



Hirose Board-to-Board Connectors

Purpose

- **To Introduce Hirose's Board-to-Board and Board-to-FPC connectors.**

Objective

- **To explain features and benefits**
- **Overview several series of Board-to-Board and Board-to-FPC connectors offered by Hirose**

Content

• **** pages**

Learning time

• *** Minutes**

Welcome to the Hirose Board-to-Board and Board-to-FPC Connector Product Training Module (PTM). This module is intended to introduce the various connectors manufactured by Hirose and to discuss some of their features and construction.

Product Lineup

- Hirose's Board-to-Board and Board-to-FPC connectors offer innovative, cost effective answers for variety of applications. With contact pitches ranging from 0.4mm to 5mm, multiple pin counts, various terminations styles and many height combinations, Hirose interconnects are able to solve many engineering problems.



Games and bar
code readers



Notebook
computers



PDA's



Portable
devices



Digital cameras

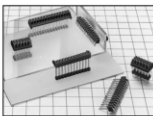
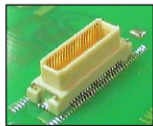
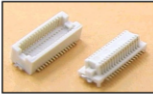
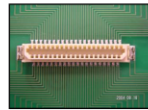


Video cameras

Hirose's Board-to-Board connectors offer innovative, cost effective answers for many different types of applications. With contact pitches ranging from 0.4mm to 5mm, multiple pin counts, various terminations styles and many height combinations Hirose has the interconnect solution to solve many engineering demands.



Board to Board Connectors



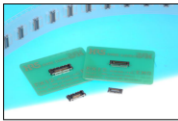
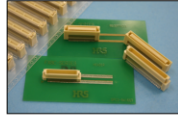
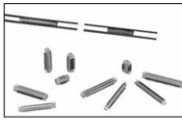
Series	Stack Height	Pitch	Positions Available	Features
DF9	4.3mm	1mm	9,11,13,15, 17,19,21,23, 25,31,41,51	Available with/without metal fittings and guide pin. 0.5A rating
DF12	3-5mm	0.5mm	10,14,20,30, 32,36,40,50, 60,80	Available with/without metal fittings and guide pin. 0.5A rating
DF17	4-8mm	0.5mm	20,26,30,32, 36,40,50,60, 70,80	Designed to withstand shock encountered when the device is dropped. (Note: not all positions are available in all heights.)
MDF7	2.54-15mm	2.54mm	Single: 3,5-25 Double: 12,14,16,20, 22,24,26,30, 34,40,46, 48	Several variations available. Single or double rows, tin or gold plated. Allows for board to board size to be set freely.

Quick Reference Guide

Hirose has many product offerings to fill a customer's engineering needs. The next three slides are a quick reference to the series that will be reviewed in the Product Training Module.



Board to Board Connectors



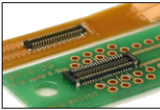
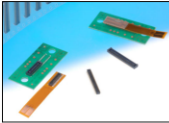
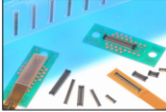
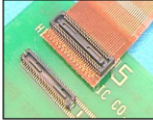
Series	Stack Height	Pitch	Positions Available	Features
FX6	5-9mm	0.8mm	12,20,40,50,60,80,100	Available with/without board guides. 0.5A rating
FX8/FX8C	3-16mm	0.6mm	40,60,80,90,100,120,140	High Speed – 3.125 Gbps. Available board guides and bridged headers. 0.4A rating
FX12	1.5-3.5mm	0.4mm	24,40,60,80	10+ Gbps High Speed. Dual shields prevent EMC. 0.3A rating
FX18	15,20,25,30mm	0.8mm	40,60,80,120,140	Mounting options available: Vertical/ Coplanar/ Parallel. Rated: 0.5A Signal contact, 3.0A Metal hold down

Quick Reference Guide

Hirose's FX6, FX8, FX12, and FX18 series have a stack height ranging from 1.5mm to 30mm.



