



ZebOS-XP®

Network Platform

Version 1.4

Extended Performance

Synchronous Ethernet
Configuration Guide
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Preface

This guide describes how to configure Synchronous Ethernet (SynchE) in ZebOS-XP.

Audience

This guide is intended for network administrators and other engineering professionals who configure Synchronous Ethernet.

Conventions

Table P-1 shows the conventions used in this guide.

Table P-1: Conventions

Convention	Description
<i>Italics</i>	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
<code>monospaced type</code>	Code elements such as commands, functions, parameters, files, and directories

Contents

This guide contains these chapters:

- [Chapter 1, Configuring Synchronous Ethernet](#)
- [Chapter 2, Configuring External Commands](#)

Related Documents

Use this guide with these command references for details about the commands used in the configurations.

- *Synchronous Ethernet Command Reference*
- *Network Services Module Command Reference*

Note: All ZebOS-XP technical manuals are available to licensed customers at http://www.ipinfusion.com/support/document_list.

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CHAPTER 1 Configuring Synchronous Ethernet

This chapter shows how to configure Synchronous Ethernet. This chapter shows two scenarios in selecting a frequency source:

- Using quality level
- Using priority

Topology

In the topology shown in [Figure 1-1](#), ZebOS2 can select a clock source from ZebOS1 or ZebOS3. The selection is based on quality level or priority.



Figure 1-1: Selecting a Frequency Source

Using Quality Level

In the procedure below, ZebOS1 and ZebOS3 are both configured as output sources, with ZebOS1 having quality level QL_PRC and ZebOS3 having quality level QL_SSU_A. ZebOS2 is configured to accept a frequency from either ZebOS1 or ZebOS3. Because quality level is used as the clock selection criteria (the default setting), ZebOS2 chooses ZebOS1 as the frequency source.

ZebOS1

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.
(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth6 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_PRC	Assign the quality level as PRC.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS2

(config)#interface eth9	Configure interface eth9.
(config-if)#switchport	Configure eth9 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with priority 2.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.
(config)#int eth10	Configure interface eth10.
(config-if)#switchport	Configure eth10 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with priority 2.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS3

(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth1 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_SSU_A	Assign the quality level as SSU_A.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

Validation

ZebOS1

1. Verify the Synchronous Ethernet details.

```
#show synce details
Clock State:          Free-run
```

2. Verify the output source.

```
#show synce output-sources
Interface Name:       eth6
ESMC Status:          OK
QL:                   QL_PRC
```


ZebOS2

1. Verify the input source.

```
#show synce input-sources
Interface Name:      eth9
ESMC Status:         OK
Is-selected-Source:  YES
QL:                  QL_PRC
Priority:             2
Hold-off(ms) :       300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   None

Interface Name:      eth10
ESMC Status:         OK
Is-selected-Source:  No
QL:                  QL_Ssu_A
Priority:             2
Hold-off(ms) :       300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   None
```

2. Verify the Synchronous Ethernet details.

```
#show synce details
Interface Name:      eth9
ESMC Status:         OK
Is-selected-Source:  YES
QL:                  QL_PRC
Clock State:         Locked
```

Zebos3

1. Verify the Synchronous Ethernet details.

```
#show synce details
Clock State:         Free-run
```

2. Verify the output source on Zebos3.

```
#show synce output-sources
Interface Name:      eth6
ESMC Status:         OK
QL:                  Ql_Ssu_A
```

Using Priority

In the procedure below, ZebOS1 and ZebOS3 in [Figure 1-1](#) are both configured as output sources, with ZebOS1 having priority 2 and ZebOS3 having priority 1. ZebOS2 is configured to accept a frequency from either ZebOS1 or ZebOS3. Because quality level is not used as the clock selection criteria (an explicit setting), ZebOS2 chooses ZebOS3 (with the higher priority) as the frequency source.

ZebOS1

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.
(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth6 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_PRC	Assign quality level as PRC.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS2

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode
(config)#interface eth9	Configure interface eth9.
(config-if)#switchport	Configure eth9 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with priority 2.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.
(config)#int eth10	Configure interface eth10.
(config-if)#switchport	Configure eth10 as a layer 2 port
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 1	Configure the interface as an input source with priority 1.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS3

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Configure synchronization network as option 1.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.
(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth6 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_SSU_A	Assign quality level as SSU_A.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

Validation

ZebOS1

1. Verify the Synchronous Ethernet details.

```
#show synce details
Clock State:          Free-run
```

2. Verify the output source.

```
#show synce output-sources
Interface Name:       eth6
ESMC Status:         OK
QL:                  QL_PRC
```

ZebOS2

1. Verify the input source.

```
#show synce input-sources
Interface Name:       eth9
ESMC Status:         OK
Is-selected-Source:  No
QL:                  QL_PRC
Priority:             2
Hold-off(ms) :       300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   None

Interface Name:       eth10
ESMC Status:         OK
Is-selected-Source:  YES
QL:                  QL_SSU_A
```

```
Priority: 1
Hold-off(ms): 300
Wait-to-restore(mins): 5
Signal Fail: No
External Commands: None
```

2. Verify the Synchronous Ethernet details.

```
#show sync details
Interface Name: eth10
ESMC Status: OK
Is-selected-Source: YES
QL: QL_SSU_A
Clock State: Locked
```

Zebos3

1. Verify the Synchronous Ethernet details.

```
#show sync details
Clock State: Free-run
```

2. Verify the output source.

```
#show sync output-sources
Interface Name: eth6
ESMC Status: OK
QL: Ql_SSU_A
```

CHAPTER 2 Configuring External Commands

This chapter shows how to configure external commands for Synchronous Ethernet.

