

CABLE DRAWING: MWA-3016

DRAWING TITLE:  
**Temperature Monitoring Cable**

DRAWING NO.: <b>MWACAB-0016</b>	DRAWN BY: <b>DRC</b>	DATE: 15-Nov-10	REV: <b>A</b>
		SHEET: 1 of 3	

**Cable Detail:**

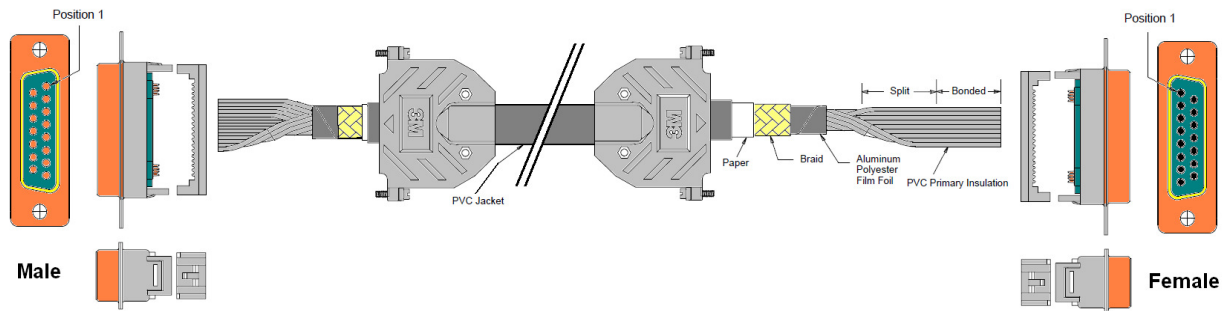
Connectors:	Description	Parts (Qty)
TempMon	DA15 Male IDC	See Note1 Below(1)
SBC	DA15 Female IDC	See Note2 Below(1)
Conductors:		
Cable	Ribbon Cable, Rnd/Flat, 15Way	See Note3 Below(60cm)
Misc:		
Backshell	For Connectors	See Note4 Below(2)
Numbering	Attach Cable Numbers 1 & 6 (Supplier to specify)	See Note5 Below

Overall Length 500+/-5mm

**Notes:**

1. DA15 Male IDC connector can be supplied from Element14 #469-385. Any equivalent will be OK refer to data sheets supplied with this drawing.
2. DA15 Female IDC connector can be supplied from Element14 #469-427. Any equivalent will be OK refer to data sheets supplied with this drawing.
3. The ribbon cable can be supplied from Element14 #297-562. Any equivalent will be OK refer to data shells supplied with this drawing.
4. The connector backshells can be supplied from Farnell #Element14. Any equivalent will be OK refer to data sheets supplied with this drawing
5. Cable numbering parts are left to the cable manufacture to decide, only the last two digits are required, for example "MWACAB-0016" is designated as "16" on the cable.

**Typical Drawing:**



**REVISION**

Date	Rev	Remarks
16/12/09	A	Draft
21/07/10	A	For Release
15/11/10	A	Changed one pin to be 3V3mcc line for sensor power

CABLE DRAWING: MWA-3016

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**Temperature Monitoring Cable**

DRAWING NO.: <b>MWACAB-0016</b>	DRAWN BY: <b>DRC</b>	DATE: 15-Nov-10	REV: <b>A</b>
		SHEET: 2 of 3	

**Typical Photo:**



**Pinouts Table:**

TempMon Pins(15)		SBC-TempMon Pins(15)
1	Sense1	1
2	Sense2	2
3	Sense3	3
4	Sense4	4
5	Sense5	5
6	Sense6	6
7	Sense7	7
8	Sense8	8
9	3V3mcc	9
10	0V	10
11	0V	11
12	0V	12
13	0V	13
14	0V	14
15	0V	15

**REVISION**

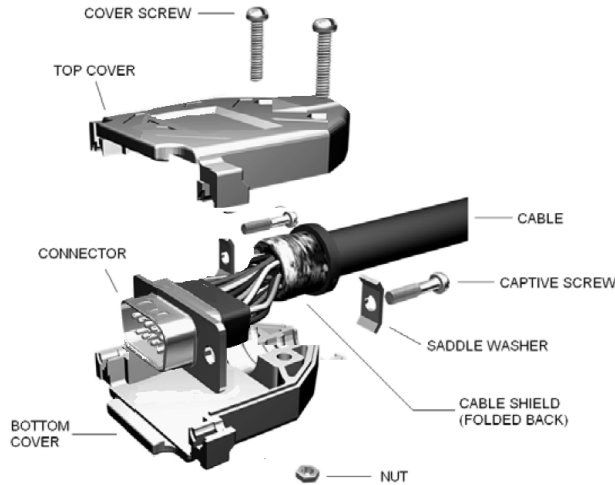
Date	Rev	Remarks
16/12/09	A	Draft
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CABLE DRAWING: MWA-3016

DRAWING TITLE:  
**Temperature Monitoring Cable**

DRAWING NO.: MWACAB-0016	DRAWN BY: DRC	DATE: 15-Nov-10	REV: A
		SHEET: 3 of 3	

**Assembly Details:**



**Connection Detail:**

From: (TempMon-DC) Various Digital Crate Front Panel TempMon Connectors  
To: (SBC) SBC Front Panel TempMon Connectors

