

APPLICATION NOTES

Connectors for LED Lighting Applications

Mill-Max addresses the connector needs of the growing field of LED lighting applications with products such as receptacles and sockets suitable for LED Bi-pin bulbs and interconnects ideal for co-planar mating of LED driver boards. We offer a variety of through-hole and surface mount products suitable for LED lighting requirements. All of these components are made to the same high quality and precision expected of Mill-Max products.

Co-Planar Board Mating

LED lighting applications, such as strip lights, often require end-to-end mating (daisy chaining) of boards. Mill-Max manufactures through-hole and SMT interconnect solutions readily available to satisfy this requirement. Our line of horizontal surface mount (HSMT) connectors are available on .100" and .050" grids. These headers and sockets have Z-bend style lead terminations providing a low profile and easy inspection of solder joints (Fig. 1).

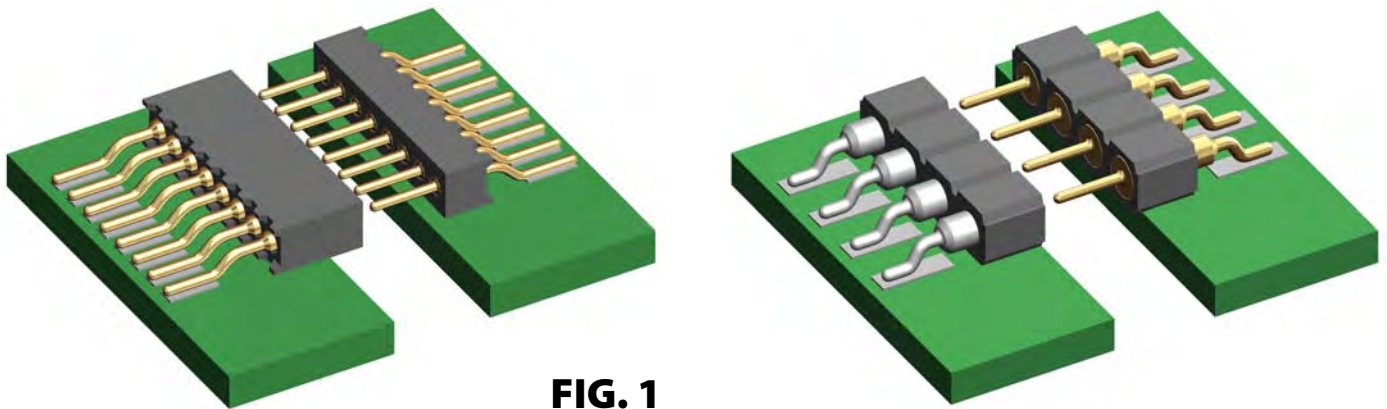


FIG. 1

We have recently added a new product to the group with the introduction of the 339-10-1XX-40-000000 series surface mount header/jumper (Fig. 2). The 339 series



header/jumper has Z-bend SMT terminations on both ends, useful for creating a soldered, daisy chain connection of two co-planar boards. This can be convenient when there is only access to the top of the board and/or a permanent connection is desired. The low profile of all these connectors, .100" maximum, makes them especially appealing for use in LED strip lighting systems.

These connectors are supplied in standard plating options of gold or tin with high temperature insulators suitable for RoHS compliant environments and for reflow soldering. The co-planarity of the connector leads is .005" for connectors up to one inch in length. (Contact Mill-Max Technical Support for information regarding longer strips.)

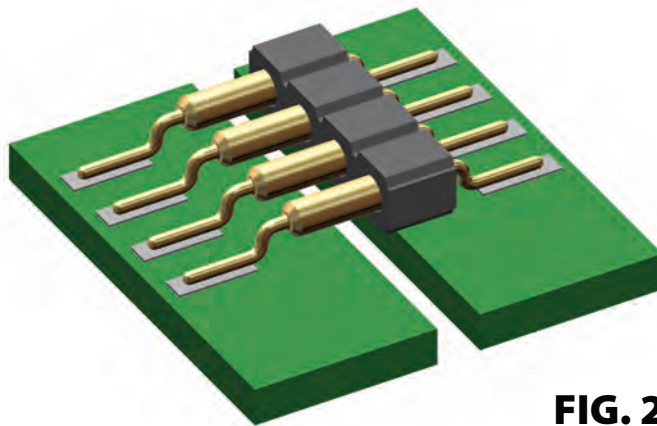


FIG. 2

Rounding out the HSMT connector line are spring-loaded products in single row strips (Fig. 3) and individual components. See Table 1 for a list of the products discussed above.

