

APPLICATION GUIDE & TECHNICAL CONFIGURATION OVERVIEW

Solving Modern Radar and Electronic Warfare's Most Demanding Test Challenges

Giga-tronics GT-ASGM18A, GT-ASAM18A, GT-SRM100A, GT-CHSIS2A, GT-CHSIS4A

Giga-tronics

Solution for Next Gen EW / Radar Test & Deployment

Challenges for Next Generation Radar and Electronic Warfare Test

Air / Space



AESA (Active Electronically Scanned Array):

Game changing technology providing the future building blocks for commercial and military multi-function, multi-waveform Radar, Communications and Electronic Warfare applications – *requiring multiple TX and RX phase coherent technology.*

Sea



Doppler Radar:

Weather and MTI (Moving Target Indicator) Radar utilizing state of the art Doppler processing, *requiring state-of-the-art phase noise performance.*

Land



SAR (Synthetic Aperture Radar):

Surveillance and Exploration application drive for ultra-high resolution radar image resolution by using **very wide modulation bandwidths.**

Affordable:

COTS Radar and EW building blocks simplify system design

Reliable:

Solve complex problems with lower part count new technology solutions

Serviceable:

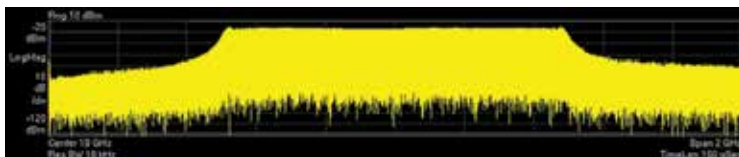
Modular solutions allow for quick and easy replacement, simplifying support.

Scalable:

Simplified scalability using a modular approach

Solutions for Next Generation Radar and Electronic Warfare Test

Giga-tronics Advanced Signal Generation and Analysis System



2 GHz Span
10 GHz Center Frequency



GT-ASGM18A / GT-ASAM18A Advanced Signal Generation and Analysis System:

The Giga-tronics Advanced Signal Generation and Analysis System is a high performance signal source / up-converter and analyzer / down-converter platform optimized for applications requiring coherent multiple channels of sophisticated wide instantaneous bandwidth microwave signals.

The Advanced Signal Generation and Analysis System is an ideal tool for advanced EW threat simulation, RADAR target generation, emulation of Satellite communication links and calibration of receivers in direction finding systems.

Features:

- Up to 4 independent signal sources / up-converters and analyzers / down-converters per chassis
- Frequency reference module supports 1 to 4 signal sources / analyzers
- 2 or 4 channel system chassis
- Multiple chassis can be locked together for higher channel count
- Compatible with most high performance arbitrary waveform generators / signal digitizers
- Improved reliability for maximum up-time
- Easy sparing of modules and chassis for maintainability
- Field replaceable chassis power supply, fans & fan filter

Configuration

The Giga-tronics Advanced Signal Generation and Analysis System consists of 5 main elements as follows:

1. **Giga-tronics AXle chassis with Zone3 coherent analog synchronization bus**
 - a. GT-CHSIS2A supports up to 2 signal generation / analysis channels, in any combination.
 - b. GT-CHSIS4A supports up to 4 signal generation / analysis channels, in any combination.
2. **GT-SRM100A System Reference Module (supports 1 to 4 channels)**
3. **GT-ASGM18A 100 MHz to 18 GHz Advanced Signal Generator Master Module**
4. **GT-ASAM18A 500 MHz to 18 GHz Advanced Signal Analyzer Master Module**
5. **GT-CHSISBK 2-slot blank module for air flow management and backplane termination**

For Advanced Signal Creation and Analysis, the ASGM / ASA can be used with a number of COTS Arbitrary Waveform Generators and Signal Digitizers.



Example Systems Configurations

Coherent Two Channel - Analog



Advanced Signal Generator Unit with Internal Coherent LO, 100 MHz to 18 GHz



Advanced Signal Generator Unit with Internal Coherent LO, 100 MHz to 18 GHz



Precision Frequency Reference, 10 MHz, 100 MHz, 1200 MHz

GT-ASGM18A



GT-ASGM18A



GT-SRM100A



GT-CHSIS2A 2 Channel Chassis

Single Channel - Analog



AXIe Compatible Arbitrary Waveform Generator



Advanced Signal Generator Unit with Internal Coherent LO, 100 MHz to 18 GHz



Precision Frequency Reference, 10 MHz, 100 MHz, 1200 MHz

AXIe Compatible



GT-ASGM18A



GT-SRM100A



GT-CHSIS2A 2 Channel Chassis

Coherent Four Channel



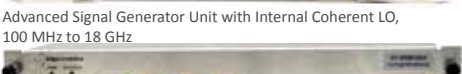
Advanced Signal Analyzer, 500 MHz to 18 GHz



