

MFi Component Guide

R25

September 20, 2012


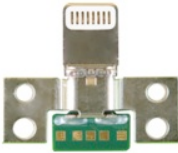
The availability & specifications of MFi components is subject to change without notice.

Component usage is subject to approval by the MFi Licensing Department

Apple Lightning Connectors

Lightning Connector descriptions, specifications, and drawings are contained in the Accessory Interface Specification in the MFi Portal. RoHS information for Lightning Connectors can be found on Avnet's MFi website.

Lightning Connector Sample Kits

Name	Description	Avnet Part #	Image
C10 Lightning Connector Sample Kit	<p>This kit contains 3 samples each of the 4 configurations of C10 connectors: USB Host Mode (C10A), USB Device Mode (C10B), Serial (C10C) and "Power Only" (C10D).</p> <p>The C10 connectors are recommended for cable integrations. For a full description of the capabilities of each of these connectors, please reference the Accessory Interface Specification.</p>	MFI677-0644	
C11 Lightning Connector Sample Kit	<p>This kit contains 3 samples each of the 4 configurations of C11 connectors: USB Host Mode (C11A), USB Device Mode (C11B), Serial (C11C) and "Power Only" (C11D).</p> <p>The C11 connectors are required for accessory dock integrations and recommended for form-fitting accessories. For a full description of the capabilities of each of these connectors, please reference the Accessory Interface Specification.</p>	MFI677-0653	

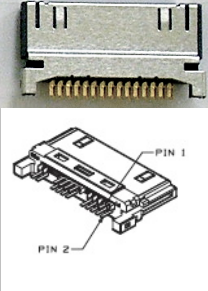
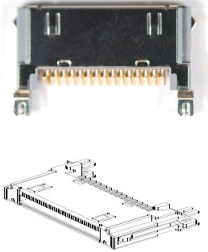
30-pin connectors

30-pin connector drawings are found in the iPod Connectors ZIP archive in the MFi Portal. RoHS information for connectors can be found on Avnet’s MFi website.

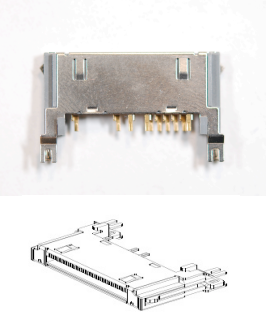
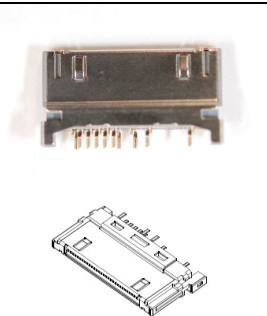
The connector descriptors, drawings, and images are subject to change without notice, and licensees should purchase samples of connectors and determine their fit for the licensee’s product before purchasing production volume quantities of a connector.

These connectors must not be the sole or main point of physical support for an iPod, iPhone, or iPad. Accessories must use the universal dock & dock adapter approach to provide support, or, alternatively, must implement another means (other than the connector) to provide physical support to an iPod, iPhone, or iPad.

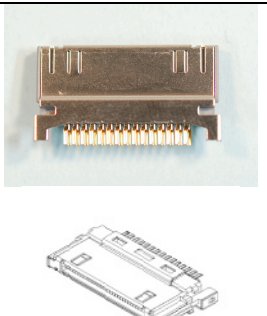
Mid-plane connectors

Description	Primary Usage	Avnet Part #	Image
<p>30-pin connector, plug, mid-plane</p> <p><u>Associated metal shells sold separately</u></p>	<p>This connector should be used with products that require a metal shell around the connector (for shielding) or with products that do not require latching pins (friction or detent). This plug is designed so that the pins on the connector will straddle both sides of a PCB and is not designed for surface mount solutions. Commonly used with products that have electronics right in the plug that plugs into the iPod.</p> <p>Designed for use with the MFI805-6462 & MFI805-6463 shells (which provide an passive/friction latching mechanism).</p> <p><i>Note: Only 16 pins are present in this connector. See the connector drawing for details. Licensees are strongly encouraged to purchase samples of this connector to confirm that it meets their requirements.</i></p>	<p>MFI512S0011</p>	
<p>30-pin connector, plug, mid-plane, with friction latches</p> <p><u>There are no metal shells used with this connector</u></p>	<p>This connector is designed so that the pins on the connector will straddle both sides of a PCB. Commonly used with products that have electronics within the connector’s housing.</p> <p>This connector should be used with products where a metal shell around the connector is not desired or supported, but does require friction latching pins.</p>	<p>MFI512S0017</p>	

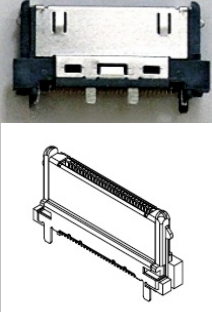
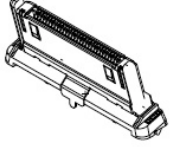
Power & Sync Only connectors

