

Table of Contents

Expanded Beam Fiber Optic Products 64, 65

Connector/Cable Assembly Nomenclature 66

Pro Beam Connector and Pro Beam Jr. Expanded Beam Connectors and Cable Assemblies for Field-Deployable Communications

 Introduction 67

 Typical Dimensions for Pro Beam Jr. Connectors 68

 Typical Dimensions for Pro Beam Connectors 69

Pro Beam Connector and Pro Beam Jr. Connector Accessories

 Cable Adapter Kits and Spare Parts 70

 Reels and Reel Stands for Field-Deployable Cable Assemblies 71

Pro Beam/Pro Beam Jr. Connector Kit and Component Cross Reference 72

ARINC 600 and ARINC 404 Connectors with Expanded Beam Fiber Optic Inserts 73-75



Note:
For the Expanded Beam Product Family, consult Tyco Electronics for Design guidance & production availability.

Introduction

Product Facts

- ARINC 600 and 404 connectors, with inserts/holder blocks designed for Mini-Expanded Beam inserts — up to 128 channels
- MIL-C-38999 Series III shell size 13 and 11 style circular connectors — Cable assemblies up to 4 fibers
- Pro Beam Connector and Pro Beam Jr. Connector field-deployable interconnects
- Use 1 to 4 channel expanded beam inserts
- Tactical cables, cable reels, man-packs
- Cable assembly and termination services
- Non-contacting method of mating optical fibers
- No wear on fiber optic interface; Very vibration resistant
- Easy alignment for low-loss, repeatable performance
- Consistent overall optical “link budget”
- Low sensitivity to thermal fluctuations and interface contamination
- Repeatable low-loss performance in harsh environments
- Lenses expand, then focus and collimate light; Housed in high strength, high precision connectors
- Easy to handle, easy to clean. Durable connection that is more resistant to dirt/debris
- Common insert for 1- through 4-channels
- Allows modularity for up to 128 optical channels (ARINC 600 size 3)
- Singlemode or multimode
- Common 850, 1300, 1310, or 1550 nm wavelengths



Fiber Optic interconnect/cable system using Expanded Beam technology, which physically expands and collimates transmission signal into an optical beam over 14 times its original diameter (the cross sectional area of the light beam increases over 200 times for multimode optical signals. For singlemode signals, the collimated beam is over 45 times its original diameter

and the cross-sectional area of the light beam increases over 2,000 times.). It is then refocused back down onto the core of the receiving fiber. This concept provides ease of alignment and low sensitivity to thermal changes and contamination. High strength, precision connector housings enhance a durable connection, optimizing low loss and repeatable performance.

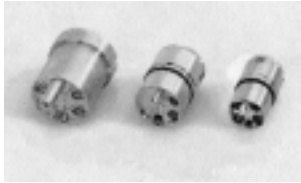
Suitable for aerospace, avionics, field-deployable communications, marine ship-to-shore applications, security systems, mobile diagnostic units, oil and gas exploration and other harsh environment applications demanding strength, durability and reliable performance in conditions of multiple coupling/decouplings, blindmate situations, and high vibration.

Note:

For the Expanded Beam Product Family, consult Tyco Electronics for Design guidance & production availability.

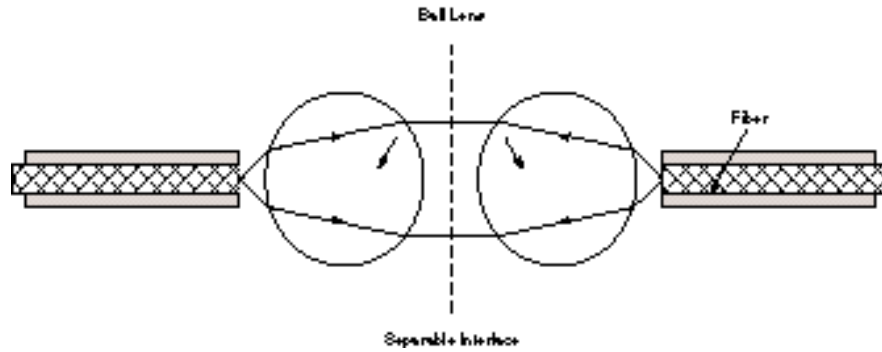
Introduction (Continued)

Expanded Beam Principle

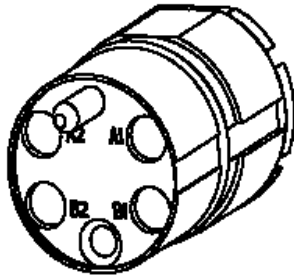


From left to right: Pro Beam insert, Pro Beam Jr. Expanded Beam insert, Mini-Expanded Beam insert.

