CW INDUSTRIES

IDC SELECTION GUIDE

An ISO Company that Delivers World Class Quality

CW Industries 130 James Way Southampton PA, 18966 215-355-7080 www.cwind.com

About CW IDC Connectors

CW mass terminated Insulation Displacement Connectors are specifically designed to provide a reliable long term, gas-tight connection at every position. In addition to our patented Torq-Tite™ contact, other significant design advantages include ruggedness of construction, ease of assembly, integral strain relief options, choice of contact materials and plating finishes.

The complete series of DIP, PCB, Socket and Header, Card Edge and D-Subminiature Connectors meets applicable Military Specifications, and offers direct interchangeability with other industry standard Insulation Displacement Connectors.

CW connectors are designed not only for reliability, but also for ease of use in many applications. Simple assembly tools can be used to terminate CW connectors to cable, since preassembled covers and built-in guides on each connector orient cable conductors to contact tines. Cover types for strain relief, daisy-chaining, or cable end protection are available.

Light or heavy gold over nickel plated contacts or tin-lead plated contacts are available to suit specific applications. All elements of the CW connector system are available through a nation-wide network of stocking distributors and value-added assembly centers. They have on hand a comprehensive inventory of all types of flat cable and connectors for fast delivery of connectors or 100% pre-tested, ready to use assemblies made to your specifications.

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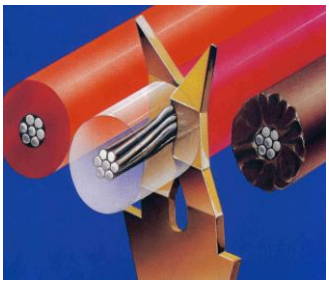
Selection Criteria for IDC's

Selection decisions on Insulation Displacement Connectors (IDCs) present opportunities for significant improvements in quality, interchangeability, and cost-effective handling and assembly. The connectors selected will impact significantly on the overall reliability and usefulness of the final system. Here are the important considerations in the selection of IDC components:



The Electrical Contacts

Contact integrity must be maintained in two places–between the contact and the cable conductor and between the contact and its mate…whether it be a PC board, a pin or a socket. There can be no compromise on either end.

A properly designed contact will completely displace the insulation, and provide clean metal-to-metal contact with the conductor, insuring a long-term, gas-tight connection.

One end of our patented IDC contact consists of a pair of offset tines. When forced through the insulation, they slide along the conductor, compressing it and gripping it to form a gas-tight connection. The conductor is compressed by dual force. As the cable conductor is wedged into the contact's insulation displacement slot, the wiping action of the tines cleans the conductor surface and the conductor is compressed. In addition to the compression force, a second force is created by the offset tines. The resultant torque produces a long-term, Torq-Tite™ connection, impervious to environmental contaminants.

The electrical connection on the other end–between the contact and its mate–whether it be a PC board, a pin or a socket, is of equal importance. Here structural design, materials, area of contact, surface finish, contact redundancy, and mechanical means of seating the contact in the insulator can be critical. Every CW contact has been designed with full consideration of each of these factors.

The Insulator

The excellent electrical insulating characteristics of IDCs, their physical ruggedness, ability to withstand extremes of environmental conditions, and ease of assembly are the result of careful and detailed material testing and selection as well as insulator design. Where the connector is exposed to soldering, the insulator must be resistant to dissolution by solder, fluxes and PC board washes. The material should be rugged enough to be handled without breaking or chipping and strong enough to hold the contacts firmly in place. It should be chemically-inert and have dielectric properties consistent with the application requirements. These are the criteria considered in selecting materials for all CW insulators.

Mating and Interchangeability

An important consideration in the design and development of every CW connector is compatibility and mateability with connectors of other manufacturers.

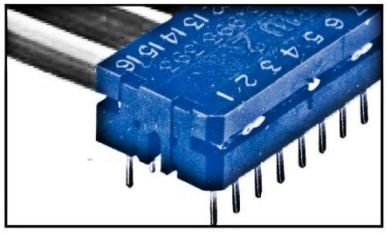
The problem of connecting a PCB, DIP or Card Edge connector to a printed circuit board are not as serious as mating a "socket" to a "header" or a "socket" D-Subminiature to a "pin" D-Subminiature, when connectors from different manufacturers are used. CW connector designs, in almost every instance, minimize electrical or mechanical mismatches resulting from mating connectors of various manufacturers. Our designs permit dual sourcing of almost all elements. To this end, CW has worked closely with the US Defense Electronic Supply Center in the development of industry standards and specifications as defined in Mil-DTL-83503. CW IDC connector products are qualified to applicable Mil-DTL-83503 standards and are interchangeable and mateable with other connectors so qualified.

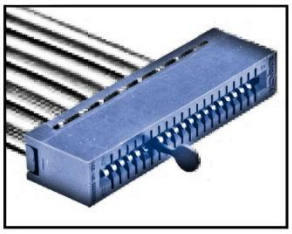
Polarization and Contact Identification

Where there are so many electrical circuit connection possibilities, contact identification is desirable. CW includes numbered contacts on most connectors.

An inherent part of the CW system is a positive means of polarizing mating pairs of IDCs, or positively orienting the connector to the PC board, thereby preventing cross wiring and possible equipment damage.

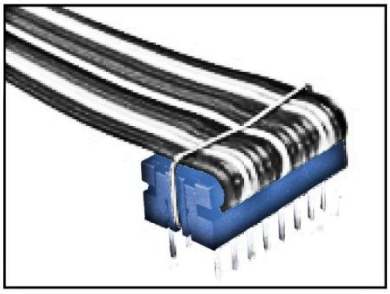
Standardization is attained by using polarization and identification methods consistent with Mil-DTL-83503 specifications.





