



# VTAC USER MANUAL

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## VTAC PASS-THRU INSERT FEATURE IDENTIFICATION

PART # 610151103

1. The VTAC Pass-Thru Insert has both a front mating end (**Figure A**) and rear mating end (**Figure B**). The front mating end is used to mate with the front mating end of additional VTAC Pass-Thru Inserts (**Figure D**). The rear mating end mates with VTAC Right Angle Inserts or VTAC Vertical Headers.
2. There are two ways to identify pin position 1. The first method is a keying feature that creates a large and a small side which only allows the insert to be installed one-way to ensure correct orientation (**Figure E**).
3. Pin position 1 can also be determined by a small indentation located on one side of the insert (**Figure C**). Note that the insert is positioned with the three circular indentations on the bottom.

**NOTE:** The VTAC Insert serves as both an ITA and receiver insert.

**NOTE:** The blue VTAC Insert used for patchcord termination, versus the VTAC Pass-Thru Insert has raised circular bosses on one side. When using a VTAC patchcord with multiple inserts or multiple VTAC patchcords loaded side-by-side in a SIM module, these bosses are intended to mate with the circular indentations on the opposite side of the insert to make grouping easier.

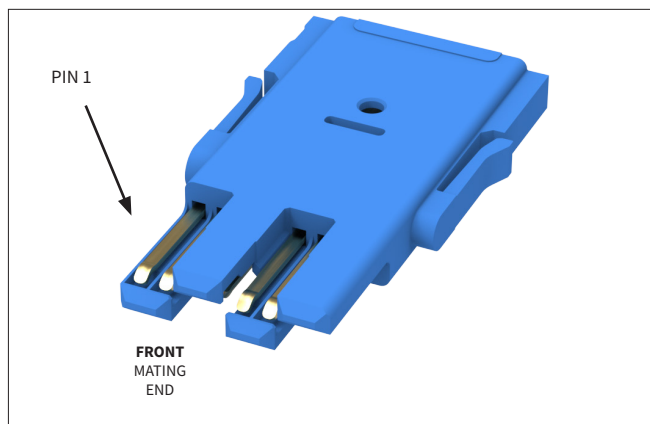
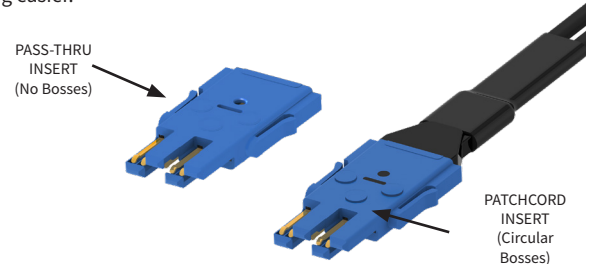


Figure A. Front mating end

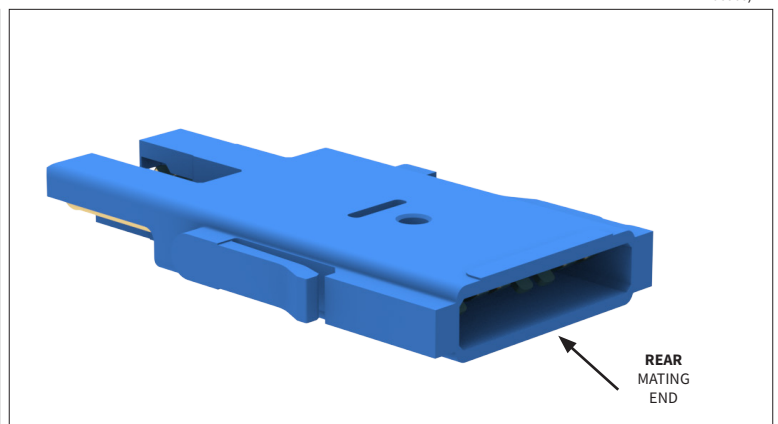


Figure B. Rear mating end

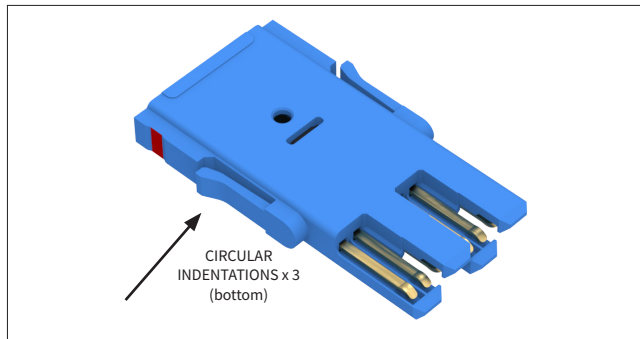


Figure C. Indentation (marked here in red for illustrative purposes) to help identify location of pin position 1.

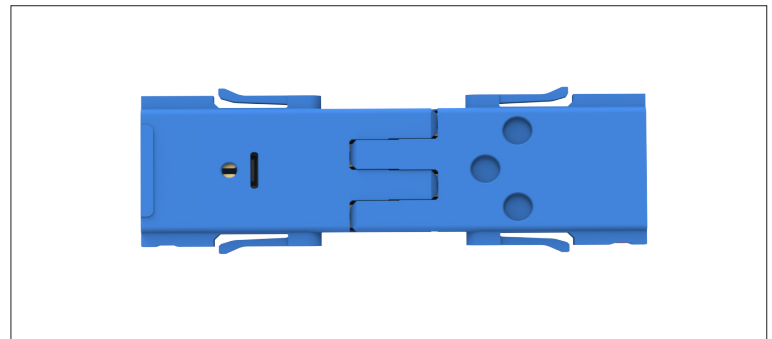


Figure D. Mated inserts



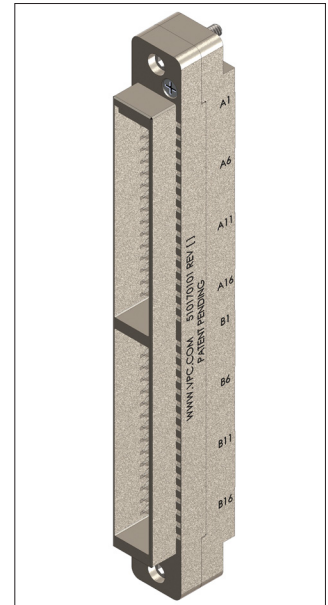
Figure E. Front mating view

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## SIM MODULE FEATURE IDENTIFICATION- RECEIVER

PART # 510170101

1. The top of the SIM Receiver Module can be identified by the position A1 indicator, located on the front side and is marked with a notch (**Figure C**). When the module is oriented correctly, this notch is located in the upper left corner of the front side.
2. The front is the mating side of the module and is also where the extraction tool cavities are located (**Figure C**).
3. The rear side can be identified as the side with the labeling closest to the edge from the side view. The rear side is the side where wiring exits. (**Figure B**).
4. Blue and white markings along the slot edges denote slot (insert) count. Each blue or white marked area indicate 5 slot positions. (**Figure A**).



SIM Receiver Module.

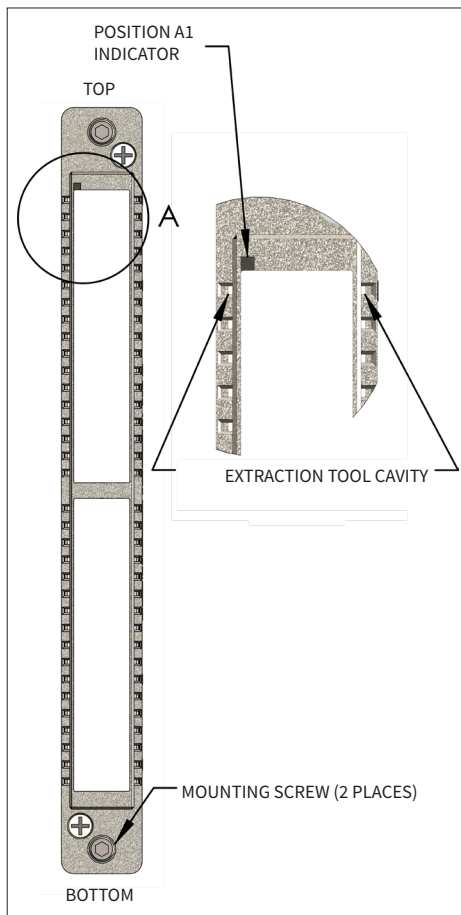


Figure C. Front view (mating side).

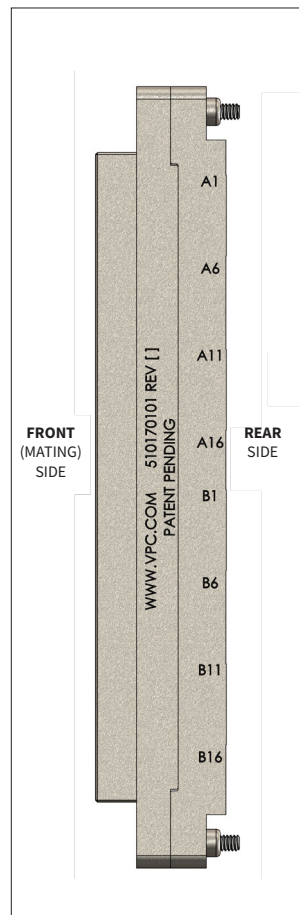


Figure B. Side view.

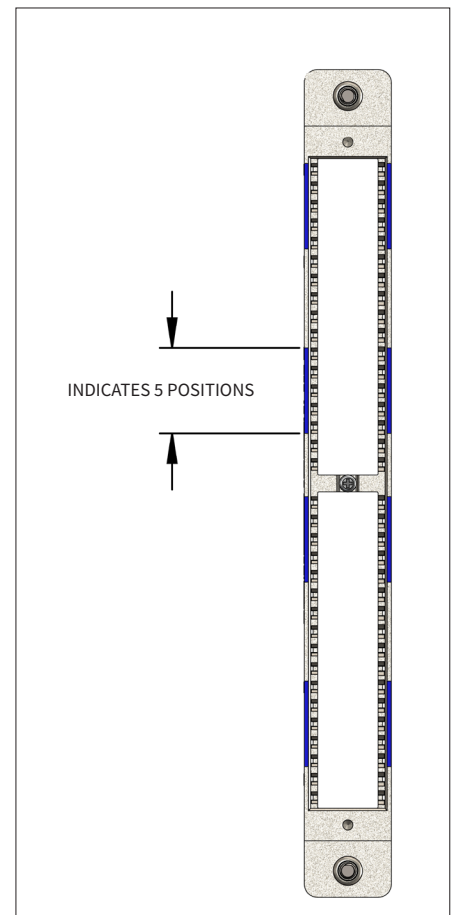


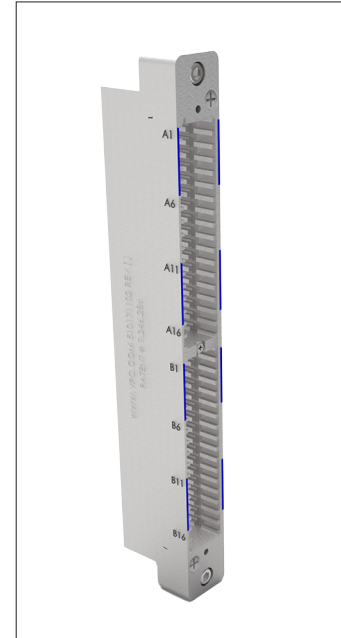
Figure A. Rear side/ wiring exit side.

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## SIM MODULE FEATURE IDENTIFICATION- ITA

PART # 510171101

1. The top of the SIM ITA Module can be identified by the position A1 indicator. This is located on the rear side and is designated by a notch (**Figure A**). Correct module orientation will place the position A1 indicator in the upper left-hand corner.
2. The front of the ITA module mates with the receiver module (**Figure B**). It also provides access to the extraction tool cavities (**Figure C**).
3. The rear side contains the position A1 notch and markings closest to the edge of the frame (**Figures B & C**). Wiring also exits from the rear side.
4. Blue and white markings along the slot edges denote slot (insert) count. Each blue or white marked area indicate 5 slot positions. (**Figure A**).



