Nx64-MUX_DD

Dual Composite and Dual Power Redundancy

FEATURES / BENEFITS

- √ Dual Composite Ports – Any channel may be assigned to one of two composites operating at the same rate. Dual links may be used for switch-on-fault or for aggregating bandwidth
- √ Composite Port Interface – Each port software selectable for RS-232, RS-530, V.35,RS-422/449 or X.21
- √ Composite Port speeds - 64k up to 2.048Mbps in common 64k multiples
- √ Sub-Channel Interface(s) - 16 ports RS-232, four ports are software selectable for RS-232, RS-530, V.35, RS-422/449 or X.21
- √ Sub-Channels support Sync to 768k and Async data up to 38.4kbps. Also supports Nx8-MUX for sub-rate multiplexing
- √ Independent sub-channel configuration with support for remote downlink loading
- √ Non-disruptive channel configuration
- √ Automatic cut-over of channels from failed to active composite port
- √ All configuration via terminal port
- √ In-Band Management Channel allows remote upgrades, configuration and status
- √ Modular design with front load cards
- √ Redundant power supplies

DESCRIPTION

The 16-Port Dual Nx64-MUX is a modular TDM Multiplexer designed to support up to sixteen sub-channel ports from 9.6Kbps to 768Kbps in both Sync and Async formats.

The unit is designed with a pair of composite ports with variable port rates from 64Kbps to 2.048Mbps in 64k increments for maximum flexibility. The composite port data interface is software selectable as RS-232, RS-530, V.35, RS-422/449 or X.21.

The dual composite architecture allows for the distribution of channels over two aggregate links of equal bandwidth. This permits the utilization of the 2X bandwidth either to achieve up to ~4 Mbps total bandwidth, or to allocate spare bandwidth for channel recovery in the event either link fails. For the latter configurations, channels may be assigned with either high or low priority, which assures that high priority channels remain in service on the surviving link.

The sub-channel ports may be individually configured to support flow control of RTS to DCD on a port by port basis or no flow control. The ports also support individual RTS to CTS delays and external TXC timing for DCE to DCE crossover. The data interfaces are RS-232 on 16 ports. Four of the user ports are software selectable for RS-232, RS-530, V.35, RS-422/449 or X.21.

The Dual Nx64-MUX derives its timing from the external DCE attached to the composite port. Alternately, timing may be sourced by the Nx64-MUX in a direct cabled pair of multiplexers. When using dual composites, timing may be independently selected for each link.

The Dual Nx64-MUX utilizes four, 4-port interface cards, a main processor card and dual power supply cards. This modular design facilitates future upgrades and allows the user to add user ports in 4-port increments. All cards are front load.

The management port allows local and remote configuration commands. Integral software design features allow configuration of a sub-channel without disrupting existing sub-channels. Network management features include channel and composite loop backs, and link down error reporting. All port parameters are set with an async terminal connected to the configuration port. Setup procedures are menu driven and all parameters are stored in memory that supports power outages.

The Dual Nx64-MUX supports voltages of 85-264 VAC and supports redundant power supplies with system notification. The unit is 5-U high and is standalone or rackmount. The factory warranty is 3 years.

SPECIFICATIONS

Application
Multiple Sync or Async DTE devices time division multiplexed onto one or two Sync DCE communication links

Timing
System Timing: External via Composite Port or Internal Timing for back-to-back connections. Each sub-channel Port capable of accepting external TXC timing for DCE to DCE crossover

Capacity
Composite Port: One or two Ports
Sub-Channel Ports: Up to sixteen

Data Format
Data transparent at all data rates

Data Rates
Composite Ports: 64k to 2.048Mbps in 64k increments
Sub-Channel Ports:
SYNC: (Full Rates) 19.2k, 38.4k, 56k, 64k, 128k, 256k, 384k, 512k, 768k
(3/4 Rates) 7.2k, 14.4k, 28.8k
ASYNC: (Full Rates) 9.6k, 19.2k, 38.4k
(3/4 Rates) 7.2k, 14.4k, 28.8k
Async Support: configurable for 8, 9, 10 and 11 bit data on a per channel basis

