ADVANCES IN TELEVISION TRANSMISSION SOLUTIONS

MARTYN HORSPOOL
PRODUCT MANAGER – TV
MASON, OHIO, USA
Today's Virtual Event Topics:

- Innovative High-Efficiency TV Transmitters
  - VHF & UHF, Air-Cooled Low Power to Liquid-Cooled High Power
- Intuitive HTML GUI’s - Advanced Security
- Integrated Satellite Receivers
- Integrated IP Content Distribution

Future Virtual Events (not covered today):

- Flexible Low-Power TV Transmission Systems
- PMTX-1 Outdoor Transmitter and Applications Review
- Total Cost of Ownership - The Economics of Deploying High-Efficiency Transmitters
GATESAIR IN USA + ITALY

United to Create One Company

- GatesAir USA had a long-term relationship partnering with Onetastic Italy for low power products for over 5 years.
- Italy has some of the finest RF engineers in the World.
- Top-notch support from all major component suppliers.
- Onetastic customers very enthusiastic regarding product quality and design and GA ownership.
- Engineering from both sides are now integrated - The best technology from Europe is being combined the best technology from the USA
TWO MANUFACTURING LOCATIONS

QUINCY, IL USA

BRESCIA, LOMBARDY, ITALY
# PRODUCTS FOR TV TRANSMISSION

## GatesAir USA – Quincy, IL

<table>
<thead>
<tr>
<th>Product</th>
<th>Power Range</th>
<th>TV Broadcast</th>
<th>Translator/SFN GF</th>
<th>ATSC 3.0 Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxiva™ UAXT/VAXT</td>
<td>Up to 200W</td>
<td>✔</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Maxiva™ UAXTE (UHF)</td>
<td>Up to 150W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Maxiva™ VAXTE (VHF)</td>
<td>Up to 400W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Maxiva™ Air-Cooled</td>
<td>Up to 700W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Maxiva™ Liquid-Cooled</td>
<td>Up to 2,000W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

## GatesAir S.r.l. - Brescia (Italy)

<table>
<thead>
<tr>
<th>Product</th>
<th>Power Range</th>
<th>TV Broadcast</th>
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</tr>
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<tbody>
<tr>
<td>UAXT/VAXT</td>
<td>Up to 150W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>UAXTE (UHF)</td>
<td>Up to 400W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VAXTE (VHF)</td>
<td>Up to 700W</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>ULX/VLX-OP Series</td>
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<tr>
<td>ULX/VLX-OP Series</td>
<td>Up to 44kW</td>
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</table>

## Digital TV Products – Virtual Event April 16/17th

- **Digital TV**: ✔
- **Analog TV**: ✗
- **Translators/SFN GF**: Partial
- **Supports ATSC 3.0**: ✔
- **Liquid-Cooled UHF**: ✔
- **Liquid-Cooled VHF**: ✗
USA MANUFACTURED TV PRODUCTS

Maxiva Air-Cooled (XTE / UAXTE / VAXTE)

- **100mW**
- **200W**
- **600W**
- **600W – 4.8kW**
- **Up to 19.2kW**

Maxiva™ XTE

Maxiva™ UAXTE-1P/2P/3P-C

Maxiva™ UAXTE-10/50/100/150/200

Maxiva™ UAXTE

Maxiva Liquid-Cooled (ULXTE)

- **1.2kW**
- **19.2kW**
- **56.4kW >>150kW**

Maxiva™ ULXTE

Maxiva™ UAXTE

Up to 8 racks (150kW)

Maxiva™ UAXTE-10/50/100/150/200

Maxiva™ VAXTE

Maxiva™ VAXTE-1P/2P

Maxiva™ VAXTE-100

Maxiva™ VAX I E-100

100mW

400W

800W (DAB 1kW)

