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AirBorn

HIGH-SPEED CONNECTORS

MULTI-GIGABIT HYBRID

High speed solutions for mission critical applications.

Configurable

AirBorn

July 2010

AirBorn is an international, middle-market, value added solutions provider. For over 50 years, our foundation has been connector manufacturing, producing integrated technology solutions for high reliability applications for the military and aerospace markets. The customer base expanded to include a wide range of connectors, power supplies, flexible circuits, and value added services and solutions. We are proud to have become very well known for our value added service and high quality of the products we provide. We partner with our customers in multiple industries: aerospace/avionics, defense, geophysical, energy, industrial, automotive and medical.

This catalog contains performance information and technical drawings to provide a solution from design stage through production specifications. The products in this catalog are organized by the AirBorn part number assigned to them.

Each connector part number identifies six elements:

- Series
- Modules and Contacts
- Body Style
- Contact Termination
- Body Material and Body Finish
- Hardware (optional)

Each catalog page shows the choices available for each of these elements. If you do not find a particular connector size or option, please contact AirBorn for further assistance. AirBorn can manufacture special configurations for your exact specifications.

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RUGGED HIGH SPEED CONNECTORS

TABLE OF CONTENTS

Specifications
Materials and Finishes*

Contacts:	Pins: BeCu alloy strip per ASTM B 194 Sockets: Brass per ASTM B 121/B 121M, ASTM B 16/B 16M, ASTM B 453			
Contact Finish:	Gold plate per ASTM B 488			
Embedment:	Insulating compound per MIL-I-16923			
Molded Insulators:	Glass filled Liquid Crystal Polymer (LCP) per MIL-M-24519			
Shells:	Aluminum Alloy 6061-T6 per QQ-A-250/11 or 6061-T5611 per QQ-A-200/8			
Aluminum Shell Finishes:	Electroless Nickel per SAE AMS-2404 Electrodeposited Cadmium per SAE AMS-QQ-P-416 Gold per MIL-DTL-45204			
Jackscrews and Jacknuts:	Corrosion resistant steel per ASTM A 484/A 484M and ASTM A 582/A 582M, Passivated per SAE AMS-2700			
Face Seal Gaskets:	Fluorosilicone per SAE AMS-R-25988			
Tolerances:	Unless otherwise specified:	Fractions	=	±1/64
		Decimals	=	±0.010
		Angles	=	±5°
		Wire Lengths		
		Insulated/stranded	=	+1.0”/-0.0”

* = Reference the above listed specifications or an equivalent industry standard when applicable.

Performance*

High Speed Differential Pairs:	Per Quad Module: Pair 1 – 3 Pair 2 – 4
Differential Impedance:	100Ω±10Ω** 110Ω±6Ω**
Wire Size:	Signal: Stranded 24 AWG, 26 AWG, 28 AWG, or 30 AWG High Speed: Stranded 24 AWG, 26 AWG, 28 AWG, or 30 AWG PCB Leads: Solid 28 AWG
Signal Contact Rating:	3-amperes maximum
Test Voltage:	600 V, RMS, 60 Hz
Operating Temperature:	-55°C to +125°C
Insulation Resistance:	5000 megohms minimum @ 500 VDC
Durability:	500 connector mating cycles
Vibration:	Tested in accordance with MIL-STD-1344, Method 2005, Condition IV
Shock:	Tested in accordance with MIL-STD-1344, Method 2004, Condition E
Salt Spray:	Mated connectors tested in accordance with MIL-STD-1344, Method 1001, Test Condition B
Humidity:	Mated connectors tested in accordance with MIL-STD-1344, Method 1002, Type II (except steps 7a and 7b)
Thermal Shock:	Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 125°C)
Contact Resistance:	0.065 Volt maximum drop @ 2.5 amps (0.026Ω)
Contact Engaging Force:	6.0 ounce maximum, with 0.0221 diameter test sleeve
Contact Separating Force:	0.5 ounce minimum, with 0.023 diameter test sleeve

* = Signals and overall construction meets or exceeds MIL-DTL-83513 Performance Specifications.
** = Differential impedance in the mated connectors shall be the stated impedance ±20Ω when measured using a TDR pulse with a rise time of 250 ps when mated connectors are terminated to equal impedance differential cables.

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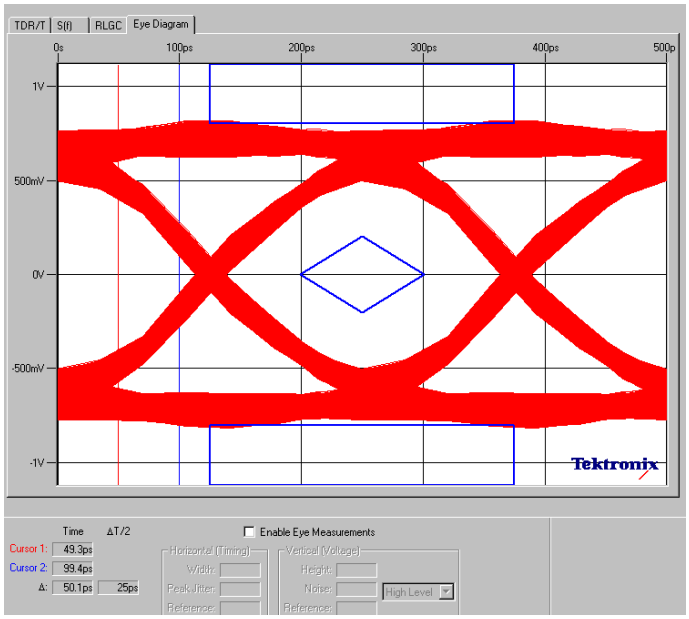
High Speed Performance

Eye Pattern

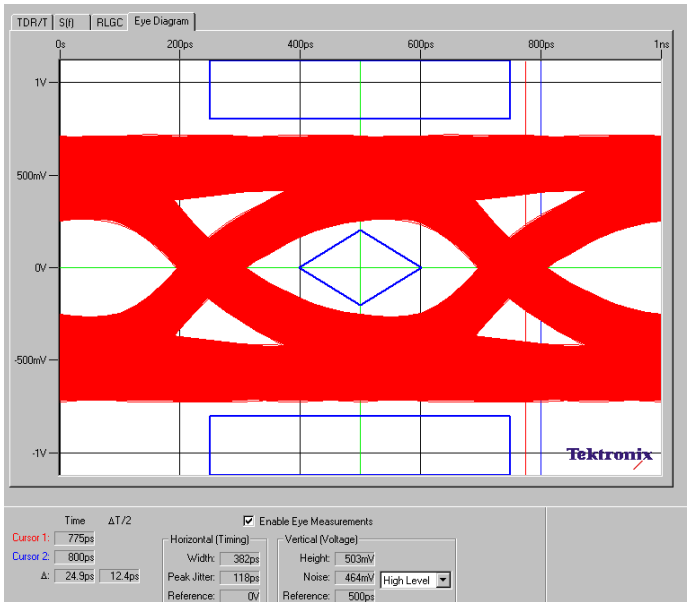
Sample results of eye patterns using 110Ω 30 AWG Quadrax Cable using an IEEE 1394B mask running at 2 Gbps. Cable length is 3 feet and 14.7 feet.

Contact factory for application specific questions.

3 Feet



14.7 Feet



BODY LENGTH CALCULATION
RUGGED HIGH SPEED I/O, JUMPERS, H-SMT, & V-SMT
(Not Rear Panel Mount)

INSTRUCTIONS:

1. Select quantity of modules (1-10) and, if needed, a SIGxx from Table A.
2. Add the sum of the selections from Table A to the sum of the gaps between modules and SIGxx's from Table B.
3. Add 0.896 to your previous sum to get the body length.

NOTES:

1. Do not exceed 3.25 inches body length.
2. Modules may go next to modules or SIGxx's.
3. Signals (SIGxx) may only go next to modules.
4. Only count gaps between insulators: not before the first insulator or after the last insulator.
5. By default, modules will be next to the square end of the interface, not the key end.
6. Consult factory for alternate configurations (alternating modules/SIGxx's, etc.)

TABLE A	
	DIMENSION
MODULE	0.200
SIG10	0.321
SIG20	0.571
SIG30	0.821
SIG40	1.071
SIG50	1.321

PLUS

TABLE B		
	GAP DIMENSION IF PREVIOUS ZONE IS SIGxx	**GAP DIMENSION IF PREVIOUS ZONE IS MODULE**
MODULE	0.028	0.025
SIGxx		0.028

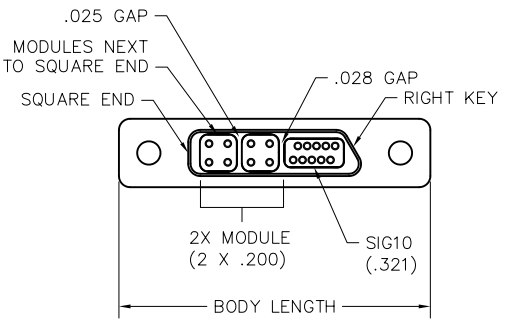
PLUS

0.896

= BODY LENGTH

EXAMPLE:
MMHS-02R1-11B-006-2000 =
Plug, 2 High Speed Modules + 10 position Signal

(0.200 X 2) + 0.321 = .721
Plus Gaps = (.025 + .028 = .053) + .721 = .774
Plus Constant = (.896) + .774 = **1.670 INCHES**



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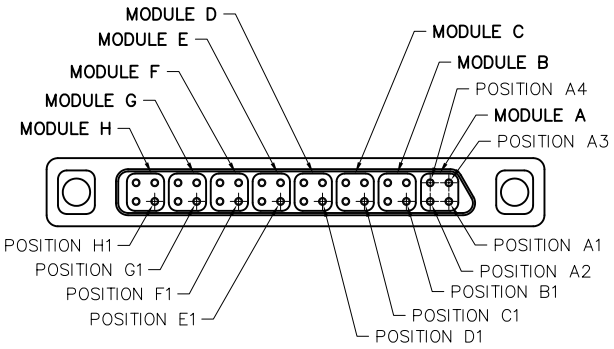
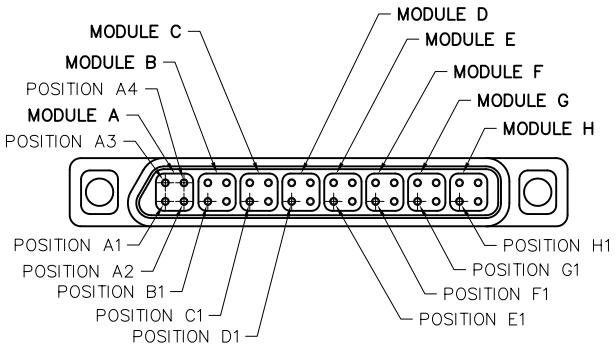
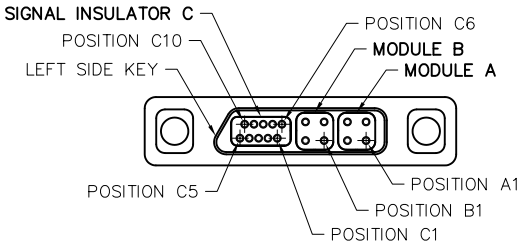
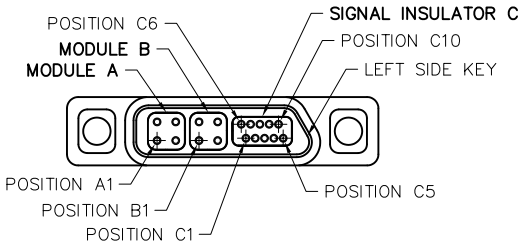
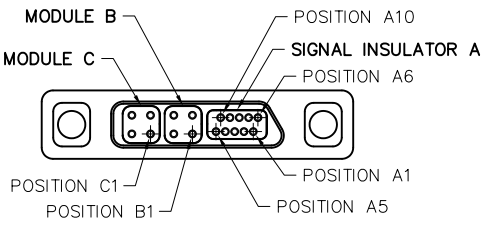
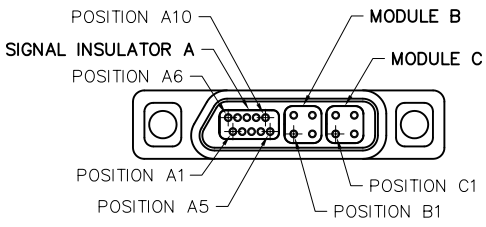
EXAMPLES OF STANDARD RUGGED HIGH SPEED INTERFACE LAYOUTS

Note: When looking at the PLUG interface, Position A1 is always on the Major Side - Right

PLUG	RECEPTACLE
8 MOD, NO SIGNALS, RIGHT KEY (MODULES AND CONTACT POSITION NUMBERING)	**8 MOD, NO SIGNALS, RIGHT KEY** (MODULES AND CONTACT POSITION NUMBERING)
	