Strain Relief

Test the strength of your cable and connector by pull a test. In Torq-Tite™ D-Subminiature and Card Edge Connectors, strain reliefs are "built-in." In DIPs, PCBs and Sockets, you may require an optional strain relief for additional protection. CW's strain relief designs effectively isolate the connection of cable-to-contact from mechanical strain even if the cable is pulled or yanked. CW strain reliefs require limited space, are easy to apply, are available in several options for alternate cable orientation, and are capable of withstanding a minimum pull-off force of 8 ounces per contact, consistent with Mil-DTL-83503 standards.



Reusable Cover

The ability to remove the connector cover without breakage is often desirable. Most CW designs make it possible to easily, safely and non-destructively remove the cover that protects the connection. The connector, and often the cover itself, are *reusable.*

CW IDC

Selection Chart

	Description	Features		No. of Conductors	Pages	Standards and Specifications
	Socket Normally used to interconnect PC boards or points on a backplane through headers or pins on .100 in. x .100 in. spacing. Advanced design includes patented Torq-Tite™ contact for positive gas-tight cable termination. Nose end of contact provides superior wiping action and redundant electrical contact. Qualified per U.S. Defense Department to Mil-DTL-83503/7 and interchangeable and mateable with other connectors so qualified.	• Mil-DTL-83503/7 approved • Preassembled cover provides for precise, rapid assembly • Ridges on cover help align cable • Reusable contact and cover design • Choice of polarizing method and optional strain relief strap		10, 14, 16, 20, 26, 34, 40, 50, 60	6, 7 8, 9	• Contacts: phosphor bronze, standard. • Contact Plating: 30 µ in. gold over 50 µ in. nickel, standard* 10 µ in. gold over 50 µ in. nickel optional* 50 µ in. gold over 50 µ in. nickel, optional 100 µ in. tin-lead optional* 200 µ in. tin-lead optional* • Housing Material UL 94V-0 flame-retardant thermoplastic • Color: blue • Operating Temperature: -55˚ to +125˚C • Current Rating: 1 amp (maximum) per contact • Dielectric Withstand Voltage: greater than 500 Vdc at sea level • Insulation Resistance: greater than 5x10⁸ ohms • Standard Contact Resistance 15 milliohms max. * Tin-lead plating not available on header connectors. 10 µ in. gold over 50 µ in. nickel is standard contact plating on DIP connectors. 100 µ in. tin-lead is standard contact plating on PCB connectors.
	Headers Fully shrouded, 3 wall and low profile box headers are available to provide a reliable mating interface for standard sockets having .100 in. x .100 in. contact spacing. Headers have pins on their mating side and offer the designer a choice of either wire-wrap or solder pins in various lengths on the opposing end in straight or right angle styles. Qualified per U.S. Defense Department to Mil-DTL-83503/20, 21, 24 and 25.	• Mil-DTL-83503/20, 21, 24 and 25 approved • Mateable with sockets from other manufacturers, with or without strain relief • Patented polarization design consistent with Mil-DTL-83503 standards–integral ribs eliminate need for gluing polarizing keys to the header base • Polarization ribs can be removed for use with non-polarized sockets • Easy ejection, and secure locking available with long or short latches		10, 14, 16, 20, 26, 34, 40, 50, 60	10, 11 12, 13 14, 15 16, 17	
	D-Subminiature Ideal for input/output applications and interconnecting electronic equipment. Connectors are UL recognized and CSA listed and are designed to meet the applicable standards of Mil-DTL-24308. They are interchangeable and mateable with other connectors that meet these standards. Available in all-plastic or metal-face versions with optional EMI/RFI shield.	• Choice of 3-way strain relief • Accepts standard .050 in. conductor spacing cable without special cable preparation • Preassembled cover provides for precise, rapid assembly • Accepts jacketed and shielded cable without the need for a backshell • Patented contact design provides for precise mating with our D-Subminiature connectors • Metal Face and shield provide EMI/RFI shielding		9, 15, 25, 37 with pin or socket contacts	18, 19 20, 21 22, 23 24, 25	
	Card Edge Provides a fast means for connecting/disconnecting single, double-sided or multi-layer PC boards. Extra long cantilevered contact provides an extended self-cleaning, wiping action, and ensures positive connection to the board. Good contact pressure is maintained with minimal wear on PC board pads.	• Factory pre-assembled cover provides for fast assembly • Self-adjusting contact force adjusts for variations in PC board thickness • Long cantilever contact provides consistent insertion/withdrawal forces • Full polarization capability • Reusable contact and cover design		10, 20, 26, 34, 40, 50	26, 27 28, 29	
	DIP Used for rapid, permanent connection of ribbon cable to a PC board or when connect/disconnect capabilities are required. Mates with a standard DIP socket. Cover is factory preassembled to connector base to simplify handling and assembly of cable. Qualified per U.S. Defense Department to Mil-DTL-83503/6.	• Mil-DTL-83503/6 approved • Sturdy, yet flexible terminal posts • No "bare shoulders" on the contact at the PC board interface • Preassembled cover minimizes assembly time • Optional strain relief strap is available		14, 16 24, 40	30, 31 32, 33	
	PCB Used when a permanent connection of flat cable to the PC board is required. Cable is terminated to the PCB plug to make a reliable gas-tight connection through use of Torq-Tite™ contacts. The connector's pins are then soldered to the board. Qualified per U.S. Defense Department to Mil-DTL-83503/23.	• Mil-DTL-83503/23 approved • Sturdy, yet flexible solder posts able to withstand bending and straightening • No "bare shoulders" on the contact at the PC board interface • Integral strain-relief option available • Cover lip available for cable end termination		10, 20, 26, 34, 40, 50, 60	34, 35 36, 37	

