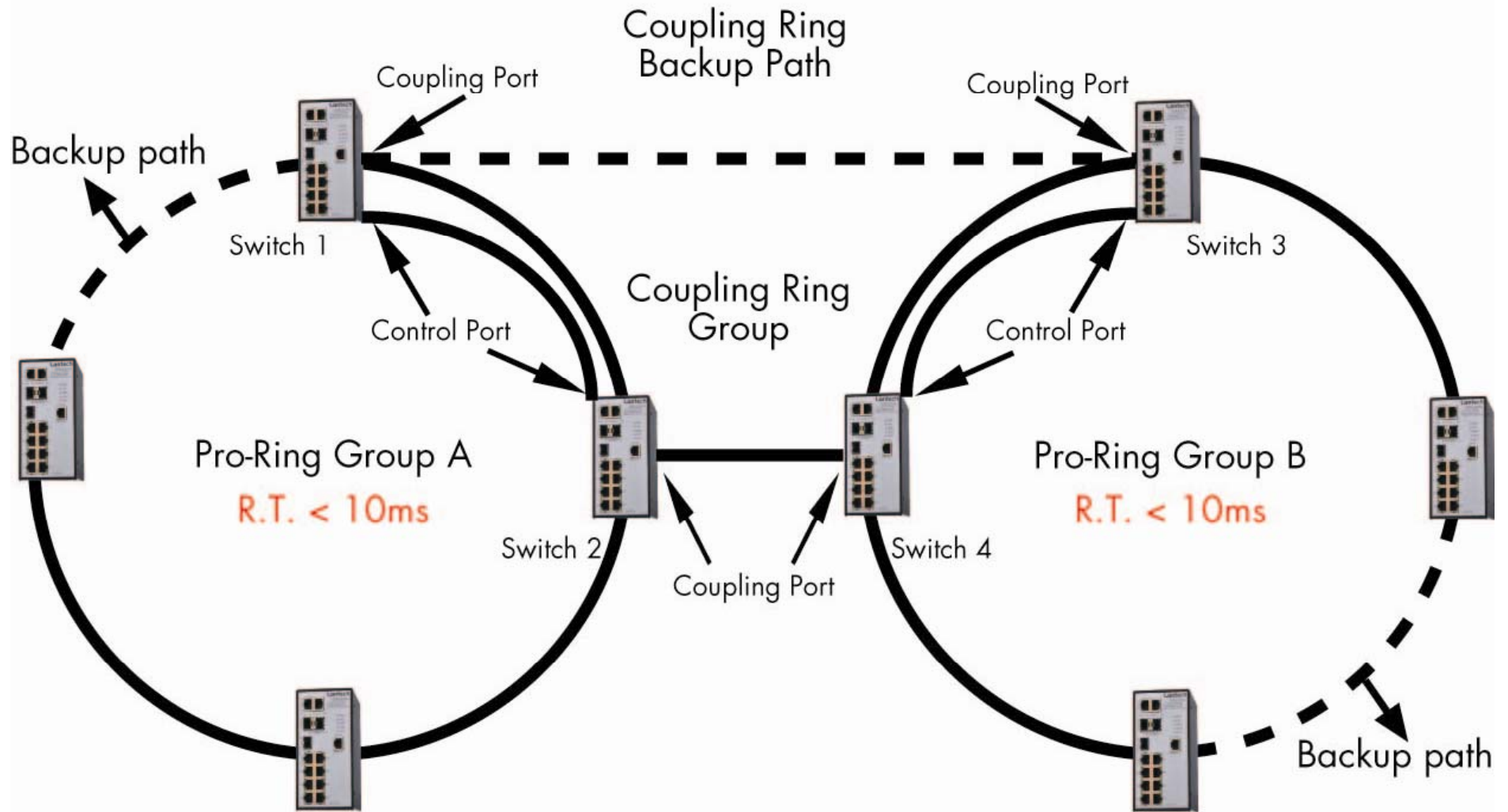
Topic: Use 6 "IES-2307C" to set up Coupling Ring

Step 1: Assign different IP address for each switches.

