

Switching Catalog and Selection Guide



ASCOR RF/Microwave Switching Benefits

Practical Guide to Microwave Switch Selection

RF/Microwave Switching Chassis Solutions

Custom-designed RF Interface Units Solutions

DC to Microwave Switching Solutions

Switch Modules Selection Guide



Why Giga-tronics ASCOR?

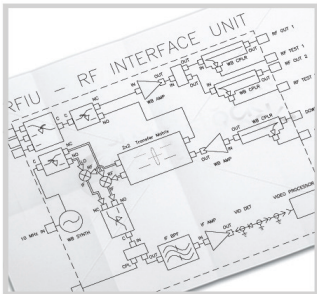
- ▣ All ASCOR brand products carry a standard **3-Year Warranty** (microwave relays excluded).
- ▣ **Triple Groundplanes**, chassis ground, digital ground and signal ground to preserve DUT signals, keep DUT signals isolated from communication and groundplane noise, preserving DUT signal.
- ▣ **Stripline design** techniques maintain a 50 ohm path from the connector to the relay in order to preserve DUT **Signal Integrity**.
- ▣ **Shielded Reed Relays** approximate a 50 ohm impedance which allows the 50 ohm path to be maintained completely through the board. Shielded Reed Relay also provide the highest reliability, rated in Billions of operations.
- ▣ All power switch cards use **Discrete Wires** between the front panel connector and the relay making short circuit issues Repairable.
- ▣ **Expertise in Custom Design** from mission critical military/aerospace test to high volume consumer device manufacturing.

SPACE SYSTEMS MILITARY COMMUNICATIONS A
LESS COMMUNICATIONS ADVANCED AVIONICS N
FROM SIMPLE TO MISSION CRITICAL APPLICATIO
MILITARY COMMUNICATIONS AND RADAR WIREL
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LET US TAILOR A SOLUTION FOR YOU THAT MEETS THE KEY REQUIREMENTS OF YOUR SPECIFIC APPLICATION.

DESIGN



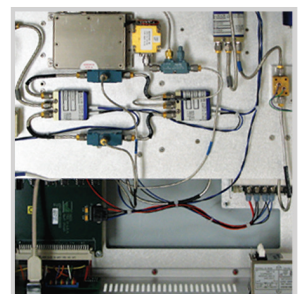
DOCUMENT



BUILD



TEST



We offer a full spectrum of experience with a long history of success in Space Systems, Military Communications and Radar, Wireless Communications, Advanced Avionics, Medical Devices, and more.

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expert to help with your design.**
email: applications@gigatronics.com



A Practical Guide to Microwave Switch Selection for ATE Systems

We at Giga-tronics ASCOR frequently spend time with our switching solution customers discussing microwave relay selection, and verifying that we are in agreement with our customer on the definition of terms. There are a number of important selection criteria for Microwave relays and below are some suggestions:

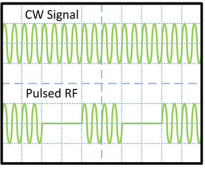
1. Frequency range
2. Power Level, CW or Pulsed
3. Relay reliability
4. Low PIM or passive intermodulation
5. Connector style
6. VSWR
7. Isolation
8. Insertion loss
9. Repeatability
10. Termination
11. Phase or path length matching
12. Latching vs. non-latching
13. Environmental shock and vibration
14. Pulsed digital signals

A Practical Guide to Microwave Switch Selection for ATE Systems

Application Note

by Robert Waldeck
VP Business Development, ASCOR Switching

We at Giga-tronics ASCOR frequently spend time with our switching solution customers discussing microwave relay selection, and verifying that we are in agreement with our customer on the definition of terms. There are a number of important selection criteria for Microwave relays and below are some suggestions for how to select one over another.

1. **Frequency Range** – This is probably the most simple and basic requirement. The microwave relays are going to be the most expensive element in your switching design, and the price increases with frequency, so you should select the relay which supports the frequency range you need and not overdesign. On the other hand, if your company is developing a new higher frequency product, it can be far more expensive to replace low frequency relays with new higher frequency relays, so having some idea of your company's direction could save money in the long run.
2. **Power Level, CW or Pulsed** – Power level for microwave switches is all about heat dissipation and how it affects the mechanical portions of the switch. There is more of an impact with higher Frequencies. For example, one popular switch will handle 100 Watts of power at 1 GHz, but is derated down to about 20 Watts at 18 GHz. The take away here is that if your Unit Under Test (UUT) puts out any significant amount of power, then you might be well served to take the signal through an attenuator first (if possible) so as not to overload the switches or to burden your design with a requirement for high power switches. High power microwave switches are available, but the price increases dramatically.
3. **Reliability** – this is another one of those criteria which increases along with price. There are microwave relays with life ratings ranging from 1 million cycles up to 10 million cycles. Clearly, the 10 million cycle relay will be priced higher. The real question is what do you need for your application? For customers in high volume production environments, the cost of downtime will easily justify the extra expense of the higher reliability relays. On the other hand, a recent customer purchased a switching system to automate a software validation



Download the full application note online:
<http://www.gigatronics.com/practical-guide-microwave-switch-selection>

Switching Product Guide

Solutions	Product	Benefits
Flexible, Low Cost Microwave Chassis	8900 Series 	Two chassis sizes Customer configured Solutions for multi-channel BERT testing
Fiber Optic Switch Chassis		SM & MM Products Adaptable to standard chassis above Customer configured
Modular Microwave Chassis	8800 Series 	Two chassis sizes Low MTTR Customer configured
Flexible Microwave Chassis / Custom Designed RF Interface Units	8000 Series 	Multiple chassis sizes Customer configured can contain any combination of switches and/or RF components
High Density Switching Chassis for 3000 Series Products, DC to Microwave	GT-8300A Series 	LAN or GPIB 3U chassis Over 60 unique switch designs Industry leading performance specifications
Scalable Switching Chassis for 4000 Series Products, DC to Microwave	GT-8400A 	LAN or GPIB 3U chassis 500 MHz analog Backplane Over 40 unique switch designs Industry leading performance specifications
High Density VXI Switch Modules	3000 Series	Over 60 unique switch designs Industry leading performance specifications
Scaleable, DC to Microwave, Switch Modules	4000 Series	500 MHz analog Backplane Over 40 unique switch designs Industry leading performance specifications
High Performance PXI Switch Modules	7000 Series	Industry leading performance specifications 20 standard models
Tektronix VXI Replacement	Tektronix Replacement	14 Models Drop in replacements, both hardware and software compatible

Flexible, Low-Cost Microwave Switch Chassis

8900 Series

The 8901 Half Rack, and the 8902 Full Rack solution provides a flexible, easily re-configurable Microwave Switching solution. These units can be ordered fully or partially configured as required. Additional Relays can be added by the user as needed depending on the application.