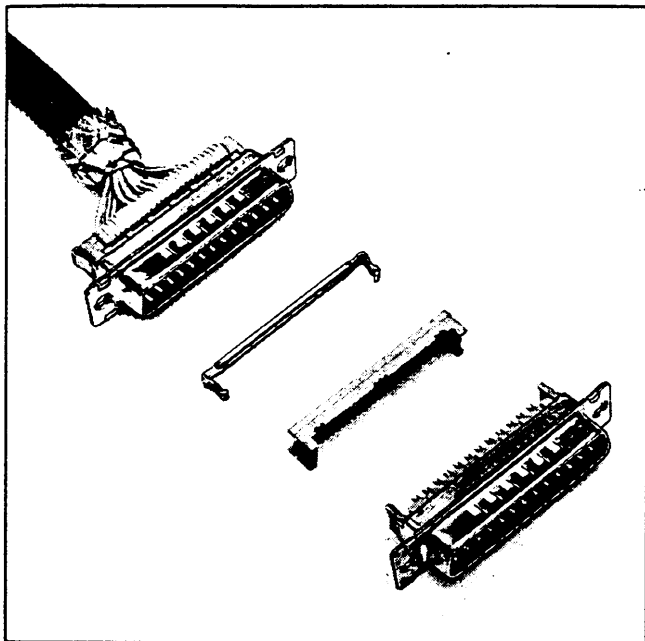
**REVISION**

Date	Rev	Remarks
16/12/09	A	Draft
21/07/10	A	For Release
15/11/10	A	Changed one pin to be 3V3mcc line for sensor power

# D Sub

Plug Connector

8200 Series



- Available in either pre-assembled or two piece covers
- Available in either open or closed end cover
- Available with dimples to aid in EMI/ESD protection
- Improved metal strain relief hooks directly to metal shell
- Low profile
- Four mounting options

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Sheet 1 of 3

## Physical

### Insulation

Material: Glass Filled Polyester (PBT)  
 Flammability: UL 94V-0  
 Color: Gray

### Contact

Material: Beryllium Copper  
 Plating  
 Underplate: 50  $\mu$ " (1.27  $\mu$ m) Nickel — QQ-N-290, Class 2  
 Wiping Area: 30  $\mu$ " (0.76  $\mu$ m) Gold — MIL-G-45204, Type II, Grade C

### Shell

Material: Steel  
 Plating: 197-394  $\mu$ " (5-10  $\mu$ m) 90/10 Tin Lead Over Copper  
 Strain Relief Material: Stainless Steel .016 (0.40) Thick  
 Wire Accommodation: 26 & 28 AWG Solid or Stranded  
 Marking: 3M Logo & Contact Position Numbers

## Electrical

Current Rating: 1 A  
 Insulation Resistance:  $> 1 \times 10^9 \Omega$  at 500 VDC  
 Withstanding Voltage: 1000 Vrms at Sea Level

## Environmental

Temperature Rating:  $-55^\circ$  to  $+105^\circ$

UL File No.: E68080  
 CSA File No.: LR 40971

### 3M Electronic Products Division

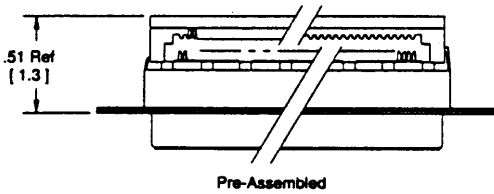
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# D Sub Plug Connector

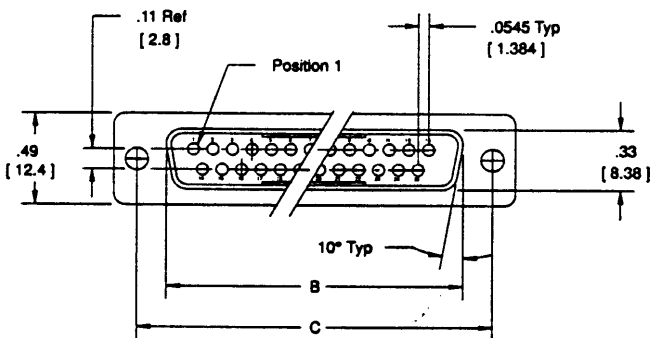
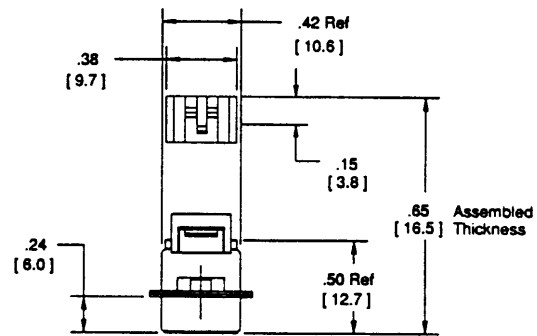
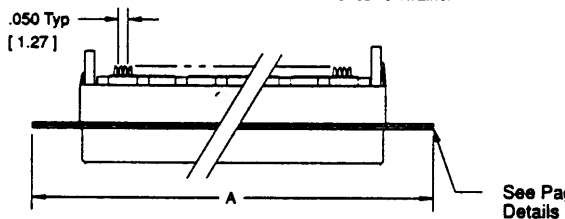
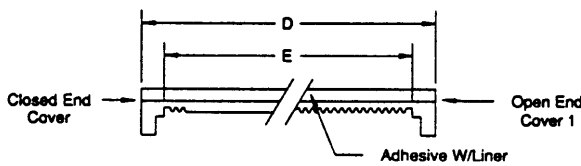
8200 Series

