Universal Switching Corporation

CE

Specification Sheet G2S47-001
Solid-State High Performance 20-250MHz
Non-Blocking IF Switching Array w/Expanders
Series G2S47

August 2007

General

The solid-state G2S47 analog switching module is offered for applications demanding high performance analog IF switching. The non-blocking full fanout switching module is available in a number of configurations. The switching array is a "fixed" size and can be used as a building block for larger switching systems by cascading modules together. Each input and output port has an associated expander port allowing the module to be expanded to additional equipment.

It provides a very cost effective switching solution. It's available in the sizes shown in the table on page 2 as standard configurations. The size of the array is determined by the model number. Additional configurations are available on special order.

The switching array is non-blocking with full fanout allowing the user to connect any given input to one, many, or up to all outputs at any given time. No input loading or impedance mis-matches are presented to the user due to the architecture of the switching array, and the use of high performance power splitters and amplifiers.

The suffix of the model number can specify some unique features or additional performance specifications (consult the factory). For control and DC power, the module must be installed into any G2 type mainframe controller. They must be configured with the -207 or -D207 power supply configuration.

Applications

- Airborne surveillance systems
- Communication installations
- Uplink and downlink IF routing
- Satellite control centers
- Ground station IF signal routing

Features

- Includes Input & Output expansion ports (SMB)
- Solid-state GaAs switching elements
- Wide 20MHz to 250MHz bandpass (min)
- BNC signal connectors standard, TNC or SMA optional
- Hot-Swap module technology
- Designed for low level, low noise IF applications
- Full fanout, non-blocking design
- Unity gain, high isolation signal path

32 INPUT & LOOP-OUT PORTS
J1 = INPUT 01
J32 = INPUT 32

32 OUTPUT & LOOP-IN PORTS
J33 = OUTPUT 01
J64 = OUTPUT 32

INPUTS AND OUTPUTS ARE BNC FEMALE CONNECTORS

EXPANDER "LOOP" PORTS ARE SMB CONNECTORS

G2

Universal Switching Corporation

G2S47-001

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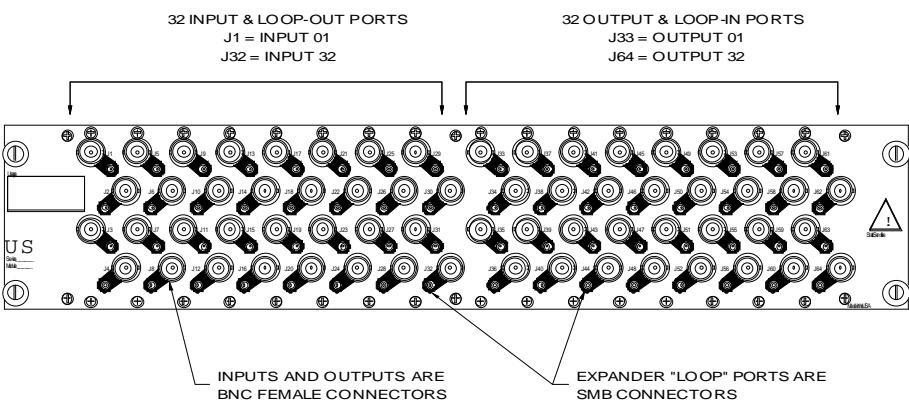
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Construction

The diagram on page 1 shows the physical rear configuration of the G2S47 module. Three sides of the module contains venting slots for flow through cooling for proper operation in extreme temperature environments. The rugged aluminum enclosure provides a shielded environment for low level, low noise signals. The module also provides aluminum slides for additional grounding to the host mainframe.

The module contains all solid-state components for extreme reliability, suitable for critical applications. Internally, an embedded CPU controls the switching operations of the array and the "looping" ports (for expansion).

