

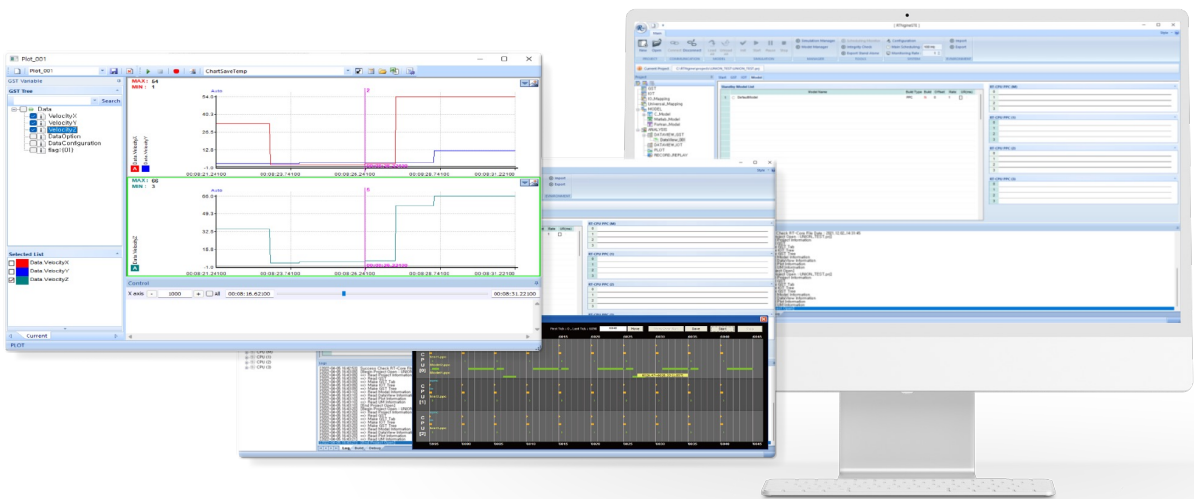


RTN^gine

Software

RTNginer Software

RTNginer software a real-time simulation engine for Avionics SIL and FLCC HILS configurations, is a key program to control, simulate and manage all equipment interlinked with the operation and testing of the equipment.



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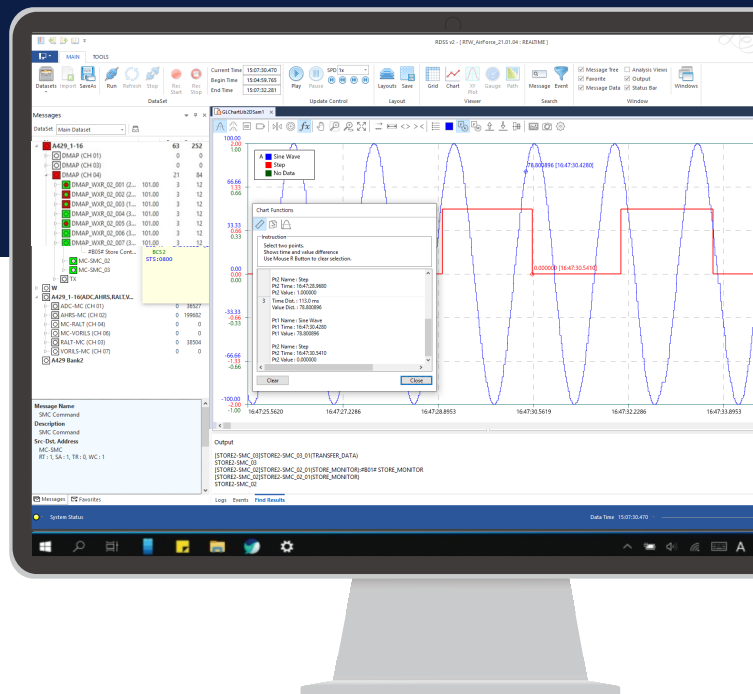
RTNginer a key software to establish simulation and integrated testing environment based on real-time, provides convenient development environment and allows user to form testing equipment easily, quickly and efficiently.

- ▶ Based on various testing tools, it is a main program that is optimized for simulation performance /test, analysis, error and detection.
- ▶ Possible to input a lot of data and error and analyze them accurately and variously.
- ▶ Supports recent Matlab/Simulink and execute ICD, Behavior and Dynamic model on real-time.
- ▶ Provides I/O control technology that expand CPU and I/O interface easily.



Highlights

- Control and execute model precisely by Sub Frame basis
- Support for Frame Scheduler to ensure execution priority between models
- Execution synchronization technology among multiple CPU
- GST data synchronization technology among multiple CPU
 - Share data by variable type and bit basis
 - Share Union data
- Provides I/O control technology that expand CPU and I/O interface easily
- IO Mapping Middleware which connects simulation variable and IO Input-Output
- Measure execution procedure and time of all scheduled IO and model
- Process Injection real-time data
- Transfer real-time data using network or shared memory



System Architecture

RTNginer STE	Configuration	GST Editor	IO Mapping	Universal Mapping	SIM Manager	Sched Monitor
	Model Manager	Data view	Dynamic TST Injection	Strip Chart Plotter	Record Replay	BIT
RTNginer Core	Simulation Control / Real-time Processing / Model Scheduling (HILS Model, 6DOF Model)					
RTNginer Drv	Real-time IO Device Driver (MIL-STD-1553B, ARINC429, CAN, SDLC, Serial, Ethernet, AIO, DIO, RFM, ScramNet...etc)					
RTNginer Bench (Realtime Control System)	RTOS(VxWorks) (Real-time Processor, IO Module, SCU, IOB, FIU, TP&BOB, IFB...etc)					

