

SS 539 .
USB-A/B (611) - 110101

Thomas & Betts

Computer I/O
USB

UNIVERSAL SERIAL BUS & 1394 FIREWIRE RECEPTACLES

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COMPUTER
I/O

OVERVIEW

Universal Serial Bus (USB) is a peripheral serial bus (12Mbps) designed to provide a single interface to connect both user I/O devices and telecommunication devices.

The cabling is a twisted pair for data and another pair for power in the shielded cable for higher data rates (12Mbps) and power. The clock and data are combined into a single half-duplex signal using NRZI encoding, which represents a zero bit with a transition.

The USB specification was written by a group of companies and formalized in the Universal Serial Bus Implementers Forum. The seven initial companies were Compaq, Digital Equipment Corporation, IBM PC Company, Intel, Microsoft, NEC, and Northern Telecom.

USB is not the first bus to tackle the peripheral attachment problem, but its technical capabilities and, even more important, its backing make it destined to dominate in PC's.

DESCRIPTION/APPLICATION

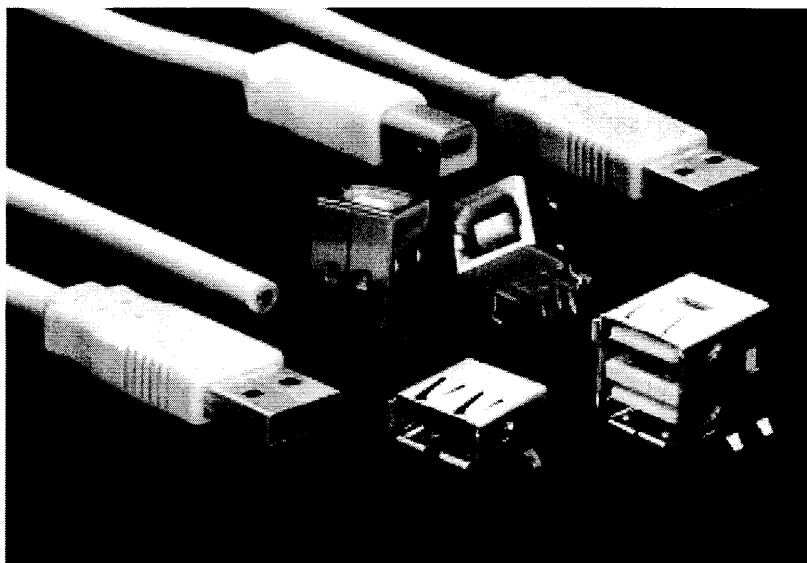
Thomas & Betts Universal Serial Bus (USB) board-mounted connectors and cable assemblies provide designers with a single shielded "plug and play" interconnection system for computer peripherals.

All Thomas & Betts USB Series connectors are designed to comply with the current USB Specification, ensuring compatibility and intermateability of components.

DESIGN ADVANTAGES

- Cable mounted connectors employ reliable crimp contact termination.
- More complete receptacle shielding for better EMI protection.
- Standard rear shield on right angle receptacles prevents EMI and RFI interference from entering through an unmated connection.
- One-piece shield designs for cost effective assembly and reliability.
- User friendly plug and play design allows peripherals to be added or removed without rebooting the computer.
- Single interconnect system for all peripherals.
- Board mounted connectors available in through hole designs; materials are compatible with surface mount technology.

UNIVERSAL SERIAL BUS INTERCONNECTION SYSTEM


Connector Usage

PERIPHERALS	CABLE PLUGS		A-B ASSY.	SINGLE REC.		STACKED A REC.
	A	B		A	B	
Scanners	-	-	Y	-	Y	-
Printers	-	-	Y	-	Y	-
Monitors	-	-	-	O	-	O
Keyboards	Y	-	O	Y	O	Y
Mice	Y	-	-	-	-	-
Gaming Devices	Y	-	-	-	-	-
Hubs	-	-	Y	Y	Y	Y
Modems	-	-	Y	-	Y	-
Phones	Y	-	O	-	O	-
PCs (Host)	-	-	-	Y	-	Y
Notebooks	-	-	-	Y	Y	Y

Y = Yes

O = Optional

USB SERIES A RIGHT ANGLE THRU-HOLE RECEPTACLES



PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated UL 94V-0, infrared and vapor phase compatible
INSULATION COLOR: Natural
CONTACT MATERIAL: Copper alloy, tin/lead over nickel plating in termination area. See Ordering Information below for plating in contact area
SHIELD MATERIAL: Copper alloy, tin over copper plating

ELECTRICAL PROPERTIES

CURRENT RATING: 1.5 Amp
INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$
DIELECTRIC STRENGTH: 1000 VRMS @ sea level