SIM ITA module.

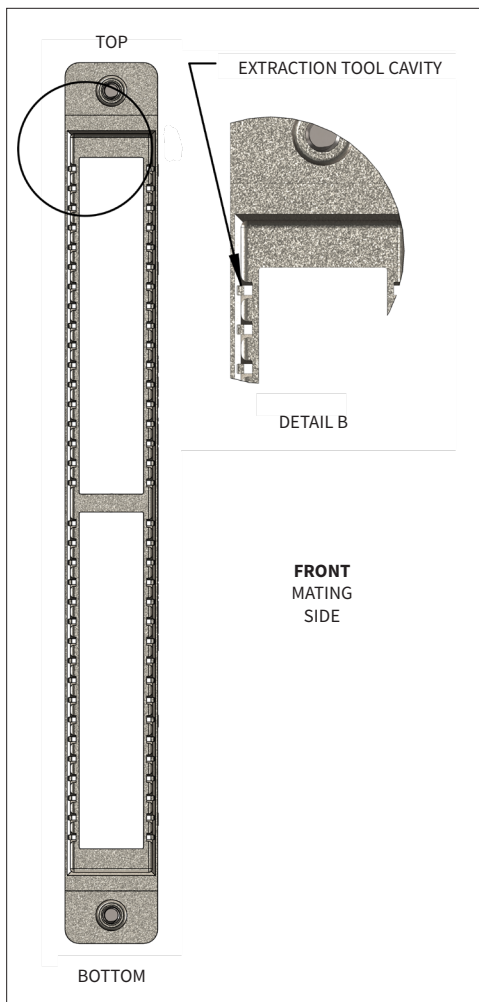


Figure C. Front view (mating side).

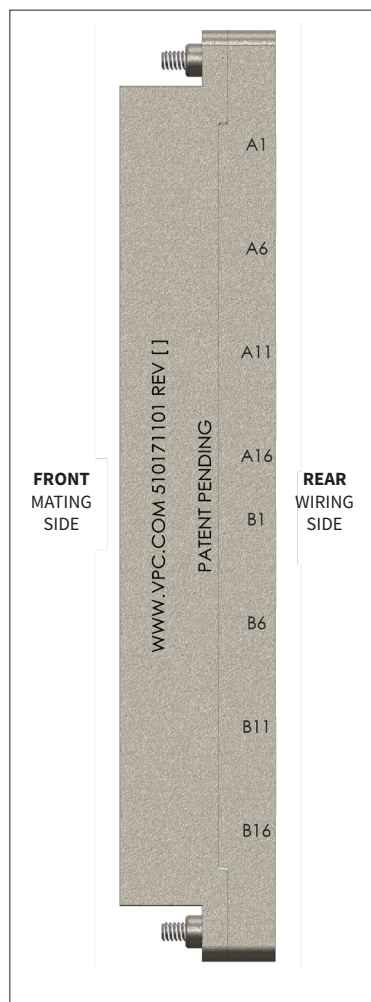


Figure B. Side view.

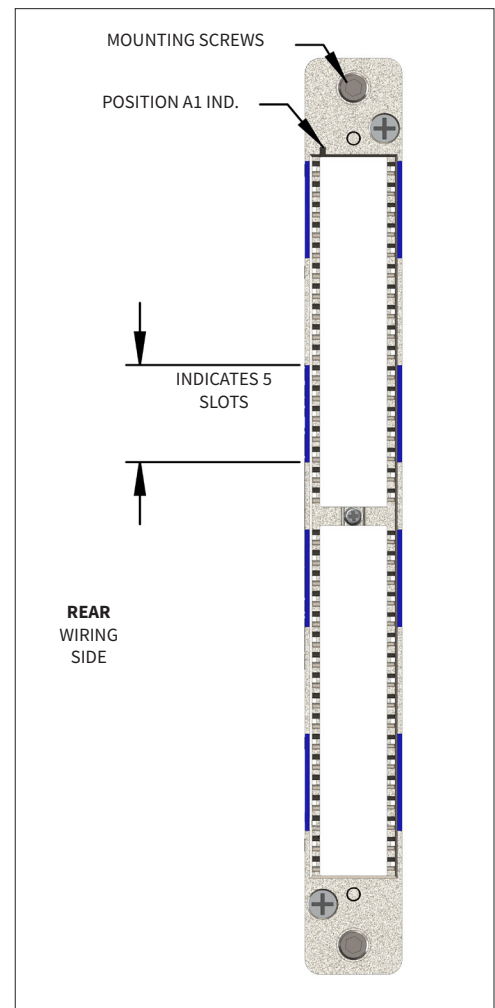


Figure A. Rear view (wiring side).

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## I2 MX FEATURE IDENTIFICATION- RECEIVER

PART # 310130113, 310130114

1. The front side of the i2 MX Receiver can be determined by locating the keying receptacles. The numeric keying receptacle should be located at the top and the alpha keying receptacle at the bottom of the front (**Figure B**). The front, also has a polarizing feature which prevents incorrect engagement with the ITA (**Figure B**). Finally, the front features a latch for secure mating with the ITA (**Figure A**).
2. Position A1 is located on the front by a cavity marked in black in the top left corner (**Figure B**). An additional Position A1 indicator can be found in the bottom tier of slots (Tier B), in the top left corner. The cavities are used to place pins from the VTAC Extraction Tool.
3. The rear side can be identified by the marking closest to the edge from the side view (**Figure B**). The rear side is where wire exits the receiver.
4. Blue and white markings along the slot edges denote slot (insert) count. Each blue or white marked area indicate 5 slot positions. (**Figure C**).

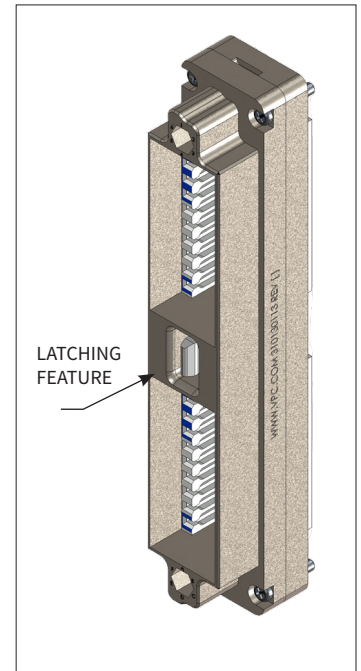


Figure A. Front view

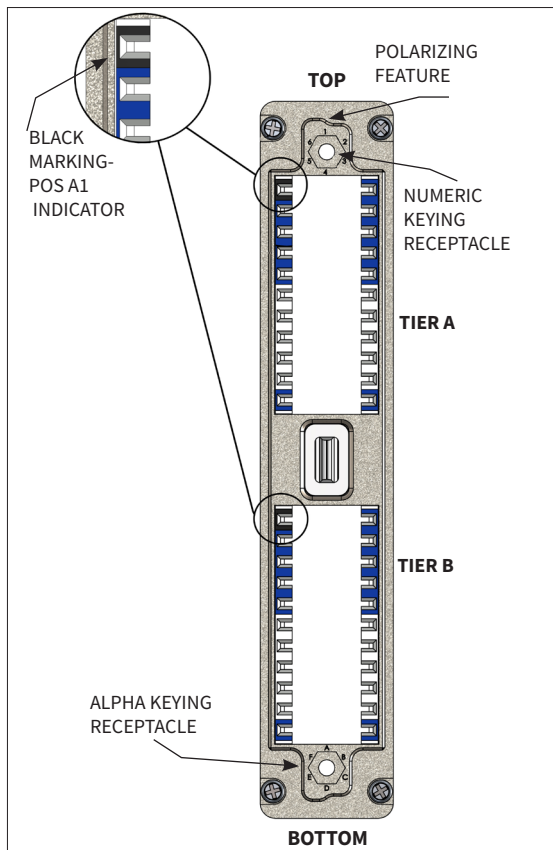


Figure B. Front view (ITA mating side)

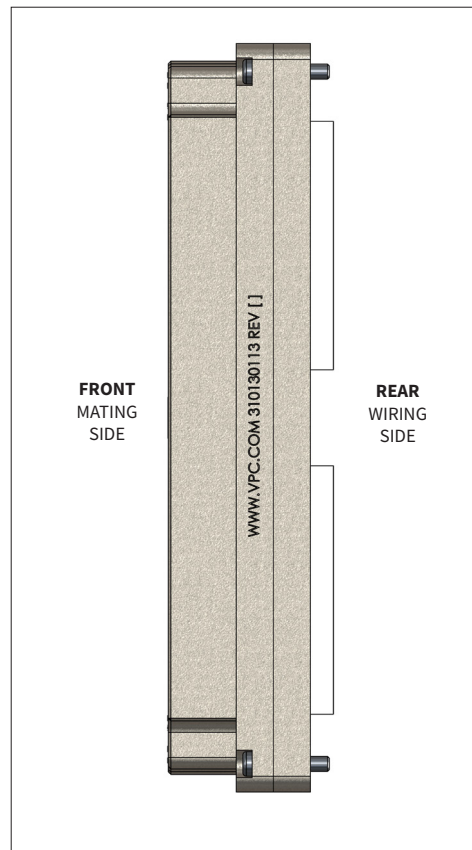


Figure C. Side view

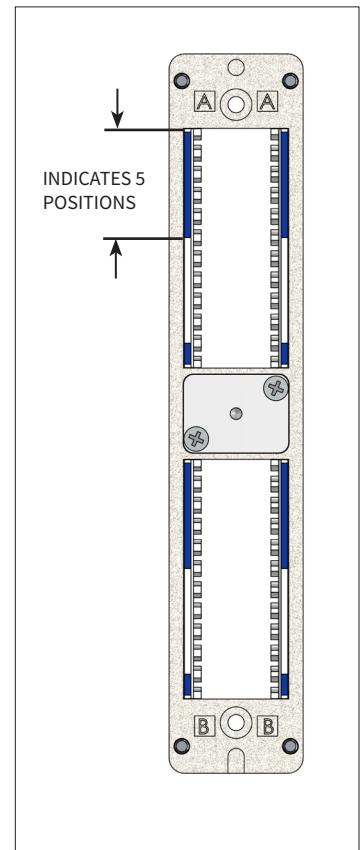


Figure D. Rear view (Wire exit side)

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## i2 MX FEATURE IDENTIFICATION- ITA

PART # 410130116, 410130206

1. The front of the i2 MX ITA frame can be identified by locating the keying receptacles. The numeric keying receptacle should be located at the top and the alpha keying receptacle at the bottom of the front (**Figure B**). The front also has a polarizing feature which prevents engagement with the receiver in an incorrect orientation (**Figure B**). Finally, the front features locking tabs for secure mating with the receiver(**Figure A**).
2. Position A1 can be located on the front by the cavity marked in black in the top right corner (**Figure B**). An additional position A1 indicator can be found in the bottom tier of slots (Tier B) , in the top right corner. The cavities are used to place pins from the VTAC extraction tool.
3. The rear side can be identified as the side that the backshell attaches to (**Figure C**). The rear side is where wire exits the ITA.
4. Blue and white markings along the slot edges denote slot (insert) count. Each blue or white marked area indicate 5 slot positions. (**Figure B**).