Sheet 2 of 3

Contact Quantity	Dim A	Dim B	Dim C	Dim D	Dim E	Dim F
09	1.21 [ 30.7 ]	.67 [ 17.0 ]	.98 [ 25.0 ]	.66 [ 16.7 ]	.49 [ 12.5 ]	.70 [ 17.8 ]
15	1.54 [ 39.1 ]	1.00 [ 25.4 ]	1.31 [ 33.3 ]	.99 [ 25.2 ]	.79 [ 20.1 ]	1.03 [ 26.1 ]
25	2.09 [ 53.1 ]	1.54 [ 39.1 ]	1.85 [ 47.0 ]	1.53 [ 39.0 ]	1.29 [ 32.8 ]	1.57 [ 39.8 ]
37	2.73 [ 69.3 ]	2.18 [ 55.4 ]	2.50 [ 63.5 ]	2.18 [ 55.4 ]	1.89 [ 48.0 ]	2.22 [ 56.3 ]



Note: Preassembled closed cover on Pin 1 side of connector.



Inch [mm]		
Tolerance Unless Noted		
	.0	.00 .000
Inch	±.1	±.01 ±.005

[ ] Dimensions for Reference Only

TS-0234-11

## Ordering Information

Connector  
82XX-X0XX

Strain Relief  
3448-8DXXA

Contact Quantity

Cover Style:

- 6 = Open Cover
- 7 = Closed Cover
- 8 = Open Cover, W/O Adhesive, Preassembled
- 9 = Closed Cover, W/O Adhesive, Preassembled

Strain Relief Option:

- 0 = Tin Lead, Dimples, W/O Strain Relief
- 6 = Tin Lead, Dimples, with Strain Relief

Mounting Style:

- 0 = Standard
- 3 = English
- 4 = Metric

- 09 = 9 Position
- 15 = 15 Position
- 25 = 25 Position
- 37 = 37 Position

3M Electronic Products Division

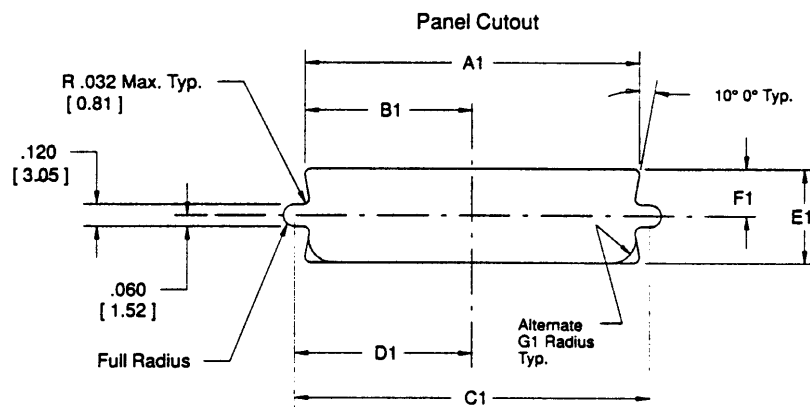
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# D Sub Plug Connector

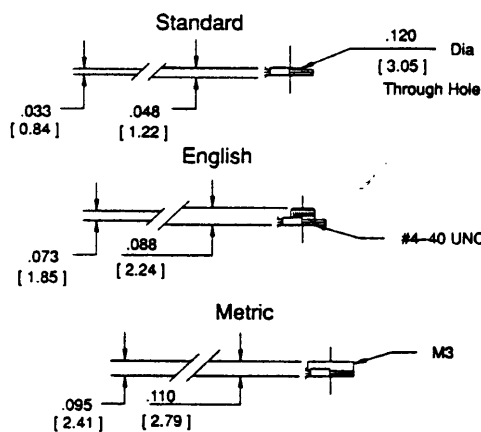
8200 Series

Mounting Method	Contact Quantity	Dim A1	Dim B1	Dim C1	Dim D1	Dim E1	Dim F1	Dim G1
Front	9	.874 [22.20]	.437 [11.10]	.984 [24.99]	.492 [12.50]	.513 [13.03]	.257 [6.53]	.120 [3.05]
	15	1.202 [30.53]	.601 [15.27]	1.312 [33.32]	.656 [16.66]	.513 [13.03]		
	25	1.744 [44.30]	.872 [22.15]	1.852 [47.04]	.926 [23.52]	.513 [13.03]		
	37	2.392 [60.76]	1.196 [30.38]	2.500 [63.50]	1.250 [31.75]	.513 [13.03]		
Rear	9	.806 [20.47]	.403 [10.24]	.984 [24.99]	.492 [12.50]	.449 [11.40]	.225 [5.70]	.120 [3.05]
	15	1.134 [28.80]	.567 [14.40]	1.312 [33.32]	.656 [16.66]	.449 [11.40]		
	25	1.674 [42.52]	.837 [21.26]	1.852 [47.04]	.926 [23.52]	.449 [11.40]		
	37	2.326 [59.08]	1.163 [29.54]	2.500 [63.50]	1.250 [31.75]	.449 [11.40]		

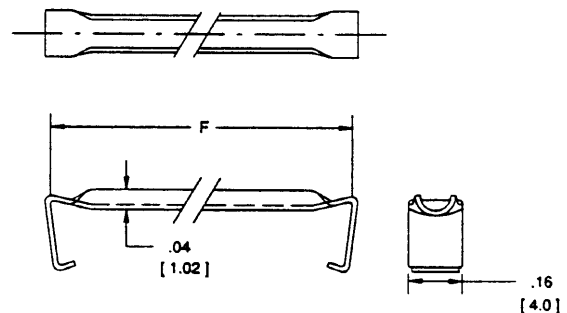
\*Front Mount – The connector is mounted in front of the panel.  
Rear Mount – The connector is mounted behind the panel.