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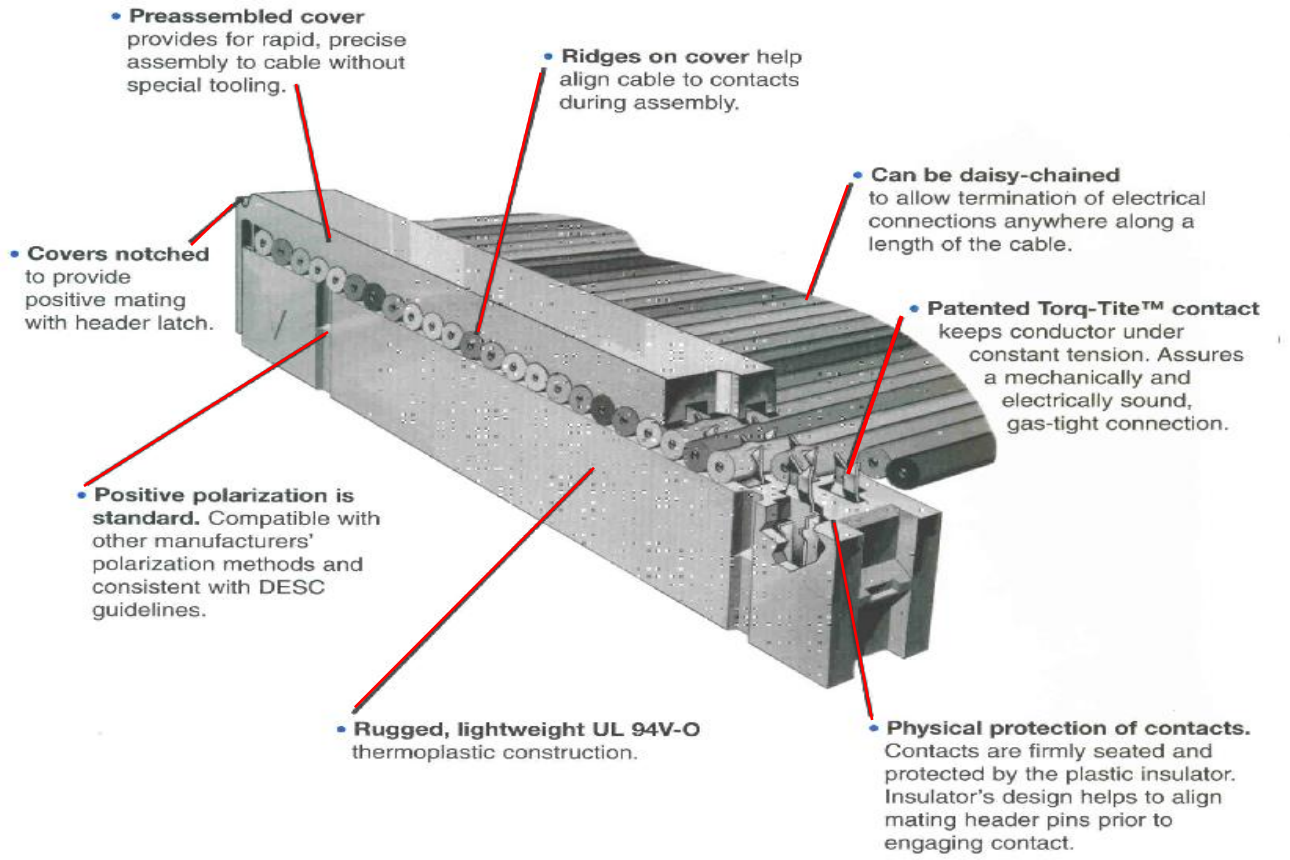
SOCKET CONNECTORS

Socket connectors are typically used to interconnect PC boards or points on a backplane through headers or pins on .100 in. x .100 in. spacing. They feature an advanced mechanical design which includes CW's patented offset-tine (Torq-Tite™) contact for positive gas-tight cable termination. The nose end of the contact provides a long, dual cantilever for a longer wiping action and improved self-cleaning of the mating pin. The extra length also results in a longer and more reliable working life.

The preassembled cover design allows fast, reliable assembly to extruded, bonded or laminated cable and features built-in cable alignment. These features permit the use of simplified termination equipment. CW's socket connectors meet Mil-DTL-83503/7 specifications and are listed on the U.S. Defense Department's Qualified Products List.