IP Configuration

DHCP Client : Disable ▼

IP Address	192.168.16.10		IP Address	192.168.16.20		IP Address	192.168.16.30
Subnet Mask	255.255.255.0		Subnet Mask	255.255.255.0		Subnet Mask	255.255.255.0
Gateway	192.168.16.254		Gateway	192.168.16.254		Gateway	192.168.16.254
DNS1	0.0.0.0		DNS1	0.0.0.0		DNS1	0.0.0.0
DNS2	0.0.0.0		DNS2	0.0.0.0		DNS2	0.0.0.0

[Apply] [Help]

IP Configuration

DHCP Client : Disable ▼

IP Address	192.168.16.40		IP Address	192.168.16.50		IP Address	192.168.16.60
Subnet Mask	255.255.255.0		Subnet Mask	255.255.255.0		Subnet Mask	255.255.255.0
Gateway	192.168.16.254		Gateway	192.168.16.254		Gateway	192.168.16.254
DNS1	0.0.0.0		DNS1	0.0.0.0		DNS1	0.0.0.0
DNS2	0.0.0.0		DNS2	0.0.0.0		DNS2	0.0.0.0

[Apply] [Help]

Configuring X-Ring

X-Ring provides a faster redundant recovery than Spanning Tree topology. The action is similar to STP or RSTP, but the algorithms not the same.

In the X-Ring topology, every switch should enable X-Ring function and assign two member ports in the ring. Only one switch in the X-Ring group would be set as a backup switch that would be blocked, called backup port, and another port is called working port. Other switches are called working switches and their two member ports are called working ports. When the failure of network connection occurs, the backup port will automatically become a working port to recovery the failure.

The ring master can negotiate and place command to other switches in the X-Ring group. If there are 2 or more switches in master mode, then software will select the switch with lowest MAC address number as the ring master. The X-Ring master ring mode will be enabled by the X-Ring configuration interface. Also, user can identify the switch as the ring master from the R.M. LED panel of the LED panel on the switch.

The system also supports the coupling ring that can connect 2 or more X-Ring group for the redundant backup function and dual homing function that prevent connection lose between X-Ring group and upper level/core switch.

Enable X-Ring: To enable the X-Ring function. Marking the check box to enable the X-Ring function.
Enable Ring Master: Mark the check box for enabling this machine to be a ring master.
1st & 2nd Ring Ports: Pull down the selection menu to assign two ports as the member ports. 1st Ring Port is the working port and 2nd Ring Port is the backup port. When 1st Ring Port fails, the system will automatically upgrade the 2nd Ring Port to be the working port.
Enable Coupling Ring: To enable the coupling ring function. Marking the check box to enable the coupling ring function.
Coupling port: Assign the member port.
Control port: Set the switch as the master switch in the coupling ring.
Enable Dual Homing: Set up one of port on the switch to be the Dual Homing port. In an X-Ring group, maximum Dual Homing port is one. Dual Homing only work when the X-Ring function enable.
And then, click "Apply" to apply the configuration.

[Note]
When the X-Ring function enable, user must disable the RSTP. The X-Ring function and RSTP function cannot exist at the same time. Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when switch power off.

Step 2: Click the X-Ring protocol. Enable Ring and assign 192.168.16.10 as Ring Master. Enable Coupling Ring.

Step 3: Repeat step 2 when you are configure 192.168.16.20, but do not enable ring master.

Step 4: Enable Ring protocol only when you are configure 192.168.16.30.