- Light is expanded, collimated, and transmitted across an air gap
- Ball lens expands cross-sectional area of light over 200 times for multimode and over 2000 times for singlemode



Expanded Beam Inserts



- Unique patented Modular Design, for use with multimode and singlemode fiber
- Rugged hermaphroditic construction (i.e., same insert mates to each other)
- Three different insert sizes, up to four channels per insert
- Mini-Expanded Beam insert for multi-channel small form factor — the smallest expanded beam multi-channel insert in the industry, an AMP exclusive
- Physically non-contacting mating conditions; no wear
- Easy to terminate and easy to clean
- Simple termination procedure
- Low transmission loss

Expanded Beam Avionics-Related Standards and Specifications for ARINC 763 and 664

ARINC 763 — Avionics Network Server System

AMP ARINC 600 Connectors are designed to meet/exceed 100 Base-FX Ethernet LAN applications

Network Server Unit (NSU) — can use ARINC 600 Size 1 connector with up to 8 Expanded Beam fiber optic channels (two Mini-Expanded Beam inserts in cavity C)

Server Interface Unit (SIU) — can use ARINC 600 Size 3 connector with up to 16 Expanded Beam fiber optic channels (four Mini-Expanded Beam inserts in cavity F)

Integrated Network Server Unit (INSU) — can use ARINC 600 Size 3 connector with up to 16 Expanded Beam fiber optic channels (four Mini-Expanded Beam inserts in cavity F)

ARINC 664 — Aircraft Data Network

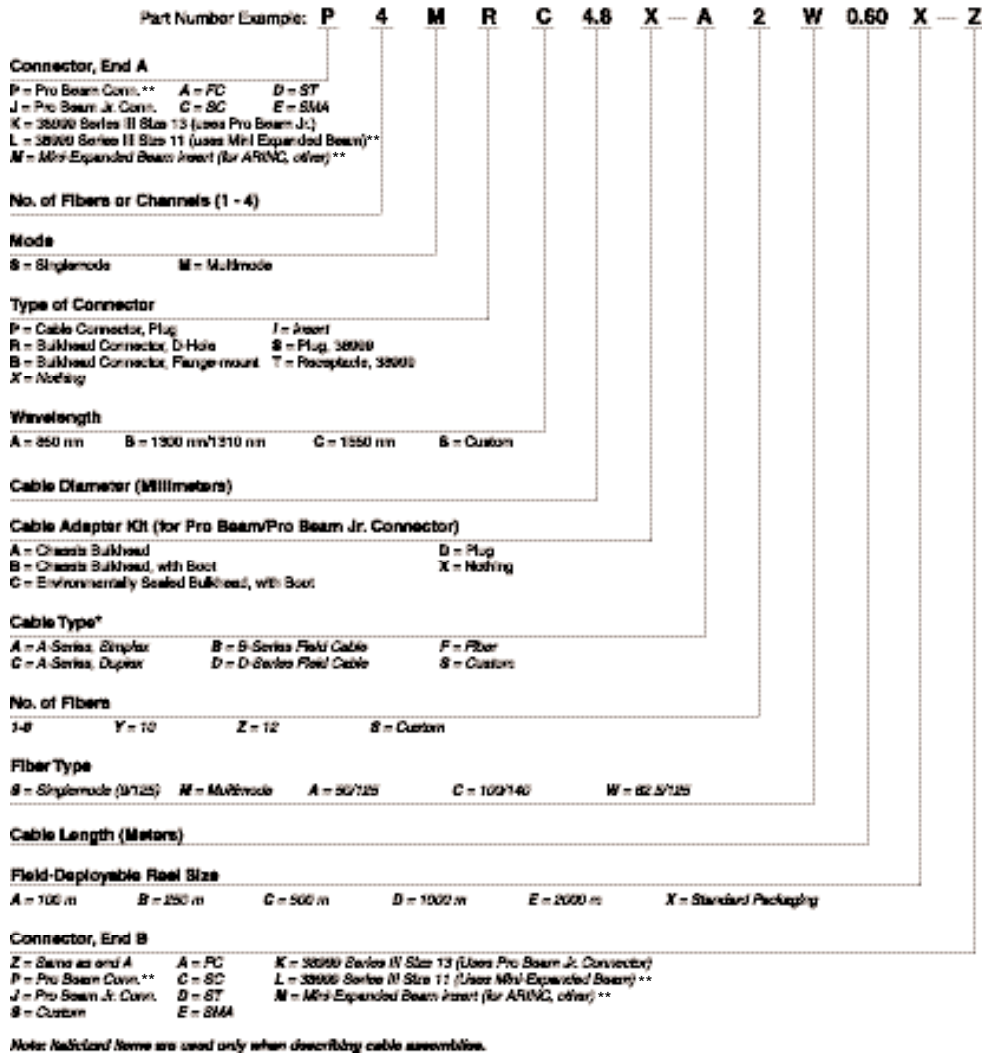
AMP ARINC Connectors with Mini-Expanded Beam inserts will meet/exceed all 100 Base-FX Ethernet LAN applications

Note:

For the Expanded Beam Product Family, consult Tyco Electronics for Design guidance & production availability.