ENVIRONMENTAL PROPERTIES

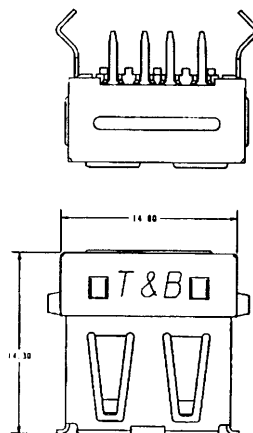
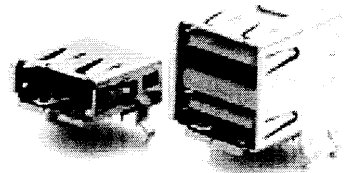
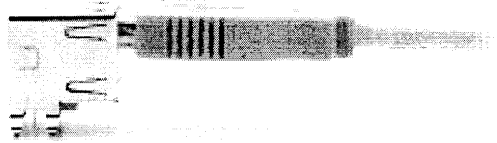
TEMPERATURE RATING: -55°C to +125°C

Ordering Information

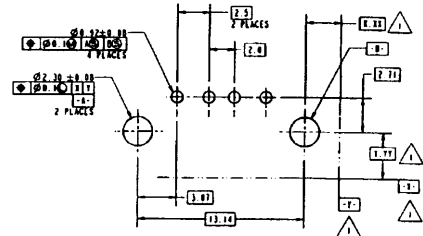
CATALOG #	CONTACT PLATING
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Single A

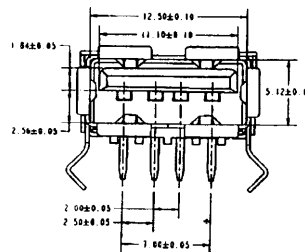
USBS-ARPCB	30 μ inch Gold
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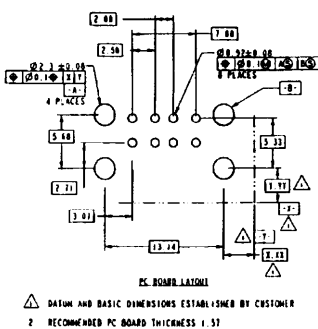
Single "A" Receptacle



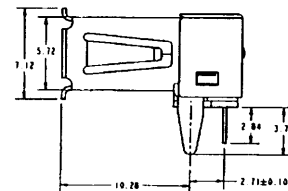
PC BOARD LAYOUT
 1. DATUM AND BASIC DIMENSIONS ESTABLISHED BY CUSTOMER
 2. RECOMMENDED PC BOARD THICKNESS: 1.57



Stacked "A" Receptacle



PC BOARD LAYOUT
 1. DATUM AND BASIC DIMENSIONS ESTABLISHED BY CUSTOMER
 2. RECOMMENDED PC BOARD THICKNESS: 1.57

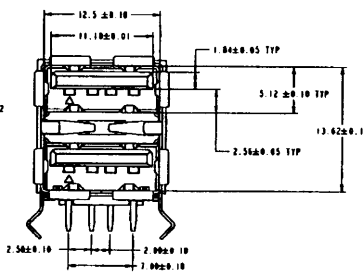
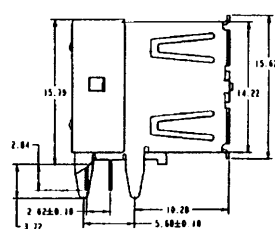
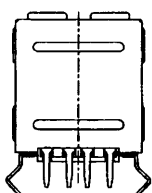


Ordering Information

CATALOG #	CONTACT PLATING
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Stacked A

USBS-A2RPCB	30 μ inch Gold
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X.XX and Y.YY established by customer.
 Recommended PCB thickness of 1.57 (.062)

USB SERIES B RIGHT ANGLE THRU-HOLE RECEPTACLES



PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated

UL 94V-0, infrared and vapor phase compatible

INSULATION COLOR: Natural

CONTACT MATERIAL: Copper alloy, tin/lead over nickel plating in termination area. See Ordering Information below for plating in contact area

SHIELD MATERIAL: Copper alloy, tin/lead plating

ELECTRICAL PROPERTIES

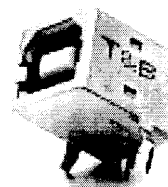
CURRENT RATING: 1.5 Amp

INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$

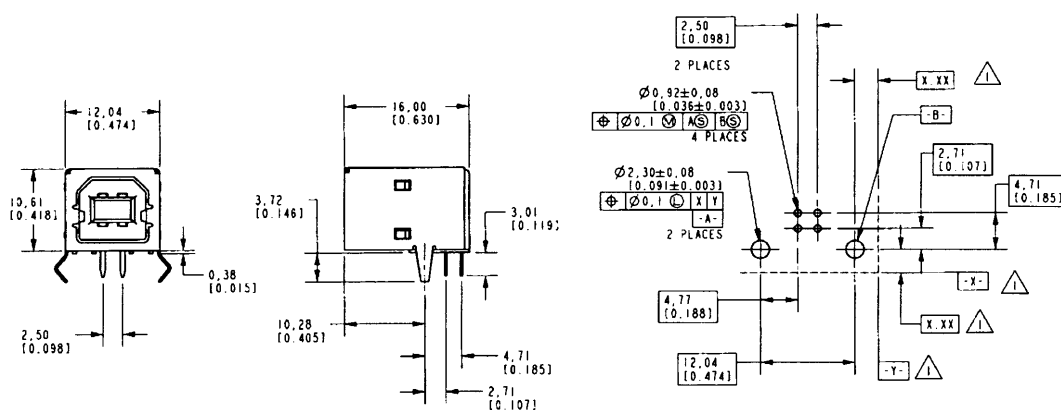
DIELECTRIC STRENGTH: 1000 VRMS @ sea level