Note: Please choose different ports to each protocol. (Ring and Coupling Ring)

Open all
- Main Page
- ⊞ System
- ⊞ Port
- ⊟ Protocol
  - VLAN
  - RSTP
  - SNMP
  - QoS
  - IGMP
  - X-Ring
  - LLDP
- ⊞ Security
- Factory Default
- Save Configuration
- System Reboot

X-Ring Configuration

☑ Enable Ring		
☑ Enable Ring Master		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	BLOCKING
☑ Enable Couple Ring		
Couple Port	Port.03 ▼	FORWARDING
Control Port	Port.04 ▼	BLOCKING
☐ Enable Dual Homing		
Homing Port	Port.05 ▼	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	BLOCKING

This switch is Ring Master.

[Apply] [Help]

192.168.16.10

X-Ring Configuration

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	FORWARDING
☑ Enable Couple Ring		
Couple Port	Port.03 ▼	FORWARDING
Control Port	Port.04 ▼	BLOCKING
☐ Enable Dual Homing		
Homing Port	Port.05 ▼	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	FORWARDING

[Apply] [Help]

192.168.16.20

X-Ring Configuration

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	FORWARDING
☐ Enable Couple Ring		
Couple Port	Port.03 ▼	LINKDOWN
Control Port	Port.04 ▼	LINKDOWN
☐ Enable Dual Homing		
Homing Port	Port.05 ▼	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▼	FORWARDING
2nd Ring Port	Port.02 ▼	FORWARDING

[Apply] [Help]

192.168.16.30

Step 5: Click the X-Ring protocol. Enable Ring and assign 192.168.16.40 as Ring Master. Enable Coupling Ring.

Step 6: Repeat step 5 when you are configure 192.168.16.50, but do not enable ring master.

Step 7: Enable Ring protocol only when you are configure 192.168.16.60.

Note: Please choose different ports to each protocol. (Ring and Coupling Ring)

Open all
- Main Page
- ⊞ System
- ⊞ Port
- ⊟ Protocol
  - VLAN
  - RSTP
  - SNMP
  - QoS
  - IGMP
  - X-Ring
  - LLDP
- ⊞ Security
- Factory Default
- Save Configuration
- System Reboot

X-Ring Configuration

☑ Enable Ring		
☑ Enable Ring Master		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	BLOCKING
☑ Enable Couple Ring		
Couple Port	Port.03 ▾	FORWARDING
Control Port	Port.04 ▾	BLOCKING
☐ Enable Dual Homing		
Homing Port	Port.05 ▾	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	BLOCKING

This switch is Ring Master.

[Apply] [Help]

192.168.16.40

X-Ring Configuration

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	FORWARDING
☑ Enable Couple Ring		
Couple Port	Port.03 ▾	BLOCKING
Control Port	Port.04 ▾	BLOCKING
☐ Enable Dual Homing		
Homing Port	Port.05 ▾	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	FORWARDING

[Apply] [Help]

192.168.16.50

X-Ring Configuration

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	FORWARDING
☐ Enable Couple Ring		
Couple Port	Port.03 ▾	LINKDOWN
Control Port	Port.04 ▾	LINKDOWN
☐ Enable Dual Homing		
Homing Port	Port.07 ▾	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01 ▾	FORWARDING
2nd Ring Port	Port.02 ▾	FORWARDING

[Apply] [Help]

192.168.16.60

Coupling Ring Application

Coupling Ring Application

Coupling Ring Backup Path

Coupling Port — Switch 1 — Coupling Port — Switch 4

Control Port — Coupling Ring Group — Control Port
R.T. < 150ms

control port link — control port link

Pro-Ring Group A — Switch 2 — Switch 3 — Pro-Ring Group B
R.T. < 10ms — R.T. < 10ms

