



**707, 727-787**  
**STANDARD WIRING PRACTICES MANUAL**  
**S280W701-() FIBER OPTIC CABLE ASSEMBLIES**

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**S280W701-() FIBER OPTIC CABLE ASSEMBLIES**

This Subject gives the procedures to disassemble, disconnect, assemble, and install Boeing S280W701-() fiber optic cable assemblies.

**1. PART NUMBERS AND DESCRIPTION**

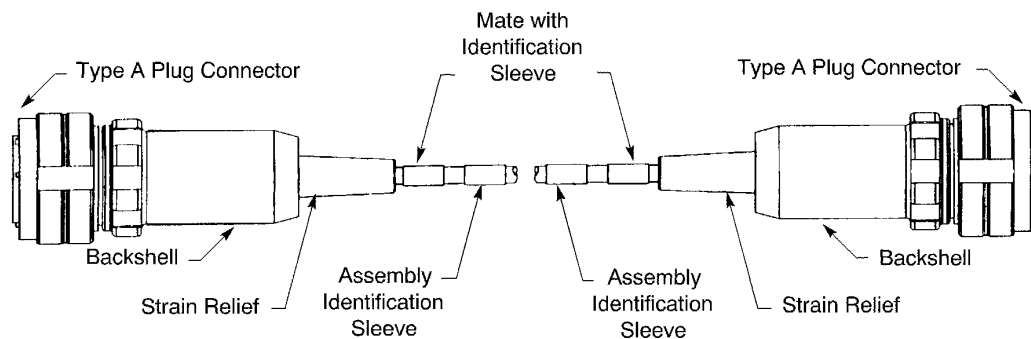
**A. Fiber Optic Cable Assembly Part Numbers**

The configurations of the S280W701-() fiber optic cable assembly are:

- The trunk cable; refer to Table 1 and Figure 1
- The stub cable; refer to Table 2 and Figure 2
- The gatelink cable; refer to Table 3 and Figure 3
- The gatelink inline cable; refer to Table 3 and Figure 4.

**Table 1**  
**3-CHANNEL TRUNK CABLE ASSEMBLY PART NUMBERS**

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-101	202.0	214.0	S280W701-602	S280W701-601
S280W701-102	434.0	446.0	S280W701-601	S280W701-602
S280W701-114	480.0	492.0	S280W701-601	S280W701-602
S280W701-115	860.0	877.0	S280W701-602	S280W701-601



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**S280W701-() TRUNK CABLE ASSEMBLY**

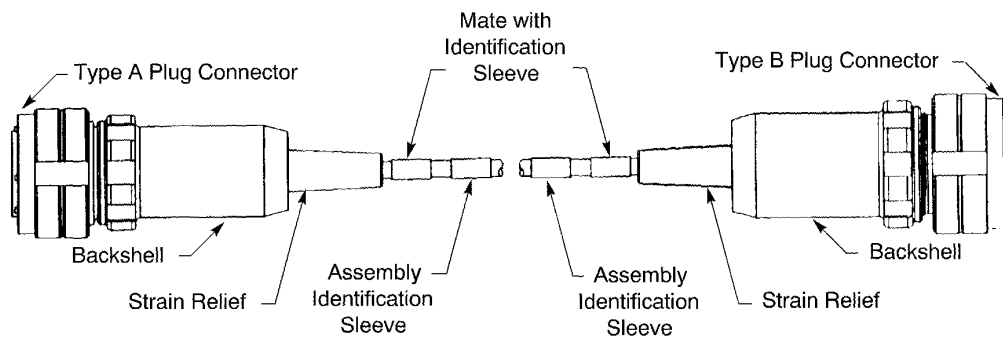
**Figure 1**

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**Table 2**  
**5-CHANNEL STUB CABLE ASSEMBLY PART NUMBERS**

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-106	170.0	182.0	S280W701-613	S280W701-641
S280W701-107	114.0	126.0	S280W701-613	S280W701-641
S280W701-108	100.0	112.0	S280W701-614	S280W701-641
S280W701-110	496.0	508.0	S280W701-615	S280W701-641
S280W701-111	614.0	626.0	S280W701-615	S280W701-643
S280W701-116	70.0	82.0	S280W701-613	S280W701-641
S280W701-117	100.0	112.0	S280W701-614	S280W701-641
S280W701-118	890.0	902.0	S280W701-613	S280W701-641
S280W701-112	1110.0	1132.0	S280W701-615	S280W701-643
S280W701-113	460.0	472.0	S280W701-614	S280W701-641
S280W701-122	258.0	270.0	S280W701-616	S280W701-641
S280W701-123	232.0	243.0	S280W701-616	S280W701-641
S280W701-124	172.0	184.0	S280W701-614	S280W701-641



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**S280W701-() STUB CABLE ASSEMBLY**  
**Figure 2**

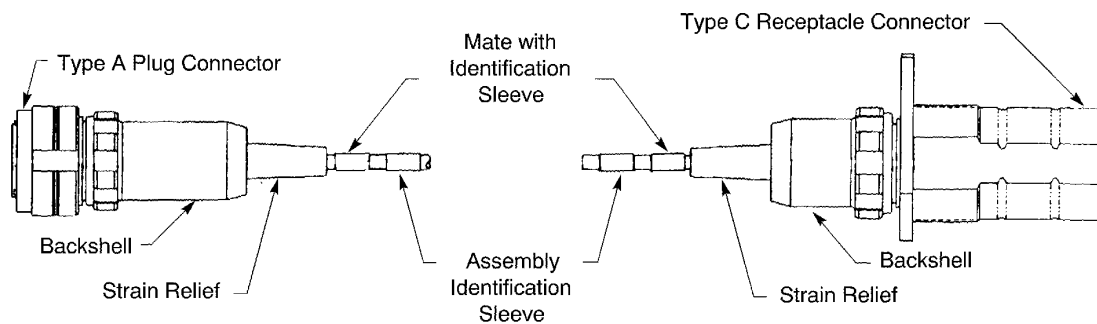
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**Table 3**  
**5-CHANNEL GATELINK CABLE ASSEMBLY PART NUMBERS**

Boeing Specification	Length (inch)		Connectors	
	Minimum	Maximum	First End	Second End
S280W701-119	275.0	287.0	S280W701-642	S280W701-631
S280W701-120	30.0	36.0	S280W701-611	S280W701-661



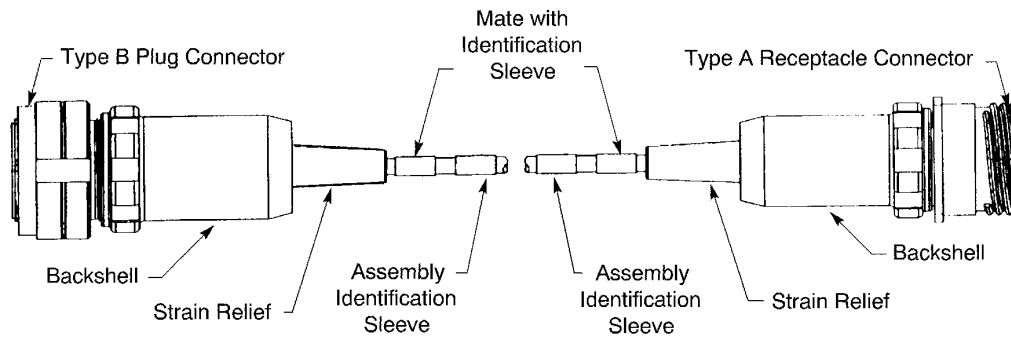
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**S280W701-() GATELINK CABLE ASSEMBLY**  
**Figure 3**

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**S280W701-() FIBER OPTIC CABLE ASSEMBLIES**



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**S280W701-() GATELINK INLINE CABLE ASSEMBLY**

**Figure 4**

**Table 4**

**SUPPLIER PART NUMBERS FOR FIBER OPTIC CABLE ASSEMBLIES**

<b>Boeing Specification</b>	<b>Part Number</b>	<b>Supplier</b>
S280W701-101	140125-0000	ITT Cannon
S280W701-102	140125-0001	ITT Cannon
S280W701-106	140127-0003	ITT Cannon
S280W701-107	140127-0004	ITT Cannon
S280W701-108	140127-0005	ITT Cannon
S280W701-110	140127-0006	ITT Cannon
S280W701-111	140127-0007	ITT Cannon
S280W701-112	140127-0011	ITT Cannon
S280W701-113	140127-0012	ITT Cannon
S280W701-114	140125-0002	ITT Cannon
S280W701-115	140125-0003	ITT Cannon
S280W701-116	140127-0008	ITT Cannon
S280W701-117	140127-0009	ITT Cannon
S280W701-118	140127-0010	ITT Cannon
S280W701-119	140126-0002	ITT Cannon
S280W701-120	140126-0003	ITT Cannon

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**Table 4 SUPPLIER PART NUMBERS FOR FIBER OPTIC CABLE ASSEMBLIES (Continued)**

Boeing Specification	Part Number	Supplier
S280W701-122	140127-0020	ITT Cannon
S280W701-123	140127-0021	ITT Cannon
S280W701-124	140127-0022	ITT Cannon

**B. Fiber Optic Connector Part Numbers**

The S280W701-() fiber optic cable assemblies have these types of connectors:

- Type A; refer to Figure 5
- Type B; refer to Figure 6
- Type C; refer to Figure 7.

**Table 5**  
**FIBER OPTIC CONNECTOR PART NUMBERS**

Boeing Specification	Connector Type	Number of Channels	Polarization
S280W701-601	Type A Plug	3	N
S280W701-602	Type A Plug	3	A
S280W701-611	Type A Plug	5	N
S280W701-613	Type A Plug	5	B
S280W701-614	Type A Plug	5	C
S280W701-615	Type A Plug	5	D
S280W701-616	Type A Plug	5	E
S280W701-631	Type A Receptacle	5	N
S280W701-641	Type B Plug	5	N
S280W701-642	Type B Plug	5	A
S280W701-643	Type B Plug	5	B
S280W701-661	Type C Receptacle	5	-

**Table 6**  
**SUPPLIER PART NUMBERS FOR FIBER OPTIC CONNECTORS**

Boeing Specification	Part Number	Supplier
S280W701-601	140124-0022	ITT Cannon
S280W701-602	140124-0032	ITT Cannon
S280W701-611	140124-0024	ITT Cannon
S280W701-613	140124-0039	ITT Cannon
S280W701-614	140124-0040	ITT Cannon
S280W701-615	140124-0041	ITT Cannon
S280W701-616	140124-0042	ITT Cannon
S280W701-631	140124-0028	ITT Cannon

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Table 6 SUPPLIER PART NUMBERS FOR FIBER OPTIC CONNECTORS (Continued)

Boeing Specification	Part Number	Supplier
S280W701-641	140143-0000	ITT Cannon
S280W701-642	140143-0007	ITT Cannon
S280W701-643	140143-0008	ITT Cannon
S280W701-661	140126-0005	ITT Cannon

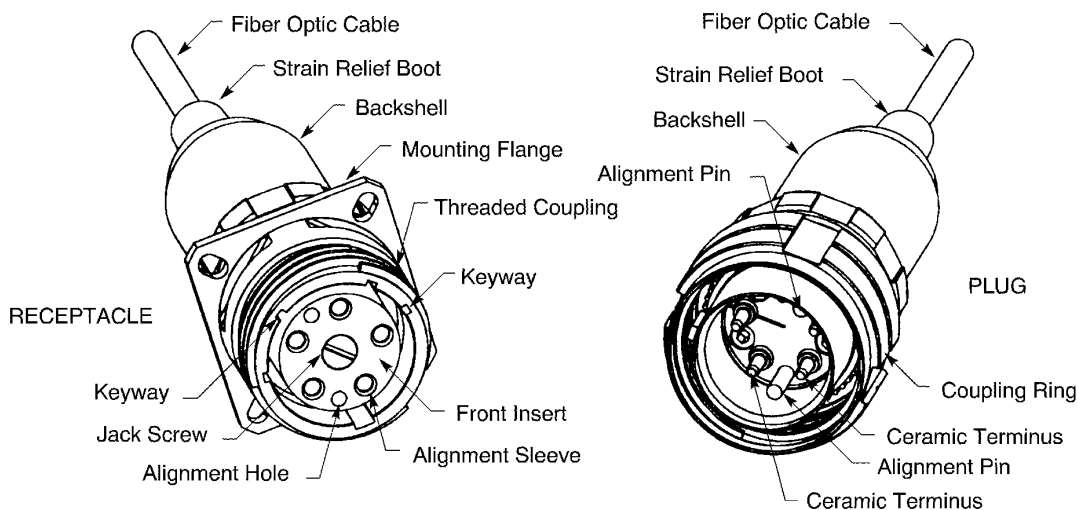
Table 7  
DUST CAPS PART NUMBERS

Connector	Shell Size	Part Number	Supplier
Plug, Threaded	17	204-9520-000	ITT Cannon
	19	204-9520-001	ITT Cannon
Receptacle, Threaded	17	204-9519-000	ITT Cannon
	19	204-9519-001	ITT Cannon

**NOTE:** A MIL-C-38999 Series III style dust cap is an acceptable alternative to a 024-95() dust cap. These dust caps do not have threads.

A Type A connector has these technical qualities:

- A threaded coupling mechanism
- A butt type connector with ceramic terminuses
- The transmission of a light beam from the end of one optical fiber into the end of another optical fiber.



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TYPE A RECEPTACLE AND PLUG CONNECTORS

Figure 5

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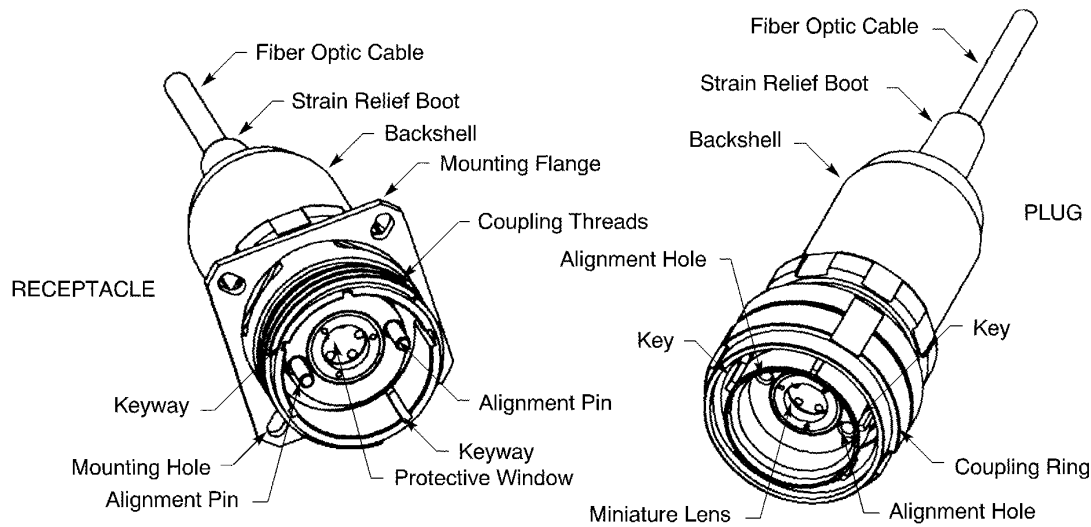


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A Type B connector has these technical qualities:

- A threaded coupling mechanism
- An expanded beam connector that has a miniature lens behind a protective window
- The transmission of a light beam by the miniature lens from an optical fiber through the protective windows to the opposite miniature lens into the opposite optical fiber.



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### TYPE B RECEPTACLE AND PLUG CONNECTORS

Figure 6

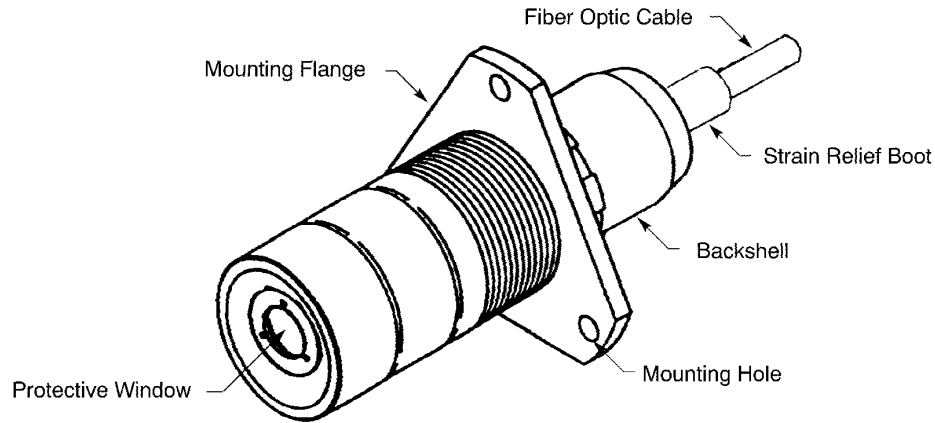
A Type C connector has these technical qualities:

- A push-pull coupling mechanism
- An expanded beam connector that contains a miniature lens behind a protective window
- The transmission of a light beam by the miniature lens from an optical fiber through the protective windows to the opposite miniature lens into the opposite optical fiber.

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**TYPE C RECEPTACLE CONNECTOR**

**Figure 7**

**C. Necessary Tools**

**Table 8**  
**NECESSARY TOOLS**

Tool	Part Number	Supplier
Adapter, Connector, Shell Size 17	CM-389TR-17	Daniels
Adapter, Connector, Shell Size 19	CM-389TR-19	Daniels
Allen Wrench, Ball Point	5/64 inch	An available source
Flashlight, LED	720	Edmund Scientific
	A38	Edmund Scientific
Insertion Tool, Lens	600135	ITT Cannon
Microscope, Connector Inspection	320-7037-000	ITT Cannon
Microscope, Test Equipment Inspection	OFS-300	Noyes
Removal Tool, Connector	BT-ST-701	Daniels
Removal Tool, Protective Glass	Pen Vac 847PR010	Techni-Tool
Retainer Ring Tool	323-7519-000	ITT Cannon
Trigger Assembly	ES710V	Chemtronics
Tweezers, Plastic	758TW064	Techni-Tool

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**D. Necessary Materials**

**Table 9**  
**NECESSARY MATERIALS**

Material	Part Number	Supplier
Dry Wipe	805	Berkshire, Surex
Finger Cots	Commercial	Commercial source
Swab	TX785B	Texwipe
Swab, Foam	740	Texwipe
Swab, Polyester Woven	762	Texwipe
Swab, Tapered	LT001163	Berkshire, Surex
Tape, Fiberglass, 1 inch	P212	Permcel
	P213	Permcel
Tape, Polyester	850	3M

**Table 10**  
**NECESSARY MATERIALS FOR REPAIR AND CLEANING OF AN FIBER OPTIC CONNECTOR**

Material	Part Number	Supplier
Canned Air	ES1020	Chemtronics
Alcohol, Ethyl	O-E-760	QPL
Alcohol, Isopropyl	MIL-F-5566	QPL
Lubricant	RTV 160	GE
	Super-O-lube	Parker
Thread Lock	410	Loctite
	222	Loctite

**2. REMOVAL OF A FIBER OPTIC CABLE ASSEMBLY**

**A. Safety Precautions**

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION.

- (1) Set the power to all the interface equipment to the off condition.

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**B. Separation of Type A or Type B Plugs and Receptacles**

- (1) Turn the coupling ring of the plug counterclockwise until it is disengaged from the threads of the receptacle.
- (2) Carefully pull the plug from the receptacle.  
Make sure that the plug and the receptacle stay axially aligned during the separation.
- (3) Put a dust cap or a plastic bag over the plug and the receptacle.

**C. Separation of a Type C Receptacle from a Plug**

- (1) Carefully pull the plug straight from the receptacle.  
Make sure that the plug and the receptacle stay axially aligned during the separation.

**CAUTION:** DO NOT PULL THE FIBER OPTIC CABLE. DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH CAN OCCUR.

- (2) Examine the dust caps on both the plug and the receptacle.  
Make sure that the dust caps return to the closed position.

**D. Removal of a Fiber Optic Cable Assembly**

- (1) Disconnect the connectors from the equipment. Refer to Paragraph 2.B. and Paragraph 2.C.
- (2) Carefully cut the plastic tie straps on the cable clamps.
- (3) If it is necessary, remove:
  - The raceway clamps
  - The cable from the elastomeric inserts.
- (4) Remove the cable from the clamps.  
Make sure that the bend radius of the cable is always more than 1.5 inches.

**3. FIBER OPTIC CONNECTOR DISASSEMBLY**

**A. General Instructions**

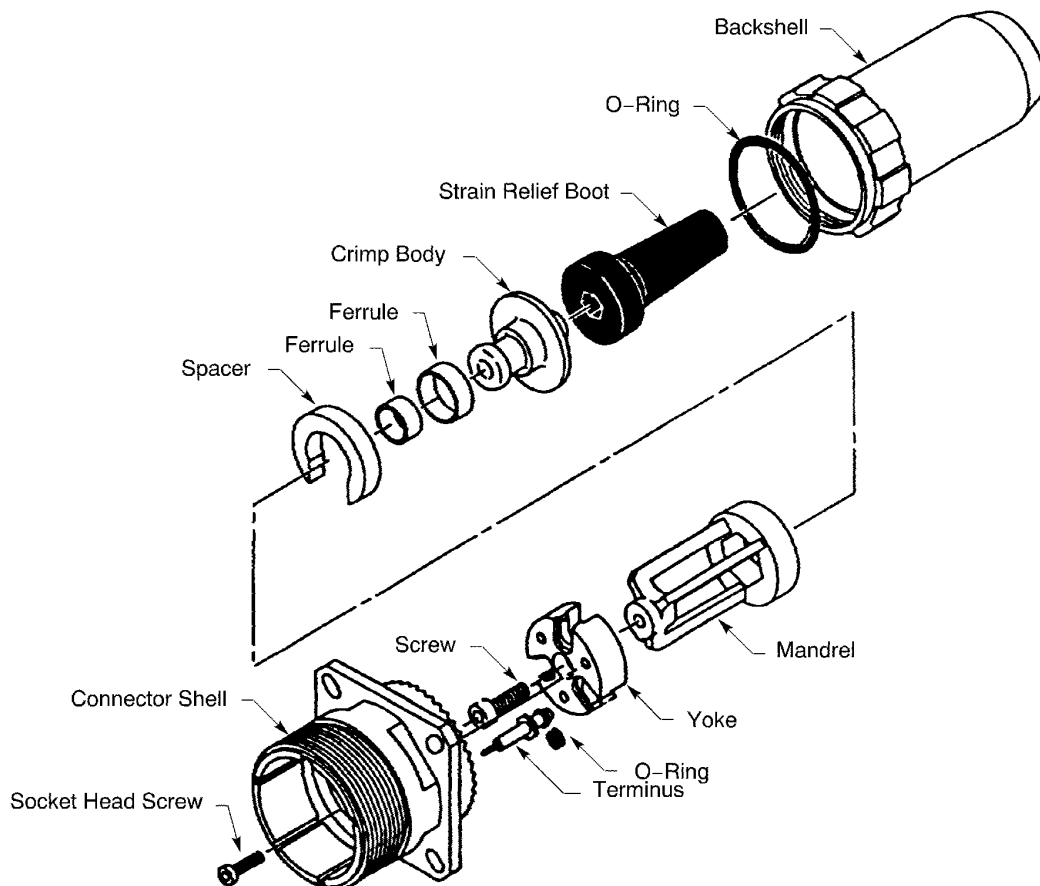
- (1) Put the finger cots on before disassembly work is started.  
Keep the finger cots on during disassembly and assembly procedures.
- (2) During the connector disassembly, make sure that:
  - The bend radius of an optical fiber is always more than 0.5 inch
  - The bend radius of the optical cable is always more than 1.5 inches.
- (3) Remove the fiber optic cable assembly. Refer to Paragraph 2.

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B. Disassembly of a Type A Plug Connector



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COMPONENTS OF THE TYPE A PLUG CONNECTOR  
Figure 8

Refer to Figure 8.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
- (2) Put the adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.