2
Fiber Optic Connectors

Connector/Cable Assembly Nomenclature



To define a Pro Beam Connector, Pro Beam Jr. Connector, 38999 Expanded Beam Connector, or insert for ARINC Connector:

The first seven items define the connector and its cable adapter kit requirements.

Connector (Pro Beam Connector, Pro Beam Jr. Connector, 38999, or Mini-EB insert)

Number of Channels (1 through 4)

Singlemode or Multimode

Connector Type — Plugs or Bulkheads for Pro Beam Connector and Pro Beam Jr. Connector; Plugs or Receptacles for 38999. Mini-EB insert for ARINC Connector. For other items, this should be "X".

Wavelength — 850 nm or 1300 nm for Multimode use, 1310 nm or 1550 nm for Singlemode use. Custom capability, also.

Cable Diameter (mm) — Used to define the proper cable adapter kit for Pro Beam Connector and Pro Beam Jr. Connectors. This value should be "00" for all other connectors.

Cable Adapter Kit — For Pro Beam Connector and Pro Beam Jr. Connectors; three versions for bulkheads, one for plugs. For other items, this should be "X".

To define an Expanded Beam Cable Assembly:

All items at the left are used to define the connector/insert/ferrule on the "A" end.

To define the cable:

***Cable Type** — Indicates if tactical/field cable is needed. Terminology based on field cable from Optical Cable Corporation.

Number of Fibers — May indicate if multiple connectors/inserts/ferrules are needed on either end.

Cable Length

Field-Deployable Reel Size — Determines the type of reel for field use.

Connector, B End — Provides option for defining different connector, if not the same as the "A" end.

****Note:**

For the Expanded Beam Product Family, consult Tyco Electronics for Design guidance & production availability.

Introduction**Connectors and
Cable Assemblies****Product Facts**

- Singlemode and multimode connectors with proven high-performance during field use
- Easy termination suitable for field use
- Use 1 to 4 channel Expanded Beam inserts
- Cable connector plugs, standard bulkhead (d-hole cut out) and flange-mount bulkhead
- Cable connector plugs provide protection from harsh environments
- Cable adapter kits for bulkheads — standard, standard with boot, environmentally sealed with boot
- Descriptive nomenclature can be used to define connector and cable assembly requirements
- Spare parts are available
- Pro Beam Connector and Pro Beam Jr. Connectors are intermateable with other Expanded Beam Connectors in the market

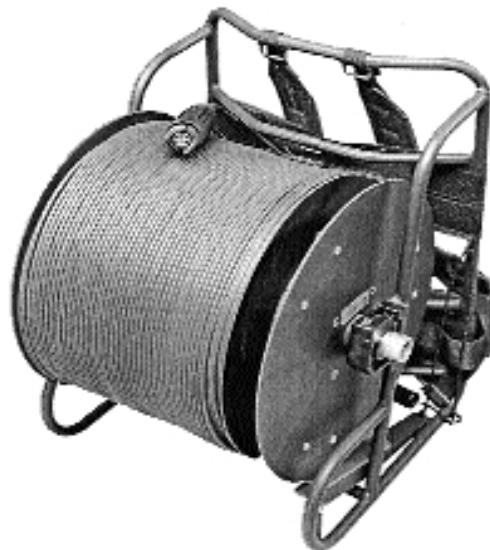


Plug

Bulkhead

**Cable Assemblies
and Accessories****Product Facts**

- Ruggedized cable assemblies custom-tailored for field use in harsh environments
- Heavy-duty lightweight cable reel organizes and protects connectors and cable for easy pay-out and safe storage
- Reels available in 500 meter and 2000 meter versions
- Options for 500 meter reels include special Man-Pack harnesses, a separate reel stand, or a combination reel and reel stand



Typical Dimensions for Pro Beam Jr. Connectors

Performance Specifications

Optical, Multimode

Insertion Loss, Typical —
0.3 - 0.8 dB @ 1300 nm

Optical, Singlemode Version

Insertion Loss, Typical —
0.4 - 0.9 dB @ 1310 nm

Return Loss — > 32 dB @ 1310 nm

Mechanical

Vibration, Sinusoidal — 10 - 500 Hz,
3 directions; 0.75 mm amplitude @ 10g
acceleration

