

Trio QH Quick Start Guide



Hot Standby Full Duplex - Q Data Radio

Introduction

Welcome to the Trio™ Quick Start Guide for the QH Hot Standby full duplex radio. This section provides additional installation considerations, wiring diagrams and operational descriptions. This document should be read in conjunction with the QB full duplex radio Quick Start Guide.

The QH is a fully redundant, hot standby, full duplex radio providing automatic changeover facilities.

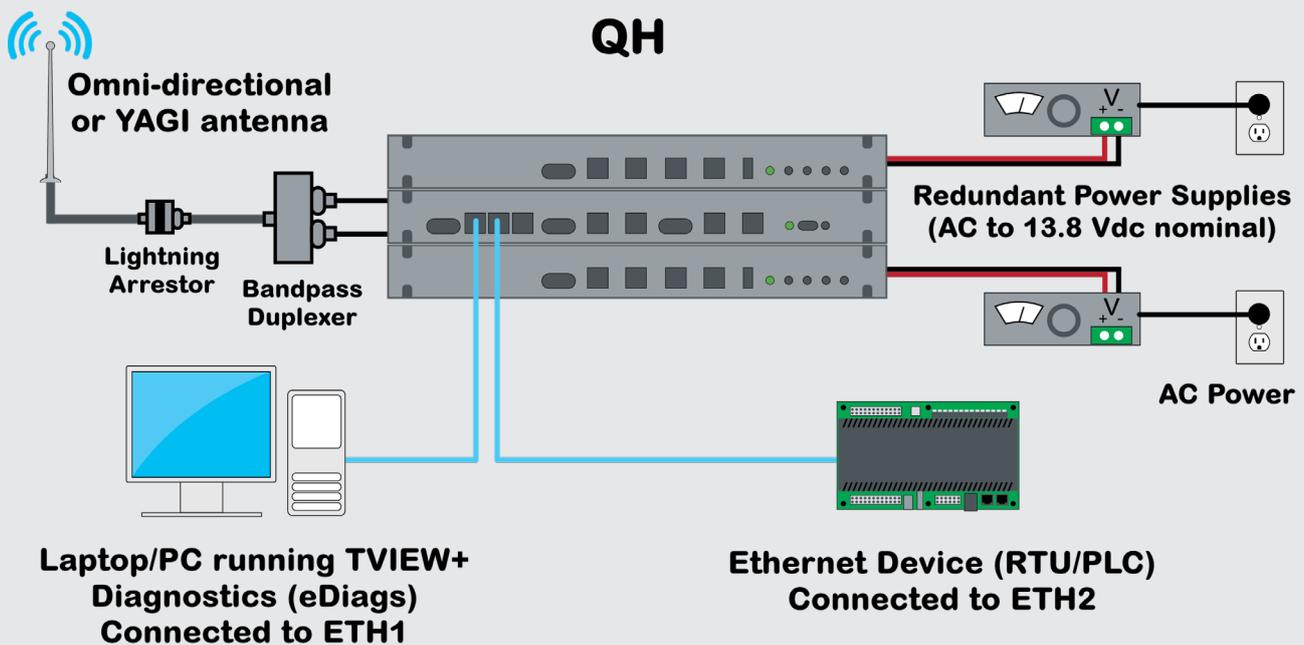
The QH is designed as a modular solution, comprising two identical QB full duplex radios (standard) linked to a central monitoring and changeover controller (Hot Standby Controller). Either QB may be taken out of service for maintenance without the need for system downtime. The automatic changeover can be triggered by the online out-of-tolerance (alarm) conditions based on either RF and/or user data throughput parameters.

Features and Benefits

- Two identical QB full duplex radios with a separate changeover controller
- Hot-swappable full duplex radios without system downtime
- Flexible antenna options – Separate Tx & Rx, two Tx and two Rx
- Increased sensitivity with receiver pre-amplifier
- Both online and off-line units monitored regardless of online status
- Also refer to the common Features and Benefits list of the Q data radio range.



