

Installation Manual: 1771-to-1756 I/O Swing-arm Conversion System (Cat 1492-)

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I. Conversion Preparation

Prior to actually beginning the removal of the 1771 I/O hardware, it is vital to prepare for the I/O field wire swing-arm conversion by at minimum reviewing the following steps:

a) Inventory the 1492 swing-arm conversion mounting hardware on site to ensure the correct components are available, before removing any 1771 I/O hardware. Refer to Appendix A 1771 to 1756 I/O Chassis Conversion System Selection Process for details.





Conversion Base-Plate: To mount conversion modules

Conversion Cover-Plate: To mount the 1756 Chassis and to protect the conversion modules

b) Inventory the 1492 swing-arm conversion modules (e.g. 1492-CM1771-LD001) and 1492 cables (e.g. 1492-CONCAB005X, 1492-CONACAB005C, etc) to interface the conversion module to the 1756 I/O module. Inventory your 1756 I/O modules, power supply and chassis. Ensure the correct component types and correct number of those components are on site to complete the conversion. A sufficient number of spare parts should also be available in case a part is damaged during the conversion. Refer to Appendix B Conversion Module Selection Process for details.





1492 25-Pin Cable

1492 Cables: Provide interface between conversion module to 1756 I/O module

1492 37-Pin Cable

- c) Review the application considerations in each conversion module's Installation manual to ensure the conversion module 1756 I/O module or associated 1492 cable is not being misapplied. A wiring diagram which shows the circuit connections from the 1771 I/O swing-arm to the 1756 I/O module is also in the Installation Manual to assist in possible troubleshooting.
- d) Review Rockwell Automation Publication 1770-4.x Industrial Automation Wiring and Grounding Guidelines (available at the Publication Literature Library: http://.www.ab.com/literature). Ensure to follow these guidelines with particular attention to ground when installing the conversion system.
- e) Obtain current and correct 1771 I/O wiring schematics prior to disassembly. Typically this will not be used but should be available in advance for reference.
- f) Tools required: Flat blade and phillips screwdriver, box or socket wrench set (size dependent on original installation), cable ties.



Conversion Modules: Convert 1771 I/O module field wire terminations to ones compatible with a 1756 I/O module (refer to Appendix B and C for compatability details)



De-energize and lockout any and all power to all I/O field devices connected to the 1771 I/O Chassis, and the power to the 1771 I/O Chassis itself. Ensure all power is de-energized and locked out to any device in the control cabinet where the conversion is to be performed. Work shall be performed by qualified personnel.

1) Remove the 1771 I/O Swing-arm Hardware from the I/O Chassis

a) NOTE: ensure the power supply, processor or remote I/O adapter are removed from the chassis prior to removing the first I/O module.

Start I/O module swing-arm removal beginning with the left most I/O module in the chassis.

To remove the 1771 I/O module swing-arm/terminal block (Refer to Figure 1a and 1b). Press down and pull out on the module swingarm locking tab located at the top of the 1771 module until it releases from the module. This will allow the swing-arm to pivot at the horizontal bar located at the bottom of the 1771 chassis. Gently pull at the bottom part of the swing-arm until the swing-arm releases from the horizontal bar.



Figure 1a



Figure 1b



Refer to Figures 1c and 1d. After each swing-arm is removed from its respective 1771 module place a temporary label on the swing-arm/terminal block as it will be used with the conversion system (example: slot number and 1771 module Cat. Number) or mark (example: color code) it to ensure you can correctly match each 1771 I/O terminal block with the correct 1492 conversion module and ultimately the 1756 I/O module. NOTE: These labels are not provided with the conversion system.



Figure 1c

Figure 1d

b) Carefully place the labeled 1771 I/O swing-arm, below the 1771 I/O Chassis (refer to Figure 1e) to ensure it and the associated field wires are not damaged.

NOTICE

Closely inspect the 1771 I/O swing-arm for any damage which may impact the reliability of the conversion. If necessary replace the 1771 I/O swing-arm (Refer to the respective 1771 I/O module installation manual for the appropriate part Number.) Check terminal screw integrity and re-torque if necessary.