Bump — 4,000 Bumps, 3 directions @
40g acceleration

Free Fall — 500 falls on concrete;
Severity 1.2 m

Coupling Endurance —
3,000 couplings

Weight —

Plug — 123 grams, typical
D-Hole bulkhead — 102 grams, typical

Temperature

Operational Temperature —
-40°C/+85°C

Storage Temperature —
-55°C/+85°C

Temperature, Cyclic — -55°C/+85°C

Damp Heat, Cyclic — +55°C

Corrosion

Salt — Conforms

Acid — Conforms

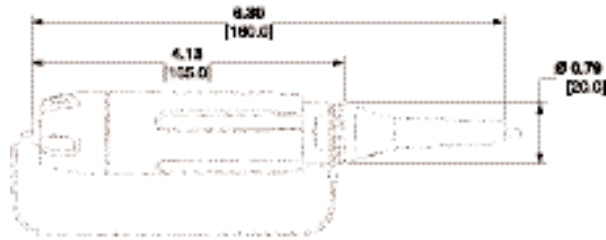
Immersion

Water — 5 m depth

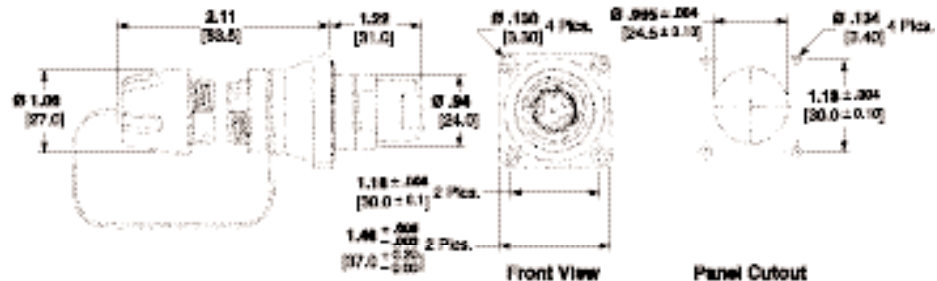
Mud — Conforms

Pressure

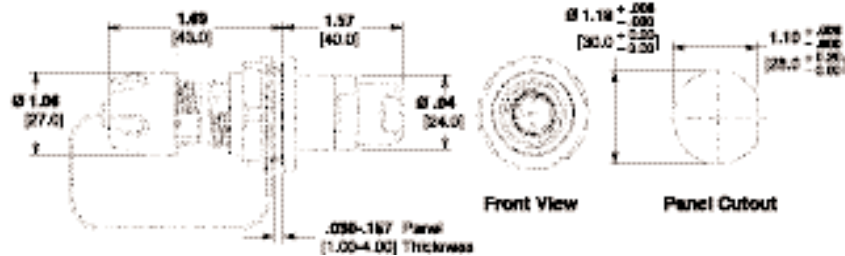
Low Pressure — 25 kPa @ -55°C



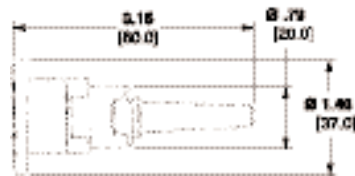
Cable Connector, Plug



Flange Mount Bulkhead,
Standard Cable Adapter



D-Hole Bulkhead,
Standard Cable Adapter



Standard Cable Adapter,
with Boot



Environmentally Sealed Cable Adapter,
with Boot

Typical Dimensions for Pro Beam Connectors

For Pro Beam designs, consult Tyco Electronics for availability.

Performance Specifications

Optical, Multimode

Insertion Loss, Typical —
0.5 - 1.0 dB @ 1300 nm

Optical, Singlemode

Insertion Loss, Typical —
0.5 - 1.0 dB @ 1310 nm

Return Loss — > 32 dB @ 1310 nm

Mechanical

Vibration, Sinusoidal — 10 - 500 Hz,
3 directions; 0.75 mm amplitude @ 10g
acceleration

