Vyper

Satellite Modulator by TeamCast
DSNG / Contribution / DTH
All in one : life is easier

Full feature

- Full DVB-S compliant,
  - QPSK constellation
- Full DVB-DSNG compliant
  - QPSK, 8 PSK, 16 QAM constellations
- Full DVB-S2 & DVB-S2X (coming for IBC) compliant
  - QPSK, 8PSK, **16APSK**, **32APSK** and **64APSK** constellations
- 0.1 to 68 Mbauds Symbol Rate
- Roll Off : **5/10/15/20/25 & 35 %**
- MPEG-TS from 0.1 to 200 Mbits/s over ASI (x2) & IP interfaces

⇒ The same device for any satellite transmissions
Crystal spectrum Quality : state of the Art

- Output Frequency :
  - Full L band : 950 MHz to 2 150 MHz
  - IF band : 50 MHz to 180 MHz
  - 1 Hz step resolution / Agility

- Output Power :
  - + 5 dBm to – 30 dBm
  - 0.1 dB step adjustment

- Output Quality
  - EVM > 40 dB @ 0 dBm / 30 Mbauds
  - EVM > 34 dB @ 0 dBm / 45 Mbauds
  - Spurious < 65 dBc @ 0 dBm

→ Low Roll Off naturally and easily introduced
RF Quality – Crystal Spectrum benefits

A tool to reduce the out of band shoulder and also allow a reduction of the inter carrier spacing as shown:

EN 302 307 spectrum mask

Out of band shoulders but in the standard

1 carrier more => 1 service more!
Friendly device : your best companion

- Intuitive Web Browser with stored configurations
- Front panel control
- SNMP control management
- Standard interfaces : ASI & IP
- Low Power consumption (< 30 Watts)
- Vibration approved
- High MTBF ( > 8 years )
- Quick boot (< 15 seconds)
- Light (< 4 Kg)

Try our online device : http://194.206.71.180

Easy and quick handling
Evolutive Platform : Future proof

- FPGA based
- Software upgradable (free of charge)
- Already ready for DVB-S2X
  - Extended low Roll Off : 5, 10 and 15 %
  - RF Carrier_Id management (NIT & ETSI)
  - 64 APSK
  - Linear ModCod

Already Included

IBC

Roll off 5%

Roll off 35%
Satellite Capacity in Linear Channel
(AWGN channels)

\[ C = B \log_2 \left(1 + \frac{S}{N}\right) \]

- **DVB-S2X**
- **DVB-S**
- **DVB-S**
- **DSNG**

Claude Shannon
(1916-2001)
Additional innovative services: DualCast

OB-Van (DSNG)

TV Channel

DualCast ©: Complementary push data service

Free service offered by Vyper innovation
The MPEG-TS packets are encapsulated into Base Band Frames (BBF). These BBF consist of a header and a payload (content). Into the header the Input Stream Identifier (ISI) value is inserted to restore the streams’ position at the receiver’s end.

Additional services: Multistream

MPEG-TS1 over ASI1 (7Mbps)
MPEG-TS2 over ASI2 (7Mbps)

Single configuration
To support 2x7Mbps = 14Mbps
⇒ 8PSK – 3/5 – 8MBaud

Bitrate monitoring
Bitrate overflow control

2 MPTS over 1 DVB-S2 transponders
ACM Contribution: Seamless MODCOD switching

- Seamless switching

Null Packets
Overshoot

Real time adjust of robustness & capacity without service interruption.
BUC Driver included : Compactness

Internal module to mix :

- L band satellite signal,
  - DVB-S or DVB-DSNG or DVB-S2 signal

- BUC (Block Up Converter) power supply
  - 12 Volts DC
  - 18 Volts DC
  - 24 Volts DC
  - 48 Volts DC
  - Up to 50 VA

Software selection

- BUC (Block Up Converter) frequency reference
  - 10 MHz reference signal

⇒ One BUC Driver for any BUC
Redundancy

1 + 1 redundancy solution

- Modulator main
- Modulator backup

ASI → RF

Dry contact:
- Fast (< 500 ms)
- stand alone solution
- no extra software

N + 1 redundancy solution

- Modulator main 1
- Modulator main 2
- Modulator backup

ASI 1 → RF 1
ASI 2 → RF 2
ASI 3 → RF 3

- Stand alone solution
- Manage N different modulator configurations
- Controlled by SNMP (local LAN between Switch & Modulators)
The dimensions of the box excluding connectors are: 450 x 350 x 44 mm. The dimensions including connectors are: 450 x 370 x 44 mm.
Thank you for your attention!