Figure 1e

c) Remove the 1771 I/O Module from the 1771 Chassis:

NOTE: It may not be necessary to remove the modules from the chassis. Depending on chassis size, weight and clearance it may be possible to remove the chassis with the 1771 modules installed. If that is the case proceed to step 2a. If it is necessary to remove the modules use the following procedure. Release the I/O module chassis latch lever above the I/O module by pressing in the direction of the arrow and pushing up on the latch. NOTE: Some 1771 chassis (1771-A1B, -A2B, A3B1, -A4B Series B) have one large chassis locking bar that locks all the modules into the chassis. To release the locking bar simultaneously push in on the locking pins at both end of the bar and swing it up. Remove the I/O module from the chassis by pulling up on the module ejector lever (top of module) until it releases from the chassis. NOTE: Check to ensure the module Catalog Number information placed on the associated swing-arm label (Step b) is in agreement with the module nameplate label.

d) Repeat the preceding steps until all 1771 I/O swing-arms modules (optional, refer to step C above) are removed from the 1771 I/O Chassis.

2) Remove the 1771 I/O Chassis from the Control Cabinet

a) Refer to Figures 2a. Loosen (do not remove) the hardware which attach the 1771 I/O Chassis to the control cabinet enough to remove the chassis. This mounting hardware will be used to mount the conversion system base plate in Section 3.



Figure 2a

b) Refer to Figures 2b and 2c. Remove the 1771 I/O Chassis from the control cabinet. NOTE: In this example the conversion modules were left in the 1771 chassis.



Figure 2b



Figure 2c

3) Install the 1492 I/O Conversion System Base-plate in the Control Panel

Before installing the conversion system base-plate into the control panel ensure you follow the system grounding guidelines found in Rockwell Automation Publication 1770-4.x Industrial Automation wiring and Grounding Guidelines. Follow PLC chassis mounting information.

a) Refer to Figure 3a. Place the 1492 conversion base-plate into the control cabinet at the location previously used by the 1771 I/O chassis. The conversion base-plate panel mounting bolt hole locations match those of the 1771 I/O chassis.





Figure 3a

Figure 3b

b) Refer to Figure 3b. Securely fasten the base-plate to the control panel so as not to exceed the torque value of the mounting hardware. NOTE: The hardware you select will depend on what was used to mount the 1771 I/O chassis.

NOTICE

4) Install the 1771 I/O Conversion Modules into the Base-plate

a) Match the Conversion Module with the 1771 I/O Swing-arm:

Begin conversion at the left most slot of the base-plate and continue inserting modules left-to-right. Find the 1492 conversion module that mates to the 1771 swing-arm (I/O module) that was previously inserted in that slot of the 1771 I/O chassis. NOTE: Closely review the 1771 I/O module Catalog Number and slot location information you placed on the swing-arm label in steps 1a and 1b. The nameplate label on the conversion module (refer to Figure 4a for an example) indicates which 1771 I/O module it is compatible with. Compare that information to the label on the swing-arm to ensure there is a functional match.

NOTICE There is a label on the 1492 conversion module to indicate which 1771 to 1756 I/O module it is capable to convert. Also refer to Appendix B for a conversion list.



Figure 4a

b) Insert the Conversion Module into the Base-plate:

Refer to Figure 4b, Notice the opening at the bottom of the base-plate and the plastic extension at the bottom of the conversion module. These two parts mate together and lock the bottom of the module to the base-plate. To get them to lock, (Refer to Figure 4c) place the module at approximately a 30 degree angle (lower part to upper part) to the back of the base-plate. With the aid of the lower two horizontal tabs/guides (Refer to Figure 4d), guide the plastic extension into the opening at the bottom of the base-plate. Once this is done, the module will insert between the remaining horizontal tabs and will snap into place at the upper base-plate opening using the plastic spring finger at the top of the module (refer to Figure 4e) NOTE: The plastic spring is also used to remove the conversion module from the base-plate.

c) Repeat steps 4a and 4b until all of the required conversion modules are installed into the base-plate.



Figure 4b



Figure 4c



Figure 4d



Figure 4e

5) Install the 1771 Swing-arm into the Conversion Modules

NOTICE Before inserting the 1771 I/O swing-arm terminal block into the conversion module it is recommended that the terminal block contacts be carefully inspected and cleaned if necessary to ensure a good electrical connection with the conversion module. A mild abrasive (e.g. pencil eraser) is recommended. Do not use a solvent.

- a) Locate the 1492 conversion module that mates to the 1771 I/O swing-arm and conversion base-plate slot location. Review both conversion module and swing-arm labels to ensure a correct match. Refer to Appendix B or C for additional component compatibility details.
- b) Refer to Figure 5a and 5b, With the proper swing-arm selected for the conversion module (review labels), guide and press the lower part of the 1771 swing-arm into the horizontal bar located in the lower part of the conversion module. NOTE: this allows the swing-arm to pivot like it did in the 1771 chassis. Pivot the swing-arm terminals to mate with the conversion module terminal until the locking tab at the top of the swing-arm snaps into place on the conversion module.