Composite Port Interface
Two Ports: DB-25 Male, Software selectable for RS-232, RS-530, *V.35, *RS-422/449 and *X.21
*(Adapter cable required)

4 Port Sub-Channel I/O Card(s)
Four Ports: DB-25 Females, Four ports RS-232, one port Software Selectable for RS-232, RS-530, V.35, RS-422/449 and X.21 Maximum 4 cards per chassis, 16 I/O's per chassis

Control Leads Passed
Options for none or RTS to DCD in Band

Maximum Channel Composite Rate
2.048Mbps with composite overhead of 8Kbps. Overhead is constant for all composite port rates.

Cascade Port
Via any sub-channel port

Indicators
Power, TX Data, RX Data, TX Clock, RX Clock, Sync, Loopback

Power Source
Redundant supplies with system notification, 85-264 VAC @10%, 47-440 Hz, IEC Power Inlet, (2) 5mm Fuses

Environmental
Operating Temperature....32º to 122º F (0º to 50º C)
Relative Humidity.............5 to 95% Non-Condensing
Altitude............................0 to 10,000 feet

Dimensions
Height .... 8.72 inches (22.10 cm)
Width .... 17.00 inches (43.18 cm)
Length .... 9.00 inches (22.86 cm)

Weight
15 pounds (6.8 Kg)

Warranty
Three Years, Return To Factory

ORDERING INFORMATION

Part Number: 166100
Model: Nx-MUX_DD
Description: Dual Composite, Dual Power Chassis
QTY Req: 1

Part Number: 166102
Model: Nx-Dual Composite
Desc: Dual Composite Processor Card
Qty Req: 1

Part Number: 166007
Model: Nx8-I/O
Desc: I/O Board, 4-Port, Nx-MUX
QTY Req.: 1 to 4 Max

Part Number: 166080
Model: Nx-SRPS
Description: Nx-MUX,Single Redundant Power Supply
QTY Req: 1 or 2

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Link Timing Options

There are three timing modes:

1) Each link composite locks timing to the associated link and each active channel has timing derived from assigned-to composite which may be asynchronous with the other. This is useful for enhanced bandwidth requirements, diverse link configurations with dynamic re-allocation, and pure redundant link configurations.

2) Both link composites lock timing to one selected link and the second link must source timing to the network. This is useful for enhanced bandwidth requirements where only one timing source is allowable.

3) Both link composites operate from the common internal timing source and both links must provide timing to the network. This is useful for any short-range (line-driver) or some dedicated carrier applications, in pure redundant link configurations and for enhanced bandwidth requirements.

Link Fault Detection

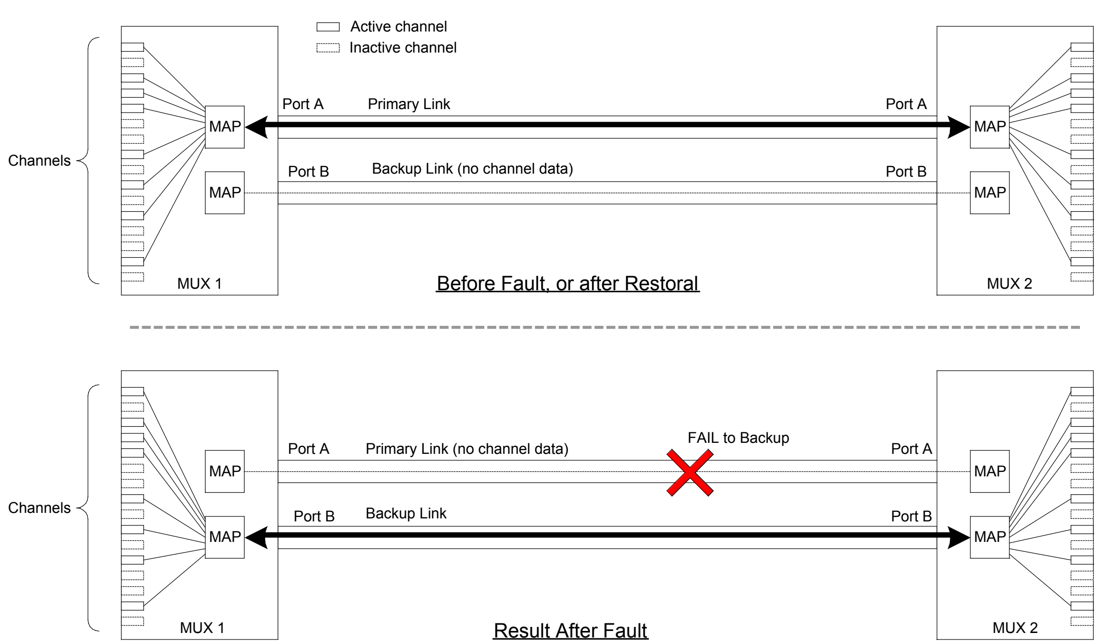
Fault detection consists of monitoring two activities of the link: clock and data.

