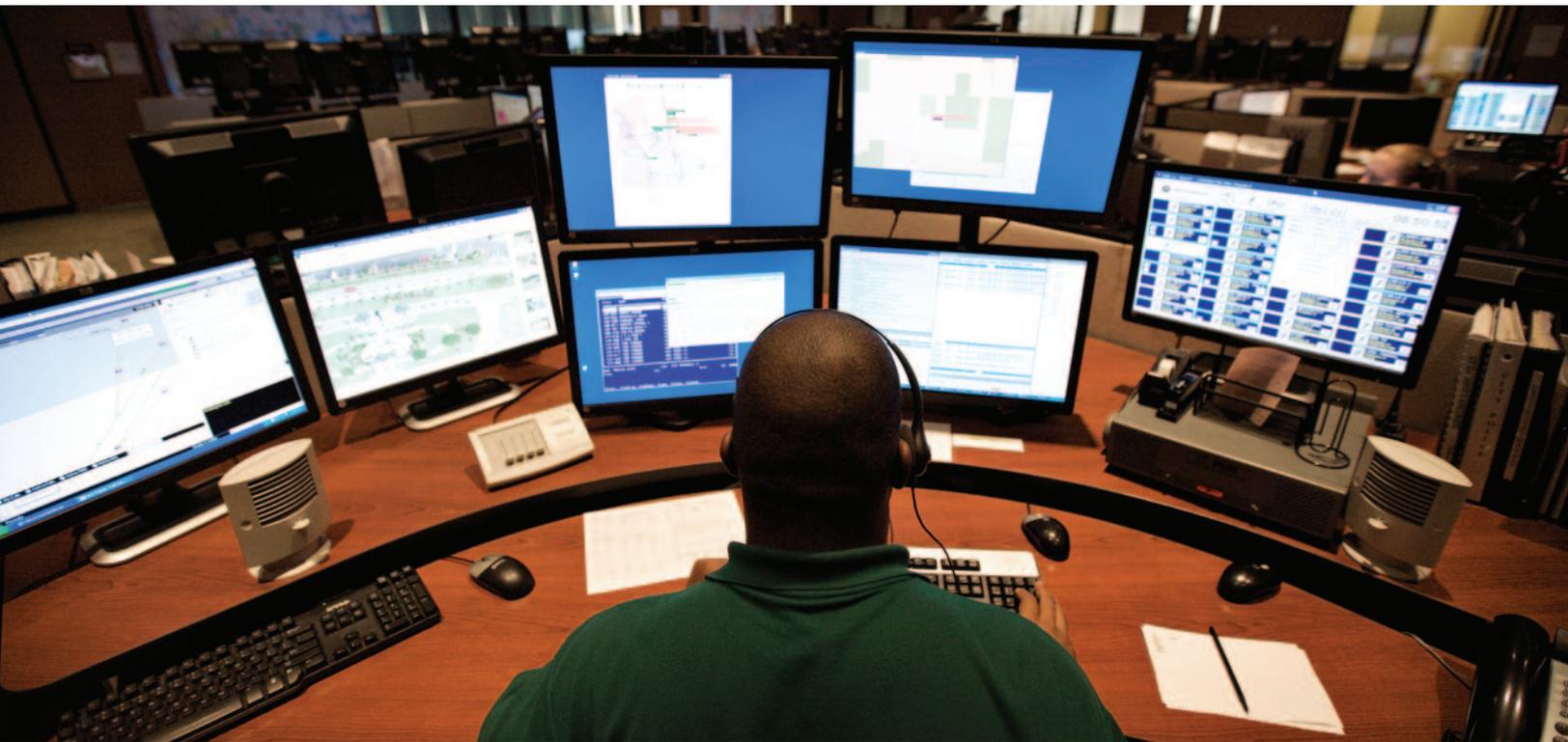


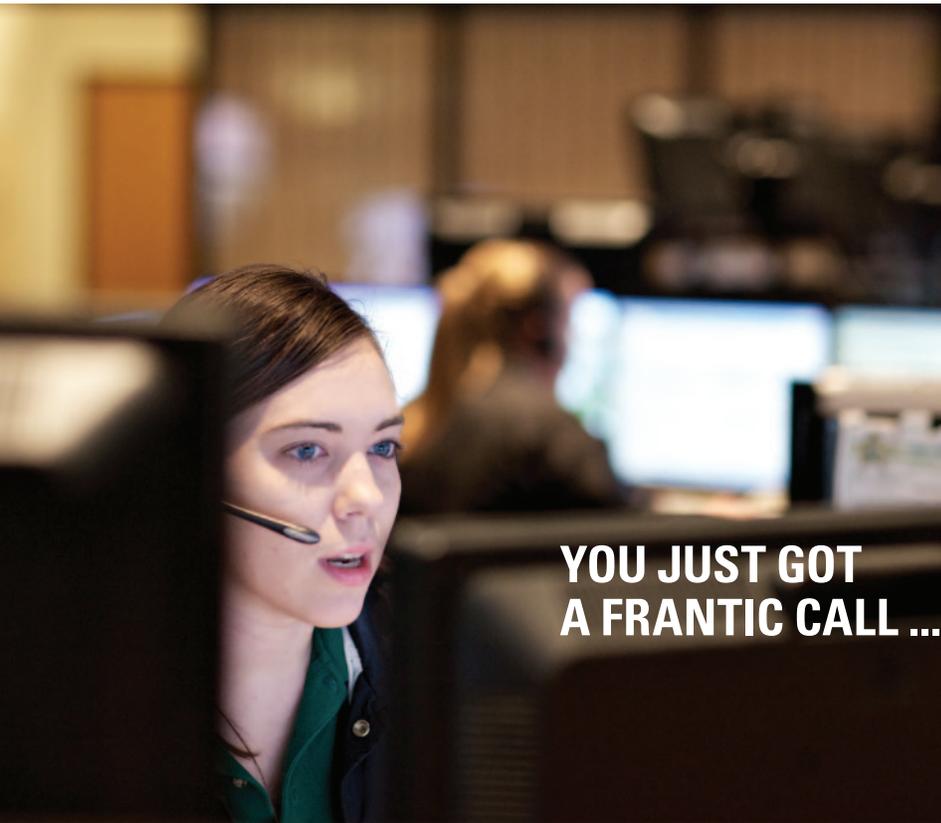


MOTOROLA SOLUTION BRIEF

# WHEN AN OUTAGE IS DISASTROUS, YOUR FAILSAFE SYSTEM IS A LIFE-SAVER.



**OUR REDUNDANCY OPTIONS  
KEEP YOU CONNECTED.**



## YOU JUST GOT A FRANTIC CALL ...

from a woman whose husband is on the floor and barely breathing. Now, you have to get the pertinent information and dispatch an emergency medical team to the family, fast. A man's life depends on your every action and the reliability of your communications network.

A communication breakdown in such urgent situations is just not an option. Whether you are answering an emergency call, providing online banking or streaming video from surveillance cameras, hardware redundancy helps you achieve failsafe connectivity for critical applications.

Our Point-to-Point (PTP) 800 Licensed Ethernet Microwave radios are frequently deployed to provide high-availability communications for critical applications. Recognizing how important it is to deliver continuous connectivity for those situations, we offer the following options to achieve hardware redundancy on PTP 800 wireless links:

- 1+1 hot standby configuration
- 2+0 configuration

This paper explains these redundancy options and why you might choose one over the other.

# INTRODUCTION

The proliferation of wireless communications has made on-demand access to information commonplace. We all expect to have requested information available anytime and anyplace we choose. Generally, that is what we get until something goes wrong and access is interrupted.