Advanced Signal Generator Unit with Internal Coherent LO, 100 MHz to 18 GHz



Advanced Signal Generator Unit with Internal Coherent LO, 100 MHz to 18 GHz



Precision Frequency Reference, 10 MHz, 100 MHz, 1200 MHz

GT-ASAM18A



GT-ASGM18A



GT-ASGM18A



GT-ASGM18A



GT-SRM100A



GT-CHSIS4A 4 Channel Chassis

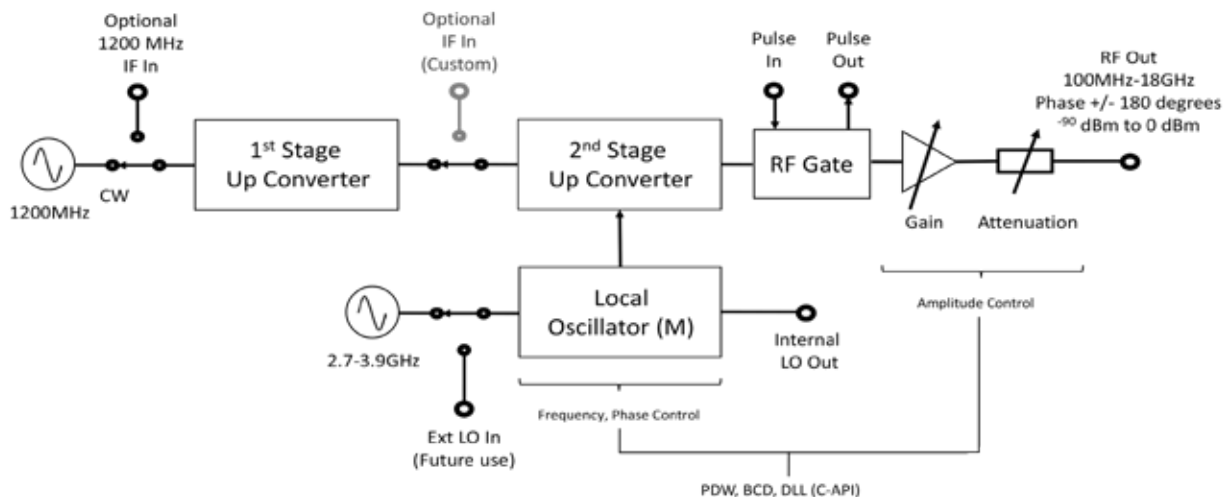
GT-ASGM18A - Advanced Signal Generator



The Giga-tronics GT-ASGM18A combines an agile, low-noise, phase-coherent local oscillator with a state-of-the-art millimeter-wave up-converter to generate high spectral purity microwave signals over the 100 MHz to 18 GHz frequency range. The optional up-converting input allows the GT-ASGM18A to generate signals with wide bandwidth complex modulation for testing RADAR and modern communication systems. The modular GT-ASGM18A is based upon the industry standard AXIe format and works with the Giga-tronics GT-SRM100A frequency reference and either the GT-CHSIS2A two-channel or GT-CHSIS4A four-channel chassis.

Features:

- Broadband microwave signal generation
- Very low phase noise
- High spectral purity
- Sub-microsecond switching speeds
- Phase coherent frequency switching
- Optional wide bandwidth up-converting input
- Modular format and compact size