Coupling Port

Backup path
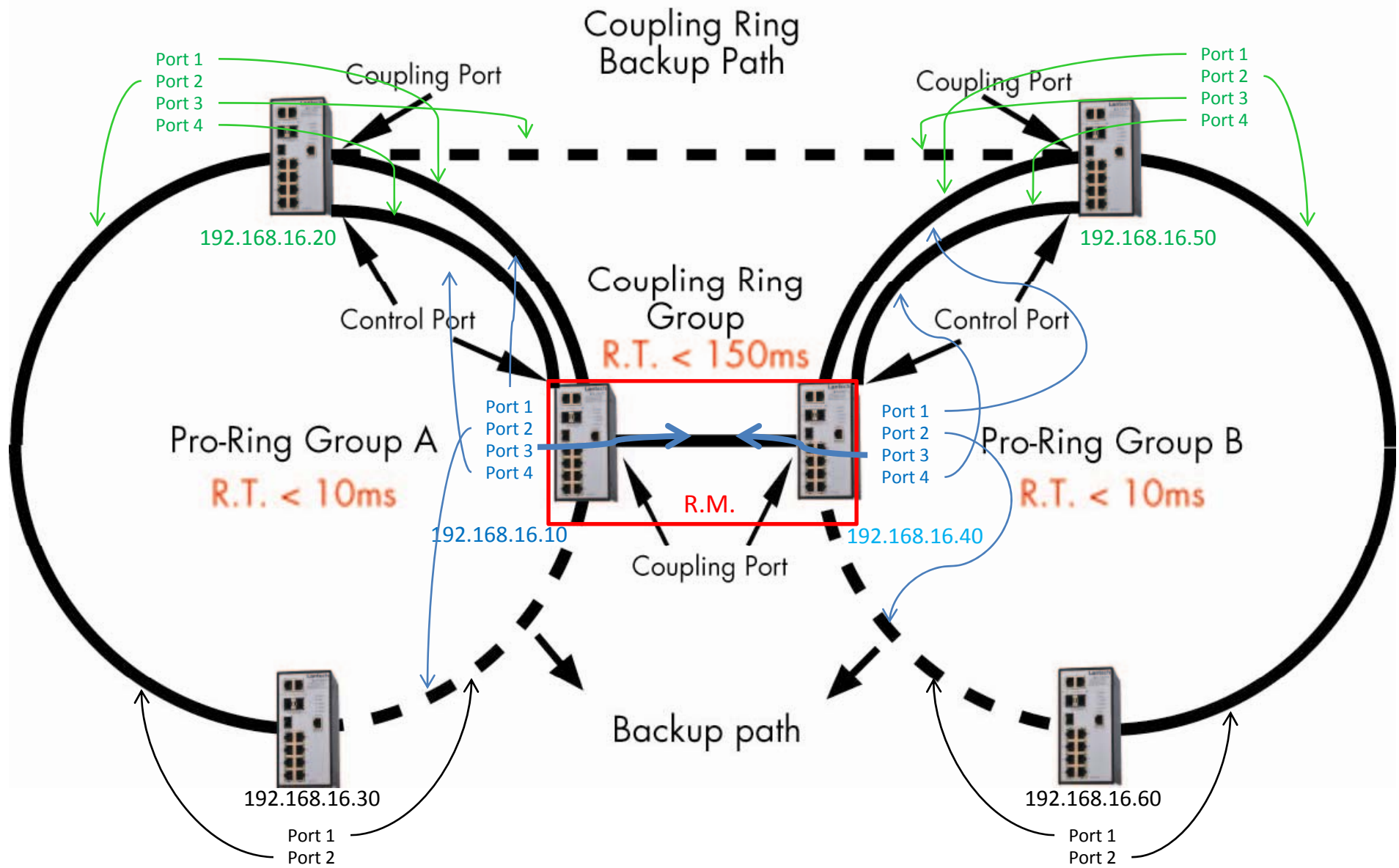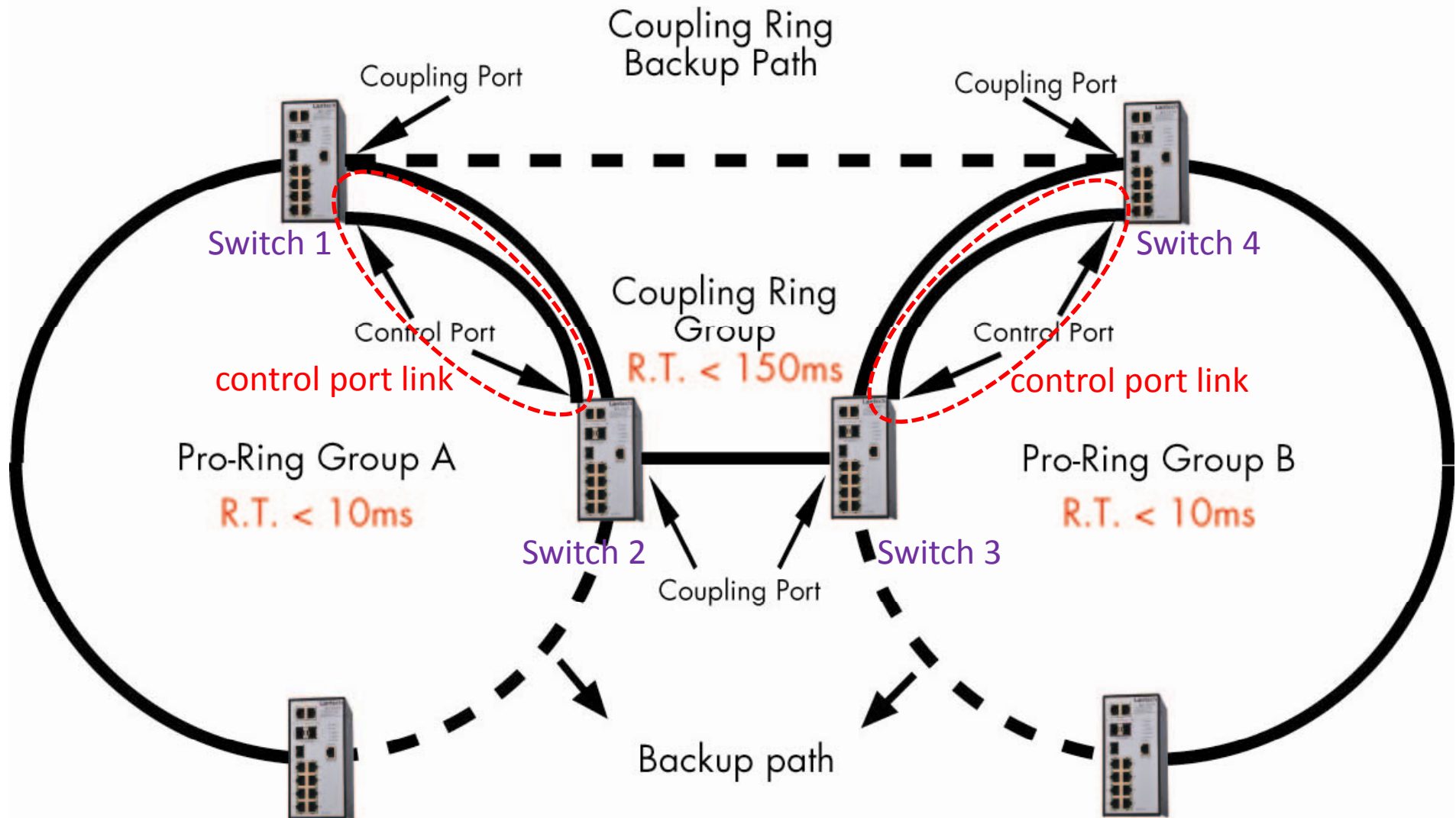
Note: 1. Ring master is only can enable at Switch 1 ~ 4 and ring master number can't over 2.
       2. In multicast environment please enable IGMP function.
       3. Please keep the control port link alive or the coupling ring will be crash.

Ring Tool Recovery time test method:
1. We send the test packet from NIC #1 to NIC #2.
2. Because of the X-Ring topology we can see the data flow.
3. When the X-Ring topology change the data flow will be change too.
4. Ring tool will capture the test packet when NIC #2 not only receive data.
5. It will calculate test packet the interval in ms.