<p>'Power/Sync Only' 30-pin connector, plug, 10 contact, mid-plane, with friction latches</p> <p><u>There are no metal shells used with this connector</u></p>	<p>For use in 'Power & Sync Only' products.</p> <p>This connector is designed so that the pins on the connector will straddle both sides of a PCB.</p> <p>This connector should be used with products where a metal shell around the connector is not desired or supported, but does require friction latching pins.</p> <p><i>Note: Only 10 pins are present in this connector. See the connector drawing for details.</i></p>	<p>MFI514S0164</p>	
<p>'Power Only' 30-pin connector, plug, 10 contact, cable end</p> <p><u>Associated metal shells sold separately</u></p>	<p>For use in 'Power & Sync Only' products.</p> <p>This connector is designed to be soldered to the end of a cable. Should be used with cable assemblies, where the connector cannot be unplugged unless the user presses release buttons on the side of the connector housing. This connector has solder tail pins, and is not suitable for mounting onto a PCB.</p> <p>Designed for use with the MFi870-1281 & MFi870-1282 shells (which provide an active latch mechanism).</p> <p><i>Note: Only 10 pins are present in this connector. See the connector drawing for details.</i></p>	<p>MFI517-0595</p>	

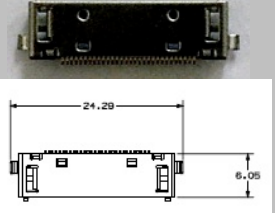
Cable End (Solder-tail) connector

<p>30-pin connector, plug, cable end</p> <p><u>Associated metal shells sold separately</u></p>	<p>This connector is designed to be soldered to the end of a cable. Should be used with cable assemblies, where the connector cannot be unplugged unless the user presses release buttons on the side of the connector housing. This connector has solder tail pins, and is not suitable for mounting onto a PCB.</p> <p>Designed for use with the MFi870-1281 & MFi870-1282 shells (which provide an active latch mechanism).</p>	<p>MFI517-0433</p>	
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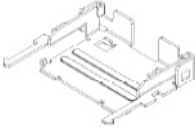
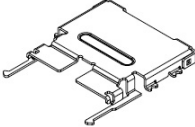

Dock plugs

<p>30-pin connector, plug, vertical dock (SMT)</p>	<p>The connector is used in products where the Apple device will sit vertically (perpendicular to the PCB), such as battery packs.</p>	<p>MF1514S0084</p>	
<p>30-pin connector, plug, angled dock, with support tab.</p>	<p>This connector is angled 15 degrees off vertical, with a support tab. It is designed for use with plastic sleeve and adapters used with the universal dock.</p>	<p>MF1514S0117</p>	

Receptacle

<p>30-pin connector, receptacle</p>	<p>This receptacle connector is only available in sample quantities, and is only for use in manufacturing and R&D test fixtures.</p> <p><i>Note: This connector is not available for use in production and/or shipping products.</i></p>	<p>MF1514S0037</p>	
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Connector Shells

Description	Primary Usage	Avnet Part #	Image
<p>Top shell for MFI517-0433 and 517-0595-01 (Detent Latch)</p>	<p>Used in combination with MFI870-1282</p> <p>This component includes latch 'fingers' that hold the connector into the iPod. Users are required to press detent buttons on the side of the connector to disconnect the accessory.</p> <p>Not a plastic over-mold or shell. Helps shield against EMI.</p>	<p>MFI870-1281</p>	
<p>Bottom shell for MFI517-0433 and 517-0595-01 (Detent Latch)</p>	<p>Used in combination with MFI870-1281</p>	<p>MFI870-1282</p>	
<p>Top shell for MFI512S0011 (Friction Latch)</p>	<p>Used in combination with MFI805-6463.</p> <p>This component includes latch 'fingers' that hold the connector into the iPod. Users are <i>not</i> required to press detent buttons on the side of the connector to disconnect the accessory.</p> <p>Not a plastic over-mold or shell. Helps shield against EMI.</p>	<p>MFI805-6462</p>	
<p>Bottom Shell for MFI512S0011 (Friction Latch)</p>	<p>Used in combination with MFI805-6462.</p>	<p>MFI805-6463</p>	

Automotive Plug & Cable Kits

Plug kits are only available to automotive head unit & car radio manufacturers. A plug kit contains the plug connector, shell, lock, hood A and B, clamp and bushing.

Description	Avnet Part #
White plug cover. Cable diameter of 5.0mm	MFIDD1P030MAD
Black plug cover. Cable diameter of 5.0mm	MFIDD1P030MA2
Black plug cover. Cable diameter of 6.0mm	MFIDD1P030MA5
Black plug cover. Cable diameter of 7.0mm	MFIDD1P030MA6

Headphone Remote and Microphone Transmitter Chips

A Headphone Remote and Microphone system product requires the use of an Apple designed transmitter chip. There are two classes of transmitter chips available:

- Noise occluding – This transmitter chip should be used with earphones, headsets or headphones which actively or non-actively cancel or suppress external noises, such as the user's own voice. An example of a non-active noise-occluding solution would be form-fitting earpieces that fit tightly enough in the ear that outside noises cannot be heard by the user.
- Non-noise occluding – This transmitter chip should be used with headsets or headphones which do not prevent the user from hearing external noises. This transmitter chip must be in iPod shuffle remote control adapters.