### Mounting Styles



### Strain Relief (Order Separately or with Connector)



Sheet 3 of 3

TS-0234-11

# D Sub

## Socket Connector

8300 Series



- Available in either preassembled or two piece covers
- Available in either open or closed end cover
- Improved metal strain relief — hooks directly to metal shell
- Low profile
- Four mounting options

Date Modified: September 29, 1999

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Sheet 1 of 3

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## Physical

### Insulation

Material: Glass Filled Polyester (PBT)  
Flammability: UL 94V-0  
Color: Gray

### Contact

Material: Copper Alloy  
Plating  
Underplate: 100  $\mu$ " (1.27  $\mu$ m) Nickel — QQ-N-290, Class 2  
Wiping Area: 30  $\mu$ " (0.76  $\mu$ m) Gold — MIL-G-45204, Type II, Grade C

### Shell

Material: Steel  
Plating: Tin

**Strain Relief Material:** Stainless Steel .016 (0.40) Thick

**Wire Accommodation:** 26 & 28 AWG Solid or Stranded

**Marking:** 3M Logo & Contact Position Numbers

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## Electrical

**Current Rating:** 1 A

**Insulation Resistance:**  $> 1 \times 10^9 \Omega$  at 500 VDC

**Withstanding Voltage:** 1000 Vrms at Sea Level

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## Environmental

**Temperature Rating:**  $-55^\circ$  to  $+105^\circ$

UL File No.: E68080

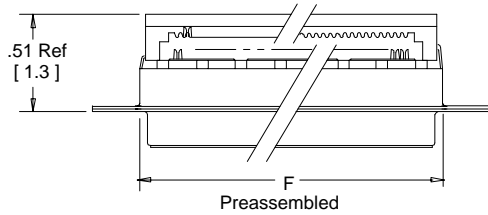
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### 3M Interconnect Solutions Division

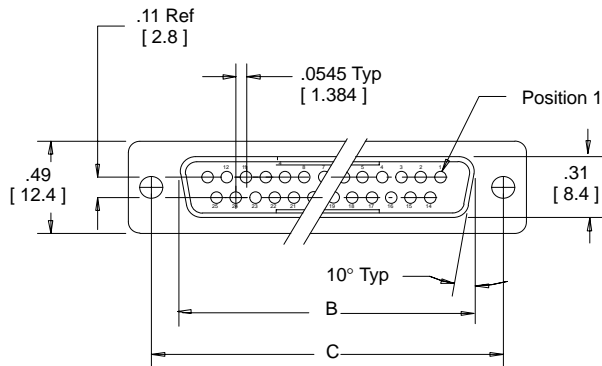
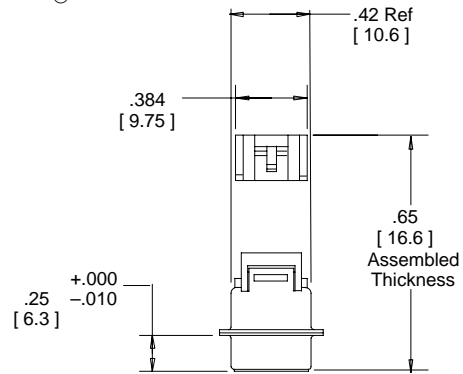
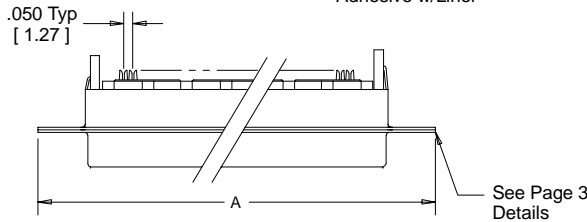
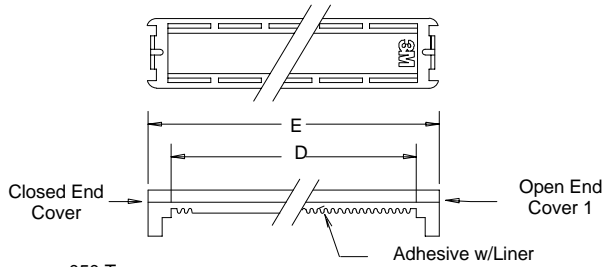
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Austin, TX 78726-9000

For technical, sales or ordering information call  
**800-225-5373**

Contact Quantity	Dimensions					
	A	B	C	D	E	F ± .008
09	1.23 [ 31.2 ]	.64 [ 16.3 ]	.98 [ 24.9 ]	.46 [ 11.7 ]	.67 [ 17.0 ]	.70 [ 17.7 ]
15	1.56 [ 39.6 ]	.97 [ 25.6 ]	1.31 [ 33.3 ]	.76 [ 19.3 ]	.99 [ 25.2 ]	1.03 [ 26.2 ]
25	2.10 [ 53.3 ]	1.51 [ 38.4 ]	1.85 [ 47.0 ]	1.27 [ 32.3 ]	1.54 [ 39.1 ]	1.57 [ 39.9 ]
37	2.74 [ 69.6 ]	2.16 [ 54.9 ]	2.50 [ 63.5 ]	1.87 [ 47.5 ]	2.19 [ 55.6 ]	2.22 [ 56.4 ]



Note: Preassembled closed cover on Pin 1 side of connector.