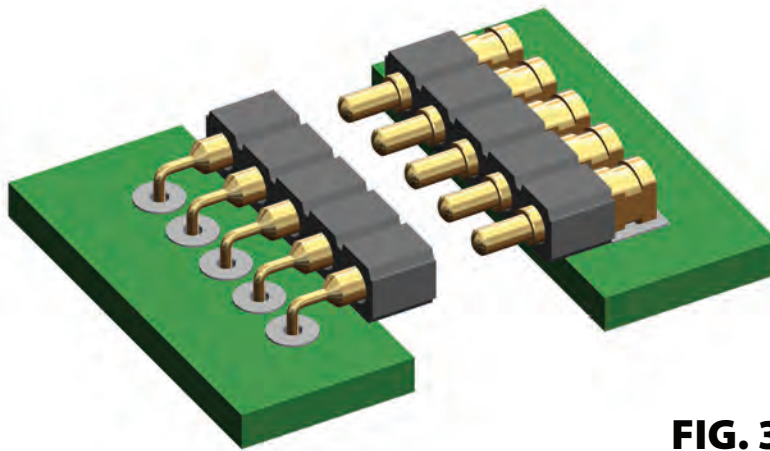


FIG. 3



Horizontal SMT Connectors (HSMT)

- Table 1 -

| | Part No. / Description | Grid (pin - pin spacing) | Profile | Features | Mating Pairs |
|---|---|--------------------------------|---------|--|---|
|  | 310-43-1XX-40-023000 (XX = 02 - 10 Pins) Socket | .100" | .100" | Accepts .015"-.025" Diameter Leads |  |
|  | 330-YY-1XX-40-027000 (XX = 02 - 10 Pins) Header | .100" | .100" | .018" Diameter Mating Leads | |
|  | 801-43-0XX-40-002000 (XX = 02 - 10 Pins) Socket | .100" | .100" | Accepts .025"-.037" Diameter Leads |  |
|  | 830-YY-0XX-40-028000 (XX = 02 - 10 Pins) Header | .100" | .100" | .030" Diameter Mating Leads | |
|  | 339-10-1XX-40-000000 (XX = 02 - 10 Pins) Header / Jumper | .100" | .100" | .020" Dia. Z-Bend Terminations | |
|  | 851-13-0XX-40-001000 (XX = 02 - 20 Pins) Socket | .050" | .087" | Accepts .015"-.020" Diameter Leads |  |
|  | 850-10-0XX-40-001000 (XX = 02 - 20 Pins) Header | .050" | .087" | .016" Diameter Mating Leads | |
|  | 810-22-0XX-40-001101 (XX = 02 - 10 Pins) Spring-Loaded Header | .100" | .100" | Spring-loaded with .045" working travel (.090" max. stroke) | |
|  | 0967-0-15-20-75-14-11-0 Spring-Loaded Pin | N/A | .100" | Spring-loaded with .0275" working travel (.055" max. stroke) |  |
|  | 7937-0-00-15-00-00-03-0 Target Pin | N/A | .100" | | |

* YY = Plating Options. Please visit Mill-Max website



The through-hole products offered for co-planar board-to-board interconnects include connectors on .050", .070", 2 mm & .100" grids (Fig. 4). These are right angle connectors and like the SMT products, these interconnects are ideal for daisy chaining of boards, are low profile and have high temperature insulators suitable for reflow soldering processes. Plating options are gold and tin (RoHS compliant) as well as tin/lead. See Table 2 for a listing of the right angle connector products.