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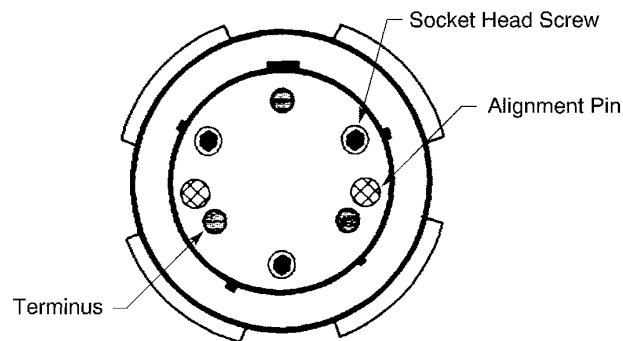


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**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.
- (8) Move the backshell and the backshell O-ring away from the connector.
- (9) Remove the spacer from the mandrel.
- (10) Remove the three socket head screws, that attach the yoke to the connector shell, with an allen wrench. Refer to Figure 9.



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**SOCKET HEAD SCREW REMOVAL**

**Figure 9**

- (11) Carefully pull the plug assembly from of the connector shell.

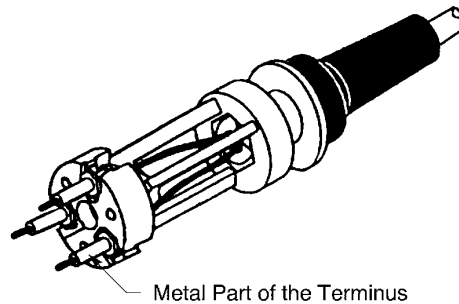
**CAUTION:** DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.
- (13) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 10.

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2445572 S00061544131\_V1

**LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS**

**Figure 10**

- (14) Carefully pull each terminus sideways out of the channel of the yoke.
- (15) Remove the yoke and the mandrel from the cable.
- (16) If it is necessary, remove the socket head screw that attaches the yoke to the mandrel.

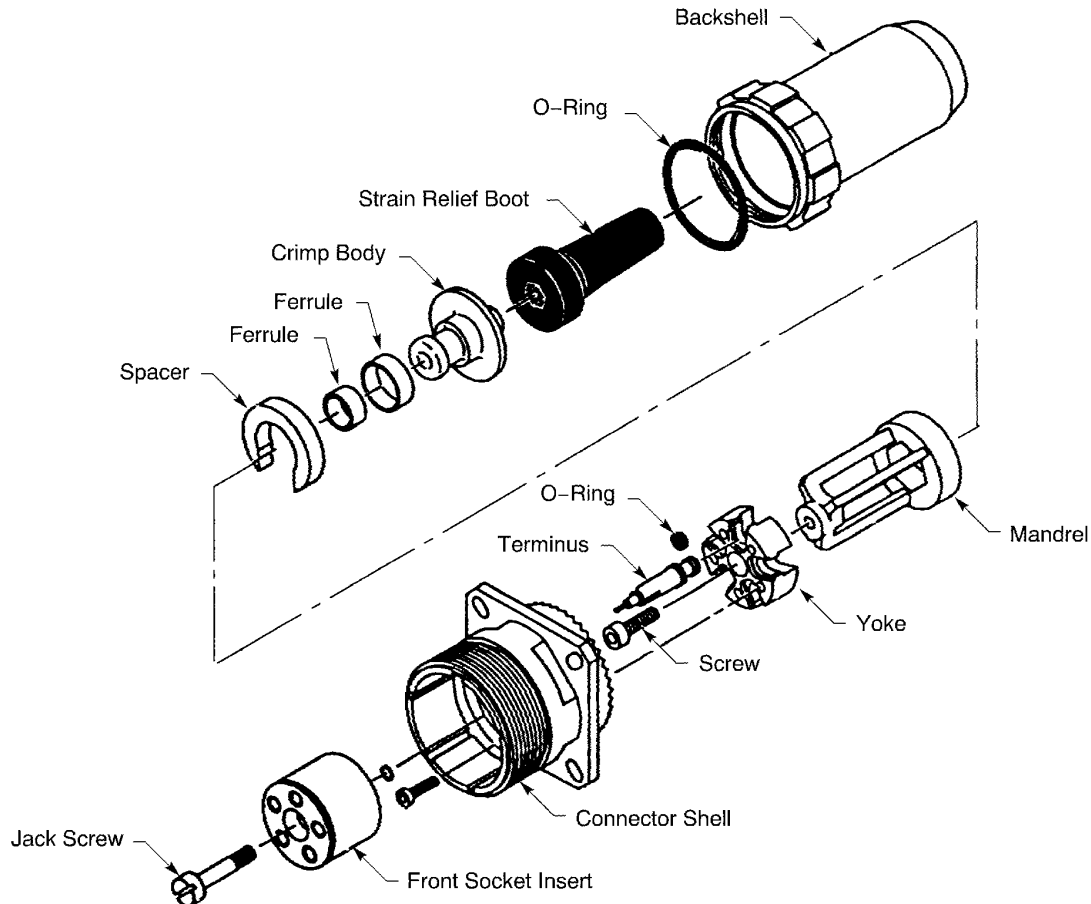
**CAUTION:** THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE YOKE AND THE MANDREL. THE YOKE AND THE MANDREL MUST BE DISASSEMBLED CAREFULLY TO PREVENT DAMAGE.

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**C. Disassembly of a Type A Receptacle Connector**



2445573 S00061544133\_V1

**COMPONENTS OF THE TYPE A RECEPTACLE CONNECTOR**  
**Figure 11**

Refer to Figure 11.

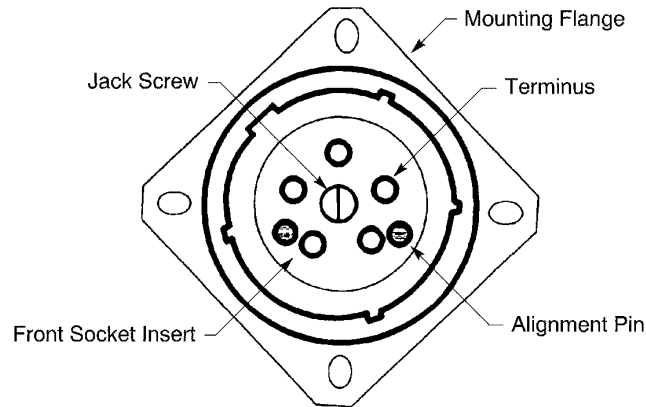
- (1) Turn the jack screw in the center of the front socket insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.

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**JACK SCREW REMOVAL**

**Figure 12**

- (2) Carefully pull the insert straight out of the connector shell.  
Make sure that the retainer ring and the jack screw are not removed from the insert.
- (3) Make a selection of a connector adapter and a backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
- (4) Put the connector adapter in the backshell removal tool.
- (5) Put the connector in the connector adapter.
- (6) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (7) Manually hold the strain relief boot and the cable.
- (8) Push the strain relief boot and the cable against the connector.
- (9) Loosen the backshell with a pair of adjustable, soft jaw pliers.

**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (10) Move the backshell and the backshell O-ring away from the connector.
- (11) Remove the spacer from the mandrel.
- (12) Remove the three socket head screws, that attach the yoke to the connector, with an allen wrench.

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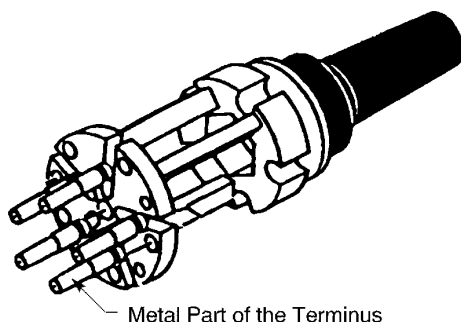
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- (13) Carefully pull the receptacle assembly from the connector shell.

**CAUTION:** DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (14) Push the crimp body against the mandrel so that the tension on the optical fibers is released.  
(15) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 13.



2445575 S00061544135\_V1

**LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS**

**Figure 13**

- (16) Carefully pull each terminus sideways out of the channel of the yoke.  
(17) Remove the yoke and the mandrel from the cable.  
(18) If it is necessary, remove the socket head screw that attaches the yoke to the mandrel.

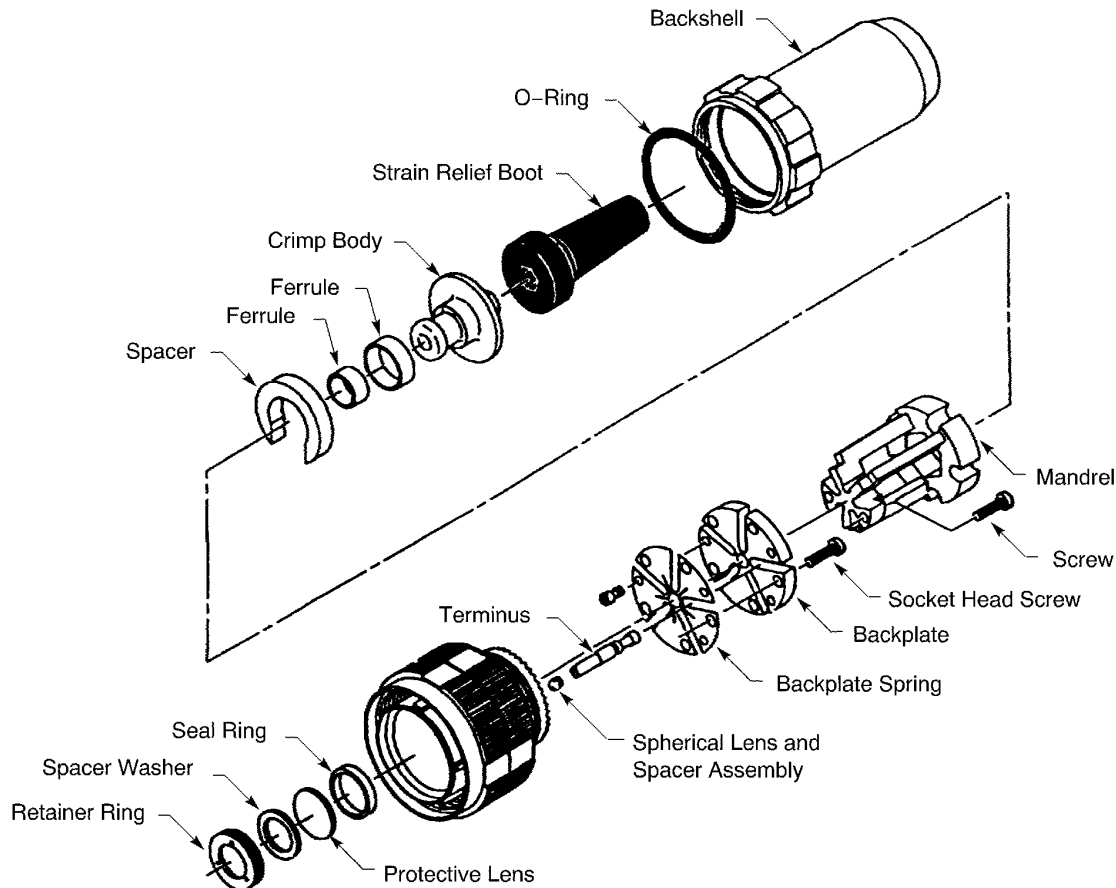
**CAUTION:** THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE YOKE AND THE MANDREL. THE YOKE AND THE MANDREL MUST BE DISASSEMBLED CAREFULLY TO PREVENT DAMAGE.

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D. Disassembly of a Type B Plug Connector



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COMPONENTS OF THE TYPE B PLUG CONNECTOR  
Figure 14

Refer to Figure 14.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
- (2) Put the connector adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.

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- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.

**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (8) Move the backshell and the backshell O-ring away from the connector.

- (9) Remove the spacer from the mandrel.

**CAUTION:** TO PREVENT DAMAGE TO THE CONNECTOR ASSEMBLY, DO NOT REMOVE THE TWO SOCKET HEAD SCREWS THAT ATTACH THE BACKPLATE ASSEMBLY TO THE MANDREL.

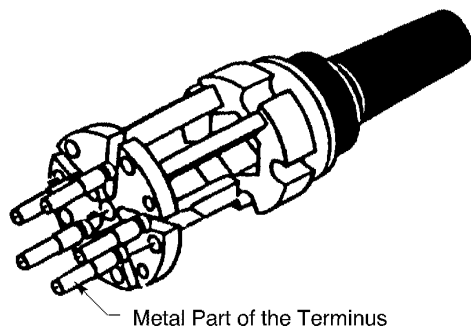
- (10) Remove the three socket head screws, that attach the backplate to the connector shell, with an allen wrench.

- (11) Carefully pull the mandrel, the backplate, and the terminuses from of the connector insert.

**CAUTION:** DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.

- (13) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 15.



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**LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS**

**Figure 15**

- (14) Carefully pull each terminus sideways out of the channel of the backplate.
- (15) Remove the backplate and the mandrel from the cable.

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- (16) Examine the backplate spring.
- (17) If there is a crack or a bent edge on the backplate spring:
  - (a) Remove the three screws.
  - (b) Replace the backplate spring.
- (18) If it is necessary, remove the screws that attach the backplate to the mandrel.

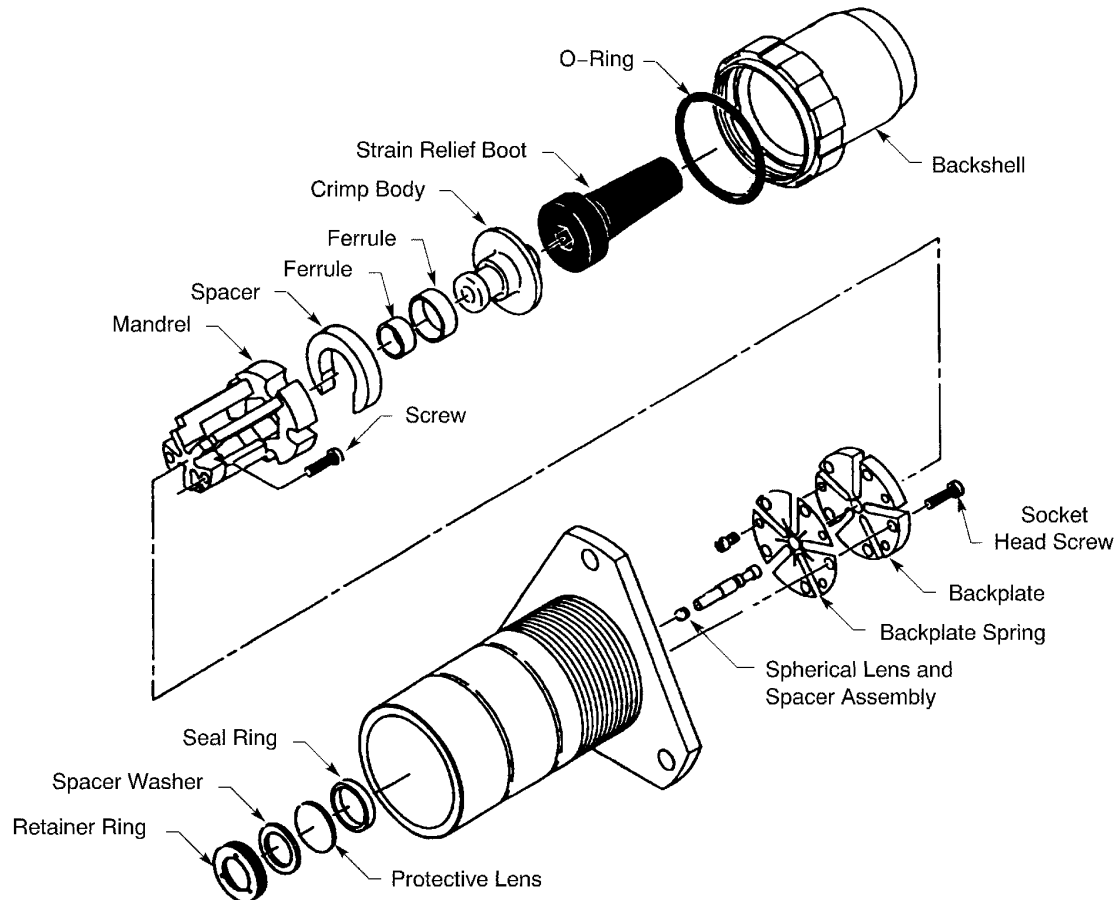
**CAUTION:** THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE BACKPLATE AND THE MANDREL. THE BACKPLATE AND THE MANDREL MUST BE DISASSEMBLED CAREFULLY TO PREVENT DAMAGE.

- (19) If more disassembly is necessary:
  - (a) Make a selection of necessary tools from Table 8.
  - (b) Remove the retainer ring with a retainer ring tool.
  - (c) Remove the seal ring with a pair of plastic tweezers.
  - (d) Remove the protective glass with a pen vacuum.
  - (e) Push the spherical lens and the spacer assemblies from the connector insert with a 0.125 inch diameter, cone shaped plastic rod or an equivalent plastic tool.

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**E. Disassembly of a Type C Receptacle Connector**



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**COMPONENTS OF THE TYPE C RECEPTACLE CONNECTOR**  
**Figure 16**

Refer to Figure 16.

- (1) Make a selection of a connector adapter and a backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
- (2) Put the connector adapter in the backshell removal tool.
- (3) Put the connector in the connector adapter.
- (4) With a syringe, put small quantity isopropyl alcohol into the area between the rear of the backshell and the strain relief boot as a lubricant.
- (5) Manually hold the strain relief boot and the cable.
- (6) Push the strain relief boot and the cable against the connector.

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- (7) Loosen the backshell with a pair of adjustable, soft jaw pliers.

**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS LOOSENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (8) Move backshell and the backshell O-ring away from the connector.

- (9) Remove the spacer from the mandrel.

**CAUTION:** TO PREVENT DAMAGE TO THE CONNECTOR ASSEMBLY, DO NOT REMOVE THE TWO SOCKET HEAD SCREWS THAT ATTACH THE BACKPLATE ASSEMBLY TO THE MANDREL.

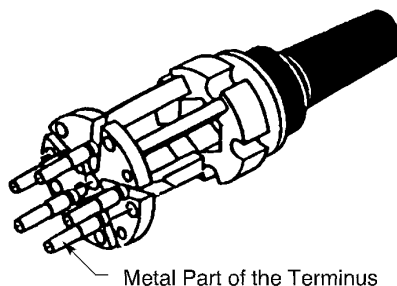
- (10) Remove the three socket head screws, that attach the mandrel and the backplate assembly to the connector insert, with an allen wrench.

- (11) Carefully pull the mandrel, the backplate, and the terminuses from of the connector insert.

**CAUTION:** DO NOT APPLY TOO MUCH PRESSURE ON THE CRIMP BODY AS THE TERMINUSES ARE REMOVED FROM THE MANDREL AND THE YOKE. DAMAGE TO THE OPTICAL FIBERS CAN OCCUR.

- (12) Push the crimp body against the mandrel so that the tension on the optical fibers is released.

- (13) Put the jaws of the plastic pliers on the metal part of the terminus. Refer to Figure 17.



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#### LOCATION OF THE JAWS OF THE PLASTIC PLIERS ON THE TERMINUS

Figure 17

- (14) Carefully pull each terminus sideways out of the channel of the backplate.  
(15) Remove the backplate and the mandrel from the cable.

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- (16) Examine the backplate spring.
- (17) If there is a crack or a bent edge on the backplate spring:
  - (a) Remove the three screws.
  - (b) Replace the backplate spring.
- (18) If it is necessary, remove the screws that attach the backplate to the mandrel.

**CAUTION:** THERE IS LOCTITE ADHESIVE BETWEEN THE SURFACES OF THE BACKPLATE AND THE MANDREL. THE BACKPLATE AND THE MANDREL MUST BE DISASSEMBLED CAREFULLY TO PREVENT DAMAGE.

- (19) If more disassembly is necessary:
  - (a) Make a selection of necessary tools from Table 8.
  - (b) Remove the retainer ring with a retainer ring tool.
  - (c) Remove the seal ring with a pair of plastic tweezers.
  - (d) Remove the protective glass with a pen vacuum.
  - (e) Push the spherical lens and the spacer assemblies from the connector insert with a 0.125 inch diameter, cone shaped plastic rod or an equivalent plastic tool.

**4. FIBER OPTIC CONNECTOR ASSEMBLY**

**A. Assembly of a Type A Plug or Receptacle Connector**

Refer to:

- Figure 8 for the Type A plug connector
- Figure 11 for the Type A receptacle connector.

- (1) Assemble the yoke and mandrel:
  - (a) If it is necessary, install one O-Ring on each terminus.  
Make sure that the O-Ring does not have cracks or contamination.
  - (b) Clean the yoke and the mandrel with isopropyl alcohol.
  - (c) Let the yoke and the mandrel fully dry.
  - (d) Apply a layer of Loctite 410 on the surfaces of the yoke and the mandrel that make an interface.
  - (e) Put the yoke on the mandrel.
  - (f) Put a small quantity of Loctite 222 on the threads of the screws that attach the yoke to the mandrel.
  - (g) Tighten the screws.
- (2) Put each terminus through the hexagonal holes of the mandrel.
- (3) Put each terminus in the applicable channel of the yoke.  
Make sure that the optical fibers do not make an overlap.

Refer to:

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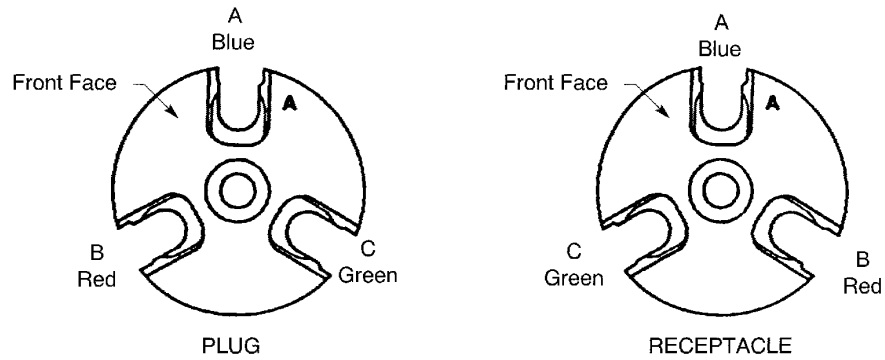




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- Figure 18 for the position of the terminuses in a 3-channel yoke
- Figure 19 for the position of the terminuses in a 5-channel yoke.



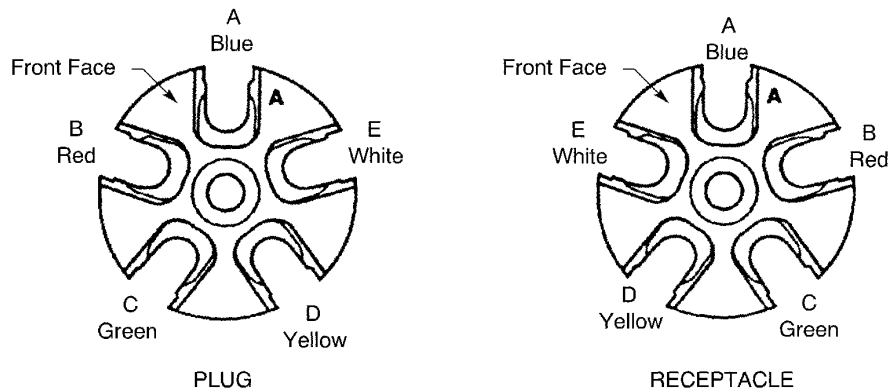
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**POSITION OF THE TERMINUSES IN THE 3-CHANNEL YOKE**  
**Figure 18**

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POSITION OF THE TERMINUSES IN THE 5-CHANNEL YOKE

Figure 19

- (4) Put a small quantity of silicone lubricant or isopropyl alcohol on the cable jacket near the crimp body.
- (5) Push the strain relief boot until it is against the shoulder of the crimp body.
- (6) Put the spacer between the shoulder of the crimp body and the mandrel.
- (7) Manually hold the mandrel.
- (8) Align the terminuses with the applicable holes in the connector shell. Make sure that the terminuses are in the correct holes.
- (9) Carefully push the terminuses and the yoke into the connector shell.
- (10) Install the socket head screw that attaches the yoke to the connector shell:
  - (a) Tighten the screw with an allen wrench.
  - (b) Torque the screw 5.0 inch-pounds  $\pm 0.1$  inch-pound.
- (11) Assemble the backshell:
  - (a) Make a selection of a connector adapter and backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
  - (b) Put the connector adapter in the backshell removal tool.
  - (c) Put the connector shell in the connector adapter.
  - (d) Push the strain relief boot and the cable against the connector.
  - (e) Manually tighten the backshell.

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**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS TIGHTENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.