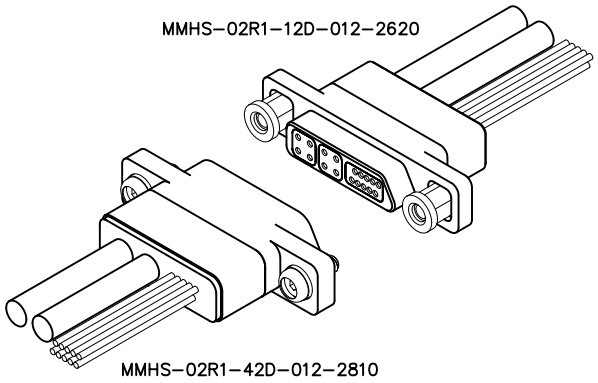
WHEN COMBINING MODULES AND SIGNALS
MODULES ARE ON NON-KEY SIDE OF THE INTERFACE

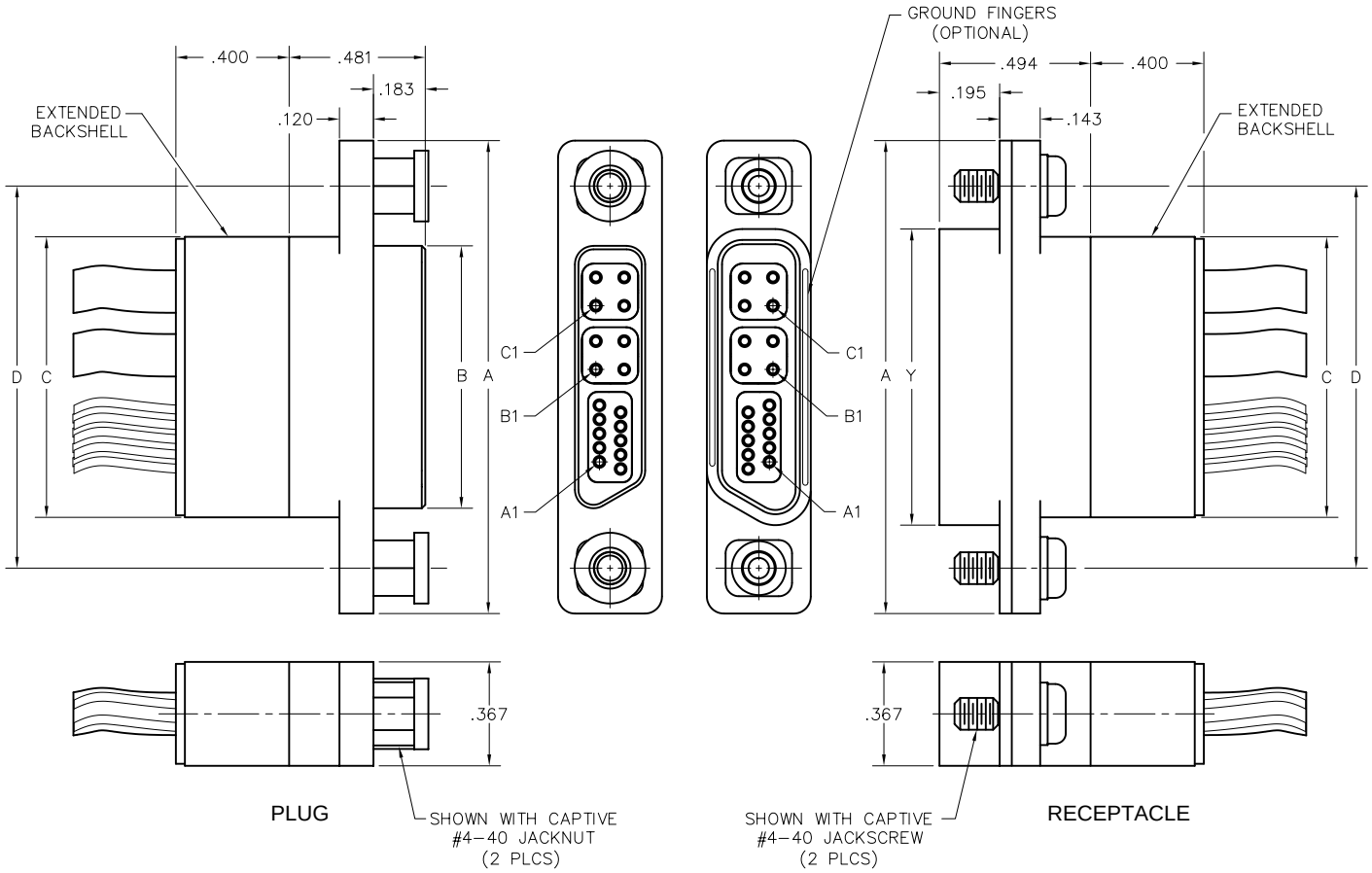
KEY	PLUGS	RECEPTACLES
LEFT	**2 MOD, 10 SIG, LEFT KEY** 	**2 MOD, 10 SIG, LEFT KEY** 
RIGHT	**2 MOD, 10 SIG, RIGHT KEY** 	**2 MOD, 10 SIG, RIGHT KEY** 

Rugged Cable I/O

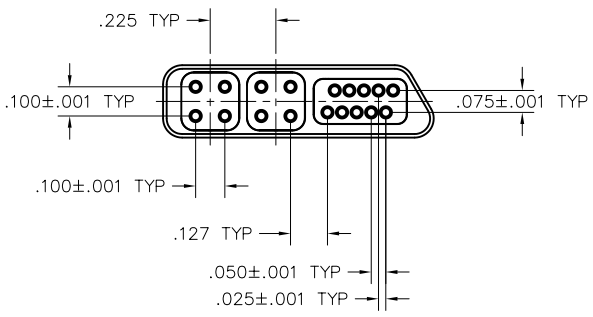
1 thru 10 High Speed Modules
0 thru 50 Signal Contacts

MMHS





INTERFACE DIMENSIONS



DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6)
B	"A" MINUS 0.744
C	"A" MINUS 0.680
D	"A" MINUS 0.320
Y	"A" MINUS 0.624

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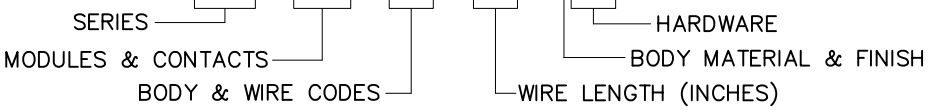
PLUG: MMHS – 05L2 – 12D – 197 – 2620
RECEPTACLE: MMHS – 02R1 – 41B – 039 – 2810
XXXX – XXXX – XXX – XXX – XXXX



PLUG

SERIES

MMHS HIGH SPEED Rugged Metal I/O Connector
(MMHS mates with MMHS, MKHS, MLHS, MJHS receptacles)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

1 Plug

WIRE TYPE & GAUGE - HIGH SPEED

X See Wire Code Page for High Speed Cable

WIRE TYPE & GAUGE - SIGNALS

0 No Signal Contacts
X See Wire Code Page

WIRE LENGTH

Wire Length in Inches - (Uses 3 digits)
(Example: 018 = 18 Inches) Minimum 3 Inches

BODY PLATING (LCP INSULATORS)

1 Electroless Nickel Plated Aluminum Shell - RoHS Compliant
2 Electroless Nickel Plated Aluminum Shell ☒
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
5 Gold Plated Aluminum Shell - RoHS Compliant
6 Gold Plated Aluminum Shell ☒

HARDWARE

000 No Hardware
620 Two Fixed Jacknuts - Captivated **
810 Two Turning Jackscrews, Allen Head, Captivated **
NXX Keying Jackpost Hardware, See Options ***
JXX Keying Jackscrew Hardware, See Options ***

RECEPTACLE

SERIES

MMHS HIGH SPEED Rugged Metal I/O Connector
(MMHS mates with MMHS, MKHS, MLHS, MJHS plugs)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

2 Receptacle
4 Receptacle with Ground Fingers (Preferred)

WIRE TYPE & GAUGE - HIGH SPEED

X See Wire Code Page for High Speed Cable

WIRE TYPE & GAUGE - SIGNALS

0 No Signal Contacts
X See Wire Code Page

WIRE LENGTH

Wire Length in Inches - (Uses 3 digits)
(Example: 018 = 18 Inches) Minimum 3 Inches

BODY PLATING (LCP INSULATORS)

1 Electroless Nickel Plated Aluminum Shell - RoHS Compliant
2 Electroless Nickel Plated Aluminum Shell ☒
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
5 Gold Plated Aluminum Shell - RoHS Compliant
6 Gold Plated Aluminum Shell ☒

HARDWARE

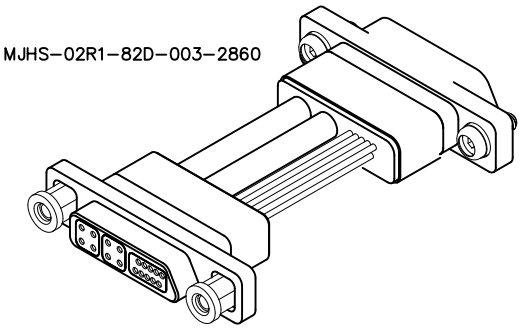
000 No Hardware
620 Two Fixed Jacknuts - Captivated **
810 Two Turning Jackscrews, Allen Head, Captivated **
NXX Keying Jackpost Hardware, See Options ***
JXX Keying Jackscrew Hardware, See Options ***

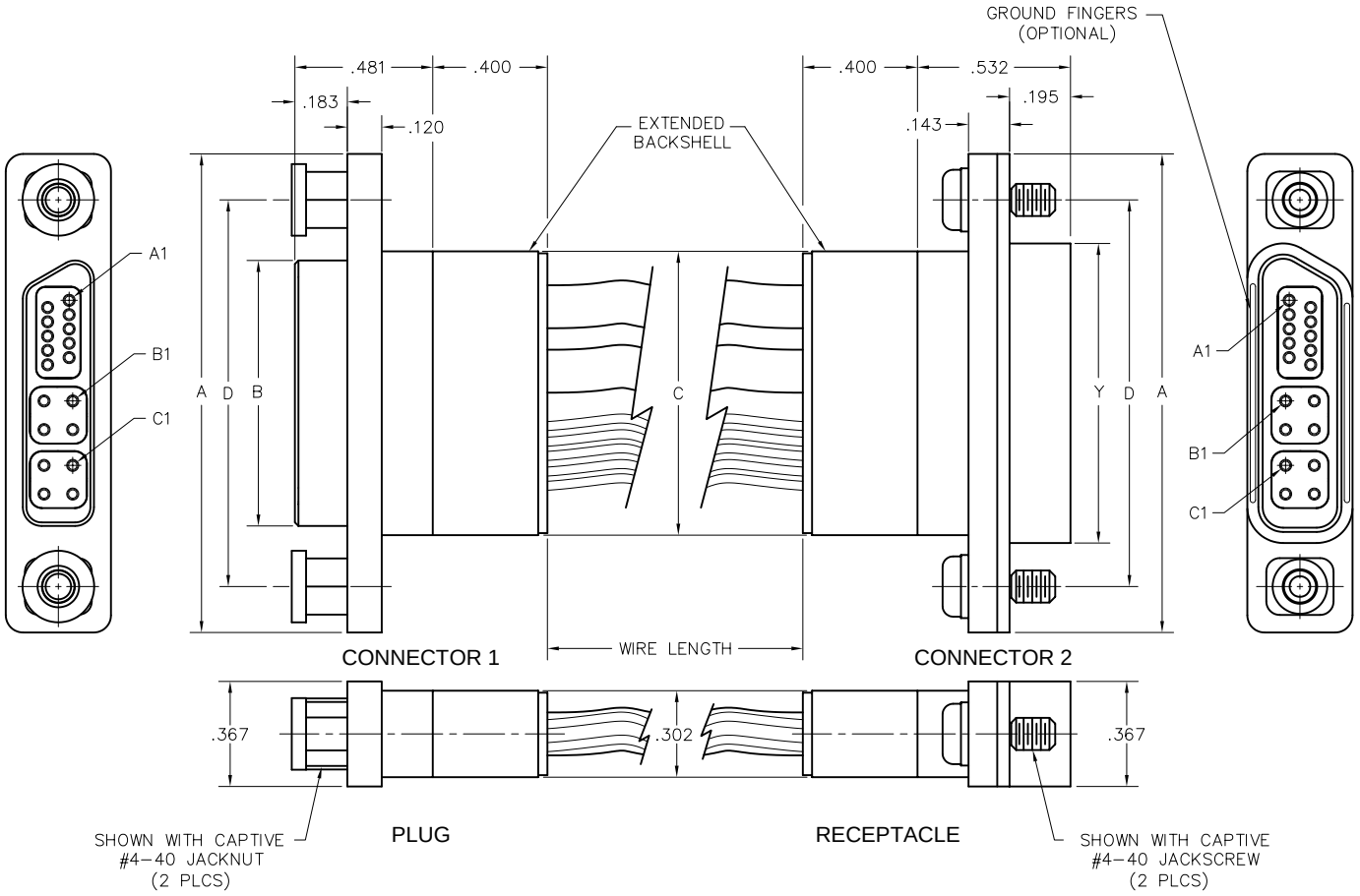
NOTES:
1. All high-speed receptacles have fluoropolymer interfacial seals.
☒ = Option not RoHS compliant in plating and/or internal terminations.
* = Left and right key is determined by looking at the PLUG interface with the LONG SIDE downward. The key is the angled side of the interface.
** = Captivated hardware is factory installed and non-removable.
*** = Refer to catalog Page 29 for keying options.

