

## MXTS: Multi-program DVB Audio Encoder

### Reliability of Services

#### **Reliability is imperative when operating a broadcast service!**

This can only be achieved if equipment is available with redundancy options. Below you will find a number of redundancy options, which the MXTS can offer in case of a partial or complete failure.

The MXTS chassis is available in two versions:

- MXTS - standard chassis
- MXTS-A - advanced chassis.

Redundancy of output module is only available in the MXTS-A version.

Before focussing on the internal features of the MXTS system, we need to mention two additional aspects beforehand.

**Path Redundancy** – two separate physical links are established for the same signal. As link failures are the most likely reason for a service interruption, the two program signals should be monitored at the receive point and switched over in case of an input error. The MXTS provides a dual output in all versions. HEADROOM also offers various back-up switches with intelligent detectors!

**System Redundancy** – two separate MXTS units are installed at the same site. In case one system produces errors, switching over to a back-up system will ensure a very short down time.

**A combination of path and system redundancy is the optimal solution for critical services.**

The reliability of a multiplex system depends on several factors. Failures are mostly caused by:

1. the power supply (the MXTS has 2 redundant psu modules)
2. the failure of an input module (user side); for one program the MXTS provides an automatic channel swap function to a stand-by module, idle in the same sub-rack
3. the multiplexer and controller (replacement required)
4. the output module (replacement required or use enhanced chassis MXTS-A)

Each of the above will be explained in detail.

### Standard Redundancy Features of MXTS

#### **1. Power supply failure**

The MXTS provides 2 slots for identical power supply modules to operate simultaneously. They should be fed from different power circuits. Each failure of a primary or secondary power outlet creates an alarm and enables the system administrator to initiate a replacement while in operation (hot swap).

#### **2. Failure of an input module (encoder, X module, DD module...)**

Input modules deliver the processed audio data internally to a data bus. Spare modules may be inserted in any free slot, dedicated to replace other ones should they fail. A module failure is treated as a major fault and creates an alarm. Upon this alarm, either the MXTS internal controller or the external management system is able to create a configuration change which automatically inserts the stand-by module(s) into the encoding / multiplexing process and isolates the faulty one(s). The transition is smooth and does not affect the output of the other programs in the transport stream.

The alarm signal provided to the external management system may even be used to control an external audio switch, routing the correct audio signal to the replacement module. The programming features of the MXTS provide the user with an efficient set of tools to prevent serious down times.

### 3. The multiplexer and controller

The built-in multiplexer is embedded in the control and management structure of the MXTS. As several interactions take place permanently between the multiplexer, communication controller and output modules, a parallel structure to replace the multiplexer in case of a failure is not possible. In that case, exchange of the basic chassis is the fastest action to recover services.

### 4. Failure of an Output module (available only in the – A version)

In order to enhance the measures taken to prevent system failure, the **MXTS-A** chassis offers space for two output modules marked **OUT-A**. With only half the width of the standard output modules, they fit into the traditional slot most left. Standard OUT modules cannot be inserted.

- The multiplexer provides pre-processed signals containing all program data to 2 special output modules marked OUT-A.
- Both modules provide the same DVB Multi-Program Transport Stream in ASI format and communicate permanently with the MXTS system controller.
- Both modules are similar, which simplifies the provision of spare parts. Determined by the slot in which they are inserted, one works as a Master, the other one as a Slave module.
- Only the Master module interfaces with the control environment. The Slave I/O interface is provided, but SW disabled.
- Both modules are monitored permanently.
- Should the Master module fail, the service will automatically be taken over by the slave module. It will not cause the complete service to fail, as the Slave module continuously provides the ASI format output signal. It is easy to replace the defective module.
- Should the Slave module, while not in use, fail it is also recognised and indicated as an alarm.

## MXTS-A

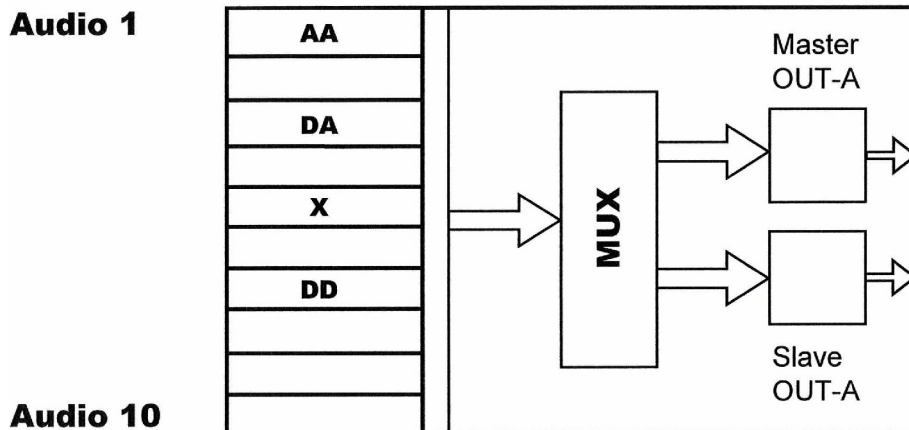


Figure 1: Full redundancy of the output module

### Mechanical design of MXTS-A chassis:

Due to a different mechanical design, only the enhanced MXTS-A frame accepts the slim OUT-A modules. It comes together with the SW option Master/Slave which is embedded in the standard control software.

Converting a basic frame to the enhanced frame therefore requires a factory upgrade.