FIG. 4

Lastly, to bring power to the driver board Mill-Max has connectors with solder cup terminations. Mating Series 329-YY-1XX-41-540000 [Socket], 380-YY-0XX-00-001000 [Header] (Fig. 5) and 801-13-0XX-10-007000 [Socket], 800-YY-0XX-10-007000 [Header] (Fig. 6) are .100" grid connectors and can handle wire sizes up to 24 AWG and 20 AWG respectively.

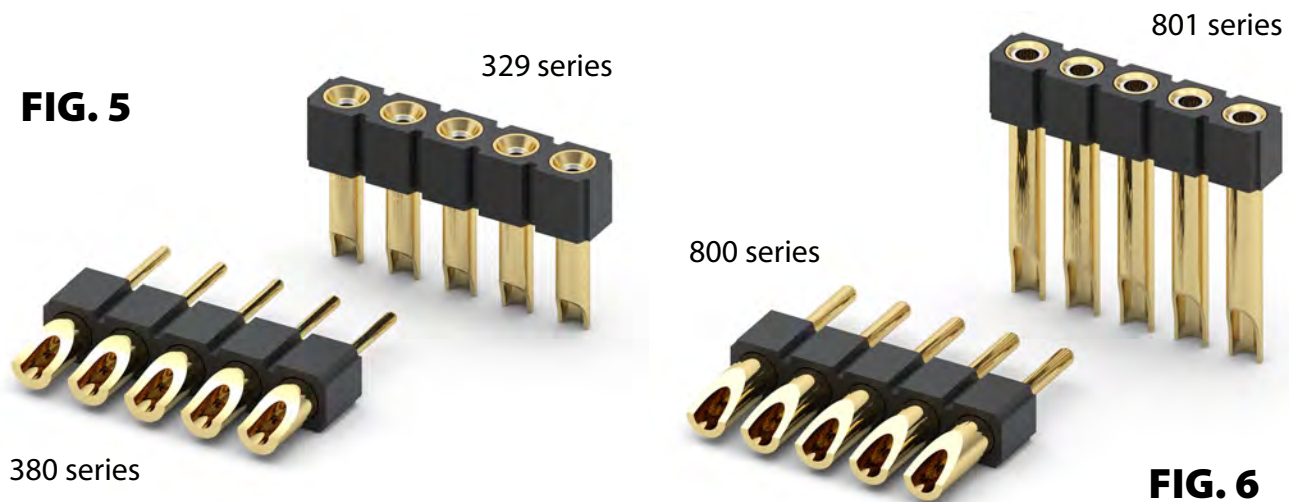


FIG. 5

FIG. 6



Through-Hole Right Angle Connectors

- Table 2 -

| | Part No. / Description | Grid (pin - pin spacing) | Profile | Features | Mating Pairs |
|---|---|--------------------------------|---------|---------------------------------------|---|
|  | 851-YY-0XX-20-001000 (XX = 01 - 50 Pins) Right Angle Socket | .050" | .087" | Accepts .015"-.020" Diameter Leads |  |
|  | 850-YY-0XX-20-001000 (XX = 01 - 50 Pins) Right Angle Header | .050" | .087" | .016" Diameter Mating Leads | |
|  | 871-YY-0XX-20-001000 (XX = 02 - 21 Pins) Right Angle Socket | .070" | .104" | Accepts .015"-.025" Diameter Leads |  |
|  | 870-10-0XX-20-001000 (XX = 02 - 21 Pins) Right Angle Header | .070" | .104" | .018" Diameter Mating Leads | |
|  | 831-YY-0XX-20-001000 (XX = 01 - 50 Pins) Right Angle Socket | 2mm | 2mm | Accepts .015"-.025" Diameter Leads |  |
|  | 830-10-0XX-20-001000 (XX = 01 - 50 Pins) Right Angle Header | 2mm | 2mm | .018" Diameter Mating Leads | |
|  | 399-YY-1XX-10-003000 (XX = 02 - 64 Pins) Right Angle Socket | .100" | .100" | Accepts .015"-.025" Diameter Leads |  |
|  | 399-YY-1XX-10-009000 (XX = 02 - 64 Pins) Right Angle Header | .100" | .100" | .018" Diameter Mating Leads | |
|  | 801-YY-0XX-20-001000 (XX = 01 - 50 Pins) Right Angle Socket | .100" | .100" | Accepts .025"-.037" Diameter Leads |  |
|  | 800-YY-0XX-20-001000 (XX = 02 - 64 Pins) Right Angle Header | .100" | .100" | .030" Diameter Mating Leads | |

