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Guzik RWA-1601 + PRML

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200 Mbit/s Digital Channel Analyzer

- **RWA-1601 Plus PRML**
- **Maximum 200Mbits/sec Data Rate**
- **Non Linear Transition Shift (NLTS)**
- **Optional Signal Equalization Module**
- **Sample Value Distributions**
- **Fast Margin-Type Prediction of Error Rate for PRML Channel output**
- Features
- Specifications

The **Guzik RWA-1601+ (Digital Channel Analyzer)** provides the capabilities of Guzik RWA-1601 plus ***PRML*** (Partial Response Maximum Likelihood) channel evaluation. PRML channel testing can be customized to use any PRML channel chip. Analog signals are digitized and digitally processed by the hardware with clock recovery.

In addition to the standard tests performed with the Peak Detector channels, several new tests have been added in order to evaluate and optimize the PRML channel. These tests consist of Adaptive Equalization with an analog equalizer, NLTS measurement nts, Histograms of Sample Distribution Values to control the quality of Partial Response (PR), direct measurement of Bit Error Rate, estimation of Error Rate***,** adaptive Precompensation, etc.

Non Linear Transition Shift distorts the shape and position of the readback waverform, especially in high density magnetic recording. Several diverse methods to measure NLTS have been proposed. The RWA-1601+ supports all of these methods. NLTS can be estimated by 5th harmonic, pseudo-random sequence autocorrelation, and comparing linear superposition of pulses with a measured dibit.

Also, the RWA-1601+ provides a fast margin-type estimation of error rate from the output of PRML channels by several methods. Error rate estimations, with correlated and uncorrelated noise, are based on predictive performance of maximum likelihood detect Different PRML channel chips can be integrated for testing using the Chip Adapter board with maximum data rate of 200 Mbits/second.

The WITE (Windows Integrated Test Environment) software package allows the user to capture Sampled Value Distributions and Eye diagrams generated from the sampled data, along with all the standard Peak Detector and PRML channel tests.

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1601 + PRML Features

- Up to 200 Mbit/s data rates.
- PRML Chip Adapters.
- Programmable write data Precompensation of individual bits with 20 ps resolution.
- Optional Analog Signal Equalizer (130MHz BW)
- Histogram of Sample Distributions.
- Eye Diagram Plot.
- Programmable pattern generator with random pattern length up to 32 Kbytes and hierarchical pattern structure.
- DSP Processor Array(240 MIPS).
- Non-Linear Transition Shift Measurements
    - 5th Harmonic Measurement.
    - Pseudo-Random pattern autocorrelation .
    - Pulse Shape Best Fit.
- Direct Bit Error Rate Measurement
- Error Rate Estimation.
- Direct Access to Sampled Data in 2 Megabyte Memory.
- Optional 2 Gigasample/sec Asynchronous ADC.
- Optional High Speed Pattern Generator (320 Mflux/sec).

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Analog Channel 961

Analog Channel Technical Specifications:

Bandwidth: 0.1 to at least 250 MHz at -3 dB

Flatness: 0.1 to 100 MHz at ± 0.2 dB

Programmable Attenuator: 36 dB in 2 dB steps

Filters: 3 low pass (custom cutoff frequencies up to 160 MHz 8 overwrite from .5 to 20 MHz high/band pass filters available for measuring Popcorn

Write Current: Programmable 0 to 80mA in 0.02mA steps

MR Read Bias: Programmable -20 to 20mA in 0.01mA steps

Differentiators: Two plug-in positions for custom modules up to 160 Mflux/s. 5 modules shipped standard for data ranges from 5 to 160 Mflux/s

Programmable Equalizer:

Bandwidth: 0.1 to at least 130 MHz at -3 dB

Flatness: 0.1 to 100 MHz at ± 0.2 dB

Control: 12 tap 12 bit resolution

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1601 + PRML Chip Adapter

1601+PRML Overview **1601+PRML Specification** **Products**

Currently Available PRML Chips:

SSI 4901

SSI 4910

Additional PRML chips can be integrated upon request.

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1601 + PRML Write channel

Frequency Synthesizer: Up to 320 MHz with 0.01% resolution

Pattern Generator: Any user specified data pattern up to a maximum of 32 KBytes of encoded data and hierarchical pattern structure.

Precompensation: Individual Bit precompensation with resolution 20 ps

Jitter: 20ps RMS

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1601 + PRML Digital Test

Data Sampling: Up to 2 Gigasample/s

PRML Data Rate: Up to 200 Mbits/s

Memory Size: Up to 4Million PRML Sample

Error Rate Analyzer Data Rate:

Data Rate: Up to 320 Mbits/s, limited by channel chip used

Repeatability: To be determined

Accuracy: To be determined

Peak Data Separator: 5 MFlux/s to 160 MFlux/s

Window Centering: 100 ps or 1% of window

Bit Shift Analyzer:

Accuracy: better than 100 ps or 1% of window

Repeatability: better than 50 ps

Resolution: 20 ps

Jitter: 40 ps RMS

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1601 + PRML Parametric Measurement Accuracy

TAA: ± 1.5%

Modulation: ± 2.0%

SNR: ± 0.5 dB

Crest factor: ± 2.0%

Overwrite: ± 0.3 dB

Pulse width: ± 2.0%

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1601 + PRML Options

1601+PRML Overview 1601+PRML Specification Products

Analog Signal Equalizer

Pulse Shape Analyzer (PSA)

Digital Signal Processor Array (DSP)

ADC 2GHz

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1601 + PRML Physical Parameters

RWA-1601+PRML

Size	21.6" x 17.6" x 7.3"
Weight	30 lb.
Power	100/120 vac ± 10%, 50/60 Hz, 4.0 amps approximately 220/240 vac ± 10%, 50/60 Hz, 2.0 amps approximately

ANA-961

Size	19.0" x 17.6" x 3.3"
Weight	10 lb.
Power	Supplied from RWA

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