Board to Board and Board to FPC



Series	Stack Height	Pitch	Positions Available	Features
DF30	0.9mm	0.4mm	10,14,20,22, 24,30,34,40, 44,50,60,70, 80	Low profile and space saving Bd to Bd and Bd to FPC. Designed to withstand shock.
DF37	0.98mm	0.4mm	10,16,20,24, 30,34,40,44, 50,60,70,74	Robust configuration aids the shock absorption. 0.3A rating
DF40	1.5-4.0mm	0.4mm	10,12,20,24,30, 34,40,44,50,60, 70,80,90,100	Space saving, low profile Bd to Bd and Bd to FPC. High contact reliability.
BM10	0.6 or 0.8mm	0.4mm	10,16,20,24,30, 34,40,44,50,60	Low profile and space saving Bd to Bd and Bd to FPC. Designed to withstand shock.

Quick Reference Guide

Hirose series DF30, DF37, DF40, and BM10 include board to board and board to FPC solutions.

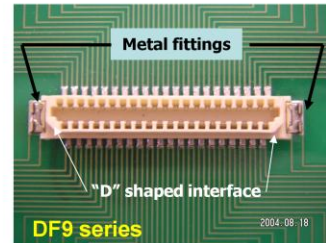


DF9 Series

Board-to-Board Connectors

Features:

- Contact pitch: 1mm
- Stack height: 4.3mm
- Current rating: 0.5A
- Pin count: 9, 11, 13, 15, 17, 19, 21, 23, 25, 31, 41, 51
- Available with or without metal fittings
- Available with or without boss (guide pin)
- Positive “click” when fully mated
- Built-in secure locking mechanism



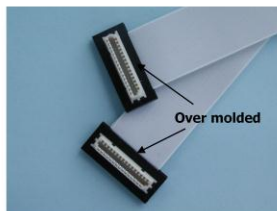
The DF9 series has a stack height of 4.3mm and is a 1mm pitch connector system. The series has many configurations available including with or without metal fittings and guide pins.



DF9 Series Board-to-Board Connectors

Applications:

- Common display interconnect
- Automotive or Factory Equipment
- High retention FFC connection



DF9 connectors are frequently soldered on FFC and over molded.

HRS DOES NOT provide these cable assemblies

Shown with permission of Meritec, Inc.

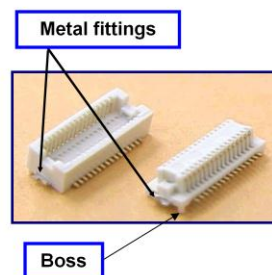
The DF9 is a very versatile connector that can be adapted to many uses such as being over-molded on a FFC cable. DF9's are a common interconnect used on many LCD displays.



DF12 Series Board-to-Board Connectors

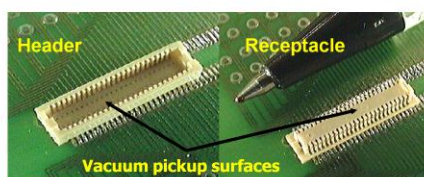
Features:

- Contact pitch: 0.5 mm pitch
- Pin count: 10 – 80
- Stack heights: 3-5mm
- Current rating: 0.3A
- Available with or without metal fittings
- Available with or without boss (guide pin)



Applications:

