

# Optimizing Mobile Backhaul

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## TDM Mobile Backhaul

As wireless networks continue to grow and evolve from voice only services to voice and data services, there is an increasing need to provide quality and efficient mobile backhaul solutions.

Wireless networks have historically relied on TDM (Time-Division Multiplexing) services for the connection between cell sites and base controllers. While 3G specifications add native Ethernet interface support, it is important to note that there are approximately 150,000 existing cell sites in the U.S. that have T1 TDM interfaces on their base station. Most 2G cell sites can be serviced by one to four T1's worth of bandwidth, which equates to 1.5Mbps to 6Mbps. The addition of 3G data services will increase the need for more bandwidth at the cell site, but the amount of bandwidth is still relatively modest. An advanced 3G cell site will only require approximately 20Mbps of bandwidth.

For the near future we know that T1 TDM is not going to disappear from these cell sites. Yet how can a service provider that is backhauling this traffic support future services without replacing all of the equipment when moving to 3G services? One solution is to use a hybrid approach that supports both TDM traffic and Ethernet, such as Transition Networks' 4xT1 products with Ethernet. These products allow you to reduce capital (CapEx) and operational (OpEx) expenses while quickly recognizing the return on investment (ROI).

## Product Features

- 10/100 Mbps Ethernet port
- T1/E1 line settings
- Remote management capabilities
- Loopback capabilities
- Free technical support
- Lifetime warranty

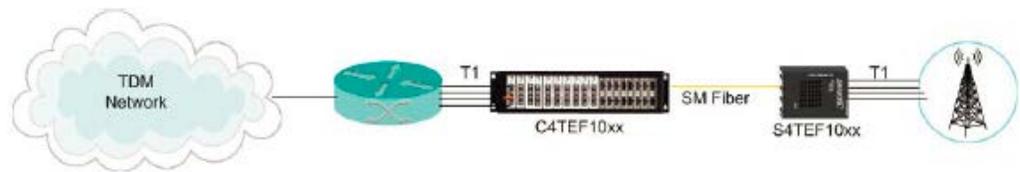
## How It Works

TDM is a proven solution for mobile backhaul and many of the wireless service providers insist on TDM services because of their consistent reliability. It is this ability to deal with these performance factors that mobile backhaul providers require.

The 4xT1 and T1 solutions from Transition Networks allow service providers to take advantage of reduced OpEx through the remote management and troubleshooting capabilities. This reduction in OpEx comes from fewer truck rolls and increased reliability.

### Product Benefits

The 4xT1 product comes with 4 T1/E1 interfaces and an optional 10/100Mbps Ethernet port. It also includes a RS232 data channel along with the fiber optic interface. The fiber interface can utilize two fibers, one to transmit and one to receive or a single bi-di connector can be used for transmit and receive on a single fiber. This product is available as a slide-in card or a stand-alone unit. It is important to note that the 4xT1 product needs to be used in pairs as shown in Figure 1:



The optional 10/100Mbps Ethernet port allows for the transport of up to 100 Mbps of Ethernet traffic, in addition to the T1 traffic across the fiber optic infrastructure. The addition of this Ethernet port allows service providers to upgrade or utilize the product in 3G scenarios where the base station has an Ethernet interface. The Ethernet port can also be used at 2G cell sites where the backhaul traffic is TDM, but there may be additional equipment at the site that requires Ethernet connectivity. By utilizing the TDM and Ethernet ports, the service provider is able to reduce the amount of fiber optic infrastructure that is required at a cell site.

As shown in Figure 2 you can see an example where a cell site is using traditional TDM circuits for the backhaul. One cell site is using 4 T1 lines while the other cell site only requires a single T1 connection.

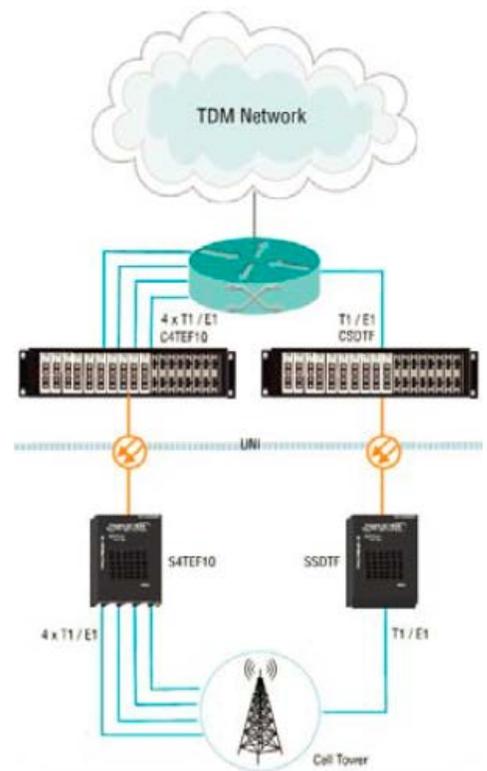
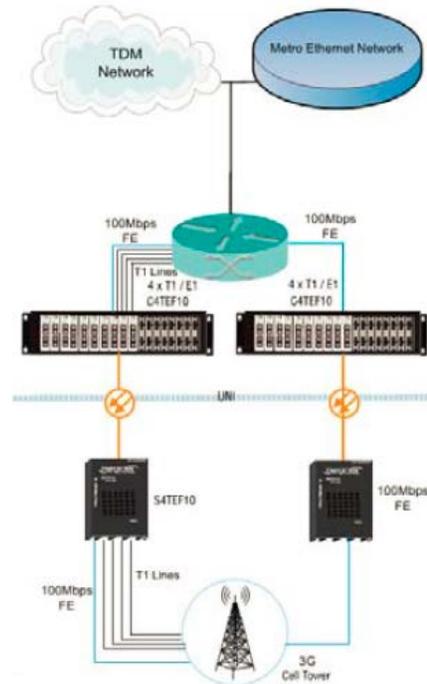


Figure 2

In Figure 3, you can see how the optional Ethernet port on the 4xT1 product is used in a 3G cell site with Ethernet connectivity. The other cell site shows traditional TDM circuits for the backhaul, but is again utilizing the optional Ethernet port to enable additional data connectivity at the cell site while still using a single pair of fibers.

Figure 3



## Summary

Transition Networks understands the need for service providers to support the embedded base of legacy TDM services commonly associated with 2G, while planning for future services. We also understand that the current install base of TDM circuits for mobile backhaul is going to remain an integral part of the wireless infrastructure for many years to come. With Transition Networks' standard lifetime warranty, service providers can be assured of our knowledge and understanding of the importance to deliver a quality product to minimize risks of downtime in the network.