- (f) Torque the backshell 70.0 inch-pounds  $\pm 5.0$  inch-pounds.
- (12) If the connector is a Type A receptacle:
  - (a) Align the holes of the front socket insert with the applicable terminuses.
  - (b) Carefully push the insert into the receptacle.

**NOTE:** If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

- (c) Engage the threads the jack screw and the connector shell.
- (d) Torque the jack screw 5.0 inch-pounds  $\pm 0.1$  inch-pound.

#### B. Assembly of a Type B Plug Connector or Type C Receptacle Connector

Refer to:

- Figure 14 for the Type B plug connector
- Figure 16 for the Type C receptacle connector.

- (1) Assemble the backplate, backplate spring, and mandrel:
  - (a) Install one O-ring on each terminus.  
Make sure that the O-ring does not have cracks or contamination.
  - (b) Clean the backplate and the mandrel with isopropyl alcohol.
  - (c) Let the backplate and the mandrel fully dry.
  - (d) Apply a layer of Loctite 410 on the surfaces of the backplate and the mandrel that make an interface.
  - (e) Put the backplate on the mandrel.
  - (f) Put a small quantity of Loctite 222 on the threads of the socket head screws.
  - (g) Torque each screw  $10 \pm 12$  ounce-inches.
  - (h) Examine the backplate spring.
    - (i) If the backplate spring has a bent edge, a crack, or a burr on the edge, discard the spring and use one that does not have damage.
  - (j) Clean the three screws that attach the backplate spring to the backplate with isopropyl alcohol.
  - (k) Align the three small holes in the backplate spring with the three threaded holes in the backplate.  
**NOTE:** There is only one correct position for the backplate spring on the backplate.
    - (l) Put a small quantity of Loctite 222 on the threads of the screws.
  - (m) Engage the threads of the three screws and the backplate spring.
  - (n) Tighten the screws with a screw driver.
- (2) Put each terminus through the hexagonal holes of the mandrel.

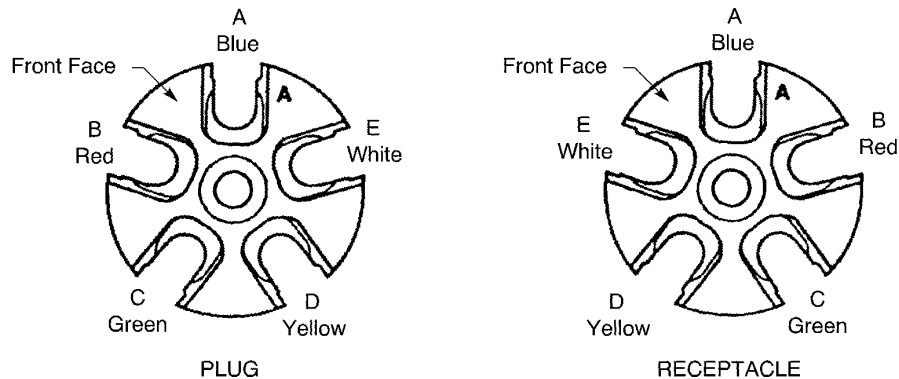
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- (3) Put each terminus in the applicable channel of the backplate. Refer to Figure 20.  
Make sure that the optical fibers do not make an overlap.



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POSITION OF THE TERMINUSES IN THE 5-CHANNEL BACKPLATE

Figure 20

- (4) Put a small quantity of silicone lubricant or isopropyl alcohol on the cable jacket near the crimp body.
- (5) Push the strain relief boot until it is against the shoulder of the crimp body.
- (6) Put the spacer between the shoulder of the crimp body and the mandrel.
- (7) Examine all of the holes in the connector insert for contamination with a microscope.
- (8) If it is necessary, clean the connector insert. Refer to Paragraph 7.
- (9) Install each spherical lens and spacer assembly:
- (a) Remove the lens and spacer from the storage container with a pair of plastic tweezers.

**CAUTION:** DO NOT TOUCH THE SPHERICAL LENS AND THE SPACER ASSEMBLY WITH THE FINGERS. THE FINGERS CAN MAKE SCRATCHES OR PUT CONTAMINATION ON THE LENS AND THE SPACER ASSEMBLY.

- (b) Put the lens and spacer in the lens insertion tool.  
Make sure that the lens is put into the insertion tool first.
- (c) Hold the lens and spacer vertically.
- (d) Align the lens and spacer with the lens position in the connector shell.
- (e) Put the lens and spacer in the lens position in the connector shell.

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- (f) Examine the lens for contamination with a microscope.
- (g) If it is necessary, clean the spherical lens. Refer to Paragraph 7.
- (10) In this order put these components in each hole in the connector insert:
  - A seal ring
  - The protective lens
  - The spacer washer
  - The retainer ring.
- (11) Torque each retainer ring with the retainer ring tool 6.5 inch-pounds to 7.0 inch-pounds.
- (12) Manually hold the mandrel.
- (13) Align the terminuses with the applicable holes in the connector shell.  
Make sure that the terminuses are in the correct holes.
- (14) Carefully push the terminuses and the backplate into the connector shell.
- (15) Install the three socket head screws to attach the backplate to the connector shell.
  - (a) Tighten the screws with an allen wrench.
  - (b) Torque the screws 5.0 inch-pounds  $\pm 0.1$  inch-pound.
- (16) Assemble the backshell:
  - (a) Make a selection of a connector adapter and backshell removal tool from Table 8.  
**NOTE:** A vise and a connector adapter are satisfactory alternatives for the Daniels tools.
  - (b) Put the connector adapter in the backshell removal tool.
  - (c) Put the connector shell in the connector adapter.
  - (d) Push and hold the strain relief boot against the connector.
  - (e) Manually tighten the backshell.  
  
**CAUTION:** DO NOT PERMIT THE STRAIN RELIEF BOOT AND THE CABLE TO TURN WHEN THE BACKSHELL IS TIGHTENED. DAMAGE TO THE COMPONENTS OF THE CONNECTOR CAN OCCUR.
- (f) Torque the backshell 70.0 inch-pounds  $\pm 5.0$  inch-pounds.

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**5. INSTALLATION OF A FIBER OPTIC CABLE ASSEMBLY**

**A. Safety Precautions**

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION

(1) Set the power to all the interface equipment to the off condition.

**B. General Installation Instructions**

**CAUTION:** STRESS MUST NOT BE APPLIED TO THE AREA WHERE THE CABLE IS ATTACHED TO THE CONNECTOR. THE STRESS CAN CAUSE DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH.

**CAUTION:** BEFORE, DURING, AND AFTER THE INSTALLATION, A FIBER OPTIC CABLE MUST NOT BE BENT SO THAT THE BEND RADIUS IS LESS THAN 1.5 INCHES. DAMAGE TO THE CABLE OR AN OPTICAL FIBER CAN OCCUR.

(1) Before and during the installation:

(a) Do not let the cable stay on the floor.

Make sure that damage to the cable, by the feet or by objects that can fall on the cable, is prevented.

(b) If only a portion of a cable is installed, hang the remaining part of the cable with a plastic tie strap.

Make sure that the cable is not on the floor.

Make sure that the plastic tie strap is not tightened against the cable.

(2) If it is possible, try to install the cable directly into its correct position.

Make sure that the cable is not pulled or pushed.

(3) If a direct installation is not possible and the cable moves freely:

(a) Pull or push the cable in the direction that is aligned with the cable.

**CAUTION:** IF THE CABLE DOES NOT MOVE FREELY, DO NOT TRY TO PULL OR PUSH THE CABLE. DAMAGE TO THE CABLE CAN OCCUR.

(b) Pull or push the cable into an area where the cable cannot be seen only if it can be made sure that the bend radius is not less than 1.5 inches.

(4) During the installation, obey these precautions:

- Gloves must not be worn to hold the cable better when it is pulled or pushed
- The cable must not be wound around the hand to hold the cable better
- The cable must not touch or rub against sharp surfaces or corners

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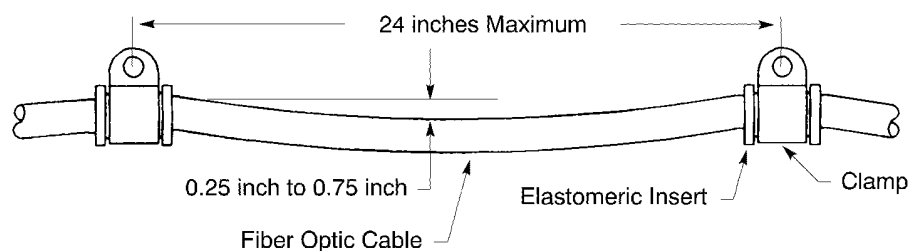
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- The cable must not have loops except the drip loops
  - The connector or the backshell must not be used as a handle when the cable is pushed or pulled
  - The connector must not rub or move against the aircraft structure
  - The cable must not be installed with other parts or materials other than those that are specified in this procedure; for example, a plastic tie strap or wire harness tie are not permitted
  - The cable must be away from a fluid line, an oxygen line, or a water line a distance of 1.0 inch minimum unless it is specified differently.
- (5) Install the fiber optic cable in the cable clamps.
- Make sure that the cable has sufficient slack:
- To connect and disconnect the connectors
  - For the movement of the aircraft structure.
- Refer to Paragraph 5.C.
- (6) Make a drip loop on the cable near the connector.
- The drip loop must make sure that:
- Fluids do not go into the connectors, the junction boxes, and other closed equipment
  - Fluids do not fall on the electrical equipment below the drip loop
  - The bend radius of the drip loop is more than 1.5 inches.
- Refer to Paragraph 5.D.

#### C. Configuration of Cable Slack for an Installed Fiber Optic Cable

Refer to:

- Figure 21 for the usual configuration of fiber optic cable slack
- Figure 22 for the configuration of fiber optic cable slack in a high vibration area.



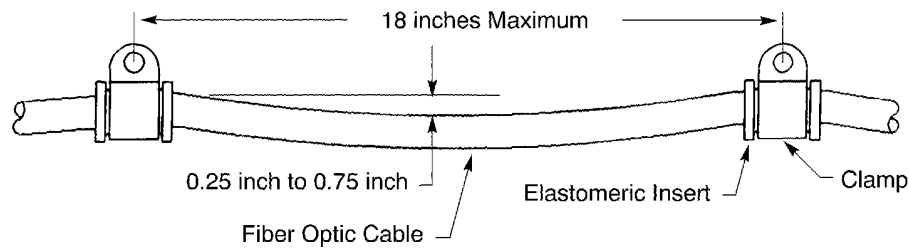
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**USUAL SLACK OF AN INSTALLED FIBER OPTIC CABLE**  
**Figure 21**

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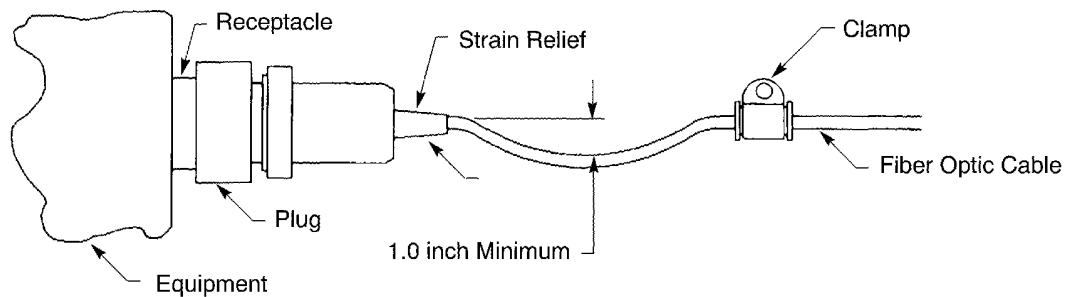
**SLACK OF AN INSTALLED FIBER OPTIC CABLE IN A HIGH VIBRATION AREA**

**Figure 22**

**D. Configuration of a Drip Loop for an Installed Fiber Optic Cable**

Refer to:

- Figure 23 and Figure 24 for the usual configurations of a drip loop
- Figure 25 and Figure 26 for the configurations of a drip loop in a high vibration area.



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**USUAL CONFIGURATION OF A DRIP LOOP ON A HORIZONTAL CABLE**

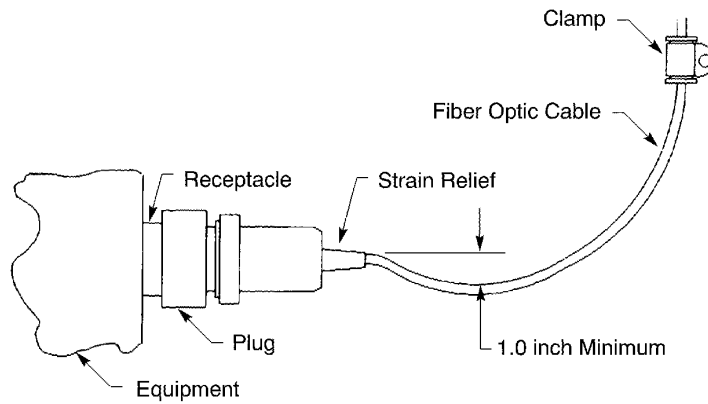
**Figure 23**

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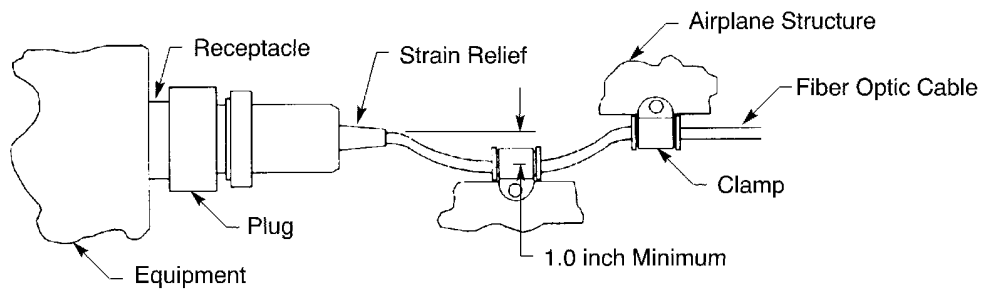
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**USUAL CONFIGURATION OF A DRIP LOOP ON A VERTICAL CABLE**

**Figure 24**



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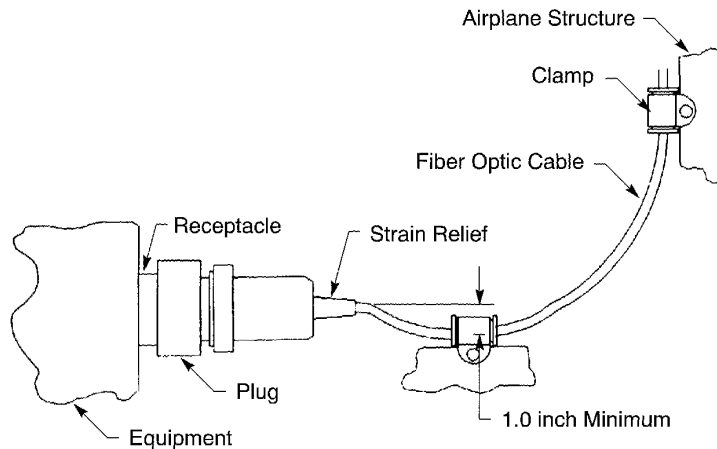
**CONFIGURATION OF A DRIP LOOP ON A HORIZONTAL CABLE IN HIGH VIBRATION AREAS**

**Figure 25**

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**CONFIGURATION OF A DRIP LOOP ON A VERTICAL CABLE IN HIGH VIBRATION AREAS**

**Figure 26**

**E. Installation of a Fiber Optic Cable in a Loop Clamp**

**Table 11**  
**FIBER OPTIC CABLE CLAMPS**

Number of Cables		Boeing Specification	Insert	
Minimum	Maximum		Part Number	Supplier
1	1	287T0011-1	94A10391	Elastomeric Silicone Products, Inc.
2	6	287T0011-4	93A10375	Elastomeric Silicone Products, Inc.

**CAUTION:** STRESS MUST NOT BE APPLIED TO THE AREA WHERE THE CABLE IS ATTACHED TO THE CONNECTOR. THE STRESS CAN CAUSE DAMAGE TO THE CABLE OR THE CONNECTOR, OR BOTH.

- (1) Open the slot in the elastomeric insert.
- (2) Put the cable inside the cable cavity of the insert.  
If the insert has multiple cable cavities, make sure that only one cable is put into each cavity.
- (3) Push the insert along the cable until the center of the insert is aligned with the center of the cable clamp.
- (4) Open the cable clamp.
- (5) Push the cable and the insert into the clamp.  
Make sure that the center of insert stays approximately aligned with the center of the clamp.

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- (6) Put a plastic tie strap in the slots at the opening of the clamp.
- (7) Tighten the plastic tie strap with a tie gun.  
Make sure that the cable clamp is fully closed.

**F. Installation of a Fiber Optic Cable in a Wire Harness Channel**

**Table 12**  
**NECESSARY PARTS FOR CABLE INSTALLATION**

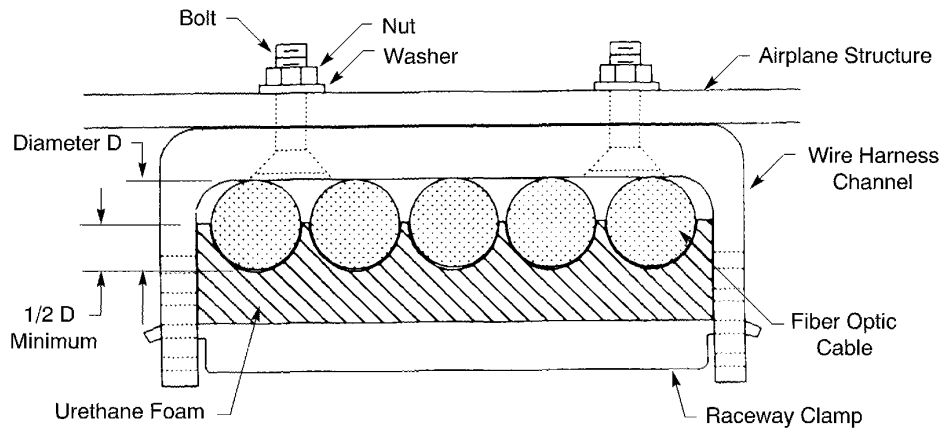
<b>Boeing Standard</b>	<b>Description</b>
BACC10DR()	Wire Harness Channel
BACC10DS3	Raceway Clamp

- (1) Put the fiber optic cables inside the wire harness channel.  
Make sure that:
  - The cables do not go across each other in the channel
  - The cables do not go between one channel and another channel
  - No more than one layer of fiber optic cables are put in a channel.
- (2) Install the raceway clamp on the channel.  
Make sure that:
  - The urethane foam of the clamp is compressed a minimum of 1/2 the outside diameter D of the smallest cable. Refer to Figure 27.
  - None of the cables stay between the end of the urethane foam and the side of the channel. Refer to Figure 28.

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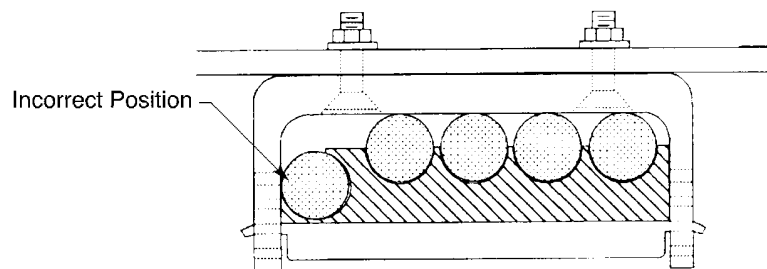
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POSITION OF THE FIBER OPTIC CABLES IN THE RACEWAY CLAMP

Figure 27



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INCORRECT POSITION OF A CABLE IN A RACEWAY CLAMP

Figure 28

G. Installation of a Type A or a Type B Connector

- (1) Remove the dust cap or the plastic bag from the connector.
- (2) Align the keys of the plug with the keyways of the receptacle.

**NOTE:** The plug can be turned a small amount against the receptacle until the keys and the keyways are aligned.

**CAUTION:** DO NOT TURN THE PLUG MORE THAN A HALF TURN IN EITHER DIRECTION. DAMAGE TO THE CABLE ASSEMBLY CAN OCCUR.

- (3) Push the plug into the receptacle until it stops.

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- (4) Manually turn the coupling ring of the plug clockwise, in relation to the rear of the plug, until it is tight.  
Make sure that a torque wrench is not used to tighten the coupling ring.
- (5) Examine the red line painted around the circumference of the external surface of the receptacle shell.
- (6) If the coupling ring does not make an overlap with part of the red line, try to tighten the coupling ring manually until the ring and the line make an overlap.
- (7) If an overlap of the coupling ring and the red line cannot be made:
  - (a) Turn the coupling ring counterclockwise until it is disengaged from the threads of the receptacle.
  - (b) Do Step 5.G.(2) through Step 5.G.(6) again.

#### H. Installation of a Type C Connector

- (1) Turn the dust caps on the plug and the receptacle until the dust caps are locked in the open position.
- (2) Align the keys of the plug with the keyways of the receptacle.  
**NOTE:** The plug can be turned a small amount against the receptacle until the keys and the keyways are aligned.
- (3) Push the plug into the receptacle until the plug and the receptacle are locked.

## 6. INSPECTION AND CLEANING OF A TYPE A FIBER OPTIC CONNECTOR

#### A. Safety Precautions

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION

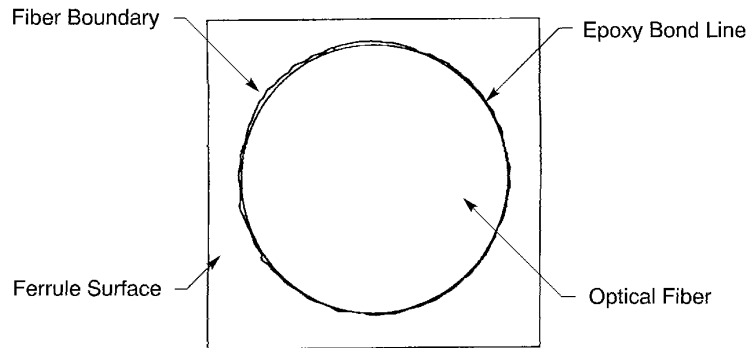
- (1) Set the power to all the interface equipment to the off condition.