Inch  
[mm]

Tolerance Unless Noted			
	.0	.00	.000
Inch	± .1	± .01	± .005

[ ] Dimensions for Reference only

### Ordering Information

#### Connector 83XX-X00X

Contact Quantity

- Cover Style:  
 6 = Open Cover  
 7 = Closed Cover  
 8 = Open Cover, w/o Adhesive, Preassembled  
 9 = Closed Cover, w/o Adhesive, Preassembled

- Mounting Style:  
 0 = ∅ .120 [ 3.05 ]  
 3 = 4-40 UNC  
 4 = M3

#### Strain Relief (Order Separately) 3448-8DXXA

- 09 = 9 Position  
 15 = 15 Position  
 25 = 25 Position  
 37 = 37 Position

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Sheet 2 of 3

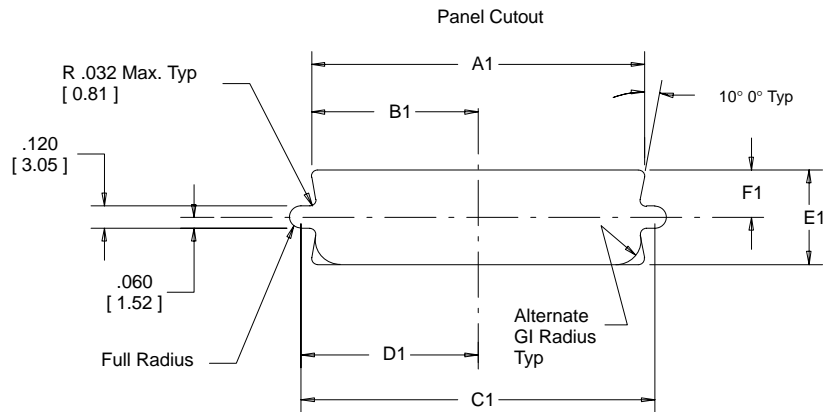


# D Sub Socket Connector

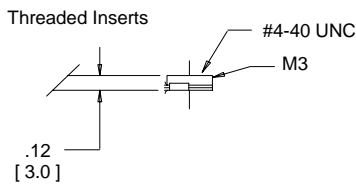
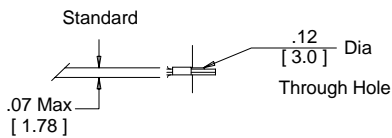
8300 Series

Mounting Method*	Contact Quantity	Dimensions						
		A1	B1	C1	D1	E1	F1	G1
Front	9	.87 [ 22.0 ]	.44 [ 11.2 ]	.98 [ 24.9 ]	.49 [ 12.5 ]	.51 [ 13.0 ]	.26 [ 6.6 ]	.12 [ 3.1 ]
	15	1.20 [ 30.5 ]	.60 [ 15.2 ]	1.31 [ 33.3 ]	.66 [ 16.8 ]			
	25	1.74 [ 44.2 ]	.87 [ 22.1 ]	1.85 [ 47.0 ]	.93 [ 23.6 ]			
	37	2.39 [ 60.7 ]	1.20 [ 30.5 ]	2.50 [ 63.5 ]	1.25 [ 31.8 ]			
Rear	9	0.81 [ 20.6 ]	.40 [ 10.2 ]	.98 [ 25.0 ]	.49 [ 12.5 ]	0.45 [ 11.4 ]	0.22 [ 5.8 ]	.12 [ 3.1 ]
	15	1.13 [ 28.7 ]	.57 [ 14.5 ]	1.31 [ 33.3 ]	.66 [ 16.8 ]			
	25	1.67 [ 42.4 ]	.84 [ 21.3 ]	1.85 [ 47.0 ]	.93 [ 23.6 ]			
	37	2.33 [ 59.2 ]	1.16 [ 29.5 ]	2.50 [ 63.5 ]	1.25 [ 31.8 ]			

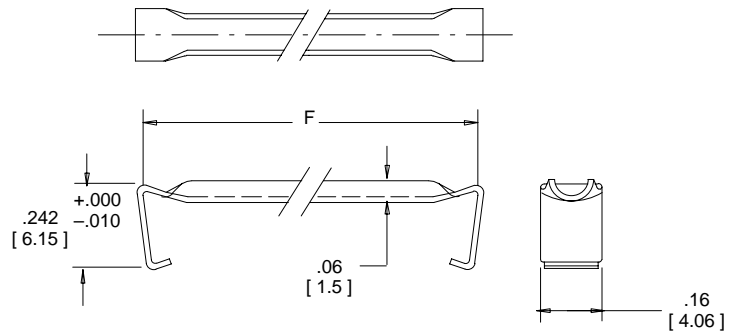
\* Front Mount—The connector is mounted in front of the panel.  
Rear Mount—The connector is mounted behind the panel.



### Mounting Styles



### Strain Relief (Order Separately or with Connector)



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Sheet 3 of 3

## 3M Interconnect Solutions Division

6801 River Place Blvd.  
Austin, TX 78726-9000

For technical, sales or ordering information call  
**800-225-5373**

# .050" Round, Shielded/Jacketed, Flat Cable

28 AWG Stranded, Mass-Term, PVC/PVC

3659 Series



- Round construction permits easier routing
- 28 AWG wire on .050 inch pitch permits mass termination to broad line of IDC connectors
- Continuous split/bond repeat allows for mass termination on 2.4 inch centers (approximate)
- Primary cable is zippable for branching or discrete terminations
- Meets external wiring requirements of National Electrical Code, Article 725 (CL2)
- UL listed for USA and Canadian markets
- Dual shielding provides 35 db average shielding effectiveness