GT-ASGM18A Simplified Block Diagram

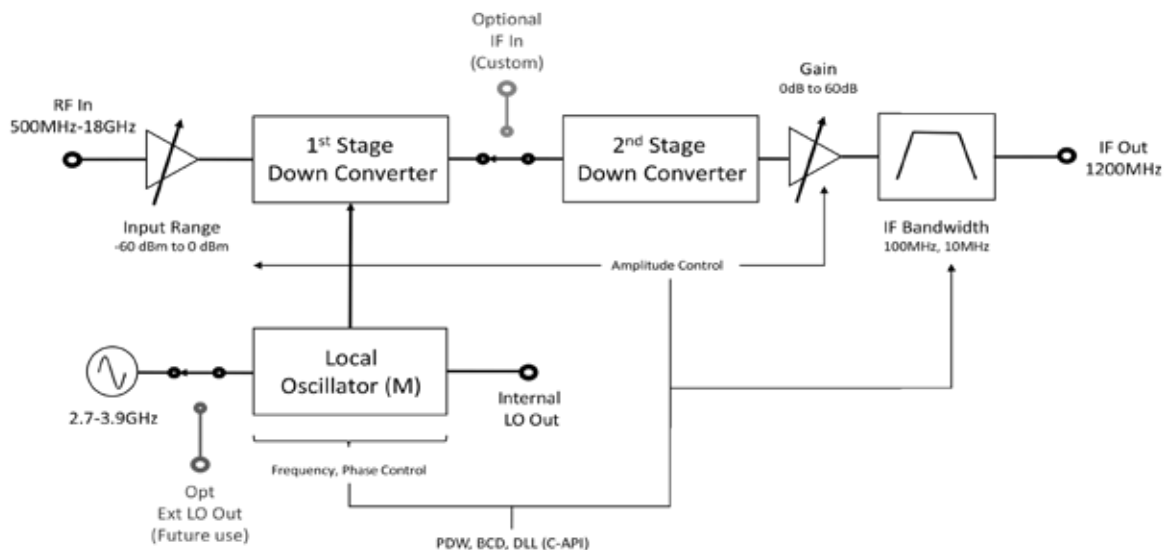
GT-ASAM18A - Advanced Signal Analyzer



The Giga-tronics GT-ASAM18A combines an agile, low noise, phase coherent local oscillator with a state-of-the-art millimeter-wave down-converter to acquire microwave signals over the 500 MHz to 18 GHz frequency range. The down converted IF output allows the GT-ASAM18A to support the analysis of wide bandwidth modulated signals used in RADAR and modern communication systems. The GT-ASAM18A is based upon the industry standard AXIe modular format and works with the Giga-tronics GT-SRM100A frequency reference and either the GT-CHSIS2A two-channel or GT-CHSIS4A four-channel chassis.

Features:

- Broadband microwave signal acquisition
- Very low phase noise
- High spectral purity
- Sub-microsecond switching speeds
- Wide bandwidth IF output
- Phase coherent frequency switching
- Modular format and compact size



GT-ASAM18A Simplified Block Diagram

GT-SRM100A - System Reference Module



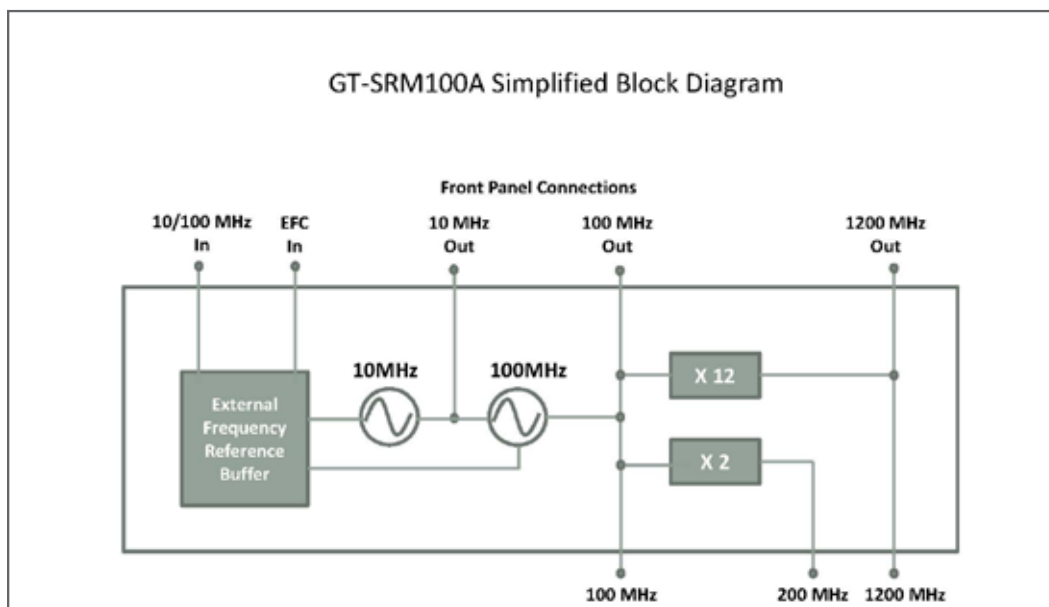
Ultra-Low Phase Noise Precision Frequency Reference