Typical Radio Setup



Schneider Electric offers a variety of wireless accessories. For further information, refer to the wireless accessories data sheet.

Operational Description

The QH Hot Standby Controller (QHHSC) unit is a 1RU rack-mounted module that interfaces to two independent full duplex radios (each a 1RU rack-mounted module) via a number of RF and data cables.

Both full duplex radios (Radio A & Radio B) operate simultaneously, constantly receiving radio signals. However, only data from one radio (the “online” radio) is directed to the user equipment. The online radio is also the only unit transmitting at any time. The Hot Standby Controller provides the following functions:

- Amplify and split the incoming signal in order that both Radio A and Radio B receive simultaneously
- Monitor the alarm output from both Radio A and Radio B and change over the online radio if required
- Switch all user data through to the online radio
- Switch the antenna, via internal coaxial relay, to the online radio transmitter (Requires QHHSC Kit Option A)

Digital switching in the QHHSC directs data to and from the user ports on the front panel directly to the user ports of the online radio.

The QHHSC and the two full duplex radios pass operational/alarm detection status between one another via the AUX interface. Any alarm detection indicated from the online radio can cause the QHHSC to change over the online radio.

Mounting and Environmental Considerations

The QH hot standby full duplex radio is housed as a 3RU 19” rack mounted set, encompassing two x 1RU QB full duplex radios and one x 1RU QH Hot Standby Controller. The Controller and full duplex radios are each supplied with two x 1RU mounting brackets, which are to be fitted to either side of each unit before being installed into the 19” rack. The mounting brackets can be fitted to the side of each unit in 3 different locations to provide different mounting possibilities: Front Mount, Proud Mount or Center Mount. Refer to the QB Mounting guide within the Q user manual for a graphical representation of the different mounting positions.

Mount the radio in a clean and dry location, protected from water, excessive dust, corrosive fumes, extremes of temperature and direct sunlight. Provide sufficient passive or active ventilation to allow the full duplex radio fans to pass air through the internal heat sink efficiently.

All RF, power and digital I/O connections are made at the rear of the unit. All user interfaces are located at the front of the unit, these include: Ethernet interface, Serial COM port interfaces and Auxiliary interfaces.

Power Supply Requirements

Operating Voltage: 11...30 Vdc (Dual Input)

Input Power (Rx typical): 35 Watts

Input Power (Tx typical): (See table below)

Tx Power (dBm)	Typical Input Power (Watts)	
	QH150	QH450
30	48	55
37	59	67
40	68	80

In high ambient temperature situations, the internal fans may operate, resulting in an increase of input power of up to 56 W [x 2 QBs].

Typical receive/standby input power is 35 W. The input power will vary in transmit mode according to RF output power level.

Each QB within the hot standby arrangement is supplied with a lock-in mating DC power connector which should be installed with the locking screws done up tightly (0.5 - 0.6 Nm / 4.42 - 5.31 lbf-in). Replacement parts available from

Schneider Electric, part number TBUMPWR-PLUG-QB.

The radios are designed to limit damage if the voltage exceeds the operating voltage or if reverse polarity is applied. Each QB has a field-replaceable internal fuse with a 12 A rating. Replacement fuses are available from Schneider Electric, part number TBUMPWR-FUSE-QB.

Radio Position Allocation

The QH is made up of three separate devices, a single QH hot standby controller and two separate QB full duplex radios.

Within a hot standby arrangement, the two full duplex radios must be allocated a QH position, either Radio A or Radio B.

