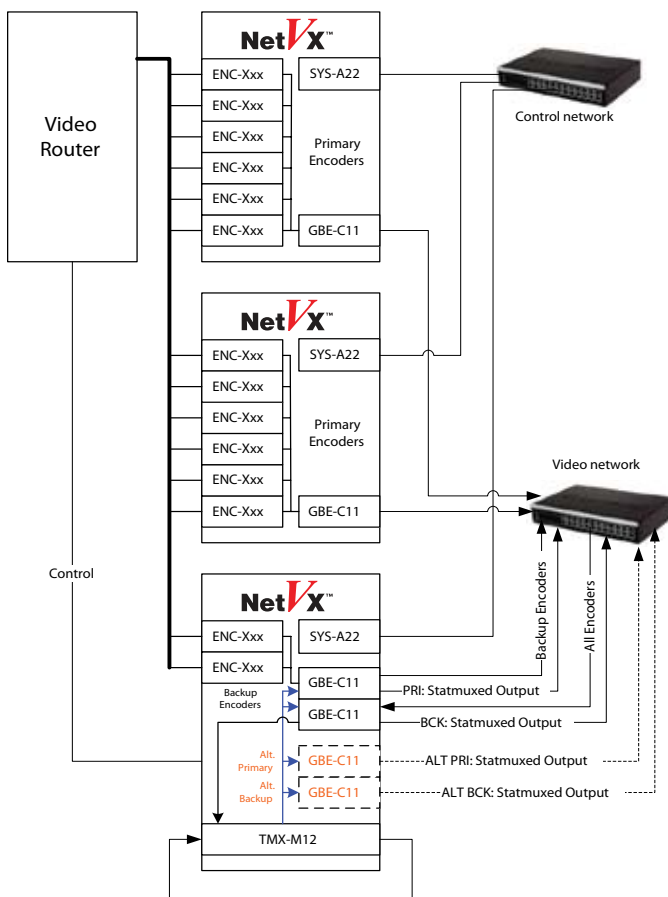


Distributed Statistical Multiplexing and Multi-Chassis Redundancy in NetVX™

Distributed Statistical Multiplexing

In direct-to-home and IPTV applications, the number of channels included in statistical multiplex (statmux) groups continues to increase. As this number increases, multiple NetVX™ chassis are used and the number of encoded channels multiplexed into a single group also increases.

NetVX™ now allows the inclusion of up to 63 encoders from multiple chassis in the same statmux group. The number of channels chosen for a statmux group is dependent on the mix of HD and SD channels and the associated available bandwidth. The distributed statmux feature takes the encoded signals from disparate chassis and routes them to a single ASI or IP interface for output.



How it works

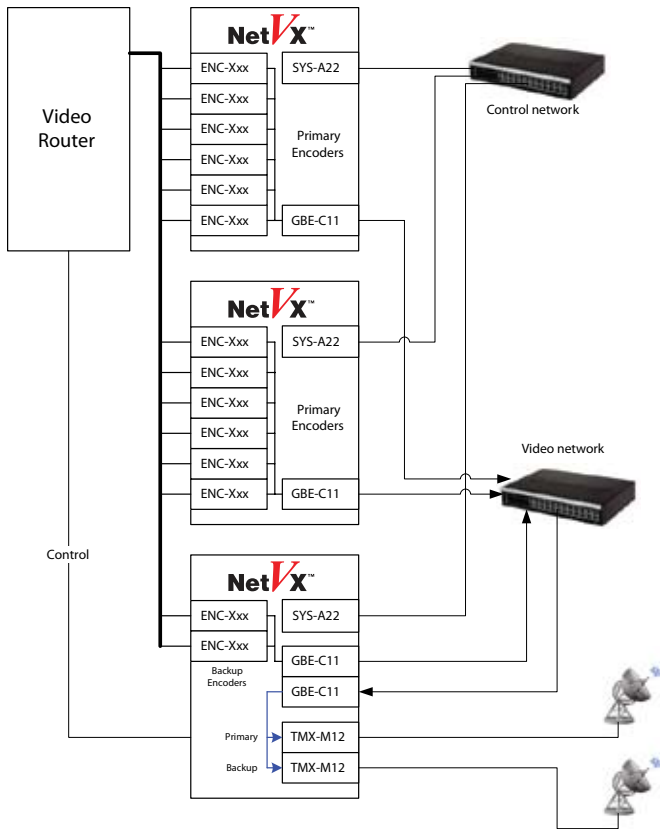
Chassis are interconnected to each other via either IP or ASI — IP being the most cost-effective and ASI having the lowest statmux latency. For chassis interconnects that use IP, each chassis needs a GBE-C11 card. For chassis interconnects that use ASI, each chassis needs a TMX-M12 card.

The encoders in each chassis are mapped to an output virtual circuit (VC) on the GBE-C11 or TMX-M12 card. If the final output needs to be statmuxed, a TMX-M12 card is required. The encoded signals from the encoders are all sent to the chassis containing the statmuxing TMX-M12 card. The TMX-M12 multiplexes the signal and transmits it over DVB-ASI. In the event that the final statmuxed output needs to be IP, the TMX-M12 card's output is brought back into an ASI input and mapped to a GBE-C11 card.

As shown in the diagram, there are a few options that are available to provide a primary and backup multiplexed IP output. The most cost-effective method is to utilize the two GBE-C11 cards used for moving the primary and backup encoder signals to and from the bottom-most chassis. An alternative approach is to use additional GBE-C11 cards and dedicate them to primary and backup multiplexed IP outputs — shown in the diagram as "Alt. Primary" and "Alt. Backup."

Multi-Chassis Redundancy

In most instances, multichannel systems of this size have a redundancy requirement. The multi-chassis redundancy option allows the NetVX™ to have backup encoders protect primary encoders across multiple chassis. For this configuration, it is required that the interconnect between chassis be over IP. Therefore, a single GBE-C11 card is required in each frame that has a set of primary encoders, and two GBE-C11 cards in the chassis that has the redundant encoders.



How it works

The output of each encoder is mapped to a virtual circuit (VC) on the GBE-C11 card of each chassis. In the diagram, the two top chassis contain primary encoders and a GBE-C11 card. The bottom-most chassis contains the backup encoders, along with two GBE-C11 cards. In the bottom-most chassis, the first GBE-C11 card is used to output the signals from backup encoders. The second GBE-C11 card is used to receive signals from all encoders, including the backup encoders.

When a primary encoder fails, the video connected to the failed encoder is automatically re-routed to the input of the backup encoder. Additionally, the configuration of the failed encoder is copied to the backup encoder and the failed encoder GBE-C11 VC configuration is copied to the GBE-C11 VC of the backup encoder. The backup encoder and associated GBE-C11 VC will take over all encoding services of the failed encoder.

Copying of the configurations from shelf to shelf is performed between system controllers of the shelf containing the failed encoder and the shelf containing the backup encoder. It is recommended that the GBE-C11 cards and the system controller cards be on different subnets, resulting in separate control and video networks.

When used for multi-chassis redundancy, the first GBE-C11 in the bottom-most chassis cannot be used to transmit and receive the video signals simultaneously. This is because most Ethernet switches to which a GBE-C11 would be connected will not send a packet back on the same interface from which it came. That means that if the system has a failed encoder, a backup encoder output would go active. The output of the backup encoder is emitted from the first GBE-C11 in the bottom-most chassis. Since the Ethernet switch will not send back those same packets on the first GBE-C11 card, a second GBE-C11 card is needed to receive all the encoder outputs.

For more information, please visit www.broadcast.harris.com/networking.

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