Typical Applications

- **R&D Labs** – Simple front panel re-configurability allows the switching to be easily customized to suit a specific application.
- **Test Labs** – Whenever Microwave testing is repeated such as Qualification or Environmental Testing.
- **Production Test** – Especially in High Mix production environments where the Switching System needs to provide flexibility and re-configurability
- **Product Support** – Re-configurability allows various production test systems to be simulated in the Product Support shop on an “as needed” basis.
- **Incoming Inspection** – Easily re-configurable to allow for batch testing of incoming lots of parts. Reduces overall test time.

Capabilities

- Low cost
- High density up to 1x12
- Front cabling available
- Front replaceable relays
- LabWindows driver w/source
- Indicator lights (optional)



ASCOR Series 8902 Full Rack

Contact a Giga-tronics switching expert to help with your design.
email: applications@gigatronics.com

8900 Series Optical



A 2U (3.5" high), reconfigurable Switching chassis for Optical, Microwave or both, which comes with a LAN and IEEE-488 interface. The 8901 is the half rack unit pictured above, and the 8902 is the full size rack mount unit below.

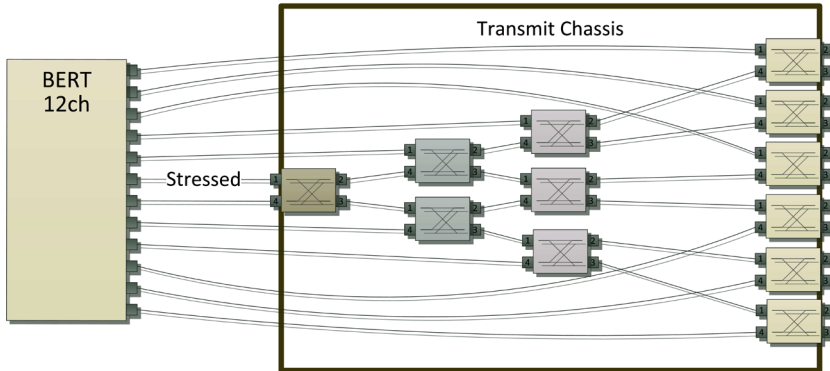
Recommended Use:

- ATE Applications - Complements any other ATE instrument technology, LXI, PXI, Rack and Stack.
- Non-ATE Applications - Great for repetitive testing tasks

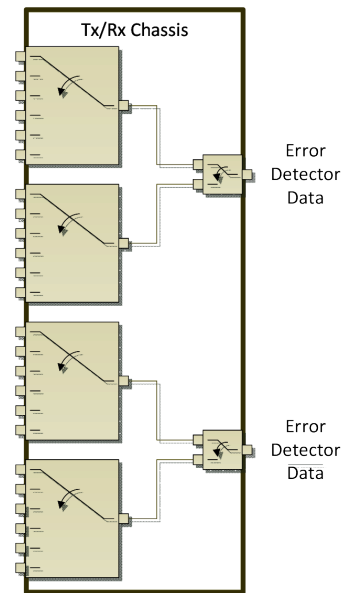
Flexible, Low-Cost Microwave Switch Chassis

Solutions for Multi-Channel BERT Testing

12 Channels loaded, any Channel Stressed, Single ended



12 Channels, Single Lane , Differential

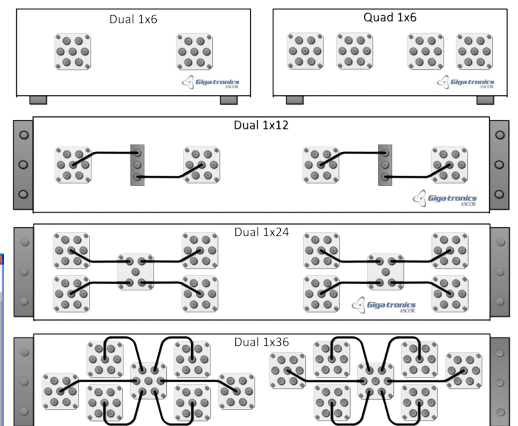
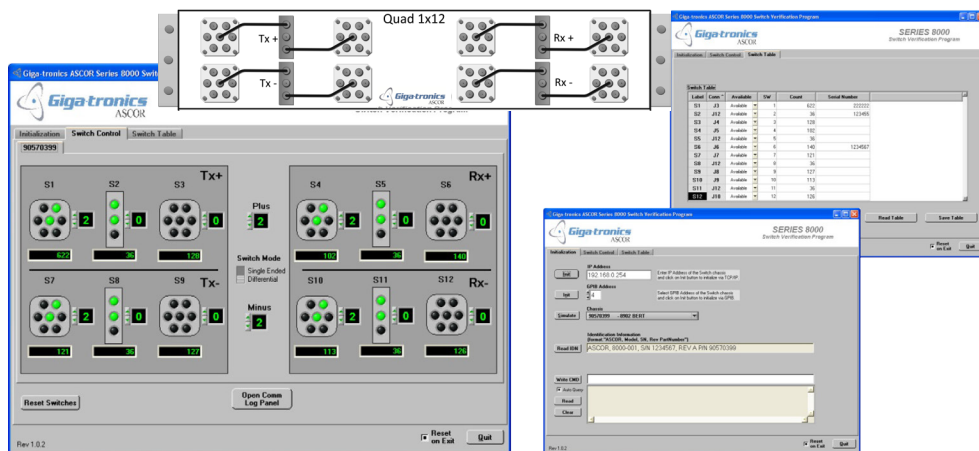


Learn more:

White paper - Switching Solutions for Multi-Channel BERT Testing
<http://www.gigatronics.com/ASCOR-Switching-BERT-Testing>

Sample Configuration

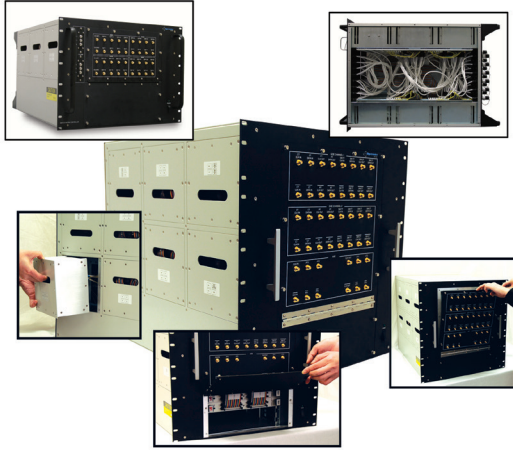
All cabling shown is phase matched Semi-Rigid Coax Cable. Path Lengths can easily be matched to $\pm 2\text{pS}$, closer matching can be achieved at additional cost. The user is encouraged to use high quality, phase stable flexible cables to connect between the switch, instrument and DUT.



Modular Microwave Chassis

8800 Series

Giga-tronics Modular solutions are about Serviceability and Scalability. The modular boxes contain the replaceable components.



Key Features

- **Fold Down Doors**– Front and Rear doors fold down for replacement when re-tasking the box, or for access to internal RF Cabling.
- **Removable Top Cover** – Allows access to internal cabling.
- **Modular Boxes** – Once RF cabling is disconnected, the boxes can be replaced quickly to put the system back into service, and the defective component in the box can be repaired offline.
- **Control Modules** – The lower portion of the chassis contains a four slot chassis to hold Giga-tronics 3000 Series Switching cards. These are typically used to control internal Relays and components, but can be used for other Lower Frequency applications in the System.

RF Switches

Although the front panels can be modified to accommodate a variety of Switch Manufacturers, Giga-tronics recommends the highest quality relays with the following general specifications:

- 4, 8, 12, 18, 26, 40 GHz Freq Ranges
- Amplitude Repeatability 0.03 dB
- 10 Million Switching Cycles
- Insertion Loss 0.5 dB (18 GHz)
- Isolation 60 dB (18 GHz)
- VSWR 1.5 (18 GHz)
- Max Power 100W (18 GHz)



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email: applications@gigatronics.com

Flexible Microwave Chassis

8000 Series



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email: applications@gigatronics.com

The Giga-tronics ASCOR Series 8000 line of switch products are based on rugged electromechanical switches and microwave relays rated for use from DC to 40 GHz with low insertion loss and high isolation. Route signals under remote control to simplify and automate RF Testing.

- **Semi-Custom Chassis** – A large variety of Standard Configurations are available from ½ Rack to Full Rack from 2U to 7U, minimizing the expense of having to design a custom Switching chassis.
- **Interface Options** – The standard 8000 Series control module supports GPIB, LAN and USB. Uses standard SCPI Control Commands
- **Relay Control Channels** – The Series 8000 has 256 channels built in to support future growth. Some other manufacturers provide as few as 64 Channels requiring additional Channels to be added before additional Relays can be added.
- **Relay Replacement** – Front panel removable, and rear Pluggable, a defective relay can be replaced in minutes

Typical Applications

- **R&D Labs** – Simple front panel re-configurability allows the switching to be easily customized to suit a specific application.
- **Test Labs** – Whenever Microwave testing is repeated such as Qualification or Environmental Testing.
- **Production Test** – Especially in High Mix production environments where the Switching System needs to provide flexibility and re-configurability
- **Product Support** – Re-configurability allows various production test systems to be simulated in the Product Support shop on an “as needed” basis.
- **Incoming Inspection** – Easily re-configurable to allow for batch testing of incoming lots of arts. Reduces overall test time.

Custom Designed RF Interface Units

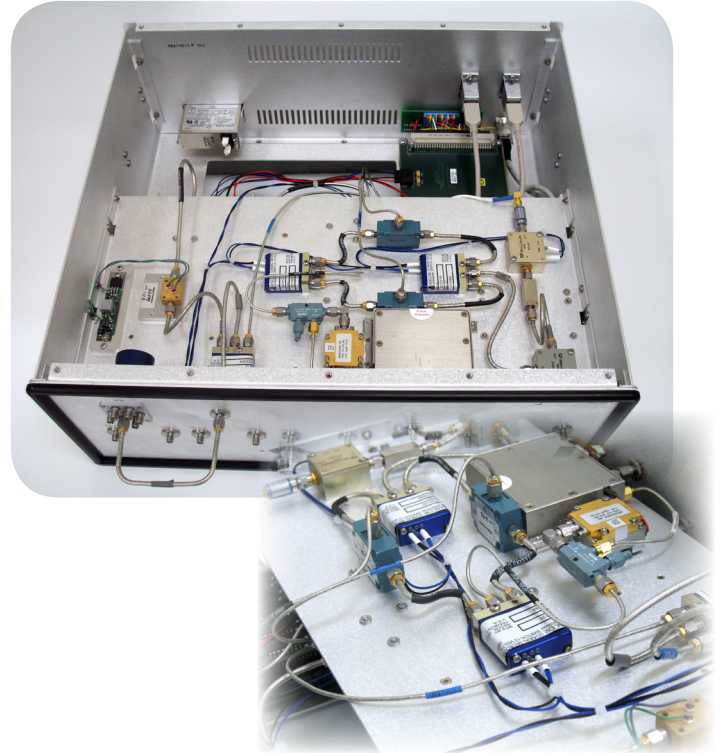
Dedicated / Custom Solutions

Giga-tronics Dedicated RF Interface Units or RFIU's can contain any combination of switches and/or RF components.