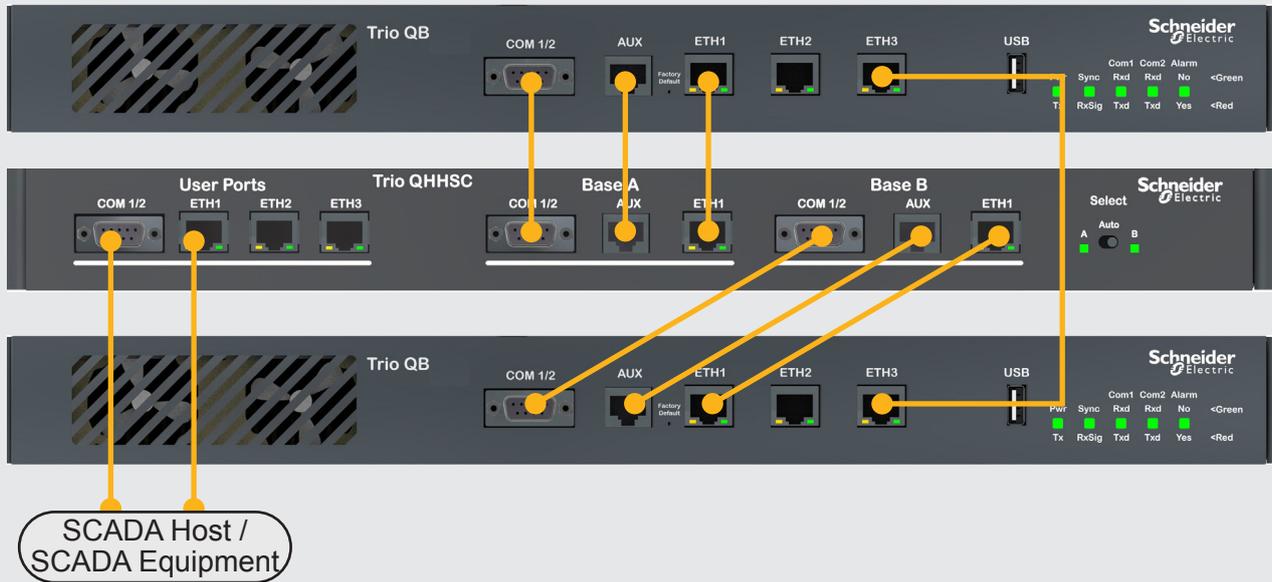
The following diagrams use the radio position allocation shown below.



Communication Ports

There are multiple connections required between the front panel interfaces of the QH:

- COM 1/2 (Both Radios to QHHSC)
- AUX (Both Radios to QHHSC)
- ETH1 (Both Radios to QHHSC)
- ETH3 (Between Radios A & B)