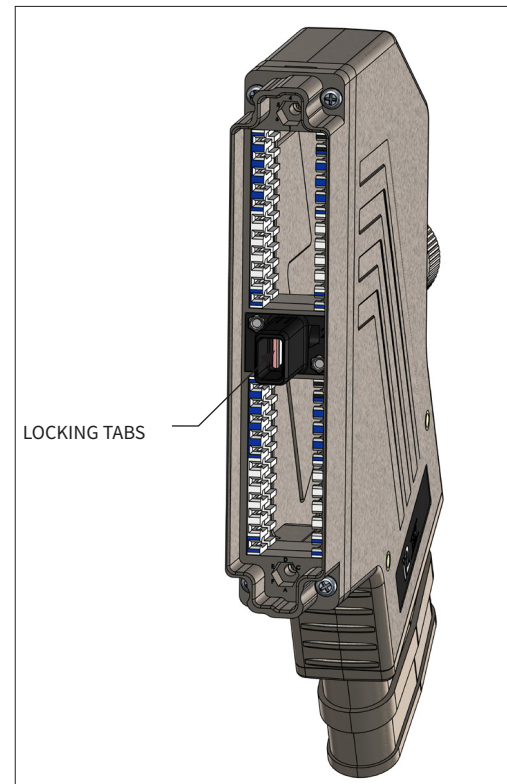


Figure A. i2 MX ITA

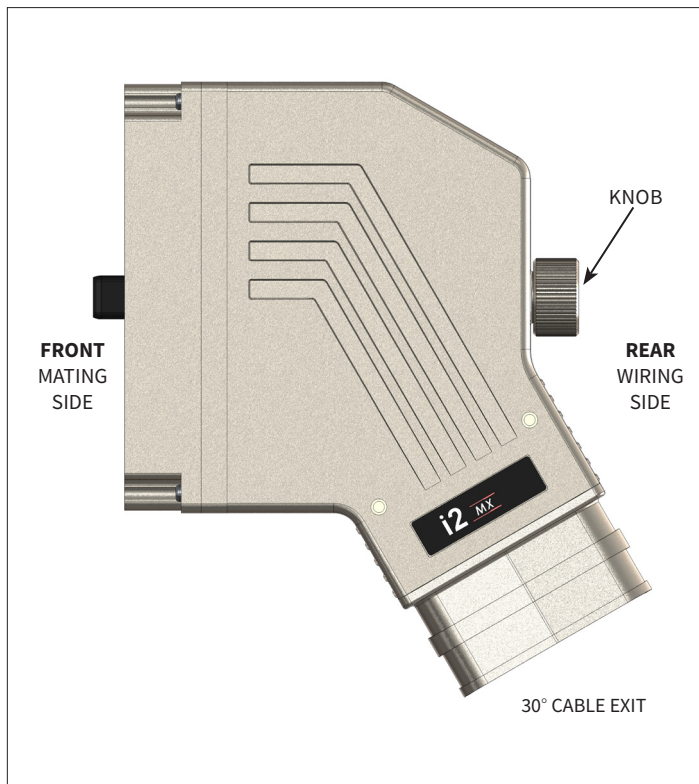


Figure C. ITA with backshell, side view

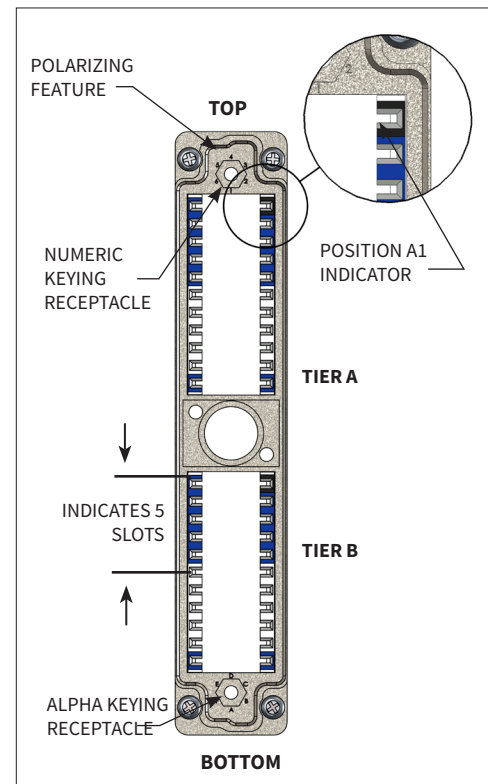


Figure B. ITA frame front view (no backshell)

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## i2 MX VTAC RAIL INSTALLATION/REMOVAL

PART # 310130114, 310130121, 310130120, 410130116, 51044001, 510143001

### TOOLS REQUIRED

Phillips Head Screwdriver

### INSTALLATION

1. To install VTAC Adapter Rails into the i2 MX Receiver or ITA, first separate the two halves of the frame by unscrewing the Phillips head screws (**Figures A and B**). Rails are installed in the bottom portion of the frame.
2. Identifying marks on each set of rails are present to ensure correct orientation is used during installation (**Figure C**).
  - The receiver rails are marked with 'RR' (Receiver Right) and 'RL' (Receiver Left). The left and right sides are determined as such, when viewing from the mating face of the receiver.
  - The ITA rails are marked with 'IR' (ITA Right) and 'IL' (ITA Left). The left and right sides are determined as such, when viewing from the rear/wiring side of the ITA.
3. After rails are installed, place frame bottom on a flat surface, then re-fasten halves together by re-tightening the Phillips screws.

### REMOVAL

1. Before separating the receiver or ITA into two halves for rail removal, the receiver may require removal of a strain relief plate first (**Figure A**). If installed, the ITA will require removal of the backshell.
2. After removing a strain relief or backshell, remove screws securing frame halves together (**Figures A and B**).
3. Once the two halves are separated, the rails may be removed.

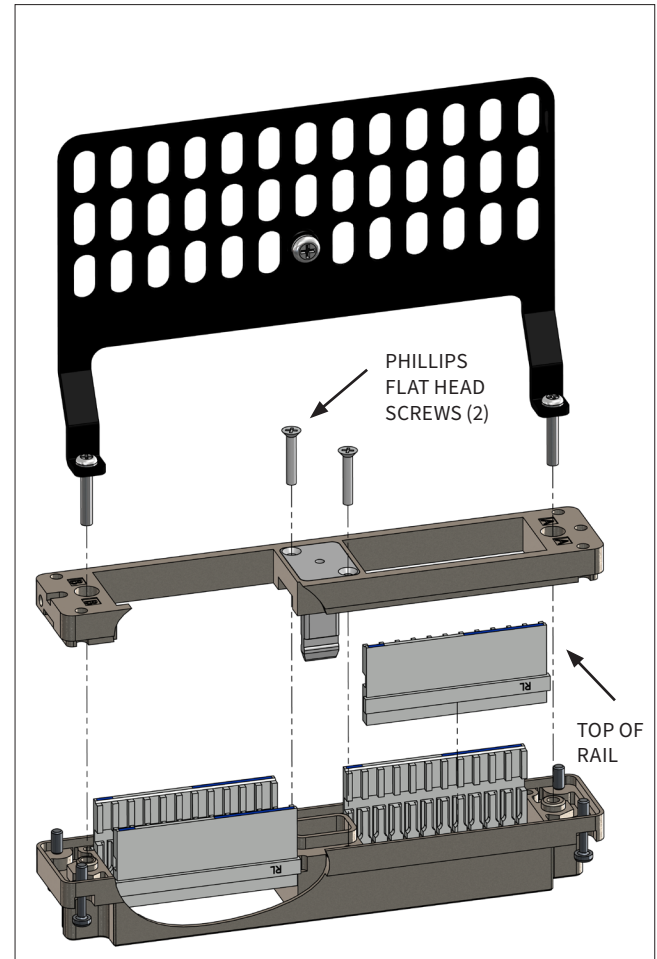


Figure A. Receiver frame separation

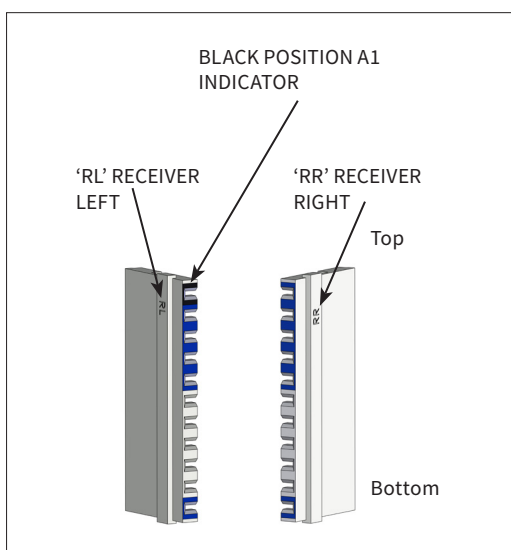


Figure C. Receiver rails.

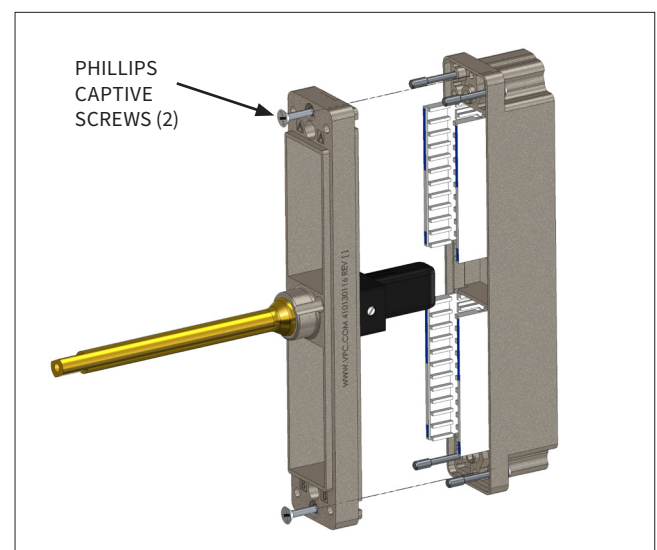


Figure B. ITA frame separation.

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## INSERT INSTALLATION/REMOVAL- SIM MODULE & i2 MX- RECEIVERS

PART # 510170101, 310130113, 310130114, 910112130

### INSTALLATION

1. Ensure the VTAC Insert(s) is in line with the corresponding module/ receiver slot(s). Inserts are installed from the rear side of the receiver/ module. When installing a patchcord containing multiple VTAC inserts, the blue insert should always be installed on top (**Figure A**).
2. Load module/receiver beginning at the top and moving downward. Please note, certain patchcords using thicker wire will require a different loading pattern to ensure that patchcords exit the module with no bend or pressure, resulting in optimal performance. Wire examples include, but are not limited to RJ45 and Dacar 535. These patchcords should be loaded starting at the top and bottom of Tier A (**Figure A**) while making your way toward the center. Recommended loading pattern should include skipping a slot between a certain number of continuously loaded patchcords. This pattern will vary based on wire thickness and spacing necessary to maintain wire integrity. (**Figure A**).

**NOTE:** Using thicker wire such as RJ45 and Dacar 535 does not allow full population of all available slot positions. As a result, system design should consider a reduced patchcord capacity per module/ receiver.

3. Apply gentle pressure and the insert(s) should easily snap into place. Force should not be needed when inserting. If force is required, incorrect orientation is being used for installation. Consult the VTAC Insert Feature Identification page in this manual for assistance with proper installation orientation.
4. The insert(s) is fully seated when the rear of the insert(s) is flush with the rear edge of the module/ receiver frame (**Figure B**).

### REMOVAL

5. *All inserts grouped together for a patchcord, must be extracted at the same time.*
6. The VTAC Extraction Tools should be grouped together to allow for removal of multiple inserts simultaneously. Each tool is magnetized and grooved to make grouping easier.
7. The extraction tool is used on the front side of the receiver/ module. Grasp the tool(s) from the sides and slide the tool pins into the square cavity holes, located externally on the frame of the SIM Receiver Module (**Figure B**) and internally on the i2 MX Receiver. The tool frame should be seated against the frame body, if tool pins are inserted correctly and completely (**Figure B**).
8. Tool(s) must be seated against the module frame before the plunger is pushed in. Otherwise damage to insert(s) may occur. Push plunger in fully. The insert(s) should be ejected (**Figure C**).
9. Force should not be needed to extract inserts. If inserts do not extract easily, ensure all pins are fully seated in the correct location and try again.