The looping expander port associated with each input port (adjacent SMB connector) provides a unity gain output for expanding the array to additional equipment. The port does not normally need to be terminated, though slightly better input return loss would be seen at the associated input port if a termination was added externally. A built-in attenuator pad provides sufficient termination for most applications. See below diagram.
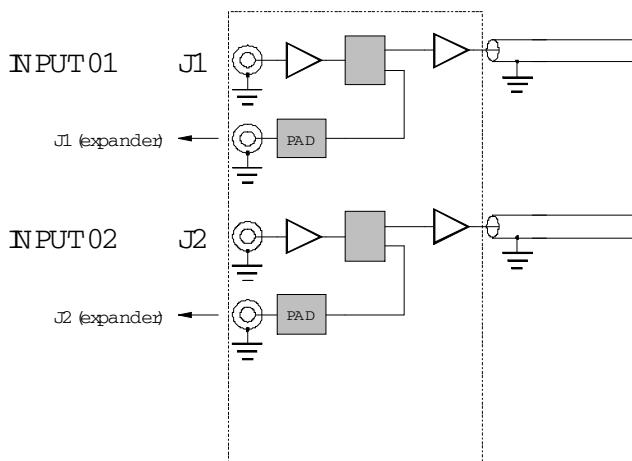
The output port also has a looping expansion port designed to easily expand signals from other equipment or other modules (associated SMB connector). If a given output port (BNC) isn't connected to an input of the module, the BNC is automatically connected to the SMB connector. See the simplified diagram on page 3.

Example Module Usage

Many high-performance IF applications can be served by the G2S47 switching module. The module provides a complete switching array, or can be used as a versatile building block for constructing even larger switching arrays up to 256x256. An example 96x96 system is shown on page 4.

There is no limit to the number of modules that can be cascaded together though some minor performance degradation (loss, noise figure and IP3) does occur on larger configurations.

Universal Switching Corporation builds systems utilizing this and other modules to meet customer applications. Many other possibilities can be realized when coupling multiple modules together. Interconnection cabling can be provided by the factory using high performance coaxial cabling insuring the best possible performance.

Configurations

50 ohm input, 50 ohm output versions

- G2S47-3216-25 . . . . . .16 input, 16 output   4 slots
- G2S47-4024-25 . . . . . .16 input, 24 output   4 slots
- G2S47-4832-25 . . . . . .16 input, 32 output   4 slots
- G2S47-6432-25 . . . . . .16 input, 48 output   6 slots
- G2S47-4016-25 . . . . . .24 input, 16 output   4 slots
- G2S47-4824-25 . . . . . .24 input, 24 output   4 slots
- G2S47-5632-25 . . . . . .24 input, 32 output   4 slots
- G2S47-7248-25 . . . . . .24 input, 48 output   6 slots
- G2S47-4816-25 . . . . . .32 input, 16 output   4 slots
- G2S47-5624-25 . . . . . .32 input, 24 output   4 slots
- G2S47-6432-25 . . . . . .32 input, 32 output   4 slots
- G2S47-8048-25 . . . . . .32 input, 48 output   6 slots

50 ohm input, 75 ohm output versions

- G2S47-3216-27 . . . . . .16 input, 16 output   4 slots
- G2S47-4024-27 . . . . . .16 input, 24 output   4 slots
- G2S47-4832-27 . . . . . .16 input, 32 output   4 slots
- G2S47-6432-27 . . . . . .16 input, 48 output   6 slots
- G2S47-4016-27 . . . . . .24 input, 16 output   4 slots
- G2S47-4824-27 . . . . . .24 input, 24 output   4 slots
- G2S47-5632-27 . . . . . .24 input, 32 output   4 slots
- G2S47-7248-27 . . . . . .24 input, 48 output   6 slots
- G2S47-4816-27 . . . . . .32 input, 16 output   4 slots
- G2S47-5624-27 . . . . . .32 input, 24 output   4 slots
- G2S47-6432-27 . . . . . .32 input, 32 output   4 slots
- G2S47-8048-27 . . . . . .32 input, 48 output   6 slots

75 ohm input, 75 ohm output versions

- G2S47-3216-277 . . . . .16 input, 16 output   4 slots
- G2S47-4024-277 . . . . .16 input, 24 output   4 slots
- G2S47-4832-277 . . . . .16 input, 32 output   4 slots
- G2S47-6432-277 . . . . .16 input, 48 output   6 slots
- G2S47-4016-277 . . . . .24 input, 16 output   4 slots
- G2S47-4824-277 . . . . .24 input, 24 output   4 slots
- G2S47-5632-277 . . . . .24 input, 32 output   4 slots
- G2S47-7248-277 . . . . .24 input, 48 output   6 slots
- G2S47-4816-277 . . . . .32 input, 16 output   4 slots
- G2S47-5624-277 . . . . .32 input, 24 output   4 slots
- G2S47-6432-277 . . . . .32 input, 32 output   4 slots
- G2S47-8048-277 . . . . .32 input, 48 output   6 slots