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -55°C to +125°C



Right Angle "B" Receptacle



Ordering Information

CATALOG #	CONTACT PLATING
Right Angle B	
USBS-BRPCB	30 μ inch Gold

X.XX and Y.YY established by customer.
Recommended PCB thickness of 1.57 (.062)

USB SERIES A VERTICAL THRU-HOLE RECEPTACLE



PHYSICAL PROPERTIES

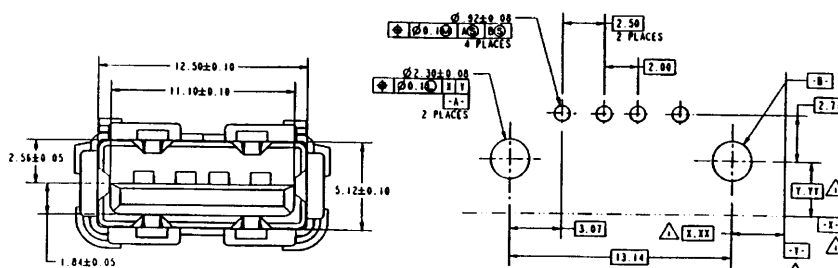
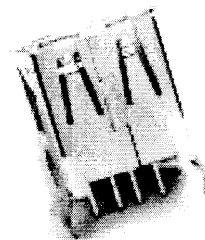
LIFETIME: > 100,000 mating cycles
INSULATION MATERIAL: High Temp. Polymere,
UL94 V-0
CONTACT MATERIAL: > Cu alloy
CONTACT PLATING: Au over Ni

ELECTRICAL PROPERTIES

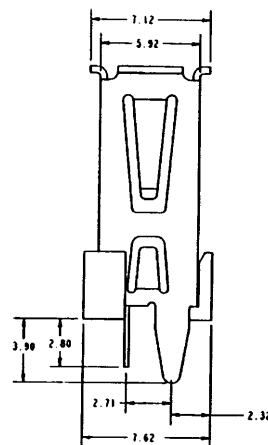
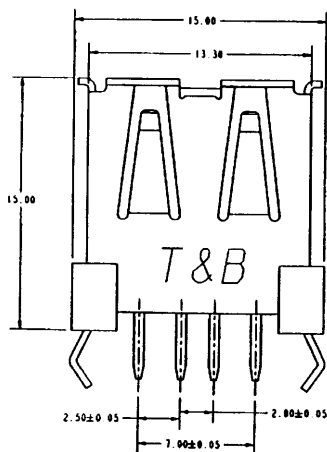
VOLTAGE RATING: 50 V max
CURRENT RATING: 10uA min, 1.5 A max.
CONTACT RESISTANCE: < 100 mOhm
INSULATION RESISTANCE: < 10³ mOhm

ENVIRONMENTAL PROPERTIES

APPLICATION TEMPERATURE: -40°C to +85°C
STORAGE TEMPERATURE: -55°C to +110°C
REFLOW SOLDERING: 240°C, 15 sec.



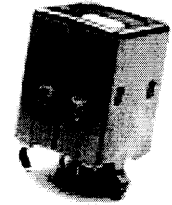
PC BOARD LAYOUT
△ DATUM AND BASIC DIMENSIONS ESTABLISHED BY CUSTOMER
2. RECOMMENDED PC BOARD THICKNESS 1.57



Ordering Information

CATALOG #	CONTACT PLATING
Vertical Thru Hole	
USBS-AVPCB	30 µ inch Gold

USB SERIES B VERTICAL THRU-HOLE RECEPTACLE



PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated UL 94V-0, infrared and vapor phase compatible

INSULATION COLOR: Natural

CONTACT MATERIAL: Copper alloy, tin/lead over nickel plating in termination area. See Ordering Information below for plating in contact area

SHIELD MATERIAL: Copper alloy, tin over copper plating

ELECTRICAL PROPERTIES

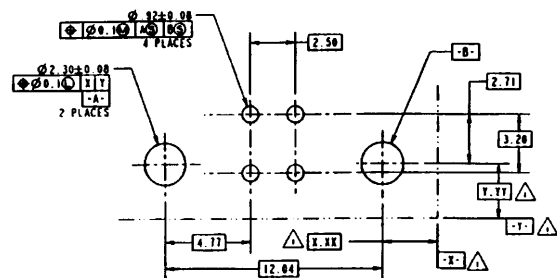
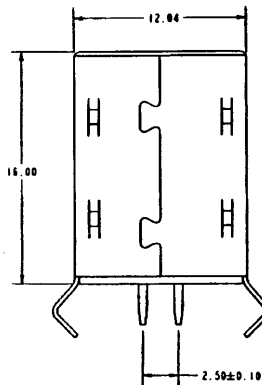
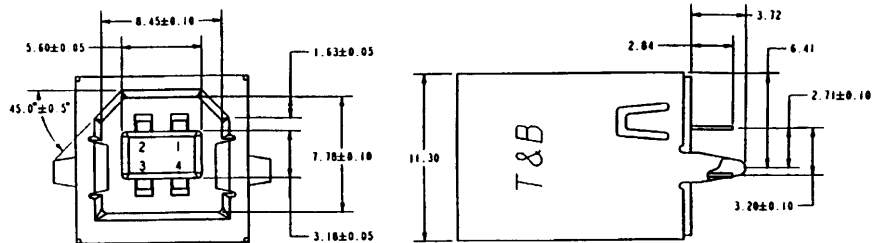
CURRENT RATING: 1.5 Amp

INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$

DIELECTRIC STRENGTH: 1000 VRMS @ sea level

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -55°C to +125°C



△ DATUM AND BASIC DIMENSIONS ESTABLISHED BY CUSTOMER
 2. RECOMMENDED PC BOARD THICKNESS 1.57

Ordering Information

CATALOG #	CONTACT PLATING
Vertical Thru Hole	
USBS-BVPCB	30 μ inch Gold

USB SERIES A TO STUB AND A TO B CABLE ASSEMBLIES

PLUG PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic,
rated UL 94V-0
INSULATION COLOR: Natural
OVERMOLD MATERIAL: PVC
OVERMOLD COLOR: Frost White
CONTACT MATERIAL: Copper alloy. See Ordering
Information below for plating in contact area
SHIELD MATERIAL: Series A: Steel, tin plating
Series B: Copper alloy, tin/lead
plating

PLUG ELECTRICAL PROPERTIES

CURRENT RATING: 1.5 Amp
INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$
DIELECTRIC STRENGTH: 1000 VRMS @ sea level

CABLE PHYSICAL PROPERTIES

JACKET MATERIAL: PVC
JACKET COLOR: Frost white
SHIELDING: Aluminum foil with tinned copper braid
CONDUCTOR INSULATION:
POWER CONDUCTORS: Semi-rigid PVC
SIGNAL CONDUCTORS: HDPE

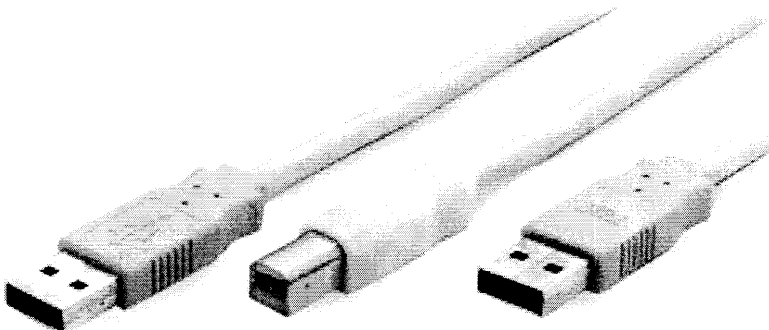
CABLE ELECTRICAL PROPERTIES

IMPEDANCE: $90 \pm 15\% \Omega$ @ 1 MHz
CAPACITANCE: 65 pF/m @ 1 MHz
ATTENUATION (dB/305m): 4.8 @ 64 kHz
6.7 @ 256 kHz
8.2 @ 512 kHz
9.4 @ 772 kHz
12 @ 1 MHz
24 @ 4 MHz
35 @ 8 MHz
38 @ 10 MHz
48 @ 16 MHz

PROPAGATION DELAY: 6 ns/m Max.

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -40° C to 75° C



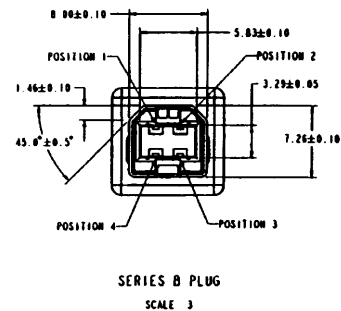
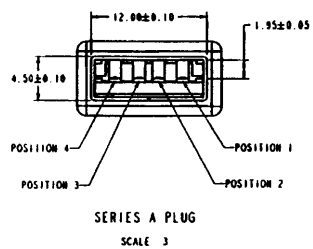
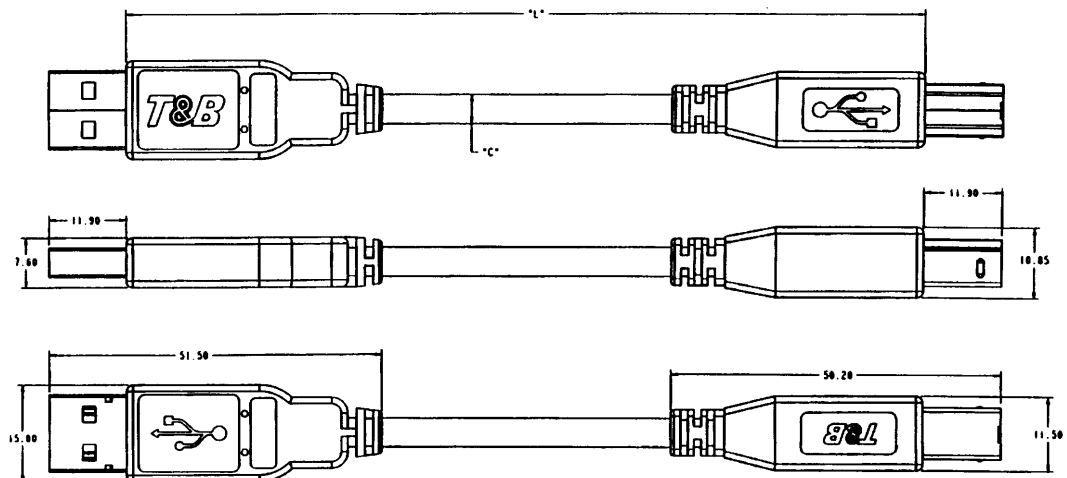
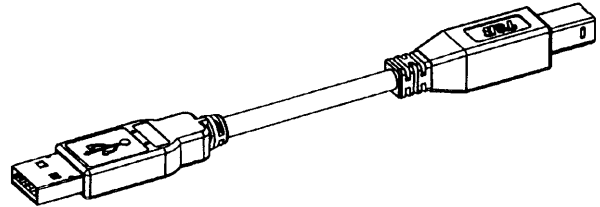
Ordering Information - A To B Cable Assembly