6.4kW

12.8kW

25.6kW/30kW

Maxiva™ XTE

Maxiva™ VAXTE

Maxiva™ XTE
MAXIVA XTE EXCITER

5th Generation Digital TV Exciter
## 5 GENERATIONS OF DTV EXCITERS

<table>
<thead>
<tr>
<th></th>
<th>CD-1</th>
<th>CD-1A</th>
<th>Apex</th>
<th>Apex M2X</th>
<th>Maxiva XTE</th>
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<tbody>
<tr>
<td><strong>Manual Correction</strong></td>
<td>Linear Adaptive</td>
<td>Manual Non-Linear</td>
<td>Linear + Non-Linear Adaptive</td>
<td>Linear + Non-Linear Adaptive</td>
<td>Improved Linear + Non-Linear Adaptive</td>
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<tr>
<td><strong>RU</strong></td>
<td>4 RU</td>
<td>4 RU</td>
<td>3 RU</td>
<td>2 RU</td>
<td>1 RU</td>
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<tr>
<td><strong>First ATSC Exciter</strong></td>
<td>2nd generation</td>
<td>3rd Generation</td>
<td>4th Generation</td>
<td>5th Generation</td>
<td></td>
</tr>
<tr>
<td><strong>S/W defined Modulation</strong></td>
<td>ATSC only</td>
<td>ATSC only, added ISDB-T</td>
<td>Most DTV modulations</td>
<td>Added ATSC-3.0</td>
<td></td>
</tr>
</tbody>
</table>

*All designed by Harris/GatesAir*

\( \frac{1}{4} \) the size, ~100x more processing power!
MAXIVA™ XTE EXCITER

- Basis of all USA GA TV & DAB Transmitters
- Compact 1RU, 19” size
- Flexibility of software-defined modulation
- Advanced digital signal processing power
- Dual-redundant Transport Stream inputs
- Seamless auto-switching with user-settable buffer length
- Supports TV digital modulations and DAB+
- Frequency agile – covers all TV/DAB bands
- Very fast turn-on time (< 35 seconds)
- Internal battery UPS (15 minutes for all low-level circuits)
The heart of the XTE Exciter - Modern architecture and devices:

- **Micro-Processor**
  - Freescale 1.0 GHz Quad ARM Cortex™ A9 core 2GB DDR3-1066
  - uSD Card Slot – 32GB

- **FPGA 1**
  - Xilinx: 254,200 6-input LUTs,
    - 508,400 Flip flops
      - 28,620Mb Block RAM
      - 1540 DSP Blocks
  - External Memory
    - 2 – 128Mx16 DDR3L
    - 2 – 1Mx18 SBSRAM

- **FPGA 2**
  - Xilinx Kintex7
  - External Memory
    - 2 – 128Mx16 DDR3L

Q: How many layers in this PCB?
A: 16 Layers
INSIDE THE XTE EXCITER

Power Supply Interface

Power Supply

Battery Control Module

Battery (located under PCB – front removal, on-air replaceable)

100mW Power Amp

Modulator

Space for larger Power Amp (future)

4 Fans (DC, front access, on-air replaceable)
AIR-COOLED TV TRANSMITTERS

USA Manufactured - Maxiva UAXTE / VAXTE Series
LOW POWER 2RU TRANSMITTERS

KEY FEATURES

- 2 RU Chassis, XTE exciter + PA
- Stand-alone UHF/VHF transmitter
- Exciter/driver for high power air-cooled systems
- Battery UPS for Exciter
- Supports all digital modulations
- High-efficiency 100, 200W (Doherty)

PRODUCTS

<table>
<thead>
<tr>
<th>Band</th>
<th>Models</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHF</td>
<td>UAXTE-10-C</td>
<td>16W</td>
</tr>
<tr>
<td>UHF</td>
<td>UAXTE-50-C</td>
<td>75W</td>
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<tr>
<td>UHF</td>
<td>UAXTE-100-C</td>
<td>150W</td>
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<tr>
<td>UHF</td>
<td>UAXTE-100HE-C</td>
<td>100W</td>
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<tr>
<td>UHF</td>
<td>UAXTE-200HE-C</td>
<td>200W</td>
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<tr>
<td>VHF</td>
<td>VAXTE-200HE-C</td>
<td>200W</td>
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</tbody>
</table>
INSIDE THE 2 RU TX

