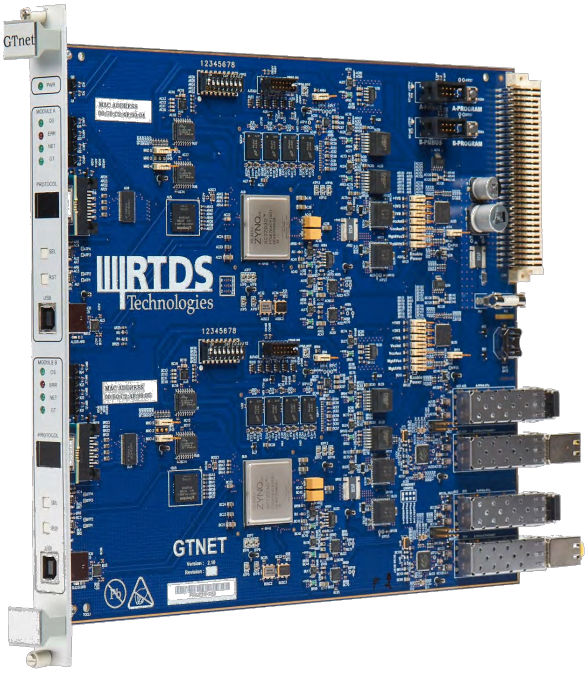
PRODUCT PROFILE

GTNET-PMU

The second generation Giga-Transceiver Network Communication Card, or GTNETx2, provides a real time communication link to and from the simulator via Ethernet. Different firmware versions are used with the GTNETx2 depending on the application. For applications related to phasor measurement units, the GTNET-PMU firmware is used.



Firmware Capabilities

The PMU firmware option for the GTNETx2 provides synchrophasor output data streams according to the IEEE C37.118 standard. Two PMU streaming options are available for GTNET-PMU.

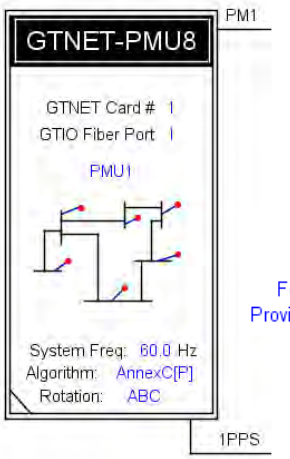
Using the first option, a single GTNET-PMU firmware can represent and provide output for up to eight (8) PMUs with symmetrical component information related to 3-phase sets of voltage and current using UDP or TCP connections. The reporting rate of each PMU can be set individually between 1 and 60 frames per second. Using this option, reporting rates as high as 240 frames per second are supported.

Using the second option, a single GTNET-PMU firmware can represent and provide output for up to twenty four (24) PMUs containing only positive sequence data. Frame rates up to the system frequency (50/60 Hz) are supported.

Both P and M class models (defined in Annex C of the IEEE C37.118 standard) for synchrophasor data output are available. CBuilder source code is provided for both the P and M class reference models should the user wish to try implementing their own algorithms. Note that M class reporting rates are limited to 10 frames per second.

The GTNET-PMU component output is synchronized to an external 1PPS, IRIG-B or IEEE 1588 signal via the GTSYNC card.

RSCAD Software Components



GTNET PMU
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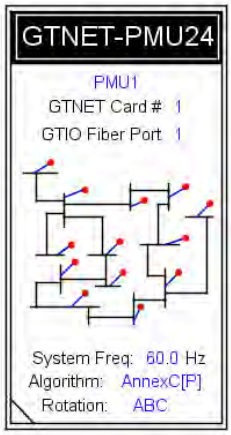
For use with a GTNET card.
Provides IEEE C37.118 PMU Data



Hardware Exchange Program

The GTNETx2 card is part of our hardware exchange program. Customers participating in our hardware maintenance program can exchange their GTNET card to receive a GTNETx2 at a reduced price.

Learn more at **www.rtds.com**.