Figure 5a



Figure 5b

c) Some 1771 analog swing-arms may have a shield wire that was previously connected to a 1771 chassis mounting bolt for shield grounding. This shield wire must be connected to the shield mounting bolt (refer to Figure 5c and 5d) on the mating conversion module. Making this connection will ensure a contiguous shield path through the conversion module, 1492 cable and to the 1756 analog module. The 1771 shield wire must be connected on the conversion module at this point and not on the chassis. NOTE: Maximum torque is 12.0 lb-in.



Figure 5c



Figure 5d

6) Attach the 1492 Cables to the Conversion Module

Use the following procedure to attach the 1492 interface cable to the conversion module. The function of this cable is to attach the conversion module to the 1756 I/O module.

a) Find the appropriate 25-pin (Figure 6a) or 37-pin (Figure 6b) cable for the conversion and 1756 I/O module. Refer to Appendix B and C for a list of compatible cables and refer to the label on the cable.







b) Refer to Figure 6c, Find the conversion module compatible end of the cable. Each cable has a slide latch which mechanically locks the cable into the conversion module, Ensure the cable is latched.



Figure 6c

c) Refer the Figure 6d. Gently guide the conversion module end of the cable into the conversion module, and firmly press the two components together and lock the cable slide latch.



Figure 6d

- d) After the cable is attached to the conversion module, gently lay the opposite end (ControlLogix terminal block) below the module.
- e) Repeat steps 5a through 5c and 6a through 6d for the remaining conversion modules.



7) Install the 1756 Chassis, I/O Modules and Power Supply on the Conversion Cover-plate

The conversion system installation will be faster if it is possible (depends on space available above the base-plate, refer to next step) to attach the 1756 chassis with its integrated components (I/O modules, power supply, etc) to the conversion system cover-plate, before the cover-plate is attached to the base-plate. Use the following procedure:

a) Place the cover-plate on a horizontal surface (e.g. table, floor, etc.). Refer to Figure 7a



Figure 7a

NOTICE Before attaching the 1756 I/O Chassis to the conversion cover-plate, closely review and follow the Chassis mounting and system GROUNDING directions in the 1756 Chassis Installation Instruction manual (1756-IN080x-EN-P) that shipped with the 1756 Chassis or at www.ab.com/literature.

b) Refer to Figure 7b and 7c, Using the M5 size screws shipped with the cover-plate and base-plate assembly attach the correct 1756 Chassis to the conversion system cover plate. Torque screws to 2 Nm. Select the appropriate 1756 I/O modules (refer to Appendix B) and power supply.

NOTICE The decision to install the appropriate 1756 chassis to the cover-plate before or after it is attached to the base-plate is up to the installer. For proper power supply sizing, refer to the 1756 Power Supply Installation manual available with the product or at www.ab.com/literature.



Figure 7b



Figure 7c

8) Attach the Conversion Cover-plate to the Conversion Base-plate

To attach the cover-plate to the base-plate use the following procedure:

a) Refer to Figure 8a. At the upper right and left side of the cover-plate are hinge/pivot brackets. These fit into mating slots at the top of the base-plate to attach both of the components together. Locate these component mounting features before assembly.



Figure 8a

b) Refer to Figure 8b, With the cover-plate at about a 30-45 degree angle from the base-plate, guide the cover-plates hinge / pivot brackets into the mating slots of the base-plate. Note:Be careful not to pinch you fingers between the base and cover plate .Refer to Figure 8c.



Figure 8b

c) With the cover-plate hinge engaged into the base-plate slots slowly lower the bottom of the cover-plate.



Figure 8c

9) Attach the 1492 Cables with 1756 Swing-Arms to the Appropriate 1756 I/O Module

Use the following procedure:

- a) Closely review the labels on the conversion modules and the 1492 cables to ensure they are the correct mates for the 1756 I/O module (Refer to Appendix B).
- b) Making sure you have the correct cable, slowly guide the terminal block end into the mating connector of the 1756 I/O module (Refer to Figure 9a).



Figure 9a

c) Refer to Figure 9b. Firmly press the two components together and secure the terminal block to the 1756 I/O module.