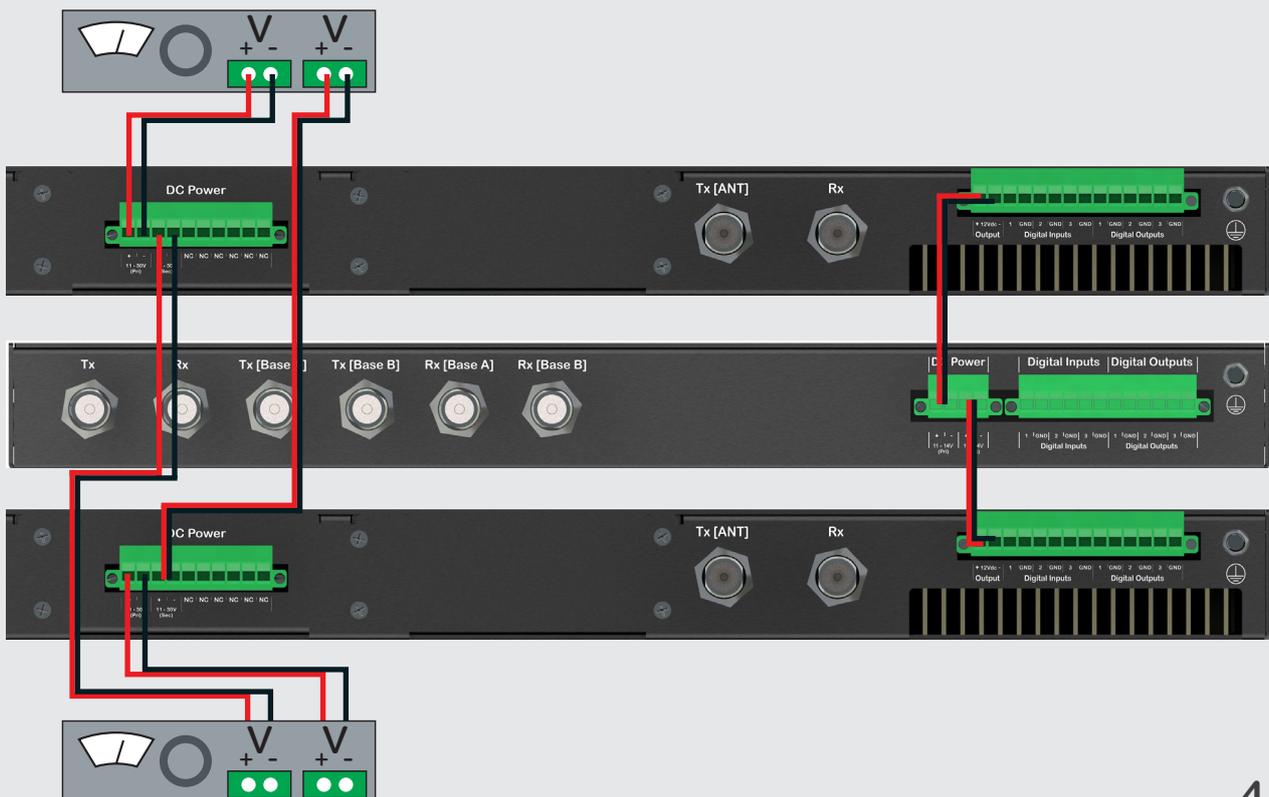


Power Supply and Protection

In order to provide power to this redundant, hot standby radio system, the QH supports dual power supplies. A separate power supply is used for each of the full duplex radios. To help increase reliability, the power supplies are crossed over to each of the secondary supply inputs of the full duplex radios as shown in the diagram below.