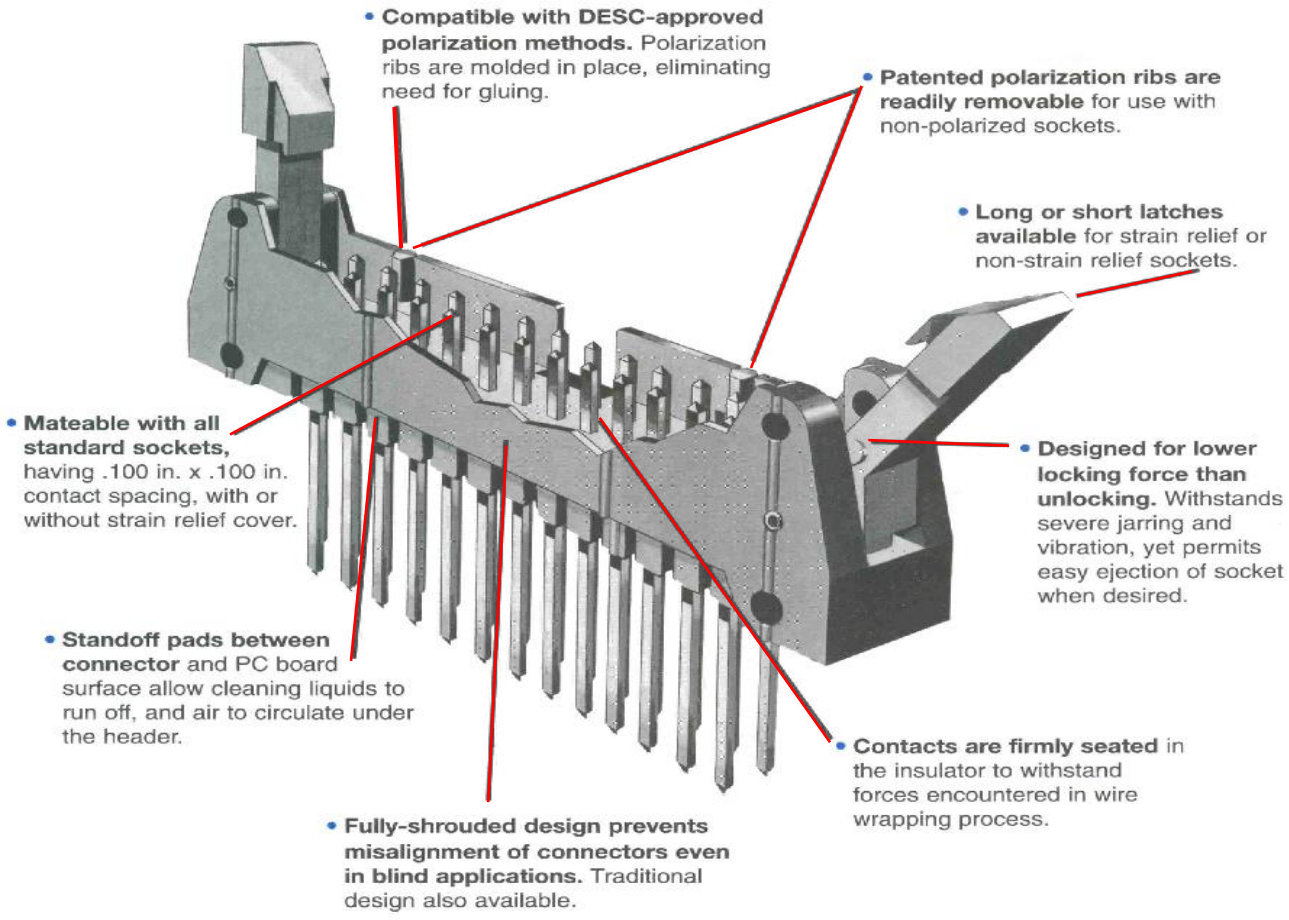


Header Connectors

Header connectors are often permanently mounted to PC boards and mate with female socket connectors having a .100 in. (2.54mm) x .100 in. (2.54mm) contact spacing.

The headers have male pins on their mating side and offer the designer a choice of either wire-wrap or solder posts in various lengths on the opposing end. With CW, the designer also can choose either straight or right-angle contacts and allow sockets to mate with headers at right angles or parallel to mating PC board or wire-wrap plane. Optional ejection latches in various sizes are available, to mate with strain relief or non-strain relief sockets.

Polarization ribs are securely molded into place, eliminating the need for gluing polarizing keys to the header base. These ribs are easily removed for applications requiring a non-polarized interconnection. CW headers are also available in Military Grade approved to Mil-DTL-83503/20, 21, 24 and 25



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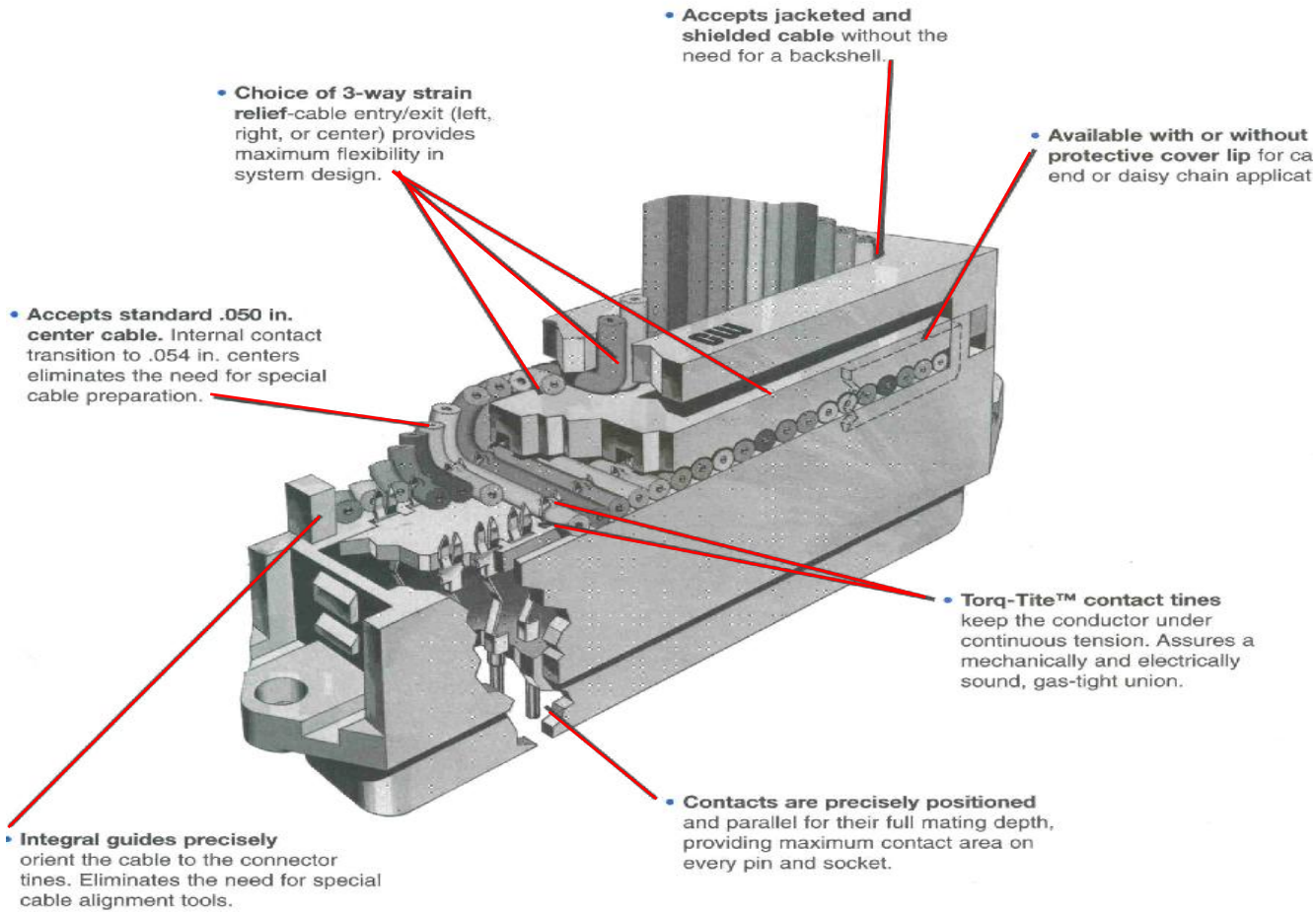
D-Subminiature Connectors–All-Plastic

The D-Subminiature Insulation Displacement Connector is a popular standard for interconnecting many types of electronic equipment–computers and peripherals, instruments, telecommunications and test equipment–throughout the military, industrial, and commercial product sectors.