Cover off

50V PA Power Supply

Exciter Power Supply + Battery

Front Ethernet RJ45

LCD

Power Amp

DC Fans

Air Intake

Major Sub-Assemblies

50V PA Power Supply

Exciter Power Supply

XTE Modulator Board

PA Assembly
LOW POWER 4RU TRANSMITTER

KEY FEATURES

• Rackmount 4 RU Chassis with XTE exciter + PA
• Stand-alone UHF/VHF transmitter
• Supports all digital modulations
• High-efficiency Doherty PA
• Battery UPS for Exciter section
• 1+1 Power Supply (option)

PRODUCTS

<table>
<thead>
<tr>
<th>Band</th>
<th>Models</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHF</td>
<td>UAXTE-1P-C</td>
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<tr>
<td>UHF</td>
<td>UAXTE-2P-C</td>
<td>400W</td>
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<tr>
<td>UHF</td>
<td>UAXTE-3P-C</td>
<td>600W</td>
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<td>VHF BIII</td>
<td>VAXTE-1P-C</td>
<td>400W</td>
</tr>
<tr>
<td>VHF BIII</td>
<td>VAXTE-2P-C</td>
<td>800W</td>
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</table>
HIGH POWER AIR-COOLED TRANSMITTERS - UAXTE

KEY FEATURES
• UHF: 600W to 4.8kW per Rack
• VHF Band III: 800W to 6.4kW per Rack
• VHF Band I: 1.25kW to 10kW per rack
• High-efficiency using Doherty PA's
• Same Power Supplies as liquid-cooled

PRODUCTS

<table>
<thead>
<tr>
<th>Band</th>
<th>Models</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHF</td>
<td>UAXTE-1</td>
<td>600W</td>
</tr>
<tr>
<td>UHF</td>
<td>UAXTE-2</td>
<td>1.2kW</td>
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<tr>
<td>UHF</td>
<td>UAXTE-8</td>
<td>4.8kW</td>
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<tr>
<td>UHF</td>
<td>Up to UAXTE-32</td>
<td>19.2kW</td>
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<tr>
<td>VHF BIII</td>
<td>VAXTE-1</td>
<td>800W</td>
</tr>
<tr>
<td>VHF BIII</td>
<td>VAXTE-2</td>
<td>1.6kW</td>
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<tr>
<td>VHF BIII</td>
<td>Up to VAXTE-32</td>
<td>25.6kW</td>
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<tr>
<td>VHF BI</td>
<td>VAXTE-1L</td>
<td>1.25kW</td>
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<tr>
<td>VHF BI</td>
<td>Up to VAXTE-24L</td>
<td>30kW</td>
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</table>
### AIR-COOLED MODEL SUMMARY

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Pre-Filter (W)</th>
<th>Model</th>
<th>Power Pre-Filter (W)</th>
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<th>Power Pre-Filter (W)</th>
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<td>VAXTE-10-C</td>
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<td>VAXTE-10L</td>
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<td>UAXTE-50-C</td>
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<tr>
<td>UAXTE-200HE</td>
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<td>UAXTE-1P-C</td>
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<td>VAXTE-1P-C</td>
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<tr>
<td>UAXTE-2P-C</td>
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<td>VAXTE-1</td>
<td>800</td>
<td>VAXTE-1L</td>
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<td>VAXTE-32</td>
<td>25,600</td>
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</tbody>
</table>
LIQUID-COOLED UHF TRANSMITTERS

Maxiva ULX Series
HIGH POWER TRANSMITTERS - ULXTE

KEY FEATURES

- 1.4kW to 150kW Liquid-cooled PA’s, power combiners and dividers
- Supports all digital modulations
- UHF High-efficiency using Doherty PA’s

PRODUCTS

<table>
<thead>
<tr>
<th>Band</th>
<th>Models</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHF</td>
<td>ULXTE-2</td>
<td>1.4kW</td>
</tr>
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<td>2.8kW</td>
</tr>
<tr>
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<td>ULXTE-6</td>
<td>4.3kW</td>
</tr>
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<td>8.5kW</td>
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<td>UHF</td>
<td>ULXTE-16</td>
<td>10.8kW</td>
</tr>
<tr>
<td>UHF</td>
<td>ULXTE-150</td>
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<tr>
<td>UHF</td>
<td>ULXTED-240</td>
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</tbody>
</table>
ULXTE MODELS