## Operational aspects (examples):

### *Return to default*

After replacing the faulty module(s), the default process requires action by the user. He has to activate the initial configuration, a step that should not be done automatically.

### *Multiple module failure*

If a spare module is in operation and a second module (or signal feed) of the same kind as the first one fails the user himself has to undertake action.

The system creates a new alarm, in this case however, no automatic response in the MXTS control software is possible.

### *N+1 back-up for inputs*

1 or more back-up input modules of any kind can be in hot stand-by mode for automatic switchover. The user can rely on the built-in n+1 back-up feature without the need for sophisticated, expensive external circuitry.

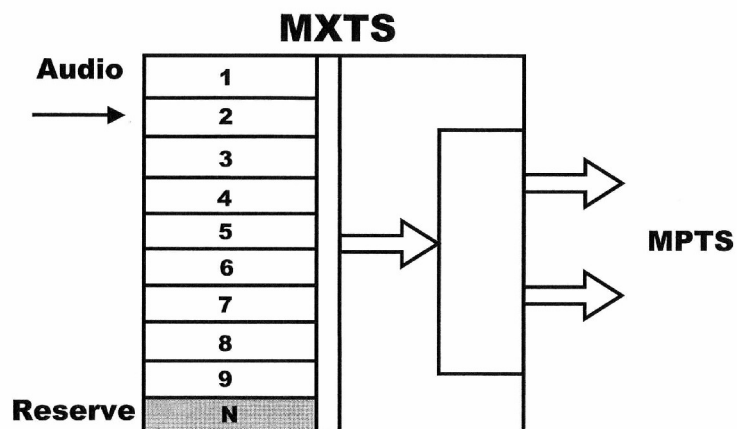


Figure 2: N+1 input module back-up

### *5 program 1+1 back-up in one sub-rack*

With 5 active programs contributing to the output stream, it is even possible to run a true 1+1 redundancy in one sub-rack! Use 2 identical sets of input modules – and feed the 5 programs simultaneously into these 2 sets. Two independent output streams provide 2 ASI outputs with MPTS. You are now running the most compact and secure encoder system possible!

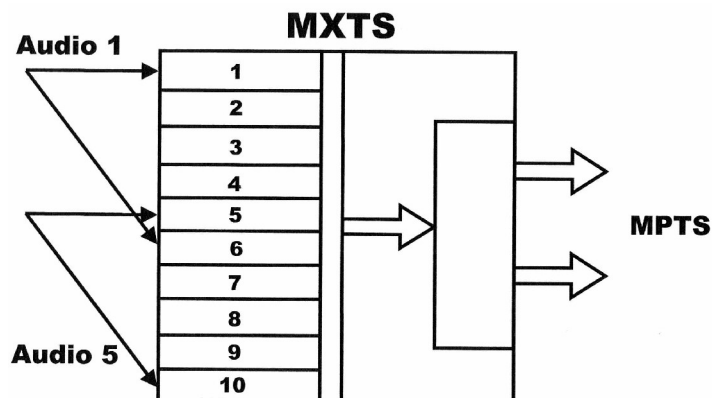


Figure 3: 5+5 input module back-up

### Path Redundancy

Two separate physical links are established for the same signal. As link failures are the most likely reason for a service interruption, the two program signals should be monitored at the receive point and switched over in case of an input error. The shown example is a combination of redundancy of both the input modules and the output-paths. The MXTS provides a dual output signal in all versions. HEADROOM also offers various back-up switches with intelligent detectors!

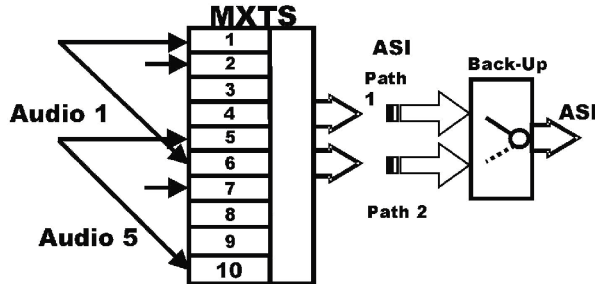


Figure 4: Path redundancy with back-up switch

### System Redundancy

Two separate MXTS are installed at the same site. In case one system produces errors, switching over to a back-up system will ensure a very short down time.

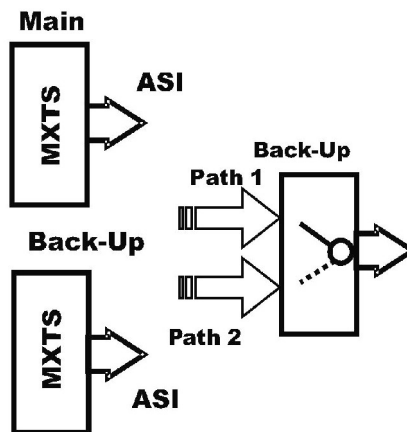


Figure 5: System redundancy with back-up switch

## Additional network elements to ensure your Secure Application

HEADROOM GmbH also offers various devices, which allow you to design your specific network, implementing existing equipment and upgrading later. These are:

- Inverse multiplexer and telecom interfaces DVB/ ASI, 1 to 4xE1 and E3/ DS3
- Switches for various signal formats – Audio, DVB/ ASI, E1, X.21
- Splitters
- ISDN Backup for X.21 Leased Lines
- Monitoring devices



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