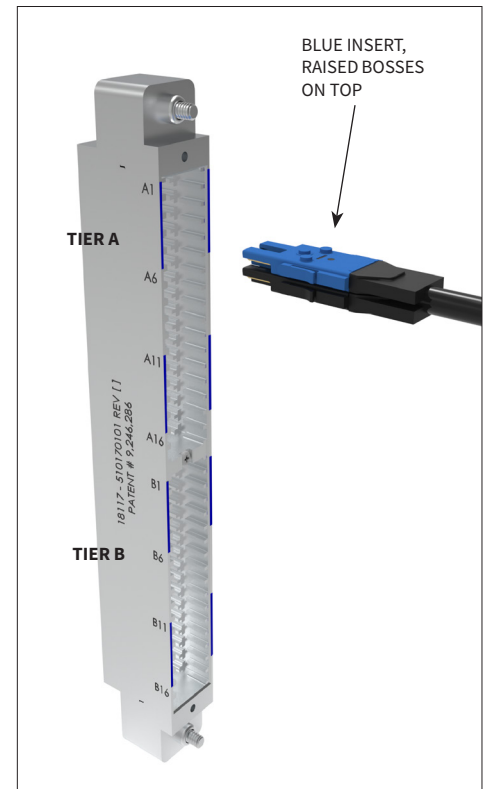


Figure A.



Figure C. Extraction

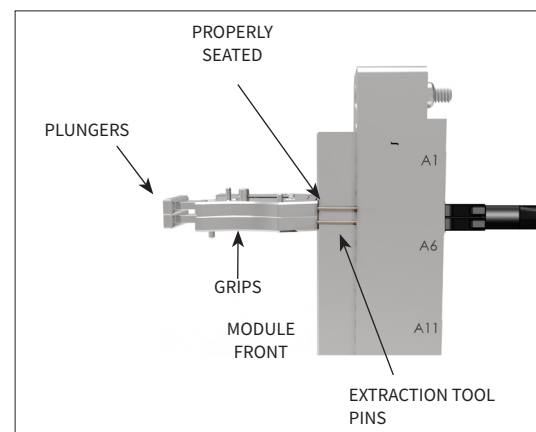


Figure B.

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## INSERT INSTALLATION/REMOVAL SIM MODULES- ITA

PART # 510171101, 910112130

### INSTALLATION

1. Ensure the VTAC Insert(s) is in line with the corresponding module slot(s). Inserts are installed from the rear side of the ITA module. Place the insert in with the (3) circular bosses facing down (**Figure A**). When installing a patchcord containing multiple VTAC inserts, the blue insert should always be installed on top (**Figure A**).
2. Load module beginning at the top and moving downward.
3. Apply gentle pressure and the insert(s) should easily snap into place. Force should not be needed when inserting. If force is required, incorrect orientation is being used for installation. Consult the VTAC Insert Feature Identification page in this manual for assistance with proper installation orientation.
4. The insert(s) is fully seated when the rear of the tool(s) is flush with the rear edge of the module frame (**Figure B**).

### REMOVAL

5. *All inserts grouped together for a patchcord, must be extracted at the same time.*
6. The VTAC Extraction Tools should be grouped together to allow for removal of multiple inserts simultaneously. Each tool is magnetized and grooved to make grouping easier.
7. The extraction tool is used on the front side of the ITA module. Grasp the tool(s) from the sides and slide the tool pins into the square cavity holes located on the inside of the module frame on either side of the insert(s) to be removed (**Figure B**). If using multiple tools simultaneously, make sure that all pins are properly inserted into each corresponding cavity. The tool frame should be seated against the frame body if pins are inserted correctly and completely (**Figure B**).
8. Tool(s) must be seated against the module frame before the plunger is pushed in. Otherwise damage to insert(s) may occur. Push plunger in fully. The insert(s) should be ejected out the opposite side of the module (**Figure C**).
9. Force should not be needed to extract inserts. If inserts do not extract easily, ensure all tool pins are fully seated in the correct location and try again.

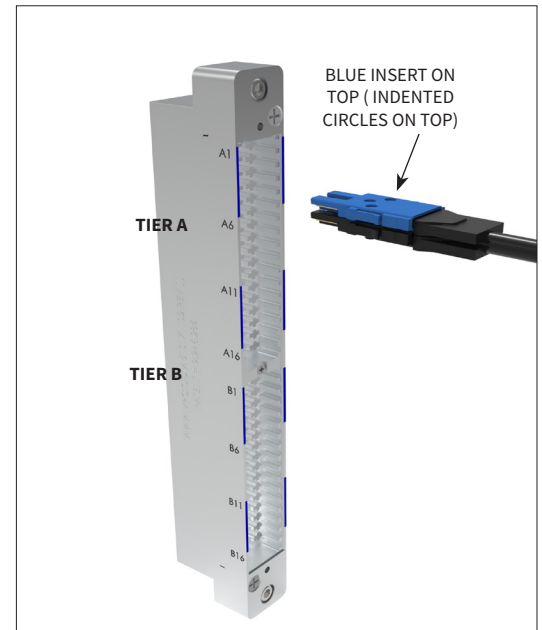


Figure A.

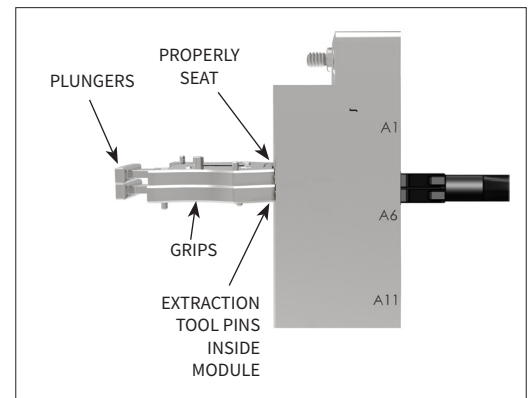


Figure B.

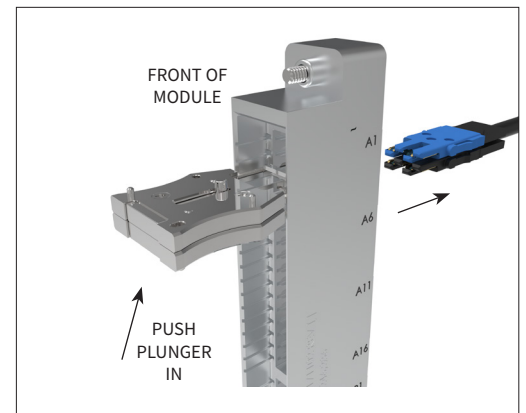


Figure C. Extraction

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## INSERT INSTALLATION/ REMOVAL i2 MX- ITA

PART # 410130206, 410130116, 910112130

### TOOLS REQUIRED

VTAC Extraction Tool

### INSTALLATION

NOTE: For i2 MX backshell removal instructions, refer to the [i2 MX User Manual](#).

1. After removing the ITA backshell, install VTAC patchcords/inserts from the rear side of the ITA frame.
2. Install into the appropriate slot(s) while applying gentle pressure. Once in place, gently pull the wire to ensure the insert(s) is fully seated.
3. As with installation of any multi-VTAC insert patchcord, the blue insert should be installed on top.
4. To maximize use of the i2 MX bend radius area, it is recommended to first install VTAC patchcords in Tier A (top) ( **Figure A**). However, special care must be taken when using thicker wire such as RJ45 and Dacar 535. These and other thicker wires require a greater bend radius and do not allow for full ITA slot capacity use. At minimum, a loading pattern is recommended that includes an even pattern of blank slots to allow for less pressure and bending at the ITA insertion base. Extra spacing between patchcords helps to ensure wire integrity and performance.

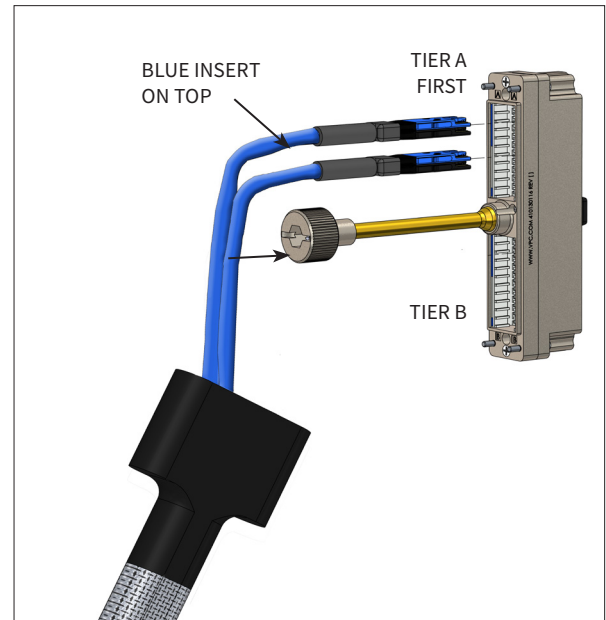


Figure A.

### REMOVAL

5. Repeat steps 1-5 to access the ITA frame.
6. *All inserts with each patchcord must be removed simultaneously to prevent damage to VTAC Inserts.*
7. Group the required number of extraction tools together for patchcord removal ( **Figure B**). Note the extraction tool pins are placed into the extraction cavities on the front side of the ITA frame.
8. While grasping the extraction tool(s) from the sides ( **Figure B**), slide tool pins into module's extraction cavities.
9. The extraction tool(s) need to be seated against the module frame before the plunger is pushed in. Otherwise, damage to the insert(s) may occur.
10. Push the plunger(s) in simultaneously to extract the insert(s). The insert(s) will be ejected out the wiring side of the module ( **Figure C**).
11. Force should not be needed to extract inserts. If inserts do not extract easily, ensure all pins are fully seated in the correct location and try again.

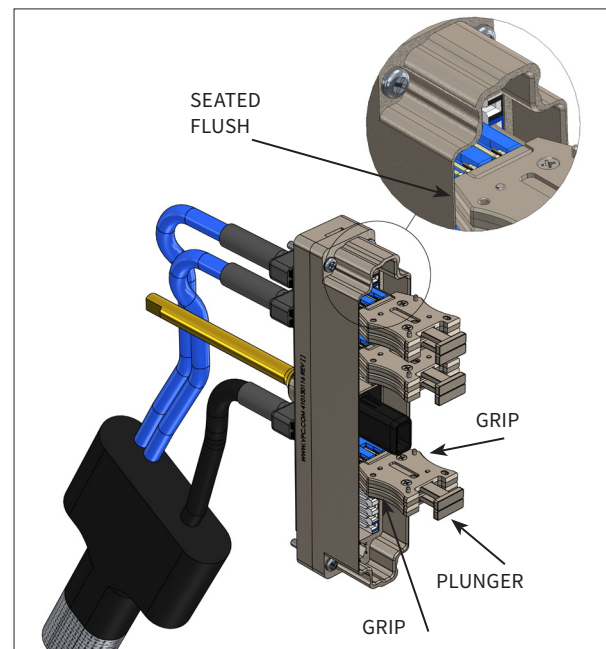


Figure B.

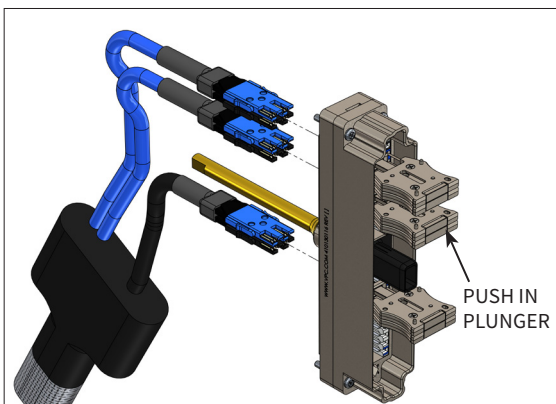


Figure C.

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## SPECIAL NOTE REGARDING VTAC PATCHCORD INSTALLATION

PART # 510170101, 510171101, 310130113, 310130114, 610151102

1. Patchcords using thicker diameter wire or sleeving will require a different loading pattern to ensure that patchcords exit ITA/ receiver SIM modules and the i2 MX , with no bend or pressure.
2. Examples of wires with this type of thicker wire and sleeving include, but are not limited to RJ45 and Dacar 535 (**Figure B**).
3. Correct loading may be done in a variety of patterns, with all options requiring an even loading pattern (i.e. 2 patchcords, 1 space, 2 patchcords, 1 space). VPC recommends the use of VTAC blank inserts (p/n 610151102) in all empty module slots to prevent the introduction of dust or extraneous air flow into the test system (**Figure C**).
4. Loading in SIM modules or the i2 MX should still begin in Tier A (**Figure A**). Beginning in Tier A is especially important with the i2 MX ITA with housing, as it allows for better utilization of the bend radius.