In most applications the interface clock(s) are received from a DCE device. The frequency of these clocks are known by configuration, and should not change excessively. If a frequency change occurs for which the on-board clock recovery circuit cannot adjust, a fault is declared. A clock loss falls into this category as well. Where two clocks are received, transmit and receive, both clocks will be monitored for faults.

End-to-end data integrity is monitored via the framing sync function. This is a periodic and recognizable pattern generated by each multiplexer to define and locate timeslot positions. While the framing pattern recognition circuit is able to tolerate a low-rate of bit errors without loss of sync, significant error rates will result in loss of sync. When this happens, a fault is declared.

Operation in Redundant Link Configurations

The simplest mode of operation for fault-tolerant applications is the pure redundant link configuration. In this mode all composite channel traffic is supported by a single link, which is backed up by a second link.



During normal operation, link port A is designated the primary link, and link port B as the backup link. The backup link may be maintained in an operational or an off-line state.

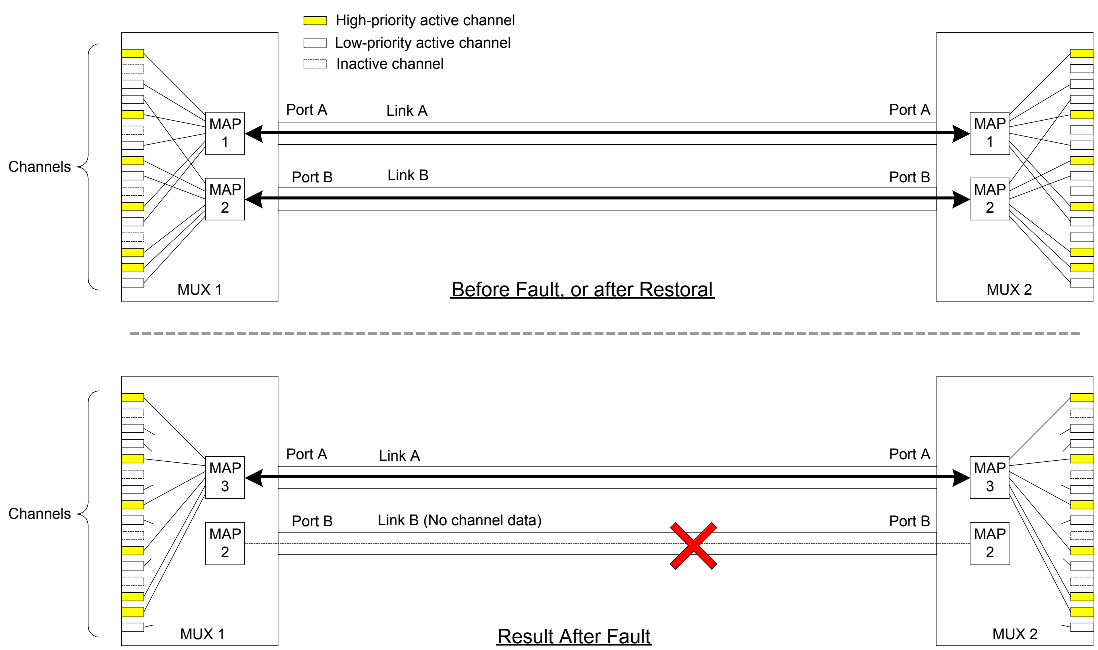
For redundant configurations, the timeslot map for each composite is identical. However, only one of the two multiplexer path controllers is enabled, actively exchanging channel data; the other is in backup and is disabled.