In our personal lives, an interruption is normally just an inconvenience. In business, government, public safety, health care and a host of other organizations, an information outage involving vital operations can have dire consequences. Lives could be at stake, national security threatened, property at risk and profitability in jeopardy.

PTP 800 solutions are IP-optimized, high-capacity licensed microwave radios that are engineered to efficiently and affordably transport data, voice and video communications for all types of applications. While all our PTP radios are extremely robust and durable, the potential implications of a hardware failure should be considered when deploying links for your crucial operations.

Of course, hardware redundancy is not required to deploy PTP 800 links. However, it is recommended for each link which supports a critical application or process – especially if an outage can cause adverse consequences. Hardware redundancy will enable you to support those vital functions with uninterrupted, real-time communications.

# OVERVIEW

Each PTP 800 link includes two Compact Modem Units (CMUs) and two Outdoor Radio Units (ODUs), with one CMU and one ODU deployed at each end of the link.

**Figure 1:**  
PTP 800 Outdoor Unit (ODU) and  
Compact Modem Unit (CMU)



There are three configurations available to you when you deploy a PTP 800 system:

- **1+0:** A non-redundant link
- **1+1:** A hot standby, redundant link\*
- **2+0:** A configuration using two independent links to provide redundancy

The following section provides details about each configuration option.