Simplified Signal Diagram

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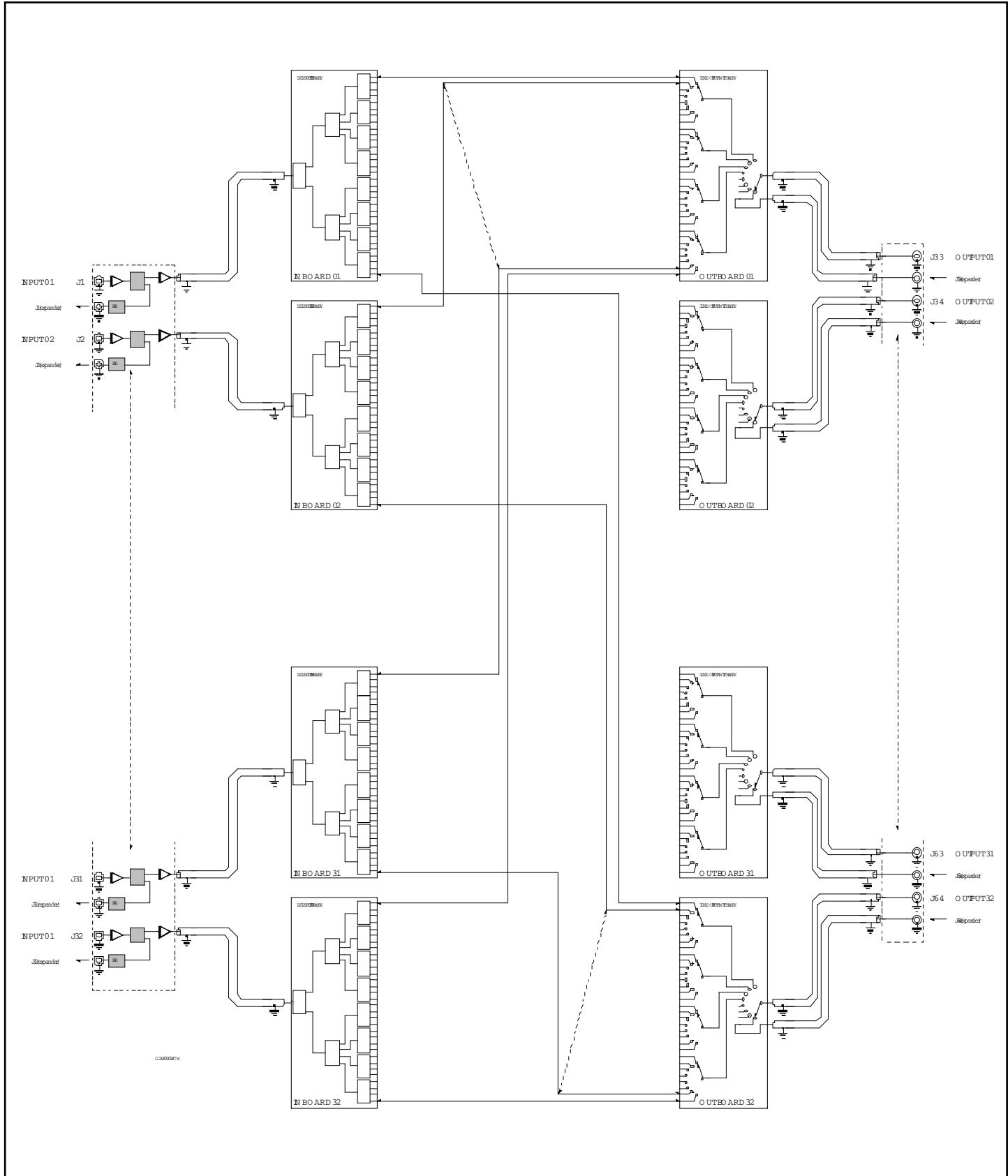
Block Diagram of a 96x96 System Using Multiple G2S47 Modules