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RTDS Technologies

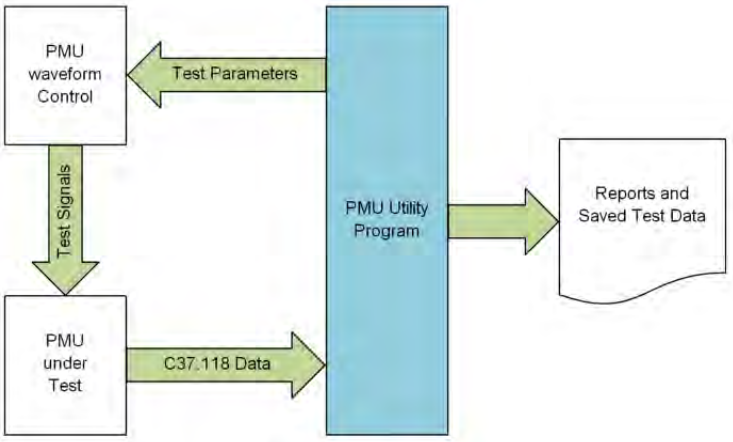
PRODUCT PROFILE

PMU Test Utility

The PMU Test Utility available in the RSCAD software is designed for testing the electrical performance of PMUs. The IEEE C37.118 standard and its amendments defines test signals and performance limits that must be met before a PMU can be compliant to the standard, but does not define specific test procedures and calculations. The IEEE Conformance Assessment Program (ICAP) has defined a Test Suite Specification (TSS) that addresses this issue, and the PMU Test Utility is designed to run the ICAP-TSS test procedures.

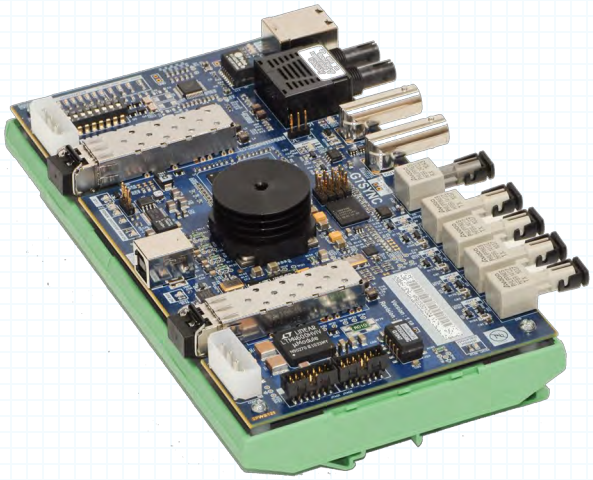
The PMU Test Utility is used to set the various parameter sliders that are embedded in the PMU waveform control component in RSCAD. The resultant waveforms are then sent to a GTAO card and appropriately scaled for connection to amplifiers or low level direct connections to the PMU under test. The slider values are also used by the PMU utility to calculate the theoretical phasor values for each test.

The PMU Test Utility then gathers the measurements made by the PMU via IEEE C37.118-compliant streaming using the GTNET card. The measured phasor, frequency, and ROCOF values are then compared to the theoretical values, and calculations such as frequency error, ROCOF error, and total vector error (TVE) are made.



GTSYNC Synchronization Card

The clock used to generate the RTDS® Simulator time step has an accuracy of +/- 100 ppm. As such, the phase of signals computed within the Simulator will drift relative to the phase of signals on external equipment that are synchronized to a high-precision time reference.



The GTSYNC Synchronization Card is used to synchronize the simulation time step to an external time reference (e.g. GPS clock) in order to eliminate this undesirable drift. The GTSYNC connects to a GT port on the back of the GTWIF card.

The GTSYNC is capable of using 1 Pulse Per Second (1PPS), IEEE 1588 PTP, or IRIG-B unmodulated signals as the synchronization source. The card supports 1PPS over BNC coax or ST type fiber connectors, IEEE 1588 over RJ45 or fiber, and IRIG-B over a BNC coax connection. The GTSYNC can also act as its own (internal) synchronization source in the absence of these external sources.

Regardless of whether the synchronization source is internal or external, and regardless of the external signal type, the GTSYNC can provide 1PPS or IRIG-B type output.

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