- Our most popular B-to-B connector
- Used across all industries



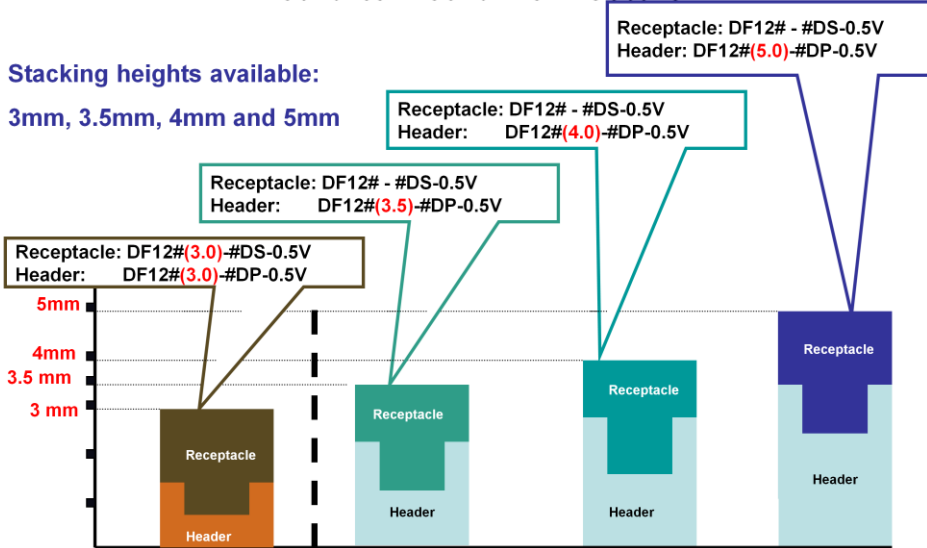
The DF12 series is a 0.5mm pitch board-to-board connector that has several height variations available and many pin counts. It also can be configured with or without metal fittings and guide pins. The metal fittings increase the connectors retention force to the PCB and are soldered at the same time the SMT leads are soldered. The boss or guide pins help keep the connector on the solder pads while going through the soldering process.



DF12 Series Board-to-Board Connectors

Stacking heights available:

3mm, 3.5mm, 4mm and 5mm



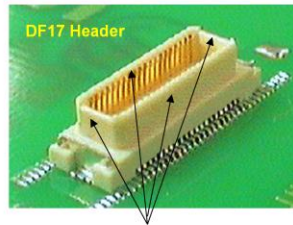
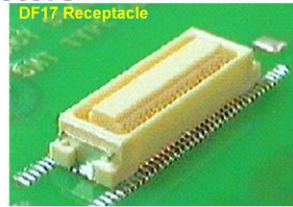
Show here are the variety of stack heights available in the DF12 series which range from 3mm to 5mm in the mated condition. Please note that on the 3mm version, both the receptacle and the header need to be paired correctly for this height. On the 3.5mm, 4mm, and 5mm versions the header side controls the height and any receptacle can be used on the mating side, except the 3mm receptacle.



DF17 Series Board-to-Board Connectors

Features:

- Contact pitch: 0.5mm
- Pin counts: 20, 26, 30, 40, 50, 60, 70 80
- Stacking heights: 4, 5, 5.5, 6, 6.5, 7, 8
- Current rating: 0.3A
- Audible “click” when fully mated
- Bellows-styles contacts
- Designed specifically to withstand shock encountered when the device is dropped.

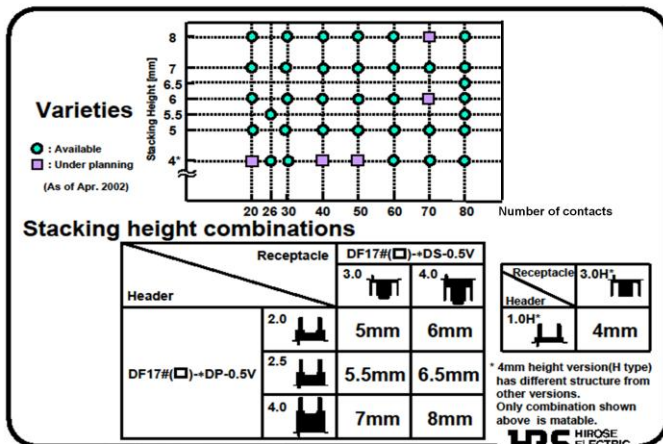


Enclosed on all four sides

The DF17 is a 0.5mm pitch connector that is available in several stack heights. This robust connector is enclosed on all four sides and was designed specifically to withstand shock encountered when the device is dropped.

DF17 Series Board-to-Board Connectors

DF17 Stack Heights



Show here are the various stack heights and pin counts that are available. The available DF17 Series heights include 5mm, 5.5mm, 6mm, 6.5mm, 7mm and 8mm. There is also a special 4mm height version, but note that the 4mm height header/receptacle are specific to the 4mm offering. The 4mm parts will not mate properly with any of the 5mm or taller variations.