- Models available for a wide range of power levels:
  - 1 rack to 5 racks
  - 2 PA’s to 150 PA’s
  - Single tx: 1.4kW to 92kW
  - Dual transmitters to 150kW

<table>
<thead>
<tr>
<th>Maxiva ULXTE Model</th>
<th>Number of PAs</th>
<th>Number of Power Blocks</th>
<th>Total Number of Racks</th>
<th>Pre-Filter Average Power (Watts) Type E PAs</th>
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<tbody>
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<td>92,800</td>
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<td>160</td>
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<td>15</td>
<td>100,300</td>
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<td>ULXTE-180</td>
<td>180</td>
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<td>112,900</td>
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<tr>
<td>ULXTE-240</td>
<td>240</td>
<td></td>
<td>17</td>
<td>150,200</td>
</tr>
</tbody>
</table>
• Location: Charlotte, NC
• Tx Power rating 75.1kW (ATSC-1.0 and ATSC 3.0)
• On-air at 67kW (customer TPO)
• Model: Maxiva ULXTE-120
• 4 Racks, 120 PA’s, 120 PA Power Supplies
ULXTE-120 INSTALL

Photo’s taken during the install
LIQUID-COOLED VHF TRANSMITTERS

Maxiva VLX-OP Series
MAXIVA VLX-OP SERIES

KEY FEATURES

- 1.8kW to 43kW Liquid-Cooled VHF
- High-efficiency ≥ 40% (inc. cooling)
- Integrated dual pumps in rack
- Compact external heat exchanger, 24V DC power
- Automatic coolant refilling, reduces on-site maintenance
- Each PA has 100% Power Supply Redundancy
- ATSC 1.0 (with 3.0 upgrade path), DVB-T, DVB-T2, ISDB-T & Analog supported
- DAB/DAB+ also supported

PRODUCTS

<table>
<thead>
<tr>
<th>Band ** Models</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHF BIII VLX-OP-1800-R36</td>
<td>1.8kW</td>
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<tr>
<td>VHF BIII VLX-OP-3600-R36</td>
<td>3.6kW</td>
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<td>VHF BIII VLX-OP-5400-R36</td>
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<tr>
<td>VHF BIII VLX-OP-7200-R36</td>
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<td>VHF BIII VLX-OP-10800-R42</td>
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<td>VHF BIII VLX-OP-14400-R42</td>
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<td>VHF BIII VLX-OP-28800-R42</td>
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<td>36kW</td>
</tr>
<tr>
<td>VHF BIII VLX-OP-43200-R42</td>
<td>43.2kW</td>
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</tbody>
</table>

** Band I (Low Band) also available
PA POWER SUPPLY REDUNDANCY

- Same Power supply as USA FAX/FLX:
  - GE Power CP2725 (2.725kW)
  - 450,000 hrs. MTBF
  - > 96% efficient
- Hot-swap, front access

2 of 3 High Redundancy Power Supply System

Liquid-cooled PA module with front cover removed
VLX-OP HEAT EXCHANGERS

Fans 24V DC
Speed-controlled
Programmable
auto-reversing to
clear debris

61 cm W x 80 cm H x 26 cm D
(24” W x 31.5” H x 10.2” D)

72 cm W x 96 cm H x 27 cm D
(28.3” W x 37.8” H x 10.6” D)
VLX-OP LIQUID-COOLING SYSTEM

Lower part of liquid-cooled Tx Rack

Automatic Liquid Refilling System (8 litres capacity)
## VLX-OP LIQUID-COOLED (BAND III MODELS)

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<thead>
<tr>
<th>Model Digital</th>
<th>Model Analog</th>
<th>Power OFDM-TV</th>
<th>Power DAB</th>
<th>Power ATSC-1</th>
<th>Power Analog</th>
<th># PA's</th>
<th># Internal Pumps</th>
<th># Heat Exchangers</th>
<th>Rack Info</th>
<th>RF Output Connector</th>
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<tr>
<td>VLX-OP-1800-R36</td>
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</tbody>
</table>
INTUITIVE GUI AND ENHANCED SECURITY
REMOTE GUI SCREENS