\* PTP 800 release 03-00 will support 1+1 configurations.

# REDUNDANT CONFIGURATIONS

With several redundancy options, you have the flexibility to choose the option which best meets your individual requirements, and you can vary the option from link to link. As an example, you might have one PTP 800 link providing connectivity for human resources training which remote employees can complete anytime over a six-week period. In this case, you might configure that link as a 1+0 non-redundant link. Another link may be backhauling video from your surveillance cameras. Because of the critical nature of this application, you could configure the link as a 1+1 hot-standby, redundant link. The advantage is that the decision is up to you based on the criticality of communications for each link.

## 1+0 Configuration

A 1+0 configuration is a single link without any redundancy protection. Each link consists of one ODU and one CMU at each end of the link. In the event of a hardware failure, the link could incur an outage until the failed unit is replaced.

Figure 2:  
1+0 Configuration

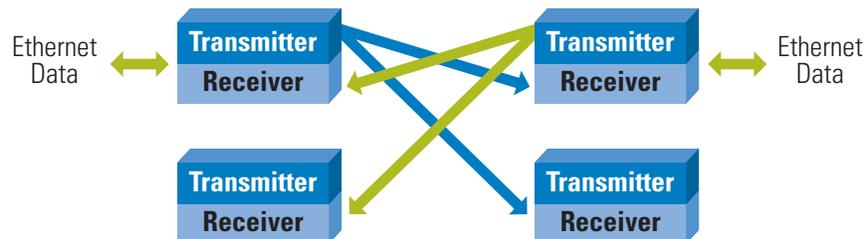


Non-redundant links are good choices to support non-critical applications that would not incur significant consequences in the event of an outage. If you install a link in a 1+0 configuration and later find that redundancy is desired, you can always upgrade to a 1+1 or 2+0 redundant configuration. As another alternative, you could deploy your PTP 800 system in a ring/mesh configuration which also can provide full redundancy.

## 1+1 Configuration

A 1+1 hot-standby (HSB) configuration is designed to provide full redundancy in case of a hardware failure. This configuration requires that two ODUs and two CMUs be installed at each end of the link. The ODUs can share the same antenna or be installed with two antennas – one antenna for each ODU. In the event of a component failure, the secondary radio would automatically take over communications.

Figure 3:  
1+1 Hot-Standby Configuration



Hot-standby redundancy protects you from a link outage due to a single CMU or ODU failure on one end or both ends of the link. After the redundant switchover takes place, maintenance and repair operations can be performed without affecting live traffic. It is important to note that a 1+1 configuration cannot protect the system from a simultaneous field component failure involving both ODUs or both CMUs on the same end of a link.

1+1 hot-standby configurations are particularly beneficial for:

- Critical applications such as video surveillance, emergency response and dispatch, telemedicine, traffic control and a host of other activities where a communication outage could have negative repercussions
- High capacity links where operations are dependent on continuous, real-time triple-play communications such as collaboration between multiple Homeland Security and public safety agencies
- High revenue impact for organizations such as service providers, online retailers and financial institutions
- Aggregation capacity links in a PTP 800 network where links must provide continuous protection for applications such as monitoring and control of utility infrastructures and railroad transportation

Without redundancy, an ODU component failure in any of these situations could cause a communications outage and stop the flow of important information. Depending on where the failed unit is deployed, it could take several days to get a tower crew to replace the radio.

You can also utilize hot-standby redundancy to perform a software upgrade without disturbing traffic flow. First, you would upgrade the software on the secondary equipment without disturbing the traffic on the primary devices. After completing the upgrade on the secondary units, you would switch the system to operate from the secondary units and upgrade the software on the primary units.

- **Protection Kits for 1+1 Configurations:** You may need to purchase a 1+1 Protection Kit for certain configurations. Two different Protection Kits are supported for the PTP 800:
  - > **1+1 Protection Kit – Out-of-Band (OOB):** For 1+1 OOB configurations, one kit is required per end. The kit includes one 4 RJ-45 port box which is used to split the OOB management from the CMU management port.
  - > **1+1 Protection Kit – Optical-Y:** For 1+1 Optical-Y configurations, one kit is required per end. The kit includes two 850 nm multi-mode Gig-E SFP modules and two, two-meter Fiber Gig-E Y-cables (one cable for the Tx split and one cable for the Rx split).