Date Modified: July 29, 1999

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## Physical

### Jacket


Material: Polyvinyl Chloride (PVC)

Color: Black

**Primary Material:** PVC

Color: Gray

### Marking

Standard: (UL) CL2 75C 28 AWG or AWM 20267 3M NU  AWM IIA/B 80C 300V FT1  
EU <50V

**Conductors:** 28 AWG 7 × 36 [ 7 × 0.127 ] Tinned Stranded Copper

**Shielding:** .001 [ 0.03 ] Thick Aluminum/Polyester Film Foil and 90% Coverage Tinned Copper Braid

## Electrical

**Voltage Rating:** USA: N.E.C. 725, CL2 or AWM; 300V      Canada: 300V      EU: <50V

**Insulation Resistance:**  $> 1 \times 10^{10} \Omega/10 \text{ ft. [ 3m ]}$

	Unbalanced	Balanced
<b>Characteristic Impedance</b>	62 $\Omega$	106 $\Omega$
<b>Capacitance</b>	27.7 pF/ft. [ 90.88 pF/m ]	15.2 pF/ft. [ 49.9 pF/m ]
<b>Inductance</b>	.13 $\mu\text{H/ft. [ 0.43 } \mu\text{H/m ]}$	.20 $\mu\text{H/ft. [ 0.66 } \mu\text{H/m ]}$
<b>Propagation Delay</b>	1.72 ns/ft. [ 5.64 ns/m ]	1.62 ns/ft. [ 5.32 ns/m ]
<b>Velocity of Propagation</b>	59%	62%

Note: Unbalanced is measured between ground-signal-ground conductors with shield grounded. Balanced is measured between signal conductors within a pair, with the shield floating.

## Environmental

**Temperature Rating:** USA: CL2; 75°C Max or AWM; -20°C to +80°C      Canada: 80°C

**Flammability Rating:** USA: N.E.C. 725, CL2      Canada: FTI

UL File No.: E118773, Power Limited Circuit Cable: CL2 (or AWM Style 20267)

### 3M Interconnect Solutions Division

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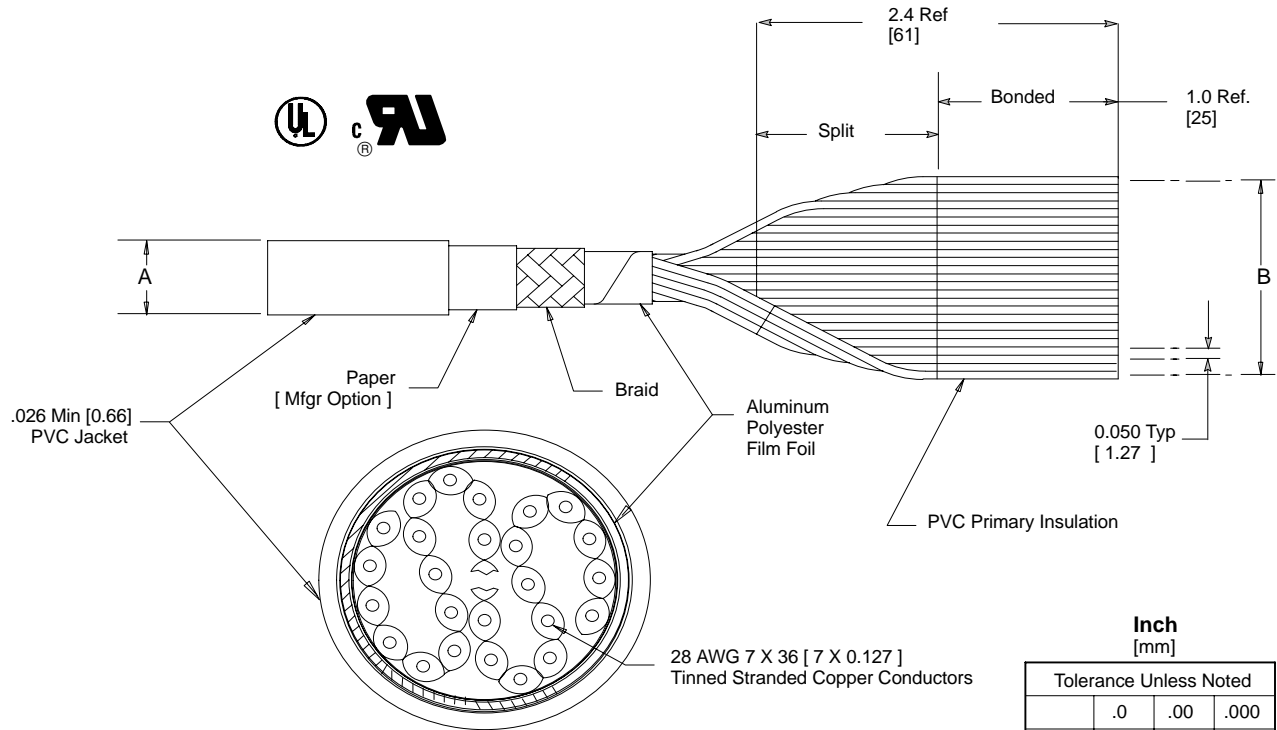
For technical, sales or ordering information call  
**800-225-5373**