CW's D-Subminiature connectors consist of four sizes of each of two types of D-Subminiature connectors…pin and socket versions…mating to standard 9, 15, 25, and 37 conductor cable. All CW D-Subminiature connectors incorporate two basic series of patents assuring contact integrity with the cable as well as the mating connector. These connectors are UL and CSA listed and are designed to meet the standards of Mil- DTL-83503. They are fully interchangeable and mate with other standard D-Subminiature connectors



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D-Subminiature Connectors with Metal Face & EMI/RFI Shield

The Problem:

Stray Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) emitted from unshielded cables, connectors, and assemblies can affect the performance of electronic devices within the range of these emissions. The Federal Communications Commission requires EMI/RFI shielding to standards defined in F.C.C. Docket 20780, Part 15 on all newly manufactured equipment. Connectors, cable, and assemblies, if an integral part of this equipment, are within the scope of the F.C.C. decree and must be appropriately shielded.

The CW Solution

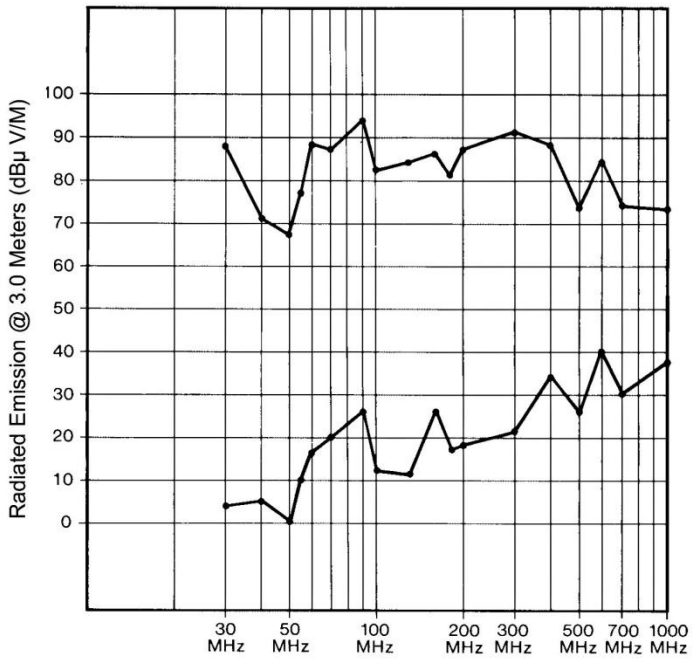
CW makes available a choice of two solutions. Select the system that best solves your EMI/RFI emission problem.

METAL-FACED D-SUBMINIATURE–A metal face forms the front of your D-Subminiature connector and shields high-frequency radiation that eminates principally from the point of external interconnection. These connectors also mate with traditional metal-faced D connectors.

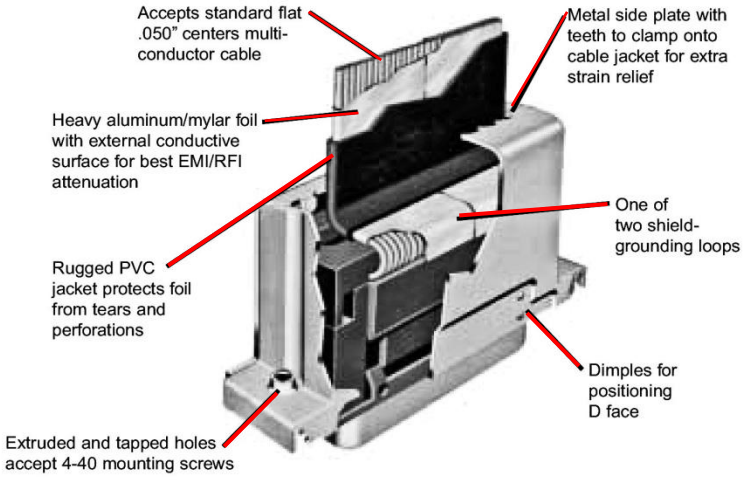
EMI/RFI SHIELD–A bright tin-plated metal shield can be added to the METAL-FACED connector to form a complete metal enclosure. Laboratory tests show that our Subminiature D connector enclosed in our assembled shield can reduce strays by up to 80dB. Performance comparison and test results are indicated graphically in the chart at right. When terminated to jacketed-and-shielded flat cable, properly stripped to expose an external conductive surface, the shielding interfaces redundantly with CW's conductive shield placing the entire assembly at "ground". CW's shield can be used on either cable end terminations or in "daisy chain" terminations along the cable. METAL SHIELDS are available to cover 9, 15, 25, and 37 pin or socket Subminiature D connectors. CW's METAL SHIELDS are designed for easy and rapid assembly to our METAL-FACED Subminiature D-connectors. No supplemental fasteners or assembly tools are required.