The Giga-tronics GT-SRM100A System Reference Module is designed for use with the Giga-tronics two-channel (GT-CHSIS2A) and four-channel (GT-CHSIS4A) chassis. The GT-SRM100A occupies a dedicated chassis slot and utilizes a coherent analog synchronization bus to deliver the precision frequency reference signals required by the Giga-tronics GT-ASGM18A / GT-ASAM18A Advanced Signal Generator / Analyzer. The GT-SRM100A supports up to four Advanced Signal Generators / Analyzers in a single chassis. This arrangement eliminates a host of inter-module front panel cabling and allows the signal generators / analyzers to exhibit superior phase stability and coherence between channels as compared to stacking traditional bench-top sources.

The GT-SRM100A System Reference Module accepts 10 MHz or 100 MHz external frequency references for phase locking the GT-SRM100A to external equipment and it provides 10 MHz and 100 MHz frequency reference outputs for phase locking multiple Giga-tronics chassis in high channel count applications.

Features:

- Time-base for the GT-ASGM18A / GT-ASAM18A
- Ultra-low phase noise signals
- 10 MHz, 100 MHz and 1200 MHz outputs
- Drives 1 to 4 Advanced Signal Generators / Analyzers
- Spurious < 80 dBc
- 10 MHz or 100 MHz external reference input



GT-CHSIS2A and CHSIS4A

AXle Advanced Signal Generation / Analysis System Chassis



Features:

- 2 channel and 4 channel configurations available
- Dedicated standby supply for reference module slot
- Field replaceable power supply, fans, and fan filter
- Supports up to 100 W per slot
- Desirable rear-panel connectivity
- Zone 3 analog synchronization bus

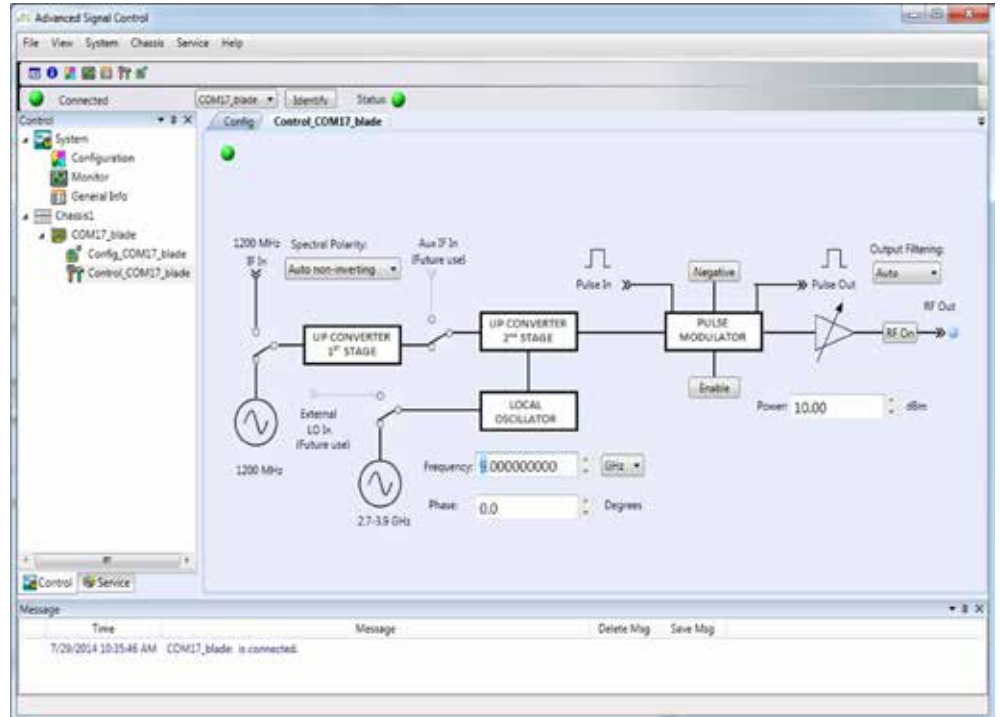
Giga-tronics GT-CHSIS2A and GT-CHSIS4A Advanced Signal Generation / Analysis System Chassis are based upon the new AXle 1.0 industry standard. Available in 2 channel (4U) or 4 channel (7U) configurations, both chassis make use of the AXle standard's Zone3 provision to implement a coherent analog synchronization bus for sharing frequency reference signals and critical timing clocks from the GT-SRM100A Reference Module with up to four GT-ASGM18A / GT-ASAM18A Advanced Signal Generators / Analyzers in a single chassis. This arrangement eliminates a host of inter-module front panel cabling and allows the signal generators and analyzers to exhibit superior phase stability and coherence between channels compared to stacking traditional bench-top sources.