### 2+0 Configuration

A 2+0 configuration consists of two independent links deployed to provide hardware redundancy. On each end of the link, you will install two CMUs and two ODUs. The two CMUs/ODUs can share the same antenna or use different antennas.

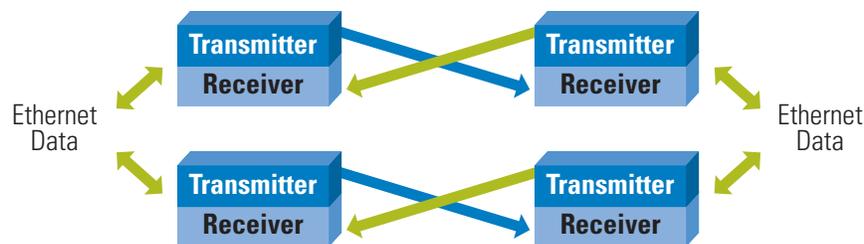


Figure 4:  
2+0 Configuration

The responsibility of link aggregation (balancing traffic), failover and fallback are completely dependent on an external switch that you would need to provide. The external switch enables the system to change over to a secondary unit if a hardware failure occurs.

It is important to note that a 2+0 configuration requires two frequency pairs. A 2+0 configuration can offer redundancy plus extra throughput capacity.

Because our PTP 800 systems are IP-based, both links will be active and can provide twice the capacity of a 1+0 link. During a hardware failover, the link capacity will be halved and equal to a 1+0 link. If the primary link fails, switchover time normally will be less than 50 ms, and all traffic will be re-directed through the secondary link. The data will be prioritized based on Quality of Service (QoS) control on the Ethernet switch.

As with 1+1 redundancy, 2+0 redundant configurations are particularly beneficial for the same types of critical applications and revenue-generating services. If you want redundancy as well as extra link capacity and/or antenna redundancy, a 2+0 configuration is an excellent option for you.

### Upgrading from 1+0 to 1+1 or 2+0 Configuration

If you have already deployed a system in a 1+0 configuration and want to upgrade to 1+1 or 2+0, all your existing equipment is usable. However, the link profile should be recalculated using our PTP LINKPlanner tool to ensure that the new configuration still meets your availability requirements.

## SUMMARY

Today's organizations need the operational agility provided by anywhere, anytime information access. Any interruption in the flow of information can be inconvenient, but many mission-critical applications simply cannot afford a communication outage. For those situations, you can configure your critical PTP 800 links with hardware redundancy to avoid any possible negative repercussions.

Of course, redundancy is not required to deploy PTP 800 Wireless Ethernet Licensed Microwave Solutions. However, where you need to maintain continuous communications, our PTP 800 systems support 1+1 and 2+0 redundancy options. A 1+1 hot-standby configuration provides outage protection as a result of a single CMU or ODU failure on one side or both sides of a link. A 2+0 configuration consists of two independent links deployed together to provide redundancy. Plus, a 2+0 configuration can give you the added benefits of extra capacity and redundant antennas.

If you install a 1+0, non-redundant link and later need redundancy on that link, you can upgrade the link to a 1+1 or 2+0 configuration. All your existing equipment will be completely usable. In addition, our PTP LINKPlanner tool helps you evaluate the best option to achieve your objectives and accurately predicts what performance you can expect after installation.

When you need the reassurance of failsafe communications, PTP 800 redundancy options give you the flexibility to deploy redundant systems where and when you need them.

## WIRELESS NETWORK SOLUTIONS

Our PTP 800 Series solutions are included in our Wireless Network Solutions portfolio. This portfolio delivers seamless connectivity that puts real-time information in the hands of users, giving you the agility you need to grow your business or better protect and serve the public. Our unrivalled wireless network solutions include indoor WLAN, outdoor wireless mesh, point-to-multipoint and point-to-point networks as well as voice over WLAN solutions. Combined with powerful software for wireless network design, security, management and troubleshooting, our solutions deliver trusted networking and anywhere access to organizations across the globe.



Motorola, Inc. 1303 E. Algonquin Road, Schaumburg, Illinois 60196 U.S.A. [www.motorola.com/ptp](http://www.motorola.com/ptp)

MOTOROLA and the stylized M Logo are registered in the U.S. Patent and Trademark Office. All other product or service names are the property of their respective owners. © Motorola, Inc. 2010. All rights reserved.