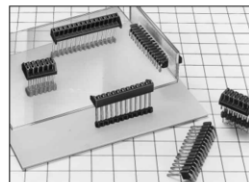


MDF7 Series*

Board-to-Board Connectors

Features:

- Contact pitch: 2.54mm
- Pin counts: Single – 3, 5-25
Double – 12, 14, 16, 20, 22, 24,
26, 30, 34, 40, 46, 48
- Stacking heights: 2.54 – 15.00mm
- Current rating: 3.0A
- Tin or Gold plated available
- Single or Double row available



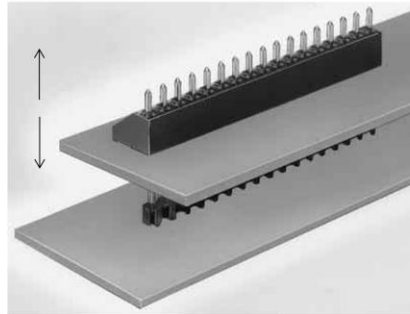
The MDF7 Series is a 2.54mm pitch bottom entry type connector that can adapt to help complete your application. Featuring a wide range of stack heights, tin or gold plating and a single or double row arrangement.



MDF7 Series*

Board-to-Board Connectors

- Stacking height can be adjusted to suit your application
- The parts mounted surface on two PCB's do not face each other, this allows them to be oriented in the same direction



Board to Board size can be adjusted to accommodate your application.

Applications:

Internal connection of telephone sets and OA/FA equipment, connection between IPM, IGBT and the board.

The MDF7 connectors allow the distance between the boards to vary as the stacking height can be adjusted to each specific application. This ability allows the board to board size to be set at multiple distances.

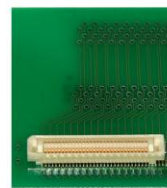
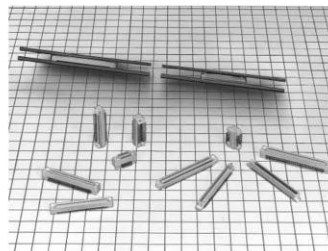


FX6 Series*

Board-to-Board Connectors

Features:

- Contact pitch: 0.8mm
- Pin counts: 20, 40, 50, 60, 80, 100
- Stacking heights: 5, 6, 7, 8, 9mm
- Current rating: 0.5A
- Effective mating length of 1.7mm
- Lead terminal coplanarity on the SMT soldered area is maintained with the accuracy of less than 0.1mm.



The FX6 series is a 0.8mm pitch stacking connector. It is currently available in multiple stacking heights and varying pin counts. Featuring a wall-supporting structure that gives a long term reliability and utilizes an effective mating length of 1.7mm. It also has a self aligning design that creates a $\pm 1.0\text{mm}$ guide level and simplifies the mating process.

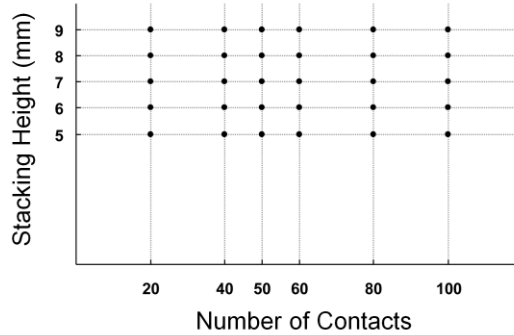


FX6 Series*

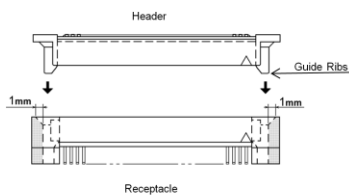
Board-to-Board Connectors

Varieties

•The stacking height can be set between 5 & 9mm, utilizing 1mm steps



±1mm Self Alignment



•Available with/without guide ribs

The FX6 series is also available with guide ribs that provide an easier mating process and enables a self-aligning action that exhibits a high guide level at ± 1 mm.



