

Reinventing
Telemetry™

QUASONIX

Adopted by the
Range Commander's
Council, IRIG 106-17,
Appendix 2-D

LOW DENSITY PARITY CHECK (LDPC) ERROR CORRECTION SYSTEM



RDMS™ Rack Mount Receivers



Side by Side Dual TIMTER™



TIMTER™



nanoTX™

The Low Density Parity Check (LDPC) Forward Error Correction mode is a *breakthrough* addition to Quasonix transmitters and receivers.

- **Improves Link Margin by 8.8 to 9.4 dB at BER = 1e-5**
Link margin improvement is equivalent to nearly tripling the operating distance on your telemetry link

- **Adaptive Decoder**

Decoding performance is within 0.2 dB of theory

Iterative decoding is optimized to fully utilize available time, improving coding gain even further as the bit rate is reduced

- **Fully Integrated Forward Error Correction System**

Transmitter automatically synthesizes expanded over-the-air bit rate for encoded blocks and receiver seamlessly converts back to continuous output at the user bit rate

Operation is completely transparent to data devices

- **Robust Synchronization**

Reliable synchronization achieved as low as -4 dB E_b/N_0

- **Uses Spectrally Efficient SOQPSK Modulation**

Even with the LDPC coding overhead, bandwidth can be 22% —or even 34%—less than PCM/FM at the same payload bit rate; Payload bit rates up to 35 Mbps are supported

- **Simple ON / OFF Control**

Allows transmitter/receiver operation with or without correction

- **Tested on Several DoD Ranges**

Already own Quasonix equipment?

The LDPC mode can be retrofitted to most Quasonix transmitters and receivers. Contact Quasonix for details.

ISO 9001:2015 Certified

All
Quasonix
Products
are under U.S.
Dept. of Commerce
jurisdiction,
not covered by ITAR

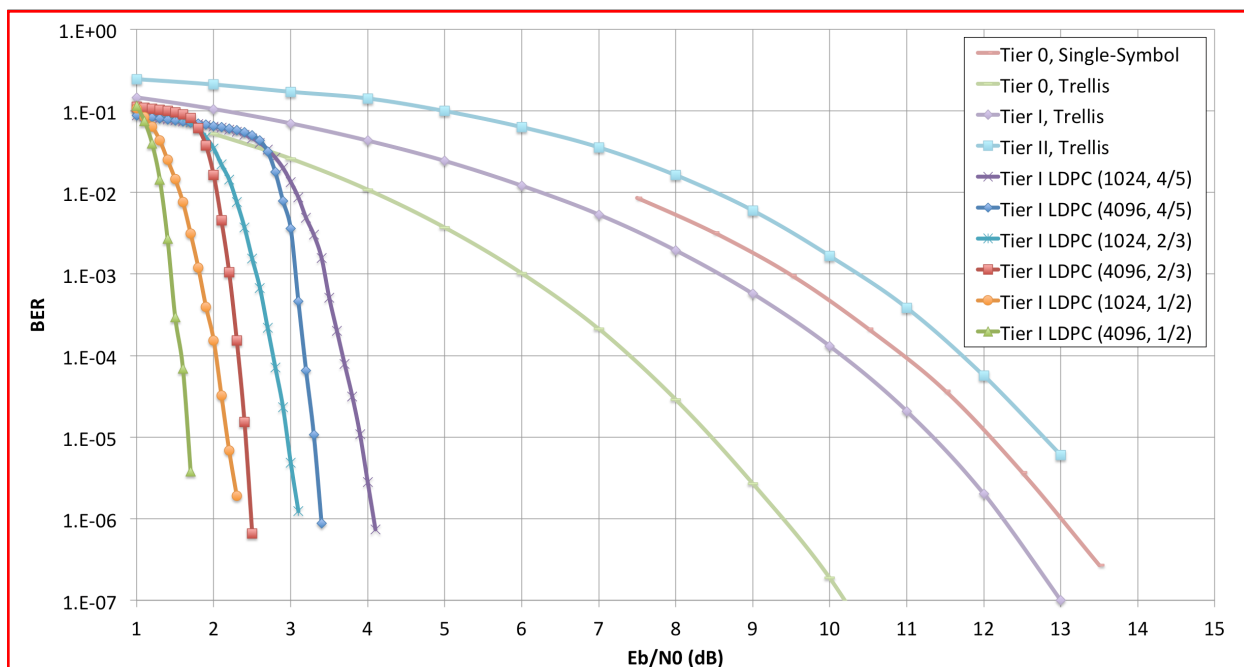
www.quasonix.com

QSX-CATALOG-180201

LDPC FORWARD ERROR CORRECTION PERFORMANCE

Performance Overview

Quasonix is the only vendor in the market offering LDPC encoding and decoding for serial streaming telemetry. This approach yields nearly triple the communications range, yet it can do so with 22%, or even 34%, less bandwidth than conventional PCM/FM.



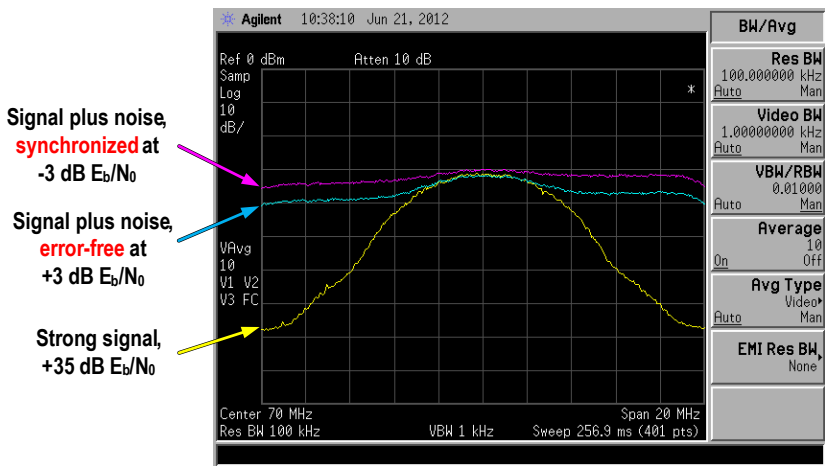
The IRIG standard calls out six variants of LDPC codes—all combinations of two different information block sizes ($k=4096$ bits and $k=1024$ bits) and three different code rates ($r=1/2$, $r=2/3$, and $r=4/5$). The larger block size offers better decoding performance in a static channel, but may work less well in a dynamic channel with fast fading or other impairments. Lower code rates also provide better decoding performance at the cost of increased occupied bandwidth.

Quasonix 3rd Generation RDMS™ Receivers offer all six block sizes/code rates. Contact Quasonix for transmitter offerings.

Synchronization Threshold

The best coding gain in the world won't help if the telemetry link cannot maintain synchronization through extremely deep fades. Only Quasonix can consistently show synchronization at negative E_b/N_0 values, and the LDPC subsystem is no exception. The ability to preserve bit count integrity at E_b/N_0 as low as -6 dB allows the user's crypto devices to stay synchronized under the most severe fading conditions, thereby eliminating the long data outages that occur when the crypto devices lose sync.

Not only does the LDPC subsystem maintain synchronization under highly adverse link conditions, but under worst-case link conditions the re-synchronization penalty is at most one LDPC code block.



Receiver IF Output During 7 Mb/s $k=4096$, $r=2/3$ LDPC Operation