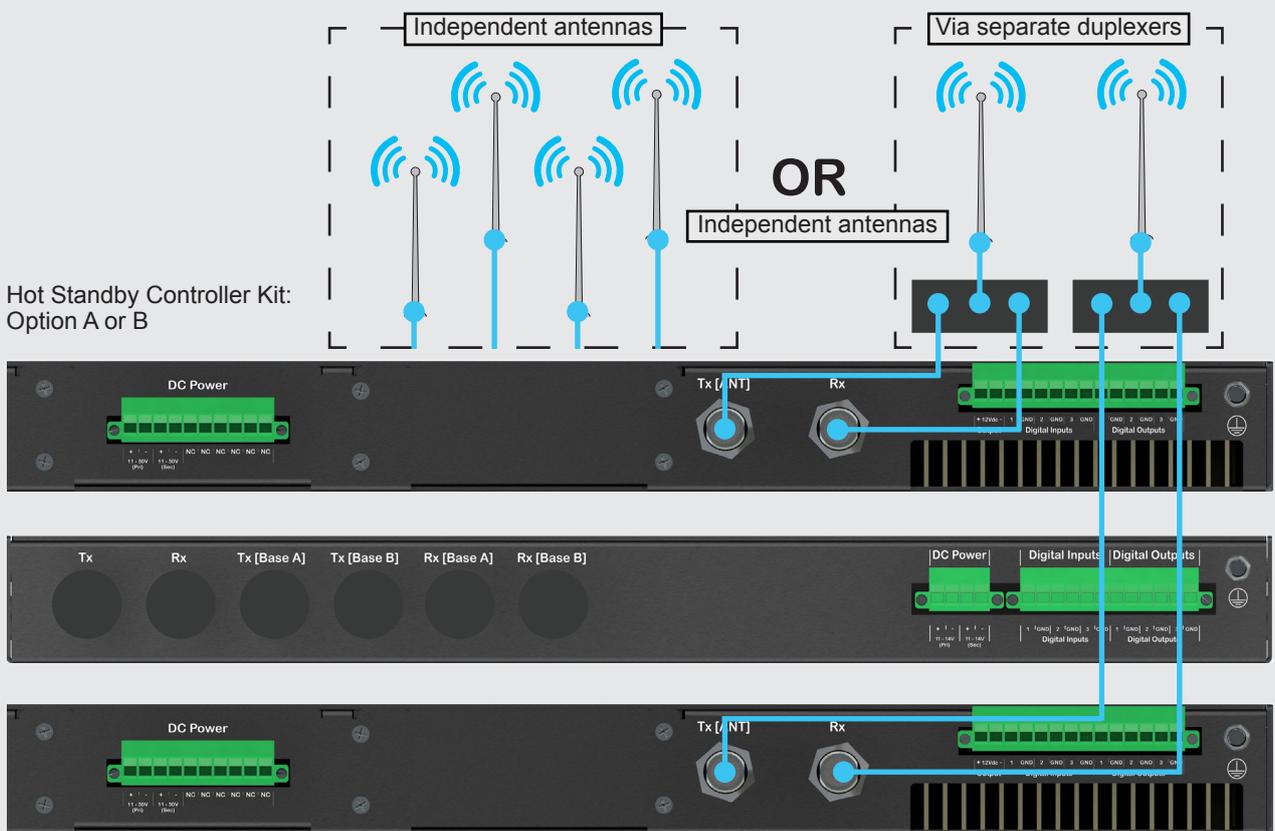
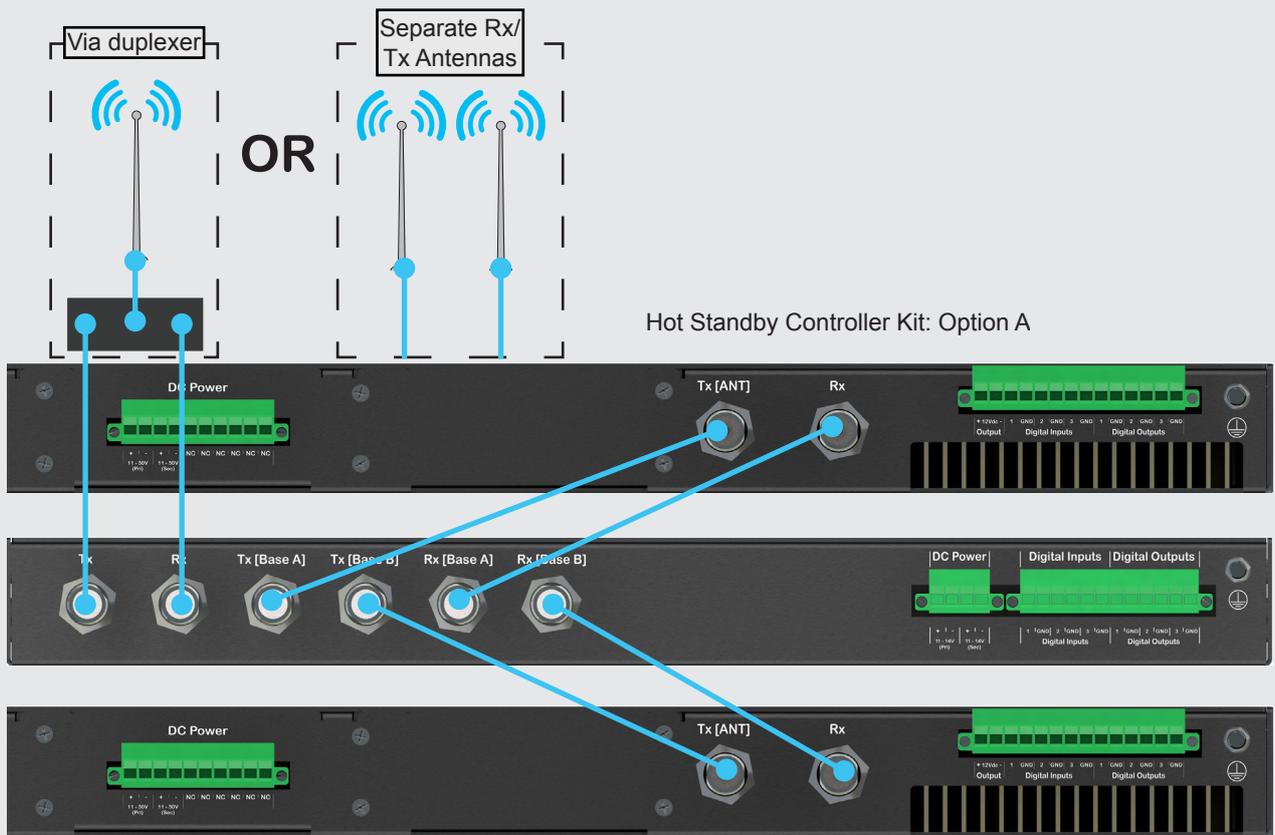
Each full duplex radio has diode-ORed supply inputs, making a redundant power supply pair for each full duplex radio possible.