# .050" Round, Shielded/Jacket, Flat Cable

## 28 AWG Stranded, Mass-Term, PVC/PVC

3659 Series

Number of Conductors	3M Part Number	Dimension A ± .03	Dimension B Ref (See Note 2)
09	3659/09	0.27 [ 6.9 ]	0.40 [ 10.2 ]
10	3659/10	0.27 [ 6.9 ]	0.45 [ 11.4 ]
14	3659/14	0.31 [ 7.9 ]	0.65 [ 16.5 ]
15	3659/15	0.31 [ 7.9 ]	0.70 [ 17.8 ]
16	3659/16	0.31 [ 7.9 ]	0.75 [ 19.1 ]
20	3659/20	0.34 [ 8.6 ]	0.95 [ 24.1 ]
24	3659/24	0.37 [ 9.4 ]	1.15 [ 29.2 ]
25	3659/25	0.37 [ 9.4 ]	1.20 [ 30.5 ]
26	3659/26	0.37 [ 9.4 ]	1.25 [ 31.8 ]
34	3659/34	0.41 [ 10.4 ]	1.65 [ 41.9 ]
36	3659/36	0.43 [ 10.9 ]	1.75 [ 44.5 ]
37	3659/37	0.43 [ 10.9 ]	1.80 [ 45.7 ]
40	3659/40	0.43 [ 10.9 ]	1.95 [ 49.5 ]
50	3659/50	0.48 [ 12.2 ]	2.45 [ 62.2 ]
60	3659/60	0.51 [ 13.0 ]	2.95 [ 74.9 ]
64	3659/64	0.54 [ 13.7 ]	3.15 [ 80.0 ]



**Inch**  
[mm]

Tolerance Unless Noted			
	.0	.00	.000
Inch	± .1	± .05	± .010

[ ] Dimensions for Reference only

- Notes:
1. Red marking on one edge of primary cable designates wire #1.
  2. Dimension B pertains to bonded area only.

### Ordering Information

**3659X/XX**

Jacket Color Options  
 Blank = "Standard" Black Jacket  
 C = "Special" Cream Jacket  
 G = "Special" Gray Jacket  
 L = "Special" Light Olive Jacket

Number of Conductors  
 (See Table)

Note: Available in standard length of 100 or 300 ft/roll, please specify when ordering.

TS-0083-14  
 Sheet 2 of 2

### 3M Interconnect Solutions Division

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For technical, sales or ordering information call  
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# 3M™ D Sub EMI Junction Shell

Metalized Plastic



- Protection from EMI/ESD
- Easy assembly reduces time and labor for low cost
- Light weight and a compact design
- Strain Relief compensates for multiple cable diameters
- Jack screws provide positive retention
- RoHS\* compliant

Date Modified: January 15, 2007

TS-2132-02  
Sheet 1 of 3

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## Physical

### Shell and Hardware

Shell Material: ABS

Shell Plating: Nickel Over Copper

Hardware: (2) Jackscrews #4-40 × .438"

(2) Saddle Washers #4

(2) Nuts #4-40

(2) Screws #4-40 × .450"

Material: Steel

Plating: Bright Zinc

### Compression Insert:

Material: Thermo Plastic Elastomer

Flammability: UL 94HB

Durometer: 75 + / -5

Mounting Hardware: See Specification Sheet TS-0142

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## Environmental

Temperature Rating: 0°C to +75°C

"RoHS compliant" means that the product or part does not contain any of the following substances in excess of the following maximum concentration values in any homogeneous material, unless the substance is in an application that is exempt under RoHS: (a) 0.1% (by weight) for lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers; or (b) 0.01% (by weight) for cadmium. Unless otherwise stated by 3M in writing, this information represents 3M's knowledge and belief based upon information provided by third party suppliers to 3M.

# 3M™ D Sub EMI Junction Shell

Metalized Plastic

Inch		[mm]	
Tolerance Unless Noted			
	.0	.00	.000
inch	±.1	±.01	±.005

[ ] Dimensions for Reference Only

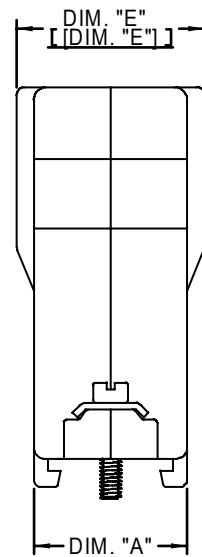
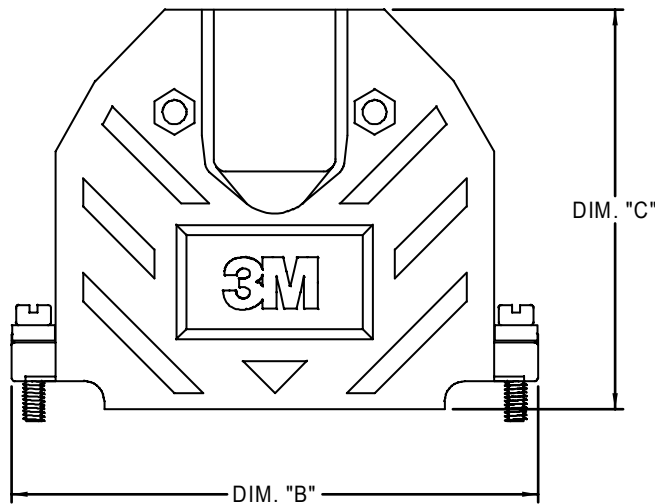
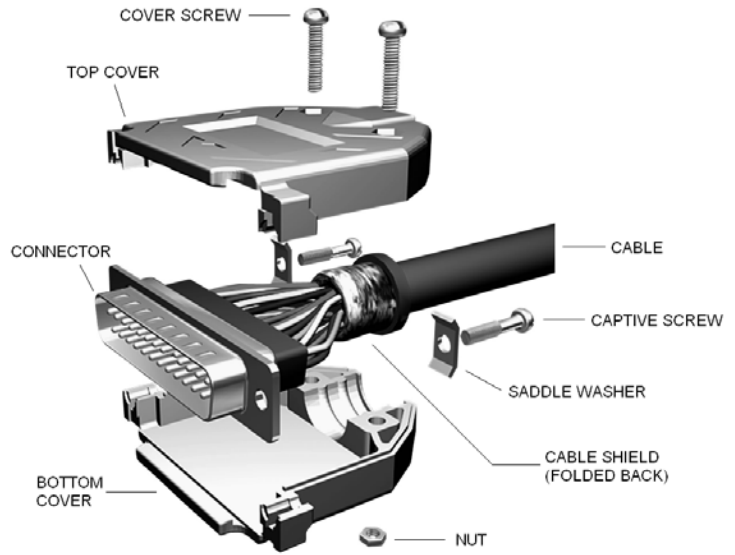
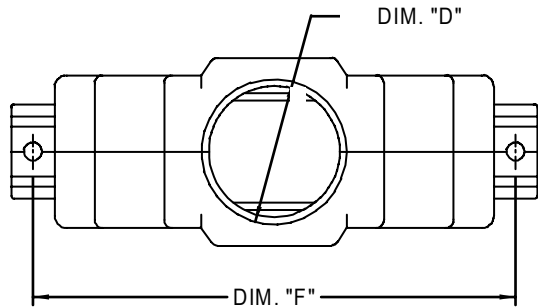