* YY = Plating Options. Please visit Mill-Max website



Bi-Pin LED Bulb Receptacles and Sockets

Mill-Max manufactures a selection of off-the-shelf receptacles that accept LED bulb leads conforming to the MR11 (G4 Style) & MR16 (G5.3 Style) base configurations. We offer through-hole solder mount, press-fit, open bottom, SMT and wire termination options to suit your application. These receptacles can be mounted in housings to make connector assemblies or fixed directly to a circuit board. Mill-Max can quickly manufacture the two pin socket of your choice by utilizing Fr-4 epoxy for the housing and standard receptacles with the termination style you require. See the figures below for examples of some of the Bi-Pin LED sockets we offer. For those applications where high operating temperatures are a concern, Mill-Max can replace the standard beryllium copper contact with a beryllium nickel contact suited for higher temperatures (above 150° C). Tables 3 and 4 below provide receptacle suggestions for different applications. The Mill-Max catalog and website have many more options to choose from. Contact Mill-Max Technical Support if you need further assistance choosing a product.

All Mill-Max pin headers, receptacle sockets and spring pin connectors feature high-speed screw machined pins, receptacles and spring pin components manufactured to precision tolerances. Inside each receptacle is a precision stamped beryllium copper Mill-Max contact. Spring pins contain durable, gold-plated beryllium copper or stainless steel springs.

3D connector models are available upon request for product engineering development.

Contact Mill-Max Technical Services for custom design options.

Receptacle Suggestions for MR11 Configurations

- Table 3 -

| MR11 BASE CONFIGURATION | | | Mill-Max Mfg. Receptacle Suggestions | | | |
|-------------------------|--------------------------|--------------------------------|--------------------------------------|-----------|-------------|------------------|
| TYPE | Grid (pin - pin spacing) | Pin Diameter | Solder Mount | Press-Fit | Open Bottom | Wire Termination |
| G4 and GY4 | 4.0mm (.1575") | 0,65 - 0,75mm (.026" - .030") | #0415-0 | #0279-0 | #0305-X | #1134-0 |
| GU4 and GZ4 | 4.0mm (.1575") | 0,95 - 1,05mm (.037" - .0413") | #0327-0 | #0328-0 | #0312-0 | #7405-0 |





Receptacle Suggestions for MR16 Configurations

- Table 4 -

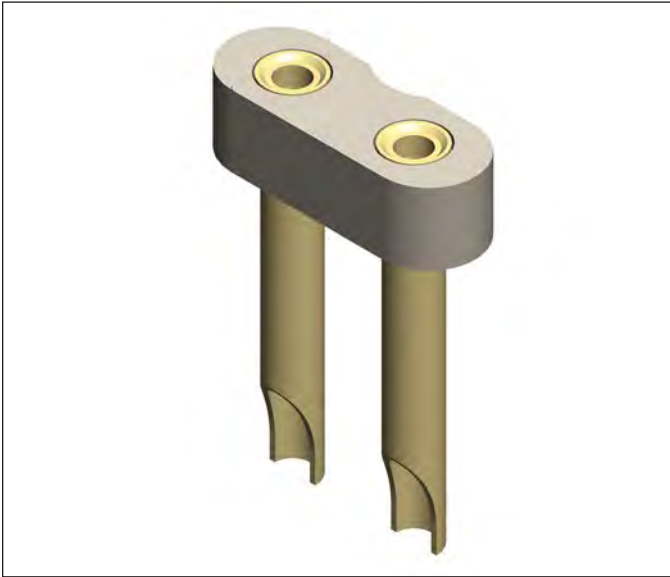
| MR16 BASE CONFIGURATION | | | Mill-Max Mfg. Receptacle Suggestions | | | |
|-------------------------|--------------------------|-------------------------------|--------------------------------------|-----------|-------------|------------------|
| TYPE | Grid (pin - pin spacing) | Pin Diameter | Solder Mount | Press-Fit | Open Bottom | Wire Termination |
| G5.3, GU5.3 and GX5.3 | 5,3mm (.210") | 1,45 - 1,60mm (.057" - .065") | #0363-0 | #0365-0 | #0372-0 | #3667-0 |