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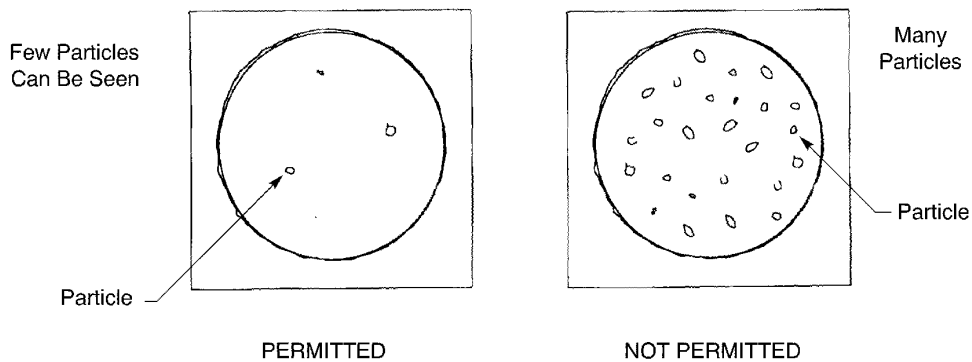
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B. General Data



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USUAL END FACE OF AN OPTICAL FIBER  
Figure 29



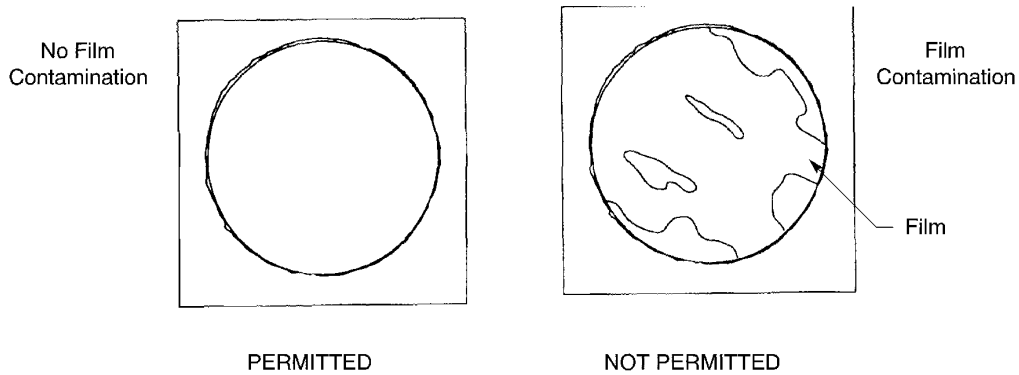
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PARTICLE CONTAMINATION ON THE END FACE OF AN OPTICAL FIBER  
Figure 30

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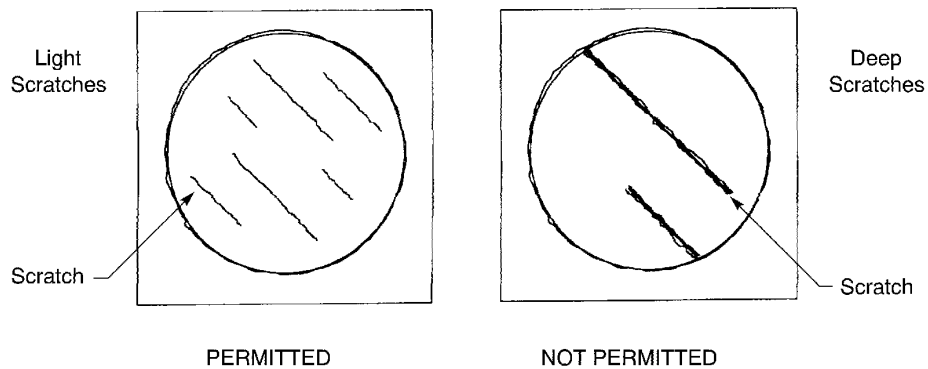


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FILM CONTAMINATION ON THE END FACE OF AN OPTICAL FIBER  
Figure 31



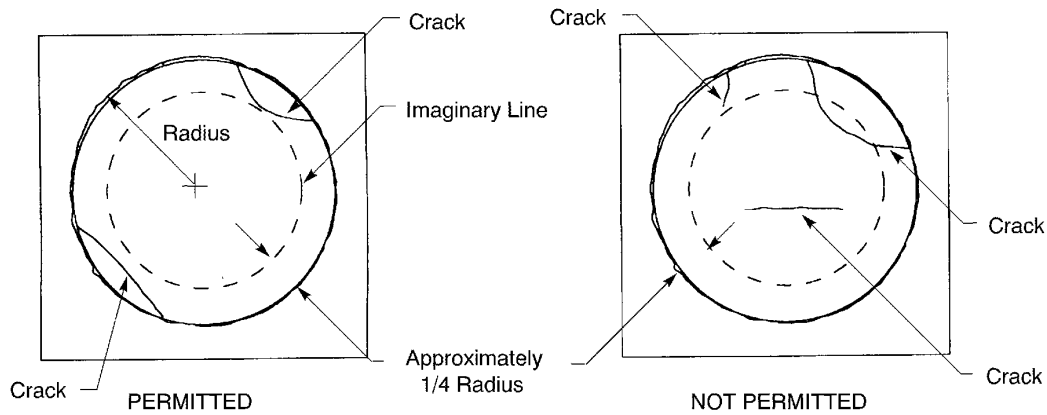
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SCRATCHES ON THE END FACE OF AN OPTICAL FIBER  
Figure 32

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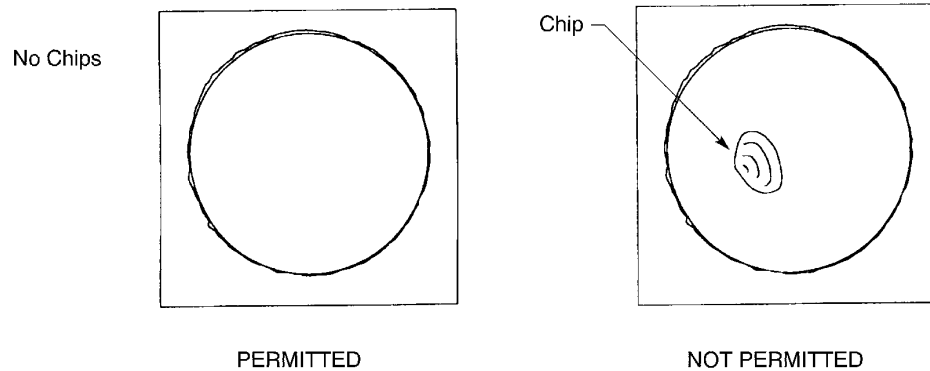
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CRACKS ON THE END FACE OF AN OPTICAL FIBER

Figure 33



2445596 S00061544165\_V1

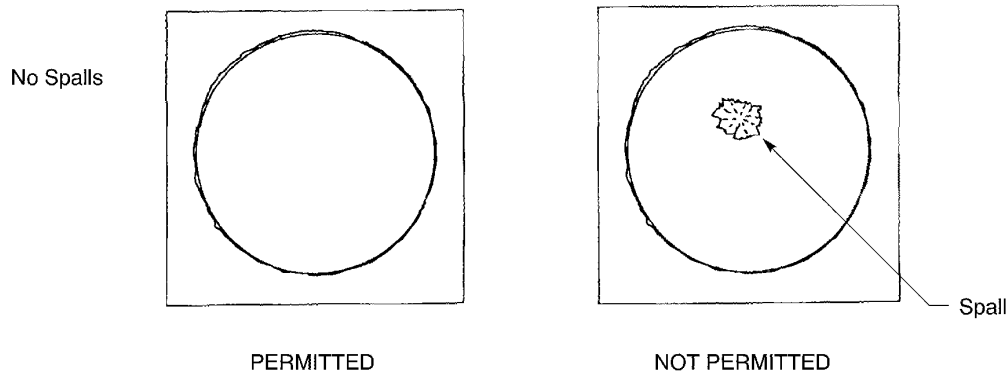
CHIPS ON THE END FACE OF AN OPTICAL FIBER

Figure 34

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**SPALLS ON THE END FACE OF AN OPTICAL FIBER**  
**Figure 35**

**C. Inspection of a Type A Connector**

Refer to Figure 29.

- (1) Put the plug or receptacle adapter on the connector inspection microscope. Refer to Table 8.
- (2) Attach the microscope to the connector.
- (3) Set the magnification power of the microscope between 200X and 250X.
- (4) Examine the end face of each terminus for these types of contamination or damage:
  - Particle contamination; refer to Figure 30
  - Film contamination; refer to Figure 31
  - Scratches; refer to Figure 32
  - Cracks; refer to Figure 33
  - Chips; refer to Figure 34
  - Spalls; refer to Figure 35.
- (5) Reject the cable assembly if the end face of the optical fiber has:
  - A crack that is located within one-quarter of the radius of the optical fiber
  - A deep scratch
  - A chip
  - A spall.

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- (6) If the connector is a plug and the end faces of the terminuses are clean, install the plug on the equipment immediately.  
**NOTE:** If the plug is not installed immediately, put a dust cap or a plastic bag on the connector.
- (7) If the connector is a receptacle and the end faces of the terminuses are clean, put a dust cap or a plastic bag on the connector.
- (8) If an end face of a terminus has a quantity of particle contamination that is not permitted, remove the contamination. Refer to Paragraph 6.D.
- (9) If the end face of a terminus has film contamination, remove the contamination. Refer to Paragraph 6.E.

#### D. Removal of Particle Contamination

Refer to Table 9 or Table 10 for the necessary materials that are used to clean the connector.

- (1) Get these materials:
  - Isopropyl or ethyl alcohol
  - Swabs
  - Tape
  - Canned air and trigger assembly.
- (2) If the connector is a receptacle, remove the front socket insert.

**CAUTION:** DO NOT SHAKE OR TWIST THE FRONT SOCKET INSERT TO REMOVE IT FROM THE CONNECTOR SHELL. DAMAGE TO THE CERAMIC TERMINUSES CAN OCCUR.

- (a) Turn the jack screw in the center of the insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.
  - (b) Carefully pull the insert straight out of the connector shell.  
Make sure that the retainer ring and the jack screw are not removed from the insert.
  - (c) Without magnification, examine the alignment sleeves of the insert for contamination.
  - (d) If an alignment sleeve has contamination, clean the insert. Refer to Paragraph 6.F.
- (3) Put on a pair of powder free gloves or finger cots.  
**NOTE:** A satisfactory alternative is to clean the hands.
- (4) Remove the particles from the end face of the terminus with a swab or a length of tape.
- (5) If a swab is used, roll the swab on the end face of a terminus to remove the particles.
- (6) If a piece of tape is used:
  - (a) Slowly put the tape on the end face of a terminus
  - (b) Lift the tape up to remove the particles.
- (7) Examine the terminuses again with the microscope to make sure that all the particles have been removed.
- (8) If the particle contamination cannot be removed with a swab or tape, clean the end face with solvent. Refer to Paragraph 6.E.

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- (9) If the connector is a plug and the terminuses are clean, install the plug on the equipment immediately.

**NOTE:** If the connector is not installed immediately, put a dust cap or a plastic bag on the plug.

- (10) If the connector is a receptacle and the terminuses are clean:

- (a) Align the holes of the front socket insert with the applicable terminuses.
- (b) Carefully push the insert into the receptacle.

**NOTE:** If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

- (c) Engage the threads of the jack screw and the connector shell.
- (d) Torque the jack screw 5.0 inch-pounds  $\pm 0.1$  inch-pound.
- (e) Put a dust cap or a plastic bag on the connector.

#### E. Removal of Film Contamination

Refer to Table 9 or Table 10 for the necessary materials used to clean the connector.

- (1) Get these materials:

- Isopropyl or ethyl alcohol
- Foam swabs
- Woven polyester swabs
- Canned air and trigger assembly.

- (2) If the connector is a receptacle, remove the front socket insert.

**CAUTION:** DO NOT SHAKE OR TWIST THE FRONT SOCKET INSERT TO REMOVE IT FROM THE CONNECTOR SHELL. DAMAGE TO THE CERAMIC TERMINUSES CAN OCCUR.

- (a) Turn the jack screw in the center of the insert counterclockwise until it is free from the threads in the connector shell. Refer to Figure 12.
- (b) Carefully pull the insert straight out of the connector shell.  
Make sure that the retainer ring and the jack screw are not removed from the insert.
- (c) Without magnification, examine the alignment sleeves of the insert for contamination.
- (d) If an alignment sleeve has contamination, clean the insert. Refer to Paragraph 6.F.

- (3) Put on a pair of powder free gloves or finger cots.

**NOTE:** A satisfactory alternative is to clean the hands.

- (4) Put the tip of a foam swab in the alcohol so that the swab becomes moist.  
Make sure the swab is not soaked in the alcohol.

- (5) With a circular movement, carefully rub the swab on the end face of the terminus.

**CAUTION:** DO NOT USE MORE THAN THE NECESSARY FORCE WHEN THE SWAB IS ON THE END FACE OF THE TERMINUS. DAMAGE FROM SCRATCHES CAN OCCUR.

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- (6) If the end face is still wet, dry the end face with either of these materials:
  - A woven polyester swab
  - Canned air.
- (7) Examine the terminuses again with the microscope to make sure that all the contamination has been removed.
- (8) If the terminus is not clean, do Step 6.E.(4) through Step 6.E.(7) again.
- (9) If the connector is a plug and the terminuses are clean, install the plug on the equipment immediately.

**NOTE:** If the connector is not installed immediately, put a dust cap or a plastic bag on the plug.

- (10) If the connector is a receptacle and the terminuses are clean:
  - (a) Align the holes of the front socket insert with the applicable terminuses.
  - (b) Carefully push the insert into the receptacle.

**NOTE:** If it is necessary, carefully turn the insert back and forth when it is pushed into the connector shell.

- (c) Engage the threads of the jack screw and the connector shell.
- (d) Torque the jack screw 5.0 inch-pounds  $\pm 0.1$  inch-pound.
- (e) Put a dust cap or a plastic bag on the connector.

#### F. Cleaning of the Front Socket Insert

Refer to Table 9 or Table 10 for the necessary materials used to clean the front socket insert.

- (1) Get these materials:
  - Isopropyl or ethyl alcohol
  - Tapered swabs
  - Canned air and trigger assembly.
- (2) Remove the contamination from the alignment sleeve with canned air.
- (3) Examine the alignment sleeve again for contamination.
- (4) If the contamination in the sleeve cannot be removed with canned air:
  - (a) Put the tip of a tapered swab into alcohol until it is moist.
  - (b) Push the swab into the alignment sleeve.
  - (c) Twist the swab for 2 or 3 turns.
  - (d) Remove the swab from the sleeve.
  - (e) Dry the insert with canned air.
- (5) Examine the alignment sleeve again for contamination.
- (6) If the contamination in the sleeve cannot be removed with the swab:
  - (a) Get two clean containers to soak the front insert.
  - (b) Put a sufficient quantity of alcohol in one container.

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- (c) Put the insert in the other container.
- (d) Put a sufficient quantity of distilled water into the container so that the insert is fully under the surface of the distilled water.
- (e) Shake the container lightly for 1 to 3 minutes.
- (f) Remove the insert from the container.
- (g) Dry the insert with canned air.
- (h) Put the insert in the container with the alcohol for 30 seconds minimum.
- (i) If it is necessary, clean the insert with the tapered swab.
- (j) Remove the insert from the container.
- (k) Let insert dry at room temperature or dry it with canned air.
- (7) Examine the alignment sleeve again.
- (8) If the alignment sleeve still has the contamination, do Step 6.F.(6) and Step 6.F.(7) again.

## 7. INSPECTION AND CLEANING OF A TYPE B OR A TYPE C FIBER OPTIC CONNECTOR

### A. Safety Precautions

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION

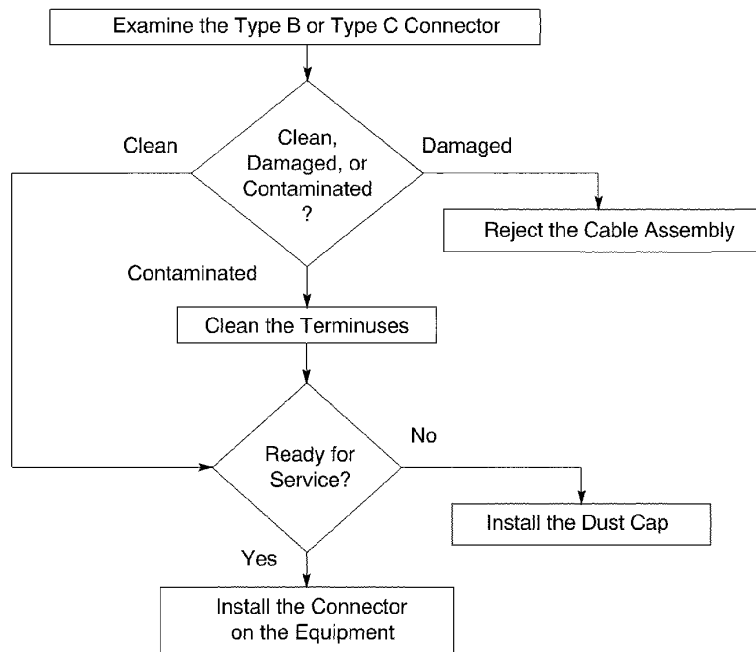
- (1) Set the power to all the interface equipment to the off condition.

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**B. General Data**



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**INSPECTION AND CLEANING PROCEDURES FOR A TYPE B OR TYPE C FIBER OPTIC CONNECTOR**  
**Figure 36**

**C. Inspection of a Type B Connector or a Type C Connector**

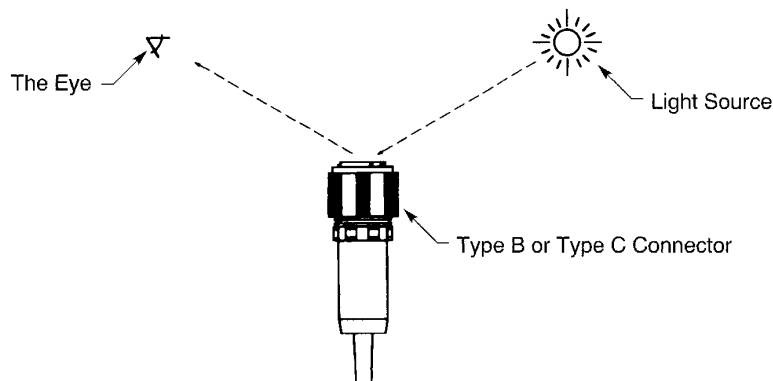
Refer to Figure 36.

- (1) Hold the connector so that the protective lens is pointed up towards a light source. Refer to Figure 37.

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**INSPECTION OF THE ENGAGING FACE OF A TYPE B OR TYPE C CONNECTOR**

**Figure 37**

- (2) Examine the surface of the protective lens for contamination.
- (3) If contamination can be seen on the protective lens, clean the connector. Refer to Paragraph 7.D.

**D. Removal of Particle Contamination**

Refer to Table 9 or Table 10 for the necessary materials that are used to clean the connector.

- (1) Get these materials:
  - Swabs
  - Tape
  - Canned air and trigger assembly.
- (2) Blow the canned air across the protective lens at an angle.

**NOTE:** As an alternative, a staticmaster brush can be used to remove the contamination.

**CAUTION:** DO NOT USE THE STATICMASTER WITH A BARE HAND. THE OIL AND DIRT FROM THE HAND CAN MAKE THE BRUSH LESS EFFECTIVE.

- (3) Examine the protective lens again.
- (4) If the protective lens is clean, install the connector on the equipment immediately.

**NOTE:** If the connector is not installed immediately, put a dust cap or a plastic bag on the connector.

- (5) If the protective lens has contamination, do Step 7.D.(2) and Step 7.D.(3) again.

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- (6) If the contamination cannot be removed with the canned air or a staticmaster brush, remove the particles from the surface of the protective lens with either of these:

- A swab
- A length of tape.

Refer to Paragraph 6.D.

- (7) Examine the protective lens again.
- (8) If the contamination cannot be removed with either the swab or the tape, clean the protective lens with solvent. Refer to Paragraph 7.E.

#### E. Removal of Film Contamination

Refer to Table 9 or Table 10 for the necessary materials used to clean the connector.

- (1) Get these materials:

- Isopropyl or ethyl alcohol
- Dry wipes
- Foam swabs
- Woven polyester swabs
- Canned air and trigger assembly.

- (2) Put on a pair of powder free gloves or finger cots.

**NOTE:** A satisfactory alternative is to clean the hands.

- (3) Put the tip of a foam or woven polyester swab in the alcohol so that the swab becomes moist. Make sure the swab is not soaked in the alcohol.
- (4) With a circular movement, carefully rub the swab on the protective lens.

**CAUTION:** DO NOT USE MORE THAN THE NECESSARY FORCE WHEN THE SWAB IS ON THE PROTECTIVE LENS. DAMAGE FROM SCRATCHES CAN OCCUR.

- (5) If the lens is still wet, dry the lens with one or more of these materials:

- A dry wipe
- A woven polyester swab
- Canned air.

- (6) Examine the protective lens again.
- (7) If the protective lens has contamination, do Step 7.E.(3) through Step 7.E.(5) again.
- (8) If the protective lens is clean, install the connector on the equipment immediately.

**NOTE:** If the connector is not installed immediately, put a dust cap or a plastic bag on the connector.

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**8. REPAIR OF A FIBER OPTIC CABLE ASSEMBLY**

**A. Replacement of an Optical Fiber**

**NOTE:** Each new fiber optic cable assembly has one unused or spare optical fiber that can be used to replace an optical fiber that has damage.

- (1) Find the optical fiber that has the damage:
  - (a) Disconnect the two connectors at each end of the cable. Refer to Paragraph 2.
  - (b) Put a low intensity, red or white light on the front face of the connector on one end of the cable.
  - (c) Look at the front face of the connector on the other end of the cable.  
If the light cannot be seen at the terminus, then that optical fiber is the one that has the damage.
- (2) Disassemble both connectors. Refer to Paragraph 3.
- (3) On both ends of the cable assembly:
  - (a) Remove the terminus of the unused optical fiber from the yoke. Refer to Figure 10.
  - (b) Put the terminus of the damaged optical fiber in the old position of the terminus of the unused optical fiber.
  - (c) Put the terminus of the unused optical fiber in the old location of the terminus of the damaged optical fiber.
- (4) Assemble the connectors. Refer to Paragraph 4.
- (5) Put the low intensity, red or white light on the front face of the connector on one end of the cable.
- (6) Look at the front face of the connector on the other end of the cable.  
Make sure that the light can be seen at each terminus except the one at the end of the optical fiber with the damage.

**B. Repair of a Cable Jacket**

- (1) Make a selection of fiberglass tape from Table 9.
- (2) Put a layer of the tape on the cable so that:
  - The ends of the layer of tape are approximately 1 inch from the ends of the damage
  - The layer of tape makes a 50 percent overlap.

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#### 1. GENERAL DATA

##### A. Safety Precautions

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION

(1) Set the power to all the interface equipment to the off condition.

##### B. Fiber Optic Contact Damage and Unwanted Material Definitions and Limits

For the contamination and damage conditions that make it necessary to clean or replace a fiber optic cable assembly, refer to:

- Paragraph 3.B. for the inspection of an uninstalled fiber optic contact
- Paragraph 3.C. for the inspection of an installed fiber optic contact
- Paragraph 3.D. for the inspection of an installed fiber optic contact in BACC65CM and BACC65CN connectors
- Paragraph 3.E. for the inspection of Installed fiber optic contact in a quadrax cavity reducer with an alignment sleeve in a receptacle connector

It is necessary to replace the fiber optic cable assembly when:

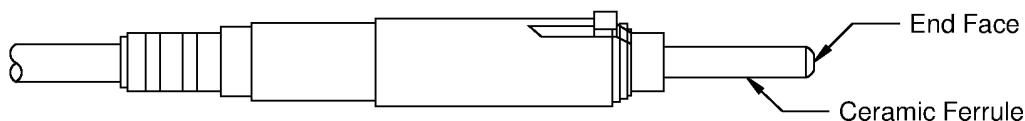
- The BACC69() fiber optic cable has a permanent deformation that is caused by a bend radius of less than ten times the outer diameter of the cable; refer to Subject 20-10-11
- The cable has damage that goes through the jacket.

Repair is not necessary when these types of damage occur:

- A small scratch on the surface of the cable jacket
- Abrasion that makes the surface of the cable jacket rough.

For the conditions that are applicable during the assembly or installation of a wire harness that has a fiber optic cable assembly, refer to:

- Subject 20-10-11
- The Subject that is applicable for the assembly of the connector.