Part Number	Usage
MFI353S2429	MFi noise-occluding headphones
MFI353S2430	MFi non-noise occluding headphones

Microphone Element

A Headphone Remote and Microphone system product requires the use of an Apple designated microphone element from Knowles.

Apple Part Number	Knowles Part Number
MFI731-0130	SPQ-2409-HE5H-PB

Authentication Coprocessors

RoHS information for the authentication coprocessors can be found on Avnet's MFi website. Please read the Authentication Coprocessor specifications for details on interfacing to, and communicating with, 2.0B & 2.0C authentication coprocessors.

Types of Authentication Coprocessors

	2.0B STD	2.0B WTR	2.0C
Size	4.2 mm x 4.2 mm	4.2 mm x 4.2 mm	2.5 mm x 2.5 mm
Package	QFN-20	SOP-8	PG-USON-8-1
Pins	20	8	8
Part number	MFI341S2162	MFI341S2313	MFI337S3959
Manufacturer	Renesas	Renesas	N/A
Usage	Auto & non-auto	Auto & non-auto	Auto & non-auto
Class	4	4	N/A
Accessory Certification	Made for iPod, Made for iPhone, Made for iPad	Made for iPod, Made for iPhone, Made for iPad	Made for iPod, Made for iPhone, Made for iPad

Authentication Coprocessor V2.0C

Recommended for use in new products.

A development board (MFISP000918596) containing an Authentication Coprocessor V2.0C part (MFI337S3959) from Avnet. This board is only available in sample quantities for the prototyping and development purposes; it is not available in production quantities.

Authentication Coprocessor V2.0B

Not recommended for use in new products.

Note: The Class 6 2.0B (MFI341S2164) authentication coprocessor is deprecated and must not be used in new products.

Discontinued & Deprecated Authentication Coprocessors

The following authentication coprocessor information is provided for legacy purposes only, and unless specifically approved by the MFi Licensing Department, new MFi accessories must not use any classes of the 2.0A authentication coprocessor, and must not use classes 1, 2, 3, 5, & 6 of the 2.0B authentication coprocessor.

	2.0A	2.0B STD
Size	6mm x 6mm	4.2mm x 4.2mm
Package	QFN-40	QFN-20
Pins	40	20
External Oscillator	Required	Not Required
Discontinued & Deprecated Classes	All	1, 2, 3, 5 & 6

Deprecated V2.0B Authentication Coprocessors

Part Number	Type	Class	Package	Mfg.	Auto/Non-Auto	Accessory Certification
MFI341S2159	2.0B STD	Class 1	QFN-20	Renesas	Auto Only	Made for iPod only
MFI341S2164	2.0B STD	Class 6	QFN-20	Renesas	Non-Auto Only	Made for iPod, Made for iPhone & Made for iPad

Deprecated Authentication Coprocessors must not be used in new products without prior approval from the MFi Licensing Department.

Discontinued V2.0B Authentication Coprocessors

Part Number	Type	Class	Package	Mfg.	Auto/Non-Auto	Accessory Certification
MFI341S2160	2.0B STD	Class 2	QFN-20	Renesas	Non-Auto Only	Made for iPod only
MFI341S2161	2.0B STD	Class 3	QFN-20	Renesas	Non-Auto Only	Made for iPod only
MFI341S2646	2.0BV2 STD	Class 3	QFN-20	Renesas	Non-Auto Only	Made for iPod only
MFI341S2163	2.0B STD	Class 5	QFN-20	Renesas	Non-Auto Only	Made for iPod, Made for iPhone & Made for iPad

Discontinued Authentication Coprocessors are not available for use in new products.

Date	Revision	Comments
2012-09-20	R25	Clarified that C11 Lightning connectors must be used in dock integrations, and are recommended for use in form-fitting accessories.
2012-09-12	R24	Added description of Lightning Connector Modules Removed description of discontinued connectors and 2.0A Authentication Coprocessors
2011-08-29	R23	Deprecated Class 6 2.0B Authentication Coprocessor.
2011-06-06	R22	Added Auth 2.0C Deprecated Class 1 & Class 3 Authentication Coprocessors. Although still available, these components may only be used in new accessories with the approval of the MFi Licensing Department.
2010-09-10	R21	Revised comment about MFI512S0011 to indicate that the metal shells used with this connector provide a passive (friction) latching mechanism rather than an active latching mechanism. Revised comment about MFI517-0433 to indicate that the metal shells used with this connector provide an active (detent) latching mechanism rather than a passive latching mechanism. Deprecated Class 3 2.0B (MFI341S2161), replaced by Class 3 2.0BV2 (MFI341S2646)
2010-01-15	R20	Added comment that new products must use the Authentication 2.0B coprocessors.