

PTP 820C/S 1+1 & 2+2 HSB Radio Protection

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Cambium Networks™

Agenda

- What is Protection?
- ACM and 1+1/2+2 HSB
- Configuration Guide
- Cabling
- Disabling Protection Admin

Different types of protections systems



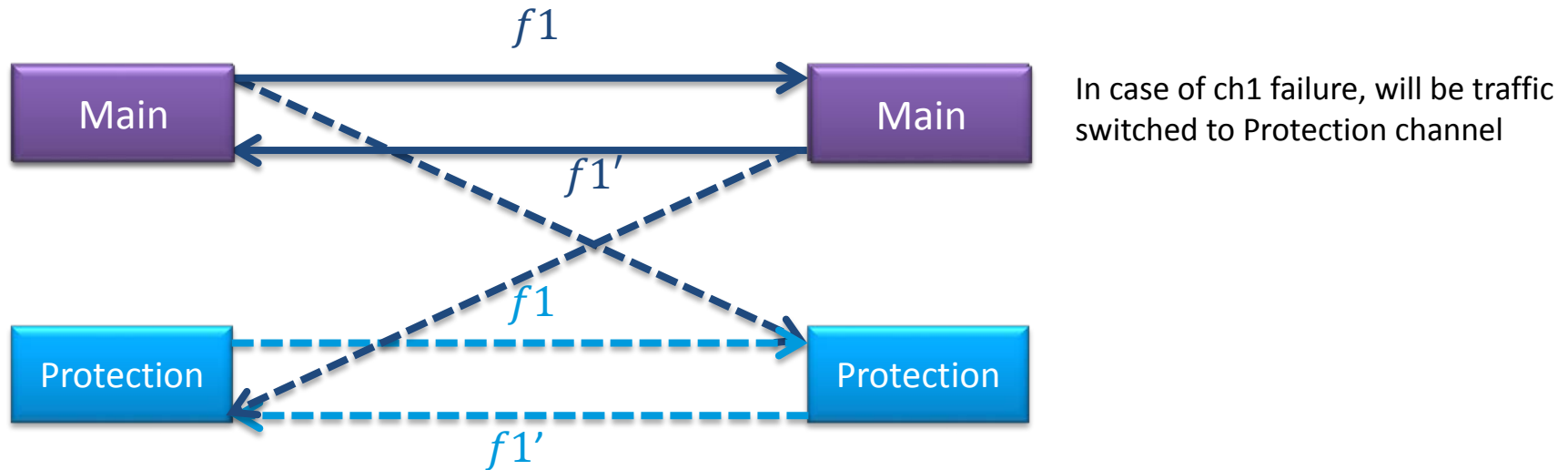
What is Protection?

- A method of using one or more devices in a standby mode in order to have a secondary link up when failure occurred to the active link
- In order to achieve a full protected link each and every device should be protected
- The number of multiplied devices depends on the link importance

"The process of keeping (something or someone) safe"

Wikipedia.com

Hot standby in general



- HSB system is using same frequency for Main and Standby channel ($f1$ & $f1'$)
 - HSB system is typically 1+1 / 2+2
 - Protection channel is internally muted. Just in case Main channel failure will be Protection channel Unmuted.
 - Space diversity with baseband switching is based on HSB system (selection of better input level)
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- In Hot Standby mode only one transmitter is active, the other transmitter is standby. Both receivers are active and hitless switching is performed if Space diversity was configured. The TX- and RX- switching at a terminal normally operates independently, but they may be configured to operate together.

Switchover Triggers

In the event of switchover, the standby unit becomes the active unit and the active unit becomes the standby unit. Switchover takes less than 50 msec.