Rugged Jumper Cable

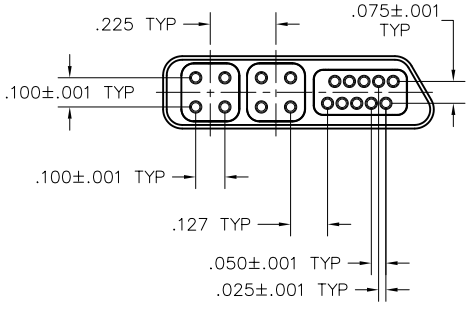
1 thru 10 High Speed Modules
0 thru 50 Signal Contacts

MJHS



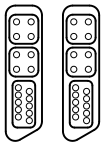
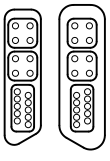
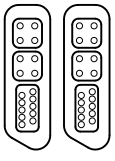


INTERFACE DIMENSIONS



DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6)
B	"A" MINUS 0.744
C	"A" MINUS 0.680
D	"A" MINUS 0.320
Y	"A" MINUS 0.624

MATING FACE ORIENTATION

PLUG TO PLUG	PLUG TO RCPT	RCPT TO RCPT
		

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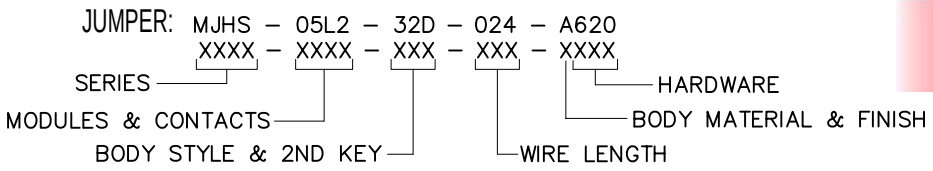


SERIES

MJHS HIGH SPEED Rugged Metal Jumper Assembly
(MJHS mates with MKHS, MLHS, and MMHS connectors)

HIGH SPEED MODULES

01	1 High Speed Module	06	6 High Speed Modules (Max Signal Count 30)
02	2 High Speed Modules	07	7 High Speed Modules (Max Signal Count 20)
03	3 High Speed Modules	08	8 High Speed Modules (Max Signal Count 10)
04	4 High Speed Modules	09	9 High Speed Modules (Max Signal Count 10)
05	5 High Speed Modules (Max Signal Count 40)	0A	10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0	Left Side Key - No Signal Contacts	R0	Right Side Key - No Signal Contacts
L1	Left Side Key - 10 Signal Contacts	R1	Right Side Key - 10 Signal Contacts
L2	Left Side Key - 20 Signal Contacts	R2	Right Side Key - 20 Signal Contacts
L3	Left Side Key - 30 Signal Contacts	R3	Right Side Key - 30 Signal Contacts
L4	Left Side Key - 40 Signal Contacts	R4	Right Side Key - 40 Signal Contacts
L5	Left Side Key - 50 Signal Contacts	R5	Right Side Key - 50 Signal Contacts

BODY STYLE AND 2ND CONNECTOR KEY

1 Plug to Plug - Left Side Key
2 Plug to Receptacle - Left Side Key
3 Plug to Receptacle with Ground Fingers - Left Side Key
4 Receptacle to Receptacle - Left Side Key
5 Receptacle to Receptacle, both with Ground Fingers - Left Side Key
6 Plug to Plug - Right Side Key
7 Plug to Receptacle - Right Side Key
8 Plug to Receptacle with Ground Fingers - Right Side Key
9 Receptacle to Receptacle - Right Side Key
A Receptacle to Receptacle, both with Ground Fingers - Right Side Key

For best performance, Receptacles with Ground Fingers are preferred

WIRE TYPE & GAUGE - HIGH SPEED

X See Wire Code Page for High Speed Cable

WIRE TYPE & GAUGE - SIGNALS

0 No Signal Contacts
X See Wire Code Page

WIRE LENGTH

Wire Length in Inches - (Uses 3 digits)
(Example: 018 = 18 Inches) Minimum 3 Inches

BODY PLATING (LCP INSULATORS)

1 Electroless Nickel Plated Aluminum Shell - RoHS Compliant
2 Electroless Nickel Plated Aluminum Shell ☒
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
5 Gold Plated Aluminum Shell - RoHS Compliant
6 Gold Plated Aluminum Shell ☒

HARDWARE

000 No Hardware
620 Two Fixed Jacknuts - Captivated ** - Both Connectors
810 Two Turning Jackscrews, Allen Head - Captivated ** - Both Connectors
860 Two Fixed Jacknuts - Captivated ** - Two Turning Jackscrews, Allen Head - Captivated **
(Jacknuts on Receptacle for Body Styles 2, 3, 7, & 8)
870 Two Fixed Jacknuts - Captivated ** - Two Turning Jackscrews, Allen Head - Captivated **
(Jacknuts on Plug for Body Styles 2, 3, 7, & 8)
NXX Keying Jackpost Hardware, See Options *** - Both Connectors
JXX Keying Jackscrew Hardware, See Options *** - Both Connectors
AXX Two Keying Jacknuts *** - Two Keying Jackscrews ***
(Jacknuts on Receptacle for Body Styles 2, 3, 7, & 8)
BXX Two Keying Jacknuts *** - Two Keying Jackscrews ***
(Jacknuts on Plug for Body Styles 2, 3, 7, & 8)

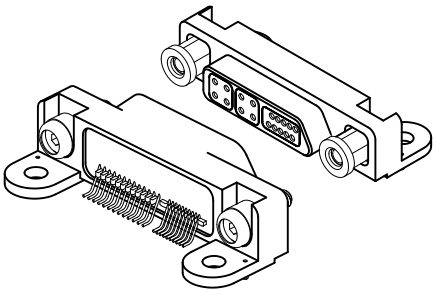
NOTES:
1. All high-speed receptacles have fluoropolymer interfacial seals.
☒ = Option not RoHS compliant in plating and/or internal terminations.
* = Left and right key is determined by looking at the PLUG interface with the LONG SIDE downward. The key is the angled side of the interface.
** = Captivated hardware is factory installed and non-removable.
*** = Refer to catalog Page 29 for keying options.

Rugged Horizontal SMT

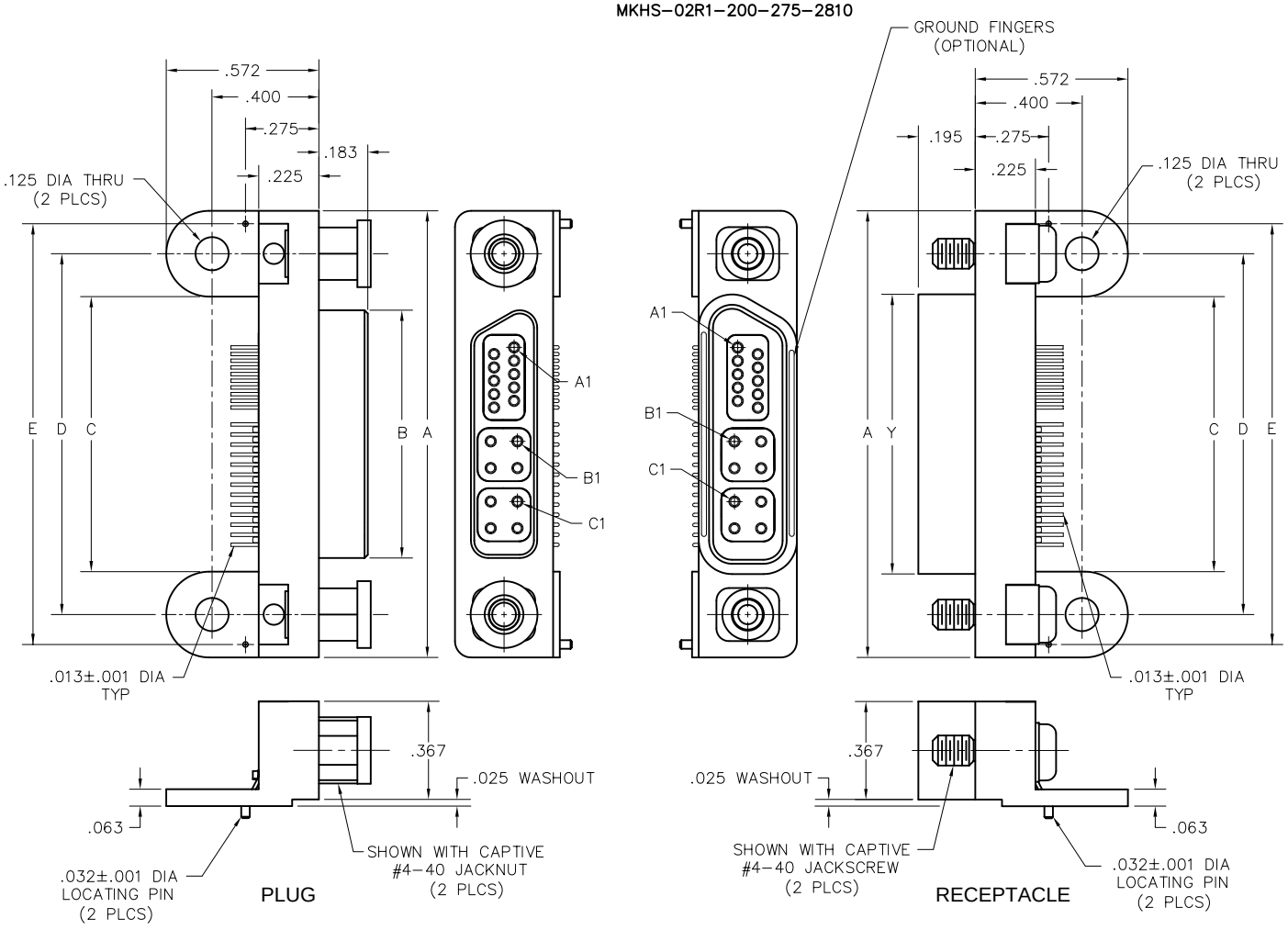
1 thru 10 High Speed Modules
0 thru 50 Signal Contacts

MKHS

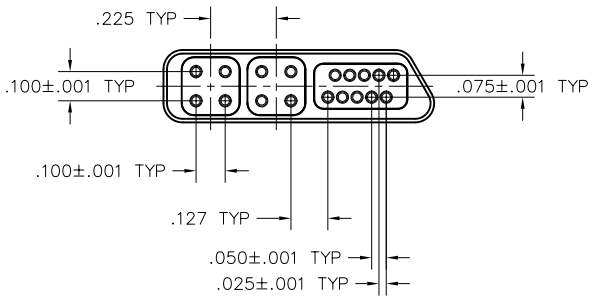
MKHS–02R1–100–175–2620



MKHS–02R1–200–275–2810

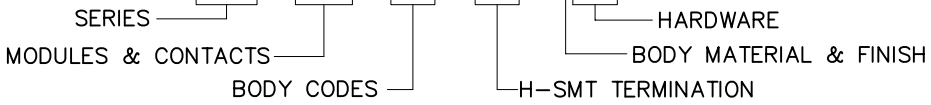


INTERFACE DIMENSIONS



DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6)
B	"A" MINUS 0.744
C	"A" MINUS 0.640
D	"A" MINUS 0.320
E	"A" MINUS 0.096
Y	"A" MINUS 0.624

PLUG: MKHS – 05L2 – 100 – 175 – 2620
RECEPTACLE: MKHS – 02R1 – 400 – 275 – 2810
XXXX – XXXX – XXX – XXX – XXXX



PLUG

SERIES

MKHS HIGH SPEED Rugged Metal Horizontal SMT
(MKHS mates with MMHS, MJHS receptacles)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

100 Plug

CONTACT TERMINATION

17 Pin, Horizontal SMT

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

000 No Hardware
620 Two Fixed Jacknuts - Captivated **
810 Two Turning Jackscrews, Allen Head, Captivated **
NXX Keying Jackpost Hardware, See Options ***
JXX Keying Jackscrew Hardware, See Options ***

RECEPTACLE

SERIES

MKHS HIGH SPEED Rugged Metal Horizontal SMT
(MKHS mates with MMHS, MJHS plugs)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

200 Receptacle
400 Receptacle with Ground Fingers (Preferred)

CONTACT TERMINATION

27 Socket, Horizontal SMT

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

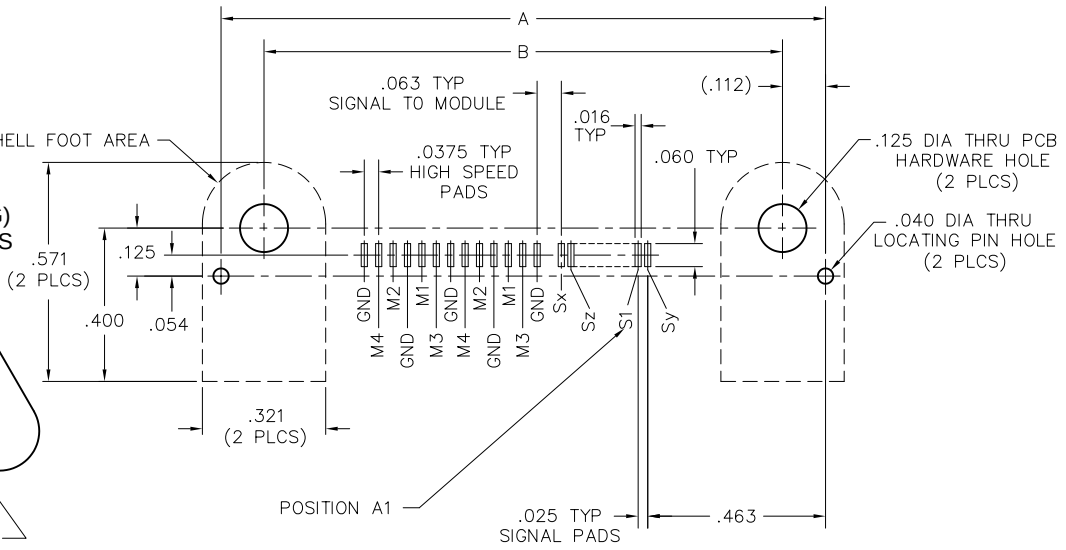
000 No Hardware
620 Two Fixed Jacknuts - Captivated **
810 Two Turning Jackscrews, Allen Head, Captivated **
NXX Keying Jackpost Hardware, See Options ***
JXX Keying Jackscrew Hardware, See Options ***

NOTES:
1. All high-speed receptacles have fluoropolymer interfacial seals.
☒ = Option not RoHS compliant
* = Left and right key is determined by looking at the PLUG interface with the LONG SIDE downward. The key is the angled side of the interface.
** = Captivated hardware is factory installed and non-removable.
*** = Refer to catalog Page 29 for keying options.