The Hot Standby Controller has connections for dual power supplies and is powered from the 12 Vdc output of the full duplex radios as shown in the diagram below.



Antennas and RF Feeders

There are two primary antenna connection options. All connectors are standard N-type sockets. See diagrams below.



Front Panel Operation



User Ports

Digital switching in the hot standby controller directs user data to and from the user ports on the front panel directly to the user ports on the online radio.

Ethernet Port LED Indicators

Indicated State	ETH port
Ethernet port inactive, no cable connected	
Ethernet port active @ 10Mbps	
Ethernet port active @ 100Mbps	

Select Switch

The 3-position switch (A / Auto / B) on the front panel provides the following functionality:

- Position A: Radio A is forced online
- Position Auto: changeover hardware will select the online radio
- Position B: Radio B is forced online

Adjacent to the Select switch are two LEDs. These LEDs indicate the current online radio.

Indicated State	Select LEDs
Auto Mode	
Local Force	
Remote Force	

The QHHSC (hot standby controller) indicates an alarm when no QBs are connected (the connection is detected via the Auxiliary interface). While this alarm is active, the QHHSC front panel becomes inactive.

QHHSC		
Alarm Type	Radio A LED	Radio B LED
No Base Detected Alarm	Red	Red

QH Hot Standby Quick Start Guide

Introduction

This document describes the seven key steps required for connecting and configuring a single QH arrangement.

Step 1 - RF and DC power connection

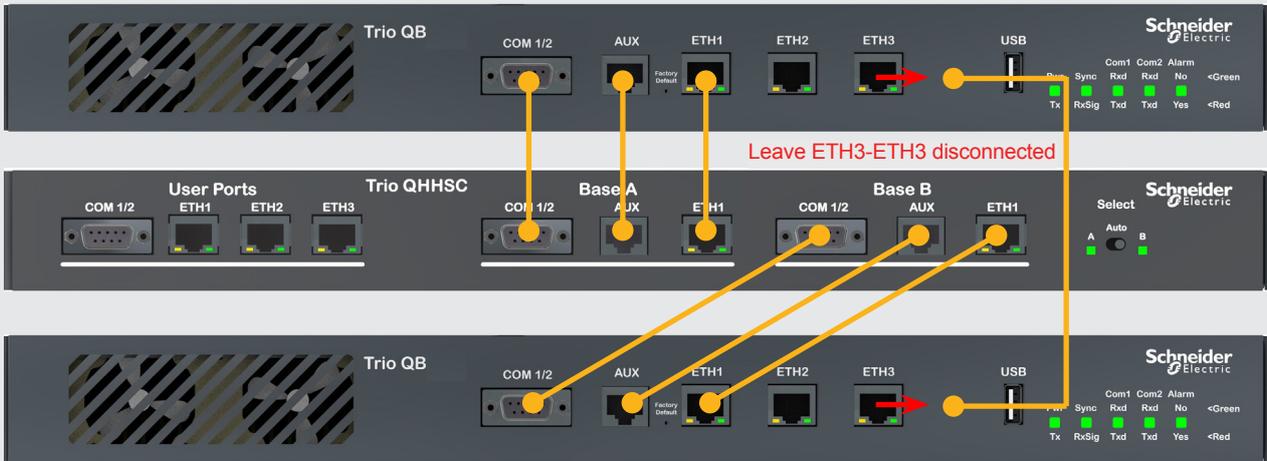
Connect the DC power and Antenna ports following the connection diagrams shown in the QH Quick Reference Guide section.