The following events trigger switchover for HSB protection according to their priority, with the highest priority triggers listed first:

1. No mate/hardware failure/Power Failure
2. Lockout
3. Force switch from GUI
4. Radio/Signal Failures

ACM and 1+1/2+2 HSB

- When ACM is activated together with 1+1/2+2 HSB protection, it is essential to feed the active unit via the main channel of the coupler (lossless channel), and to feed the standby unit via the secondary channel of the coupler (-6db attenuated channel). This maximizes system gain and optimizes ACM behavior for the following reasons:
 - In the TX direction, the power will experience minimal attenuation.
 - In the RX direction, the received signal will be minimally attenuated. Thus, the receiver will be able to lock on a higher ACM profile (according to what is dictated by the RF channel conditions).
- The following ACM behavior should be expected in a 1+1 or 2+2 configuration:
 - In the TX direction, the Active TX will follow the remote Active RX ACM requests (according to the remote Active Rx MSE performance).
 - The Standby TX might have the same profile as the Active TX, or might stay at the lowest profile (profile-0). That depends on whether the Standby TX was able to follow the remote RX Active unit's ACM requests (only the active remote RX sends ACM request messages).
 - In the RX direction, both the active and the standby carriers follow the remote Active TX profile (which is the only active transmitter).

Preparation to HSB configuration

To configure HSB radio protection:

- Verify that both units have the **same hardware part number** and the **same software version**. If the units do not have the same software version, upgrade each unit to the most recent software release
- Assign an IP address to each unit.
- Establish a management connection to one of the units. You can select either unit; once you enable Protection Administration, the system will determine which unit becomes the Active unit.

Configuration Guide

1. Physical connection

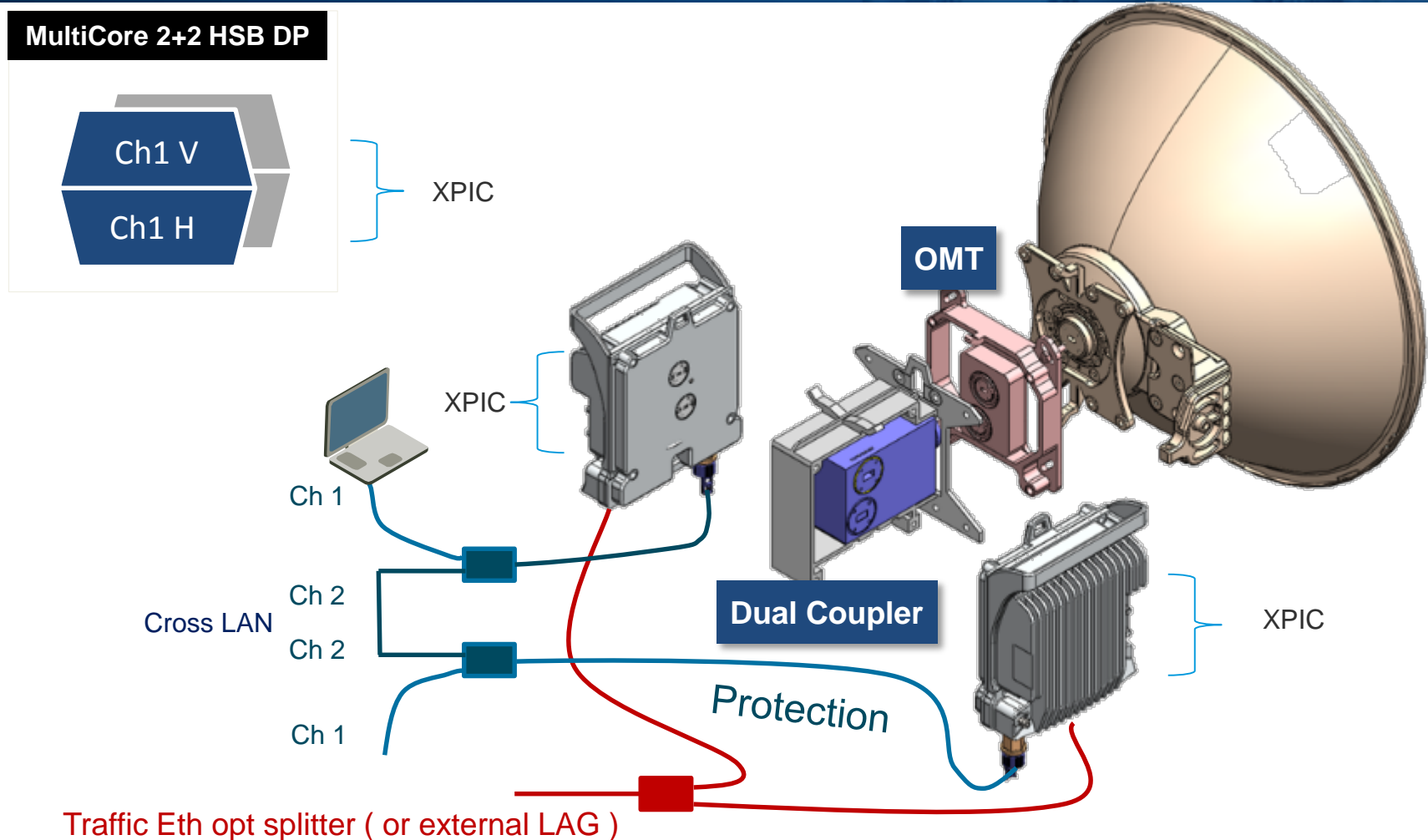
- Connect MNG splitter cable between Main and HSB unit via CH2 with Cross LAN cable