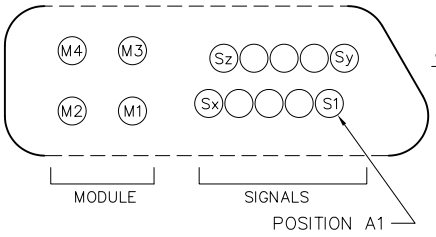
Recommended PC Board Layout, Plug

RUGGED H-SMT

PLUG, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
2 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE

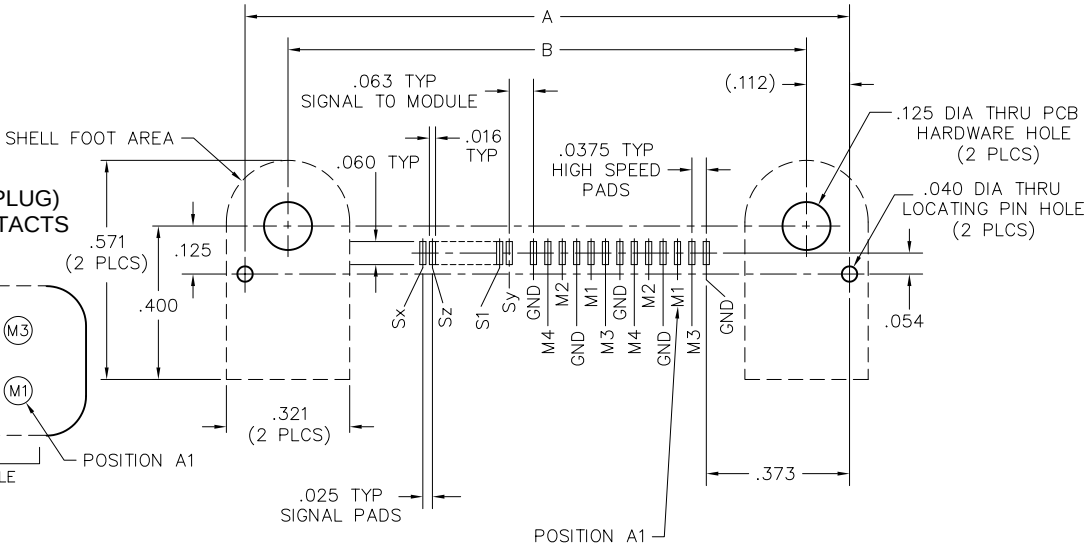


CONNECTOR MATING FACE (PLUG)
INSULATOR A = SIGNAL CONTACTS
RIGHT SIDE KEY

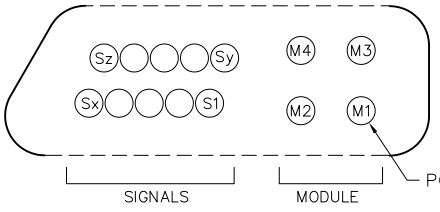


DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6) MINUS 0.097
B	"A" MINUS 0.224

PLUG, LEFT SIDE KEY
INSULATOR A = MODULE CONTACTS
2 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE (PLUG)
INSULATOR A = MODULE CONTACTS
LEFT SIDE KEY



SIGNAL CONTACT NUMBERING					
	SIG10	SIG20	SIG30	SIG40	SIG50
Zx	5	10	15	20	25
Zy	6	11	16	21	26
Zz	10	20	30	40	50

NOTES:

1. Connector module leads M3 and M4 are .080" longer than M1 and M2. PCB traces or IC programming will be required to compensate for this.

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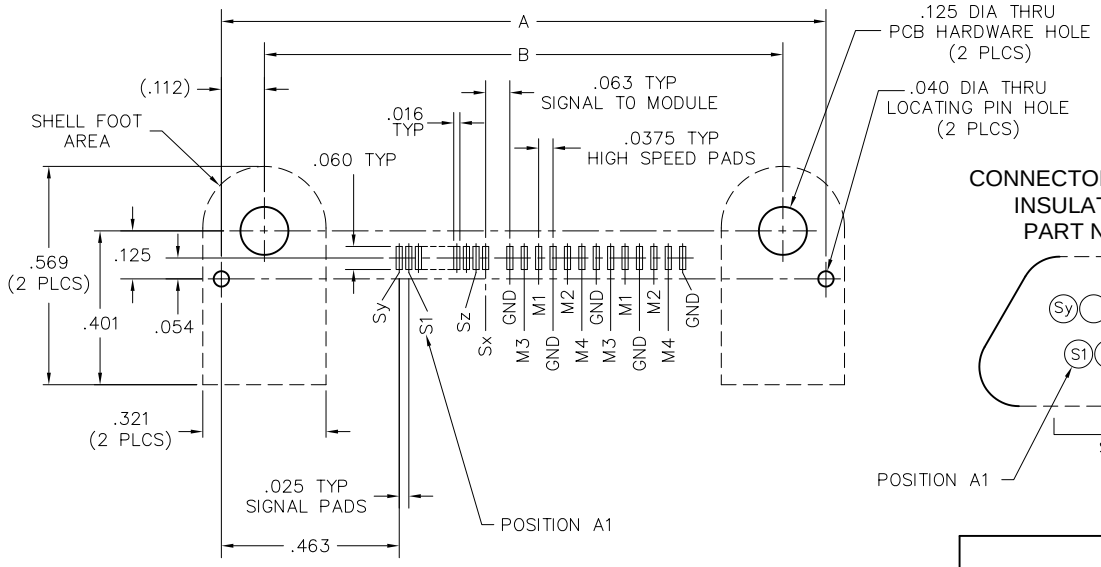
Recommended PC Board Layout Receptacle

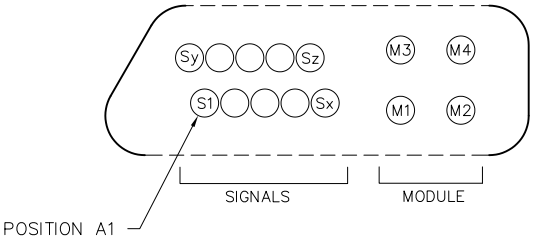
RUGGED H-SMT

RECEPTACLE, RIGHT SIDE KEY

INSULATOR A = SIGNAL CONTACTS
2 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



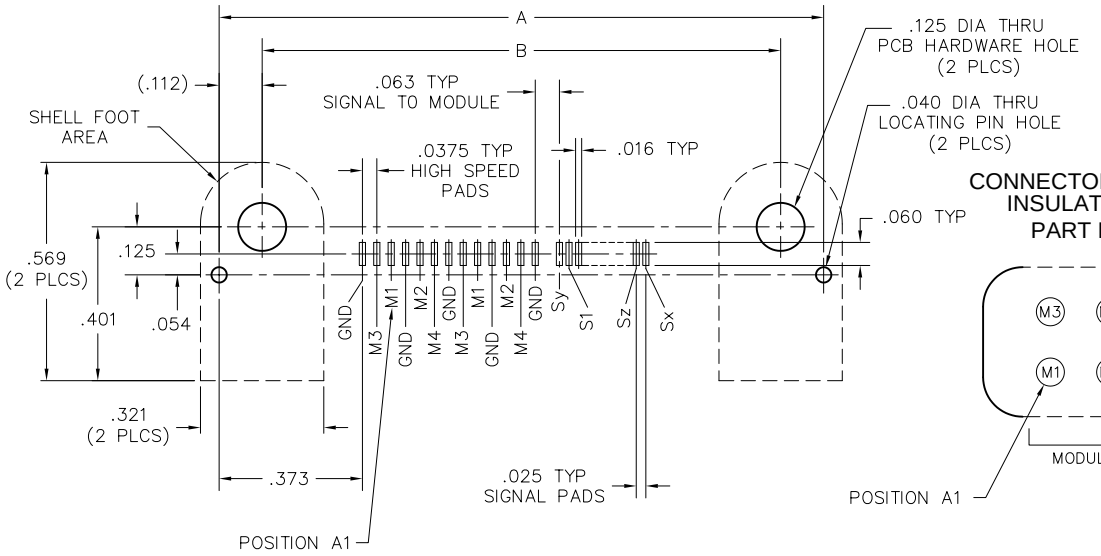
CONNECTOR MATING FACE (RECEPTACLE)
INSULATOR A = SIGNAL CONTACTS
PART NUMBER = RIGHT SIDE KEY



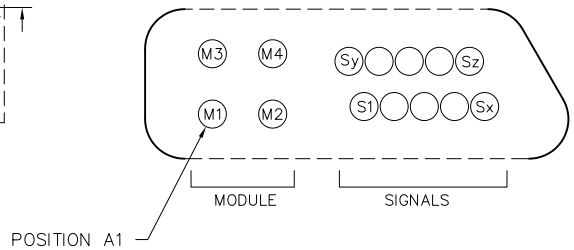
DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6) MINUS 0.097
B	"A" MINUS 0.224

RECEPTACLE, LEFT SIDE KEY

INSULATOR A = MODULE CONTACTS
2 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE (RECEPTACLE)
INSULATOR A = MODULE CONTACTS
PART NUMBER = LEFT SIDE KEY



NOTES:

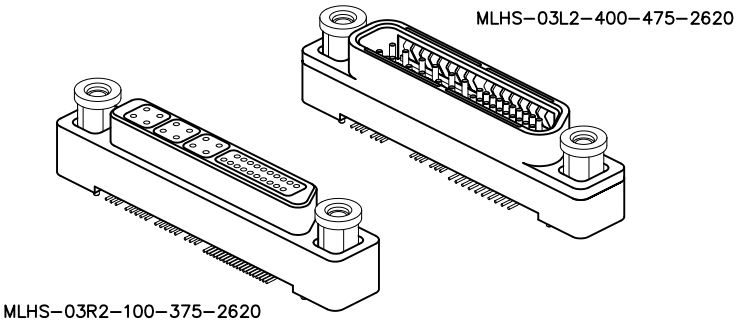
1. Connector module leads M3 and M4 are .080" longer than M1 and M2 PCB traces or IC programming will be required to compensate for this.
2. Receptacle interface key is swapped left-to-right from part number callout when looking at the receptacle interface.

SIGNAL CONTACT NUMBERING					
	SIG10	SIG20	SIG30	SIG40	SIG50
Zx	5	10	15	20	25
Zy	6	11	16	21	26
Zz	10	20	30	40	50

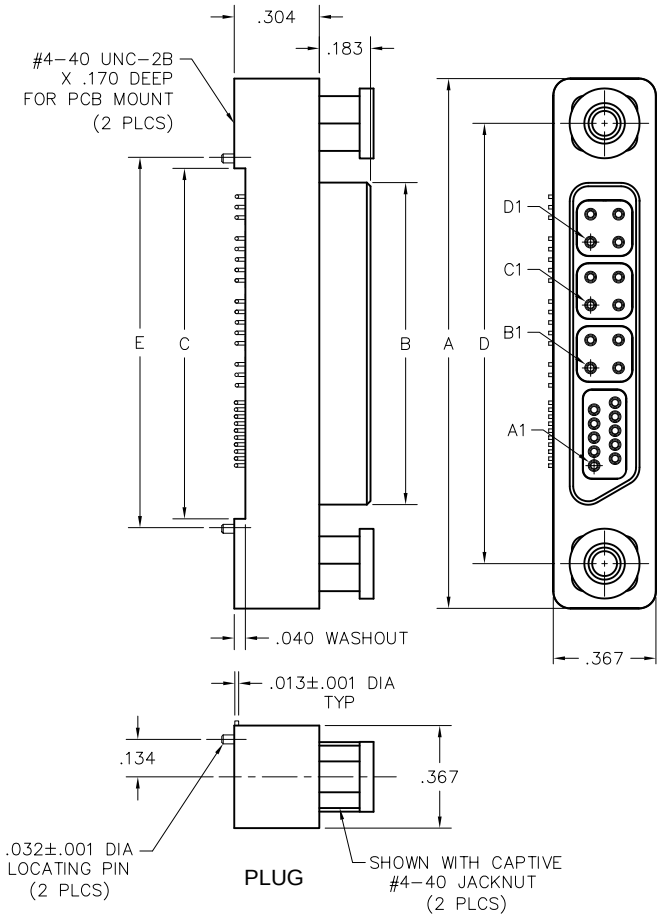
Rugged Vertical SMT Fixed Hardware

1 thru 10 High Speed Modules
0 thru 50 Signal Contacts

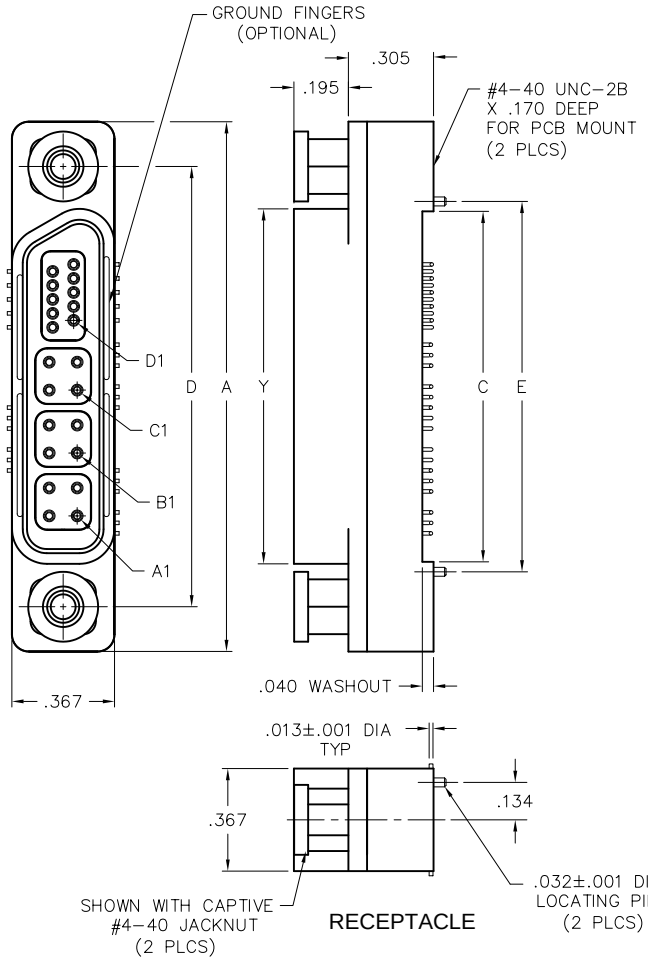
MLHS



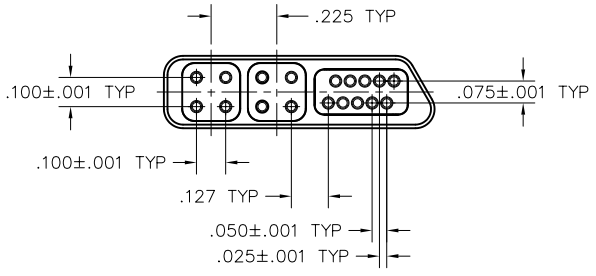
SINGLE-SIDED
LEADS SHOWN



STAGGERED
LEADS SHOWN



INTERFACE DIMENSIONS



DIMENSIONS	
A	OVERALL LENGTH PER TABLE CALCULATION (SEE PAGE 6)
B	"A" MINUS 0.744
C	"A" MINUS 0.640
D	"A" MINUS 0.320
E	"A" MINUS 0.570
Y	"A" MINUS 0.624

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PLUG: MLHS – 05L2 – 100 – 375 – 2620
RECEPTACLE: MLHS – 02R1 – 400 – 475 – 2620
XXXX – XXXX – XXX – XXX – XXXX

SERIES
MODULES & CONTACTS
BODY CODES
V–SMT TERMINATION
HARDWARE
BODY MATERIAL & FINISH

PLUG

SERIES

MLHS HIGH SPEED Rugged Metal Vertical SMT
(MLHS mates with MMHS, MJHS receptacles)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