PART #	PLUG TYPE	WIRE GAGE	CONTACT CABLE DESCRIPTION	LENGTH "L"
USB-AB1011-M050	A-B	2 #28 - 2 #20	Gold 30 microinches / natural	5.0 meters
USB-AB1211-M030	A-B	2 #28 - 2 #22	Gold 30 microinches / natural	3.0 meters
USB-AB1211-M02A	A-B	2 #28 - 2 #22	Gold 30 microinches / natural	2.5 meters
USB-AB1411-M020	A-B	2 #28 - 2 #24	Gold 30 microinches / natural	2.0 meters
USB-AB1411-M01A	A-B	2 #28 - 2 #24	Gold 30 microinches / natural	1.5 meters
USB-AB1611-M010	A-B	2 #28 - 2 #26	Gold 30 microinches / natural	1.0 meters
USB-AB1811-M00B	A-B	2 #28 - 2 #28	Gold 30 microinches / natural	0.83 meters
USB-AB1811-M00A	A-B	2 #28 - 2 #28	Gold 30 microinches / natural	0.5 meters

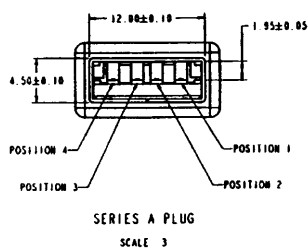
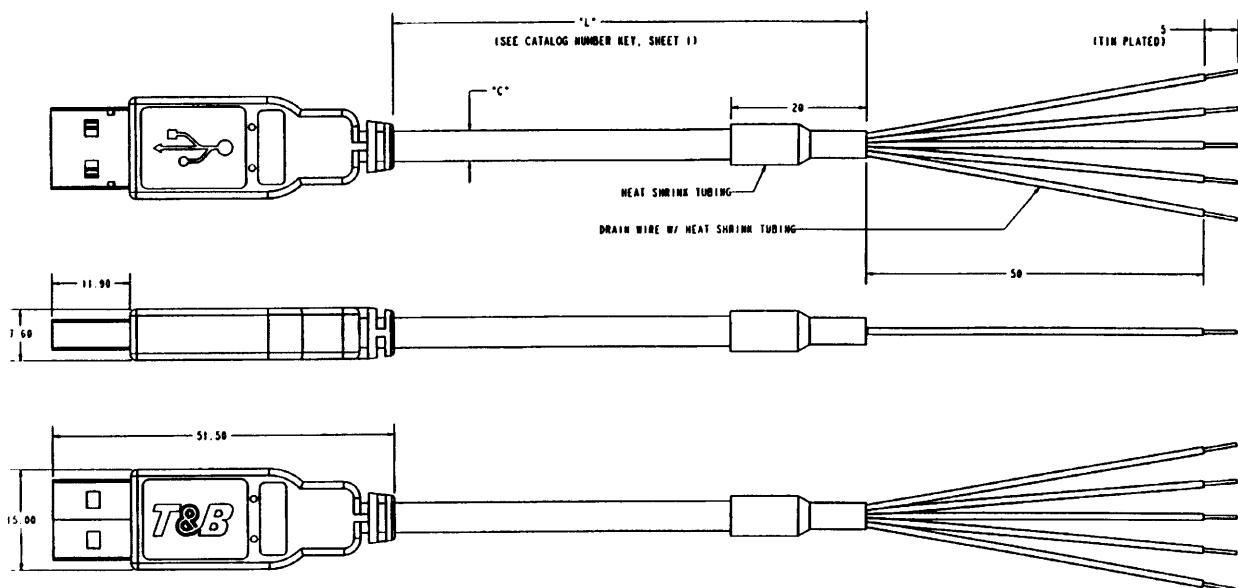
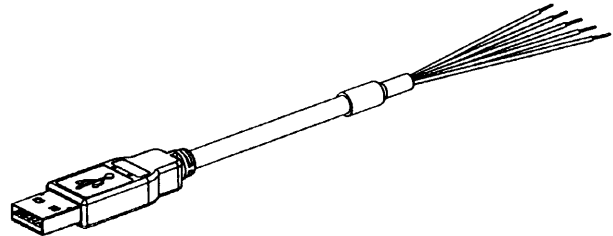
Ordering Information A To Stub Cable Assembly