Topology

In the topology shown in [Figure 2-1](#), ZebOS2 can use ZebOS1, ZebOS3, or ZebOS4 as a frequency source. On ZebOS2, the `switch-source force` external command selects ZebOS3. Also, the `lockout` command specifies not to consider ZebOS4 when selecting a source.

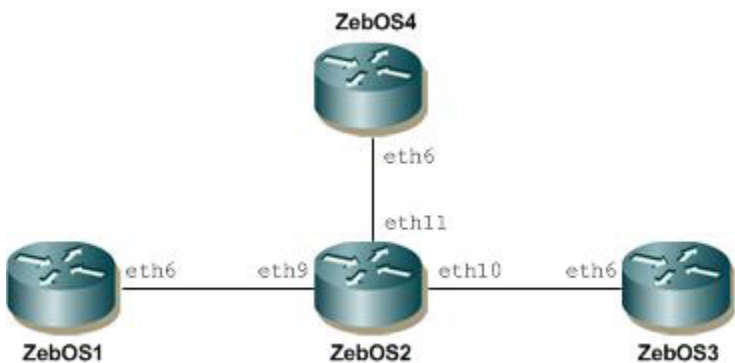


Figure 2-1: Configuring External Commands

ZebOS1

<code>#configure terminal</code>	Enter configure mode.
<code>(config)#synce</code>	Enter configure Synchronous Ethernet mode.
<code>(config-synce)#synchronization option 1</code>	Set the synchronization network type.
<code>(config-synce)#exit</code>	Exit configure Synchronous Ethernet mode.
<code>(config)#interface eth6</code>	Configure interface eth6.
<code>(config-if)#switchport</code>	Configure eth6 as a layer 2 port.
<code>(config-if)#synce</code>	Enter interface Synchronous Ethernet mode.
<code>(config-if-synce)#mode synchronous</code>	Configure synchronous mode.
<code>(config-if-synce)#output-source</code>	Configure the interface as an output source.
<code>(config-if-synce)#quality-level QL_PRC</code>	Assign quality level as PRC.
<code>(config-if-synce)#exit</code>	Exit interface Synchronous Ethernet mode.
<code>(config-if)#exit</code>	Exit interface mode.

ZebOS2

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.
(config)#interface eth9	Configure interface eth9.
(config-if)#switchport	Configure eth9 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 2	Configure the interface as an input source with priority 2.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.
(config)#int eth10	Configure interface eth10.
(config-if)#switchport	Configure eth10 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 1	Configure the interface as an input source with priority 1.
(config-if-synce)#switch-source force	Select the source using the <code>force</code> external command.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.
(config)#int eth11	Configure interface eth11.
(config-if)#switchport	Configure eth11 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#input-source 1	Configure the interface as an input source with priority 1.
(config-if-synce)#set lockout	Remove the source from the selection process.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS3

#configure terminal	Enter configure mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.

(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth6 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_SSU_A	Assign quality level as SSU_A.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

ZebOS4

#configure terminal	Enter Configure Mode.
(config)#synce	Enter configure Synchronous Ethernet mode.
(config-synce)#synchronization option 1	Set the synchronization network type.
(config-synce)#clock-selection mode ql-disabled	Disable quality level checking.
(config-synce)#exit	Exit configure Synchronous Ethernet mode.
(config)#interface eth6	Configure interface eth6.
(config-if)#switchport	Configure eth6 as a layer 2 port.
(config-if)#synce	Enter interface Synchronous Ethernet mode.
(config-if-synce)#mode synchronous	Configure synchronous mode.
(config-if-synce)#output-source	Configure the interface as an output source.
(config-if-synce)#quality-level QL_SSU_B	Assign quality level as SSU_B.
(config-if-synce)#exit	Exit interface Synchronous Ethernet mode.
(config-if)#exit	Exit interface mode.

Validation

Zebos1

1. Verify the Synchronous Ethernet details.

```
#show synce details
```

```
Clock State:          Free-run
```

2. Verify the output source.

```
#show synce output-sources
```

```
Interface Name:      eth6
```

```
ESMC Status:         OK
```

```
QL:                  QL_PRC
```

Zebos2

1. Verify the input source.

```
#show synce input-sources
```

```
Interface Name:      eth9
ESMC Status:         OK
Is-selected-Source:  No
QL:                  QL_PRC
Priority:             2
Hold-off(ms):        300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   None
```

```
Interface Name:      eth10
ESMC Status:         OK
Is-selected-Source:  YES
QL:                  QL_SSU_A
Priority:             1
Hold-off(ms):        300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   Force
```

```
Interface Name:      eth11
ESMC Status:         OK
Is-selected-Source:  No
QL:                  QL_SSU_B
Priority:             1
Hold-off(ms):        300
Wait-to-restore(mins): 5
Signal Fail:         No
External Commands:   Lockout
```

2. Verify the Synchronous Ethernet details.

```
#show synce details
```

```
Interface Name:      eth10
ESMC Status:         OK
Is-selected-Source:  YES
QL:                  QL_SSU_A
Clock State:         Locked
```

Zebos3

1. Verify the Synchronous Ethernet details.

```
#show synce details
```

```
Clock State:         Free-run
```

2. Verify the output source.

```
#show synce output-sources
```


Interface Name: eth6
ESMC Status: OK
QL: Q1_SSU_A

Zebos4

1. Verify the Synchronous Ethernet details.

```
#show synce details
```

Clock State: Free-run

2. Verify the output source.

```
#show synce output-sources
```

Interface Name: eth6

ESMC Status: OK

QL: Q1_SSU_B

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