

# NetVX™

## MPEG Processing Configuration



### Introduction

The NetVX™ ATM-X11 and GBE-C11 modules each have an “MPEG Processing” configuration parameter that can affect transport streams in the following ways:

- Null packet generation
- PCR re-stamping

The transmit and receive interfaces of the NetVX™ TMX-M12 module, particularly the various modes/standards supported by the module’s transmit interface, can also affect transport streams in the two ways mentioned above.

The objective of this application note is to clarify how the various settings for the “MPEG Processing” configuration parameter, utilized by the ATM-X11 and the GBE-C11 modules, affect null packet generation and adjustment of Program Clock Reference (PCR) time stamps. In addition, this note reviews the manners in which the TMX-M12 module’s receive and transmit interfaces affect null packet generation and PCR re-stamping. Finally, several examples are presented showing typical NetVX™ applications and the manner in which the “MPEG Processing” parameter and/or TMX-M12 interfaces should be configured.

### NetVX™ Application Modules

#### ATM-X11

The “MPEG Processing” configuration parameter needs to be set when an ATM Virtual Channel (VC) is configured to transport MPEG packets utilizing either one of the following methodologies:

- MPEG on AAL-1, CE (circuit emulation – no forward error correction)
- MPEG on AAL-1, J82 (ITU-T J82 standard – with forward error correction)
- MPEG on AAL-5

The “MPEG Processing” parameter can have the following settings:

- Constant Bitrate
- Variable Bitrate
- Pass through

Depending on whether the transport stream is incoming or outgoing, these settings affect the transport stream as indicated in Table 1:

**Table 1: ATM Module MPEG Processing Settings**

Interface	Outgoing Transport Stream	Incoming Transport Stream
Constant Bitrate	Reads packets out of its buffer at a constant rate and inserts null transport stream packets up to specified payload transmit rate	Uses PCRs to estimate incoming TS rate and dynamically adjusts its clock to maintain constant buffer level and smooth PCR jitter
	Adjusts PCR time stamps	
Variable Bitrate	Reads packets out of its buffer at the highest rate possible, without exceeding the configured payload transmit rate. NO null packets are inserted	A simple one-for-one transfer of MPEG packets from the interface to the NetVX™ backplane
	NO adjustment of PCR time stamps	
Pass through	Same as variable bitrate	Same as constant bitrate

## NetVX Application Modules

### GBE-C11

The “MPEG Processing” configuration parameter needs to be set when a GIG-E VC is configured to transport MPEG packets utilizing either one of the following methodologies:

- MPEG RTP Tx
- MPEG TS Tx
- MPEG RTP Rx
- MPEG TS Rx

**Note:** Real Time Protocol (RTP) is handled according to IETF RFC 2250. RTP supports the correction of out-of-order packets and, optionally, forward error correction.

The “MPEG Processing” parameter can have the following settings:

- Constant Bitrate
- Variable Bitrate

These settings affect the transport stream in the manner described in Table 2 and are dependent on whether the transport stream is incoming or outgoing:

### TMX-M12

#### Receive Interface

The TMX receive interface can be configured with pass-through mode enabled, which allows for ingress of complete transport streams as a whole. Pass-through mode can also be disabled, which allows for demultiplexing of programs within the transport stream. In either case, transport streams utilizing 204-byte packets, have the last 16 bytes dropped from these packets to create 188-byte packets. See Table 3.

#### Transmit Interface

The TMX transmit interface can be configured with pass-through mode enabled, allowing egress of complete transport streams as a whole. Pass-through mode can also be disabled, which allows for multiplexing of individual programs into a transport stream. The various transmitter interface modes/standards affect null packet generation and PCR-time re-stamping differently. Some of the modes have different effects depending on whether pass-through is enabled or not. Table 4 summarizes the various modes and their effects when pass-through mode is enabled or disabled. The results are pertinent for both 188- and 204-byte packet generation settings.