Bump — 4,000 Bumps, 3 directions @
40g acceleration

Free Fall — 500 falls on concrete;
Severity 1.2 m

Coupling Endurance —
3,000 couplings

Weight —

Plug — 290 grams, typical

Chassis bulkhead — 150 grams, typical

Temperature

Operational Temperature —
-40°C/+85°C

Storage Temperature —
-55°C/+85°C

Temperature, Cyclic — -55°C/+85°C

Damp Heat, Cyclic — +55°C

Corrosion

Salt — Conforms

Acid — Conforms

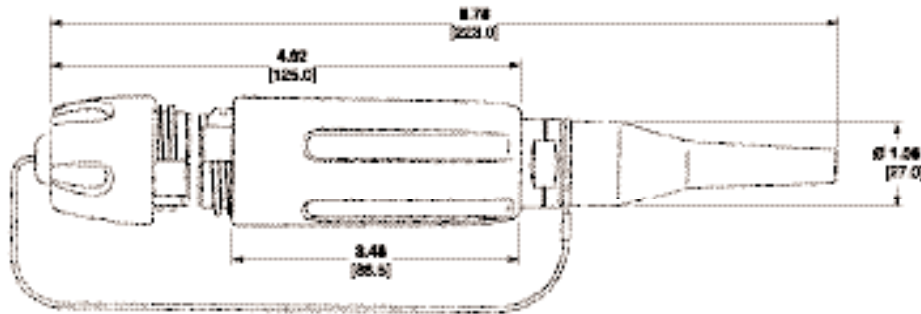
Immersion

Water — 5 m depth

Mud — Conforms

Pressure

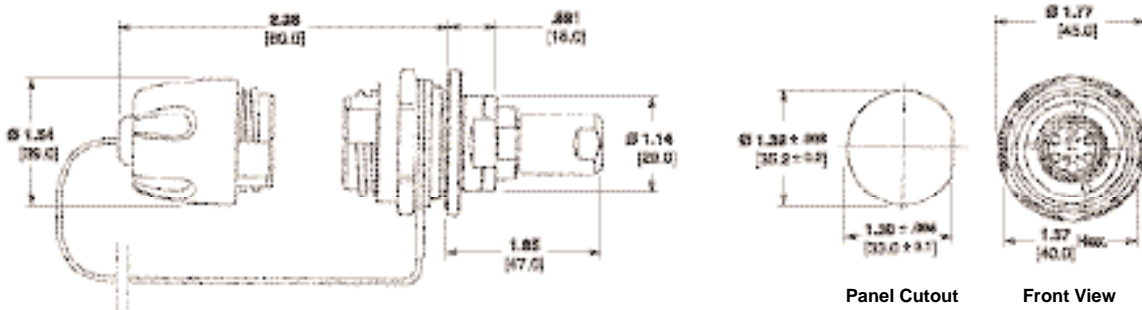
Low Pressure — 25 kPa @ -55°C



Cable Connector, Plug



Front View



D-Hole Bulkhead with Standard Cable Adapter

Panel Cutout

Front View

Also Square-flange Mount available, per drawing 1516133
(reference drawing for dimensions)

Use with the Pro Beam Connector and Pro Beam Jr. Connector and Cable Assemblies

Cable Adapter Kits

Composition of Typical Kits:

	Bulkhead, Standard Cable Adapter	Bulkhead, Standard Cable Adapter with Boot	Bulkhead, Environmentally Sealed Cable Adapter, with boot	Cable Plug
Screw	X	X		
Extension	X	X		
Crimp Sleeve	X	X	X	X
Support Tube	X	X	X	X
Boot		X	X	X
Flat Washer			X	X
Cable Seal			X	X
Rear Extension			X	
Jam Nut			X	
O-ring			X	

For Pro Beam Connector Plug

Cable Dia. (Max.)	AMP Part No.
.222 5.65	1515801-1*
.201 5.10	1515940-1*

For Pro Beam Connector Bulkhead

Cable Dia. (Max.)	Style	AMP Part No.
.222 5.65	Standard Cable Adapter	1515724-2*
.197 5.00	Standard Cable Adapter	1515847-1*

*Consult Tyco Electronics for availability.

For Pro Beam Jr. Connector Plug

Cable Dia. (Max.)	AMP Part No.
.122 3.10	1515814-1
.142 3.60	1515781-3
.161 4.10	1515848-2
.181 4.60	1516147-1
.201 5.10	1515834-2
.222 5.65	1515827-2
.240 6.10	1515859-3
.264 6.70	1588116-1

For Pro Beam Jr. Connector Bulkhead

Cable Dia. (Max.)	Style	AMP Part No.
.087 2.20	Standard Cable Adapter, with Boot	1515878-1
.122 3.10	Standard Cable Adapter	1515791-2
.126 3.20	Standard Cable Adapter, with Boot	1515810-3
.142 3.60	Standard Cable Adapter	1515808-1
.161 4.10	Environmentally Sealed Cable Adapter, with Boot	1515848-2
.165 4.20	Standard Cable Adapter, with Boot	1515839-2
.201 5.10	Standard Cable Adapter	1515835-2
.222 5.65	Standard Cable Adapter	1515829-1
.240 6.10	Standard Cable Adapter	1515796-2
4 x .118 4 x 3.00	Standard Cable Adapter	1515749-1

Spare Parts

Available from Tyco Electronics are components for spare parts and repair. These items include boots, seals, protective caps, crimp support tubes and ferrule assemblies with springs. Contact Tyco Electronics.

Protective Caps

Description	Part Number
Standard cap, for D-Hole Bulkhead, Pro Beam Jr. Connectors	1515868-1
Standard cap, for Flange-mount Bulkhead, Pro Beam Jr. Connectors	1515787-2
Standard cap, for connector plug, Pro Beam Jr. Connectors	1515867-1
Standard cap, for D-Hole Bulkhead, Pro Beam Connectors	1515726-2
Standard cap, for connector plug, Pro Beam Connectors	1515799-1
Standard cap, for Flange-mount Bulkhead, Pro Beam Connectors	1515769-1

Typical Reels and Reel Stands for Field-Deployable Cable Assemblies



Part Number 1515900-1



Part Number 1515756-1



Part Number 1515757-1

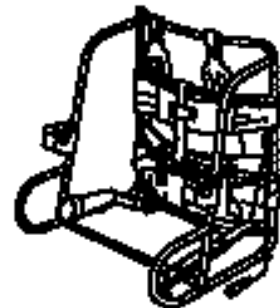
Cable Reels

Reel Capacity (2-fiber)	Max. Diameter	Width	Weight (kg)	Notes/Description	AMP Part No.
500 meters	13.78 350	11.42 290	6.4	Reel & Reel Stand Combination. Reel can be detached from stand without tools.	1515900-1*
500 meters	13.78 350	12.80 325	15.5	Fits on Man-Pack or Reel Stand	1515756-1*
2000 meters	21.65 550	17.91 455	58.5	For fixed installation on vehicle	1515757-1*

*Consult Tyco Electronics for availability.