FX8/FX8C Series*

Board-to-Board Connectors

Features:

- Contact pitch: 0.6mm
- Pin counts: 40, 60, 80, 90, 100, 120,
140, 160, 200, 240, 280
- Stacking heights: FX8: 3-4mm
FX8C: 5-16mm
- Current rating: 0.4A
- Wide self alignment of 0.6mm in the
X,Y directions
- High Speed- Up to 3.125 Gbps



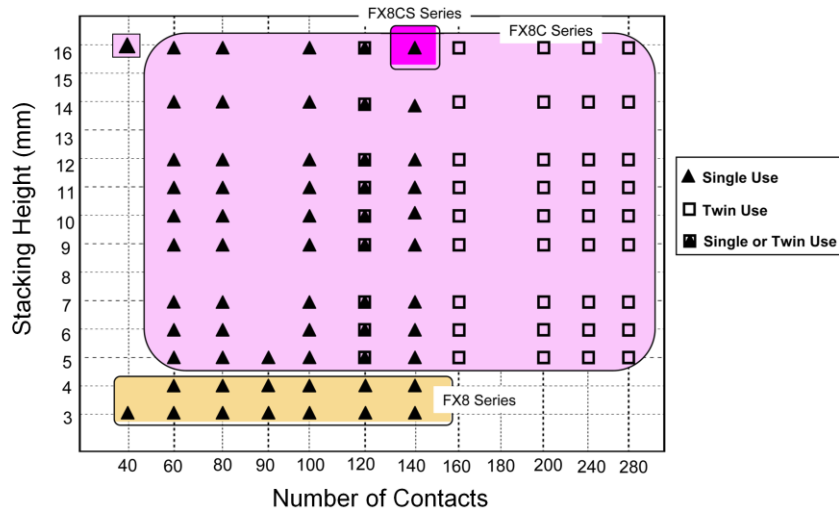
The FX8 and FX8C series are 0.6mm pitch mezzanine connectors that have varying stack heights (3-16mm) and a wide range of contact positions (40-280). These series were designed to utilize formed contacts that provide deflection for contact reliability. A high speed connector that handles speeds up to 3.125 Gbps.



FX8/FX8C Series*

Board-to-Board Connectors

Varieties



The FX8 and FX8C series are available as a single (both) or twin (FX8C) use configuration. The twin use configuration utilizes a removable joint bar that allows the contact positions to go up to 280.

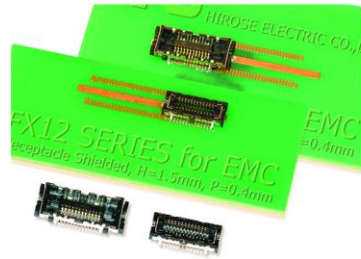


FX12 Series*

Board-to-Board Connectors

Features:

- Contact pitch: 0.4mm
- Pin counts: 24, 40, 60, 80
- Stacking heights: 1.5, 3.5mm
- Current rating: 0.3A
- High Speed – up to 10+ Gbps
- Double shielding structure prevents EMC
- Self alignment feature with a range of 0.3mm
- Secure lock and high mating retention



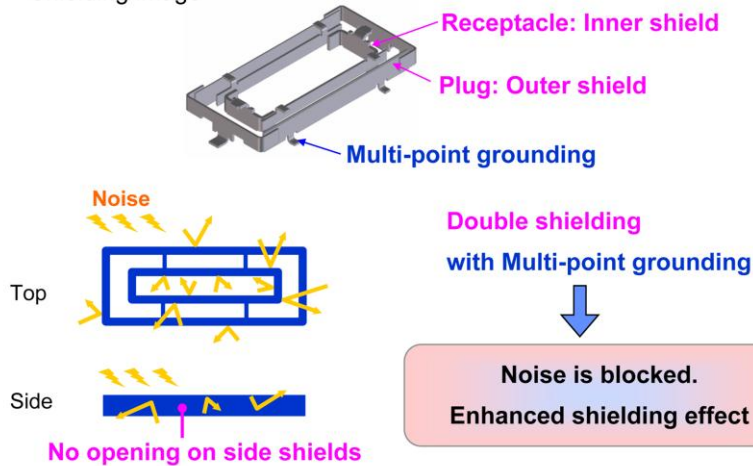
The FX12 series is a 0.4mm pitch, double shielded connector designed to prevent EMC. Complete with low stacking heights of 1.5 & 3.5mm, its robust structure boasts a secure locking mechanism, high mating retention and prevents contact buckling.