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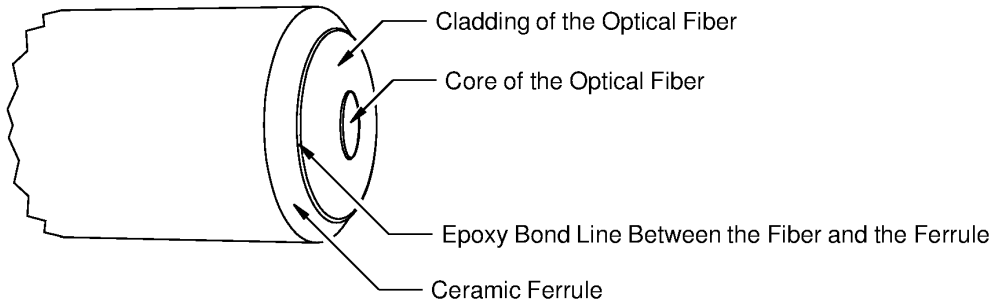
**ENGAGING END OF A FIBER OPTIC CONTACT**  
**Figure 1**

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**END OF THE OPTICAL FIBER ON THE END FACE OF A FIBER OPTIC CONTACT**

**Figure 2**

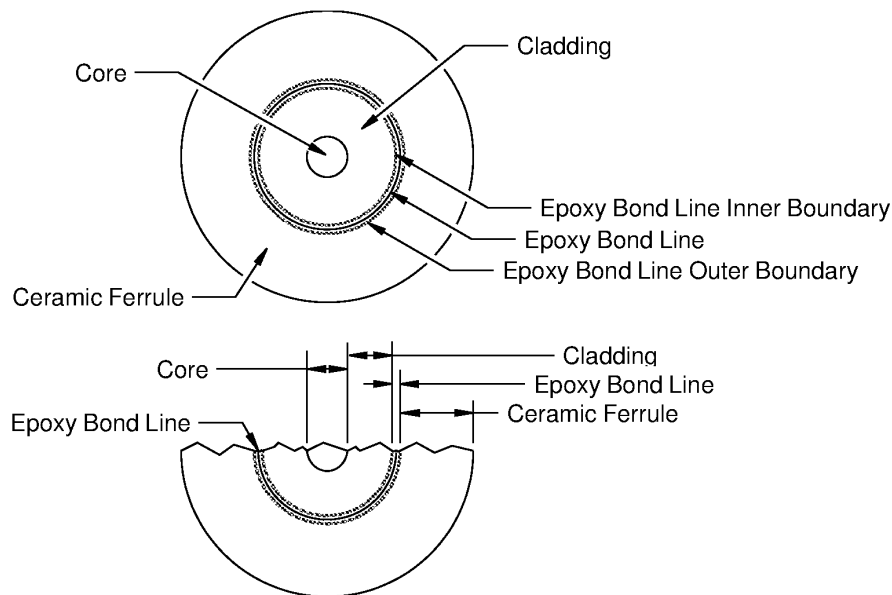
**Table 1  
ZONES OF THE END FACE OF A FIBER OPTIC CONTACT**

End Face Zone	Description	Dimensional Range (micrometers)	
		Multi-mode Fiber	Single-mode Fiber
Core	Core of the Optical Fiber	0 to 65	0 to 25
Cladding	Cladding of the Optical Fiber	55 to 120	25 to 120
Bond	Epoxy Bond Line Between the Optical Fiber and the Ceramic Ferrule	120 to 135	120 to 135
Ferrule	Ceramic Ferrule	135 to 250	135 to 250

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**ZONES OF THE END FACE OF A FIBER OPTIC CONTACT**

**Figure 3**

**Table 2  
DEFINITION OF DAMAGE**

Damage	Definition	Limits
Chip or Pit	Material missing from the end face	Table 4
Crack	Structural defect that goes into the material of the end face	Table 4
Scratch	A linear defect on the surface of the end face of the contact	Table 4

**Table 3  
DEFINITION OF UNWANTED MATERIAL**

Unwanted Material	Definition	Limits
Contamination	Material on the end face of the fiber optic contact that cannot be removed with a procedure to clean the end face	Table 5
Debris	Material on the end face of the fiber optic contact that can be removed with a procedure to clean the end face	Table 5
Film	Material on the end face of the fiber optic contact that can be removed with a procedure to clean the end face	Table 5

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**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**

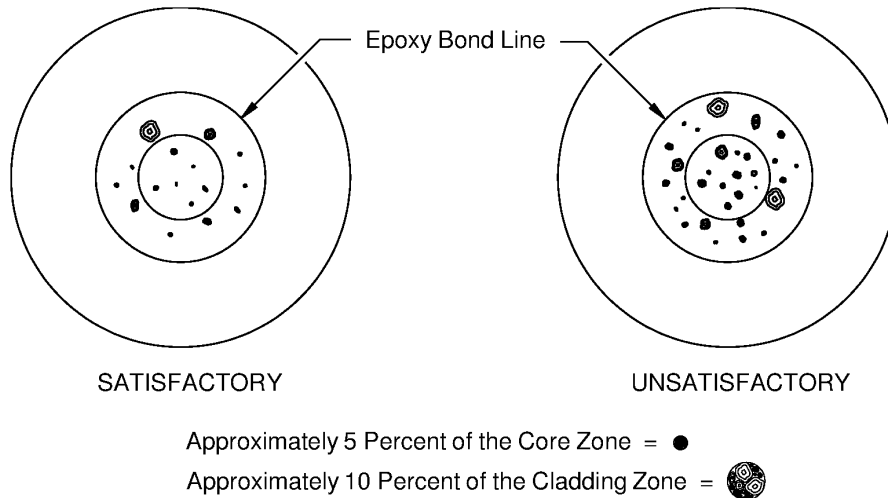
**Table 4**  
**DAMAGE LIMITS FOR THE END FACE OF A FIBER OPTIC CONTACT**

Damage	Reference Figure		End Face Zone	Limit		
	Multi-mode	Single-mode		Mode	Quantity	Size
Chip or Pit	Figure 4	Figure 5	Core	Multi	-	Total of 5 percent or less of the zone area
				Single	No Damage	-
			Cladding	Multi	-	Total of 10 percent or less of the zone area
				Single	No Damage	-
			Bond	Both	No limit	-
			Ferrule	Both	No limit	-
Crack	Figure 6	Figure 7	Core	Both	No damage	-
			Cladding	Both	No damage	-
			Bond	Both	No limit	-
			Ferrule	Both	No damage	-
Scratch	Figure 8	Figure 9	Core	Multi	3	3 micrometer maximum width of one or more
				Single	No Damage	-
			Cladding	Multi	No limit	6 micrometer maximum width of one or more
				Single	No Damage	-
			Bond	Both	No limit	-
			Ferrule	Both	No limit	-

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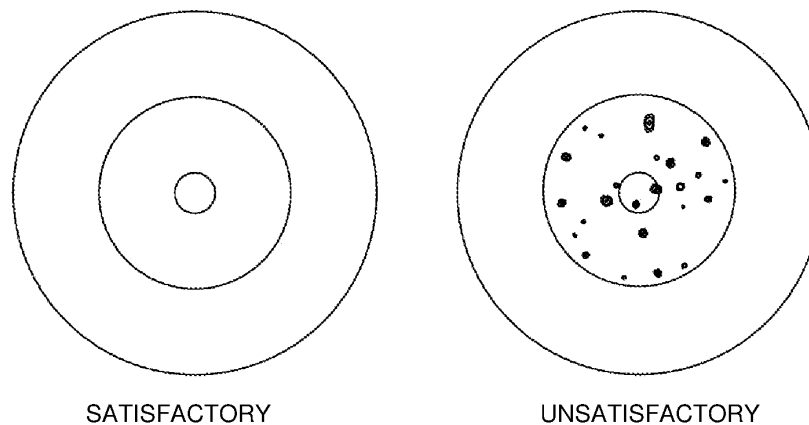
**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**



2449773 S00061544177\_V1

**END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - CHIP OR PIT DAMAGE**

**Figure 4**



2449989 S00061544178\_V1

**END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - CHIP OR PIT DAMAGE**

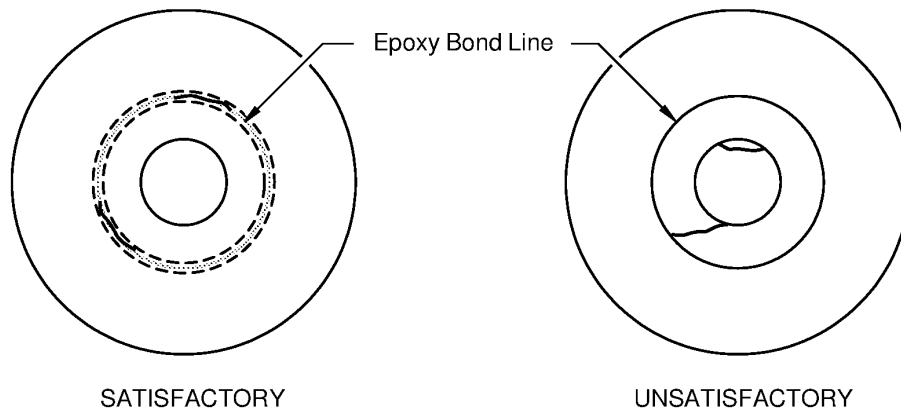
**Figure 5**

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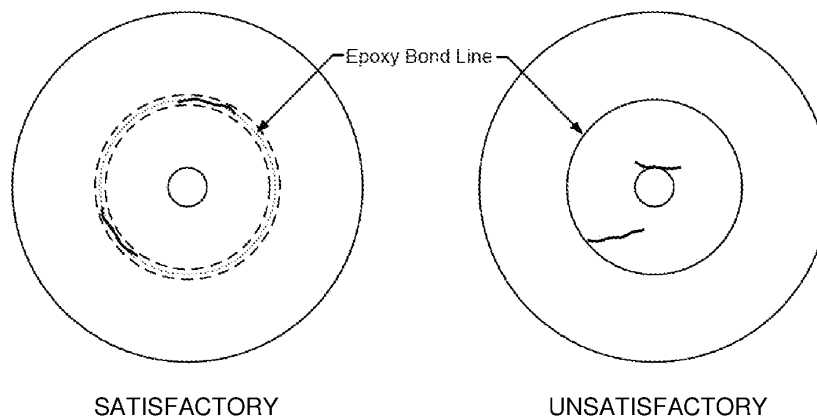
MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2449774 S00061544179\_V1

END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - CRACK DAMAGE

Figure 6



2449990 S00061544180\_V1

END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - CRACK DAMAGE

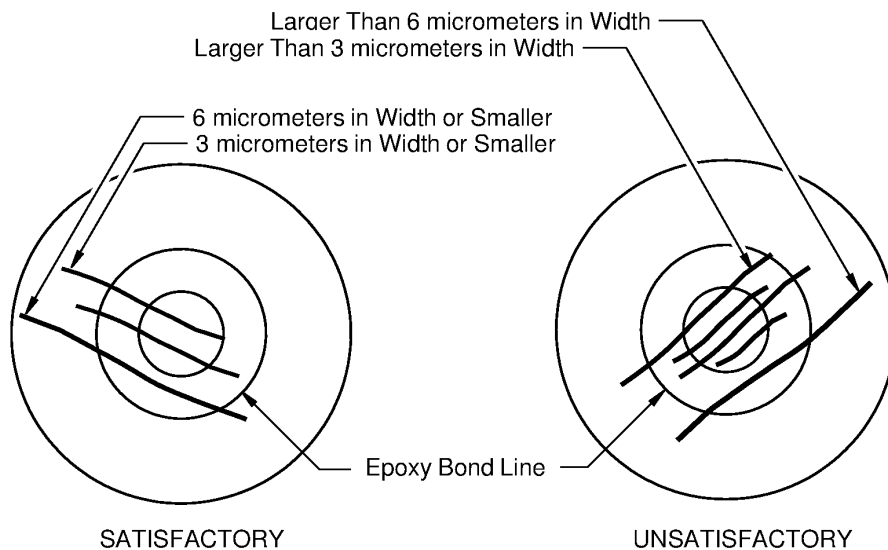
Figure 7

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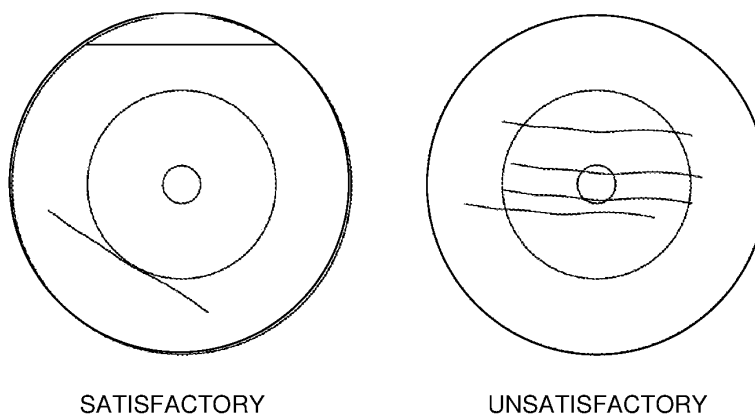
**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**



2449775 S00061544181\_V1

**END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - SCRATCH DAMAGE**

**Figure 8**



2449991 S00061544182\_V1

**END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - SCRATCH DAMAGE**

**Figure 9**

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**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**

**Table 5  
UNWANTED MATERIAL LIMITS FOR THE END FACE OF A FIBER OPTIC CONTACT**

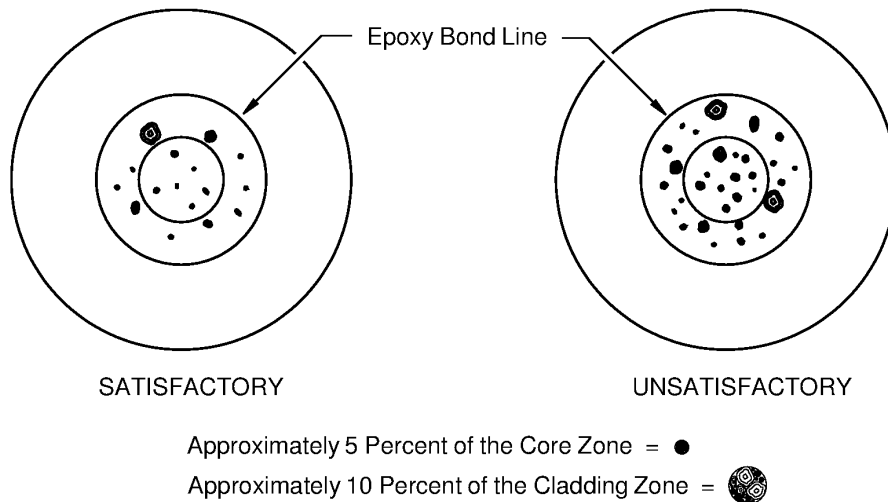
Damage	Reference Figure		End Face Zone	Limit		
	Multi-mode	Single-mode		Mode	Quantity	Size
Contamination	Figure 10	Figure 11	Core	Multi	-	Total of 5 percent or less of the zone area
				Single	None	-
			Cladding	Multi	-	Total of 10 percent or less of the zone area
				Single	None	-
			Bond	Both	No limit	-
			Ferrule	Both	No limit	-
Debris	Figure 12	Figure 13	Core	Multi	5	3 micrometer maximum width of one or more
				Single	None	-
			Cladding	Multi	5	3 micrometer maximum width of one or more
				Single	None	-
			Bond	Both	5	10 micrometer maximum width of one or more
			Ferrule	Both	5	10 micrometer maximum width of one or more
Film	Figure 14	Figure 15	Core	Both	No film	-
			Cladding	Both	No film	-
			Bond	Both	No film	-
			Ferrule	Both	No film	-

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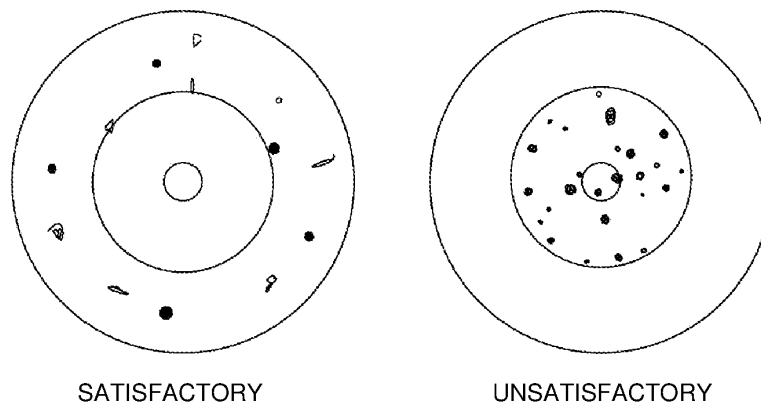
MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2449776 S00061544183\_V1

END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - CONTAMINATION

Figure 10



2449992 S00061544184\_V1

END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - CONTAMINATION

Figure 11

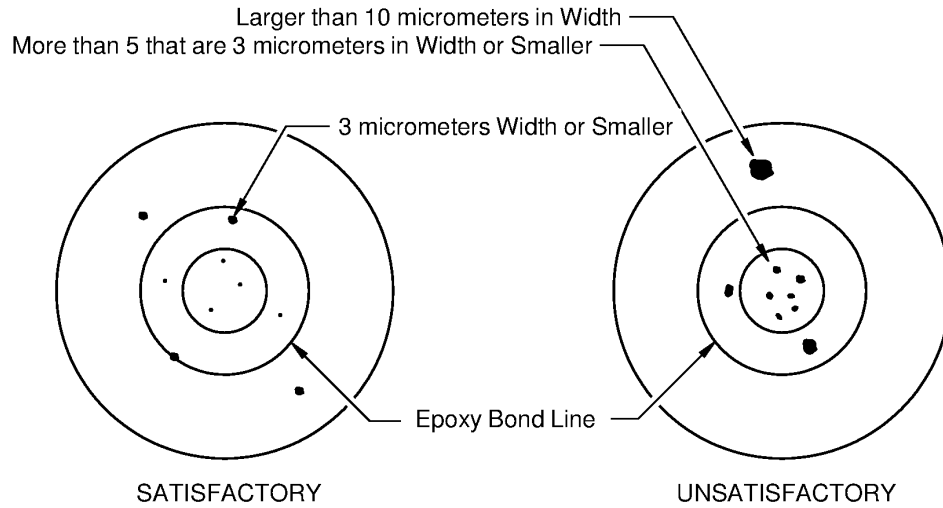
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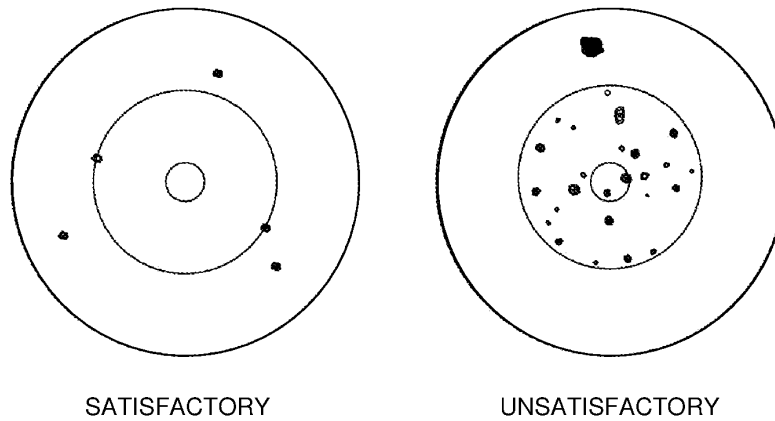
### MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2449777 S00061544185\_V1

#### END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - DEBRIS

Figure 12



2449993 S00061544186\_V1

#### END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - DEBRIS

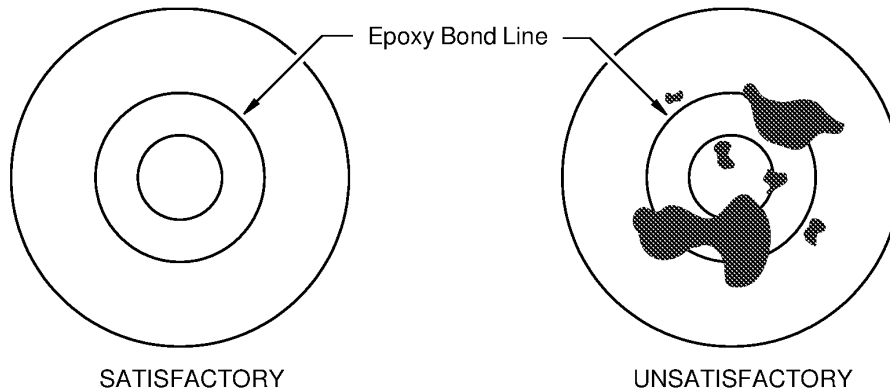
Figure 13

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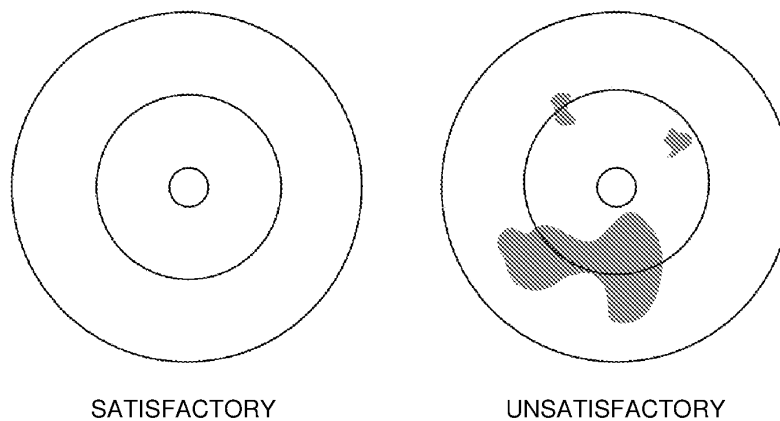
MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2449778 S00061544187\_V1

END FACE OF A MULTI-MODE FIBER OPTIC CONTACT - FILM

Figure 14



2449994 S00061544188\_V1

END FACE OF A SINGLE-MODE FIBER OPTIC CONTACT - FILM

Figure 15

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**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**

**C. Protection from Damage**

These conditions are applicable:

- The weight from a foot, a tool, or other objects must not be put on the cable assembly
- A length of the fiber optic cable must not be pushed or pulled if it does not move freely
- The BACC69() Cable Assembly must not be bent to a point where the bend radius is less than ten times the outer diameter of the cable. Refer to Subject 20-10-11.

**CAUTION:** IF THE BEND RADIUS OF A FIBER OPTIC CABLE IS LESS THAN TEN TIMES ITS OUTER DIAMETER, THE BEND CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE..

**CAUTION:** AS THE BEND RADIUS OF A FIBER OPTIC CABLE BECOMES MUCH LESS THAN TEN TIMES ITS OUTER DIAMETER, THE RISK OF DAMAGE TO THE CABLE INCREASES.

**CAUTION:** A FIBER OPTIC CABLE MUST NOT HAVE A KINK, A DENT OR A DEFORMATION. A KINK, A DENT OR A DEFORMATION OF A FIBER OPTIC CABLE CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

**D. Protection from Contamination**

These conditions are applicable:

- The engaging end of the contact terminus must not be touched with a finger or tool
- When the contact terminus is not installed in a connector, a clean protection cap must be installed on the contact terminus or the contact terminus must be put in a clean plastic bag.