Table 1 - Junction Shell

3M Part Number	Dimensions						Cable O.D. Range	
	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Min	Max*
3357-6209-1C	.640 [16.26]	1.217 [30.91]	1.692 [42.98]	.400 [10.16]	N/A	.984 [24.99]	0.19 [4.8]	0.35 [8.9]
3357-6215-1C		1.540 [39.12]	1.650 [41.91]	.400 [10.06]	N/A	1.312 [33.32]	0.19 [4.8]	0.35 [8.9]
3357-6225-1C		2.090 [53.08]	1.800 [45.72]	.522 [13.26]	.710 [18.03]	1.857 [47.17]	0.19 [4.8]	0.46 [11.7]
3357-6237-1C		2.734 [69.44]	1.975 [50.17]	.726 [18.44]	.906 [23.01]	2.500 [63.50]	0.30 [7.6]	0.68 [17.27]
3357-6250-1C		.770 [19.56]	2.645 [67.18]	2.000 [50.80]	.726 [18.44]	.940 [23.88]	2.406 [61.11]	0.30 [7.6]

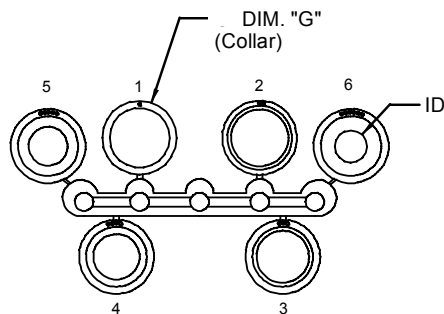
Note: \*These numbers will vary depending upon the compressibility of the wire.

**Backshell Dimension Table**  
**Table 1**

TS-2132-02  
Sheet 2 of 3

# 3M™ D Sub EMI Junction Shell

Metalized Plastic



**Elastomeric Backshell Inserts  
Figure 1**

**Table 2 - Compression Inserts**

Insert For	Dimensions												G
	1		2		3		4		5		6		
	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	
3357-6209	0.475 [ 12.07 ]	0.320 [ 8.13 ]	0.360 [ 9.14 ]	0.315 [ 8.00 ]	0.360 [ 9.14 ]	0.285 [ 7.24 ]	0.360 [ 9.14 ]	0.255 [ 6.48 ]	0.360 [ 9.14 ]	0.210 [ 5.33 ]	N/A	N/A	0.475 [ 12.07 ]
3357-6215	0.600 [ 15.24 ]	0.450 [ 11.43 ]	0.450 [ 11.43 ]	0.410 [ 10.41 ]	0.450 [ 11.43 ]	0.370 [ 9.40 ]	0.450 [ 11.43 ]	0.300 [ 7.62 ]	0.450 [ 11.43 ]	0.230 [ 5.84 ]	N/A	N/A	0.600 [ 15.24 ]
3357-6225	0.655 [ 16.64 ]	0.650 [ 16.51 ]	0.700 [ 17.78 ]	0.620 [ 15.75 ]	0.810 [ 20.57 ]	0.570 [ 14.48 ]	0.655 [ 16.64 ]	0.500 [ 12.70 ]	0.655 [ 16.64 ]	0.425 [ 10.80 ]	0.655 [ 16.64 ]	0.350 [ 8.89 ]	0.810 [ 20.57 ]
3357-6237	0.810 [ 20.57 ]	0.650 [ 16.51 ]	0.700 [ 17.78 ]	0.620 [ 15.75 ]	0.655 [ 16.64 ]	0.570 [ 14.48 ]	0.655 [ 16.64 ]	0.500 [ 12.70 ]	0.655 [ 16.64 ]	0.425 [ 10.80 ]	0.655 [ 16.64 ]	0.350 [ 8.89 ]	0.810 [ 20.57 ]

**Cable Insert Dimension Table  
Table 2**

## Ordering Information

**3357-62XX-1C**

Backshell Size  
 09 = 9 Pin  
 15 = 15 Pin  
 25 = 25 Pin  
 37 = 37 Pin  
 50 = 50 Pin

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