FX12 Series* Board-to-Board Connectors

Double Shielding Structure for EMC*

Shielding image



(Above shielding images represent
24,40 and 60 pos. of FX12.)

*the condition without unacceptable degradation
caused by EMI to or from other equipment

The FX12 features a double shielding structure. When in the mated condition, built-in shield plates and metal fittings in the plugs and receptacles prevent electromagnetic emission and external interference on the entire 360° periphery of mated connectors.



FX18 Series*

Board-to-Board Connectors

Features:

- Contact pitch: 0.8mm
- Pin counts: 40, 60, 80, 100, 120, 140
- Stacking heights: 15, 20, 25, 30
- Current rating: Signal – 0.5A

Metal hold down – 3.0A

- High speed - up to 10+ Gbps
- 3 mating options: Coplanar, Vertical and Parallel
- Effective mating length of signal contact: 2.0mm



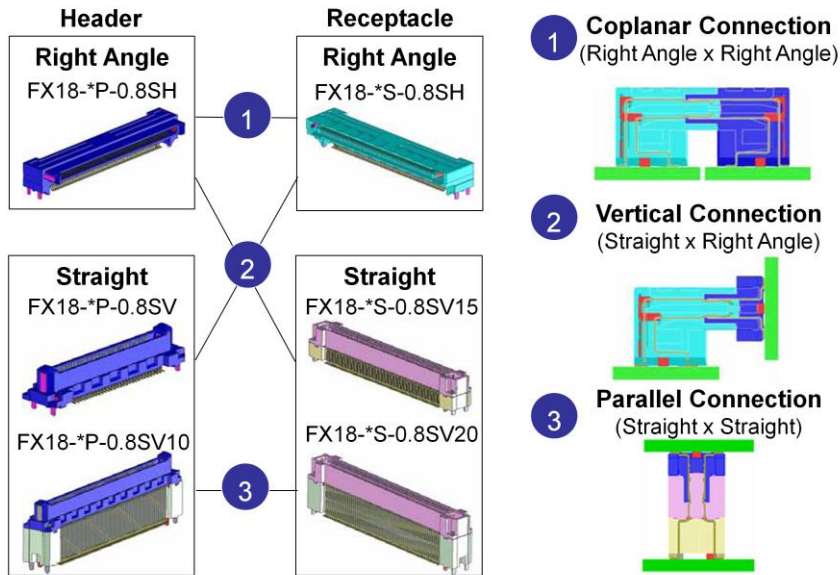
The FX18 series is a 0.8mm pitch, high speed transmission connector that can handle 10 Gbps. Three different mating options highlights the versatility of this series. Multi functional contacts can be utilized as followed, ground contacts, power supply contacts or 3-step sequential contacts for grounding and detection. A large mating guide enables easy mating and helps to take advantage of Hirose's effective mating length of 2.0mm for the signal contacts.



FX18 Series*

Board-to-Board Connectors

Varieties



The FX18 is highlighted by its ability to offer three mating options. A Coplanar option which utilizes two right angle connectors, a Vertical option which utilizes one straight and one right angle connector, and a Parallel option in which two straight connector are stacked to complete the high speed connection.

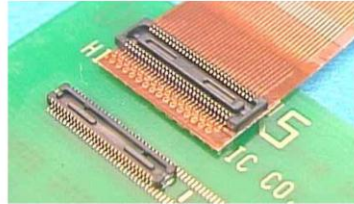


DF30 Series

Board-to-Board and Board-to-FPC connectors

Features:

- Contact pitch: 0.4mm
- Pin counts: 20, 22, 24, 30, 34, 40, 50, 60, 70 and 80
- Stack height: 0.9mm
- Low Profile and space saving
- Tactile click and high retention force
- Self cleaning structure allows high contact reliability
- Shock prevention configuration and robust structure