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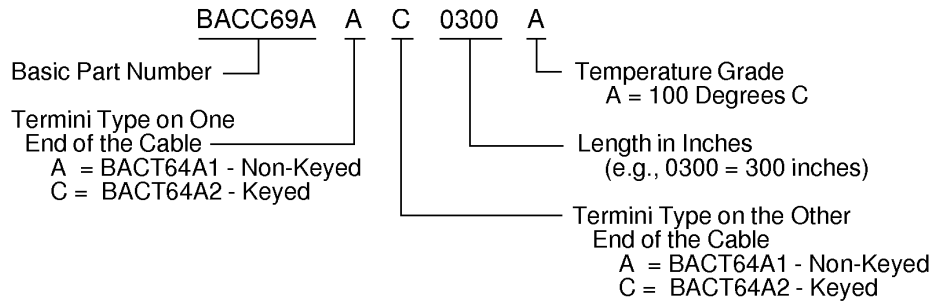


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MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES

2. PART NUMBERS AND DESCRIPTION

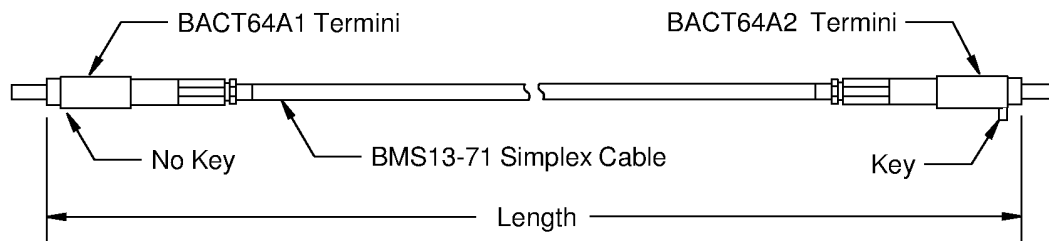
A. BACC69A and BACC69C Multi Mode Fiber Optic Cable Assembly Part Numbers



2447746 S00061544190\_V1

BACC69A SIMPLEX MULTI-MODE FIBER OPTIC CABLE ASSEMBLY PART NUMBER STRUCTURE

Figure 16



2447661 S00061544191\_V1

BACC69A SIMPLEX MULTI-MODE FIBER OPTIC CABLE ASSEMBLY - BACC69AAC() SHOWN

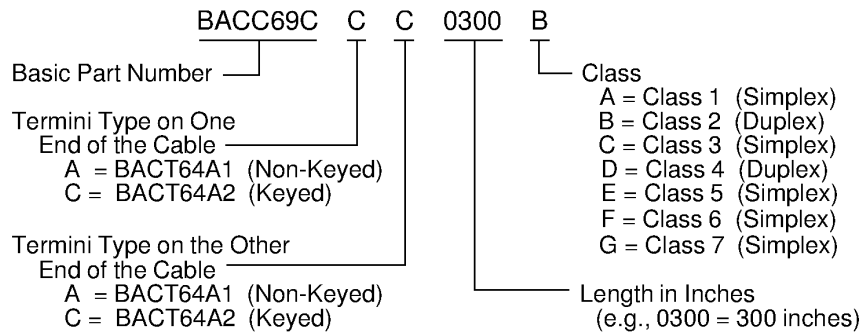
Figure 17

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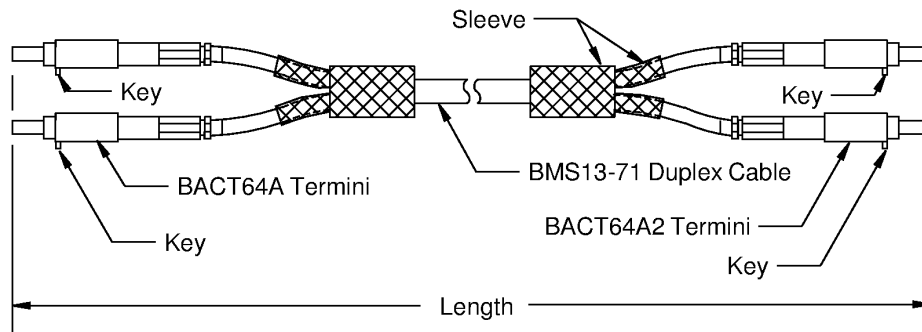
MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2448188 S00061544192\_V1

BACC69C MULTI-MODE FIBER OPTIC CABLE ASSEMBLY PART NUMBER STRUCTURE

Figure 18



2448189 S00061544193\_V1

BACC69CCC()B MULTI-MODE FIBER OPTIC CABLE ASSEMBLY (CLASS 2 - DUPLEX SHOWN)

Figure 19

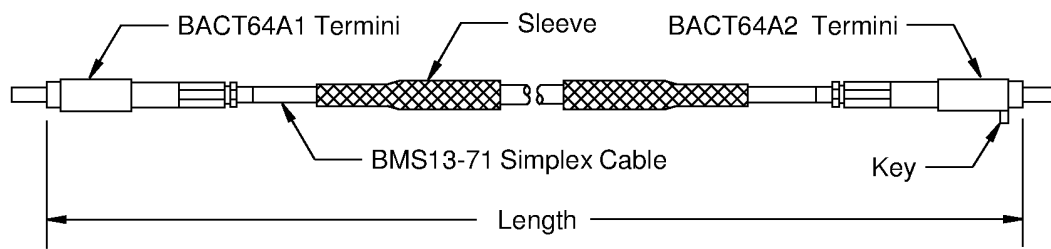
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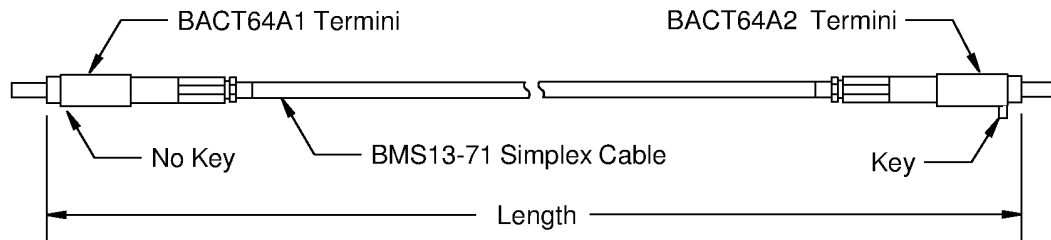
**MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**



2449771 S00061544194\_V1

**BACC69CAC()E AND BACC69CAC()F MULTI-MODE FIBER OPTIC CABLE ASSEMBLY (CLASS 5 AND 6 - SIMPLEX SHOWN)**

**Figure 20**



2447661 S00061544191\_V1

**BACC69CAC()G MULTI-MODE FIBER OPTIC CABLE ASSEMBLY (CLASS 7 - SIMPLEX SHOWN)**

**Figure 21**

**Table 6  
FIBER OPTIC CONTACT TERMINUS PART NUMBERS**

Size	Terminus Type	Feature	Part Number
16	A	Non-Keyed	BACT64A1
	C	Keyed	BACT64A2

**NOTE:** The BACT64A() contact terminus is part of the BACC69A or BACC69C fiber optic cable assembly and cannot be removed and replaced. If it is necessary to replace a contact terminus, the cable assembly must be replaced.

**NOTE:** A contact terminus that has a key can only be installed in a contact terminus cavity that has a keyway.

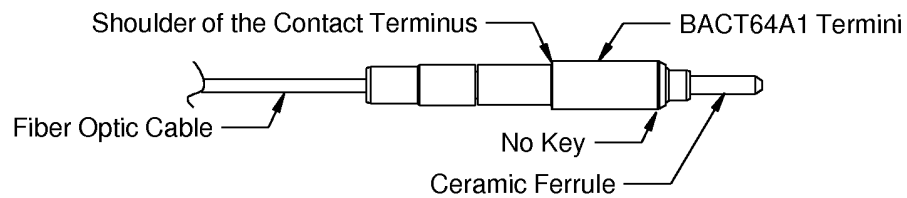
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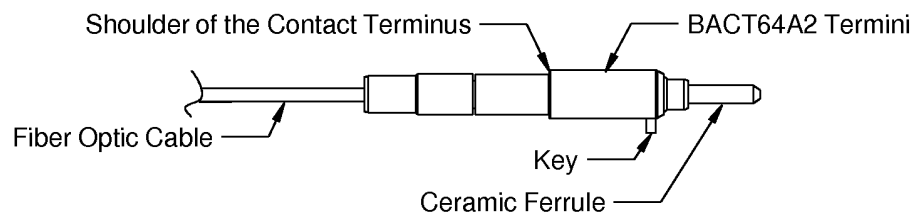
### MULTI MODE BACC69A AND BACC69C AND SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES



2447749 S00061544195\_V1

#### BACT64A1 NON-KEYED FIBER OPTIC CONTACT TERMINUS

Figure 22



2448201 S00061544196\_V1

#### BACT64A2 KEYED FIBER OPTIC CONTACT TERMINUS

Figure 23

Table 7

#### APPROVED SUPPLIERS OF MULTI MODE BACC69A() AND BACC69C() CABLE ASSEMBLIES

Cable Assembly	Supplier
BACC69A()	Radiall
BACC69C()	Radiall
BACC69C()A	Radiall
BACC69C()B	Radiall
BACC69C()C	kSaria
BACC69C()D	kSaria
BACC69C()E	kSaria
	Radiall
BACC69C()F	Radiall

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**Table 8  
CONTACT TERMINUS PROTECTION CAP PART NUMBERS**

<b>Description</b>	<b>Part Number</b>	<b>Supplier</b>
Cap, Protective	F718176201	Radiall
Cap, Protective	B 243 25 674	Radiall

**B. Single Mode Fiber Optic Cable Assembly Part Numbers**

**Table 9  
APPROVED SUPPLIERS OF SINGLE MODE FIBER OPTIC CABLE ASSEMBLIES**

<b>Cable Assembly Part Number</b>	<b>Supplier</b>
5020874001-001	Boeing
5020874002-001	Boeing
5020874002-011	Boeing
5020874002-021	Boeing
5020874003-011	Boeing
5020874003-021	Boeing
5020874003-031	Boeing

**3. INSPECTION OF A FIBER OPTIC CONTACT TERMINUS**

**A. Necessary Tools for Fiber Optic Contact Inspection**

**Table 10  
FIBER OPTIC CONTACT INSPECTION TOOLS**

<b>Tool</b>	<b>Description</b>	<b>Part Number</b>	<b>Supplier</b>
Inspection Kit	Fiber Optic Contact Inspection Kit with hand held video display	FBP-787-1	JDSU
	Fiber Optic Contact Inspection Kit with hand held video display	FBP-SD4i	JDSU
Microscope	200X magnification	VFS-00-0900 AFL Specified by supplier	NET-TECH
			An available source
Probe	400x Magnification (for single -mode FO)	FM-CM 400USN	JDSU
	Barrel assembly, narrow type	FBPP-BAP4	JDSU
Inspection Kit	Fiber Optic Termini Inspection Kit with hand held video display	FBP-ARINC-01	JDSU
	Fiber Optic Termini Inspection Kit with a portable CleanBlast system (video display is integrated with the CleanBlast system)	FCL-ARINC-01	JDSU
	Fiber Optic Contact Inspection Kit with FiberChek2 Software	FBP-SD01	JDSU

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**Table 10 FIBER OPTIC CONTACT INSPECTION TOOLS (Continued)**

Tool	Description	Part Number	Supplier
Inspection Tip	Installed Fiber Optic Contact, Receptacle Connector with an Alignment Sleeve	FBPT-RQX8-P	JDSU
	Installed Fiber Optic Contact, Plug Connector without an Alignment Sleeve	FBPT-RQX8-S	JDSU
	Uninstalled BACT64A Fiber Optic contact	FBPT-U12M-N	JDSU
Microscope	200X magnification	VFS-00-0900 AFL	NET-TECH
		Specified by supplier	An available source
Probe	Barrel Assembly, BACT64A Contact	FBPP-BAP3	JDSU
	Barrel Assembly, Quadrax Cavity Reducer	FBPP-BAP1	JDSU
	Probe Barrel Assembly, 60 degree angled with Tip	FBPP-BAP3-A6	JDSU

**Table 11  
ADAPTERS FOR INSTALLED FIBER OPTIC CONTACTS**

Connector			Adapter		
Series	Insert	Alignment Sleeve Insert (Y/N)	Part Number	Alternative Part Number	Supplier
BACC65AA	BACI10AL12F()AP	N	FBPT-A801-2-001-P	FBPT-A801-2001P	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-002-P	FBPT-A801-2002P	JDSU
	BACI10AL12F()BP	N	FBPT-A801-2-001-P	FBPT-A801-2001P	JDSU
	BACI10AL12F()BS	Y	FBPT-A801-2-002-P	FBPT-A801-2002P	JDSU
BACC65AB	BACI10AL12F()AP	N	FBPT-A801-2-002-R	FBPT-A801-2002R	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
	BACI10AL12F()BP	N	FBPT-A801-2-002-R	FBPT-A801-2002R	JDSU
	BACI10AL12F()BS	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
BACC65AN	BACI10AL12F()AP	N	FBPT-A801-2-001-P	FBPT-A801-2001P	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-002-P	FBPT-A801-2002P	JDSU
BACC65AP	BACI10AL12F()AP	N	FBPT-A801-2-002-R	FBPT-A801-2002R	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
BACC65BJ	BACI10AL12F()AP	N	FBPT-A801-2-001-P	FBPT-A801-2001P	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-001-P	FBPT-A801-2001P	JDSU
BACC65BK	BACI10AL12F()AP	N	FBPT-A801-2-002-R	FBPT-A801-2002R	JDSU
	BACI10AL12F()AS	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
BACC65CM	BACI10AP06FAP	N	FBPT-65CM-P	FBPT-65CMP	JDSU
	BACI10AP06FAS	Y	FBPT-65CM-S	FBPT-65CMS	JDSU

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**Table 11 ADAPTERS FOR INSTALLED FIBER OPTIC CONTACTS (Continued)**

Connector			Adapter		
Series	Insert	Alignment Sleeve Insert (Y/N)	Part Number	Alternative Part Number	Supplier
BACC65CN	BACI10AP06FAP	N	FBPT-65CN-P	FBPT-65CNP	JDSU
	BACI10AP06FAS	Y	FBPT-65CN-S	FBPT-65CNS	JDSU
BACC66G	BACI10AH31	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
			FBPT-A801-4-001-R	FBPT-A801-4001R	JDSU
	BACI10AH38	Y	FBPT-A801-4-002-R	FBPT-A801-4002P	JDSU
BACC66H	BACI10AH31	N	FBPT-A801-4-001-P	FBPT-A801-2001R	JDSU
	BACI10AH38	N	FBPT-A801-4-002-P	FBPT-A801-4002R	JDSU
BACC66J	BACI10AH33	Y	FBPT-A801-2-001-R	FBPT-A801-2001R	JDSU
			FBPT-A801-4-001-R	FBPT-A801-4001R	JDSU
BACC66K	BACI10AH33	N	FBPT-A801-4-001-P	FBPT-A801-4001P	JDSU
BACC68E	15-06	Y	FBPT-A801-1-002-R	FBPT-A801-1002R	JDSU
	11-02	Y	FBPT-A801-1-000-R	FBPT-A801-1000R	JDSU
BACC68F	15-06	N	FBPT-A801-1-002-P	FBPT-A801-1002P	JDSU
	11-02	N	FBPT-A801-1-000-P	FBPT-A801-1000P	JDSU
BACC68G1-4FP	BACI10BB4FP	N	FBPT-MTC-G001	-	JDSU
BACC68H1-4FS	BACI10BB4FS	Y	FBPT-MTC-G002	-	JDSU
R8R1304FOPXN	13-4	N	FBPT-A801-1-001-R	FBPT-A801-1001R	JDSU
R8W1304FOSXN	13-4	Y	FBPT-A801-1-001-P	FBPT-A801-1001P	JDSU

**B. Inspection of an Uninstalled Fiber Optic Contact**

**CAUTION:** THIS PROCEDURE IS NOT APPLICABLE FOR THE INSPECTION OF A FIBER OPTIC CONTACT THAT IS INSTALLED IN A CONNECTOR INSERT. DAMAGE TO THE CONTACT OR THE CONNECTOR CAN OCCUR.

- (1) Make a selection of a microscope or an inspection kit from Table 10.
- (2) If the selection is an inspection kit, make a selection of these tools from Table 10:
  - A probe
  - An inspection tip.

- (3) Examine the end face of the fiber optic contact.

Make sure that the magnification is set to 200X or equivalent low magnification.

**NOTE:** Software can be used as an aid to find the location and size of the damage or contamination, but must not be used as the authority to accept or reject the cable assembly.

- (4) If the end face of the fiber optic contact has unsatisfactory damage, replace the cable assembly.  
 Refer to Paragraph 1.B. for:

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- The zones of the end face of a fiber optic contact
  - The definition of the types of damage
  - The damage limits.
- (5) If the end face of the fiber optic contact has unsatisfactory unwanted materials:
- (a) Remove the unwanted materials.
- Refer to Paragraph 1.B. for:
- The zones of the end face of a fiber optic contact
  - The definition of unwanted materials
  - Unwanted material limits
- Refer to Paragraph 4.B. for the procedure to remove the unwanted material.
- (b) Do Step 3.B.(3) through Step 3.B.(5) again.
- (c) If the unsatisfactory unwanted materials cannot be removed, replace the cable assembly.

#### C. Inspection of Installed Fiber Optic Contacts

This procedure is applicable for installed fiber optic contacts that are not installed in a quadrax cavity reducer with an alignment sleeve.

For the procedure that is applicable for a fiber optic contact that is installed in a quadrax cavity reducer with an alignment sleeve, refer to Paragraph 3.E..

- (1) Make a selection of an inspection kit from Table 10.
- (2) For fiber optic contacts that are not installed in a quadrax cavity reducer, make a selection of an adapter from Table 11.
- (3) For fiber optic contacts that are installed in a quadrax cavity reducer in a plug connector, make a selection of these tools from Table 10:
- An inspection tip
  - A probe.
- (4) For a connector that has a socket insert and a fiber optic alignment sleeve insert, remove the alignment sleeve insert.

Refer to:

- Subject 20-74-02 for a BACC65BJ connector
  - The applicable Subject for the connector for other connectors.
- (5) Align the adapter in the engaging end of the connector.
- (6) Put the end of the probe in the applicable contact cavity.
- (7) Examine the end face of the fiber optic contact.
- Make sure that the magnification is set to 200X or equivalent low magnification:
- NOTE:** Software can be used as an aid to find the location and size of the damage or contamination, but must not be used as the authority to accept or reject the cable assembly.
- (8) If the end face of the optical fiber has unsatisfactory damage, replace the cable assembly.

Refer to Paragraph 1.B. for:

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- The zones of the end face of a fiber optic contact
  - The definition of the types of damage
  - The damage limits.
- (9) If the end face of the fiber optic contact has unsatisfactory unwanted materials:
- (a) Remove the unwanted materials.
- Refer to Paragraph 1.B. for:
- The zones of the end face of a fiber optic contact
  - The definition of unwanted materials
  - Unwanted material limits
- Refer to Paragraph 4.B. for the procedure to remove the unwanted material.
- (b) Do Step 3.C.(7) through Step 3.C.(9) again.
- (c) If the unsatisfactory unwanted materials cannot be removed, replace the cable assembly.
- (10) If the alignment sleeve insert is removed, install the alignment sleeve insert.
- Refer to:
- Subject 20-74-02 for a BACC65BJ connector
  - The applicable Subject for the connector for other connectors.

#### D. Alternative Inspection of Installed Fiber Optic Contacts - BACC65CM and BACC65CN Connectors

**Table 12**  
**FIBER OPTIC CONTACT INSPECTION TOOLS - BACC65CM AND BACC65CN CONNECTORS**

Tool	Description	Part Number	Supplier
Inspection Tip	Installed Fiber Optic Contact, BACI10AP06FAP Insert	FBPT-U12M-N	JDSU
	Installed Fiber Optic Contact, BACI10AP06FAS Insert, Alignment Sleeve Insert Installed	FBPT-LC	JDSU
	Installed Fiber Optic Contact, BACI10AP06FAS Insert, Alignment Sleeve Insert Removed	FBPT-U12M-N	JDSU
Probe	Barrel Assembly, BACI10AP06FAP Insert	FBPP-BAP3	JDSU
	Barrel Assembly, BACI10AP06FAS Insert, Alignment Sleeve Insert Installed	FBPP-BAP1	JDSU
	Barrel Assembly, BACI10AP06FAS Insert, Alignment Sleeve Insert Removed	FBPP-BAP3	JDSU

- (1) Make a selection of an inspection kit from Table 10.
- (2) Make a selection of these tools from Table 12:
- A probe
  - An inspection tip.
- (3) If the tools are applicable for the BACI10AP06FAS insert with the alignment sleeve insert removed, remove the alignment sleeve insert
- Refer to Subject 20-74-02.

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- (4) Examine the end face of the fiber optic contact.

Make sure that The magnification is set to 200X or equivalent low magnification.

**CAUTION:** THE INSPECTION TIP AND THE CONTACT MUST BE ALIGNED CORRECTLY. DAMAGE TO THE CONTACT CAN OCCUR WHEN THE TIP AND THE CONTACT ARE NOT ALIGNED.

**NOTE:** Software can be used as an aid to find the location and size of the damage or contamination, but must not be used as the authority to accept or reject the cable assembly.

- (5) If the end face of the optical fiber has unsatisfactory damage, replace the cable assembly.

Refer to Paragraph 1.B. for:

- The zones of the end face of a fiber optic contact
- The definition of the types of damage
- The damage limits.

- (6) If the end face of the fiber optic contact has unsatisfactory unwanted materials, remove the unwanted materials.

Refer to Paragraph 1.B. for:

- The zones of the end face of a fiber optic contact
- The definition of unwanted materials
- Unwanted material limits

- (a) Remove the unwanted materials with the CleanBlast cleaning system. Refer to Paragraph 4.B..

- (b) Do Step 3.D.(4) through Step 3.D.(6) again.

- (c) If the unsatisfactory unwanted materials cannot be removed, replace the cable assembly.

- (7) If the alignment sleeve is removed, install the alignment sleeve insert.

Refer to Subject 20-74-02.

**E. Inspection of Installed Fiber Optic Contacts - Quadrax Cavity Reducer with an Alignment Sleeve in a Receptacle Connector**

**Table 13**  
**NECESSARY TOOLS**

Tool	Type	Supplier
Driver, Torque Wrench	1 inch-pound minimum torque	An available source
Socket	5 millimeters	An available source

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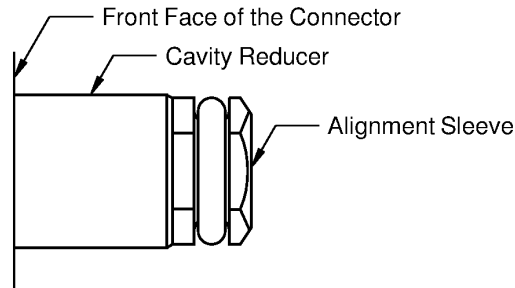




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#### CAVITY REDUCER WITH AN ALIGNMENT SLEEVE

Figure 24

Refer to Figure 24.

- (1) Make a selection of these tools from Table 10.

- An inspection kit
- A probe
- An inspection tip.

- (2) Examine the end face of the fiber optic contact.

Make sure that the magnification is set to 200X or equivalent low magnification

**NOTE:** Software can be used as an aid to find the location and size of the damage or contamination, but must not be used as the authority to accept or reject the cable assembly.

- (3) If the end face of the optical fiber has unsatisfactory damage, replace the cable assembly.

Refer to Paragraph 1.B. for:

- The zones of the end face of a fiber optic contact
- The definition of the types of damage
- The damage limits.

- (4) If the end face of the fiber optic contact has unsatisfactory unwanted materials:

- (a) Remove the unwanted materials with the CleanBlast cleaning system

Refer to Paragraph 1.B. for:

- The zones of the end face of a fiber optic contact

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- The definition of unwanted materials
- Unwanted material limits.

Refer to Paragraph 4.B. for the procedure to remove the unwanted material.

- (b) Do Step 3.E.(2) again.
- (c) If the end face of the fiber optic contact has unsatisfactory unwanted materials, remove the alignment sleeve. Refer to Paragraph 3.F..
- (d) Remove the unwanted material.

Refer to Paragraph 1.B. for:

- The zones of the end face of a fiber optic contact
- The definition of unwanted materials
- Unwanted material limits

Refer to Paragraph 4.B. for the procedure to remove the unwanted material.

- (e) Do Step 3.E.(2) through Step 3.E.(4) again.
  - (f) If the unsatisfactory unwanted materials cannot be removed, replace the cable assembly.
- (5) If the alignment sleeve is removed from the quadrax cavity reducer:
- (a) Make a selection of these tools from Table 13.
    - A torque driver
    - A 5 millimeter socket.
  - (b) Engage the threads of the alignment sleeve and the cavity reducer.
  - (c) Tighten the alignment sleeve with the hand.
  - (d) Torque the alignment sleeve 2 inch-pounds  $\pm$ 0.2 inch-pounds.

**F. Removal of a Quadrax Cavity Reducer Alignment Sleeve**

**Table 14**  
**NECESSARY TOOLS**

<b>Tool</b>	<b>Size (millimeters)</b>	<b>Supplier</b>
Driver, Hex	5	An available source
Wrench	5	An available source

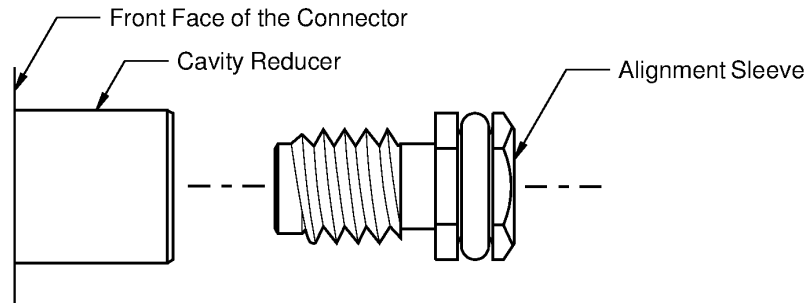
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#### ALIGNMENT SLEEVE REMOVAL FROM A QUADRAX CAVITY REDUCER

Figure 25

Refer to Figure 25.

- (1) Make a selection of a protective equipment from Table 16.

**NOTE:** Clean hands are satisfactory alternative to the protective equipment.

- (2) If the hands are not clean, put the protective equipment on.
- (3) Make a selection of one of these tools from Table 14.
  - A 5 millimeter driver
  - A 5 millimeter wrench.
- (4) Remove the alignment sleeve. Refer to Figure 25.