Captured April 3rd remotely:
Quincy Lab unit – UAXTE-100-C

Captured April 3rd remotely:
Brescia (Italy) Lab unit – UAXT-150-UC
REMOTE GUI SCREENS

Captured April 3rd remotely:
Quincy Lab unit – UAXTE-100-C

Captured April 3rd remotely:
Brescia (Italy) Lab unit – UAXT-150-UC
REMOTE GUI SCREENS

Captured April 3rd remotely:
Quincy Lab unit – UAXTE-100-C

Captured April 3rd remotely:
Brescia (Italy) Lab unit – UAXT-150-UC
ULXTE-20
Metering Screen
PA 1

Note the ability to drill down to individual pallets:
- On/Off
- Voltage
- RF device currents
- Pallet temperature
- On this Tx that’s 60 pallets
REMOTE GUI SCREENS

Header auto-fits mobile tablet and phone devices

Android Tablet

iPhone 8
1. **E-mail with encrypted security features**
   - Transmitters will have the ability to send an e-mail to up to 5 addresses, when a fault and/or warning occurs. Encryption can be enabled/disabled. In addition, a fault log can be optionally attached.

2. **Access Control List**
   - Customers can limit who can access the transmitter management interfaces. The user adds the IP address and subnet mask of systems allowed to access the transmitter in the IP access table. Using the subnet mask, you can open it to every computer on a particular subnet, or limit it to single computer using a 255.255.255.255 subnet mask.

   - For those customers using LDAP on their network, we’ve added a LDAP client. If LDAP is enabled on the transmitter, login credentials are first sent to the configured LDAP server to be validated before allowing access to changing system parameters. If the LDAP server can’t be reached, the credentials are checked against the local user accounts and access is allowed if they match.
4. Secure Web GUI
   • A customer can now select if they want a secure web GUI. On our Linux based products, it’s a typical https (Hypertext Transfer Protocol Secure) connection. All data and commands flow through the https connection.

5. Secure Websockets
   • On some products with less processing power, we are using a technology called “Secure Websockets”. All commands and configuration data are passed through the encrypted socket. Non-critical data such as meter information are passed as before using unencrypted sockets.
INTEGRATED SATELLITE RECEIVER
• Satellite distribution of TV programming is popular in many regions (DTH and Networks)
• DVB-S and later DVB-S2 used
• Today more demand for HEVC, UHD-TV and much higher throughput
• 51% efficiency gain with DVB-S2X achieved
• VL SNR MODCOD’s added to improve operation in poor SNR:
  • Operates with signal-to-noise ratio values as low as -10dB
DVB-S2X adds:

- More granularity of modulation and coding modes (116 MODCOD’s)
- Smaller filter roll-off options of 5%, 10%, 20%, and 35%
- New constellation options for linear and non-linear channels
- Channel Bonding up to 3 channels
- More scrambling options
- Very low SNR operation supporting C/N of down to -10dB
- Super Frame option

Efficiency versus C/Nref (noise integrated over Rs x (1+roll-off))

Spectral Efficiency [bps/Hz] including roll-off overhead

Increased SNR

Finer Granularity

Higher Efficiency

Extended SNR

Unconstrained Shannon limit

C/Nref [dB]

51%

DVB-S2X (RO = 5%)

DVB-S2 (RO = 20%)

2014

2005

GATESAIR DVB-S2X RECEIVER

Key Components

AV2018
Integrated silicon tuner for DVB-S2/S2X standard

Si2181-A5
DVB-S2/S2X Demod

Si218X

SiLICON LABS

Si2181-A5
DVB-S2/S2X Demod

Si218X

SiLICON LABS

XC6SLX Series FPGA

XILINX

XC6SLX Series FPGA

SDRAM - DDR3 1Gb (64M x 16) Parallel

winbond

H2+
Quad Core Cortex A7 CPU / Decoder

Allwinner Technology
DVB-S2/S2X RECEIVER SUMMARY SPECS

- Integrated DVB-S2-S2X tuner/demodulator with single input. (ETSI EN302 307-2 V1.1.1) - QPSK/8PSK, 8/16/32APSK.
- Decoding of single (MPEG-2/H.264/H.265) service
- CVBS* output (HD services must be appropriately scaled to SD, VBI signal management if present) for Analog Transmitter