**Table 2: GIG-E Module MPEG Processing Settings**

Interface	Outgoing Transport Stream	Incoming Transport Stream
Constant Bitrate	Reads packets out of its buffer at a constant rate and inserts null transport stream packets up to specified payload transmit rate	Uses PCRs to estimate incoming TS rate and dynamically adjusts its clock to maintain constant buffer level and smooth PCR jitter
	Adjusts PCR time stamps	
Variable Bitrate	Reads packets out of its buffer at the highest rate possible, without exceeding the configured payload transmit rate. NO null packets are inserted	A simple one-for-one transfer of MPEG packets from the interface to the NetVX™ backplane
	NO adjustment of PCR time stamps	

**Table 3: TMX Receive Interface MPEG Processing Characteristics**

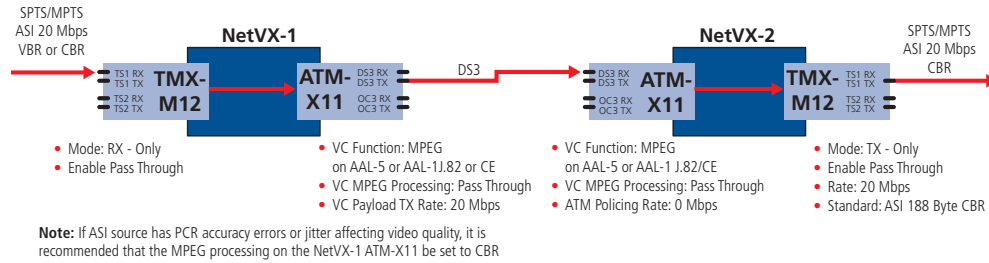
Pass Through Enabled	Pass Through Disabled
204-byte packets are made 188-byte packets	Drops null packets
	204-byte packets are made 188-byte packets

**Table 4: TMX Transmit Interface Mode MPEG Processing Characteristics**

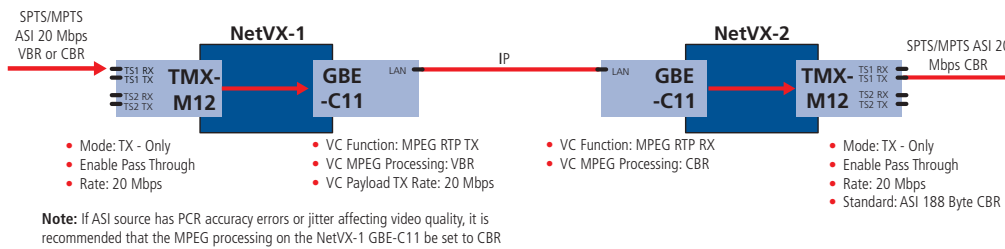
Interface	Pass Through Enabled	Pass Through Disabled
Constant Bitrate (CBR)	Reads packets out of its buffer at a constant rate and inserts null transport stream packets to bring the output rate of the multiplex up to the specified value	Reads packets out of its buffer at a constant rate and inserts null transport stream packets to bring the output rate of the multiplex up to the specified value
	Adjusts PCR time stamps	Adjusts PCR time stamps
Variable Bitrate (VBR)	Reads packets out of its buffer at the highest rate possible, without exceeding the configured output rate. NO null packets are inserted, so the resulting stream may not consume the entire configured rate	Reads packets out of its buffer at the highest rate possible, without exceeding the configured output rate. NO null packets are inserted, so the resulting stream may not consume the entire configured rate
	NO adjustment of PCR time stamps	Adjusts PCR time stamps
SMPTE 310M	Pads with null packets up to SMPTE 310M output rate	Pads with null packets up to SMPTE 310M output rate
	Adjusts PCR time stamps	Adjusts PCR time stamps
Adaptive Constant Bitrate (ACBR)	Given a constant bitrate stream to emit, the interface dynamically adjusts its output clock to maintain the output, WITHOUT inserting or deleting null packets. It uses the configured output rate as the nominal value for the multiplex, but it allows the actual rate to exceed the configured value by 1% to account for hardware clock differences between systems	Configuration now allowed
	NO adjustment of PCR time stamps	

