AVQ1030
ActiveCore®
On-Channel Repeater/Gap-Filler

One of the major obstacles in today’s broadcasting is the presence of echoes resulting from two processes:

* Main signal multi-path propagation;
* Energy leakage from the output of a repeater to its input, or so-called feedback interference.

Avateq’s AVQ1030 On-channel repeater (Gap-filler) is a robust adaptive echo and feedback interference cancellation engine that can be used as a stand-alone unit or integrated into clients’ transmitting systems. High performance adaptive engine of the on-channel repeater effectively detects and removes both echoes at the repeater’s input, providing a “clean” signal at the repeater’s output. In the context where broadcasters are more and more concerned about reducing their network OPEX costs and, at the same time, limiting impact on the environment, it becomes important to increase the broadcasting coverage area without installing additional expensive high-power digital transmitters in the “shadowed” areas.

The unit is targeted to building high performance interference cancellation systems (ICS) for digital broadcasting industry.

Features:

- High performance adaptive echo and feedback canceller with improved MER capabilities;
- Supports all major digital broadcasting video and audio standards - DVB-T/H/T2, ATSC, ISDB-T, CMMB, DTMB, DAB, DRM+, RAVIS, etc.;
- Uses innovative signal processing technique for main signal restoration;
- Multi-path echo removal;
- Adjustable echo cancelling window position;
- Integrated adaptive non-linear and linear digital predistorter (DPD) with PAR reduction;
- Integrated signal envelope tracking capabilities for HPA transistor drain control;
- Signal quality (MER, SNR) and modulated RF layer monitoring capabilities;
- Supports proprietary modulation schemes used in hybrid “satellite-terrestrial” digital broadcasting;
- Modular design.
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Technical specification:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Main signal input RFin:</td>
<td>-50.0 dBm; 470.862 MHz* 50 Ohm SMA</td>
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<tr>
<td>Feedback signal input RFbd:</td>
<td>-35.0 dBm; 470.862 MHz* 50 Ohm SMA</td>
</tr>
<tr>
<td>Main output RFout:</td>
<td>-32.0 dBm; 470.862 MHz* 50 Ohm SMA</td>
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<tr>
<td>Monitor output RFmon:</td>
<td>-52..20 dBm; 470..862 MHz* 50 Ohm SMA</td>
</tr>
<tr>
<td>Frequency reference:</td>
<td>10 MHz; 1 Vp-p, Sine (SMA)</td>
</tr>
<tr>
<td>Time reference:</td>
<td>1 PPS; +3.3 V, 10 µs, Pulse (SMA)</td>
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<tr>
<td>Supported signal bandwidth:</td>
<td>1.5..10 MHz</td>
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<tr>
<td>Feedback interference (Gain Margin):</td>
<td>up to 30 dB (max) above main signal</td>
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<tr>
<td>Feedback interference cancellation:</td>
<td>≥ 40 dB</td>
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<tr>
<td>Processing delay:</td>
<td>≥ 10 µsec with additional shaping filter “On”</td>
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</table>
| Envelope tracking output:            | user defined multi-dimensional shaping capability
| MER degradation with DPD and         | 1 dB @ 45 dB MER at the unit input
| feedback canceller “Off”:           | - linear; - non-linear; - PAR reduction
| Interfaces:                          | a) hardware: Ethernet, USB, CAN, PCIe, RS232
|                                      | b) software: WEB GUI, host based GUI (PC GUI), SNMP, simplified machine-to-machine protocol
| Power supply:                        | 5A@12V DC (OEM module)
|                                      | 110-250V, 50/60Hz AC (1U unit)                                        |
| Operating temperature range:         | 0..50, °C                                                            |
| RF Layer Monitoring (optional):      | - Channel bandwidth; - Constellation; - Spectrum; - MER/SNR; - Distortions; (MER, RMS, PAR, Peak compression, CCDF).

Application Block-Diagram:

Ordering Information

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVQ1010-SAU</td>
<td>ActiveCore® On-Channel Repeater / Gap-Filler (stand-alone 1U unit)</td>
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<tr>
<td>AVQ1010-OEM</td>
<td>ActiveCore® On-Channel Repeater / Gap-Filler (OEM module)</td>
</tr>
<tr>
<td>AVQ1010-PCI</td>
<td>ActiveCore® On-Channel Repeater / Gap-Filler (standard PCIe card)</td>
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Applications:

- SFN compliant on-channel repeater/gap filler with extended functionality;
- Bandwidth compression unit for full-duplex transmission links;
- Central processing core for interference cancellation systems.

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