100 Plug

CONTACT TERMINATION

37 Pin, Vertical SMT, Staggered Leads - All
57 Pin, Vertical SMT, Staggered Leads - High Speed Single-Sided Leads - Signals
77 Pin, Vertical SMT, Single-Sided Leads - High Speed Staggered Leads - Signals
A7 Pin, Vertical SMT, Single-Sided Leads - All

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

000 No Hardware
620 Two Fixed Jacknuts - Captivated **
NXX Keying Jackpost Hardware, See Options ***

RECEPTACLE

SERIES

MLHS HIGH SPEED Rugged Metal Vertical SMT
(MLHS mates with MMHS, MJHS plugs)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

200 Receptacle
400 Receptacle with Ground Fingers (Preferred)

CONTACT TERMINATION

47 Socket, Vertical SMT, Staggered Leads - All
67 Socket, Vertical SMT, Staggered Leads - High Speed Single-Sided Leads - Signals
87 Socket, Vertical SMT, Single-Sided Leads - High Speed Staggered Leads - Signals
B7 Socket, Vertical SMT, Single-Sided Leads - All

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

000 No Hardware
620 Two Fixed Jacknuts - Captivated **
NXX Keying Jackpost Hardware, See Options ***

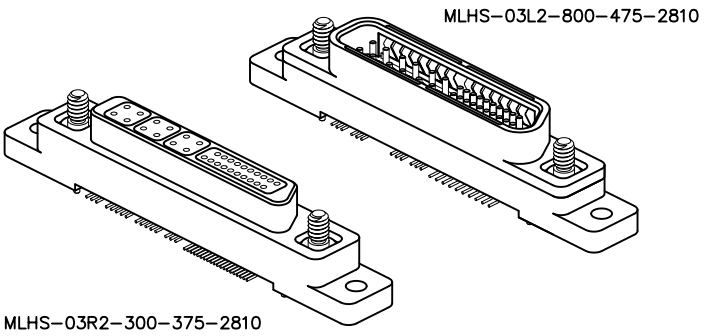
NOTES:
1. All high-speed receptacles have fluoropolymer interfacial seals.
2. Staggered leads always start on the major side for the first high speed module.
3. Single-sided leads are always on the major side.

☒ = Option not RoHS compliant
* = Left and right key is determined by looking at the PLUG interface with the LONG SIDE downward. The key is the angled side of the interface.
** = Captivated hardware is factory installed and non-removable.
*** = Refer to catalog Page 29 for keying options.

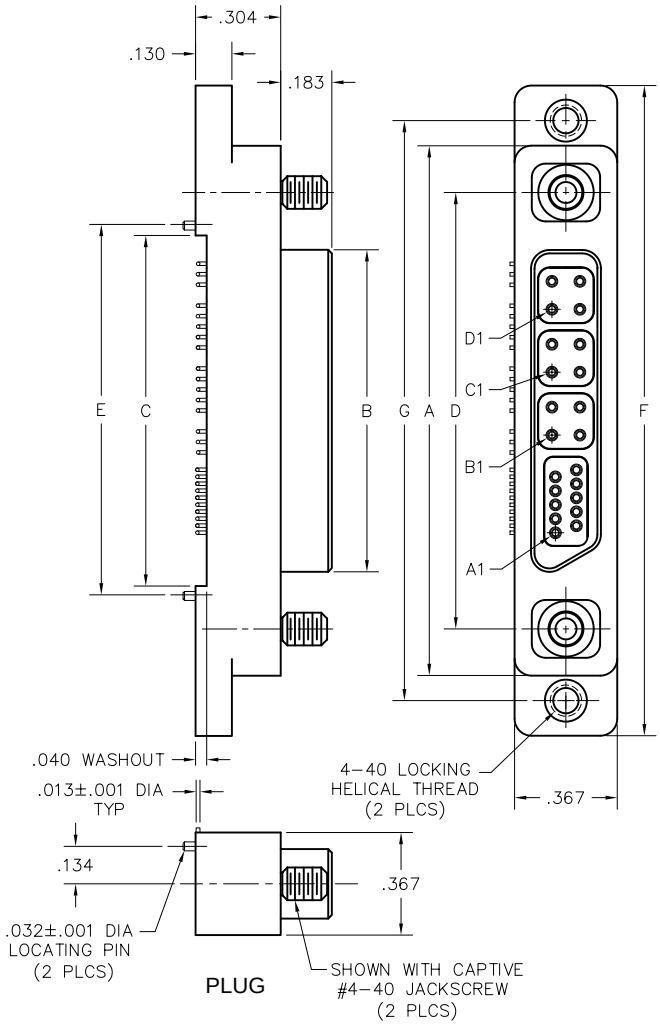
Rugged Vertical SMT Turning Hardware

1 thru 10 High Speed Modules
0 thru 50 Signal Contacts

MLHS

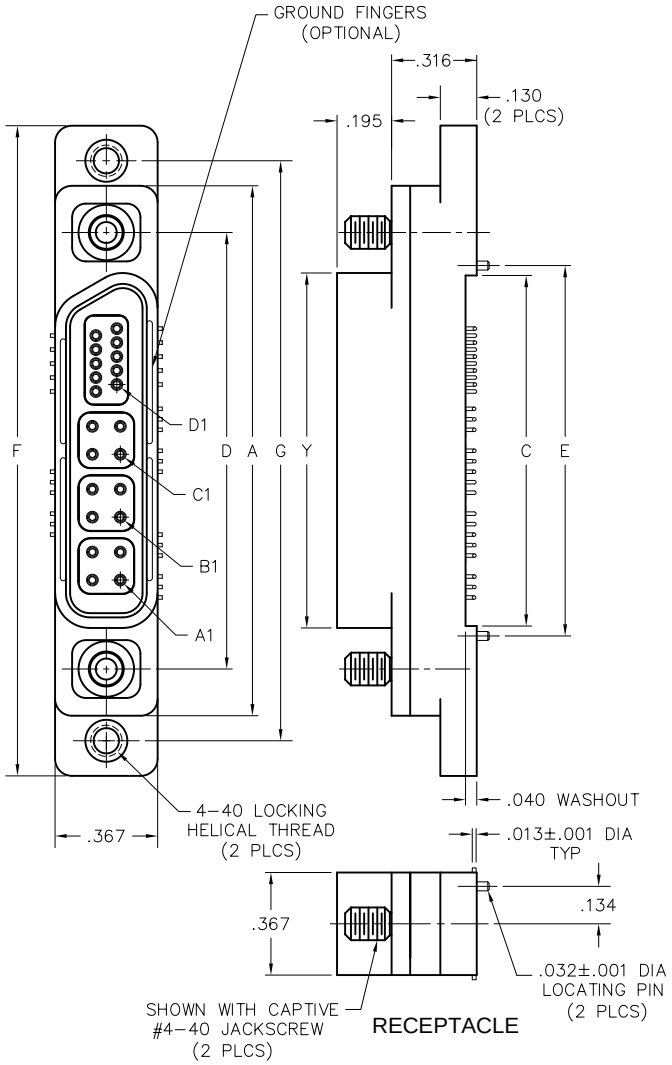


SINGLE-SIDED
LEADS SHOWN



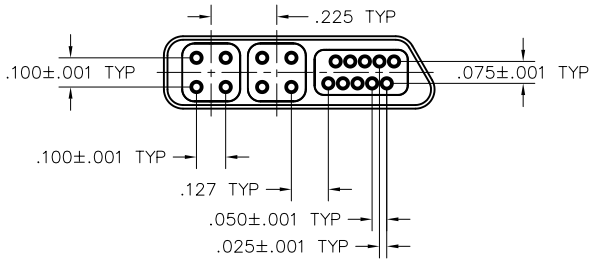
PLUG

STAGGERED
LEADS SHOWN



RECEPTACLE

INTERFACE DIMENSIONS



DIMENSIONS	
A	BODY LENGTH (W/O FEET) FOR V-SMT TURNING HARDWARE PER TABLE CALCULATION (SEE PAGE 6)
B	"A" MINUS 0.744
C	"A" MINUS 0.640
D	"A" MINUS 0.320
E	"A" MINUS 0.570
F	"A" **PLUS** 0.430
G	"F" MINUS 0.250
Y	"A" MINUS 0.624

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PLUG: MLHS – 05L2 – 300 – 375 – 2000
RECEPTACLE: MLHS – 02R1 – 800 – 475 – 2810
XXXX – XXXX – XXX – XXX – XXXX

SERIES
MODULES & CONTACTS
BODY CODES
V–SMT TERMINATION
HARDWARE
BODY MATERIAL & FINISH

PLUG

SERIES

MLHS HIGH SPEED Rugged Metal Vertical SMT
(MLHS mates with MMHS, MJHS receptacles)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

300 Plug, Vertical SMT w/ Mounting Ears

CONTACT TERMINATION

37 Pin, Vertical SMT, Staggered Leads - All
57 Pin, Vertical SMT, Staggered Leads - High Speed Single-Sided Leads - Signals
77 Pin, Vertical SMT, Single-Sided Leads - High Speed Staggered Leads - Signals
A7 Pin, Vertical SMT, Single-Sided Leads - All

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

000 No Hardware
810 Two Turning Jackscrews, Allen Head, Captivated **
JXX Keying Jackscrew Hardware, See Options ***

RECEPTACLE

SERIES

MLHS HIGH SPEED Rugged Metal Vertical SMT
(MLHS mates with MMHS, MJHS plugs)

HIGH SPEED MODULES

01 1 High Speed Module
02 2 High Speed Modules
03 3 High Speed Modules
04 4 High Speed Modules
05 5 High Speed Modules (Max Signal Count 40)
06 6 High Speed Modules (Max Signal Count 30)
07 7 High Speed Modules (Max Signal Count 20)
08 8 High Speed Modules (Max Signal Count 10)
09 9 High Speed Modules (Max Signal Count 10)
0A 10 High Speed Modules (No Signals)

SIGNAL CONTACTS*

L0 Left Side Key - No Signal Contacts
L1 Left Side Key - 10 Signal Contacts
L2 Left Side Key - 20 Signal Contacts
L3 Left Side Key - 30 Signal Contacts
L4 Left Side Key - 40 Signal Contacts
L5 Left Side Key - 50 Signal Contacts
R0 Right Side Key - No Signal Contacts
R1 Right Side Key - 10 Signal Contacts
R2 Right Side Key - 20 Signal Contacts
R3 Right Side Key - 30 Signal Contacts
R4 Right Side Key - 40 Signal Contacts
R5 Right Side Key - 50 Signal Contacts

BODY STYLE

600 Receptacle, Vertical SMT w/Mounting Ears
800 Receptacle with Ground Fingers (Preferred), Vertical SMT w/Mounting Ears

CONTACT TERMINATION

47 Socket, Vertical SMT, Staggered Leads - All
67 Socket, Vertical SMT, Staggered Leads - High Speed Single-Sided Leads - Signals
87 Socket, Vertical SMT, Single-Sided Leads - High Speed Staggered Leads - Signals
B7 Socket, Vertical SMT, Single-Sided Leads - All

TERMINATION PLATING

5 50 micro" Gold Contact, Sn/Pb Alloy Termination ☒
7 50 micro" Gold Contact, SAC305 Plated Termination

BODY PLATING (LCP INSULATORS)

2 Electroless Nickel Plated Aluminum Shell
3 Electrodeposited Cadmium Plated Aluminum Shell ☒
6 Gold Plated Aluminum Shell

HARDWARE

000 No Hardware
810 Two Turning Jackscrews, Allen Head, Captivated **
JXX Keying Jackscrew Hardware, See Options ***

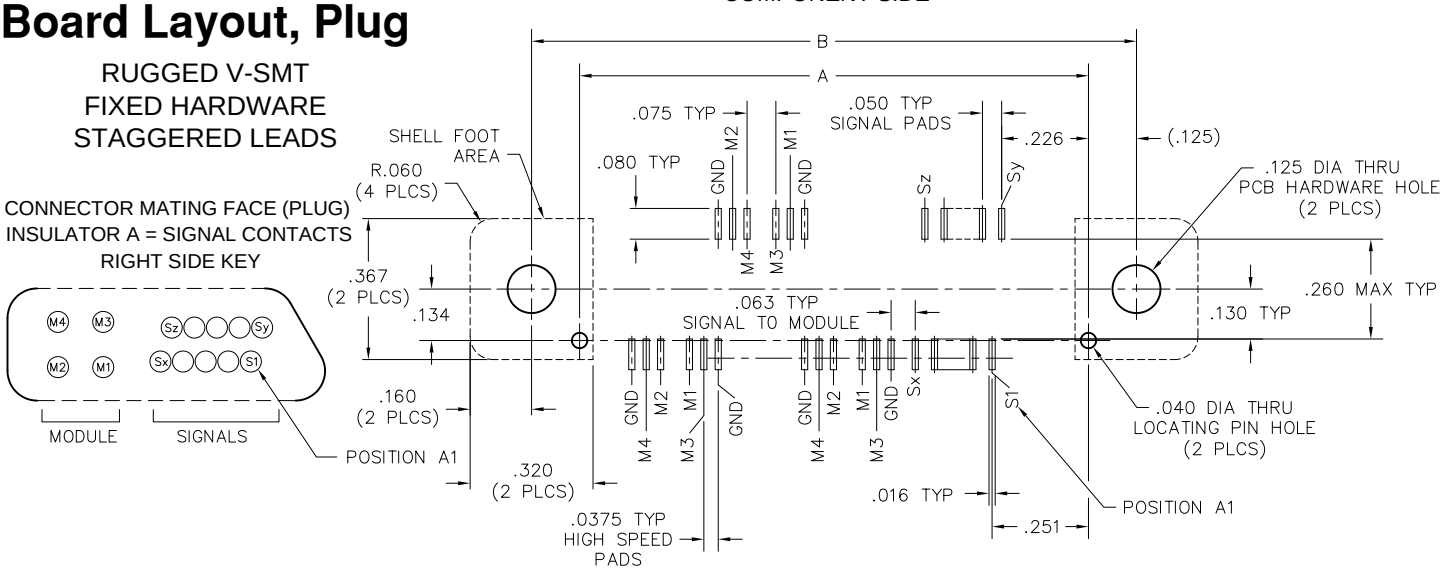
NOTES:
1. All high-speed receptacles have fluoropolymer interfacial seals.
2. Staggered leads always start on the major side for the first high speed module.
3. Single-sided leads are always on the major side.

