The MEOS™ Capture HRTG is a high performance test generator for the most demanding professional users. The MEOS™ Capture HRTG implements the same key properties as all MEOS™ Capture products: Performance, Reliability and Flexibility.

**MEOS™ Capture HRTG outputs PN sequences, simulated data and real satellite data as ECL synchronous clock and data, and a 720 MHz modulated IF signal.**

**PERFORMANCE**

**Outputs**
- Serial ECL clock/data
- (x)PSK modulated signal on 720 MHz carrier

**High data rates**
- Supporting data rates from 500 kbps to 1 Gbps
  (ref. Table 1 on page 3 for performance figures)

**Coding and data**
- Reed-Solomon, differential and convolutional

**Multiple data formats**
- Frame formats
- PN sequences
- Data bit stream (files)

**RELIABILITY**

Reduce your operations cost by automated “lights-out” operations:

- Fully automated operations, allowing schedules to be preloaded in advance. Once a schedule has been received, the MEOS™ Capture HRTG will work autonomously according to the schedule.
- Very stable Linux system, supporting 24/7 operations without operator intervention

**FLEXIBILITY & MODULARITY**

Keep your original system, just add functionality if needed:

- One extra set of output channels (digital and analog) may be added
- Data storage on removable media may be added
Data type options
- PN sequences for BER performance test
- Real data files stored locally, all formats
- Pre-generated data files stored locally
- Realtime generated frame formats - standard CCSDS frames or other (specify on order)
- Coding (ref. page 3 for coding options)

Graphical User Interface
- Programmable (XML definition), Java based GUI. Stand alone or through a web browser.

External Interface
- TCP socket and XML based external interface
- Access authentication
- MEOS™ Connect ready
- Designed for seamless integration in Ground Station networks, with GUI and API providing detailed system visibility and control from any location in the network, with minimal bandwidth requirements.

Options
- Archival & Retrieval: Archival and retrieval of data to/from removable media (requires additional HW).
- Additional channel: Increase system flexibility by adding one additional set of analog and digital channels
- Data Generation: Generate more types of data using software tools
- BERT (Bit Error Rate Tester): Test bit error rate
- Coding: see page 3
TECHNICAL SPECIFICATIONS

MEOS™ CAPTURE HRDFEP V5

Outputs
- TPSK modulated data channel
  - 720 MHz carrier frequency
    (+/- 200 MHz tunable range, 1 kHz steps)
  - Signal level: -10 dBm to -50 dBm
  - Output signal:
    - 50 ohm
    - <1.5 VSWR
  - Data Rate: see table below
- Dual serial clock/data outputs – separate or merged data
  - Data polarity:
    - Normal/Inverted
  - External clock input
  - Electrical standard:
    - Differential ECL (standard), RS-422, LVDS
    - Selectable clock inversion (0° or 180°)
- All female SMA connectors

Modulator
- Modulation:
  - QPSK, QOQPSK, BPSK, QPSK, OQPSK, UQPSK (I/Q unbalance 3dB, 6dB, 8dB), BPSK, 16QAM
- Matched filters:
  - Raised Cosine
  - Square Root Raised Cosine
- AWGN Noise Generator:
  - Eb/No: -10 dB to 30 dB, programmable
- Doppler emulation:
  - Rate range (frequency sweep): 1 kHz/s to 100 kHz/s
  - Max +/- 1.5 MHz from centre frequency
- PN data sequences of length:
  - 2^4, 2^5, 2^6, 2^7, 2^8, 2^9

Coding
- Modulo 4 Differential Coding (option)
- Modulo 2 Differential Coding (POM):
  - NRZ-M, NRZ-S, NRZ-L, BP-L
- Trellis Encoding 4D-TCM:
  - Rate: 8/12, 5/6 (10/12)
- Convolutional encoding:
  - Compliant with CCSDS 131.0-B-1
  - Rate 1/2, 2/3, 3/4, 5/6, 7/8
  - 7 bits constraint length
- Reed-Solomon:
  - [255, 223]
  - Optional: (10, 6), (255, 239)

Physical
- Rack mountable chassis
- Height x Width x Depth: 21.8 CM X 48.26 CM X 73.22 CM
- Weight: appr. 40 kg
- Power:
  - 100-240 volts, 50-60 Hz
  - Dual power supplies
  - Consumption: 500 W
- Temperature:
  - Operating: 10°C to 35°C
  - Non-operating: -30°C to 60°C
- Relative humidity (non condensing):
  - Operating: 10% to 90%
  - Non-operating: 5% to 95%
- Separate keyboard and monitor unit (optional)

Optional items can be made available upon request.

<table>
<thead>
<tr>
<th>Data type</th>
<th>BPSK</th>
<th>xQPSK</th>
<th>8PSK</th>
<th>16QAM</th>
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</thead>
<tbody>
<tr>
<td>PN sequences</td>
<td>250 Mbps</td>
<td>500 Mbps</td>
<td>750 Mbps</td>
<td>1 Gbps</td>
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<tr>
<td>Frame formats</td>
<td>250 Mbps</td>
<td>500 Mbps</td>
<td>600 Mbps</td>
<td>600 Mbps</td>
</tr>
<tr>
<td>Files on disk</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Ext clock/data input</td>
<td>250 Mbps</td>
<td>500 Mbps</td>
<td>500 Mbps</td>
<td>500 Mbps</td>
</tr>
</tbody>
</table>

Supported data rates (TBC)
FEARURES

- Encoding of output data
- Output of files, frames or PRN patterns
- PSK modulator
- Two output types; serial clock/data and modulated IF signal
- Programmable IF carrier sweep, signal level and noise generator
- State-of-the-art FPGA-based hardware
- Extensive monitoring and control capabilities, locally and remotely.
- Instant status information on ongoing testing
- Java-based Graphical User Interface
- Manual or automated operations

Application Note

MEOS™ CAPTURE HRTG

The Challenge

A network of satellite ground stations typically consists of many sites. Each site may have one or more antennas and associated switching matrices and receivers. The stations may have individual technical solutions that may also undergo evolution during the operational life. Operations are typically under a combination of local and centralized control. Equipment diagnostic tools are available primarily at the station level. Generating and distributing status reports and statistics to support operational decisions, is typically a manual process.

Operational schedules are distributed from the central site to the stations. In some cases manual work is required to run the stations according to these schedules. Manual work is also required at the central site to assemble reports, make statistics available and present this during operations briefings.

The Solution

The MEOS™ Capture HRTG is designed for seamless integration in ground station networks. Its GUIs and remote monitoring and control capability provide detailed system visibility and control from any location in the network, with minimal bandwidth requirements. Network capacity utilization is optimized by automatic and adaptive bandwidth allocation and retransmission.

System status and data quality statistics are automatically generated and disseminated for central archiving and report compilation. The MEOS™ Capture HRTG and the MEOS™ Connect are the ideal elements for building your ground station network.

Benefits

The MEOS™ Capture HRTG, MEOS™ Control and MEOS™ Connect can be combined into a ground station network requiring an absolute minimum of manual operations. This reduces operational cost and delays.

MEOS™ Capture HRTG is delivered with Suse Linux, and normally configured, tested and pre-qualified at KDA Spacetec premises.

Specifications subject to change without any further notice.

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