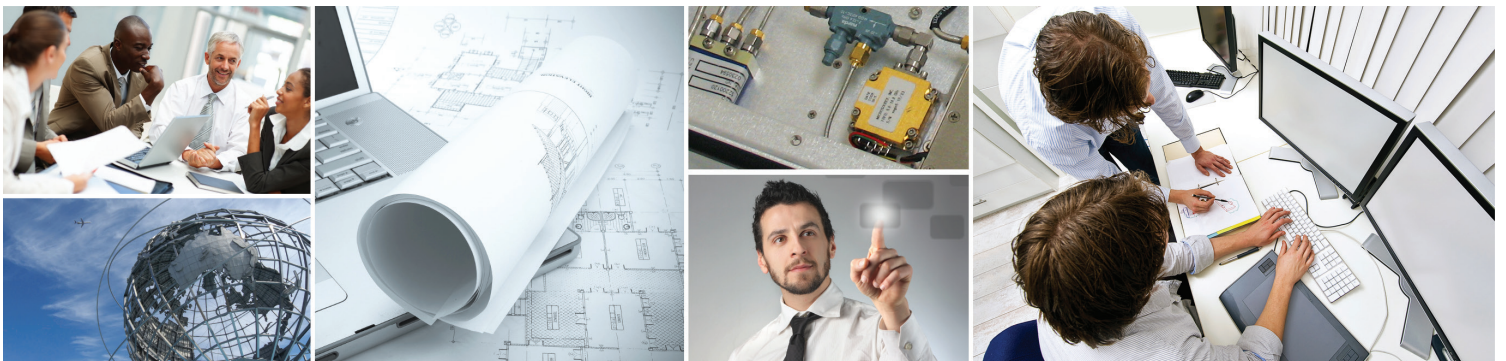
Typical Applications

- ❑ **Test Labs** – Whenever Microwave testing is repeated such as Qualification or Environmental Testing.
- ❑ **Production Test** – Custom solution can be fine-tuned to meet the customer's exact Test Requirements.
- ❑ **Product Support** – Customer Support can easily duplicate the testing being performed on the production line.
- ❑ **Incoming Inspection** – When specific tests must be performed on RF components at incoming inspection, and repeatability is essential.

Contact a Giga-tronics switching expert to help with your design.
email: applications@gigatronics.com



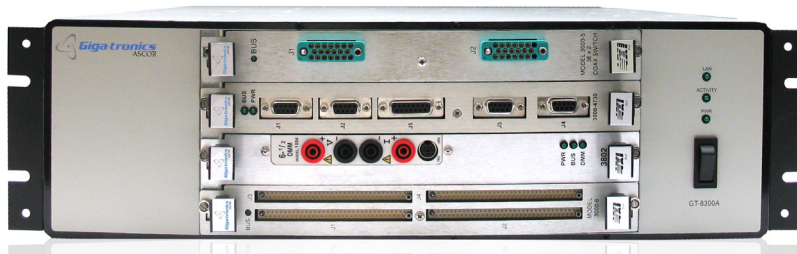
GIGA-TRONICS WILL DESIGN, BUILD, DOCUMENT, AND TEST AN RFIU



GPIB or LAN Switching Chassis, DC to Microwave

GT-8300A Series Chassis for 3000 Series Products

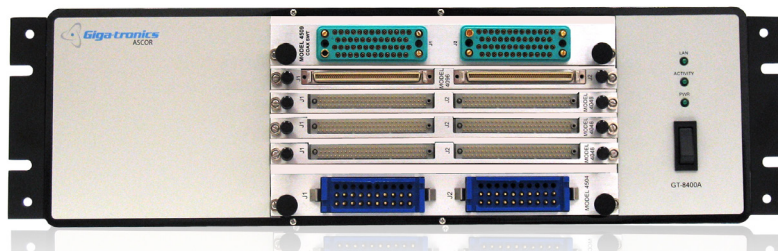
- **3U Tall 4 Slot Chassis** – Holds up to 4 single wide High Density switching modules.
- **6U Form Factor** – the 6U form factor will accommodate 3-4 times the number of relays as 3U PXI products eliminating the need to build switching structures across boards reducing Bandwidth.
- 3000 series switch modules selection guide (page)



3000 Series Switch Modules with GT-8300A Chassis

GT-8400A Series Chassis for 4000 Series Products

- **3U Tall 8 Slot Chassis** – Holds up to 8 single wide High Density switching modules.
- **Internal Analog Backplane** – The 4000 series switch cards can make use of the chassis' 32 channel 500 MHz backplane.
- **6U Form Factor** – the 6U form factor will accommodate 3-4 times the number of relays as 3U PXI products eliminating the need to build switching structures across boards decreasing Bandwidth.
- 4000 series switch modules selection guide (page)



4000 Series Switch Modules with GT-8400A Chassis

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Capabilities:

- Built-in Resource Manager
- Low Noise and High Isolation
- Star Switching
- Ultra-High Density
- Point-to-Point Software GUI
- Ultra-Quiet Power Supply
- Power Supply Indicators
- Visual and Audio Alarms
- Lab Windows Driver w/Source



Giga-tronics
ASCOR

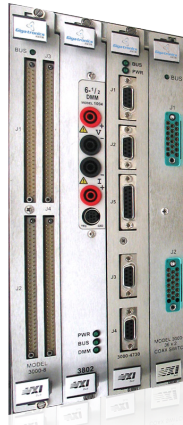
High Density VXI Switch Modules - DC to Microwave

3000 Series Switching

Overview:

- **3U Tall 4 Slot Chassis** – Holds up to 4 single wide High Density switching modules.
- **6U Form Factor** – the 6U form factor will accommodate 3-4 times the number of relays as 3U PXI products eliminating the need to build switching structures across boards reducing Bandwidth.

3000 Series Selection Guide (page 15-17)



Capabilities:

- Built-in Resource Manager
- Low Noise and High Isolation
- Star Switching
- Ultra-High Density
- Point-to-Point Software GUI
- Ultra-Quiet Power Supply
- Power Supply Indicators
- Visual and Audio Alarms
- Lab Windows Driver w/Source



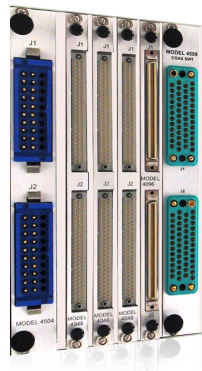
High Density VXI Switch Modules - DC to Microwave

4000 Series Switching

Overview:

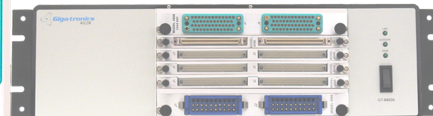
- **3U Tall 8 Slot Chassis** – Holds up to 8 single wide High Density switching modules.
- **Internal Analog Backplane** – The 4000 series switch cards can make use of the chassis' 32 channel 500 MHz backplane.
- **6U Form Factor** – the 6U form factor will accommodate 3-4 times the number of relays as 3U PXI products eliminating the need to build switching structures across boards decreasing Bandwidth.