2. Configuration

1. Enable *Protection Admin* on the HSB unit, on the Main is activated automatically
 2. Configure Main unit in term of Radio parameters and Services
 3. Provide *Copy to Mate*
- ## 3. Verify no Active alarm on the Main and HSB unit occur

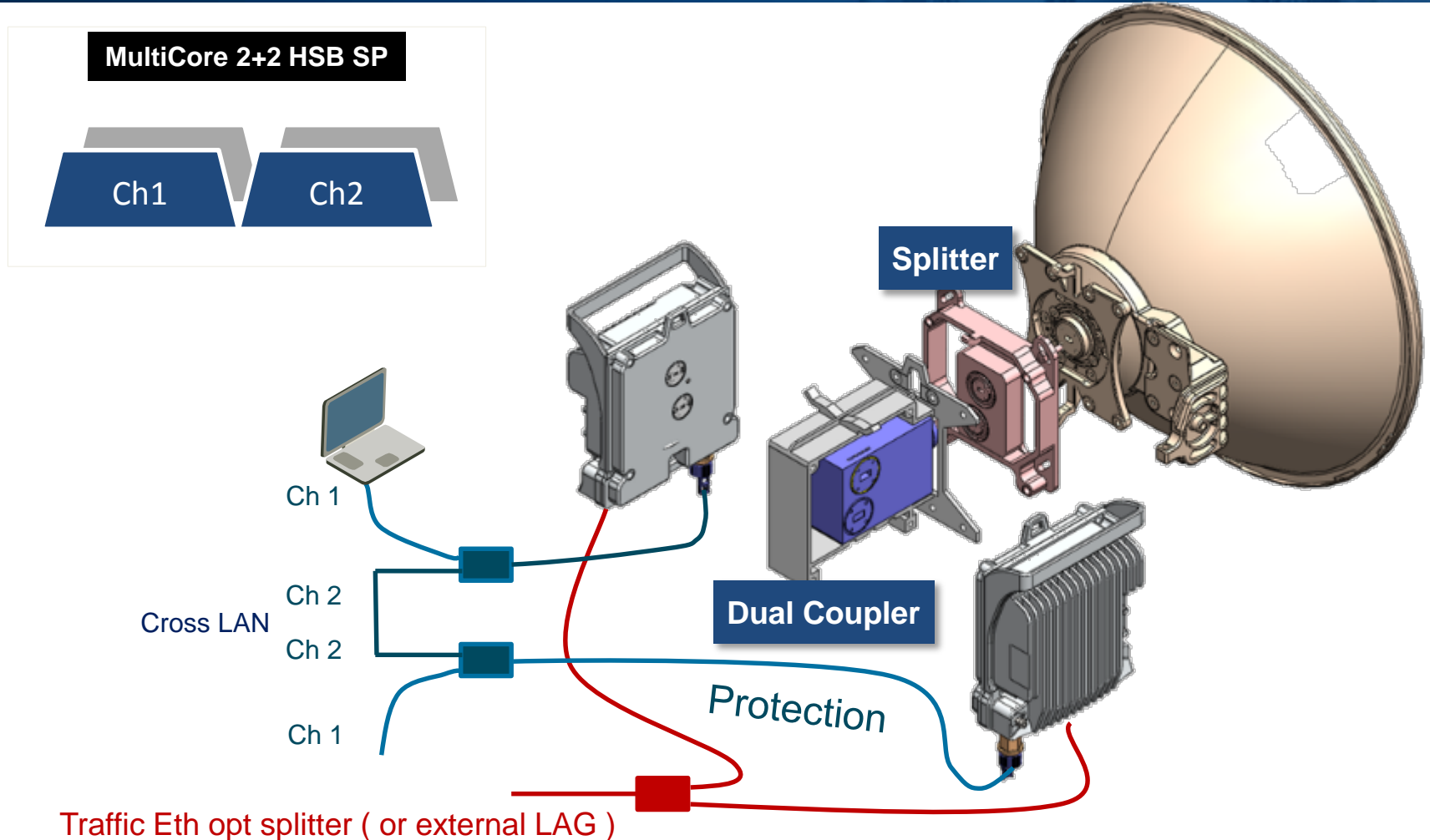
MultiCore 2+2 HSB DP XPIC / Single Core 1+1