**NOTE:** Since use of larger diameter VTAC patchcords will not allow full population of all available module/ receiver slot positions, be sure to compensate for this reduced patchcord capacity in your overall system design.

5. When possible, module strain relief should be installed to provide extra cable support, especially for heavier wire types. [Click here](#) for VPC's strain relief user manual and more information.
6. Incorrect loading may result in decreased performance, damage to product parts, and/or product failure. [Please consult a VPC representative with questions.](#)

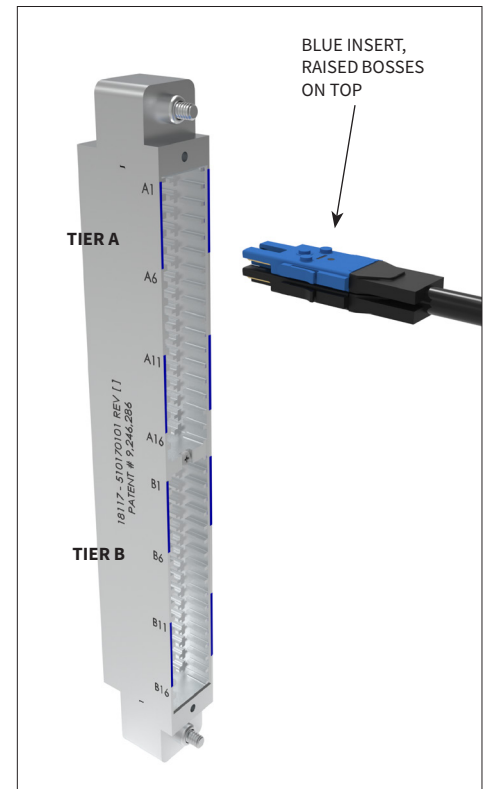


Figure A.

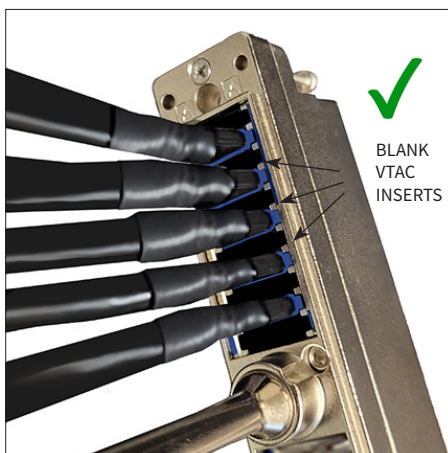


Figure C. One correct loading option for DACAR 535 VTAC patchcords in i2 MX ITA.

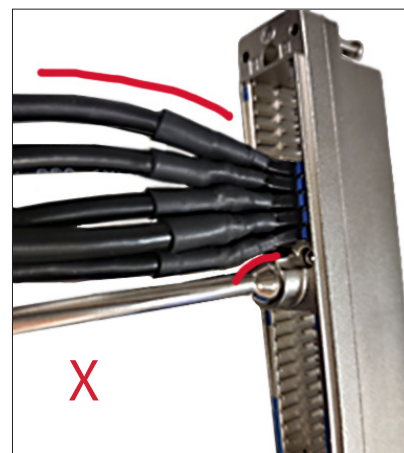


Figure B. Incorrect loading of DACAR 535 VTAC patchcords in i2 MX ITA.

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## RIGHT ANGLE RETENTION INSERT & HEADER FEATURE IDENTIFICATION

PART # 610151105, 610151104

### RIGHT ANGLE RETENTION INSERT

1. The top of the VTAC Retention Insert is located opposite of the PCB mounting surface ( **Figure A** ).
2. The alignment posts and PCB mounting surface mate with the PCB ( **Figure A** ).
3. The VTAC Retention Insert is fastened to the PCB via the mounting holes ( **Figure B** ), using the two provided pan head Phillips screws.

**NOTE:** The VTAC Retention Insert is not keyed.

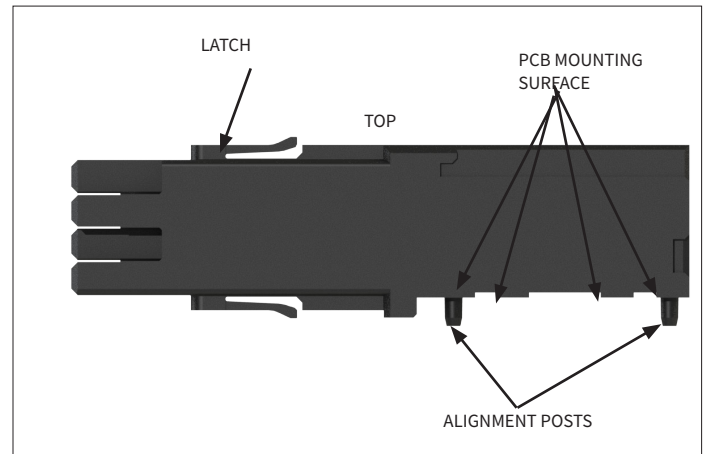


Figure A.

### RIGHT ANGLE HEADER

1. The top is located opposite of the compliant pins ( **Figure C** ).
2. The compliant pins and PCB alignment post, mate with the PCB ( **Figure C** ).
3. The front mates with the VTAC Pass-Thru Insert ( **Figure D** ).
4. Each header contains 8 contacts. The location of pin position 1 is identified below ( **Figure D** ).

**\*NOTE:** The VTAC Right Angle Header can be mated to the VTAC Pass-Thru Insert via two different orientations, which will change the location of pin position 1.

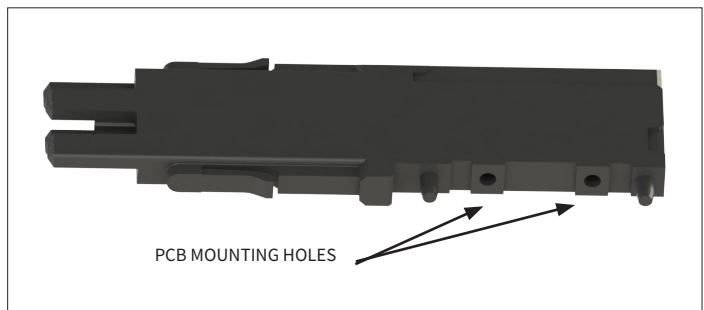


Figure B.

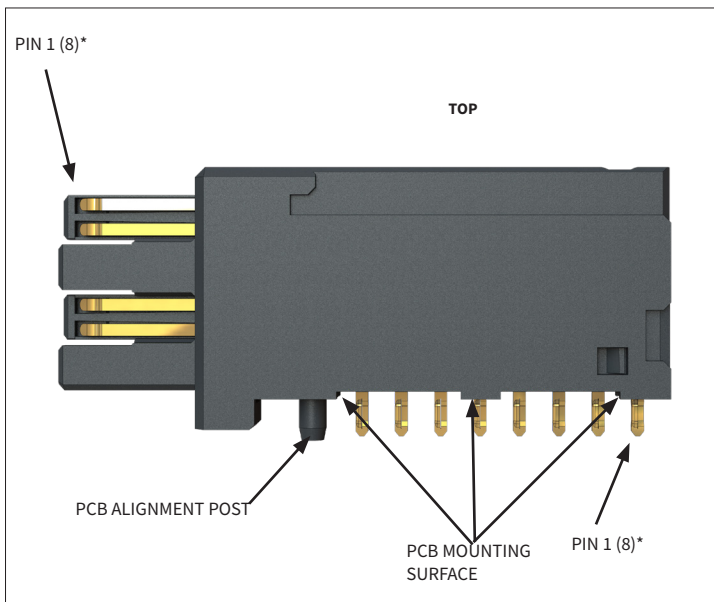


Figure D. VTAC Right Angle Insert (side view).

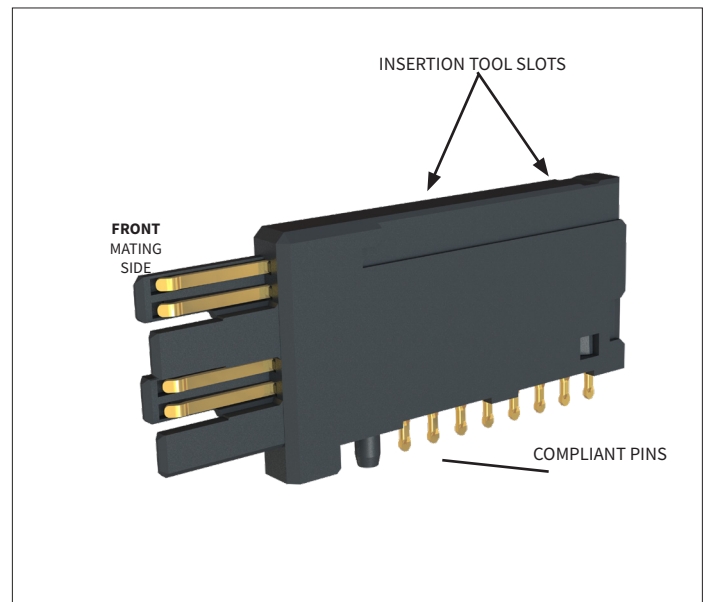


Figure C. VTAC Right Angle Insert.

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## USING VTAC RIGHT ANGLE HEADER INSTALLATION TOOL

PART # 910112132 , 610151104

The VTAC Right Angle Header is installed via press fitting, using VPC's special installation tool. For a brief video version of these instructions, please [click here](#) to access a video tutorial on VPC's YouTube channel.

### INSTALLATION

1. Load the desired number of header(s) into the tool. Header(s) should be loaded starting from the **center** of the tool and evenly distributed outward. The center position is marked by location holes (**Figure A**).
2. Align the front of each header with the edge of the tool (**Figure B**).
3. Position so that the top surface of each header is flush with the inner surface of the tool (**Figure C**).

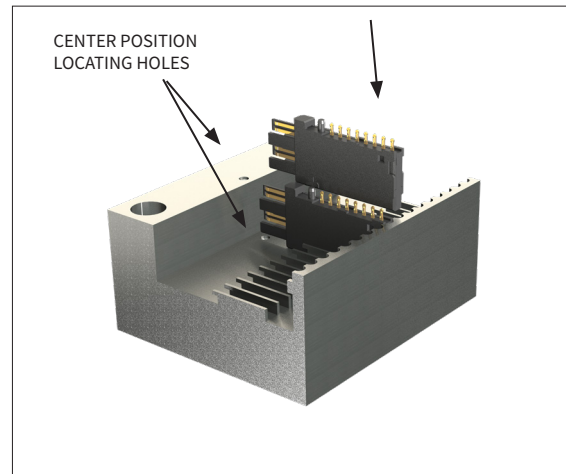


Figure A. Install starting in the center.

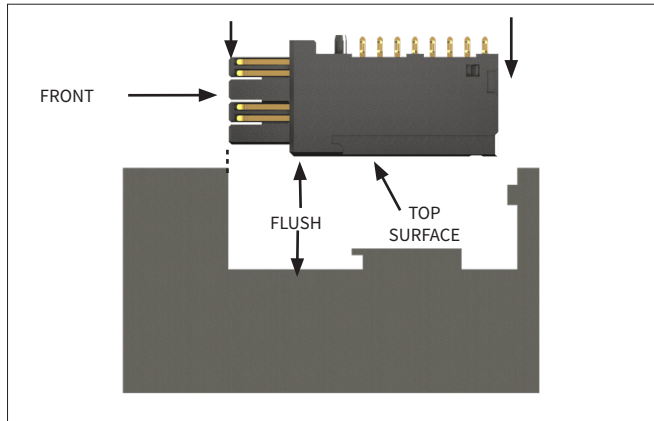


Figure B. Install with front (contact surface) flush with tool edge.