If antennas are not available, terminate the radios antenna ports with a suitable load or attenuator.

Do not apply DC power to the hot standby arrangement at this stage.

Step 2 - Interface Connections

Connect the interface cables following the diagram below (leaving the QB interconnecting cable [ETH3-ETH3] disconnected).



Step 3 - Apply DC Power

Ensure that the radio select switch on the hot standby controller is switched to Radio A.

Apply DC power to the hot standby arrangement, and allow up to two minutes for the radios to power up.

Once the hot standby arrangement is powered up (indicated by a solid green LED state on the pwr LEDs), ensure that the HSC radio select LED for Radio A is illuminated amber. This indicates that Radio A is forced online.

Step 4 - Start Web Browser on PC

Ensure that each QB radio is in its factory default state. This is done by pressing and holding the hidden factory default button on the front panel of each QB for 5 seconds. Allow up to three minutes for the factory default process to complete.

Connect the PC's Ethernet port to the ETH2 interface of Base A. Verify that the PC can communicate with Base A by performing a ping test. The default IP address of a Q data radio is 192.168.2.15.

Start a web browser and insert the IP address of the radio into the URL. In this case, type "192.168.2.15" and the configuration page should now be displayed in the browser.

Further details on factory default and WEB browser connection can be found in the corresponding QB Quick Start Guide.

Step 5 - Radio Configuration

There are three main QB configuration parameters to review for hot standby operation:

HSC Mode: Configure the QB to operate within a hot standby arrangement by enabling HSC mode. To access HSC mode, go to: Setup -> Basestation -> General and enable the HSC Mode. Once HSC Mode is enabled, a range of hot standby configuration parameters becomes available.

The screenshot shows the 'General' configuration page. The 'HSC Mode' is currently set to 'Disable' in a dropdown menu. The dropdown menu is open, showing 'Disable', 'Enable', and 'Disable' as options. The 'Enable' option is highlighted in blue.

Unique IP Address: Each QB radio within a hot standby arrangement requires its own unique IP address. To configure the IP address, go to: Setup -> Network -> Ethernet -> IP Address . For this example, the following unique IP addresses have been allocated:

- Base A IP: 192.168.2.21
- Base B IP: 192.168.2.22

Shared IP Address: The two QB radios within a hot standby arrangement can be configure to 'share' an IP address. This IP address is separate from the radio's unique IP address. The 'online' base within the hot standby arrangement assumes ownership of the shared IP address. The shared IP address has to be configured in Base A & B.

To configure the shared IP address, enable HSC mode, then go to: Setup -> Base station -> General and enable Shared IP Mode. For this example, the following shared IP address has been allocated:

- Base A & B Shared IP: 192.168.2.20

The screenshot shows the 'General' configuration page. The 'HSC Mode' is set to 'Enable' in a dropdown menu. The 'Shared IP Mode' is set to 'Enabled' with a radio button. The 'Shared IP' address is entered as '192.168.2.20' in a text box.

When these parameters have been configured, activate the configuration.

Once the configuration is activated Base A will attempt to negotiate and pair with an alternate QB. As Base B is still in a factory default state, HSC mode negotiation messages will be ignored (until HSC mode is enabled). This will cause Base A to indicate a pairing alarm, which can be ignored until Base B has been configured.