MultiCore 2+2 HSB DP



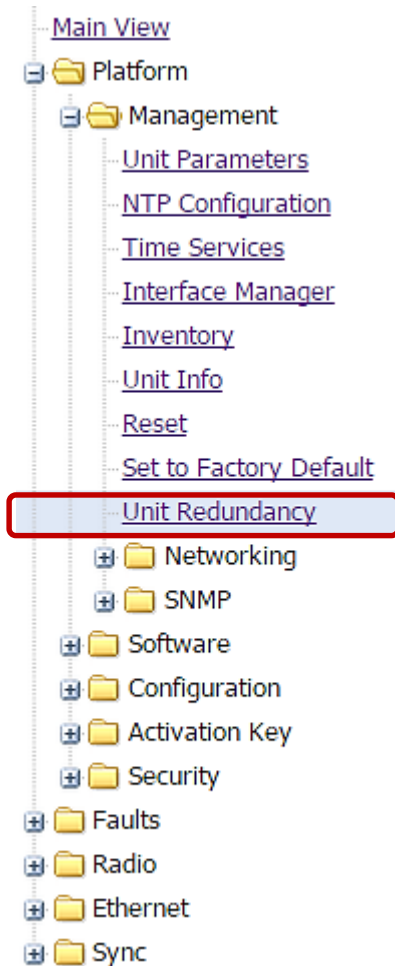
*Flexible, Easy to Install **DIRECT MOUNT** options*

MultiCore 2+2 HSB SP / Single Core 1+1



*Flexible, Easy to Install **DIRECT MOUNT** options*

2. StandBy Unit Redundancy – Enable



Unit Redundancy

Protection Operational State	Down
Protection Activity	Active
Protection Link to Mate	Disconnected

Protection Admin

Apply Refresh

Disable ▼
Enable
Disable

Protection Admin is automatically enabled on the second unit, used like Main, via Protection cable

Active vs Standby setting

The screenshot displays the Cambium Networks management interface. On the left is a navigation tree with the following items: Main View, Platform, Management, Unit Parameters, NTP Configuration, Time Services, Interface Manager, Inventory, Unit Info, Reset, Set to Factory Default, Unit Redundancy (highlighted with a red box), Networking, SNMP, Software, Configuration, Activation Key, Security, Faults, Radio, Ethernet, and Sync. The main content area is divided into two sections. The top section is for the 'Active' mode, with 'Active' selected in the top tabs. It shows settings for Unit Redundancy: Protection Operational State is 'Up', Protection Activity is 'Active' (highlighted with a red box), Protection Link to Mate is 'Connected', and Copy to mate status is 'Success'. Below these are 'Protection Admin' (Enable) and 'Lockout' (off) dropdowns, and buttons for 'Apply', 'Manual Switch', 'Copy to Mate', and 'Refresh'. A warning message states: 'Warning: "Copy to Mate" involves Mate unit reboot. A temporary loss of management connection may be expected.' The bottom section is for the 'Standby' mode, with 'Standby' selected in the top tabs. It shows settings for Unit Redundancy: Protection Operational State is 'Up', Protection Activity is 'Standby' (highlighted with a red box), Protection Link to Mate is 'Connected', and Copy to mate status is 'Ready'. Below these are 'Protection Admin' (Enable) and 'Lockout' (off) dropdowns, and a 'Refresh' button.