Test Results

Radiated Emission Comparison
Unshielded vs. CW Shielded D-Subminiatures Assemblies

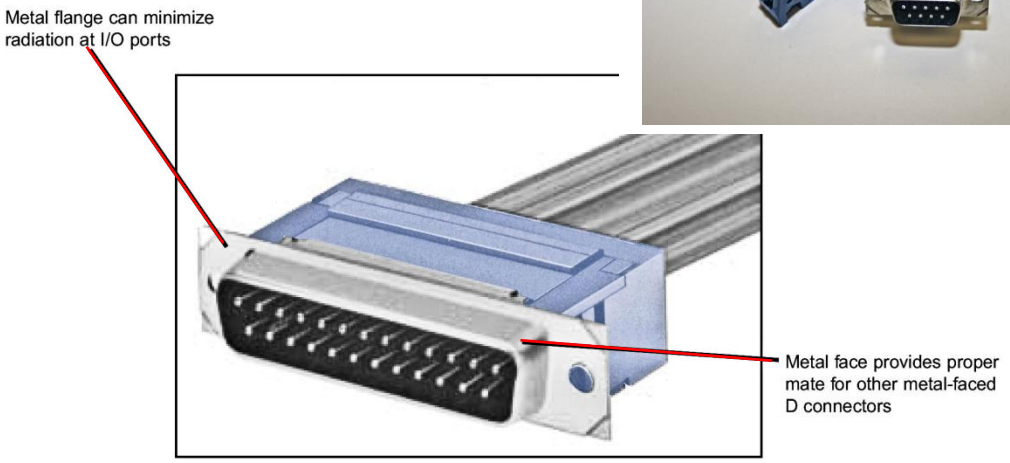


CW D-Subminiature Connectors with Metal Face & Assembled EMI/RFI Shield



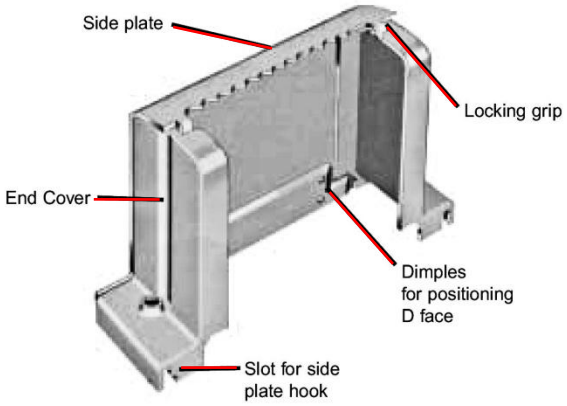
D–Subminiature Connector with Metal Face

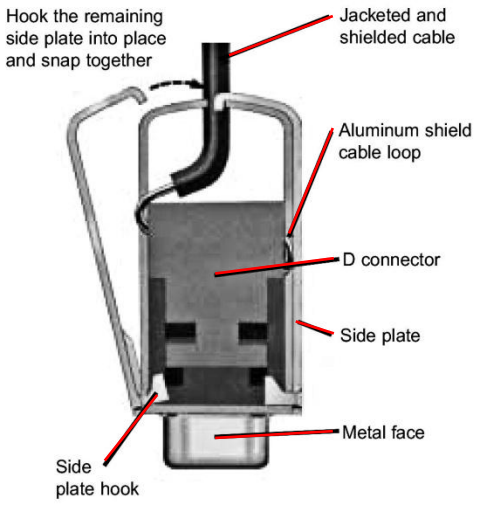
CW metal faced D-Subminiature connectors are ideal for input/output applications and interconnecting electronic equipment. These connectors are designed to the applicable standards of Mil-DTL-24308 and are interchangeable and mateable with other connectors so designed.



Assemble an EMI/RFI shield to our D-Subminiature connector in a snap

After terminating the connector to C-03-021 or C-03-031 style jacketed and shielded flat cable, slide the D-Subminiature connector with metal face into the preassembled shield.





Card Edge Connector

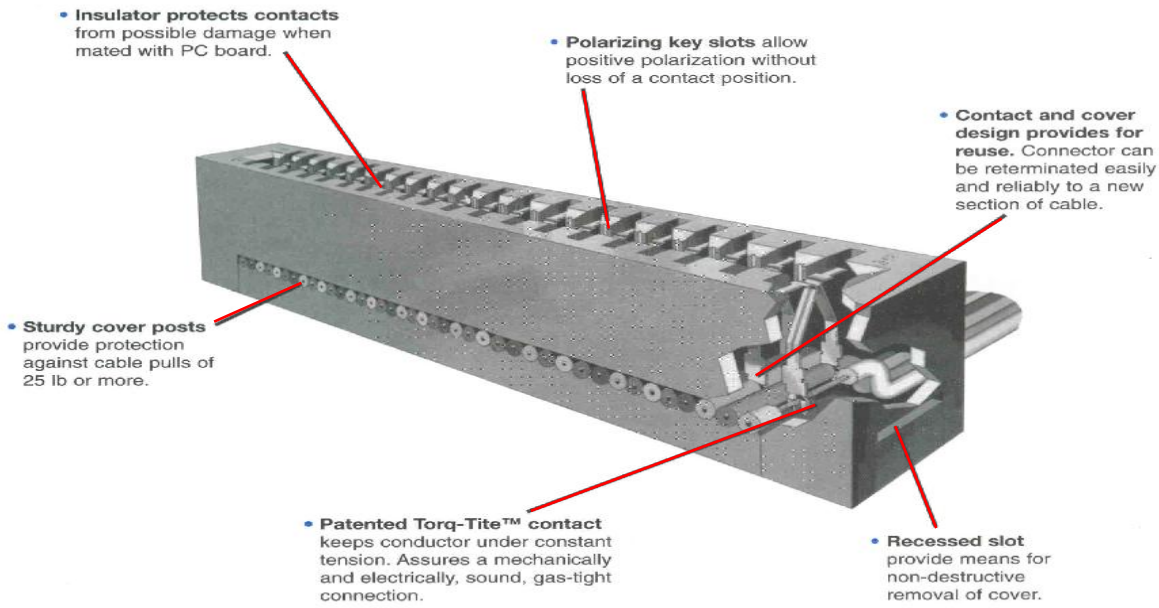
The card edge connector provides a fast means for connecting/disconnecting single, double-sided or multilayer printed circuit boards.

Contact force consistency is obtained through the use of a long cantilevered contact having a minimum deflection angle and an extended self-cleaning, wiping action. These contacts ensure positive connection to the board, even when pad surfaces are irregular.
Good contact pressure is maintained with minimum wear on PC board pads, even in hostile environments, and after numerous insertions and withdrawals or shock and vibration.

