Exciter SV700

Digital TV standard ATSC for Transmitter Family Nx700x

Upgradable to all standards thanks to modular design

Due to their modularity and appropriate interfaces, the exciters for the individual standards differ only by the encoder used. In addition to the new ATSC encoder, the exciter comprises the following tried-and-tested components:

- Digital equalizer
- I/Q modulator
- Synthesizer
- Central control unit (CCU) with control panel
- Motherboard and power supply

Coding and modulation by the ATSC encoder

FIG 1 shows the block diagram of the exciter. All functions of the ATSC encoder are in line with the ATSC DOC A/53 standard. Important components of the ATSC encoder have been taken from the successful TV Test Transmitter SFQ [3], which many manufacturers of electronic consumer goods use for testing ATSC receivers.

The input interface includes two inputs for MPEG2 transport streams with a packet length of 188 bytes. The inputs can be configured independently of each other.

- Asynchronous serial interface (ASI) to EN50083-9 (1999) with a variable data rate of up to 19.392658 Mbit/s
- Synchronous serial interface to SMPTE310M with a constant data rate of 19.392658 Mbit/s

If the signal at the connected input fails, the active standby input is automatically switched into operation. If the transport stream fails at both inputs, a pseudo random bit sequence (PRBS) with frame is generated instead. This ensures that the receivers can synchronize at any time.

The parallel data stream from the input interface is processed in the ATSC coder/modulator. Several functional units ensure a constant power density in the spectrum, perform inner and outer error correction coding, and...
modulate the signal according to the 8VSB mode. For details on the ATSC coder/modulator refer to [3].

A subsequent digital filter carries out vestigial sideband (VSB) filtering and Hilbert transform. The signal is band-limited to 6 MHz with the aid of the specified roll-off characteristic and is available at the filter output as an inphase and quadrature signal.

**Optimum precorrection under the most adverse conditions**

Because of the narrow channel spacing and the adjacent analog and digital channels, channel combiners with extremely steep edges must be used at the transmitter outputs. These combiners cause a ripple in the frequency response and considerable group-delay differences in the channel.

To achieve optimum correction in the transmitter system even under such adverse conditions, the ATSC encoder offers further resources in addition to those of the digital equalizer. The digital filter for VSB filtering is also used for linearizing the frequency response. Another digital filter module is provided for group-delay precorrection.

**An investment for the future**

Since changeover between the different transmission standards is straightforward and requires little effort, the TV Transmitter Family Nx700x is ideal for NTSC radio broadcasting networks that have to be adapted to ATSC or DVB-T in the future.

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**REFERENCES**


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**Condensed data of ATSC Exciter SV700**

- **Frequency range**: 174 MHz to 240 MHz, 470 MHz to 860 MHz
- **Data inputs**: 2, can be separately configured as ASI or SMPTE310M input
- **Input signal**: MPEG2 transport stream with max. 19.392658 Mbit/s and a packet length of 188 bytes
- **Modulation mode**: 8VSB
- **Channel bandwidth**: 6 MHz
- **S/N ratio**: >35 dB
- **Shoulder distance**: >50 dB
- **Ripple of frequency response**: <0.2 dB
- **Group delay differences**: <10 ns
- **Output level**: 13 dBm rms

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**FIG 2** The transmitter is controlled via the user interface in the control panel of the Exciter SV700 or from an external PC

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*More information and data sheet at www.rohde-schwarz.com. (search words: NH7000/7001 or NV7000/7001)*