Main View

- Platform
- Management
 - Unit Parameters
 - NTP Configuration
 - Time Services
 - Interface Manager
 - Inventory
 - Unit Info
 - Reset
 - Set to Factory Default
 - Unit Redundancy**
- Networking
- SNMP
- Software
- Configuration
- Activation Key
- Security
- Faults
- Radio
- Ethernet
- Sync

Active Standby

Unit Redundancy

Protection Operational State Up

Protection Activity **Active**

Protection Link to Mate Connected

Copy to mate status Success

Protection Admin Enable ▼

Lockout off ▼

Apply Manual Switch Copy to Mate Refresh

⚠ Warning: "Copy to Mate" involves Mate unit reboot. A temporary loss of management connection may be expected.

Active **Standby**

Unit Redundancy

Protection Operational State Up

Protection Activity **Standby**

Protection Link to Mate Connected

Copy to mate status Ready

Protection Admin Enable

Lockout off

Refresh

IP setting

Main View

- Platform
 - Management
 - Unit Parameters
 - NTP Configuration
 - Time Services
 - Interface Manager
 - Inventory
 - Unit Info
 - Reset
 - Set to Factory Default
 - Unit Redundancy
 - Networking**
 - Local**
 - Remote
 - SNMP
 - Software
 - Configuration
 - Activation Key
 - Security
 - Faults
 - Radio
 - Ethernet
 - Sync

IP Family Configuration

IP address Family: IPv4

Apply

Description	local-management-port
IP address	192.168.2.202
Subnet mask	255.255.255.0
Default gateway	0.0.0.0
IPv6 Address	fec0::c0:a8:1:1
IPv6 Prefix-Length	120 (1..128)
Default Gateway IPv6	::

Apply Refresh

Active **Standby**

IP Family Configuration

IP address Family: IPv4

Description	local-management-port
IP address	192.168.2.202
Subnet mask	255.255.255.0
Default gateway	0.0.0.0
IPv6 Address	fec0::c0:a8:1:1
IPv6 Prefix-Length	120
Default Gateway IPv6	::

Refresh

HSB IP address is changed into Main IP address

Radio & Service Configuration on the Main

- Main View
 - Platform
 - Faults
 - Radio
 - Radio Parameters**
 - Remote Radio Parameters
 - Radio Thresholds
 - ATPC
 - Ethernet Interface
 - MRMC
 - PM & Statistics
 - Diagnostics
 - Groups
- Ethernet
 - General Configuration
 - Services**
 - Interfaces
 - PM & Statistics
 - QOS
 - Protocols
 - Sync

Active Standby								
Radio table								
Radio location	Type	TX Frequency	RX Frequency	Operational TX Level (dBm)	RX Level (dBm)	Modem MSE	Defective Blocks	TX Mute Status
Radio: Slot 2, port 1	RFU-N-DC	14950.000	14550.000	2	-33	-40.15	0	Off
Radio: Slot 2, port 2	RFU-N-DC	15000.000	14600.000	0	-99	-99.00	0	Off
Edit Refresh								

Active Standby					
Ethernet Services Configuration Table					
<input type="checkbox"/>	Service ID	Service Type	EVC ID	EVC description	Admin
<input type="checkbox"/>	1	P2P	N.A.	N.A.	Operational
<input type="checkbox"/>	257	MNG	MNG	MNG	Operational

Disable Auto Negotiation of Fiber Port

192.168.1.1/responder.fcgi?winid=277&deviceid=

Active, Physical Interfaces - Edit

Interface location: Ethernet: Slot 1, port 2

Operational Status: Up

Admin status: Up

Media type: Auto-Type

Actual port speed: 1000

Actual port duplex: Full Duplex

Description:

Media type: SFP

Auto negotiation: Off

Speed: Off

Duplex: Full Duplex

Apply Refresh Close

The Fiber Port “Auto Negotiation” **MUST** set to “Off”

Copy to Mate

Main View

- Platform
- Management
 - Unit Parameters**
 - NTP Configuration
 - Time Services
 - Interface Manager
 - Inventory
 - Unit Info
 - Reset
 - Set to Factory Default
 - Unit Redundancy**
- Networking
- SNMP
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- Activation Key
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- Ethernet
- Sync

Unit Redundancy

✓ **Active** Standby

Unit Redundancy	
Protection Operational State	Up
Protection Activity	Active
Protection Link to Mate	Connected
Copy to mate status	Success

Protection Admin: Enable ▼

Lockout: off ▼

Apply Manual Switch **Copy to Mate** Refresh

⚠ Warning: "Copy to Mate" involves Mate unit reboot. A temporary loss of management connection may be expected.