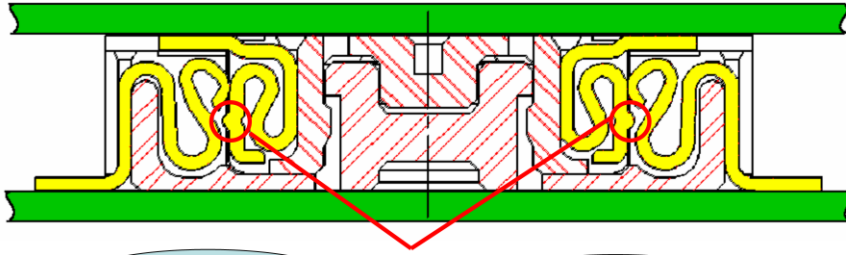
The DF30 series is a 0.4mm pitch, 0.9mm stack height connector that has a very robust design. The series can be used either as a board-to-board connector or a board-to-Flex circuit connector. The DF30 will self align within a 0.3mm range; this is helpful in mating the connectors in limited spaces.



DF30 Contact Advantages

1. Self Cleaning

Rough surface on header contact enhances wiping operation, which improves contact reliability



2. Positive Tactile Click

+

3. High Retention Force

The dimples on the header contacts allow a tactile sensation when connector is fully mated and the dimples also improve mated retention.

The contact design of the DF30 has several benefits including, self cleaning, positive tactile click when mated, and a higher retention force.

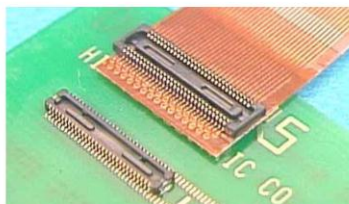


DF37 Series*

Board-to-Board and Board-to-FPC connectors

Features:

- Contact pitch: 0.4mm
- Pin counts: 10, 16, 20, 24, 30, 34,
40, 50, 60, 70, 74
- Stack height: 0.98mm
- Space saving: 2.6mm depth
- Highly reliable contact design with 2-point contact
- 2-point contacts absorb shock and ensures an uninterrupted electrical connection
- Tactile click and high retention force
- Enhanced self alignment mechanism utilizing guidance ribs



The DF37 series is a versatile board to board or board to FPC connector that boasts a 0.4mm pitch, 0.98mm stacking height and a space saving 2.6mm depth help this series produce the worlds shortest depth in its class. Featuring a 2-point contact design that absorbs shock and produces a stable uninterrupted electrical connection. Guidance ribs give this series a wide range for self alignment and provides a smooth and easy mating operation.



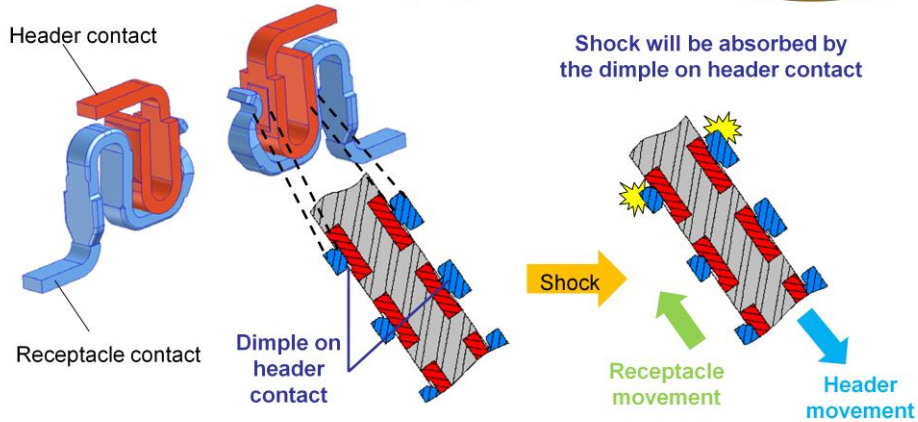
DF37 Series*

Board-to-Board and Board-to-FPC connectors

Shock Absorbing Contact Design

**Dimples at two points of each header contact
reduce shock from drop impact.**

Patented



The robust 2-point contact design was designed as a shock absorbing mechanism and has been patented. Strategically placed dimples on the contacts provide a cushion to absorb shock and prevent damage from any unintended drop impact.

