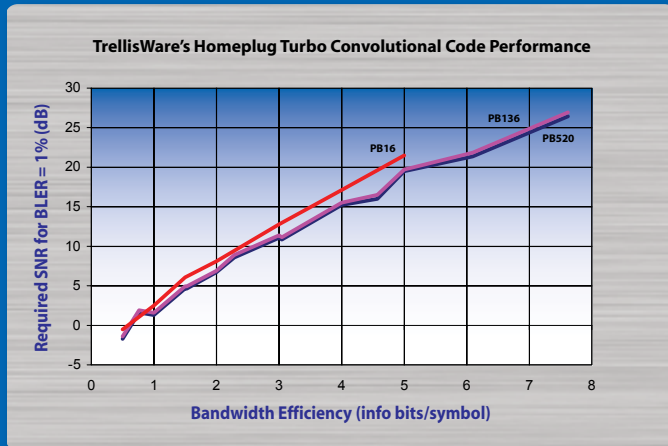


HomePlug AV TCC Encoder and Decoder Cores



TrellisWare[®]
TECHNOLOGIES

HomePlug is the specification for a technology that connects devices to each other through the power lines in a home. HomePlug products provide a simple solution for consumers interested in networking their home without adding any new wires. HomePlug AV is the exciting next generation of powerline technology, and is built from the ground up to support entertainment applications, such as HDTV and Home Theater.



Transmitting data at more than 100 Mbps over home power lines is extraordinarily challenging. Therefore powerful forward error correction (FEC) technology is required. Turbo convolutional codes were selected as the best FEC technology to meet the requirements of HomePlug AV. However, TCCs have significant decoder complexity and high encoder and decoder latency. TrellisWare addresses these issues by drawing on our many years of TCC design experience to produce HomePlug AV TCC cores with minimal complexity and latency.

TrellisWare's HomePlug AV TCC encoder and decoder cores have been successfully synthesized and integrated into existing 0.13 μm HomePlug AV devices. The decoder achieves 135 Mbps throughput at 4 iterations with a 150 MHz clock – higher throughputs are easily achieved with less iterations or a higher clock frequency. Encoder and decoder latency has been minimized, with particular attention paid to the encoder – it has only 4181 cycles of latency (last input bit to first output symbol). Plus, the encoder latency can be halved by disabling tail-biting. The total synthesized area of the encoder and decoder cores using the UMC L130 library, including all memories, is 2.3 mm^2 .

TrellisWare has developed low-latency, low-complexity HomePlug AV compliant Turbo Convolutional Code (TCC) encoder and decoder ASIC cores. These cores are proven in existing HomePlug AV devices and are available for immediate integration into new systems.

Key Features

- Supports PB16, PB136, and PB520 frame sizes
 - Supports rate 1/2 and rate 16/21 code rates
 - Includes channel interleaver and deinterleaver
 - Tail-biting can be disabled to halve encoder latency
 - Single clock domain
 - Successfully synthesized at 150 MHz with UMC L130 library (faster clock is certainly possible)
 - FPGA cores also available
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- Programmable number of decoder iterations
 - Decoder latency of 574 cycles per sub-iteration (PB520)
 - Decoder complexity of 122 Kgates, with 162 Kbits of memory
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- Encoder and decoder programmable on the fly
 - Encoder throughput of 300 Mbps (150 MHz clock)
 - Decoder throughput of 135 Mbps (4 iterations, 150 MHz clock)
 - Encoder latency of 4181 cycles (PB520)
 - Encoder complexity of 13 Kgates, with 30 Kbits of memory

Availability

TrellisWare's HomePlug AV TCC encoder and decoder are available as both ASIC and FPGA cores for immediate integration. For further information please email: info@trellisware.com

About TrellisWare Technologies

TrellisWare Technologies, Inc. is a privately-held communications IP and products company headquartered in San Diego. Self funded since its incorporation in April 2000, TrellisWare has built a reputation as a leader in advanced communication algorithms, waveforms and turnkey communication systems that work when nothing else does. TrellisWare has developed a wide range of highly-advanced Forward Error Correction (FEC) algorithms and software defined radio (SDR) waveforms used in many military and commercial communication products. With deep expertise in radio physical layer design, networking, efficient high speed decoding, algorithm development and RF integration, TrellisWare is also developing a unique family of communication products capable of operating in the harshest RF environments.

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