PART #	PLUG TYPE	WIRE GAGE	CONTACT CABLE DESCRIPTION	LENGTH "L"
USB-A1011-M050	A-B	2 #28 - 2 #20	Gold 30 microinches / natural	5.0 meters
USB-A1211-M030	A-B	2 #28 - 2 #22	Gold 30 microinches / natural	3.0 meters
USB-A1211-M02A	A-B	2 #28 - 2 #22	Gold 30 microinches / natural	2.5 meters
USB-A1411-M020	A-B	2 #28 - 2 #24	Gold 30 microinches / natural	2.0 meters
USB-A1411-M01A	A-B	2 #28 - 2 #24	Gold 30 microinches / natural	1.5 meters
USB-A1611-M010	A-B	2 #28 - 2 #26	Gold 30 microinches / natural	1.0 meters
USB-A1811-M00B	A-B	2 #28 - 2 #28	Gold 30 microinches / natural	0.83 meters
USB-A1811-M00A	A-B	2 #28 - 2 #28	Gold 30 microinches / natural	0.5 meters

USB A-B CABLE ASSEMBLIES



USB CABLE ASSEMBLIES SERIES A TO STUB



1394 FIREWIRE UPRIGHT THRU-HOLE RECEPTACLES



PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated UL 94V-0, infrared and vapor phase compatible

INSULATION COLOR: Natural

CONTACT MATERIAL: Copper alloy, tin/lead over nickel plating in termination area. See Ordering Information below for plating in contact area

SHIELD MATERIAL: Copper alloy, tin over copper plating

ELECTRICAL PROPERTIES

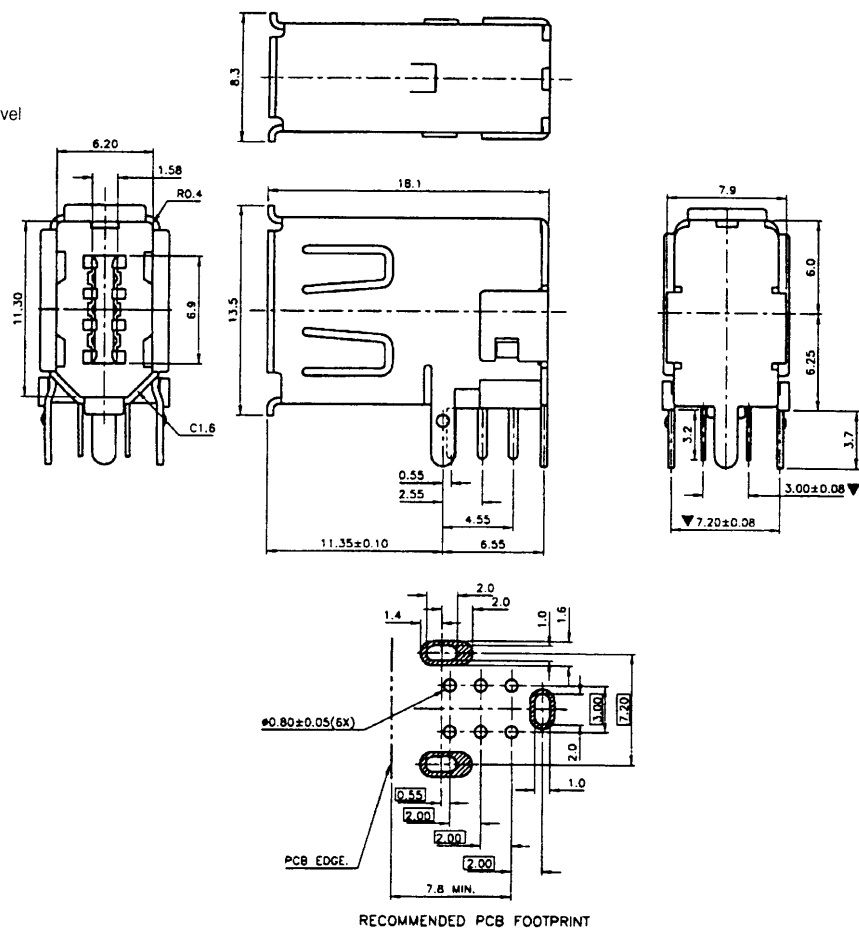
CURRENT RATING: 1.5 Amp

INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$

DIELECTRIC STRENGTH: 1000 VRMS @ sea Level

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -55°C to +125°C

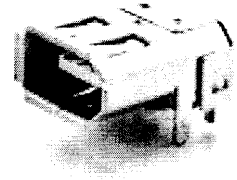


Ordering Information

CATALOG #	CONTACT PLATING
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Upright Receptacle