4000 Series Selection Guide (page 18-19)



Capabilities:

- Built-in Resource Manager
- **High Signal Integrity Backplane**
- Low Noise and High Isolation
- Star Switching
- Ultra-High Density
- Point-to-Point Software GUI
- Ultra-Quiet Power Supply
- Power Supply Indicators
- Visual and Audio Alarms
- Lab Windows Driver w/Source



High Performance PXI Switch Modules

7000 Series Switching

Overview:

- **3U Tall** – Meets PXI 2.0 and cPCI specifications.
- **High Performance** – Industry leading Performance from the 3000 and 4000 Series products brought to PXI, Giga-tronics ASCOR's focus is performance over price.
 - Shielded Reed Relays – provide not only a shield over the entire Relay contact area, but also brings out the shield contacts at both ends so that a continuous shield can be maintained throughout the path.
 - Stripline PC Board design – creates a continuous 50Ω path from the connector, through the shielded relay, and back to the connector. In this way, the Switch Card becomes an extension of the Cable Harness.



7000 Series Selection Guide (page 20)

Tektronix Replacement - VXI

Overview:

Giga-tronics ASCOR offers a family of products to support Tektronix VXI users. Our Tektronix Replacement Card is a true drop-in replacement with full software and hardware compatibility for Tektronix VXI module. Truly compatible functions and specifications were achieved in the product development efforts. We are the only company able to offer you form-fit-function built on superior design architecture. There are no special cables or adapters required. Our Tektronix Replacement cards offer:

- Register-based VXI versions which use Plug&Play Software Drivers
- Message-based VXI versions (MPU Internal) which respond to standard SCPI commands
- Identical Front Panel Connectors, with the same signal on the same pin as the Tektronix module
- ASCOR Superior Design Architecture results in identical or Improved Specifications over the original Tektronix specifications
- The ASCOR provided Software Plug&Play Driver will drive a mixture of ASCOR replacements and original Tektronix cards in the same chassis at the same time



Model #	Description	Manufacturer Part #
VXI 3000-4320*	Eight 1x4 Coaxial Switches (Replaces Tektronix VX4320)	90401351
VXI 3000-4350*	64 SPDT Switch (Replaces Tektronix VX4350)	90401340
VXI 3000-4351*	40 SPST Switch (Replaces Tektronix VX4351)	90401220
VXI 3000-4353*	32 SPST Switch (Replaces Tektronix VX4353)	90401310
VXI 3000-4356*	20 DPDT Switch (Replaces Tektronix VX4356)	90401290
VXI 3000-4357*	32 SPDT Switch (Replaces Tektronix VX4357)	90401200
VXI 3000-4380	256 Cross Point Matrix (Replaces Tektronix VX4380)	90401270
VXI 3000-4730*	12 Channel DAC, 16 BITS (Replaces Tektronix VX4730)	90401320
VXI 3000-4801	48 TTL/CMOS compatible Optically Isolated I/O line. 48 optically isolated TTL or CMOS compatible bidirectional digital I/O lines, organized as six 8-bit bytes. Define mask for I/O, latch data via software or external handshake.	90401250
VXI 3000-4802	80 TTL/CMOS compatible I/O lines. 80 TTL or CMOS compatible bidirectional digital I/O lines, organized as six 8-bit bytes. Define mask for I/O, latch data via software or external handshake.	90401260
VXI 3000-A308	Register based 80 Channel Driver (Replaces Tektronix 73A308). 80 open collector outputs	90401230

* Register based driver will control both Tektronics as well as the ASCOR version of this switch

** Message based driver will control both Tektronics as well as the ASCOR version of this switch

Need more details about each Tektronix Replacement switch module? Download the datasheet.

<http://www.gigatronics.com/ASCOR-Tektronix-Replacement-Technical-Information>
or scan the QR code to access the webpage.



3000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
3000-04	90400660	Digital/Driver	128 Channel Relay Driver		45V	500 mA	(+12V Terminations Std)
3000-04 Opt 1	90400660-001	Digital/Driver	128 Channel Relay Driver		45V	500 mA	with SCSI Connectors
3000-48	90400390	Digital/Driver	16 Channel High Power Source Driver		50V	4A	
3000-49	90400400	Digital/Driver	16 Channel High Power Sink Driver		50V	4A	
3000-61	90401390	Digital/Driver	128 Channel Digital I/O CMOS				
3000-61 Opt 3	90401390-003	Digital/Driver	128 Channel Digital I/O CMOS with 64 Ch Differential				
3000-62	90400840	Digital/Driver	128 Channel TTL I/O (1-slot Motherboard)		5V		
3000-62 Opt 1	90400840-001	Digital/Driver	Additional 128 Channel TTL I/O 256 Total		5V		Specify Termination
3000-62 Opt 2	90400840-002	Digital/Driver	128 Channel TTL I/O (1-slot Motherboard) with 96Ch Daughterboard		5V		Specify Termination
3000-62 Opt 3	90400840-003	Digital/Driver	128 Channel TTL I/O (1-slot Motherboard) with 64 Differential Drivers Daughterboard		5V		Specify Termination
3000-62 Opt 4	90400840-004	Digital/Driver	128 Channel TTL I/O (1-slot Motherboard) with 128 Relay Driver Daughterboard		5V		Specify Termination
3000-63	90401400	Digital/Driver	128 Channel OC TTL Drivers		5V	64ma	
3000-63 Opt 1	90401400-001	Digital/Driver	256 Channel OC TTL Drivers		5V	64ma	
3000-12	90400570	General	32 DPDT Switch Module	55MHz	220VAC	2A	Component Mounting locations
3000-53	90400530	General	96 SPDT Switch Module	5MHz	220VAC, 250VDC	1A	(1-slot)
3000-53A	90400530-101	General	144 SPDT Switch Module	5MHz	220VAC, 250VDC	1A	(2-slot)
3000-53B		General	192 SPDT Switch Module	5MHz	220VAC, 250VDC	1A	(2-slot)
3000-56	90400870	General, Shielded	64 SPDT Switch Module	500MHz	200VDC, 200VACpk	1A	
3000-60	90401190	General	32 DPDT Switch Module	180MHz	220VDC, 250VAC	2A	Component Mounting locations
3000-05	90400100-002	Matrix Coax	1(2x36) Coaxial Matrix	350MHz	200VDC	0.5A	Wired Construction
3000-06	90400260-001	Matrix Coax	2(2x18) Coaxial Matrix	350MHz	200VDC	0.5A	Wired Construction
3000-25	90400920	Matrix Coax	7(2x6) Coaxial Matrix	500MHz	200VDC	1A	Wired Construction
3000-30	90400280-001	Matrix Coax	2(2x6) & 2(2x12) Coaxial Matrix	500MHz	200VDC	1A	Wired Construction
3000-34	90400190	Matrix, Shielded	4(2x32) 1-wire Matrix or 2(2x64), or 1(1x128)	45MHz	200VDC, 200VACpk	1A	Factory Jumper Configurable
3000-39	90400300-002	Matrix	Universal I/O Card (1-slot)	500MHz	200VDC, 200VACpk	0.5A	
3000-39A	90400300-003	Matrix	Universal IO Card (2-slot)	500MHz	200VDC, 200VACpk	0.5A	
3000-39B	90400300-004	Matrix	Universal IO Card (2-slot)	500MHz	200VDC, 200VACpk	0.5A	