#### 4. CLEANING OF A FIBER OPTIC CONTACT TERMINUS

##### A. Cleaning Materials and Tools

Table 15  
CLEANING MATERIALS

Tool	Description	Part Number or Specification	Supplier
Canned Air	Compressed Gas	Air Express 340 GRS P	Prolicom
		ES1015	Chemtronics
		ES1020	Chemtronics
	Tetrafluoroethane	ES1620	Chemtronics

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**Table 15 CLEANING MATERIALS (Continued)**

Tool	Description	Part Number or Specification	Supplier
Solvent	Alcohol, Ethyl	O-E-760	An available source
	Alcohol, Isopropyl	TT-I-735	An available source
	CleanBlast Systems Solvent	FCLP-SOL1	JDSU
		HFE-72DA	3M
	Non-flammable Solvent	MCC-FPF	MicroCare
Tape	Polyester, Acrylic Adhesive	850	3M

**Table 16  
FIBER OPTIC CLEANING TOOLS**

Tool	Description	Part Number	Supplier
Cleaning Kit	Fiber Optic cleaning Kit (Swabs, Alcohol Wipes, Cotton Wipes, Isopropyl Alcohol, Canned Air)	E-250K	The Light Brigade
Cleaning Tip	CleanBlast system	FCLT-BAP-125	JDSU
	CleanBlast system, quadrax cavity reducer without an alignment sleeve	FCLT-RQX8-S	JDSU
	CleanBlast system, quadrax cavity reducer with an alignment sleeve	FCLT-RQX8-P	JDSU
Equipment, Protective	Finger Cot	Specified by supplier	An available source
	Gloves, powder free	Specified by supplier	An available source
Pen, Cartridge	IBC Brand Cleaner H125	12910	US Conec
Swab	Foam	TX740	Texwipe Company
	Polyester	WS301	MicroCare
		WS302	MicroCare
		WS303	MicroCare
	Polyester, molded	MCC-P25	MicroCare
		MCC-S12	MicroCare
		MCC-S16	MicroCare
	Polyester, woven	TX762	Texwipe Company
		TX759B	Texwipe Company
	Polypropylene	TX758B	Texwipe Company
	Polyurethane	TX757B	Texwipe Company
Wipe	Lint-free	BMS15-5	QPL
		MCC-WFW	MicroCare

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**B. Fiber Optic Contact Cleaning**

- (1) Make a selection of a protective equipment from Table 16.

**NOTE:** Clean hands are satisfactory alternative to the protective equipment.

- (2) If the hands are not clean, put the protective equipment on.
- (3) Clean the fiber optic contact.

For the removal of:

- - Debris with a dry swab; refer to Paragraph 4.C.
- - Debris with a tape; refer to Paragraph 4.D.
- - Debris with a cartridge pen; refer to Paragraph 4.E.
- - Unwanted material with wet swab; refer to Paragraph 4.F.
- - Unwanted material with the CleanBlast cleaning system; refer to Paragraph 4.G..

**C. Debris Removal - Dry Swab**

For conditions that are applicable for this procedure, refer to Paragraph 4.B..

- (1) Make a selection of a swab or a cleaning kit from Table 16.
- (2) Roll the swab across the end face of the fiber optic contact.

**D. Debris Removal - Tape**

For conditions that are applicable for this procedure, refer to Paragraph 4.B..

- (1) Make a selection of a tape from Table 15.
- (2) Carefully put the adhesive side of a length of the tape on the end face of the fiber optic contact.
- (3) Lift the tape to remove the particles.

**E. Debris Removal - Cartridge Pen**

For conditions that are applicable for this procedure, refer to Paragraph 4.B..

- (1) Make a selection of a cartridge pen from Table 16.
- (2) For a fiber optic contact in a socket insert:
  - (a) Remove the cover and the guide cap from the tip of the pen.
  - (b) Align the tip of the pen and the alignment sleeve.
  - (c) Push the tip of the pen forward until it makes a click.

**CAUTION:** IF THE TIP OF THE PEN AND THE ALIGNMENT SLEEVE ARE NOT ALIGNED, DAMAGE TO THE PEN OR THE FIBER OPTIC CONTACT CAN OCCUR.

- (d) Remove the tip from the alignment sleeve.
- (e) Put the guide cap and the cover on the tip of the pen.

**CAUTION:** THE GUIDE CAP AND COVER MUST BE ON THE TIP OF THE PEN WHILE THE PEN IS NOT USED. IF THE GUIDE CAP AND COVER ARE NOT ON THE TIP OF THE PEN, DAMAGE TO THE TIP CAN OCCUR.

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- (3) For a fiber optic contact in a pin insert:

- (a) Remove the cover from the guide cap.

Make sure the guide cap stays on the end of the pen.

- (b) Align the tip of the pen and the end of the fiber optic contact.

**CAUTION:** IF THE TIP OF THE PEN AND THE FIBER OPTIC CONTACT ARE NOT ALIGNED, DAMAGE TO THE PEN OR THE FIBER OPTIC CONTACT CAN OCCUR.

- (c) Push the tip of the pen forward until it makes a click.

- (d) Remove the pen from the end of the fiber optic contact.

Make sure the tip of the pen and the fiber optic contact stay aligned.

**CAUTION:** IF THE TIP OF THE PEN AND THE FIBER OPTIC CONTACT ARE NOT ALIGNED, DAMAGE TO THE PEN OR THE FIBER OPTIC CONTACT CAN OCCUR.

- (e) Put the cover on the guide cap.

**CAUTION:** THE GUIDE CAP AND COVER MUST BE ON THE TIP OF THE PEN WHILE THE PEN IS NOT USED. IF THE GUIDE CAP AND COVER ARE NOT ON THE TIP OF THE PEN, DAMAGE TO THE TIP CAN OCCUR.

**F. Unwanted Material Removal - Wet Swab**

For conditions that are applicable for this procedure, refer to Paragraph 4.B..

- (1) Make a selection of these cleaning tools from Table 16.

- A swab or a cleaning kit
- A woven polyester swab.

- (2) Make a selection of these cleaning materials from Table 15.

- A solvent
- A canned air.

- (3) Put a small amount of the solvent on the end of the swab to make it moist.

Make sure that the swab is not too wet.

- (4) Carefully rub the swab on the end face of the fiber optic contact in a circular motion. Refer to Figure 26.

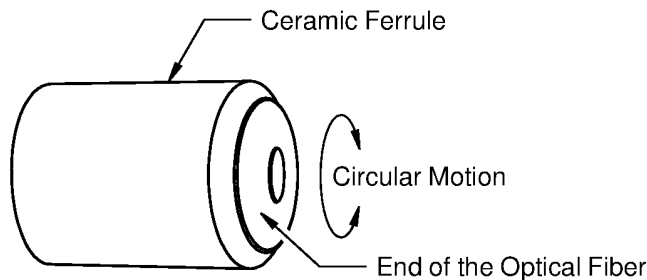
**CAUTION:** DO NOT USE MORE THAN THE NECESSARY FORCE TO REMOVE THE CONTAMINATION. TOO MUCH FORCE CAN MAKE A SCRATCH ON THE END FACE OF THE CONTACT.

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CIRCULAR CLEANING MOTION

Figure 26

- (5) Dry the fiber optic contact with the canned air or a woven polyester swab.

**G. Unwanted Material Removal - CleanBlast Cleaning System**

For conditions that are applicable for this procedure, refer to Paragraph 4.B..

**CAUTION:** THE CLEANBLAST SYSTEM CAN LEAVE A RESIDUE ON ADJACENT FIBER OPTIC CONTACTS.

- (1) Make a selection of an adapter from Table 11.
- (2) Align the adapter in the engaging end of the connector.
- (3) Put the tip of the cleaning probe in the applicable contact cavity.
- (4) Clean the fiber optic contact.

**5. FIBER OPTIC CABLE REPLACEMENT**

**A. Replacement of a Single Core (Simplex) Fiber Optic Cable Assembly**

Table 17

AVAILABLE PART NUMBERS FOR SIMPLEX FIBER OPTIC CABLE ASSEMBLIES

Necessary Cable Length (feet)		Fiber Optic Cable Part Number
Minimum	Maximum	
0	1	BACC69ACC0013A
1	3	BACC69CCC0036E
3	5	BACC69CCC0060E
5	10	BACC69CCC0120E
10	15	BACC69CCC0180E
15	25	BACC69CCC0300E
25	30	BACC69CCC0360E
30	35	BACC69CCC0420E
35	40	BACC69CCC0480E

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**Table 17 AVAILABLE PART NUMBERS FOR SIMPLEX FIBER OPTIC CABLE ASSEMBLIES (Continued)**

Necessary Cable Length (feet)		Fiber Optic Cable Part Number
Minimum	Maximum	
40	50	BACC69CCC0600E
50	70	BACC69CCC0840E
70	85	BACC69CCC1020E
85	120	BACC69CCC1440E

- (1) Use the necessary cable length to make a selection of a replacement fiber optic cable part number from Table 17.

Example:

To replace a 20 foot fiber optic cable, select part number BACC69CCC0300E.

- (2) Move the unwanted length of the replacement cable away from the wire harness:
- (3) If more than one wire makes an exit from the same area of the wire harness:
- (a) Put the wires and cables together.
  - (b) Assemble a lacing tape wire harness tie on the wires and cable near the location where the wires make an exit from the wire harness.

Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

- (4) If the wire harness has a sleeve:
- (a) Make a selection of a sleeve that is the same material as the sleeve on the wire harness. Refer to Subject 20-00-11.
  - (b) Put the necessary length of sleeve on the fiber optic cable.

Make sure that the sleeve extends from the point where the wire makes an exit from the wire harness to a maximum of 2 inches from the end of the wire.

- (5) Put the unwanted length of the fiber optic cable into a coil configuration. Refer to Figure 27.

Make sure that:

- The diameter of the coil is larger than 2.2 inches
- The coil is in a position where it can be attached with a clamp.

**NOTE:** If it is necessary, multiple coils can be made.

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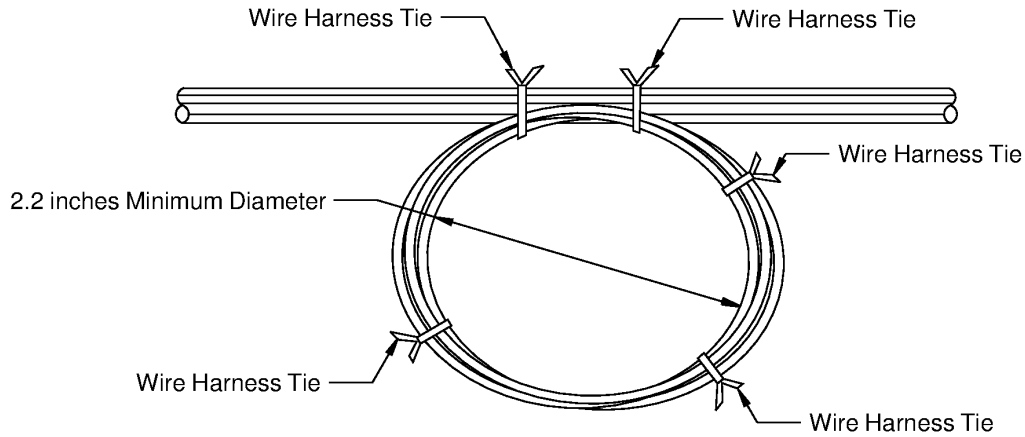




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#### COIL AND STOW CONFIGURATION FOR FIBER OPTIC CABLE

Figure 27

- (6) Assemble the necessary wire harness ties at intervals along the coil. Refer to Figure 27. Refer to Subject 20-10-11 for the procedure to assemble a lacing tape wire harness tie.

**NOTE:** More wire harness ties can be assembled to hold the shape of the coil.

- (7) Attach the coil at the location of the nearest clamp on the wire harness.

**NOTE:** A satisfactory alternative is to put the coil against the wire harness and assemble the necessary wire harness ties.

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1. GENERAL DATA

A. Safety Precautions

**WARNING:** IF THE EQUIPMENT IS ENERGIZED, THE INVISIBLE LIGHT FROM AN OPTICAL FIBER CAN BE SUFFICIENTLY INTENSE TO CAUSE DAMAGE TO THE EYES. BEFORE THE FACE OF THE CONNECTOR OR THE TERMINI ARE EXAMINED, EITHER OF THESE CONDITIONS MUST OCCUR:

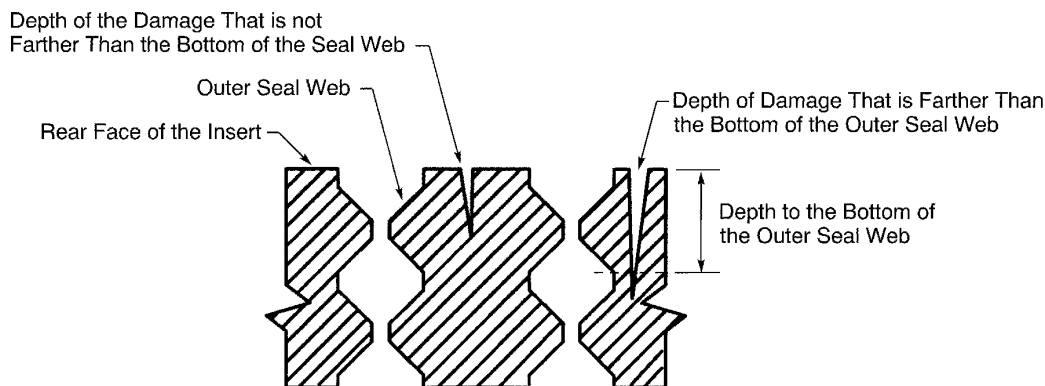
- THE CONNECTORS MUST BE DISCONNECTED FROM THE EQUIPMENT AT BOTH ENDS OF THE CABLE ASSEMBLY
- THE POWER TO THE EQUIPMENT MUST BE SET TO THE OFF CONDITION

(1) Set the power to all the interface equipment to the off condition.

B. Damage Conditions - Rear Face of the Insert

The connector must be replaced when one or more of these conditions occur:

- The depth of the damage extends farther than the bottom of the outer seal web. Refer to Figure 1.
- The damage extends from one contact terminus cavity to a different contact terminus cavity. Refer to Figure 2.
- The damage extends from one contact terminus cavity to the outer edge of the insert. Refer to Figure 2.



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REAR FACE OF THE INSERT - DEPTH OF DAMAGE

Figure 1

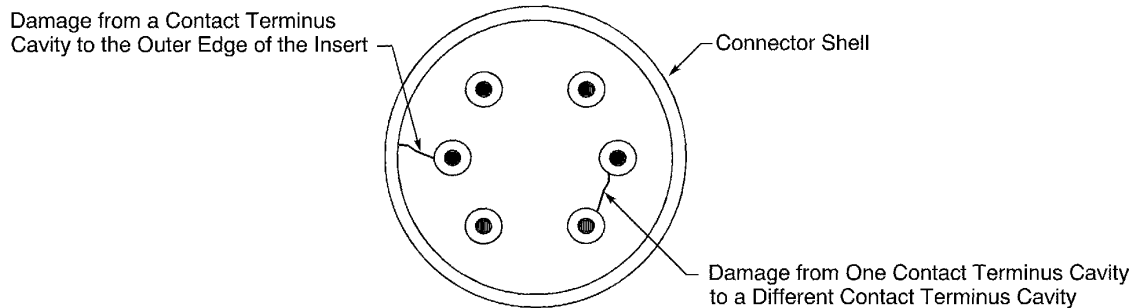
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#### REAR FACE OF THE INSERT - LENGTH OF DAMAGE

Figure 2

#### C. Damage Conditions - Fiber Optic Cable Assembly

The cable assembly must be replaced when one or more of these conditions occur:

- The fiber optic cable has damage that makes the cable assembly unserviceable. Refer to Subject 20-12-20
- The contact terminus has damage. Refer to Subject 20-12-20.

## 2. PART NUMBERS AND DESCRIPTION

### A. Connector Part Numbers

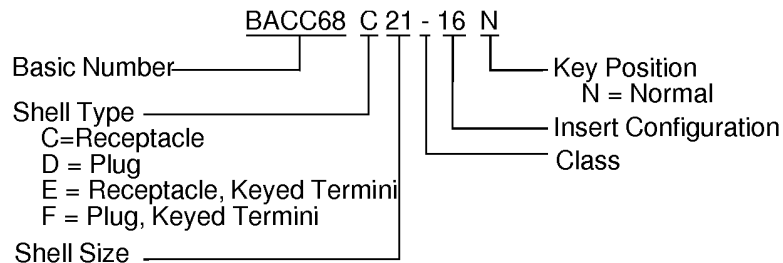
Table 1  
CONNECTOR PART NUMBERS

Boeing Standard	Type	Accepts Cable Type
BACC68C()	Receptacle	BACC69AAA()
BACC68D()	Plug	BACC69AAA()
BACC68E()	Receptacle	BACC69A(), BACC69C()
BACC68F()	Plug	BACC69A(), BACC69C()

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**BACC68C(), BACC68D(), BACC68E(), AND BACC68F() CONNECTOR PART NUMBER STRUCTURE**

Figure 3

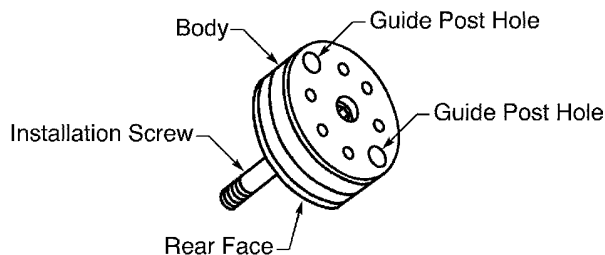
Table 2  
**APPROVED SUPPLIERS OF BOEING STANDARD CONNECTORS**

Connector	Supplier
BACC68C()	Radiall
BACC68D()	Radiall
BACC68E()	Radiall
BACC68F()	Radiall

**B. Fiber Optic Alignment Sleeve Insert Part Numbers**

Table 3  
**ALIGNMENT SLEEVE INSERT PART NUMBERS**

Boeing Standard	Configuration	Connector Shell Size	Quantity of Termini	Used With Connectors
BACI10AU02C	Circular, Aluminum body	11	2	BACC68E/F - Keyed
BACI10AU02CP	Circular, Thermoplastic body			
BACI10AU06C	Circular, Aluminum body	15	6	BACC68C/D - Non Keyed and BACC68E/F - Keyed
BACI10AU06CP	Circular, Thermoplastic body			



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**ALIGNMENT SLEEVE INSERT**

Figure 4

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**Table 4**  
**APPROVED SUPPLIERS OF BOEING STANDARD ALIGNMENT SLEEVE INSERTS**

Alignment Sleeve Insert	Supplier
BACI10AU06C	Radiall
BACI10AU06CP	Radiall
BACI10AU02C	Radiall
BACI10AU02CP	Radiall

**C. Connector Description**

The BACC68C, BACC68D, BACC68E, and BACC68F connectors have these technical features:

- A metal, M38999 type circular connector shell
- Size 16 contact terminus cavities
- Rear release and rear removal of contact termini.

The BACC68D and BACC68F connectors have these extra features:

- A removable alignment sleeve insert
- Two guide posts for the alignment sleeve insert
- A self-locking threaded coupling ring.

The BACC68E and BACC68F connectors have this extra feature:

- The inserts have terminus contact cavities with terminus keyway mark.

**D. Fiber Optic Contact Terminus Part Numbers**

**Table 5**  
**FIBER OPTIC CONTACT TERMINUS PART NUMBERS**

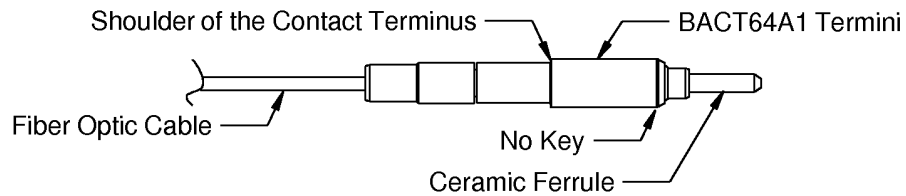
Cable Assembly	Contact Terminus		
	Type	Size	Part Number
BACC69()AA	A(Non-keyed)	16	BACT64A1
BACC69()CC	C(Keyed)	16	BACT64A2
BACC69()AC	A(Non-keyed),C(Keyed)	16	BACT64A1,BACT64A2

**NOTE:** The BACT64A() terminus is part of the cable assembly and cannot be removed. If it is necessary to replace a terminus, the cable assembly must be replaced. Refer to Subject 20-12-20 for the cable assembly part numbers.

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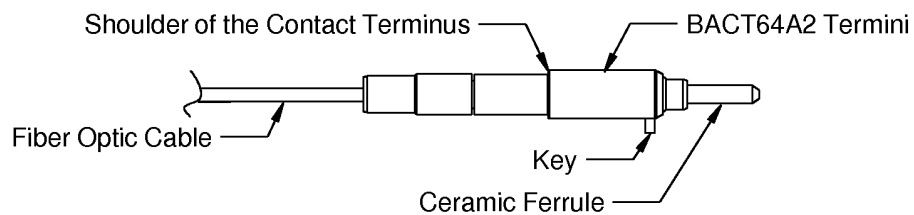
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2447749 S00061544195\_V1

**FIBER OPTIC CONTACT TERMINUS FOR BACC68C AND BACC68D CONNECTORS**

**Figure 5**



2448201 S00061544196\_V1

**FIBER OPTIC CONTACT TERMINUS FOR BACC68E AND BACC68F CONNECTORS**

**Figure 6**

**E. Backshell Part Numbers**

**Table 6**  
**BACKSHELL PART NUMBERS**

Part Number	Supplier
M85049-38S15W	QPL

**3. INSERT CONFIGURATIONS**

**A. BACC68C and BACC68D Connectors**

**NOTE:** Figure 8 shows the rear face of the insert for the plug connector. The view of the rear face of the insert for the receptacle connector is a mirror image of this view.

**Table 7**  
**CONNECTOR INSERT CONFIGURATIONS**

Insert Configuration	Contact Terminus Cavity		Reference
	Count	Size	
11-02	2	16	Figure 7 (Keyed)

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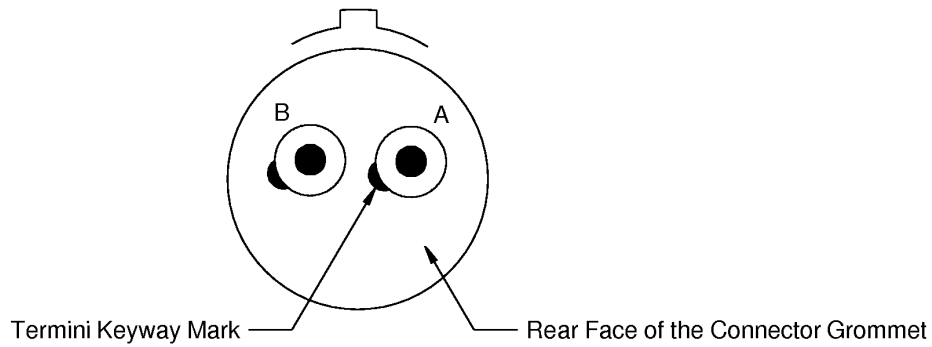


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**Table 7 CONNECTOR INSERT CONFIGURATIONS (Continued)**

Insert Configuration	Contact Terminus Cavity		Reference
	Count	Size	
15-06	6	16	Figure 8 (Non-keyed)
15-06	6	16	Figure 9 (Keyed)



2449237 S00061544213\_V1

**11-02 INSERT CONFIGURATION FOR BACC68E (MIRROR IMAGE) AND BACC68F CONNECTORS**  
**Figure 7**

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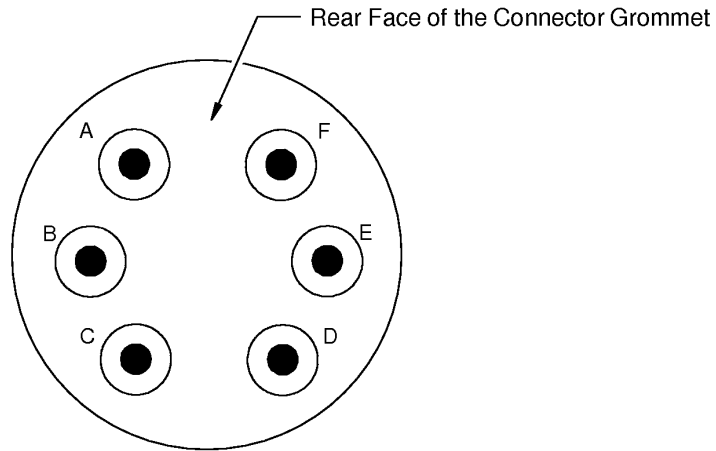




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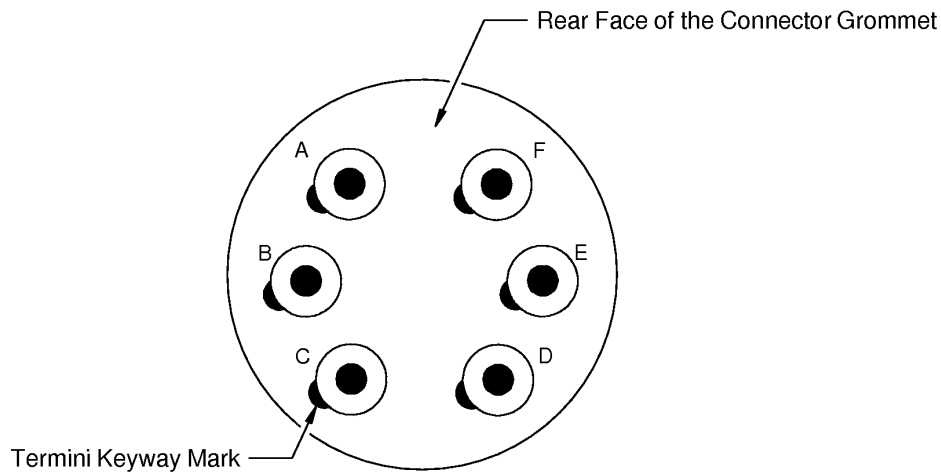
### BACC68C, BACC68D, BACC68E, AND BACC68F FIBER OPTIC CONNECTORS



2447750 S00061544214\_V1

#### 15-06 INSERT CONFIGURATION FOR BACC68C (MIRROR IMAGE) AND BACC68D CONNECTORS

Figure 8



2448198 S00061544215\_V1

#### 15-06 INSERT CONFIGURATION FOR BACC68E (MIRROR IMAGE) AND BACC68F CONNECTORS

Figure 9

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**4. CONNECTOR DISASSEMBLY**

**A. Backshell Removal**

- (1) Loosen the screws of the strain relief clamp.
- (2) Turn the coupling ring of the backshell in counterclockwise direction until the backshell is disengaged from the connector shell.
- (3) Move the backshell rearward away from the connector.