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info@teamcast.com
Available as an OEM Solution too!
The dimensions of the box excluding connectors are: 220 x 110 x 35 mm.
The dimensions including connectors are: 240 x 110 x 35 mm.
The weight of the module is: 1.000 Kg.
Vyper vs OEM Version

Same features
Same performances
Same roadmap
Same customer satisfaction !!
Low Roll Off : Technical complements
Low Roll Off Benefits

Fill in the gap with additional bitrate without interfering your neighbors
Or
Reduce your spectrum occupancy and pay less
Low Roll Off: same bandwidth - more bitrate

<table>
<thead>
<tr>
<th></th>
<th>27MBaud</th>
<th>35MBaud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll off</td>
<td>0.35%</td>
<td>0.05%</td>
</tr>
<tr>
<td>DVB-S2 mode</td>
<td>8PSK – 5/6</td>
<td>8PSK – 5/6</td>
</tr>
<tr>
<td>Useful bitrate</td>
<td>67.5 Mbps</td>
<td>87.5 Mbps</td>
</tr>
<tr>
<td>Transponder bandwidth</td>
<td>36.45MHz</td>
<td>36.75MHz</td>
</tr>
</tbody>
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Same protection $\equiv$ same C/N

$\pm 30\%$

0.8%
Low Roll Off: same bitrate – less bandwidth

<table>
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<tr>
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<th>Vyper</th>
<th>Syper</th>
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Same protection ⇔ same C/N

- 30 %

0.8 %
IF or RF Out: Make your own choice
Output frequency: either L Band or IF Band

L-Band at the output of the modulator to ...

The RF output frequency:
- L-Band for low power amplifiers
- IF Band for high power amplifier

The RF quality of the TeamCast modulator allows a good aggregation of the different RF carrier (spectrum) of the different modulator to feed only one amplifier.

The output power range (+5/-30dBm) allows to adjust the power depending on the RF bandwidth without modifying the gain of the amplifier.
Carrier_Id :
- NIT Update
- ETSI
Two satellite transmissions on the same frequency! NB: 95% of these situations are due to human errors…
Two Carrier ID: NIT info and RF_Id

NIT info:
- Information added inside the NIT table.

Pb: Must decode the satellite signal to recover this information...
100% of the case are not covered

Advantage: very low C/N needed to recover the information

Vyper manages both standardized solutions
Data push services
Push file service ... Today, without Vyper

Push data files requires additional products and another satellite frequency ⇒ Expensive...
Vyper : Dualcast©

One device, One frequency : two services !!!

⇒ Push Data files free of charge
Multistream
Multi-stream: Introduction

Multistream is a main advantage in satellite communication for “Mobile” TV and is fully compliant with the DVB-S2 standard. In a few words, Multistream allows users to aggregate (combine) several transport streams into one satellite carrier in a fully transparent manner, while maintaining the integrity of the original content.

- The multistream mode does not add any overhead.
- It does not require any pre-processing on the MPEGS-TS streams.
- The multistream mode is not enabled in DVB-S/DSNG

For DSNG application, Multistream enables the usage of a single satellite carrier to carry 2 independents contents without take care about how to do it.
Multi-stream: use case