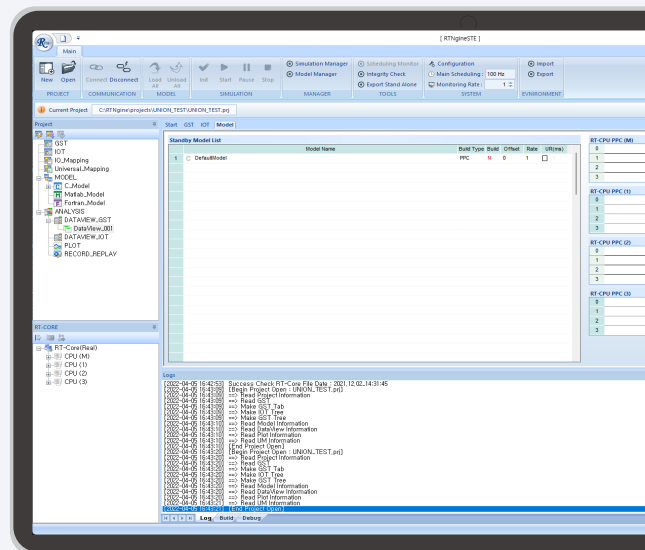


RTNginе STE

RTNginе STE is integrated development environment which is able to develop simulation Logic based on project and execute verification for operation.

Main Function

- Model Manager : Logic Model, Matlab import
- GST Editor : variable create , GST/IOT from ICD
- Configuration : Hardware Control
- Data View : Monitoring, Value Set
- Strip Chart : 2D Data Monitoring
- Record & Replay : Data recording & playback
- Simulation Manager : Simulation condition setup
- IO Mapping : Configuration setup for Interface data between IO and GST



Details Function

GTS / IOT	<ul style="list-style-type: none"> · Testing environment of RTNginе is executed basically based on GST (Global Simulation Table). · GST is a breakup real-time database possessing all dynamic data of · RTNginе as global variables defined by user for each project. · GST manufactures using GST Editor and Import provided from RTNginе. · IOT is a table generated by input/output devices and defines the actual output IO values. 	
GTS / IOT Editor	<ul style="list-style-type: none"> · Provide GST/IOT Editor · Interface IO Mapping · Model Variable Mapping · Bit Variable 	<ul style="list-style-type: none"> · Union Keyword · Integration for ICD Management Tool or System Bridge Tool
	<ul style="list-style-type: none"> · Declare GST Variable · Bit Variable · Use Union Keyword · Ready defined variable type 	<ul style="list-style-type: none"> · Loading ready defined Header file · Error Check · Save & Build GST File

Details Function

<p>Simple IO Mapping</p>	<ul style="list-style-type: none"> · Connect input-output data (such as digital signal and analog signal, etc.) to GST variable and control IO · Possible to execute Mapping between Model variable and GST with just user's double click. · Auto Mapping function that applied by name and rule
<p>Universal Mapping</p>	<ul style="list-style-type: none"> · Provides function for setting message of various I/O interface and mapping GST · M1553 <ul style="list-style-type: none"> - Set BC, RT, BM message - BC, RT, BM message GST Mapping · A429 <ul style="list-style-type: none"> - Set message - Message GST Mapping · Serial <ul style="list-style-type: none"> - Set TX, RX message - Combine message packet - Message Mapping · CAN <ul style="list-style-type: none"> - Set TX,RX message - Message Mapping
<p>Model Manager</p>	<p>Form model directly and import 3rd party Model (Matlab, C, C++, Fortran)</p> <ul style="list-style-type: none"> · Form C Model directly or load Model already written before · Load model formed with Matlab through Model Manager · Load by selecting variables by type used at Matlab. · Check and control Matlab variables through GST and Mapping
<p>Realtime Performance</p>	<p>Support Hard Real-Time based on VxWorks and measure execution time through Scheduling Monitor</p> <ul style="list-style-type: none"> · Measure execution time of model data by Micro sec · Provides a scheduling monitor to check the scheduling status · Check time of I/O Process · Check time among various Model · Record function output to Excel Format
<p>Execution</p>	<p>Run the built model by allotting it to Real-Time Core based on this GST</p> <ul style="list-style-type: none"> · Support Multi CPU · Possible to use main scheduling separately according to working method · Allot easy model with Drag & Drop way · Support Hard Real-Time
<p>Monitoring Data</p>	<p>Select GST required monitoring and monitor this data through Data View</p> <ul style="list-style-type: none"> · Select GST at left side Tree · Allows user to set the desired value in the Value line · Display timeline currently being simulated · Display Hex, Bin and Plot type
<p>Monitoring Plot</p>	<p>Select GST required monitoring and provide plot function of this data</p> <ul style="list-style-type: none"> · Select right side Chart · Select GST at left side Tree · Select GST repeatably after adding Chart · Available to move desired time zone at Control



Details Function

Data Injection Tool	<p>Possible to inject data and error to input-output data while testing and simulation are executed.</p> <ul style="list-style-type: none">· Monitor and save variable value· Input data and noise signal<ul style="list-style-type: none">- Constant, Sine, Triangle, Ramp, Step, Pulse, Random· Possible to convert data unit and display them· Manage setting list of data input
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★ Update: RTNginer ver.3.6

Multi-Core	<ul style="list-style-type: none">· T2080 based Multi-core support· Latest VxWorks7 RTOS support
FPGA	<ul style="list-style-type: none">· Support high-speed input-output IO· EW(electronic warfare) and Radar testing and verification equipment
Reliability Testing	<ul style="list-style-type: none">· Execute static test based on DAPA(Defense Acquisition Program Administration) standard· Self-verification of reliability for RTNginer testing tool



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