* = Left and right key is determined by looking at the PLUG interface with the LONG SIDE downward. The key is the angled side of the interface.
** = Captivated hardware is factory installed and non-removable.
*** = Refer to catalog Page 29 for keying options.

Recommended PC Board Layout, Plug

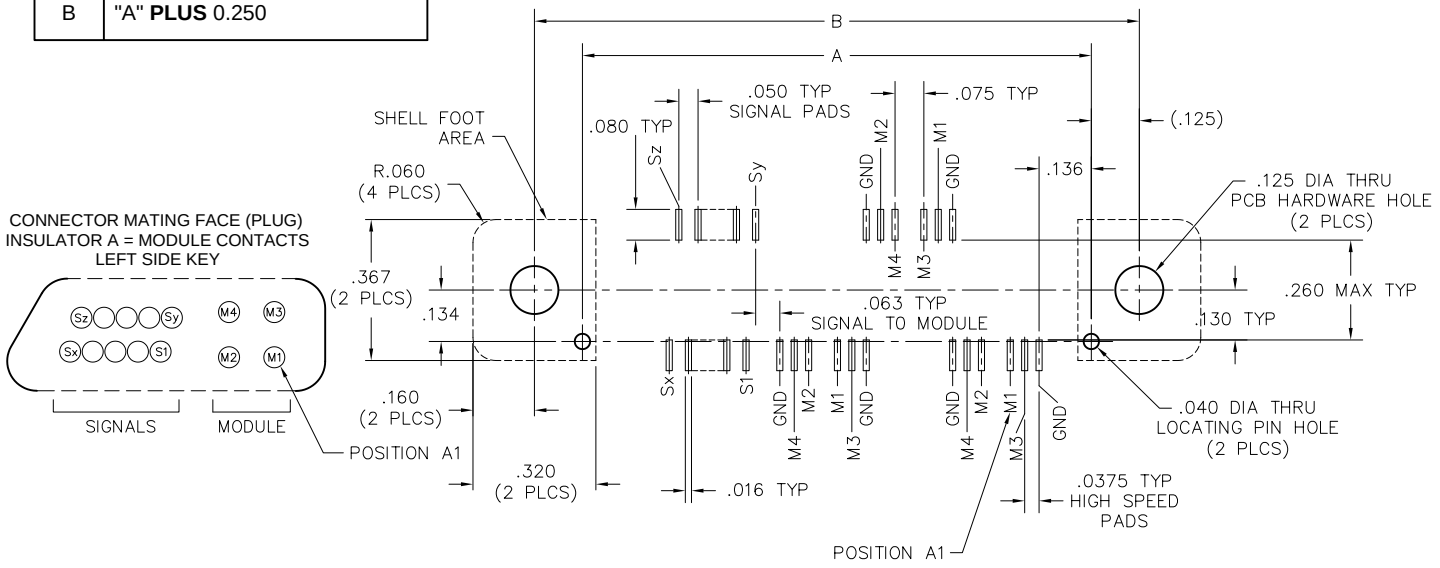
RUGGED V-SMT
FIXED HARDWARE
STAGGERED LEADS

PLUG, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6) MINUS 0.570
B	"A" **PLUS** 0.250

PLUG, LEFT SIDE KEY
INSULATOR A = MODULE CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



SIGNAL CONTACT NUMBERING					
	SIG10	**SIG20**	**SIG30**	**SIG40**	**SIG50**
Sx	5	10	15	20	25
Sy	6	11	16	21	26
Sz	10	20	30	40	50

NOTES:

1. For module leads exiting the MAJOR SIDE, leads M3 and M4 are .080" longer than M1 and M2.
2. For module leads exiting the MINOR SIDE, leads M1 and M2 are .080" longer than M3 and M4.
3. PCB traces or IC programming will be required to compensate for lead length variation.

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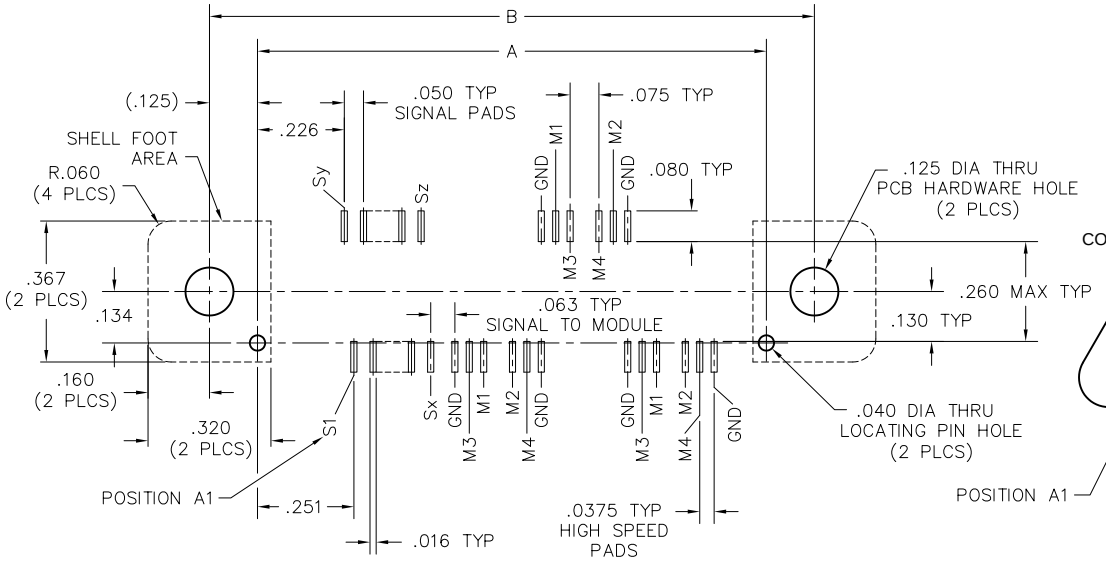
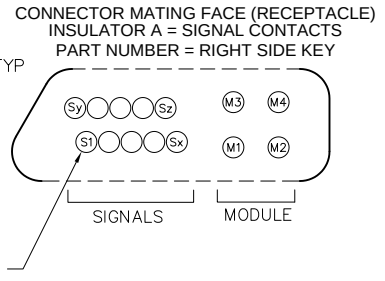
Recommended PC Board Layout Receptacle

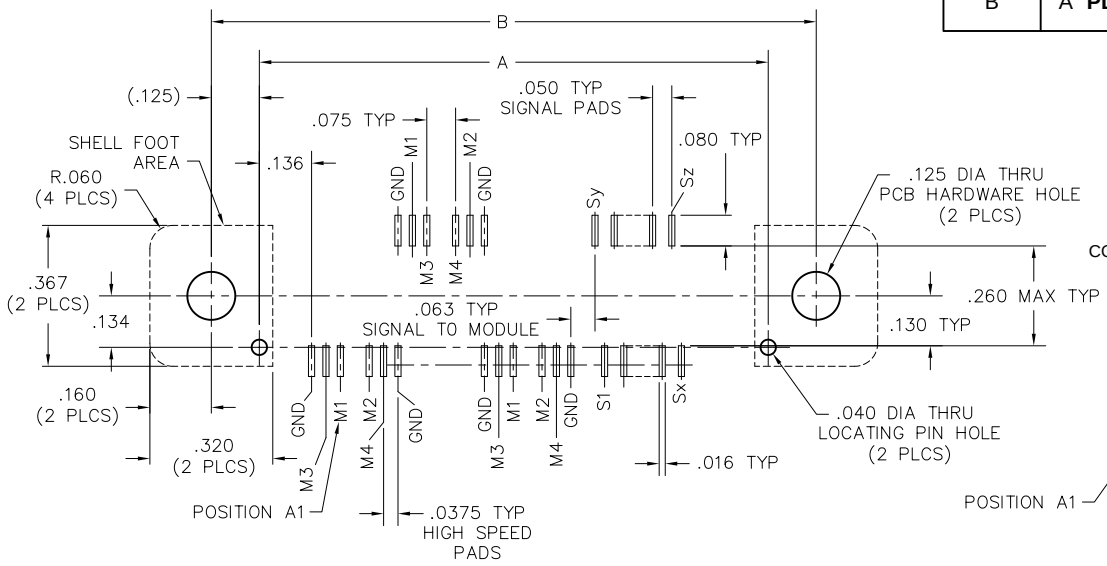
RUGGED V-SMT
FIXED HARDWARE
STAGGERED LEADS

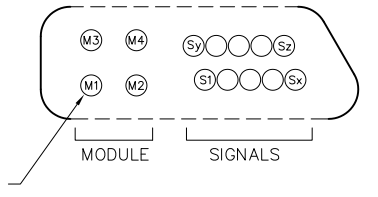
RECEPTACLE, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE





RECEPTACLE, LEFT SIDE KEY
INSULATOR A = MODULE CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE





DIMENSIONS	
A	BODY LENGTH PER TABLE CALCULATION (SEE PAGE 6) MINUS 0.570
B	"A" **PLUS** 0.250

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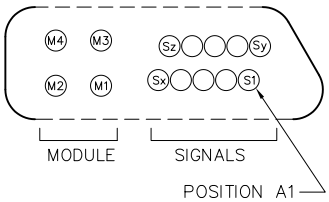
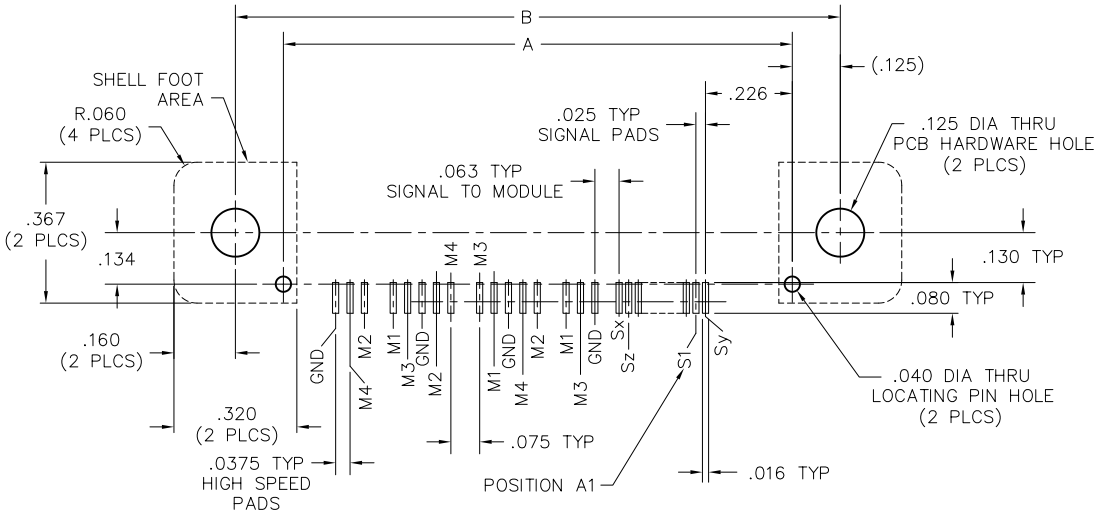
Recommended PC Board Layout, Plug

RUGGED V-SMT
FIXED HARDWARE
SINGLE-SIDED LEADS

CONNECTOR MATING FACE (PLUG)
INSULATOR A = SIGNAL CONTACTS
RIGHT SIDE KEY



PLUG, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



DIMENSIONS	
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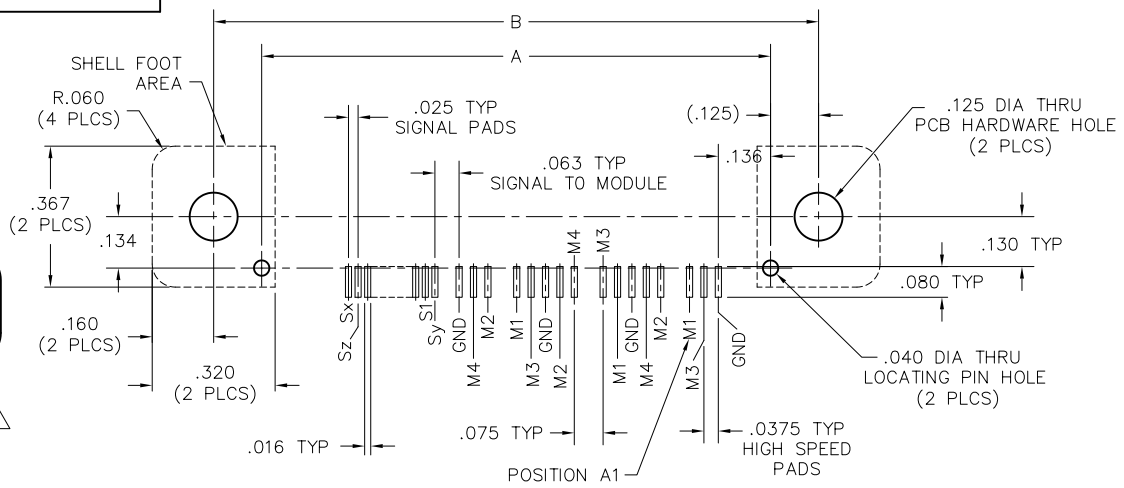
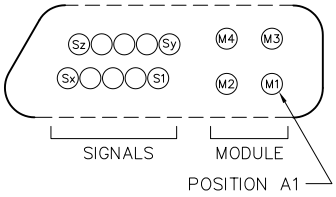
B	"A" **PLUS** 0.250

PLUG, LEFT SIDE KEY
INSULATOR A = MODULE CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE (PLUG)
INSULATOR A = MODULE CONTACTS
LEFT SIDE KEY



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Recommended PC Board Layout Receptacle