- Analog output with audio PID selection (audio 1, audio 2) and level output adjustment
- CAM support & management
- OTA management (for updating FW and for receiving specific commands that modify some parameters of the receiver)

150W Transmitter with Satellite Receiver option

DVB S2/S2X Receiver 2 x ASI / 2 x GBE Card

Sat In CAM Slot ASI Out

*CVBS= Composite Video Baseband Signal
INTEGRATED IP CONTENT DISTRIBUTION
Why is TS over IP and Native IP Transport a good thing for Broadcasters?

- Very cost-effective compared to traditional distribution methods, wire, fiber, microwave
- High bandwidth available to handle all needs
- Low-latency
- Robust using modern error correction techniques
- Good for point to point and point to multipoint distribution
- Can be made secure - VPN
- Adds flexibility and scalability
SMPTE 2022 comprises 7 standards

For Broadcast OTA Television, the first two are the most critical:

- **ST 2022-1:2007** - Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks
- **ST 2022-2:2007** - Unidirectional Transport of Constant Bit Rate MPEG-2 Transport Streams on IP Networks
- **ST 2022-3:2010** - Unidirectional Transport of Variable Bit Rate MPEG-2 Transport Streams on IP Networks
- **ST 2022-4:2011** - Unidirectional Transport of Non-Piecewise Constant Variable Bit Rate MPEG-2 Streams on IP Networks
- **ST 2022-5:2013** - Forward Error Correction for Transport of High Bit Rate Media Signals over IP Networks (HBRMT)
- **ST 2022-6:2012** - Transport of High Bit Rate Media Signals over IP Networks (HBRMT)
- **ST 2022-7:2013** - Seamless Protection Switching of SMPTE ST 2022 IP Datagrams

SMPTE 2022 is an important technology enabling the transition of broadcast systems to IP networking.[2]
202-1 “Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks”

2022-2 “Unidirectional Transport of Constant Bit Rate MPEG-2 Transport Streams on IP Networks”

- MPEG-2 TS adaptation to IP / Ethernet networks
- Support for CBR, MPEG-2, H.264 & J2K Coded Video, with Audio and ancillary data
- Focused at low and mid bit rate contribution applications
- Robust configurable 2D FEC - well-suited for short duration outages
- Both of these standards are implemented into current GatesAir TV transmitter products

Burst losses handled by column FEC stream

Random losses handled by Row FEC stream
**GA TV PRODUCTS WITH IP INPUTS**

- **Maxiva XTE Exciter**
  - Used in all UAXTE, ULXTE, VAXTE transmitter systems
  - XTE incorporates two redundant IP Transport Inputs
  - Each input can be used for:
    - **TSoIP** (or ASI over IP) - Encapsulates the native Transport Stream into IP packets.
    - **Native IP** – ATSC 3.0 is based on a native IP transport layer and utilizes the DASH delivery protocol for OTA channels. DASH allows broadcasters to feed both the broadcast OTA delivery chain using ROUTE (Real-time Object delivery over Unidirectional Transport) for transmission over an IP network, and the OTT delivery chain using the HTTP adaptive streaming format

- **Maxiva UltraCompact Series**
  - Used in UltraCompact, UAX-OP, VAX-OP, UAX-OP and ULX-OP Transmitter systems
  - XTE incorporates two redundant IP Transport Inputs
  - Each input can be used for:
    - **TSoIP / a.k.a. GBE** (or ASI over IP) - Encapsulates the native Transport Stream into IP packets.
GA TV PRODUCTS WITH IP INPUTS

XTE Exciter (Rear)

UltraCompact Exciter/Driver

DTI-IP1
DTI-IP2

GBE 1
GBE 2
GUI SCREENS FROM UAXT-150 TRANSMITTER
THANKS FOR WATCHING QUESTIONS?

More Upcoming Virtual Events: https://go.gatesair.com/virtual-events.html

Martyn Horspool
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martyn.horspool@gatesair.com