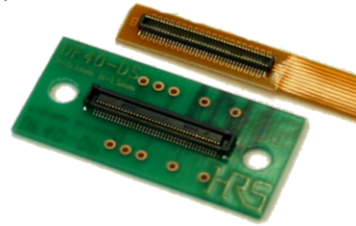


DF40 Series

Board-to-Board and Board-to-FPC connectors

Features:

- Contact pitch: 0.4mm
- Stack heights: 1.5mm to 4mm
- Pin count: 10, 20, 30, 40, 44, 50, 60, 70, 80, 100
- Current rating: 0.3A
- Space saving: 3.38 mm width
- Enhanced self alignment mechanism
- Robust shock-absorbing configuration
- High PCB retention force with support contacts
- Solder wicking prevention
- RoHS compliant.



The DF40 series is a space saving FPC-to-board connector with one of the industry's shortest depth in mated condition. It has 0.4mm pitch and 1.5mm stacking height, and the contact area is designed to be protected inside the housing. Not all pin counts are available in all heights.

In Addition to being a very compact connector, the DF40 series has a generous self-alignment range.

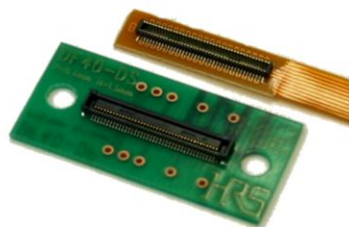


BM10 Series*

Board-to-Board and Board-to-FPC connectors

Features:

- Contact pitch: 0.4mm
- Stack heights: 0.6 / 0.8mm
- Pin count: 10, 16, 20, 24, 30, 34, 40, 44, 50, 60
- Current rating: 0.3A
- Space saving: 2.98mm depth
- Ideal for high density applications
- Enhanced self alignment mechanism utilizing guidance ribs
- Contacts are designed with dimples to absorb shock
- High PCB retention force with support contacts



The BM10 series is a 0.4mm pitch connector that is available in both 0.6 & 0.8mm stack heights with various pin counts to accommodate higher density applications. Designed with space saving in mind it has a 2.98mm depth. This series also features a contact design that creates a dependable contact with strong retention force and shock absorbing due to the dimple configuration on its contacts.



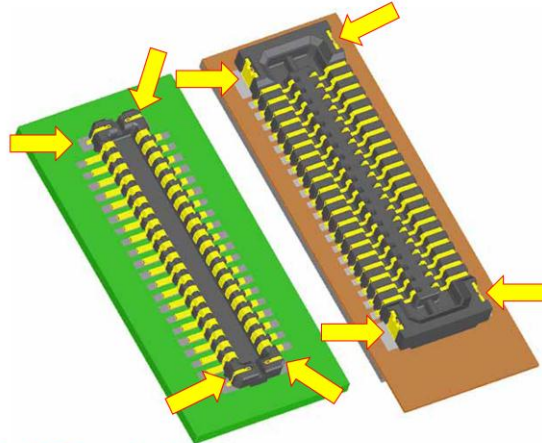
BM10 Series*

Board-to-Board and Board-to-FPC connectors

High PCB Retention Force with Metal Fittings

Metal fittings

Space saving design, but they are still able to retain a high PCB retention force against mechanical stress with metal fittings available at the corner of each connector.



Metal fittings help to protect contacts from stress created by mating/ unmating & drop impact.

The BM10's design incorporates metal fittings to boost contact retention and together with the contact dimples, help to reduce shock and damage due to accidental droppage.



Applications



Hirose DF series connectors can be utilized in almost any application where two or more PCBs need to be connected to each other. Typical applications will be small, hand held devices.



In Summary

- Hirose has a broad range of interconnect solutions for board-to-board and board-to-FPC applications.
- Several series have many stack height configurations to chose from
- Fine pitch, low profile connectors are available in many styles

In summary, Hirose has a broad range of interconnect solutions for board-to-board and board-to-FPC applications that are low profile and fine pitch. Several series have many stack height and pin count options available and all connectors are RoHS compliant.