RUGGED V-SMT
FIXED HARDWARE
SINGLE-SIDED LEADS

RECEPTACLE, RIGHT SIDE KEY
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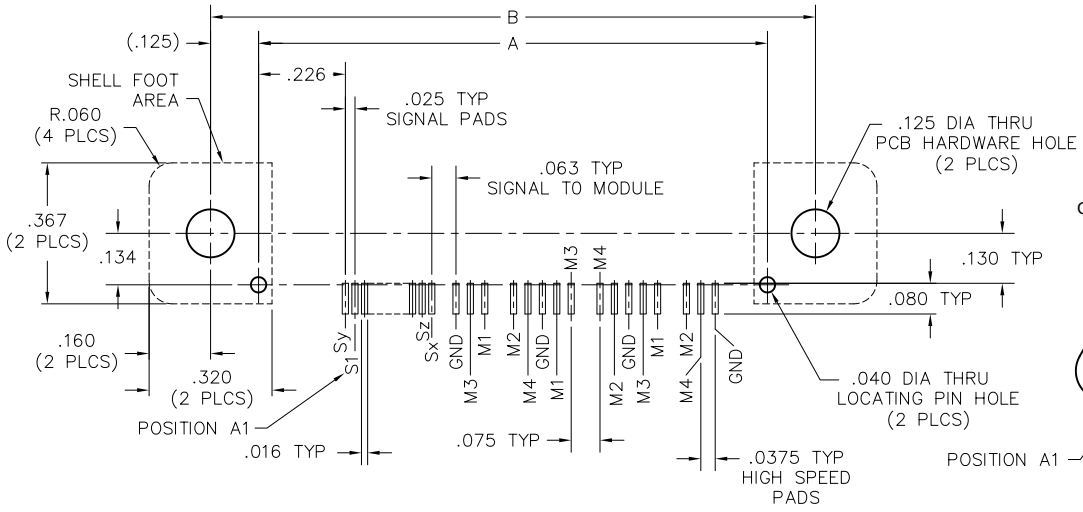
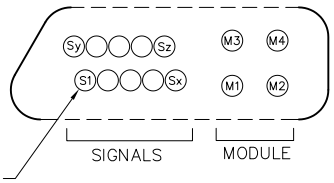
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE (RECEPTACLE)
INSULATOR A = SIGNAL CONTACTS
PART NUMBER = RIGHT SIDE KEY



DIMENSIONS	
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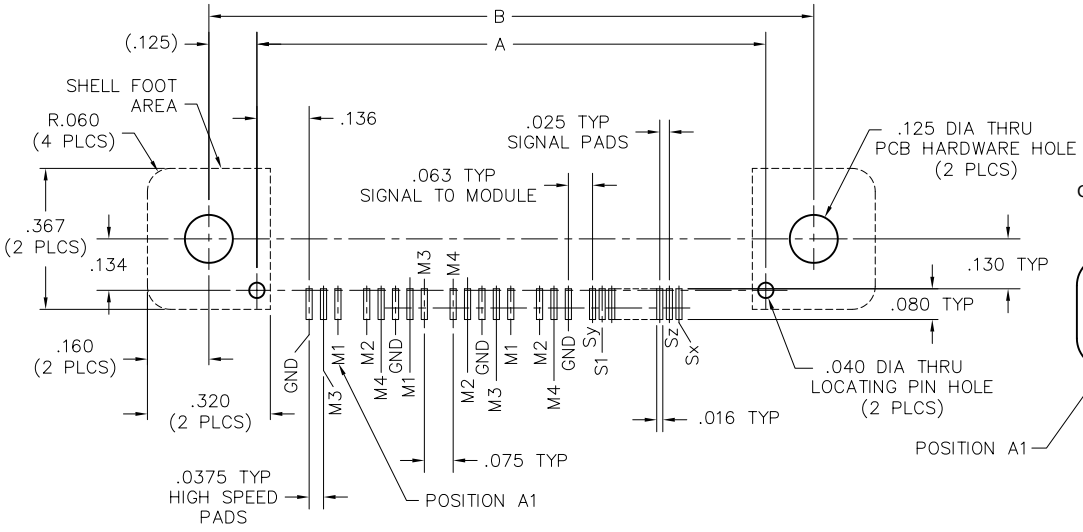
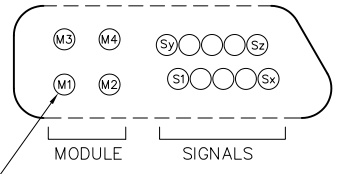
RECEPTACLE, LEFT SIDE KEY
INSULATOR A = MODULE CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE (RECEPTACLE)
INSULATOR A = MODULE CONTACTS
PART NUMBER = LEFT SIDE KEY



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Recommended PC Board Layout, Plug

RUGGED V-SMT
TURNING HARDWARE
STAGGERED LEADS

CONNECTOR MATING FACE (PLUG)
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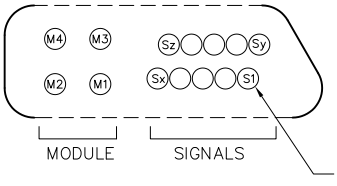
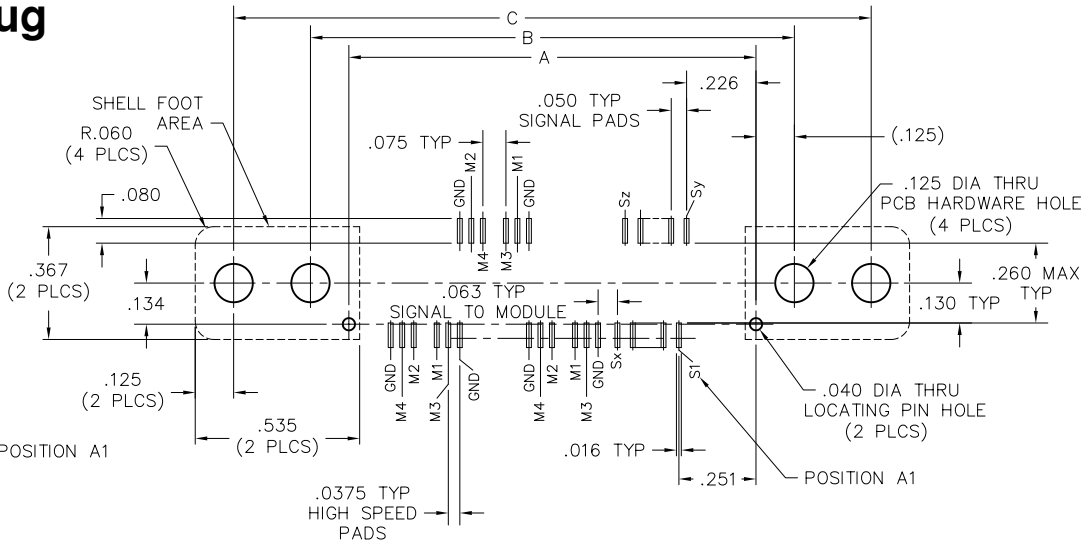
RIGHT SIDE KEY



PLUG, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



DIMENSIONS	
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CONNECTOR MATING FACE (PLUG)
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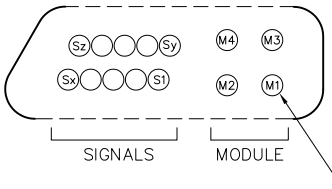
LEFT SIDE KEY



PLUG, LEFT SIDE KEY
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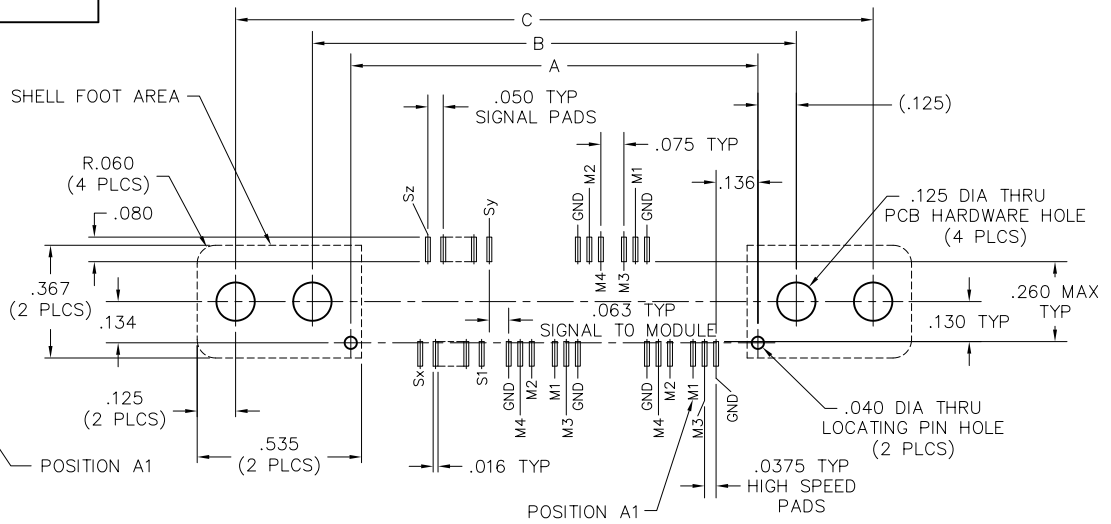
3 MODULES + SIGNAL SHOWN
PC BOARD LAYOUT
COMPONENT SIDE



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Recommended PC Board Layout Receptacle

RUGGED V-SMT
TURNING HARDWARE
STAGGERED LEADS

RECEPTACLE, RIGHT SIDE KEY
INSULATOR A = SIGNAL CONTACTS
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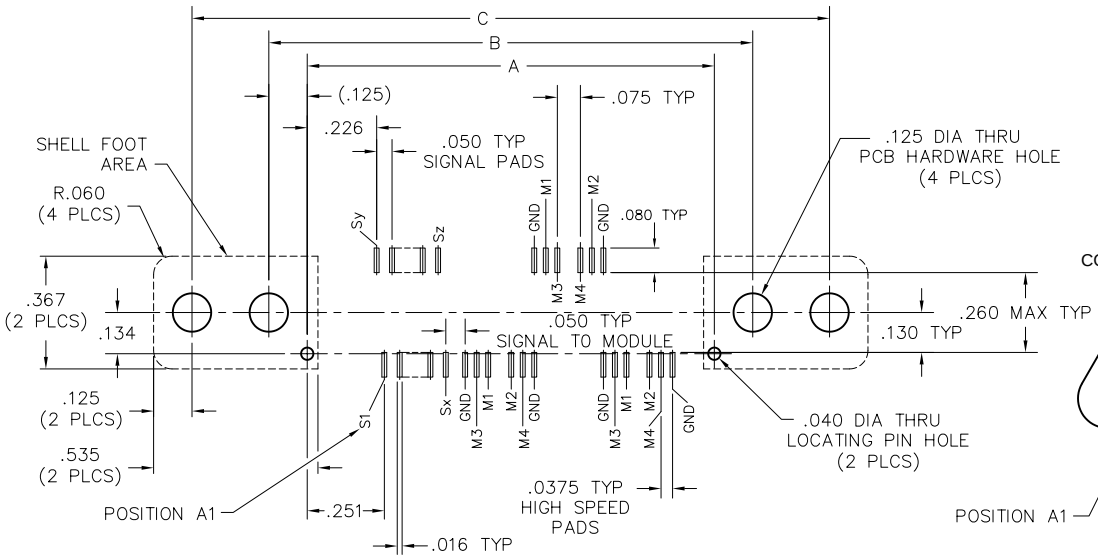
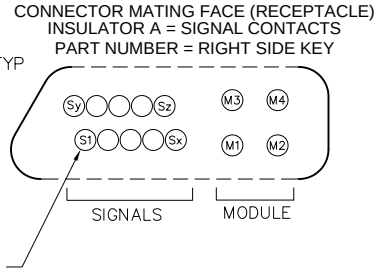
PC BOARD LAYOUT
COMPONENT SIDE





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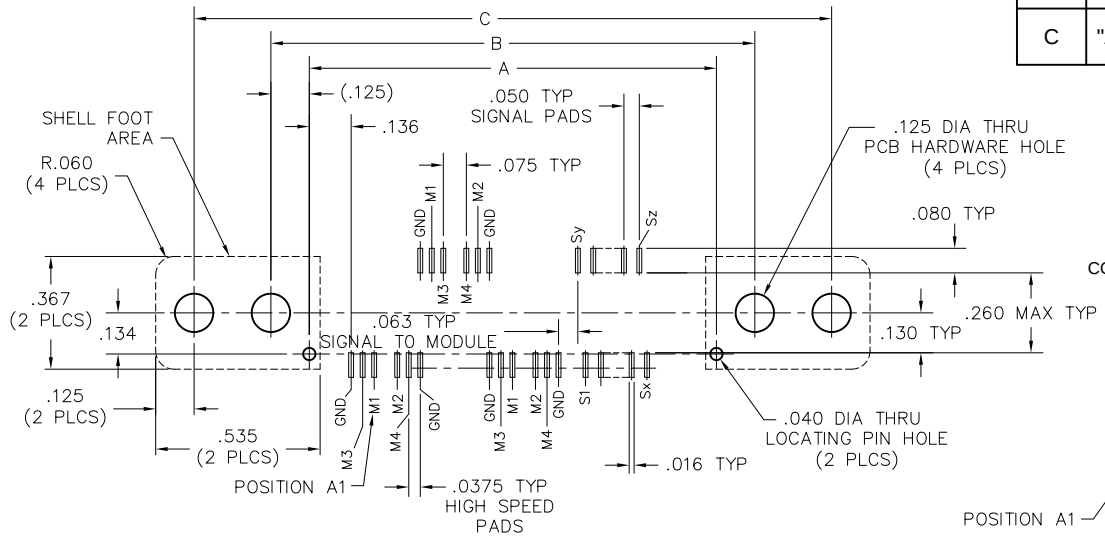
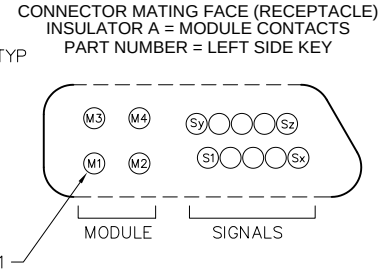
PC BOARD LAYOUT
COMPONENT SIDE





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Recommended PC Board Layout, Plug

RUGGED V-SMT
TURNING HARDWARE
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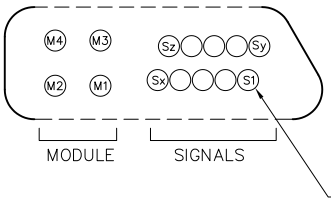