1394S-UPCB	30 μ inch Gold
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**1394 FIREWIRE
 RIGHT ANGLE
 SURFACE MOUNT
 RECEPTACLES**

PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated UL 94V-0, infrared and vapor phase compatible

INSULATION COLOR: Natural

CONTACT MATERIAL: Copper alloy, tin/lead over nickel plating in termination area. See Ordering Information below for plating in contact area

SHIELD MATERIAL: Copper alloy, tin over copper plating

ELECTRICAL PROPERTIES

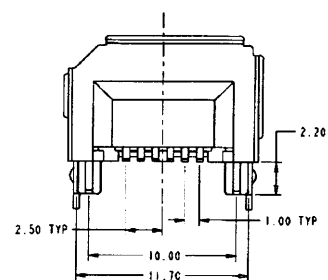
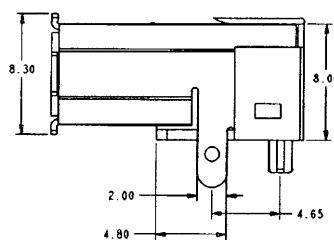
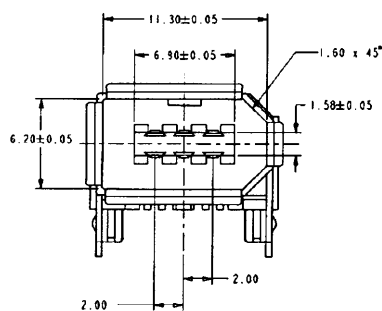
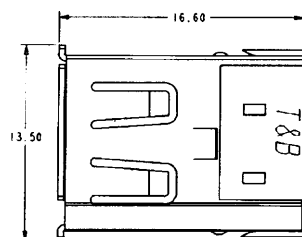
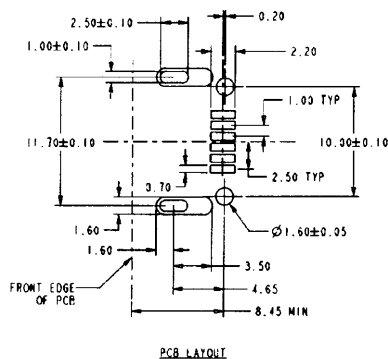
CURRENT RATING: 1.5 Amp

INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$

DIELECTRIC STRENGTH: 1000 VRMS @ sea Level

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -55°C to +125°C


Ordering Information

CATALOG #	CONTACT PLATING
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Right Angle Receptacle	
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1394S-RSMT	30 μ inch Gold
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USB SERIES B RIGHT ANGLE RECEPTACLES



PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated

UL 94V-0, infrared and vapor phase compatible

INSULATION COLOR: Natural

CONTACT MATERIAL: Copper alloy, tin/lead over nickel

plating in termination area. See Ordering Information

below for plating in contact area

SHIELD MATERIAL: Copper alloy, tin/lead plating

ELECTRICAL PROPERTIES

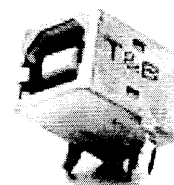
CURRENT RATING: 1 Amp

INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$

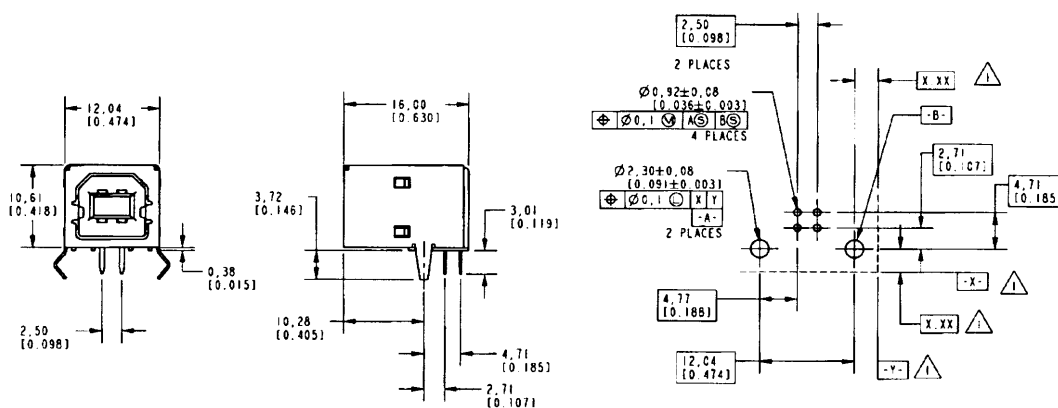
DIELECTRIC STRENGTH: 1000 VRMS @ sea Level

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING: -55°C to +125°C



Right Angle "B" Receptacle



Ordering Information

CATALOG #	CONTACT PLATING
Right Angle B	
USB-BRPCB	30 μ inch Gold
USB-BRPCB-1	30 μ inch Palladium Ni w/ gold flash

X.XX and Y.YY established by customer.
Recommended PCB thickness of 1.57 (.062)