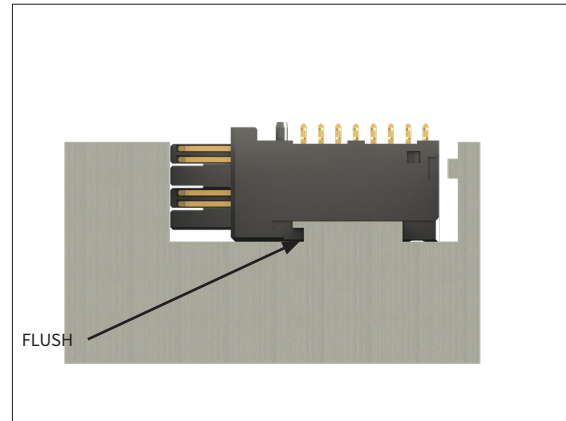


Figure C. Top surface of insert(s) must sit flush with tool surface.

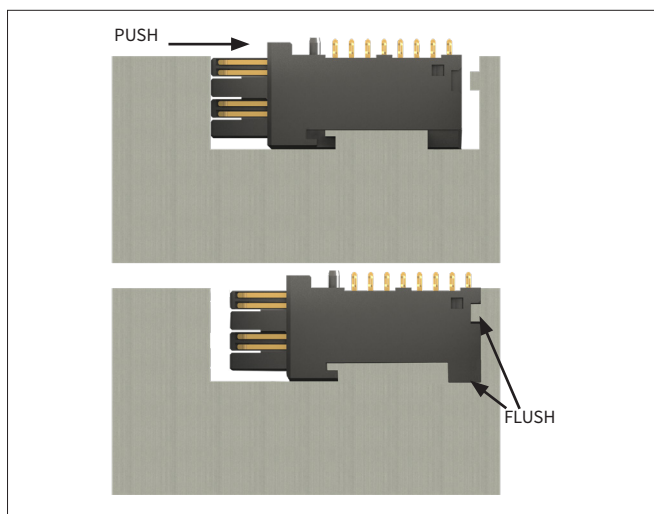


Figure D. Back end of insert(s) should sit flush with tool edge.

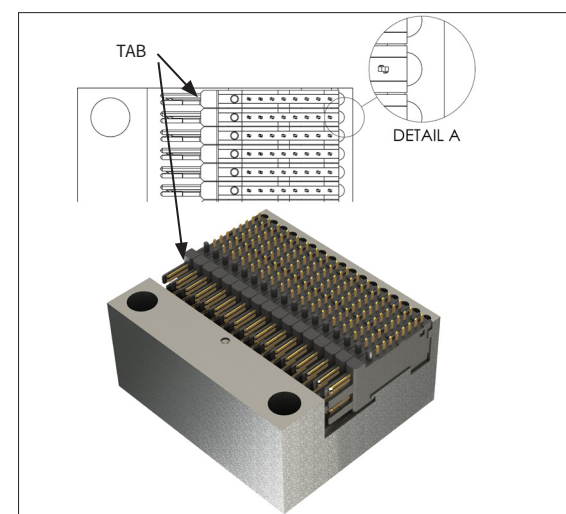


Figure E.

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## USING VTAC RIGHT ANGLE HEADER INSTALLATION TOOL (cont'd)

PART # 910112132 , 610151104

### ALIGNING PCB AND USING PRESS

6. Position the board so that the contacts and alignment pins are aligned with the proper holes (**Figure F**).
7. Place the PCB onto the contacts and hold the board in position (**Figure G**).
8. Place the other half of the tool on top. Hold the two halves together with the board in between. Ensure the contacts and the alignment pins are in the correct holes (**Figure H and I**).

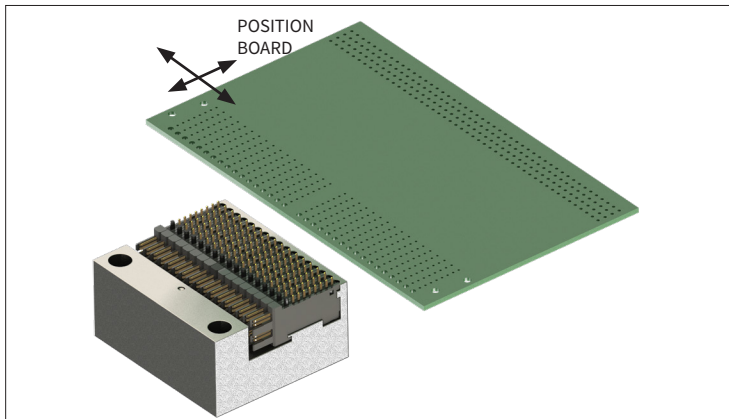


Figure F.

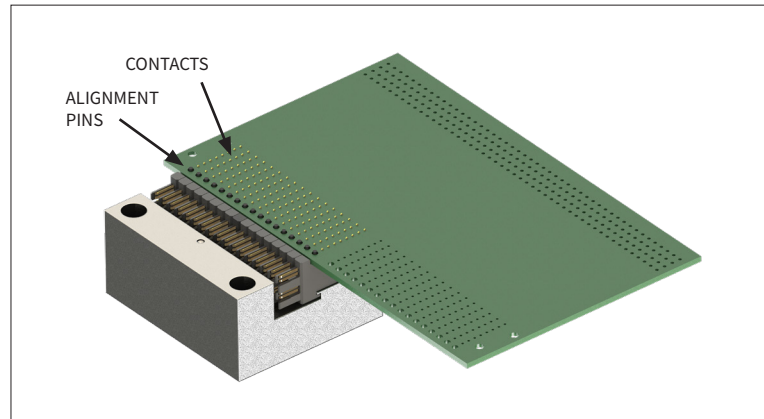


Figure G.

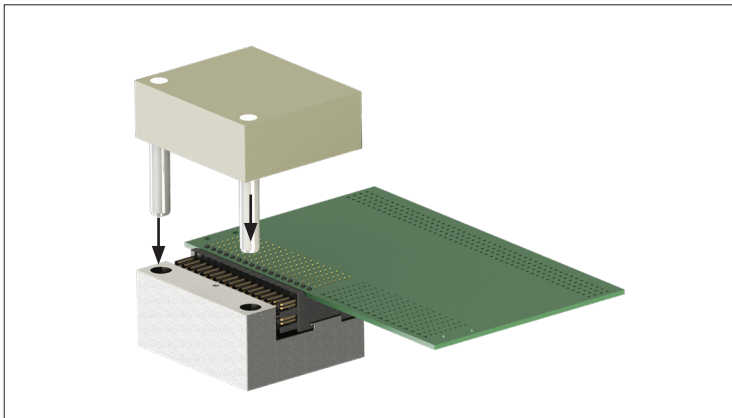


Figure H. Join both halves of tool.

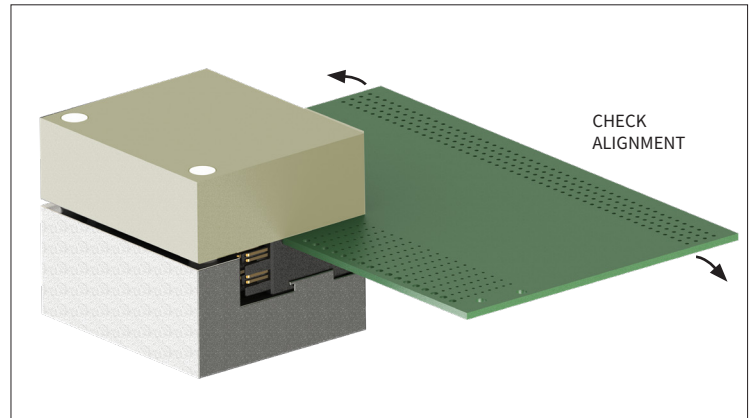


Figure I. Check alignment of contacts and alignment pins with holes.

9. The tool is now loaded and ready to be transferred to a press. The tool should be held together firmly and can be pressed with either side up.
10. Using a press, gently push the base and top of tool together until the contacts are seated. Be careful not to over-press.

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## USING VTAC RIGHT ANGLE HEADER INSTALLATION TOOL (cont'd)

PART # 910112132 , 610151104

### REMOVING FROM PRESS

11. Once done pressing, remove the tool base (**Figure J**).
12. Remove top half of the tool from the PCB assembly by pushing on the front surface. After the tool has been released, lift it off the PCB (**Figure K**).
13. Verify that the header(s) are fully seated against the board along the edge (**Figure L**).

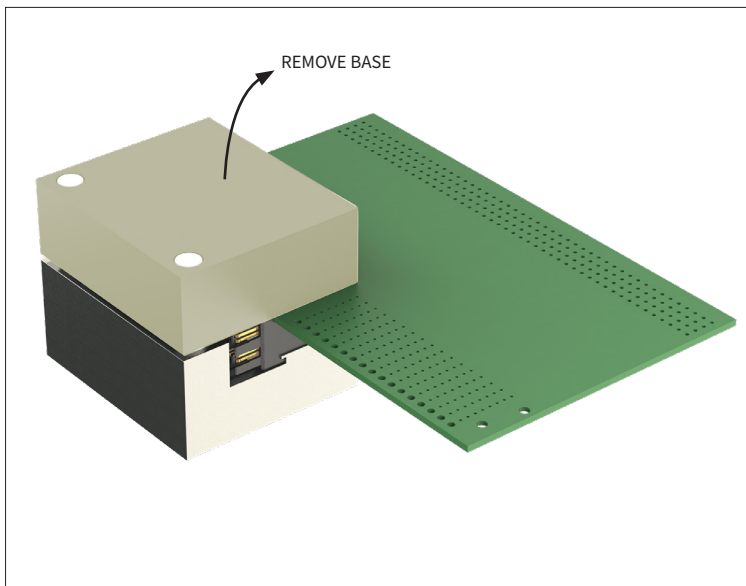


Figure J. Remove base.

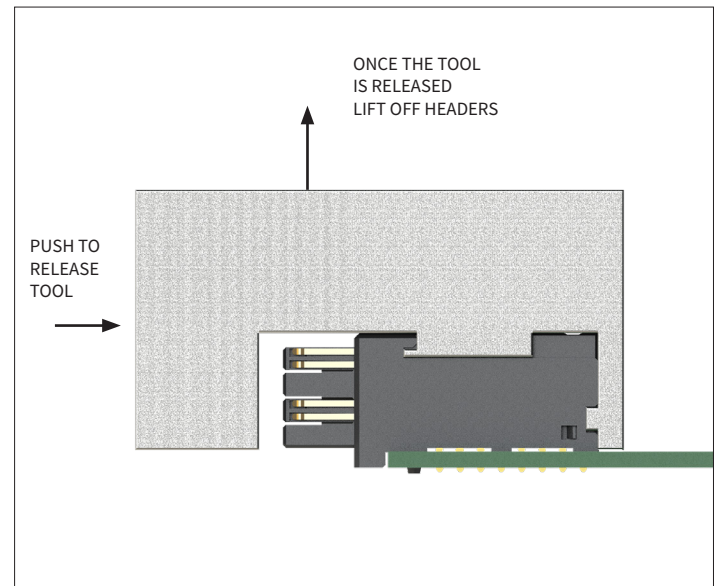


Figure K.