Strain relief - is an integral part of CW Card Edge connector. A strain relief lip is molded into the connector body. Upon installation of the cover, this lip causes a strain relief bend in the cable that prevents forces applied to the cable from being transferred to the IDC termination.

Positive polarization - is available on all CW card edge connectors. A polarizing key, inserted into a V-slot located between any two contacts, fits into a corresponding .037 in. slot cut into the PC board. This technique not only provides positive polarization without loss of a contact position, but also helps ensure precise alignment of the contacts to the PC board's pads.

Assembling these connectors is both fast and easy using only a simple bench press. The connector body is designed to orient the cable to the contact tines, and the factory preassembled cover permits termination of all conductors in one step–simply apply opposing parallel forces on the connector cover and base.



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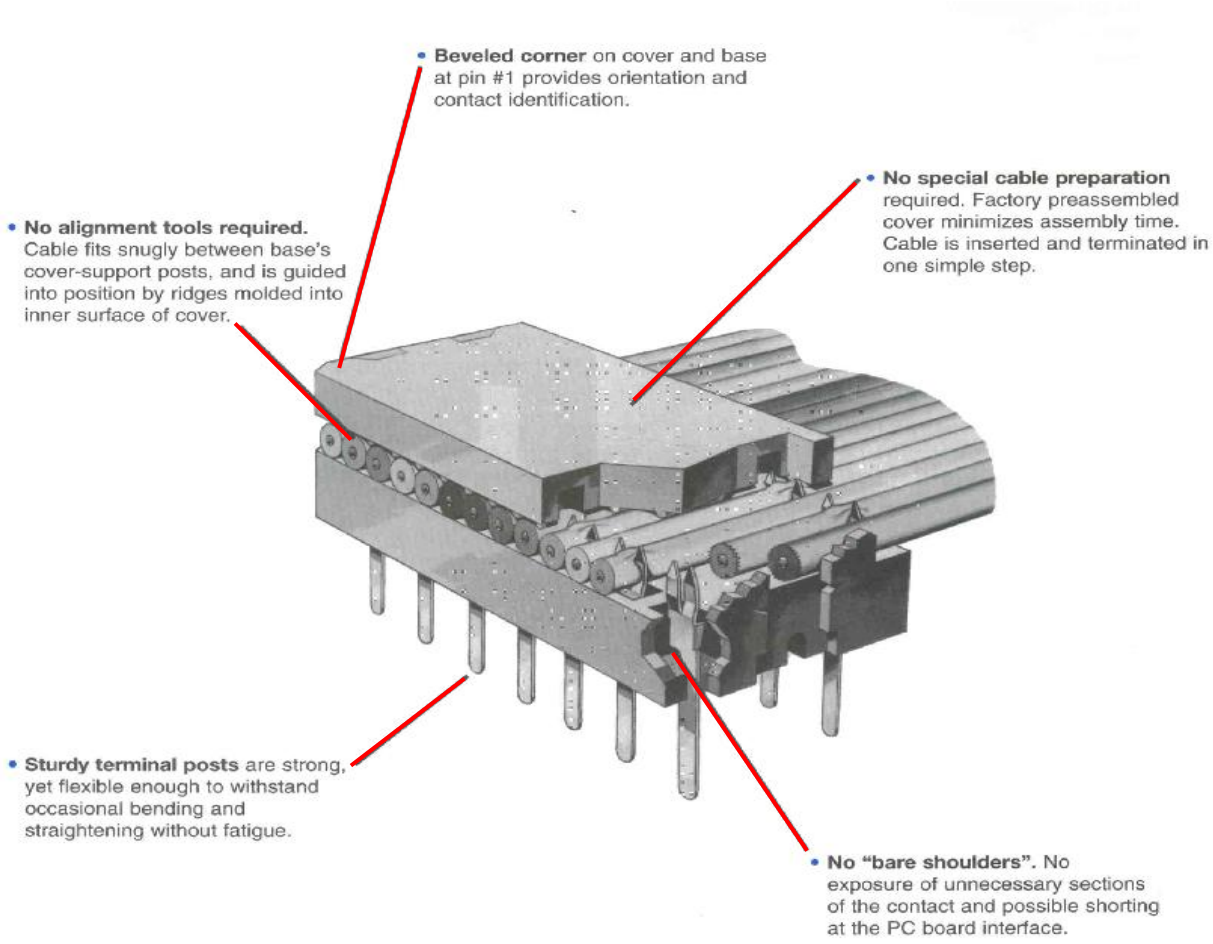
Dip Connectors

The CW Dual-In-Line Plug (DIP) connector is used for rapid, permanent connection of ribbon cable to a PC board or to a standard DIP socket when connect/disconnect capabilities are required. The cover is factory preassembled to the connector base to simplify assembly to cable and has ridges for cable alignment. CW DIP connectors are Mil-DTL-83503/6 approved.

Strain Relief -Optional metal strain relief straps are available. Connection is isolated from mechanical strain by the bend in the cable, as it is folded over the top of the assembled connector. The Strain Relief Strap is placed over the cable and snaps into a recess on the connector. A centralized top cable exit is created in the finished cable assembly.

Contact Identification - Every contact position is numbered, per Mil- DTL-83503, for easy identification. In addition, a beveled corner at pin #1 enhances orientation of the connector to the mating DIP Socket, even in blind installations.