96 OUTPUTS

32 OUTPUTS	32 OUTPUTS	32 OUTPUTS

96 INPUTS

(Diagram shows a 3×3 array of "32 X 32 W/EXPANDERS" modules, each labeled with OUTPUT, INPUT, EXPANDER ports. Left side labeled "32 INPUTS" for each row, top labeled "32 OUTPUTS" for each column.)
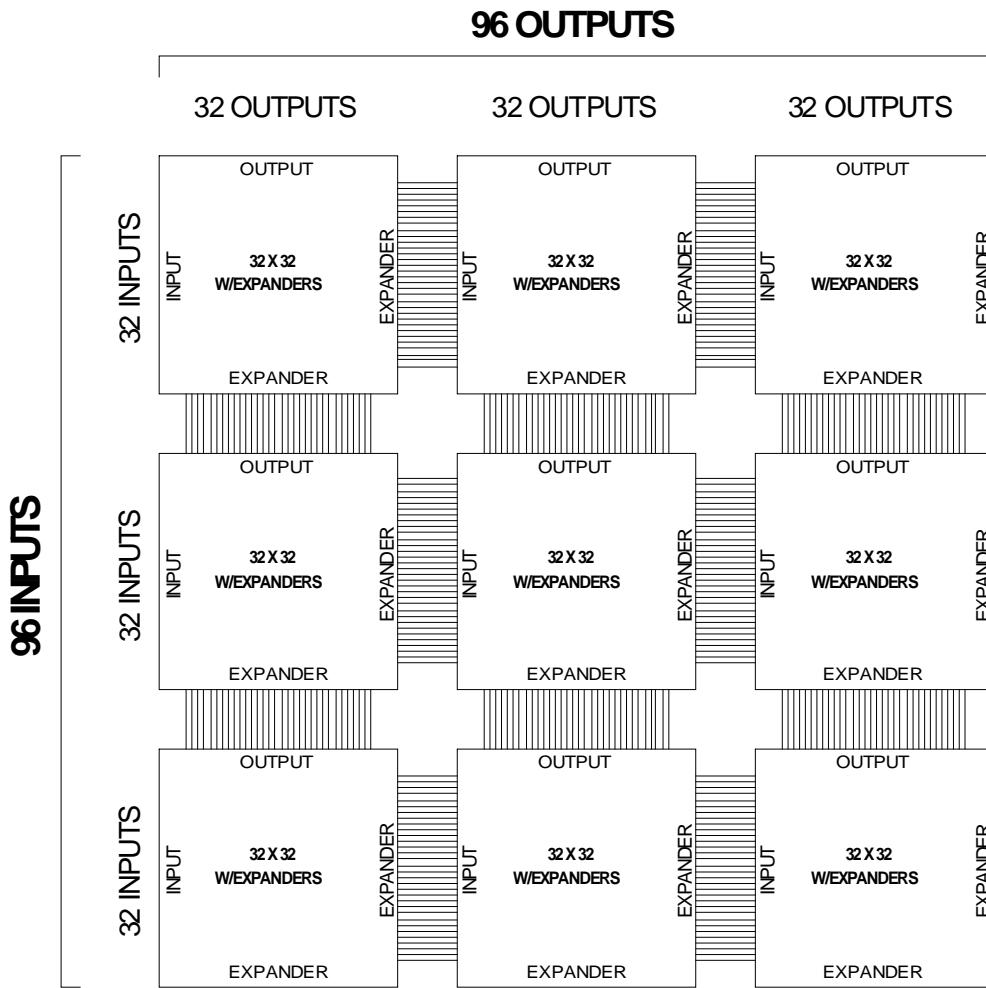
Signal Specifications

Switching elements . . . . . .Solid-State GaAs
Number of inputs . . . . .See configuration table
Number of outputs . . . . . . .See configurations table
Expander ports . . . . .Included (automatic)
Type of array . . . . .Non-blocking, unity gain, full fanout
Signal type . . . . .Single-ended, AC coupled
Signal connector . . . . .BNC standard **, TNC or SMA optional
Frequency range . . . . .20MHz - 250MHz (min)
Impedance . . . . .50 ohm (75 ohm optional)
Crosstalk isolation . . . .>60dB @ 70MHz
Input VSWR . . . .<1.5 : 1
-1dB compression . . . . .0dBm (typical)
Noise figure . . . .<10dB typical (config dependent)
Third order intercept . . . . .>15dBm typical (config dependent)
Switching speed . . . .<250uS (plus control time)
Input looping port . . . . . . .Unity gain (nominal)
Output looping port . . . . . .~0.40dB loss

** 75 ohm BNC connectors are used on 75 ohm versions

General Specifications

Module size . . . . .4 or 6 slot height
Control type . . . . .G2 compatible
Sparing . . . . .Hot-Swappable
Construction . . . . .Shielded aluminum case
DC power . . . .-207 configuration
    +5V (digital), +7/-5V (analog)
Weight . . . .<6.5lbs (32x32)
Operating temp . . . . .0 to +70C
Non-operating temp . . . . .-20 to +85C
Humidity . . . . .0 to 95% (NC @ +25C)
MTBF . . . .>110,500 hours
    (per MIL-HDBK-217F, N1
    ground benign @ +25C)