

## DISTRIBUTED PROTECTION SWITCHING

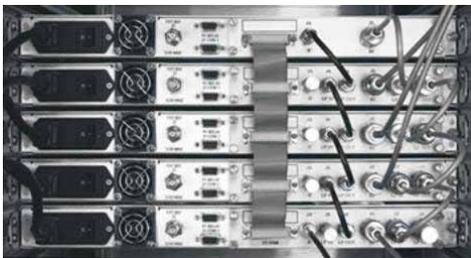
Comtech EF Data's proprietary Daisy Chain<sup>1</sup> is the most cost effective and space efficient method of performing converter protection switching available. Older generations of protection switches relied upon performing all fault determination and backup substitution in a central unit. This method was costly, added cable losses and actually contributed to the degradation of availability by the MTBF's of the added logic hardware and extra power supplies. Comtech EF Data's Daisy Chain overcomes the difficulties of the older units by distributing the converter protection switching functions to the converters themselves and can backup from 1 to 12 online converters. The 1+1 minimum configuration is just as economical, but more powerful than typical stand alone 1+1 centralized switches.

## DETACHABLE SWITCH MODULES

The Comtech EF Data T-4500 series of up and down converters are equipped with detachable Input/Output Modules (IOM) containing the signal path connectors. The basic IOM is utilized for single thread operation and/or testing of the units. The IOM is inserted into an internal chamber at the rear panel of the converter. The Daisy Chain is implemented by replacing the IOM with a detachable switch module. The module contains all of the transfer switches and looping connectors required to chain each converter to the adjacent converter with very short cables. When a faulted converter is removed, it is detached from the switch module leaving the chain intact. The chain can be extended without affecting the online converters.

## THE BACKUP CONVERTER

The Daisy Chain terminates in the backup converter. The backup converter's own microprocessor performs fault detection, self reconfiguration and logical switching functions. Since these functions are not duplicated in a central switching unit, they introduce no extra degradation in availability. If the backup converter is faulted, it will not attempt to perform protection switching tasks. If the backup converter is not faulted, it will assume the frequency and attenuation of the faulted converter and compensate for chain losses.

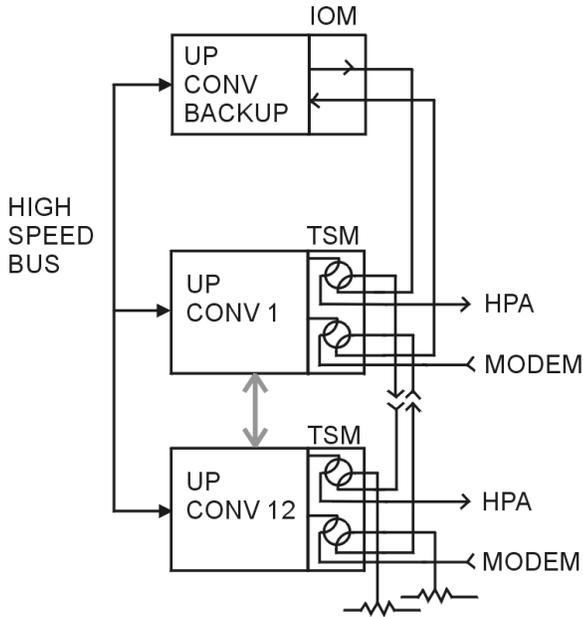


Typical 1+4 Uplink Switching

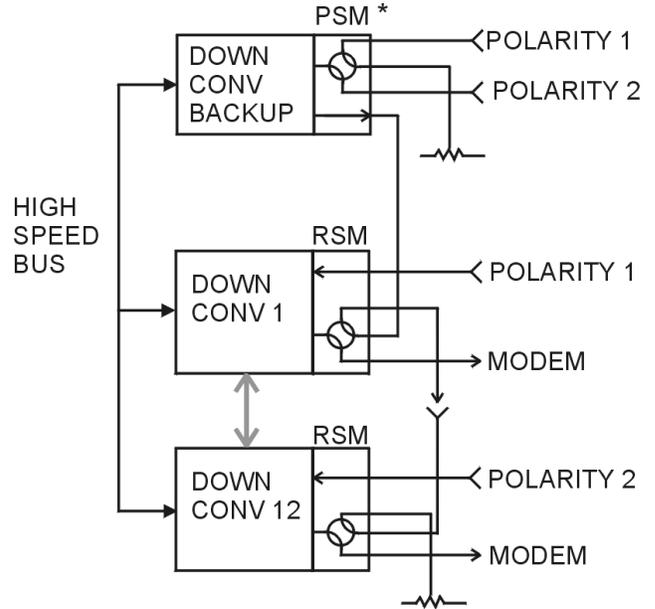


Typical 1+4 Downlink Switching

<sup>1</sup> This product is protected by one or more of the following U.S. patents: 5666646 and 6028460.



IOM Input/Output Module  
 TSM Transit Switch Module  
 RSM Receive Switch Module  
 PSM Polarity Switch Module



\* For systems with only one polarity, an IOM is used.



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