QB (within a QH)				
Alarm Type	Pwr / Tx	Sync / NoRx	COM 1 Rx/D / Tx/D	COM 2 Rx/D / Tx/D
Pairing Alarm	Green	Green		

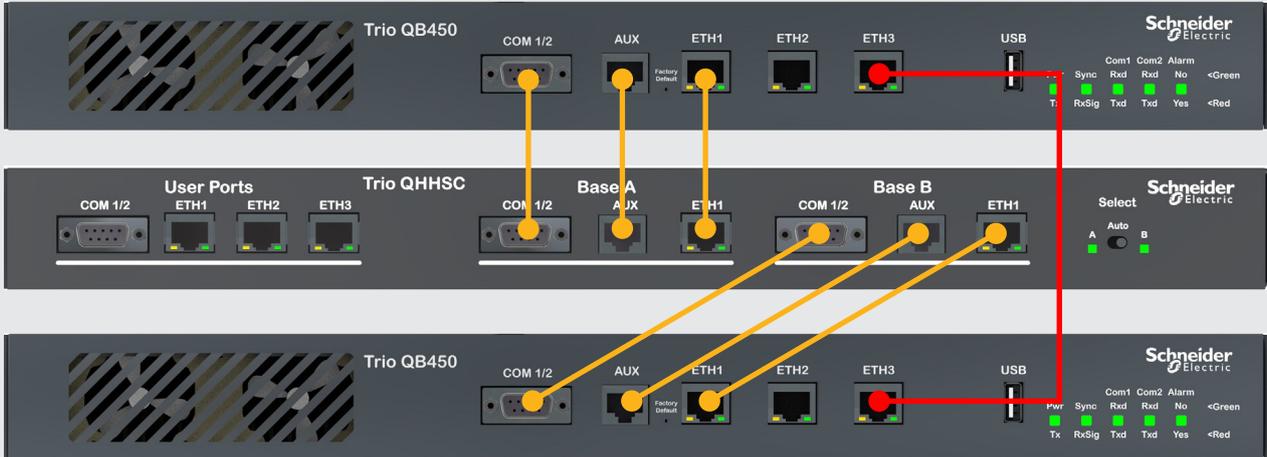
When Base A has been successfully configured, perform the following steps:

- Force Base B online using the radio select switch on the QHHSC.
- Begin from Step 4 and configure Base B.

Step 6 - Base Interconnection

When Base A and Base B have both been successfully configured, interconnect the ETH3 interfaces of both Base radios. The cable is shown in the diagram below in RED. Once this cable is in place, each base should be able to successfully negotiate with one another and the pairing alarms should stop.

When the cable has been connected, set the radio select switch on the QHHSC to the Auto position.



Step 7 - Change-over Triggers

When the alarm output becomes active on the online QB, a change-over can occur (as long as the alternate QB does not also have an active alarm output). The alarm output can become active when an alarm is detected. The alarms are user-configurable and can be subscribed to the alarm output.

By default, no alarms are subscribed to the alarm output. It is recommended to review the alarms setup in each base, to help ensure that suitable alarms have been subscribed to the alarm output for the given system requirements. If the system requirements are unknown, all of the alarms can be subscribed to the alarm output, then disabled in the future, if no longer required.

Refer to the advanced section of the Q data radio manual for further information on configuring radio alarms.

Contact Details

Technical Support: The Americas, Europe, Middle East, Asia

Available Monday to Friday 8:00am - 6:30pm Eastern Time

Toll free within North America: 1-888-226-6876

Direct Worldwide: +1-613-591-1943

Email: SupportTRSS@se.com

Technical Support: Australia/New Zealand (Pacific)

Available Monday to Friday 8:00am - 5:00pm Australian Eastern Standard Time

Inside Australia: 13 73 28 (13 SEAU)

Inside New Zealand: 0800 652 999

Email: techsupport.pz@se.com

Schneider Electric

Process Automation SCADA & Telemetry

415 Legget Drive, Suite 101, Kanata, Ontario K2K 3R1 Canada

Direct Worldwide: +1 (613) 591-1943

Email: telemetrysolutions@se.com

Fax: +1 (613) 591-1022

Toll Free within North America: +1 (888) 267-2232

www.se.com

Printed in USA Issue: 2020-11-05