3000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
3000-44	90400650	Matrix, Shielded	(2x128) 2-wire Matrix	70MHz	200VDC, 200VACpk	1.5A	
3000-44 Opt 1	90400650-101	Matrix, Shielded	2(2x64) 2-wire Matrix	70MHz	200VDC, 200VACpk	1.5A	
3000-45	90400320	Matrix, Shielded	(4x64) 2-wire Matrix (1-slot)	70MHz	200VDC, 200VACpk	1.5A	Unshielded Version = -57
3000-45B	90400790	Matrix, Shielded	(4x128) 2-wire Matrix (2-slot)	70MHz	200VDC, 200VACpk	1.5A	
3000-47	90400800	Matrix, Shielded	(8x32) 2-wire Matrix	90MHz	200VDC, 200VACpk	1.5A	Unshielded Version = -52
3000-47 Opt 1	90400800-001	Matrix, Shielded	2(8x16) 2-wire Matrix	90MHz	200VDC, 200VACpk	1.5A	
3000-52	90400810	Matrix	(8x32) 2-wire Matrix	70MHz	220VDC, 250VAC	2A	IDC, Shielded Version = -47
3000-52 opt 1	90400810-001	Matrix	2(8x16) 2-wire Matrix	70MHz	220VDC, 250VAC	2A	IDC connectors
3000-52 opt 2	90400810-002	Matrix	(8x32) 2-wire Matrix	70MHz	220VDC, 250VAC	2A	Airborn connectors
3000-52 opt 3	90400810-003	Matrix	2(8x16) 2-wire Matrix	70MHz	220VDC, 250VAC	2A	Airborn connectors
3000-52 opt 4	90400810-101	Matrix	2(8x16) 2-wire Matrix	70MHz	220VDC, 250VAC	2A	IDC conn w/latches
3000-57	90401010	Matrix	1(4x64) 2-wire Matrix	45MHz	220VDC, 250VAC	2A	Shielded Version = -45
3000-57 Opt 1	90401010-001	Matrix	2(4x32) 2-wire Matrix	45MHz	220VDC, 250VAC	2A	
3000-80	90401160	Microwave	6(1x6) Coaxial Multiplexer	26.5GHz			SMA Rotary Switches
3000-2xxxx		Microwave	Custom Configured	26.5GHz			SMA Rotary Switches
3000-03	90400620-001	Multiplexer, Shielded	Prog 4(1x30) 1-wire Multiplexer	35MHz	200VDC, 200VACpk	0.5A	
3000-03	90400620-100	Multiplexer, Shielded	Fixed 1(1x120) 1-wire Multiplexer	35MHz	200VDC, 200VACpk	0.5A	
3000-08	90400490-100	Multiplexer, Shielded	Prog 2(1x120) or 4(1x60) 1-wire Multiplexer	40MHz	200VDC, 200VACpk	0.5A	3000-03 with Daughter Card
3000-08	90400490-102	Multiplexer, Shielded	Fixed 2(1x60) and 4(1x30) 1-wire Multiplexer	40MHz	200VDC, 200VACpk	0.5A	
3000-08	90400490-105	Multiplexer, Shielded	Prog 2(1x6) or 1(1x120) and Fixed 4(1x30) 1-wire Multiplexer	40MHz	200VDC, 200VACpk	0.5A	
3000-08	90400490-106	Multiplexer, Shielded	Fixed 2(1x120) 1-wire Multiplexer	40MHz	200VDC, 200VACpk	0.5A	
3000-09	90400230	Multiplexer, Shielded	Prog 4(1x120) 1-wire Multiplexer	40MHz	200VDC, 200VACpk	0.5A	3000-03 with 3 Daughter Cards
3000-32	90400290-001	Multiplexer, Coax	4 (1x8) & 8(1x4) & 8(1x2) Coaxial Multiplexer	900MHz	200VDC, 200VACpk	1A	Wired Construction
3000-32 Opt 5	90400290-005	Multiplexer, Coax	4(1x8) & 8(1x4) Coaxial Multiplexer	900MHz	200VDC, 200VACpk	1A	Wired Construction