**B. Contact Terminus Removal for BACC69C()A, BACC69C()C, BACC69C()E, BACC69C()F, BACC69AA() and BACC69AC() (Simplex) Fiber Optic Cable Assemblies**

This paragraph gives the procedure to remove a size 16 fiber optic contact terminus that is part of a simplex fiber optic cable assembly from a connector.

Refer to:

- Paragraph 4.C. for the procedure to remove a size 16 contact terminus that is part of a duplex fiber optic cable assembly from a connector.
- Subject 20-12-20 for the fiber optic cable assembly part numbers and descriptions.

**CAUTION:** THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 8**  
**CONTACT TERMINUS REMOVAL TOOLS**

Terminus Size	Removal Tool	
	Part Number	Color
16	M81969/14-03	White
16	DRK83-16	Blue with White Dot

- (1) Make a selection of a contact terminus removal tool from Table 8.

**CAUTION:** DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the wire harness ties that are less than 6 inches from the connector.
- (3) At the rear of the connector, put the tip of the removal tool on the cable.
- (4) Axially align the removal tool and contact terminus cavity.
- (5) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

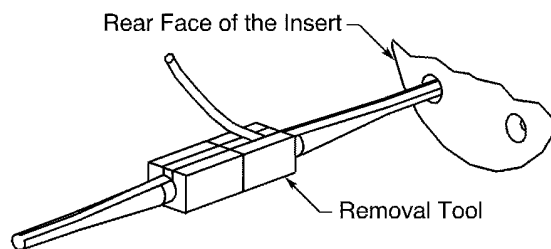
- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL UNTIL IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

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2447751 S00061544219\_V1

**POSITION OF THE REMOVAL TOOL IN THE CONTACT TERMINUS CAVITY**

**Figure 10**

- (6) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out of the terminus cavity from the rear of the insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DOT NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH A FINGER OR ANOTHER ITEM DURING THE REMOVAL PROCESS. CONTAMINATION OF THE FRONT FACE OF THE TERMINUS CAN OCCUR.

- (7) If the contact terminus is not released:
- (a) Carefully remove the tool.
  - (b) Turn the tool approximately 90 degrees on the cable assembly.
  - (c) Do Step 4.B.(3) through Step 4.B.(6) again.

- (8) Put a clean protection cap on the contact terminus.

Refer to Subject 20-12-20 for the protection cap part numbers.

**NOTE:** A clean plastic bag is a satisfactory alternative for the protection cap.

- (9) Put the connector in a clean plastic bag.

**CAUTION:** THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

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#### C. Contact Terminus Removal for BACC69C()B and BACC69C()D (Duplex) Fiber Optic Cable Assemblies

This paragraph gives the procedure to remove a size 16 fiber optic contact terminus that is part of a duplex fiber optic cable assembly from a connector.

Refer to:

- Paragraph 4.B. for the procedure to remove a size 16 contact terminus that is part of a simplex fiber optic cable assembly from a connector.
- Subject 20-12-20 for the fiber optic cable assembly part numbers and descriptions.

**CAUTION:** THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A SEALED CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (1) Make a selection of a contact terminus removal tool from Table 8.

**CAUTION:** DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the wire harness ties that are less than 6 inches from the connector.

**NOTE:** If it is necessary to remove a fiber optic terminus, then you must remove both termini on the BACC69C() or BACC69C()B fiber optic cable assembly.

- (3) Pull out both contact termini half way through the cavities one by one:

**CAUTION:** FULLY REMOVING ONE TERMINUS OF A BACC69CCC()B OR BACC69CCC() FIBER OPTIC CABLE ASSEMBLY WITHOUT HAVING THE OTHER TERMINI HALF WAY PULLED OUT CAN DAMAGE THE FIBER OPTIC CABLE.

- (a) At the rear of the connector, put the tip of the removal tool on one of the cables.
- (b) Axially align the removal tool and contact terminus cavity.
- (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert just until the rear of the terminus is approximately even with the rear face of the connector insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

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**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH A FINGER OR ANOTHER ITEM DURING THE REMOVAL PROCESS. CONTAMINATION OF THE FRONT FACE OF THE TERMINUS CAN OCCUR.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (3a) through Step (3d) again.
  - (f) Pull the removal tool fully out of the terminus cavity without removing the terminus.
  - (g) Repeat Step (3a) through Step (3d) for the other termini on the BACC69C() or BACC69C()B assemblies until both the termini are half way pulled out.
- (4) Remove the identified contact termini fully:
- (a) At rear of the connector, put the tip of the removal tool on the identified cable.
  - (b) Axially align the removal tool and contact terminus cavity.
  - (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert until the terminus is fully out of the connector insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH A FINGER OR ANOTHER ITEM DURING THE REMOVAL PROCESS. CONTAMINATION OF THE FRONT FACE OF THE TERMINUS CAN OCCUR.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (4a) through Step (4d) again.
  - (f) Pull the removal tool fully out of the terminus cavity without removing the terminus.
- (5) Fully remove the other contact termini on the BACC69C() or BACC69C()B fiber optic cable assembly:

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- (a) At rear of the connector, put the tip of the removal tool on the cable.
- (b) Axially align the removal tool and contact terminus cavity.
- (c) Push the removal tool into the contact terminus cavity until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

- (d) Hold the cable against the tool and, at the same time, carefully pull the tool and the contact terminus out towards the rear connector insert until the terminus is fully out of the connector insert.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE REMOVAL TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** MAKE SURE NOT TO TOUCH THE FRONT FACE OF THE TERMINUS WITH A FINGER OR ANOTHER ITEM DURING THE REMOVAL PROCESS. CONTAMINATION OF THE FRONT FACE OF THE TERMINUS CAN OCCUR.

- (e) If the contact terminus is not released, remove the tool and turn it approximately 90 degrees on the cable assembly. Do Step (5a) through Step (5d) again.
- (6) Put a clean protection cap on the contact termini.

Refer to Subject 20-12-20 for the protection cap part numbers.

**NOTE:** A clean plastic bag is a satisfactory alternative for the protection cap.

- (7) Put the connector in a clean plastic bag.

**CAUTION:** THE CONNECTORS MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

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**D. Seal Plug and Seal Rod Removal**

**Table 9**  
**NECESSARY TOOLS**

Tool	Type
Pliers	Needle Nose

- (1) Make a selection of pliers from Table 9.

**CAUTION:** MAKE SURE THAT THE PLIERS HAVE SMOOTH SURFACES AND NO SHARP EDGES. PLIERS WITH A ROUGH SURFACE OR A SHARP EDGE CAN CAUSE DAMAGE TO THE REAR GROMMET.

- (2) Remove the wire harness ties, that are less than 6 inches from the connector, from the wire harness.
- (3) Tightly hold the end of the seal plug or the seal rod in the jaws of the pliers.
- (4) Pull the seal plug or the seal rod out of the contact cavity.

**E. Removal of the Alignment Sleeve Insert**

**CAUTION:** DO NOT PULL, SHAKE, OR TWIST THE ALIGNMENT SLEEVE INSERT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

**Table 10**  
**NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Make a selection of a driver from Table 10.

**NOTE:** The driver can have a ball type end.

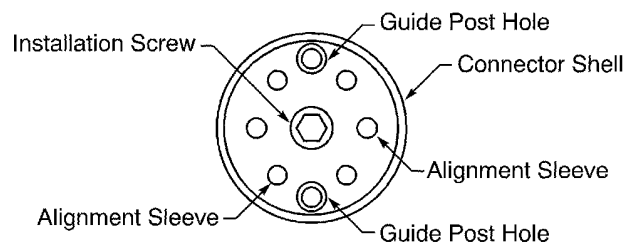
- (2) Turn the installation screw in a counterclockwise direction until the screw is disengaged from the face of the connector.

**CAUTION:** DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT TO REMOVE IT FROM THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

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**FRONT FACE OF THE ALIGNMENT SLEEVE INSERT**

**Figure 11**

- (3) Put the alignment sleeve insert in a clean plastic bag.

**CAUTION:** KEEP THE ALIGNMENT SLEEVE INSERT IN A CLEAN PLASTIC BAG UNTIL IT IS INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**5. CONNECTOR ASSEMBLY**

**A. Installation of the Alignment Sleeve Insert**

**NOTE:** The alignment sleeve insert can be installed before or after the contact termini are installed in the connector.

**Table 11**  
**NECESSARY TOOLS**

Tool	Type	Size (inch)
Driver	Allen Wrench	5/64
	Screwdriver, Hex	5/64
Torque	Allen Wrench	5/64
	Screwdriver, Hex	5/64

- (1) Examine the alignment sleeve insert. Refer to Paragraph 7.B..
- (2) Make a selection of these tools from Table 11:
- A driver
  - A torque tool.

**NOTE:** The driver can have a ball type end.

- (3) Align the guide post holes in the rear face of the alignment sleeve insert with the two guide posts in the engaging face of the connector.

**CAUTION:** DO NOT SHAKE OR TWIST THE ALIGNMENT SLEEVE INSERT WHEN IT IS INSTALLED IN THE CONNECTOR. DAMAGE TO THE CERAMIC FERRULES OF THE CONTACT TERMINI CAN OCCUR.

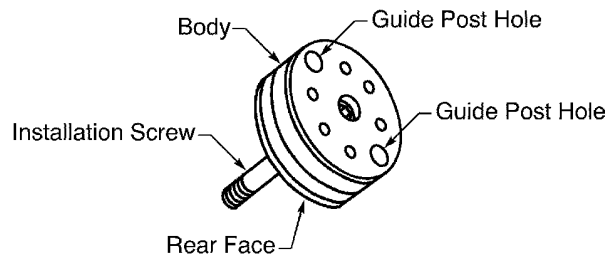
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**ALIGNMENT SLEEVE INSERT**

**Figure 12**

- (4) Fully engage the threads of the installation screw and the screw hole in the connector.
- (5) Torque the screw 2.0 inch-pounds  $\pm 0.2$  inch-pound.

**B. Contact Terminus Insertion for BACC69C()A, BACC69C()C, BACC69C()E, BACC69C()F, BACC69AA() and BACC69AC() Fiber Optic Cable Assemblies**

**NOTE:** A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

**CAUTION:** THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**Table 12  
CONTACT TERMINUS INSERTION TOOLS**

Terminus Size	Insertion Tool	
	Part Number	Color
16	M81969/14-03	Blue
16	DAK83-16	Blue

- (1) Make a selection of a contact terminus insertion tool from Table 12.

**CAUTION:** DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (2) Remove the protection from the contact terminus.
- (3) Carefully put the insertion tool on the cable and the contact terminus.

**CAUTION:** THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

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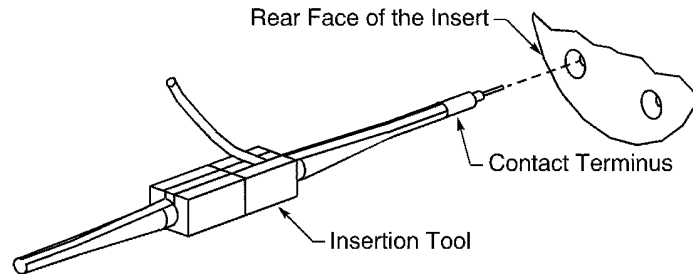


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**CAUTION:** DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (4) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity. Refer to Figure 13



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#### ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY Figure 13

- (5) When installing a BACT64A2 Terminus, align the key on the terminus (refer to Figure 6) with the keyway orientation mark on the rear face of the connector insert. Refer to Figure 9
- (6) Carefully push the insertion tool and the contact terminus into the terminus cavity to until it stops. Make sure that:
- The tool stays aligned with the cavity
  - The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

- (7) Carefully pull the insertion tool out of the terminus cavity. Make sure that:
- The tool stays aligned with the cavity
  - The tool is not turned in the cavity.
- (8) Lightly pull the cable to make sure that the terminus is locked in the terminus cavity.

**CAUTION:** DO NOT PULL THE CABLE WITH A STRONG OF A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

**CAUTION:** DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (9) If the terminus is not locked in the cavity:

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- (a) Pull the terminus out of the cavity.
  - (b) Do Step 5.B.(3) through Step 5.B.(8) again.
- (10) If the connector is not connected immediately, put the connector in a clean plastic bag.

**CAUTION:** THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

**C. Contact Terminus Insertion for BACC69C() and BACC69C()B Fiber Optic Cable Assemblies**

**NOTE:** A contact terminus can be installed before or after the alignment sleeve insert is installed in the connector.

**CAUTION:** THE CONTACT TERMINUS MUST HAVE PROTECTION FROM CONTAMINATION WITH A PROTECTION CAP OR A CLEAN PLASTIC BAG WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

- (1) Remove the protection from the contact terminus.
- (2) Align the key on the terminus with the keyway orientation mark on the rear face of the insert. Refer to Figure 6
- (3) Carefully insert each terminus of a BACC69C() or BACC69C()B fiber optic cable assembly by hand into the appropriate terminus cavity until the rear of the terminus is just inside the insert.

**NOTE:** To prevent the terminus from rotating during installation, the terminus must be partially inserted by hand to ensure the key on the terminus is in the keyway of the terminus cavity of the insert.

**NOTE:** Pushing too hard on the fiber can damage the fiber optic cables.

- (4) Make a selection of a contact terminus insertion tool from Table 12.

**CAUTION:** DO NOT USE AN INSERTION TOOL THAT HAS A DEFECT. DAMAGE TO THE GROMMET OR THE RETENTION CLIPS CAN OCCUR.

- (5) Carefully put the insertion tool on one of the cables and the contact terminus to be inserted.

**CAUTION:** THE CONTACT TERMINUS MUST BE INSTALLED IN THE CONNECTOR IF IT DOES NOT HAVE PROTECTION FROM CONTAMINATION. CONTAMINATION OF THE CONTACT TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**CAUTION:** DO NOT TOUCH THE FRONT FACE OF THE TERMINUS. CONTAMINATION ON THE TERMINUS CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

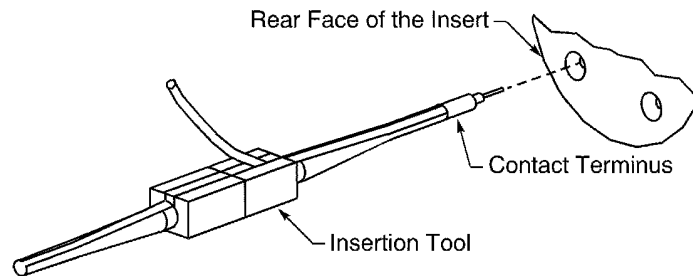
- (6) At the rear of the connector, axially align the insertion tool and the terminus with the contact terminus cavity. Refer to Figure 13.

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#### ALIGNMENT OF THE CONTACT TERMINUS, THE INSERTION TOOL, AND THE CONTACT TERMINUS CAVITY

Figure 14

- (7) Carefully push the insertion tool and the contact terminus into the terminus cavity to until it stops.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

**CAUTION:** DO NOT TURN THE REMOVAL TOOL WHILE IT IS IN THE CAVITY. IF THE INSERTION TOOL IS TURNED WHILE IT IS IN THE CAVITY, DAMAGE TO THE CONNECTOR CAN OCCUR.

**CAUTION:** DO NOT PUSH THE CABLE. DAMAGE TO THE FIBER OPTIC CABLE CAN OCCUR.

- (8) Carefully pull the insertion tool out of the terminus cavity.

Make sure that:

- The tool stays aligned with the cavity
- The tool is not turned in the cavity.

- (9) Remove the insertion tool from the cable.

- (10) Repeat Step 5.C.(6) through Step 5.C.(9) for other cable with termini on the BACC69C() or BACC69C()B fiber optic cable assembly.

- (11) Lightly pull the cable of each fiber optic cable of the BACC69C() or BACC69C()B to make sure that the termini are locked in the termini cavity.

**CAUTION:** DO NOT PULL THE CABLE WITH A STRONG OF A SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE TERMINUS, THE CABLE, OR THE CONNECTOR.

**CAUTION:** DO NOT MAKE A DENT IN THE CABLE JACKET WITH THE FINGERNAILS. DAMAGE TO THE CABLE JACKET CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CABLE.

- (12) If the terminus is not locked in the cavity, do Step 5.C.(5) through Step 5.C.(9) again.

- (13) If the connector is not connected immediately, put the connector in a clean plastic bag.

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**CAUTION:** THE CONNECTOR MUST HAVE PROTECTION FROM CONTAMINATION WHEN THE CONNECTOR IS NOT CONNECTED. UNSATISFACTORY PERFORMANCE OF THE CONNECTOR CAN OCCUR.

**D. Seal of an Empty Contact Terminus Cavity**

An empty contact terminus cavity must be sealed with a seal plug or a seal rod. Refer to Subject 20-60-08.

**NOTE:** The size of the contact terminus cavity is equivalent to a size 16 contact cavity.

**E. Backshell Assembly**

Refer to Subject 20-60-09.

**6. CONNECTOR INSTALLATION**

**A. Plug and Receptacle Connection**

Refer to Subject 20-60-06.

**7. INSPECTION AND CLEANING OF A FIBER OPTIC ALIGNMENT SLEEVE INSERT**

**A. Necessary Tools and Materials**

**Table 13**  
**NECESSARY TOOLS**

Tool	Description	Part Number	Supplier
Air, Canned	Tetrafluoroethane	ES1620	Chemtronics
	Compressed air	ES1015	Chemtronics
		ES1020	Chemtronics
		Air express 340 GRP	Prolicom

**Table 14**  
**SOLVENTS**

Solvent	Specification	Supplier
Alcohol, Ethyl	O-E-760	An available source
Alcohol, Isopropyl	TT-I-735	An available source
CleanBlast Systems Solvent (TBL695)	FCLP-SOL1	JDSU
	HFE-72DA	3M
Water, Distilled	-	An available source

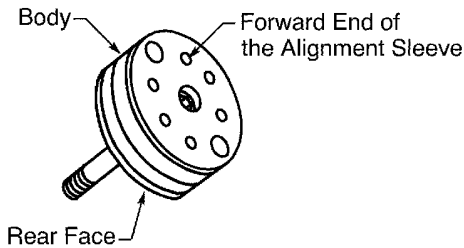
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B. Inspection and Cleaning



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**ALIGNMENT SLEEVE INSERT**  
**Figure 15**

Refer to Figure 15.

- (1) Without magnification, examine each end of the alignment sleeves of the insert.

**NOTE:** If the alignment sleeve insert is clean, it can be installed in the connector.

**CAUTION:** A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**NOTE:** A clean plastic bag is a satisfactory protection from contamination.

- (2) If an alignment sleeve has contamination, clean the sleeve without solvent. Refer to Paragraph 7.C..
- (3) If an alignment sleeve is broken, replace the BACI10AU() alignment sleeve holder with an equivalent BACI10AU() alignment sleeve holder and install it. Refer to Paragraph 5.A..
- (4) Without magnification, examine each end of the alignment sleeves again.

**NOTE:** If the alignment sleeve insert is clean, it can be installed in the connector.

**CAUTION:** A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**NOTE:** A clean plastic bag is a satisfactory protection from contamination.

- (5) If an alignment sleeve has remaining contamination, clean the sleeve with solvent. Refer to Paragraph 7.D..
- (6) Without magnification, examine each end of the alignment sleeves again.

**NOTE:** If the alignment sleeve insert is clean, it can be installed in the connector.

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**CAUTION:** A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**NOTE:** A clean plastic bag is a satisfactory protection from contamination.

- (7) If an alignment sleeve has remaining contamination, clean the sleeve with solvent again. Refer to Paragraph 7.D..
- (8) Without magnification, examine the alignment sleeves again.

**NOTE:** If the alignment sleeve insert is clean, it can be installed in the connector.

**CAUTION:** A CLEAN ALIGNMENT SLEEVE INSERT MUST HAVE PROTECTION FROM CONTAMINATION WHEN IT IS NOT INSTALLED IN THE CONNECTOR. CONTAMINATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE CONNECTOR.

**NOTE:** A clean plastic bag is a satisfactory protection from contamination.

- (9) If an alignment sleeve has remaining contamination, replace the alignment sleeve insert. Refer to Paragraph 5.A..

#### C. Contamination Removal - Without Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 7.B.

Refer to Figure 15.

- (1) Make a selection of canned air from Table 13.

**NOTE:** An equivalent canned air is a satisfactory alternative.

- (2) Apply the canned air in each alignment sleeve that has contamination.

#### D. Contamination Removal - With Solvent

For the conditions that are applicable for this procedure, refer to Paragraph 7.B.

**WARNING:** SOME SOLVENTS ARE FLAMMABLE. MAKE SURE THAT THE QUANTITY OF A FLAMMABLE SOLVENT NEAR THE AIRPLANE IS NOT MORE THAN THE QUANTITY THAT IS NECESSARY TO CLEAN THE ALIGNMENT SLEEVE INSERT.

Refer to Figure 15.

- (1) Make a selection of a canned air from Table 13.

**NOTE:** An equivalent canned air is a satisfactory alternative.

- (2) Make a selection of these solvents from Table 14:

- An alcohol
- Distilled water.

- (3) Put a quantity of alcohol in a small container that can be sealed with a lid.

Make sure that:

- The container is clean
- The size of the container is sufficient to hold the alignment sleeve insert

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- The quantity of alcohol is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.
- (4) Put a quantity of distilled water in a small container that can be sealed with a lid.  
Make sure that:
  - The container is clean
  - The size of the container is sufficient to hold the alignment sleeve insert
  - The quantity of distilled water is sufficient to put the body of the alignment sleeve insert below the surface of the alcohol.
- (5) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.  
Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.
- (6) Remove the alignment sleeve insert from the alcohol.
- (7) Seal the alignment sleeve insert in the container that has distilled water.  
Make sure that the body of the alignment sleeve insert is below the surface of the distilled water.
- (8) Lightly shake the container for 1 to 3 minutes.
- (9) Remove the alignment sleeve insert from the water.
- (10) Dry the alignment sleeve insert with the canned air.
- (11) Put the alignment sleeve insert in the container that has alcohol for 30 seconds minimum.  
Make sure that the body of the alignment sleeve insert is below the surface of the alcohol.
- (12) Remove the alignment sleeve insert from the alcohol.
- (13) Dry the alignment sleeve insert with the canned air.

#### 8. APPROVED TOOL SUPPLIERS

##### A. Contact Terminus Removal Tools

Table 15  
CONTACT TERMINUS REMOVAL TOOL SUPPLIERS

Removal Tool	Supplier
M81969/14-03	QPL
DRK83-16	Daniels Manufacturing Corporation (DMC)

##### B. Contact Terminus Insertion Tools

Table 16  
CONTACT TERMINUS INSERTION TOOL SUPPLIERS

Insertion Tool	Supplier
M81969/14-03	QPL
DAK83-16	Daniels Manufacturing Corporation (DMC)

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