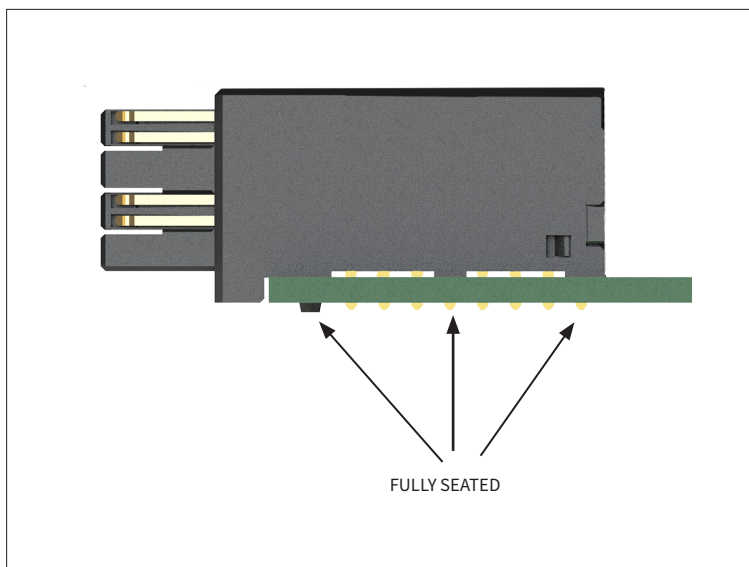


Figure L. Verify proper installation.

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## MATING SIM MODULE/ i2 MX RECEIVER TO PCB-MOUNTED VTAC HEADERS

PART # 310130114, 310130113, 510109592, 510170101, 510171101, 610151104

### TOOLS REQUIRED

Phillips screw driver

### INSTALLATION

**NOTE:** Instructions apply to both ITA and receiver SIM modules, as well as i2 MX Receivers.

1. Using the previous instructions for installing VTAC Pass-Thru Insert(s), install into the appropriate SIM module for mating with the PCB-mounted right angle headers. Ensure that the necessary module slots contain mating inserts for the PCB's mounted headers. For the purpose of this application, the mating side of the VTAC Pass-Thru insert is the rear.
2. Mate module with PCB assembly. Both ITA and receiver modules will mate to the PCB via the rear side. The module markings should be on top (**Figure A**).
3. Once the module and PCB are fully mated, use the PCB mounting brackets to fully attach the module to the PCB (**Figure B**). Insert the PCB mounting screws, but do not tighten completely. Insert the module mounting screws. Torque #2-56 and M2 screws to 1.5 in-lbs [0.17Nm] .

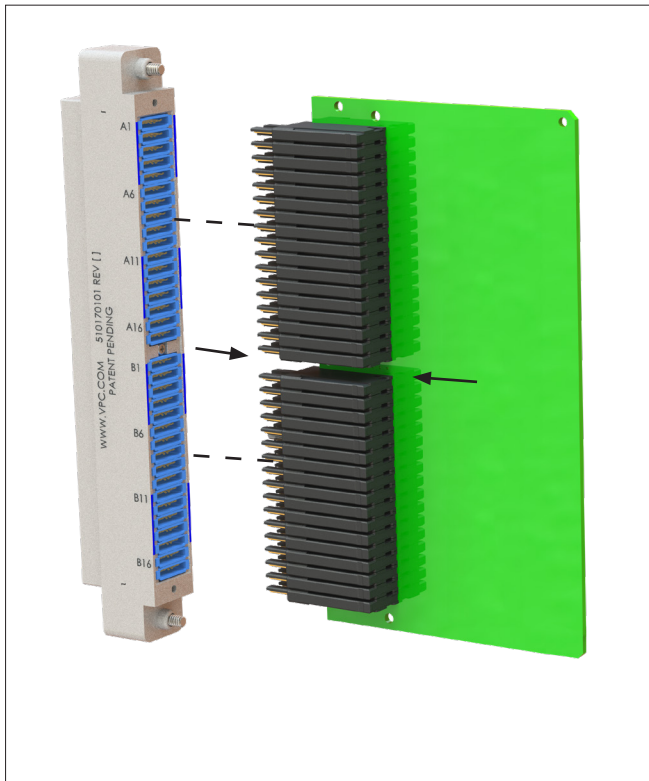


Figure A. Mating Module with PCB Assembly.

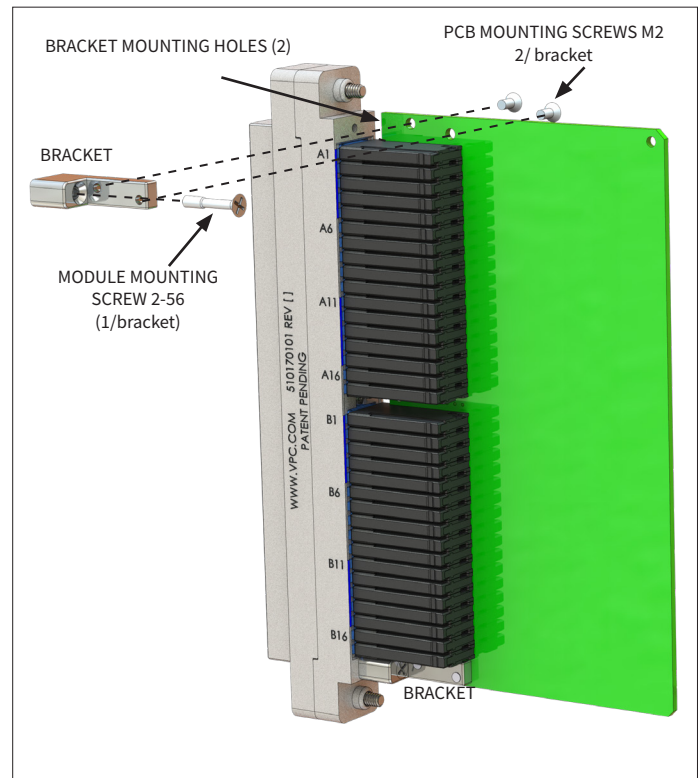


Figure B.

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## RETENTION INSERT INSTALLATION/REMOVAL- SIM MODULES AND i2 MX RECEIVERS

PART # 510170101, 510171101, 610151105, 910112130

### TOOLS REQUIRED

VTAC Extraction Tool

### INSTALLATION

1. Install VTAC Right Angle Insert(s) onto PCB (see previous pages).
2. Fasten VTAC Retention Insert to PCB using the two provided pan head Phillips screws.
3. Ensure that the VTAC Retention insert(s) is aligned with the corresponding module/ receiver position(s). Also, ensure that any VTAC Right Angle Inserts are aligned with corresponding VTAC Pass-Thru Inserts.
4. Apply gentle pressure and install the retention insert(s) into the rear (wiring side) of the module shown (**Figure A**).

### REMOVAL

1. Extract the VTAC Retention Insert(s). The PCB assembly will be extracted (**Figure B**). The VTAC Pass-Thru Inserts will remain in the module.

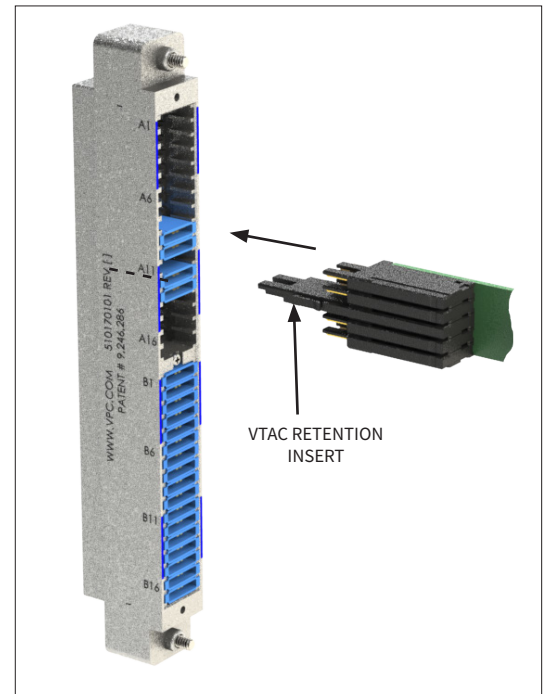


Figure A. Installation

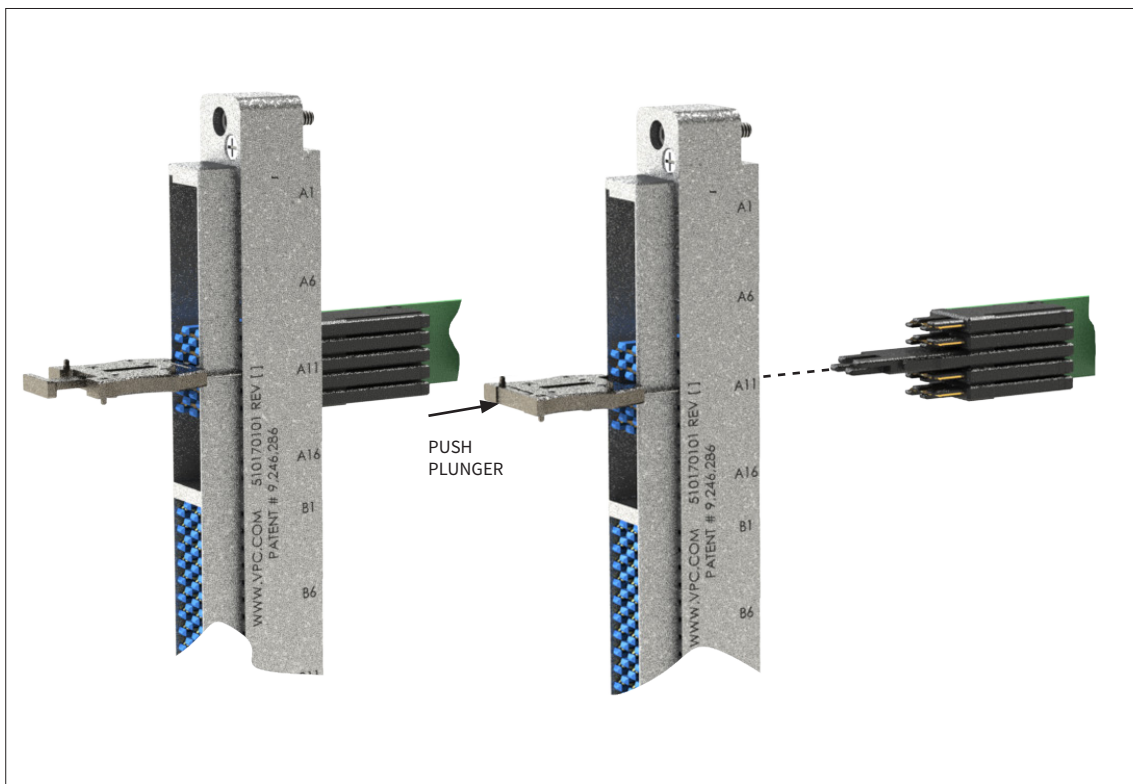


Figure B. Removal

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## VERTICAL HEADER PART IDENTIFICATION

PART # 610151107, 910112133

1. The top/ mating end is located opposite of the compliant pins (**Figure A**).
2. The compliant pins mate with the PCB via use of VPC Insertion Tool p/n 910 112 133.
3. The top mates with the VTAC Pass-Thru Insert (**Figure A**).
4. Each header contains 8 pins/contacts. The faces of the header are symmetrical, so the first pin located on the end can be considered either pin position 1 or 8 (**Figure B**).

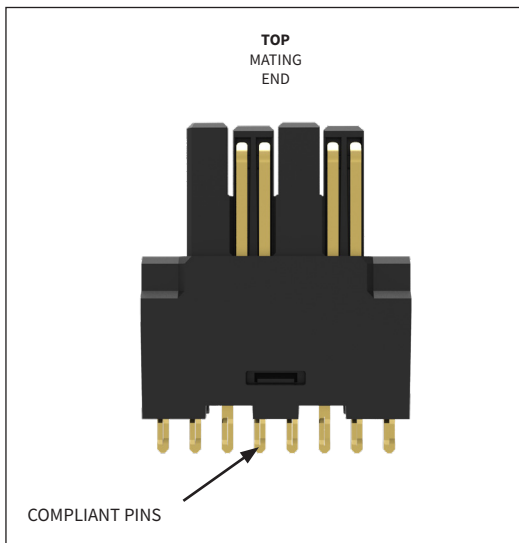


Figure A.