Reel Stand
Part Number 1515758-1



Man-Pack Harness
Part Number 1515759-1

Accessories

Description	Dimension			Weight (kg)	AMP Part No.
	Height	Width	Length		
Reel Stand*	15.35 390	15.35 390	14.76 375	2	1515758-1**
Man-Pack Harness*	19.69 500	14.37 365	14.37 365	4.1	1515759-1**

*For use with Part Number 1515756-1 reel.

**Consult Tyco Electronics for availability.

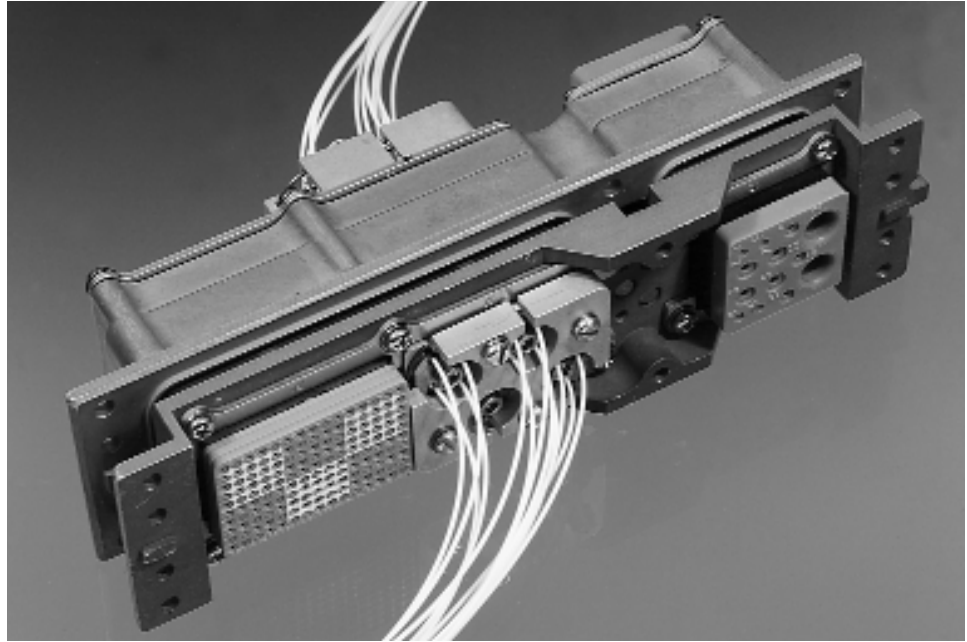
Pro Beam/Pro Beam Jr. Connector Kit and Component Cross