# Example Applications

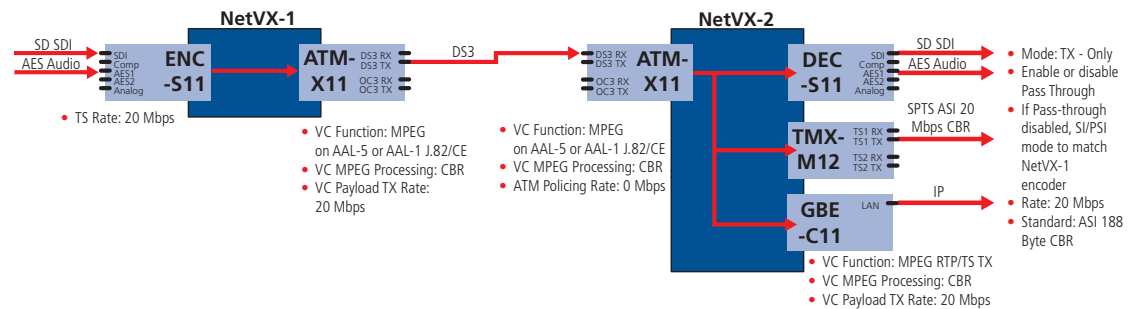
**Figure 1: ASI Tunnel Mode over ATM**



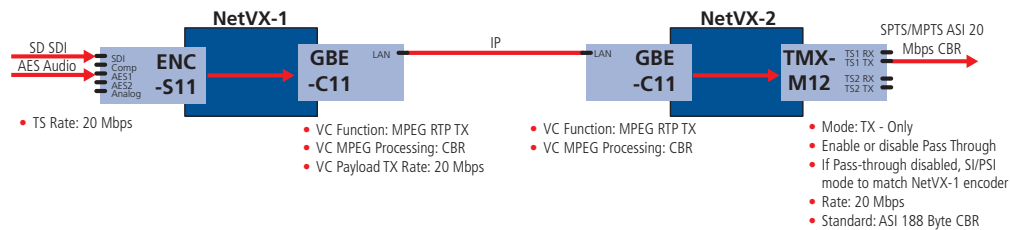
**Figure 2: ASI Tunnel Mode over GIG-E**



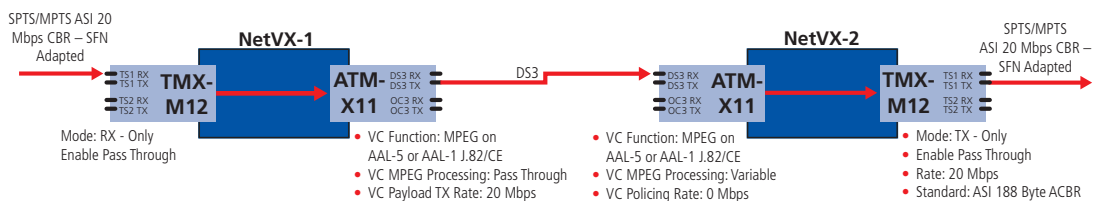
**Figure 3: Standard CBR Encode over ATM**



**Figure 4: Standard CBR Encode over IP**



**Figure 5: SFN – Single Frequency Network (preserves original bitstream)**



## Example Applications

Figure 6: Standard Encode over ATM using VBR (IPoA over-subscription applications)