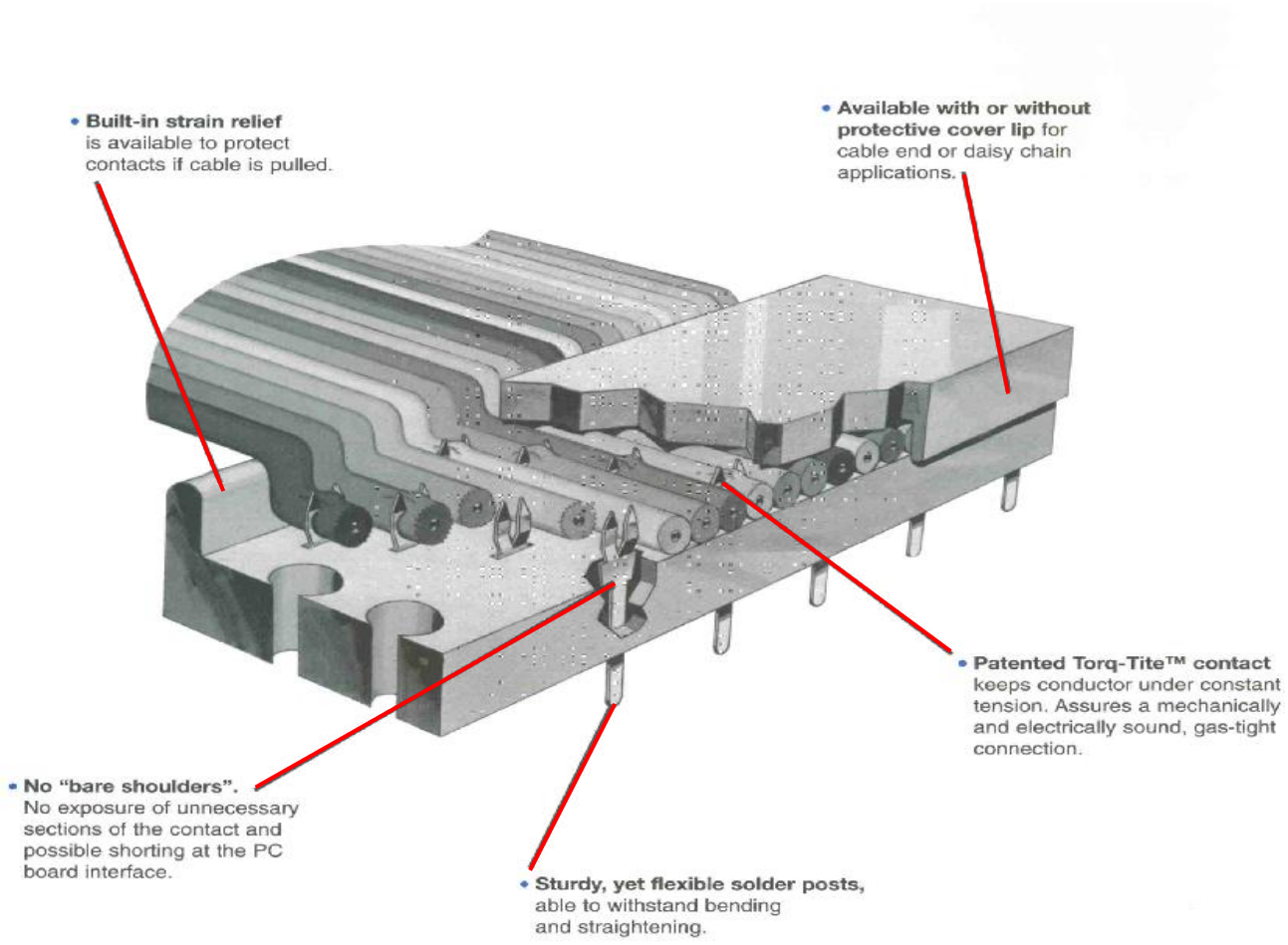


PCB Connectors

The PCB connector is used when a permanent connection of flat cable to the PC board is required. The cable is terminated to the PCB connector making a reliable gas-tight connection with CW's patented Torq-Tite™ contacts. The connector's pins are then soldered to the board. CW's PCB connectors are approved by the U.S. Defense Department and are qualified to Mil-DTL-83503/23.

Strain Relief - A molded-in strain relief is an optional feature on CW PCB connectors. (Specify CWR-140 or CWR-143 series). This lip, upon installation of the cover, creates a strain relief bend in the cable, inhibiting the transfer of any tension on the cable to the contact lines.

Cover Lip - For additional protection on cable end terminations, the CW PCB connector is available with a cover lip to insulate the ends of the cable's conductors. This eliminates possible "shorts" and allows you to position connectors more closely on your PC board. (Specify CWR-140 or CWR-141 series).



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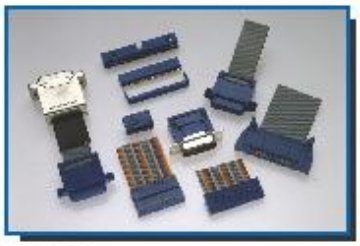
Custom-Designed Switches, Connectors and Assemblies

Mil Spec Connectors

- Full line of high density rectangular connectors
- QPL Approved to MIL-DTL-83503, MIL-DTL-24308 and MIL-DTL-28804
- NAVSEA qualified
- Used on the F-16, Standard Missile, Phalanx and others.
- In-house test facilities qualified to DOD
- Custom design capabilities

Rocker Switches

- Miniature to Full-Sized
- Ratings to 20A @ 125V-250V AC and ½ HP.
- Variety of styles, colors, and markings
- Circuitries ranging from SPST through DP 3 Position
- Sealed / IP rated available
- Illuminated and Non-Illuminated



IDC Connectors

- Sockets, Headers, D-Subminiature, Card Edge, DIP and PCB connectors
- Patented Torq-Tite™ contact for gas tight connections.
- Interchangeable with industry standard IDC connectors
- Mil Spec and Commercial Grades available

Pushbutton Switches

- Rated from .5 amps to 6 amps, 125V–250V AC
- Variable functions and mounting styles available
- Unique range of termination options
- Illuminated and Non Illuminated
- Sealed / IP rated available

Custom Products

- Electromechanical assembly
- ESD Compliant
- Custom Switches & Connectors
- Wire Harness Assembly

Slide Switches

- Micro-Miniature to Full-Sized for Panel and PC Board Mounting
- One thru four poles and one thru five positions
- Ratings from .5A to 16A @ 125V AC
- Maintained, momentary, and side actuated versions

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