<table>
<thead>
<tr>
<th>Modulation</th>
<th>DVB S</th>
<th>DVB S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>QPSK</td>
<td>8PSK</td>
<td></td>
</tr>
<tr>
<td>FEC CR</td>
<td>1/2</td>
<td>3/5</td>
</tr>
<tr>
<td>Roll-Off</td>
<td>0.35</td>
<td>0.25</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>4.5M</td>
<td>4.8M</td>
</tr>
<tr>
<td>BW</td>
<td>6 MHz</td>
<td>6 MHz</td>
</tr>
<tr>
<td>Es/No</td>
<td>4.5 dB</td>
<td>5.5 dB</td>
</tr>
<tr>
<td>Bitrate</td>
<td>4.5 Mbps</td>
<td>8.6 Mbps</td>
</tr>
</tbody>
</table>

**TWO** Individual multiplex over **TWO** DVB-S2 transponders with **TWO** modulators/demodulators

**NO Multi-stream**

MPEG-TS1 over ASI1 (7Mbps)

MPEG-TS2 over ASI2 (7Mbps)
The MPEG-TS packets are encapsulated into Base Band Frames (BBF). These BBF consist of a header and a payload (content). Into the header the Input Stream Identifier (ISI) value is inserted to restore the streams’ position at the receiver’s end.

Additional services: Multistream

- Bitrate monitoring
- Biterate overflow control

- Single configuration
- To support 2x7Mbps = 14Mbps
  ⇒ 8PSK – 3/5 – 8MBaud

→ 2 MPTS over 1 DVB-S2 transponders
Multi-stream: feature description over Vyper

• The next release of Vyper (S210) provides the multi-stream feature as specified in the **EN 302 307 DVB-S2 standard**

• **Multi-stream features:**
  - 2 x MPEG-TS (MPTS) over the 2 x ASI inputs of the current Vyper
  - M=2 with **fixed** ISI: ISI1 over ASI1 and ISI2 over ASI2
  - Same configuration (**constellation** – **code rate** – **frame length** – **pilot**) on each ASI inputs

  ⇒ Channel modulation bitrate =
  
  \[ 2 \times \text{the maximum useful input bitrate between MPEG-TS1 or MPEG-TS2} \]

  - Simple easy-to-operate GUI:
    - Select single or multi-stream configuration
    - Check if channel capability is enough to broadcast both inputs bitrate

  ⇒ **Very simple to operate:**
  - Connect your 2 MPTS streams over both Vyper ASI inputs
  - Select the right MODCOD to allow a channel capacity more than sum of the useful bitrate of the both MPTS
  - Select Multi-Stream in the GUI config screen

  Now Vyper is in multi-stream configuration.
ACM Contribution
Seamless MODCOD switching: Applications

MODCOD capacity

Encoder bit rate

Return path: C/N

MODCOD1 MODCOD2 MODCOD3

Seamless switching
Seamless switching

Time

Bad conditions, more robustness needed ➞ New MODCOD

Good conditions, lower protection allowed ➞ New MODCOD

Vyper: Null packets insertion

Do it with no video troubles thanks to Vyper!
Under construction : Pre-corrections
Pre correction IMUX/HPA/OMUX

Linear

No-linear

IMUX Ku-band (36 MHz)

Frequency (MHz)

OMUX Filter

IMUX Filter

PA

Uplink

Downlink

Projet HESAT
High Efficiency SA tellite Transmission

S2 Mod

PA precor

IMUX precor

Up converter

Tuner

S2 Demod

Egal.
Pre correction IMUX/OMUX - results

Benefits:
- A better budget link to
- Increase the bit rate
- reduce the antenna size
- reduce amplifier power
- add a new SD channel
- move to HD definition

<table>
<thead>
<tr>
<th>Baudrate</th>
<th>RO</th>
<th>SNR Sans precor</th>
<th>SNR Avec precor</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>28Mbaud</td>
<td>0,2</td>
<td>22,5dB</td>
<td><strong>34,5dB</strong></td>
<td>12dB</td>
</tr>
<tr>
<td>33Mbaud</td>
<td>0,2</td>
<td>20dB</td>
<td><strong>33,5dB</strong></td>
<td>13dB</td>
</tr>
<tr>
<td>36Mbaud</td>
<td>0,2</td>
<td>17,5dB</td>
<td><strong>31,5dB</strong></td>
<td>14dB</td>
</tr>
</tbody>
</table>