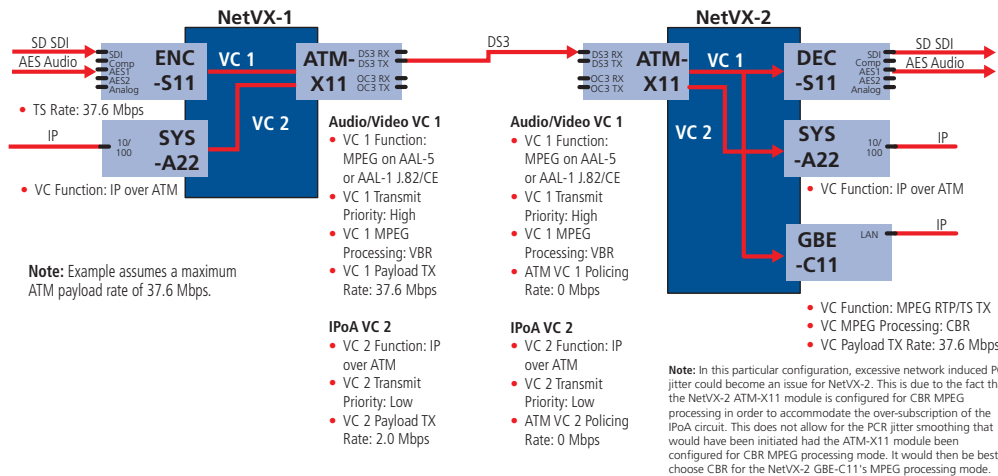


Figure 7: ASI Tunnel Mode over ATM with Intermediate ATM Circuits

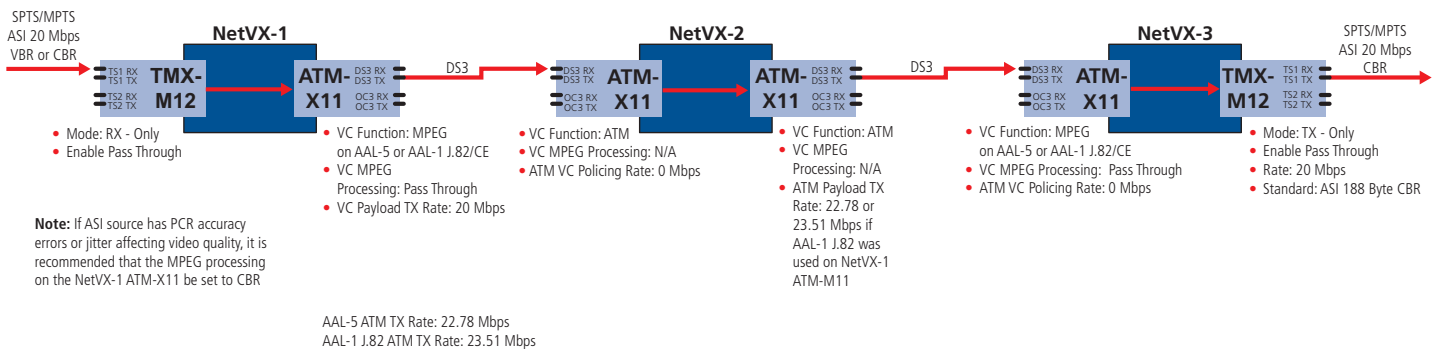
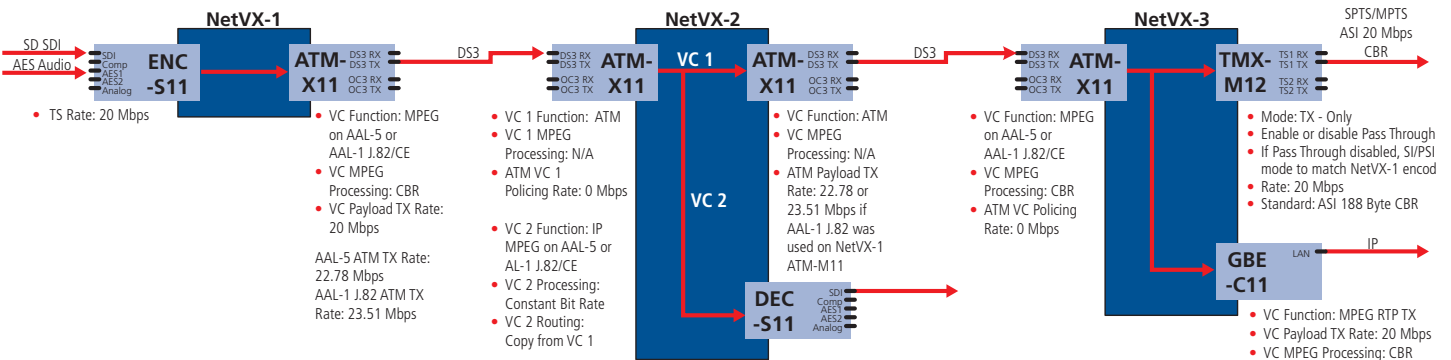


Figure 8: Standard CBR Encode over ATM with Intermediate ATM Circuits and Intermediate Decode



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