After Copy to Mate is done, HSB unit restarts

No Current Alarms

- [Main View](#)
- [Platform](#)
- [Faults](#)
- [Current Alarms](#)
- [Event Log](#)
- [Alarm Configuration](#)
- [Radio](#)
- [Ethernet](#)
- [Sync](#)

☒ Active ☐ Standby

Current Alarms

#	Time	Severity	Description
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☐ Active ☒ Standby

Current Alarms

#	Time	Severity	Description
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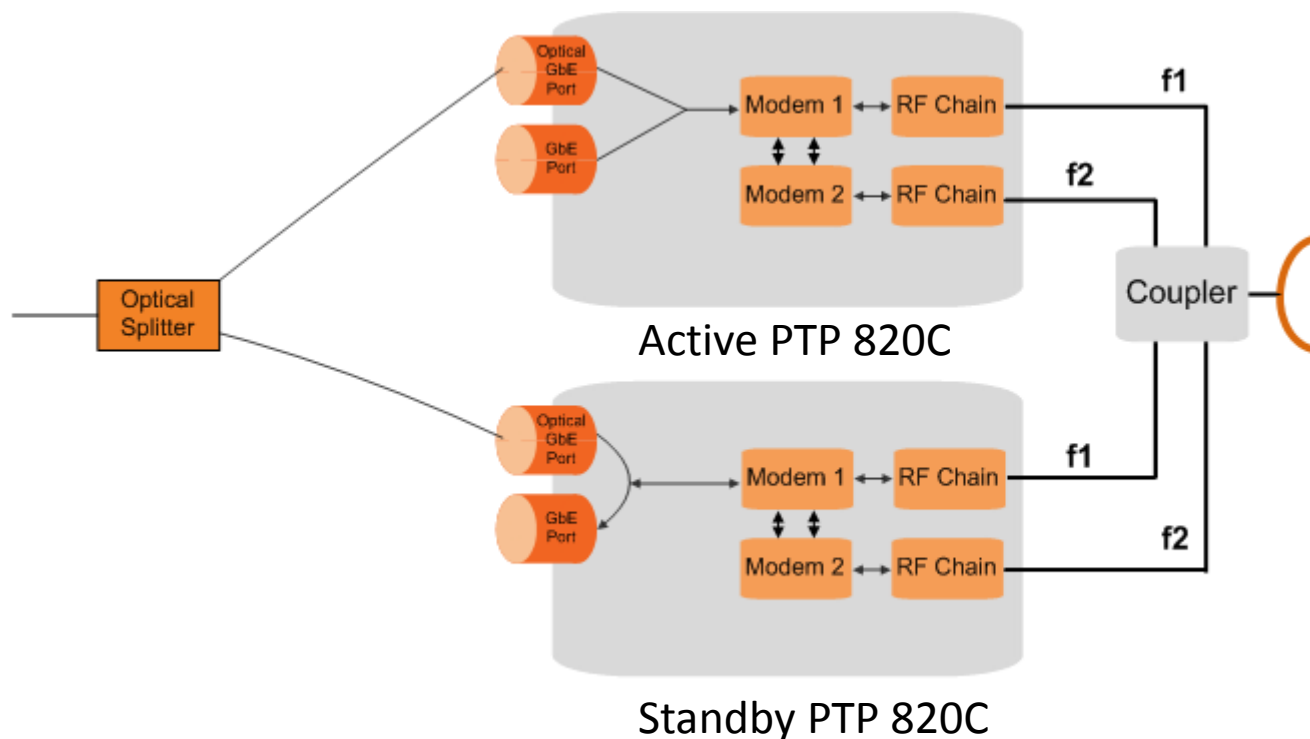
Cabling



External Traffic Protection

- One GbE port on each PTP 820C is connected to an optical splitter. Both ports on each PTP 820C unit belong to a LAG, with 100% distribution to the port connected to the optical splitter on each PTP 820C unit.
- Traffic must be routed to an optical GbE port on each PTP 820C unit. No protection forwarding cable is required.