USB SERIES A AND SERIES B CABLE ASSEMBLIES

PLUG PHYSICAL PROPERTIES

INSULATION MATERIAL: Glass filled thermoplastic, rated UL 94V-0
INSULATION COLOR: Natural
OVERMOLD MATERIAL: PVC
OVERMOLD COLOR: Frost White
CONTACT MATERIAL: Copper alloy. See Ordering Information below for plating in contact area
SHIELD MATERIAL: Series A: Steel, tin plating
Series B: Copper alloy, tin/lead plating

PLUG ELECTRICAL PROPERTIES

CURRENT RATING: 1 Amp
INSULATION RESISTANCE: $> 1 \times 10^9 \Omega$
DIELECTRIC STRENGTH: 1000 VRMS @ sea level

CABLE PHYSICAL PROPERTIES

JACKET MATERIAL: PVC
JACKET COLOR: Frost white
SHIELDING: Aluminum foil with tinned copper braid
CONDUCTOR INSULATION:
POWER CONDUCTORS: Semi-rigid PVC
SIGNAL CONDUCTORS: HDPE

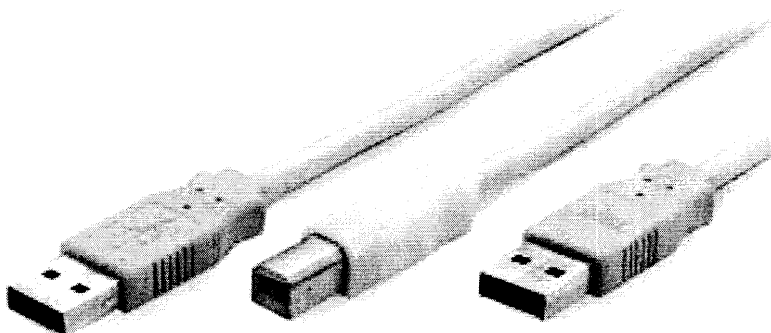
CABLE ELECTRICAL PROPERTIES

IMPEDANCE: $90 \pm 15\% \Omega$ @ 1 MHz
CAPACITANCE: 65 pF/m @ 1 MHz
ATTENUATION (dB/305m): 4.8 @ 64 kHz
6.7 @ 256 kHz
8.2 @ 512 kHz
9.4 @ 772 kHz
12 @ 1 MHz
24 @ 4 MHz
35 @ 8 MHz
38 @ 10 MHz
48 @ 16 MHz

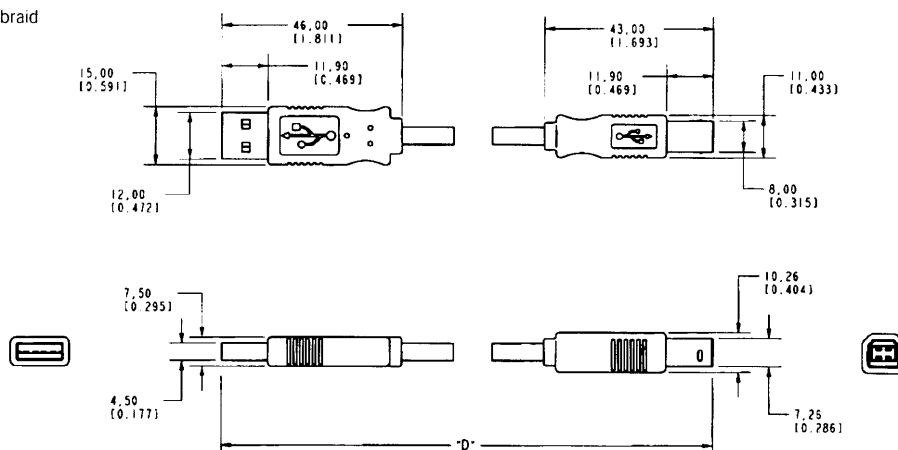
PROPAGATION DELAY: 6 ns/m Max.

ENVIRONMENTAL PROPERTIES

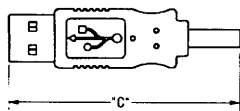
TEMPERATURE RATING: -40° C to 75° C



A To B Cable Assembly



A To Stub Cable Assembly



Ordering Information A To Stub Cable Assembly

PART #	CABLE CONSTRUCTION	LENGTH "C"
USB-A1811-M00B	2#28, 2#28 Shielded	0.83 meters
USB-A1611-M010	2#28, 2#26 Shielded	1.0 meters
USB-A1411-M020	2#28, 2#24 Shielded	2.0 meters

Ordering Information - A To B Cable Assembly

PART #	CABLE CONSTRUCTION	LENGTH "D"
USB-AB1811-M00A	2#28, 2#28 Shielded	0.5 meters
USB-AB1611-M010	2#28, 2#26 Shielded	1.0 meters
USB-AB1411-M01A	2#28, 2#24 Shielded	1.5 meters
USB-AB1411-M020	2#28, 2#24 Shielded	2.0 meters
USB-AB1211-M02A	2#28, 2#22 Shielded	2.5 meters
USB-AB1211-M030	2#28, 2#22 Shielded	3.0 meters
USB-AB1011-M040	2#28, 2#20 Shielded	4.0 meters
USB-AB1011-M050	2#28, 2#20 Shielded	5.0 meters