When a fault occurs on the primary link, the backup link must be brought online, or have been maintained online so that the multiplexers at each end will have clock and frame synchronization. If the backup link has no fault condition, then the primary data path is disabled, and the backup path is enabled.

The switchover from primary to backup takes place automatically in a relatively short period, in part due to the fact that both timeslot maps are identical and that no allocation/de-allocation process is required. All channels are switched in this fashion.

When the primary link is restored, the same process is used to automatically return all channel data back to the primary link.

Operation in Dynamic Diverse Link Configurations
Another fault-tolerant mode is the utilization of the bandwidth available in two links with the ability to move critical bandwidth to a surviving link under fault conditions.



When both links are operational, channels may be assigned individually to either link, even up to the full composite bandwidth of that link. In this case, the resulting timeslot maps are constructed independently and contain no common channels.

In the process of assignment, along with a link channels are also assigned a priority of high or low. A high priority means that the channel will survive a link failure, while a low priority means it will be dropped after a link failure.

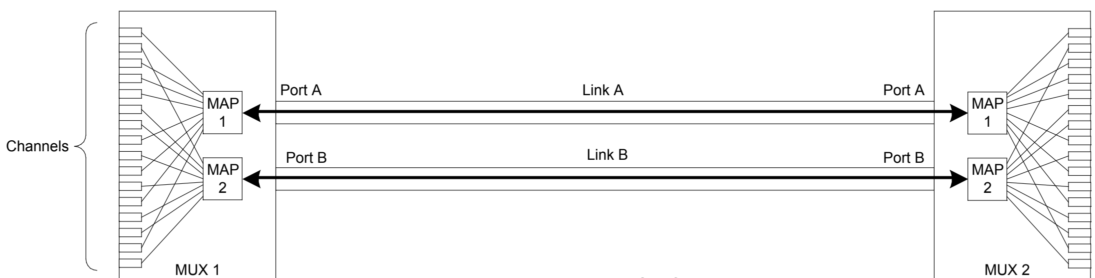
When a fault is declared on either link, the system will begin by disabling the timeslot map of the failed link. The system will also de-allocate, or bump, low-priority channels from the timeslot map of the surviving link. In the final step, the high-priority channels from the failed link will be re-allocated to the surviving link composite.

For this configuration to work, the total bandwidth requirement for all high-priority channels must not exceed the composite bandwidth of the link with the least bandwidth. This requirement will be enforced by the system firmware.

The timeslot map associated with the surviving link composite is modified after a fault, but is reconstructed upon a link restoral as the channels are returned to their fully-operational link and state. Channels which are not moved as a result of a link fault, namely those high-priority channels on a surviving link will not experience any disruptions in their end-to-end operation.

Operation in Enhanced Bandwidth Configurations

Enhanced bandwidth applications are those that require the additional capacity of a second link, rather than fault-tolerance. This configuration may be thought of as similar to, or a special case of the diverse link configuration above, but one in which all channels are low-priority, meaning that channel traffic is never switched when a link fault is declared.



Enhanced Bandwidth Configuration

Two links are used for enhanced bandwidth, but it is not required that they be of equal rates. Channels are assigned individually to either of the two links. Should a link fault occur, the system will take no automatic action to recover or restore operation to the affected channels as long as the fault persists, other than to declare the appropriate fault alarm.

When a failed link is restored to service, the status will be detected and the channels previously assigned to that link composite will become operational again without manual intervention.