3000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
3000-38	90401360	Multiplexer	16(1x8) 1-wire Multiplexer	40MHz	250VAC, 250VDC	1A	
3000-46	90400750	Multiplexer, Shielded	64 DPDT & 16(1x8) 1-wire Multiplexer	100MHz	220VDC, 250VAC	1.5A	Digital/Analog Isolation
3000-66	90401180	Multiplexer, Shielded	16(1x4) 2-wire Multiplexer	350MHz	200VDC, 200VACpk	1A	
3000-01	90400060	Power	8(1x8) 1-wire Power Multiplexer	n/a	250VAC, 150VDC	5A	Wired Construction
3000-02	90400120-002	Power	96 SPST Power Switch Module	n/a	250VAC, 250VDC	5A	Wired Construction
3000-42	90400710	Power	48 SPDT Power Switch Module	50MHz	277VAC, 110VDC	5A	Component Mounting locations
3000-43	90400830	Power	48 SPST Power Switch Module	n/a	250VAC, 110VDC	10A	Wired Construction
3000-51	90401460	Power	20 SPDT Power Switch Module	n/a	250VAC, 30VDC	20A	Wired Construction
3000-59	90401380	Power	32 SPDT	10MHz	250VAC, 150VDC	10A	Wired Construction
3000-27	90400250	Resistance	10 Channel Programmable Resistor (20-1.31M ohms)				0.25W
3000-27 Opt 2	90400250-002	Resistance	5 Resistor channels Motherboard Only				0.25W
3000-154	90401660	RF	12(1x4) Coaxial Multiplexers, SMB	1.3GHz	24VDC	1A	Wired Construction
3000-155	90401650	RF	1(4x4) Coaxial Matrix, SMB	1.5GHz	24VDC	1A	Wired Construction
3000-155A	90401650-001	RF	2(4x4) Coaxial Matrix, SMB	1.5GHz	24VDC	1A	Wired Construction
3000-155A	90401650-101	RF	2(4x4) Coaxial Matrix, SMC	1.5GHz	24VDC	1A	Wired Construction

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4000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
4050	90900340	Digital	128 Channel Digital IO Module (contact factory for driver options)				TTL, CMOS, OC, Diff
4032	90900230	General	32 SPDT (0.6" pitch)	55MHz	220VDC, 250VAC	2A	Component Mounting locations
4049	90900330	General	64 SPST (0.6" pitch)		220VDC, 250VAC	2A	Dual Contacts
4064	90900350	General, Shielded	64 SPST (0.6" pitch)	70MHz	200VDC, 200VACpk	1A	Dual Contacts
4096	90900280	General	96 SPST (0.6" pitch)	92MHz	220VDC, 250VAC	1A	Dual Contacts
4148	90900210	General	48 SPDT (0.6" pitch)	235MHz	220VDC, 250VAC	2A	
4503	90900300	General	20 SPDT Relays (1" pitch)		200VDC, 250VAC	20A	Wired Construction
4504	90900270	General	20 SPST Relays (1" pitch)		200VDC, 250VAC	20A	Wired Construction
4507	90900170	General	36 SPDT Switch Module (0.6" pitch)	100MHz	200VDC, 250VAC	2A	
4164	90900250	Matrix, Shielded	(2x64) 1-wire Matrix (0.6" pitch)	32MHz	200VDC, 200VACpk	1A	
4216	90900370	Matrix	(8x16) 2-wire Matrix (0.6" pitch)		220VDC, 250VAC	2A	
4264	90900410	Matrix	(1x64) 2-Wire Matrix (0.6" pitch)				New Design
4116	90900360	Matrix, Shielded	(4x16) 1-wire Matrix (0.6" pitch)	70MHz	200VDC, 200VACpk	1A	
4132	90900020	Matrix, Shielded	(4x32) 1-wire Matrix (0.6" pitch)	50MHz	200VDC, 200VACpk	1A	
4228	90900380	Matrix, Shielded	(2x64) 2-Wire Matrix (0.6" pitch)	50MHz	200VDC, 200VACpk	1A	
4229	90900390	Matrix	(2x64) 2-Wire Matrix (0.6" pitch)	50MHz	220VDC, 250VAC	2A	
4232	90900400	Matrix	(4x32) 2-Wire Matrix (0.6" pitch)	80MHz	220VDC, 250VAC	2A	
4208	90900050	Multiplexer	6(1x8) 2-wire Multiplexers (0.6" pitch)	60MHz	220VDC, 250VAC	2A	
4308	90900420	Multiplexer Coax	8(1x2), 6(1x8), 2(1x4) RF Mux (0.6" pitch)	900MHz	200VDC, 200VAC	1A	Wired Construction
4508	90900180	Multiplexer	22(1x4) 1-wire Multiplexer (0.6" pitch)	124 MHz	220VDC, 250VAC	2A	
4515	90900080	Multiplexer	8(1x6) 2-wire Multiplexers (0.6" pitch)	50MHz	250VDC, 250VAC	5A	
4516	90900090	Multiplexer	10(1x8) 1-wire Multiplexers (0.6" pitch)		250VDC, 250VAC	5A	
4108	90900060	Multiplexer, Shielded	12(1x8) 1-wire Multiplexers (0.6" pitch)	100 MHz	200VDC, 200VACpk	1A	
4512	90900070	Multiplexer, Shielded	2(1x32) 2-wire Multiplexers (0.6" pitch)	60MHz	200VDC, 200VACpk	1A	Backplane Access
4048	90900220	Power	48 SPDT (0.6" pitch)	50MHz	150VDC, 400VACpk	5A	Component Mounting Locations
4505	90900150	Power	5(1x4) & 5(1x2) Power Multiplexer (1" pitch)	1Khz	250VDC, 250VAC	20A	Wired Construction
4506	90900160	Power	12(1x4) Power Multiplexer (1" pitch)	1Khz	250VDC, 250VAC	20A	Wired Construction
4509	90900190	RF	17(1x4), 5(1x2), Coax Multiplexers	1.3GHz	30VDC	0.5A	Wired Construction
4518	90900130	Special, Shielded	Analog Backplane Output Isolation (0.6" pitch)	50MHz	200VDC, 200VACpk	0.5A	Backplane Access
4513	90900110	Star, Shielded	(8x8) 1-wire Matrix & 8(4-pole) Star Switches (0.6" pitch)	50MHz	200VDC, 200VACpk	0.5A	Backplane Access