Descriptive Nomenclature	AMP Part No.	Connector	No. of Channels	Mode	Type	Wavelength
J1SPB	1515780-2	Pro Beam Jr.	1	Singlemode	Cable Plug	1310 nm
J1SPC	1588104-1	Pro Beam Jr.	1	Singlemode	Cable Plug	1550 nm
J1MPA	1588106-1	Pro Beam Jr.	1	Multimode	Cable Plug	850 nm
J1MPB	1588108-1	Pro Beam Jr.	1	Multimode	Cable Plug	1300 nm
J1SRB	1515789-3	Pro Beam Jr.	1	Singlemode	Bulkhead	1310 nm
J1SRC	1588105-1	Pro Beam Jr.	1	Singlemode	Bulkhead	1550 nm
J1MRA	1588107-1	Pro Beam Jr.	1	Multimode	Bulkhead	850 nm
J1MRB	1588109-1	Pro Beam Jr.	1	Multimode	Bulkhead	1300 nm
J1SBB	1515790-2	Pro Beam Jr.	1	Singlemode	Bulkhead, Flange Mount	1310 nm
J2MPS	1515832-2	Pro Beam Jr.	2	Multimode	Cable Plug	850/1300 nm
J2MPB	1515836-2	Pro Beam Jr.	2	Multimode	Cable Plug	1300 nm
J2MPA	1588106-2	Pro Beam Jr.	2	Multimode	Cable Plug	850 nm
J2MRS	1515833-2	Pro Beam Jr.	2	Multimode	Bulkhead	850/1300 nm
J2MRB	1515837-2	Pro Beam Jr.	2	Multimode	Bulkhead	1300 nm
J2MRA	1588107-2	Pro Beam Jr.	2	Multimode	Bulkhead	850 nm
J2SPB	1515850-1	Pro Beam Jr.	2	Singlemode	Cable Plug	1310 nm
J2SPC	1588104-2	Pro Beam Jr.	2	Singlemode	Cable Plug	1550 nm
J2SRB	1515852-1	Pro Beam Jr.	2	Singlemode	Bulkhead	1310 nm
J2SRC	1588105-2	Pro Beam Jr.	2	Singlemode	Bulkhead	1550 nm
J3SPB	1515805-1	Pro Beam Jr.	3	Singlemode	Cable Plug	1310 nm
J3SPC	1588104-3	Pro Beam Jr.	3	Singlemode	Cable Plug	1550 nm
J3SBB	1515795-3	Pro Beam Jr.	3	Singlemode	Bulkhead, Flange Mount	1310 nm
J3SRB	1588110-1	Pro Beam Jr.	3	Singlemode	Bulkhead	1310 nm
J3SRC	1588105-3	Pro Beam Jr.	3	Singlemode	Bulkhead	1550 nm
J4MPB	1515826-2	Pro Beam Jr.	4	Multimode	Cable Plug	1300 nm
J4MPA	1588106-3	Pro Beam Jr.	4	Multimode	Cable Plug	850 nm
J4MPS	1588111-1	Pro Beam Jr.	4	Multimode	Cable Plug	850/1300 nm
J4MRS	1515748-1	Pro Beam Jr.	4	Multimode	Bulkhead	850/1300 nm
J4MRB	1515828-2	Pro Beam Jr.	4	Multimode	Bulkhead	1300 nm
J4MRA	1588107-3	Pro Beam Jr.	4	Multimode	Bulkhead	850 nm
J4SPB	1515851-1	Pro Beam Jr.	4	Singlemode	Cable Plug	1310 nm
J4SPC	1588104-4	Pro Beam Jr.	4	Singlemode	Cable Plug	1550 nm
J4SRB	1515853-1	Pro Beam Jr.	4	Singlemode	Bulkhead	1310 nm
J4SRC	1588105-4	Pro Beam Jr.	4	Singlemode	Bulkhead	1550 nm
P2MPB	—	Pro Beam	2	Multimode	Cable Plug	1300 nm
P2MPA	—	Pro Beam	2	Multimode	Cable Plug	850 nm
P2MRB	—	Pro Beam	2	Multimode	Bulkhead	1300 nm
P2MRA	—	Pro Beam	2	Multimode	Bulkhead	850 nm
P2MBB	—	Pro Beam	2	Multimode	Bulkhead, Flange Mount	1300 nm
P2SPB	—	Pro Beam	2	Singlemode	Cable Plug	1310 nm
P2SPC	—	Pro Beam	2	Singlemode	Cable Plug	1550 nm
P2SRB	—	Pro Beam	2	Singlemode	Bulkhead	1310 nm
P2SRC	—	Pro Beam	2	Singlemode	Bulkhead	1550 nm
P4MPB	—	Pro Beam	4	Multimode	Cable Plug	1300 nm
P4MPA	—	Pro Beam	4	Multimode	Cable Plug	850 nm
P4MRB	—	Pro Beam	4	Multimode	Bulkhead	1300 nm
P4MRA	—	Pro Beam	4	Multimode	Bulkhead	850 nm
P4MBB	—	Pro Beam	4	Multimode	Bulkhead, Flange Mount	1300 nm
P4SPB	—	Pro Beam	4	Singlemode	Cable Plug	1310 nm
P4SPC	—	Pro Beam	4	Singlemode	Cable Plug	1550 nm
P4SRB	—	Pro Beam	4	Singlemode	Bulkhead	1310 nm
P4SRC	—	Pro Beam	4	Singlemode	Bulkhead	1550 nm

Introduction

Product Facts

- For Mini-Expanded Beam and Jr. Expanded Beam inserts
- Insert holders designed to ARINC 600, Supplement 13 or to specific customer needs
- For use in 100 base-FX Ethernet LAN applications per ARINC 664 and ARINC 763
- Drop-In Insert Holders utilize Standard ARINC 404 and 600 Retainers
 - Hard Stop on Plug Side
 - Spring-Loaded Stop on Receptacle Side
 - Captive Hardware
- Facial Sealing — Optional
 - Bonded to Receptacle Block Mating Face
 - Raised Collar Seal around Optics Insert compresses against Chamfer on Plug Block Mating Face