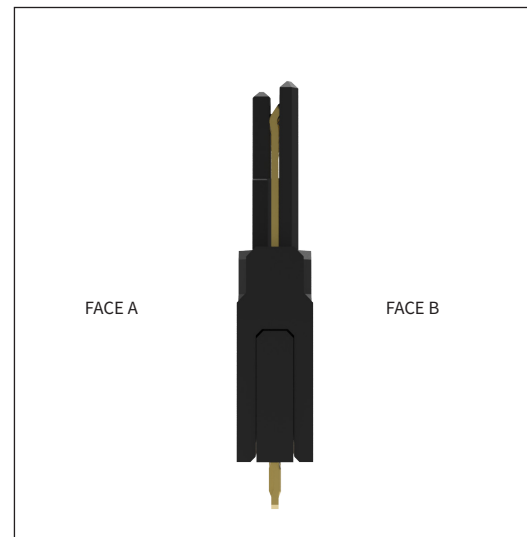


Figure B. Both faces of the insert are symmetrical.

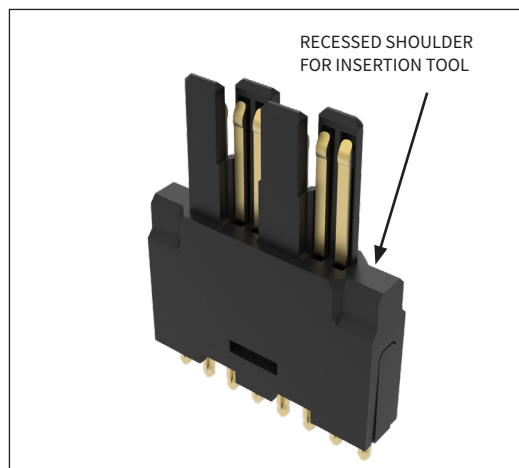


Figure C.

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## USING VERTICAL HEADER INSTALLATION TOOL

PART # 910112133, 610151107

### INSERTING HEADERS INTO TOOL

1. The VTAC Vertical Header Insertion Tool is a two-piece assembly, comprised of a top and a base (**Figure A**).
2. Remove the top from the base. Notice the alignment pins on either side of the base. These alignment pins will be used later to locate the PCB and the base (**Figure B**).
3. Load the desired number of headers into the base. Insert so that the top/ mating end is placed into the base and the compliant pins face up/out. (**Figure C**).
4. Ensure the headers are fully seated by verifying the header sides are flush against the sides of the installation tool (**Figure D**).

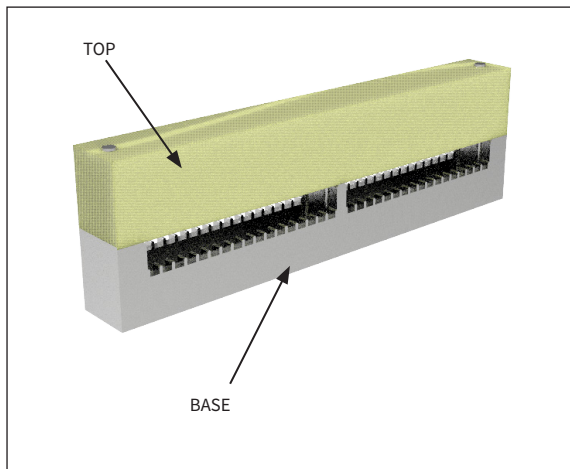


Figure A.

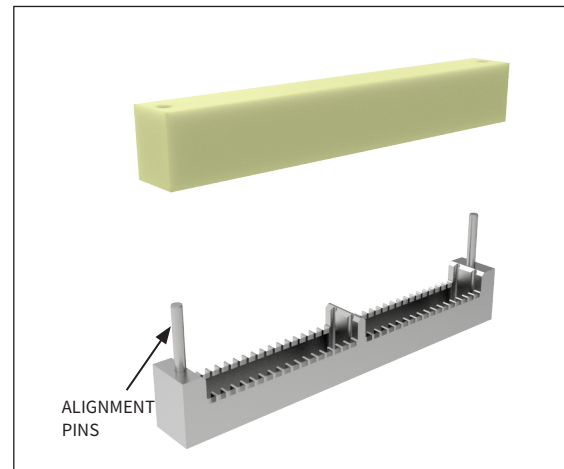


Figure B.

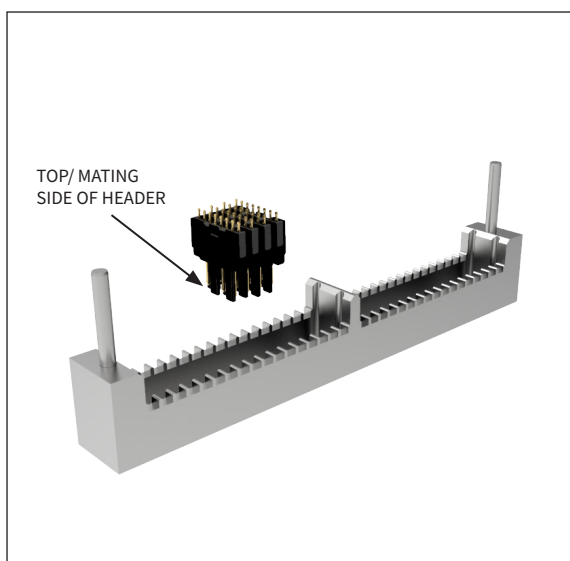


Figure C.

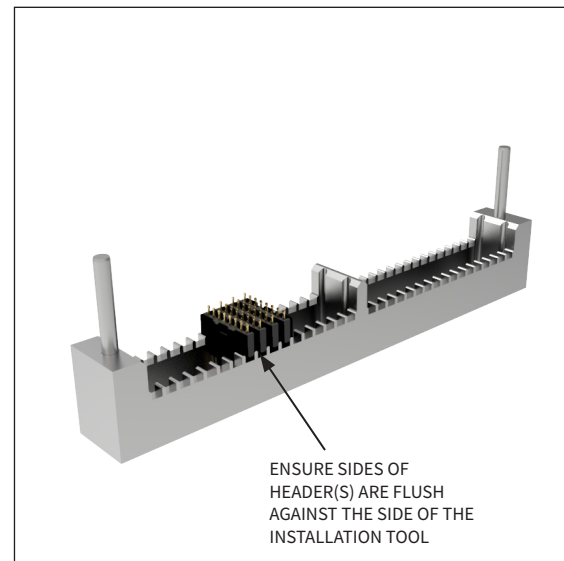


Figure D.

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## USING VERTICAL HEADER INSTALLATION TOOL (CONT'D)

PART # 910112133, 610151107

### INSTALLING PCB

1. Use of the Vertical Header Insertion Tool requires alignment holes in a PCB that correspond to those on the tool (**Figure A**). For exact PCB alignment pin hole locations and plated through-holes for compliant pins, please refer to the VTAC Vertical Header drawing (p/n 610 151 107) at [vpc.com](http://vpc.com) or use this [link](#).
2. With the top removed, insert the alignment pins into the alignment holes of the PCB (**Figure A**).
3. Ensure that the compliant pins of the header(s) align with the plated through-holes on the PCB board (**Figure B**).
4. Once the PCB has been securely placed on the base and properly aligned, add the tool top (**Figure C**).
5. Press the top down onto the PCB and towards the base, pushing the compliant pins of the header into the PCB. **Do not over press.**
6. Remove the PCB from the tool, and verify the installation of each header to the PCB is correct. Each header should be flush to the PCB with a gap of no more than .004" [.10 mm].

**NOTE:** Each insert requires 10 lbs. [4.54 kg] of force to create a gas-tight seal when installed. Inserts should not be removed once in place. Visually inspect the pin side of the PCB to ensure proper pin insertion.

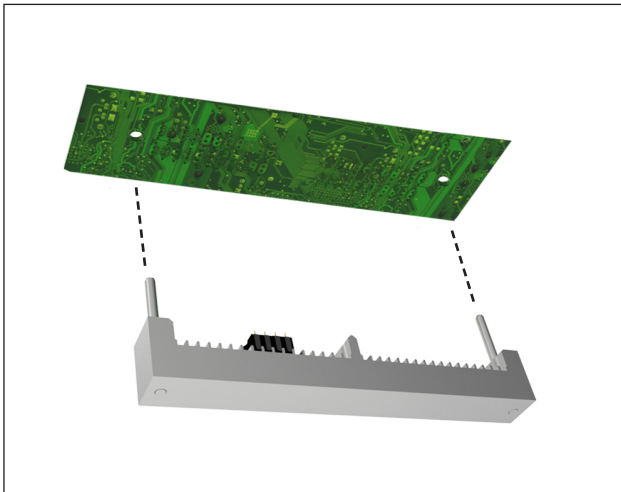


Figure A. The PCB should have alignment holes to accept the alignment pins of the insertion tool.

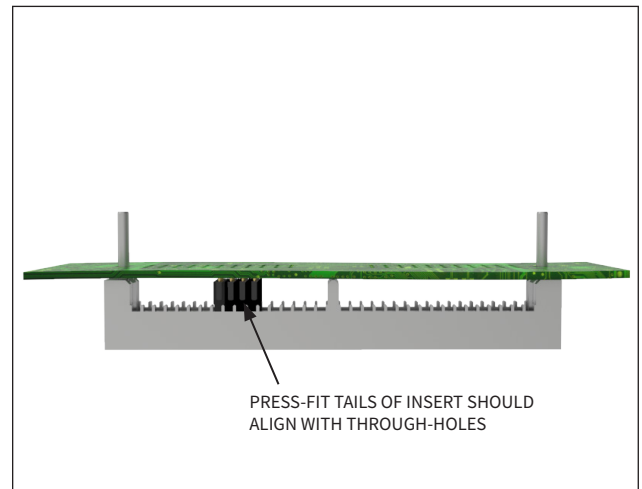


Figure B. Compliant pins align with the through-holes of the PCB.

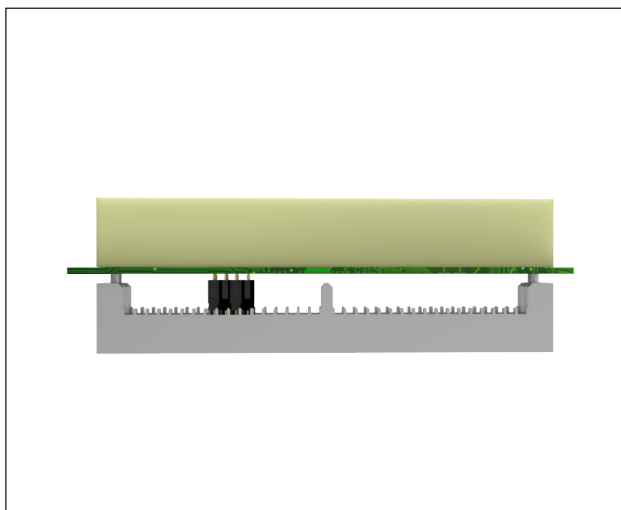


Figure C. Insertion tool is ready to press.

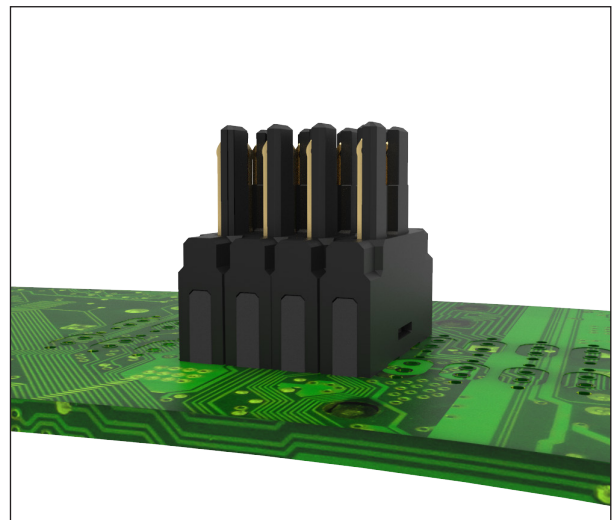


Figure D. Finished headers installed properly on a PCB.

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