BI-Pin LED Sockets

MR11, TYPES G4 & GY4, [0,65 - 0,75mm (.026"- .030") DIA. LEADS]

**SOCKET WITH #1134 RECEPTACLE FOR WIRE
TERMINATION**



**SOCKET WITH #1303 RECEPTACLE FOR
THROUGH-HOLE SOLDER MOUNT**

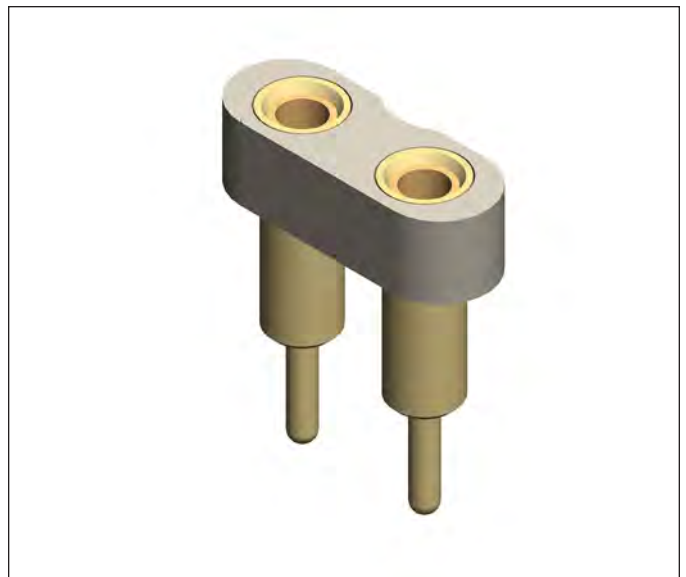


MR11, TYPES GU4 & GZ4, [0,95 - 1,05mm (.037"- .0413") DIA. LEADS]

**SOCKET WITH #7405 RECEPTACLE FOR WIRE
TERMINATION**



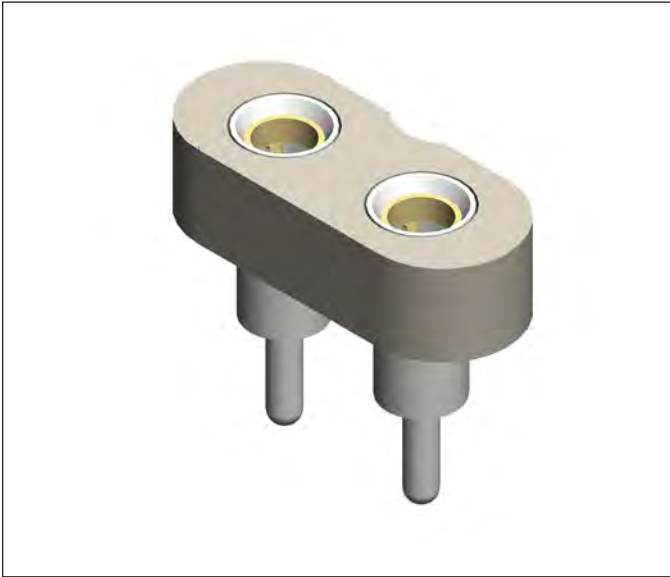
**SOCKET WITH #0405 RECEPTACLE FOR
THROUGH-HOLE SOLDER MOUNT**



BI-Pin LED Sockets

MR16

**SOCKET WITH #9324 RECEPTACLE FOR
THROUGH-HOLE SOLDER MOUNT**



**SOCKET WITH #0365 RECEPTACLE FOR
SURFACE MOUNT**