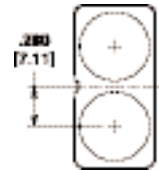
2
Fiber Optic Connectors

ARINC 600 Insert Holders for Mini-Expanded Beam Contacts

Size 1 Power Cavities



ARINC 600, 1 Position
1MP

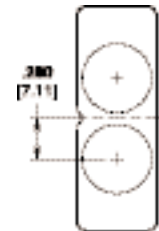


ARINC 600, 2 Position
2MP

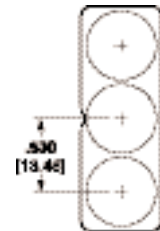
Size 1 Signal Cavities



ARINC 600, 1 Position
1MS

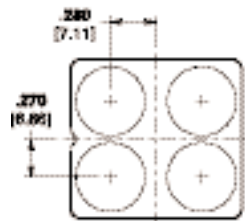


ARINC 600, 2 Position
2MS

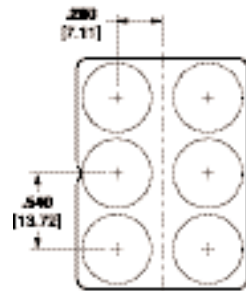


ARINC 600, 3 Position

Size 2 / 3 Power and Signal Cavities



ARINC 600, 4 Position



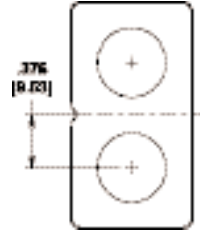
ARINC 600, 6 Position
6MS

ARINC 600 Insert Holders for Jr. Expanded Beam Contacts

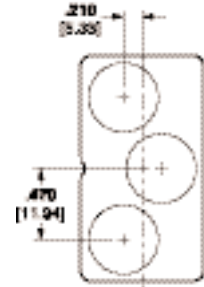
Size 2 & 3
Signal Cavities



ARINC 600, 1 Position
1JS



ARINC 600, 2 Position
2JS

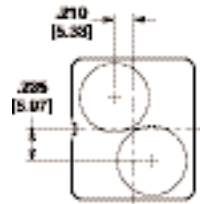


ARINC 600, 3 Position
3JS

Size 2 & 3
Power Cavities



ARINC 600, 1 Position
1JP

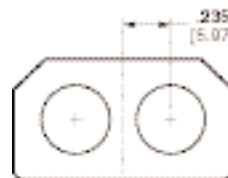


ARINC 600, 2 Position
2JP

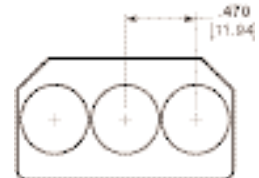
ARINC 404 Insert Holders for Mini-Expanded Beam Contacts



ARINC 404, 1 Position



ARINC 404, 2 Position

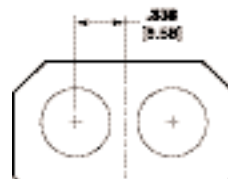


ARINC 404, 3 Position
M3

ARINC 404 Insert Holders for Jr. Expanded Beam Contacts



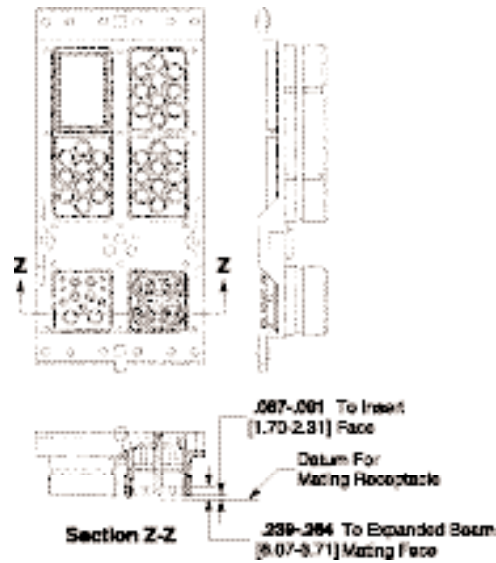
ARINC 404, 1 Position
J1



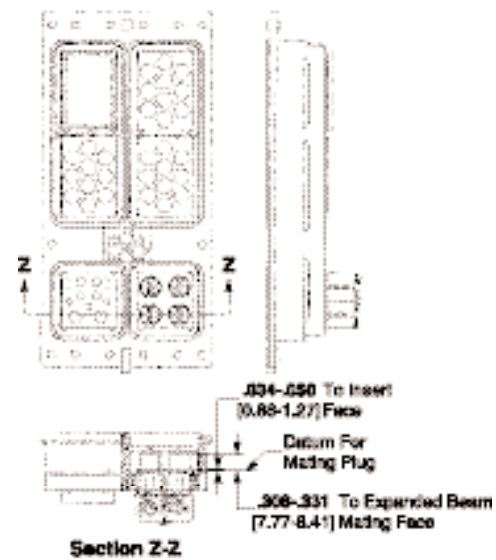
ARINC 404, 2 Position
J2

ARINC 600 Insert Holders for Mini-Expanded Beam Contacts

Typical Layout for Plug



Typical Layout for Receptacle



Engineering Notes