Each chassis incorporates an active backplane for implementing the Zone1 and Zone2 requirements of the AXle 1.0 standard permitting a more desirable rear-chassis location for the external PCIe, and Ethernet interfaces. The chassis can accept products from 3rd parties designed to the AXle 1.0 specification and can support modules requiring up to 100W per slot. For ease of maintainability, the chassis' power supply, fan and filter assemblies are removable for service or replacement to deliver maximum up-time in critical applications. The chassis can report its status over the PCIe or ethernet interfaces and will signal a fault condition via a front-panel LED.

Advanced Signal Control Software

Features:

- Designed for Windows® 7, 64 bit Pro
- Operates over cabled PCIe
- Intuitive manual control
- Comprehensive API
- Supports Multiple Channels
- Status and fault monitoring



Advanced Signal Control is an easy to use graphical user interface for controlling each of the signal generators within the Advanced Signal Generation / Analysis System. The software monitors system status and can be used to customize thresholds and trigger alarms when conditions are beyond established limits. Advanced Signal Control also provides the tools for keeping your hardware up-to-date with the latest code revision.

The included GTSigGen.dll offers programmers a comprehensive Application Programming Interface (API) for controlling the Advanced Signal Generators from your station ATE software and allows complete use of all functions of every asset within each system. A programming manual (document# 35396) with coding examples is available for help in getting your application up and running as quickly as possible.

Recommended Arbitrary Waveform Generation

Base Features:

- Ability to generate 1200 MHz IF signals
- >1.8 Gs of memory
- > 8 GS/s Sample Rate
- > 70 dBc SFDR
- Deterministic dynamic waveform selection
- Single or Dual Channel Option

Contact Giga-tronics for model and option configuration recommendations

 asg-info@gigatronics.com

Recommended Controller Hardware

Computer

- 300 GB HDD with 100 GB free disk space at runtime (500 GB or higher recommended)
- Windows® 7, 64-bit Professional
- 2 GHz or faster processor
- 2 GB of memory minimum
- Microsoft.NET Framework 4.0 (should be included in Windows® Professional, or downloadable from Microsoft website)
- At least one open x8 or x16 PCIe expansion slot

PCIe Host Adapter Cards and Cables

- Dolphin Interconnect¹ IXH620 Gen2 PCI Express XMC Adapter Card
- Dolphin Interconnect IXC2M 1 meter x 8 copper cables
- One Stop Systems² OSS-PCIe-HIB25-x8-H PCIe X8 Gen2 Host Cable Adapter
- One Stop Systems OSS-PCIE-CBL-x8 copper cables

1 Dolphin Interconnect Solutions, Woodsville, NH (www.dolphinics.com)

2 One Stop Systems, Escondido, CA (www.onestopsystems.com)

Ordering Guide

Model Number	Description
GT-ASGM18A Option ATT Option UP1 Option BCD	100 MHz to 18 GHz Advanced Signal Generator Master Module Adds 90 dB electronic step attenuator Adds 1200 MHz IF Input Adds parallel BCD Input
GT-ASAM18A Option ATT Option BCD	500 MHz to 18 GHz Advanced Signal Analyzer Master Module Adds 90 dB electronic step attenuator Adds parallel BDC input
GT-ASGS18A Option ATT Option UP1 Option BCD	100 MHz to 18 GHz Advanced Signal Generator Slave Module (requires LO from a master module) Adds 90 dB electronic step attenuator Adds 1200 MHz IF Input Adds Parallel BCD Input
GT-ASAS18A Option ATT Option BCD	100 MHz to 18 GHz Advanced Signal Analyzer Slave Module (requires LO from a master module) Adds 90 dB electronic step attenuator Adds parallel BDC input
GT-SRM100A	10 MHz, 100 MHz, 1200 MHz System Reference Module
GT-CHSIS2A	2 Channel System Chassis (4U) (For 1 or 2 channel systems)
GT-CHSIS4A	4 Channel System Chassis (7U) (For 1 to 4 channel systems)
GT-CHSISBK	2-Slot Blank module for airflow management and backplane termination

Contact Giga-tronics Application Engineering for additional support: 1-925-328-4650 or email to asg-info@gigatronics.com.

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