MultiCore 2+2 HSB Protection

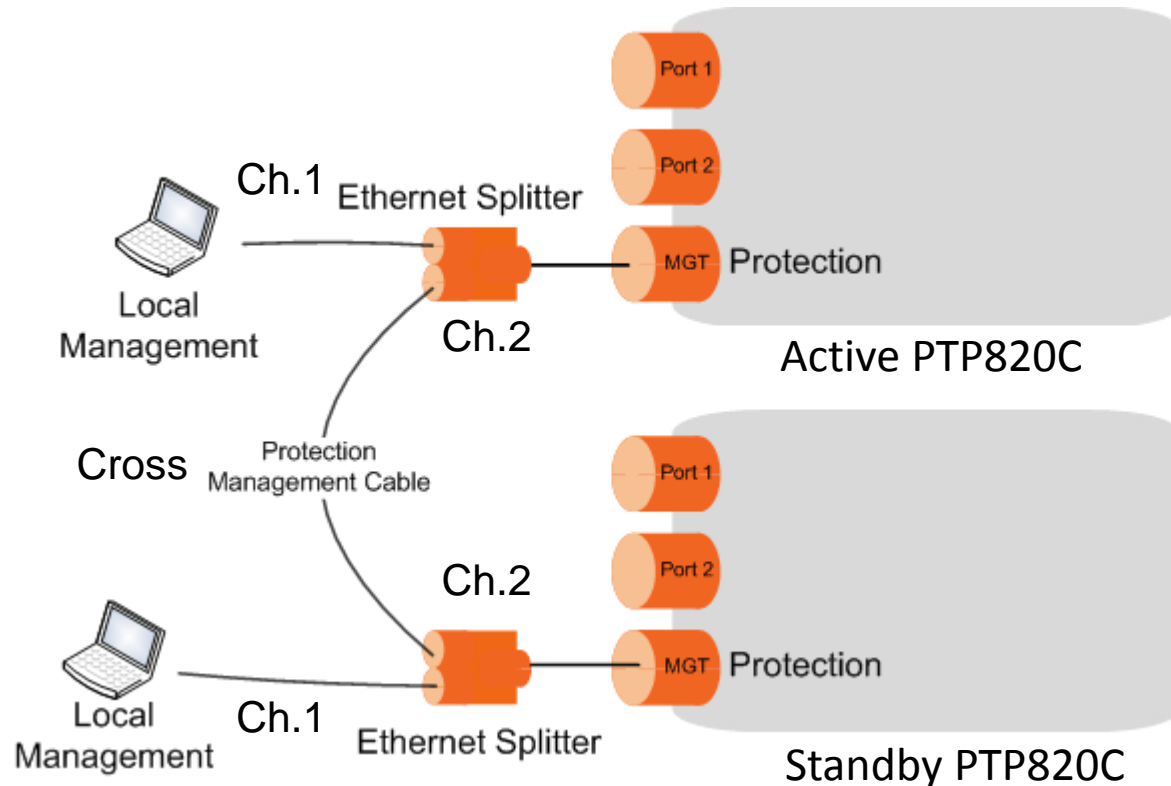


Management for External Protection

- The standby unit is managed via the active unit.
- A protection cable connects the two PTP 820C units via their management ports. This cable is used for internal management.
- By placing an Ethernet splitter on the protection port, the user can add another cable for local
- A single IP address is used for both PTP 820C units, to ensure that management is not lost in the event of switchover.



Internal and Local Management



Disabling Protection Admin

How to disable 1+1 / 2+2 HSB

1. Disable *Protection Admin* on the Main Unit
2. HSB unit will automatically disable *Protection Admin* via Protection cable
3. HSB unit is set to the default IP address *192.168.1.1*
4. *Change* default IP address
5. Provide *Reset* on the previous HSB unit
6. Provide *Reset* on the previous Main unit

Thank You