4000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
4332	90900120	Star, Shielded	8(8-pole) 1-wire, Star Switches (0.6" pitch)	50MHz	200VDC, 200VACpk	0.5A	Backplane Access
4517	90900100	Star, Shielded	8(10-pole) 2-wire, Star Switches (0.6" pitch)		200VDC, 200VACpk	1A	Backplane Access

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
4501	90900030	Matrix	Coaxial Star and (9x10)Matrix	800MHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request
4502	90900040	Matrix	16(3-P) & 16(4-P STAR), (4x6) 2-wire Matrix	200MHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request
4510	90900460	Matrix	16(4x8) 2-wire Matrix	25MHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request
4524	90900470	Matrix	DUAL(8X8) 1-wire Shielded Matrix	900MHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request
4525	90900440	Matrix	(16X48) 1-wire Matrix	450MHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request
4526	90900430	Coax	6(1X4) Coaxial Switches	1.5GHz	200VDC, 200VACpk	1A	Built in Series 80 Funnel Quote Request

Model #	Manufacturer #	Description
4003A-6	90401170	3 VXI Wide Multi-Slot Module 5 slots (.6 pitch), M-Module ready
4004B-6	90401590	4 VXI Wide Multi-Slot Module 7 slots (.6 pitch)
4004B-12	90401520	4 VXI Wide Multi-Slot Module 4 slots (1.2 pitch)
4005A-12	90401440	5 VXI Wide Multi-Slot Module 5 slots (1.2 pitch)
4005B-6	90401600	5 VXI Wide Multi-Slot Module 9 slots (.6 pitch)
4006B-6	90401610	6 VXI Wide Multi-Slot Module 11 slots (.6 pitch)
4007B-6	90401620	7 VXI Wide Multi-Slot Module 13 slots (.6 pitch)
4008B-6	90401630	8 VXI Wide Multi-Slot Module 15 slots (.6 pitch)
4008B-2	90401540	8 VXI Wide Multi-Slot Module 8 slots (1.2 pitch)

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7000 Series Switch Module Selection Guide

Model	Part Number	Type	Form	Bandwidth	Max Voltage	Max Current	Comment
7016	91000030	Digital	32 Channel TTL I/O				
7010	91000010	General	8 SPDT	100MHz	150VDC, 380VAC	10A	Wired Construction
7017	91000120	General	32 Channel OC Relay Drivers		50VDC	500ma/ch	Wired Construction
7018	91000150	General	32 SPST	153MHz	220VDC, 250VAC	2A	
7019	91000090	General	16 SPDT	67MHz	110VDC, 277VAC	5A	
7020	91000060	General	16 SPDT	67MHz	220VDC, 250VAC	2A	
7020T	91000061	General	16 SPDT	67MHz	220VDC, 250VAC	2A	
7023	91000110	General, Shielded	32 SPST	103MHz	200VDC, 200VACpk	1A	
7011	91000140	Matrix	(2x16) 2-Wire Matrix	50MHz	220VDC, 250VAC	2A	
7012	91000020	Matrix, Shielded	(2x16) 1-Wire Matrix	113MHz	200VDC, 200VACpk	1A	
7013	91000070	Matrix	(4x8) 2-wire Matrix	178MHz	220VDC, 250VAC	2A	
7015	91000040	Matrix, Shielded	(2x16) 1-wire Matrix	90 MHz	200VDC, 200VACpk	1A	Digital/Analog Isolation
7021	91000080	Matrix, Shielded	(2x16) 2-wire Matrix	90MHz	200VDC, 200VACpk	1A	
7022	91000100	Matrix, Shielded	(4x16) 1-wire Matrix	90MHz	200VDC, 200VACpk	1A	
7024	91000130	Matrix, Shielded	(4x8) 2-wire Matrix	90MHz	200VDC, 200VACpk	1A	
7027	91000210	Matrix	4(1X8) 2-wire Matrix or 2(1x16), or 1(1x24) & 1 (1x8), or 1(1x32)	73MHz	220VDC, 250VAC	2A	Software Configurable
720x		Microwave	Microwave Switching Platform 1x2, 1x4, 1x6, DPDT DC-40GHz	40GHz			Custom Configured
7014	91000050	Multiplexer, Shielded	4(1x4) 1-wire Multiplexers or 2(1x8), or 1(1x16)	150MHz	200VDC, 200VACpk	1A	Multiple Connection Points
7026	91000200	Multiplexer	(1x32) 2-wire Multiplexer	26MHz	220VDC, 250VAC	2A	

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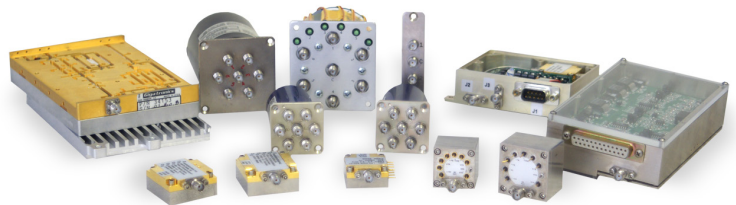
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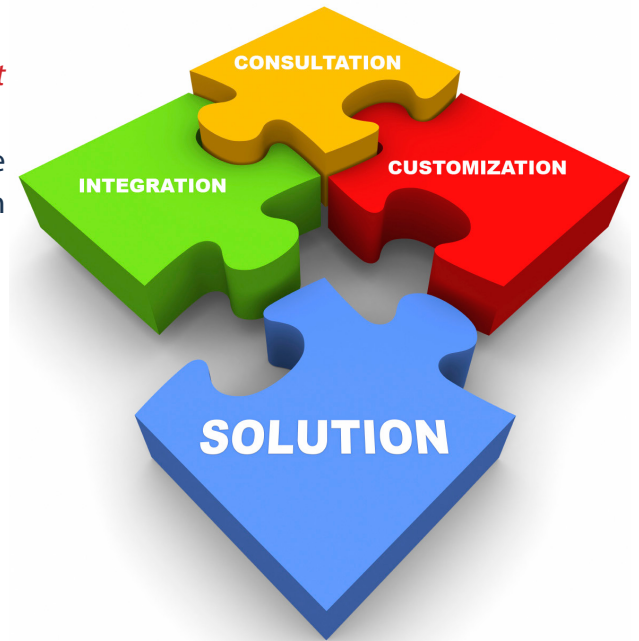


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