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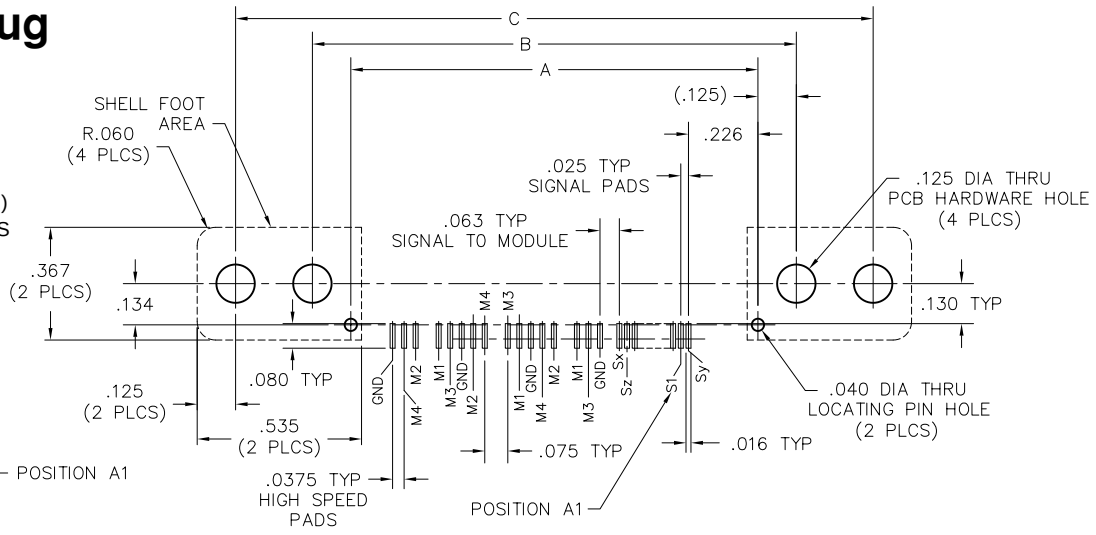
COMPONENT SIDE



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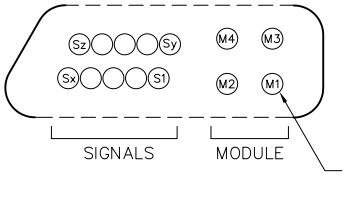

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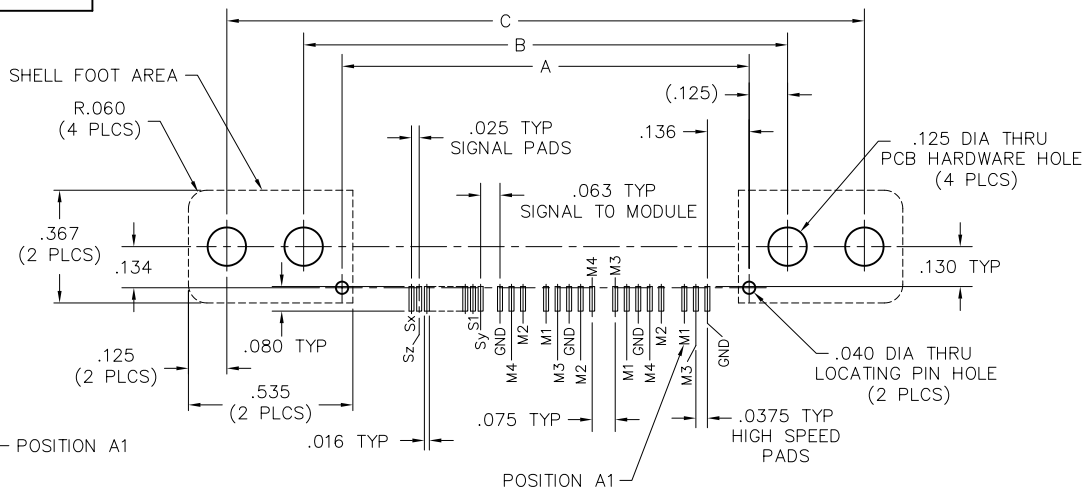

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TURNING HARDWARE
SINGLE-SIDED LEADS

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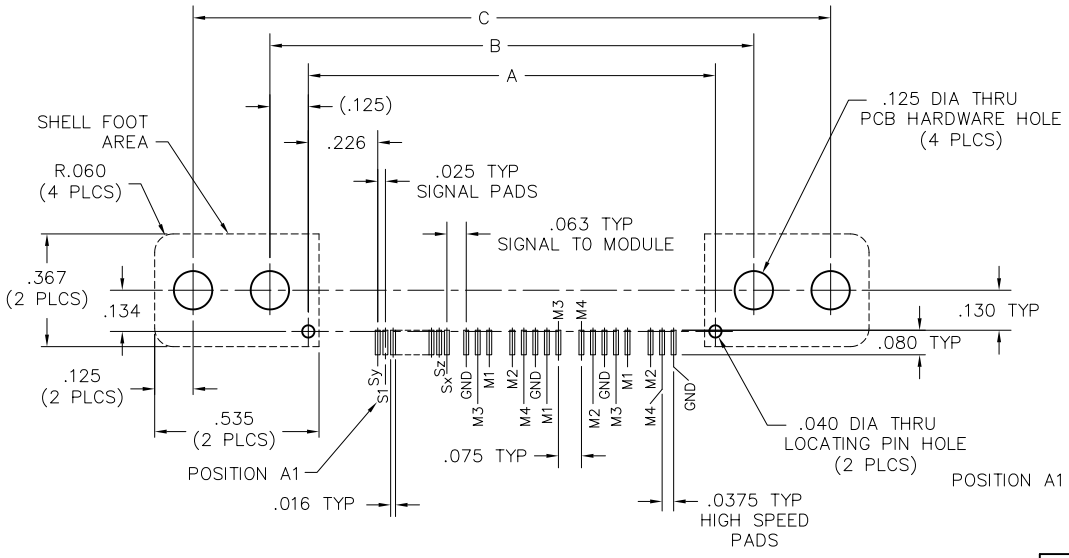
COMPONENT SIDE



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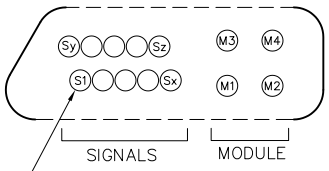

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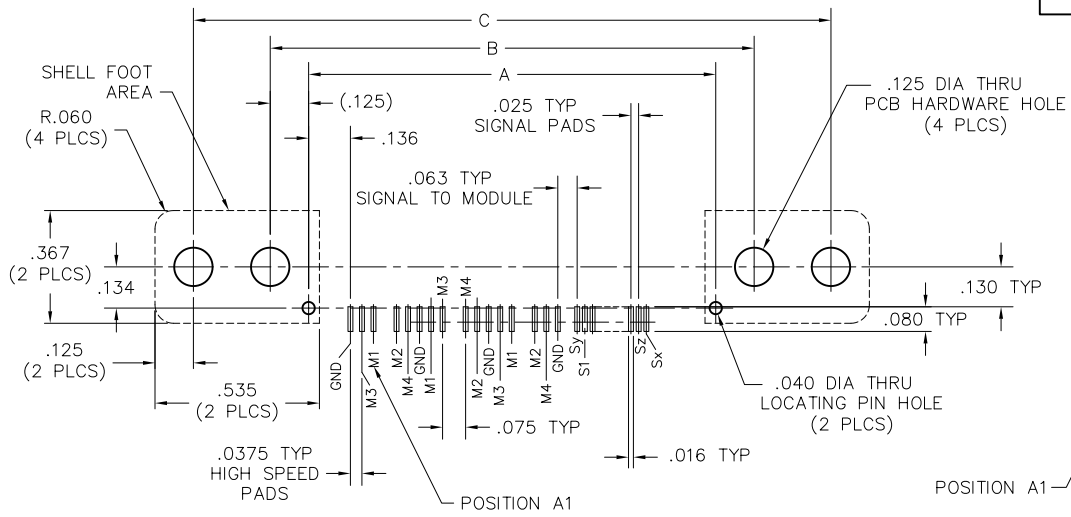

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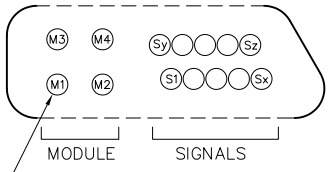

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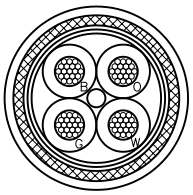
Wire Codes - High-Speed

HIGH SPEED CONNECTOR - WIRE CODES		
1	100 OHM 24 AWG	QUADRAX
2	100 OHM 26 AWG	QUADRAX
3	100 OHM 28 AWG	QUADRAX
4	100 OHM 30 AWG	QUADRAX
5	110 OHM 24 AWG	QUADRAX
6	110 OHM 26 AWG	QUADRAX
7	110 OHM 28 AWG	QUADRAX
8	110 OHM 30 AWG	QUADRAX

QUADRAX CABLE CONSTRUCTION

CONDUCTORS -	SILVER PLATED COPPER ALLOY
INSULATION -	FEP
CABLE -	PLANETARY TWIST WITH FILLER IN CORE
BINDER -	PTFE TAPE
INNER SHIELD -	ALUMINIZED MYLAR FACING OUT
OUTER SHIELD -	BRAIDED SILVER PLATED COPPER 95% MINIMUM COVERAGE
MARKER TAPE -	POLYIMIDE TAPE
JACKET -	TRANSLUCENT FEP
DIFFERENTIAL PAIRS -	PAIR 1 - BLUE (POS M1) - WHITE (POS M3) PAIR 2 - ORANGE (POS M2) - GREEN (POS M4)
TEMPERATURE -	-55°C TO +125°C
DIFFERENTIAL IMPEDANCE -	100Ω ± 10Ω 110Ω ± 6Ω
DELAY SKEW WITHIN PAIR -	4.0 ps/ft MAX



Wire Codes - Signal

HIGH SPEED CONNECTOR - SIGNAL WIRE CODES		
A	SAE AS22759/11-24	TEN REPEATING COLORS PER M83513
B	SAE AS22759/11-24	NON-REPEATING COLORS PER MIL-STD-681
C	SAE AS22759/11-24	WHITE
D	SAE AS22759/11-26	TEN REPEATING COLORS PER M83513
E	SAE AS22759/11-26	NON-REPEATING COLORS PER MIL-STD-681
F	SAE AS22759/11-26	WHITE
G	SAE AS22759/11-28	TEN REPEATING COLORS PER M83513
H	SAE AS22759/11-28	WHITE
J	SAE AS22759/33-24*** ☒	TEN REPEATING COLORS PER M83513
K	SAE AS22759/33-24*** ☒	WHITE
L	SAE AS22759/33-26*** ☒	TEN REPEATING COLORS PER M83513
M	SAE AS22759/33-26*** ☒	WHITE
N	SAE AS22759/33-28*** ☒	TEN REPEATING COLORS PER M83513
P	SAE AS22759/33-28*** ☒	WHITE
Q	SAE AS22759/33-30*** ☒	TEN REPEATING COLORS PER M83513
R	SAE AS22759/33-30*** ☒	WHITE
S	NEMA HP3-EXBEB	24 AWG NON-REPEATING COLORS PER MIL-STD-681
T	NEMA HP3-EXBEB	24 AWG WHITE
U	NEMA HP3-EXBDB	26 AWG NON-REPEATING COLORS PER MIL-STD-681
V	NEMA HP3-EXBDB	26 AWG WHITE
W	NEMA HP3-EXBCB	28 AWG NON-REPEATING COLORS PER MIL-STD-681
X	NEMA HP3-EXBCB	28 AWG WHITE
Y	NEMA HP3-EXBBB	30 AWG TEN REPEATING COLORS PER M83513
Z	NEMA HP3-EXBBB	30 AWG WHITE

NOTES:
1. Additional High Speed Cable types are available as standard options (ie. Drain wire,TwinAx, Shielded Pairs, Shielded Pair Quad, Twisted Pair Quad, etc). Contact Airborn for construction specifications of alternate cable.
2. Additional wire types are available as standard options (ie. Twisted Pair, Shielded, Braid, etc.)

*** = Corrosion has been experienced on connectors that are pre-wired with M22759/33 and stored in sealed environments. Caution in packaging and storage should be excercised when using this wire.

☒ = Option not RoHS compliant.

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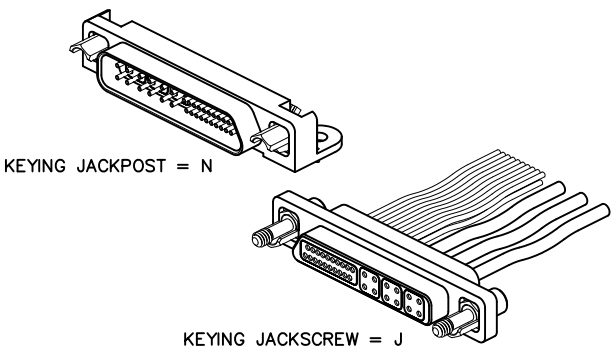
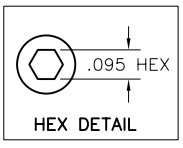
www.airborn.com

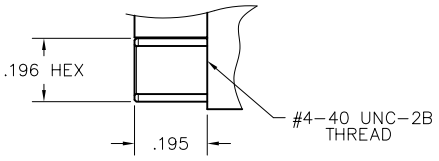
Hardware, Polarized Keying #4-40 UNC

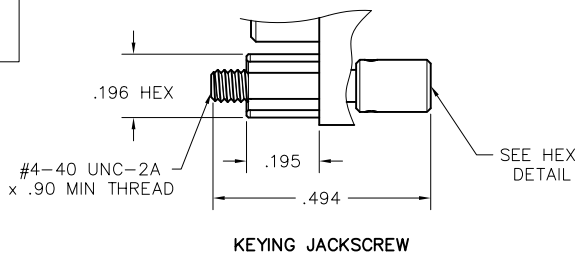
Select the appropriate two digit number above and include as the last two digits of the hardware code in the part number. (Keying hardware is factory installed and non-removable).

Example:
MMHS-03L2-12D-197-2J11
MKHS-03R2-200-275-2N11









NOTES:

AirBorn

www.AirBorn.com
highspeed@airborn.com

PUBLISH DATE: JULY 2010
CATALOG CODE: HS_M100

LOCATIONS

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PRINTED IN U.S.A.