Figure 9b

- d) Repeat steps 9a through 9b for all remaining conversion module/cable assemblies until all conversions are complete.
- e) Recheck that all cables are fully engaged into the mating connectors and that all of the cable slide latch assemblies tabs are locked on each conversion module. Ensure the 1756 terminal blocks are secured to the 1756 I/O module.
- f) Ensure all analog cable ground wires are secured to a 1756 chassis mounting screw. (Refer to Figure 9c) A lug is provided on each analog cable for this purpose.
- g) Refer to Figure 9d, Secure the cover-plate to the base-plate by using the M5 screws supplied with the system (recommended torque 2 Nm)



Figure 9c

Figure 9d



Figure 9e

System Testing Before Applying Power

Before applying power to the system, check continuity from the field wiring terminal block (typically at the bottom of the control panel) to the 1756 I/O module terminal block. This should be done for several points of each I/O module to ensure connection of the conversion system.

1771-to-1756 Chassis Conversion System Selection Process

- 1) Determine the number of 1771 I/O modules used in the 1771 I/O Chassis to be converted to 1756. NOTE: In some cases two 1756 modules may be required for one 1771 module. Select the applicable 1492 conversion modules from the Digital and Analog Conversion Selection Table Matrix, Appendix B and C.
- 2) Review the Max Slots for I/O and chassis width data from the below table, and select a 1756 I/O Chassis which meets your conversion needs from step 1.
- 3) Once the 1756 Chassis is selected, select the Conversion Assembly. The Conversion Assembly has the same dimensional foot-print as the 1771 chassis (without an external power supply) and can use the same mounting hardware. The assembly consists of a base-plate to hold the conversion modules and a cover-plate to protect the modules and to mount the selected 1756 chassis. The combined depth of the conversion assembly with the 1756 chassis mounted is 10.25 inches (Controller w/key) to 10.0 inches (Controller w/o Key).

Chassis Parameter ⁽¹⁾	1771 Chassis		1756 Equivalent Chassis		1771 Chassis		1756 Eq Chas	uivalent ssis	1771 Chassis	1756 Equivalent Chassis	1771 Chassis	1756 Equivalent Chassis
	-A1B w/o PS	-A1B w/PS	-A4 ⁽³⁾	-A7	-A2B w/o PS	-A2B w/PS	-A7 ⁽⁴⁾	-A10	-A3B1	-A13 ⁽⁵⁾	-A4B	-A17 ⁽⁶⁾
Max Slots for I/O	4	4	3	6	8	8	6	9	12	12	16	16
Chassis Width ⁽²⁾	9.01	12.61	10.35	14.49	14.01	17.61	14.49	19.02	19.01	23.15	24.01	29.06
Conversion Assembly	1492-MUA1B-A4-A7			149	2-MUA	2B-A7-A	A10	1492-MU/	\3-A10-A13	1492-MUA4-A13-A17		

Footnotes:

- ① 1771-A3B is not listed as it is used for 19 inch wide instrumentation panels
- ② Two 1771 width dimensions are provided as some PLC-5 processors have integrated power supplies. Dimension w/PS includes -P1, -P2, etc. Notice that the width dimension of some 1756 chassis exceed the width of the 1771 chassis with or without the power supply. Cover-plate chassis mounting design allows the excess 1756 chassis width to be evenly distributed to both sides, or excess to right or left. Carefully consider this in the conversion
- ③ 1756-A4 may work in a 1771-A1B application if 4 or less I/O slots were used. Conversion cover-plate is capable to mount -A4 or -A7
- ④ 1756-A7 may work in a 1771-A2B application if 6 or less I/O slots were used. Conversion cover-plate is capable to mount -A7 or -A10
- ⑤ 1756-A10 may work in a 1771-A3B1 application if 10 or less I/O slots were used. Conversion cover-plate is capable to mount -A10 or -A13
- © 1756-A13 may work in a 1771-A4B application if 13 or less I/O slots were used. Conversion cover-plate is capable to mount -A13 or -A17

Appendix B

Selection Table for 1771-to-1756 Digital I/O Swing-Arm Converter Modules and Pre-Wired Cables

	Cat. Numbers: 1492 Converter for 1771-to-1756 Digital I/O															
1771 Digital I/O Module	1492-CM1771-LD001	1492-CM1771-LD002	1492-CM1771-LD003	1492-CM1771-LD004	1492-CM1771-LD005	1492-CM1771-LD006	1492-CM1771-LD007	1492-CM1771-LD008F®	1492-CM1771-LD009F®	1492-CM1771-LD010F®	1492-CM1771-LD011	1492-CM1771-LD012	1492-CM1771-LD013	1492-CM1771-LD014	Compatible⑥ 1756 Digital I/O Module	
1771-IAD	Х														1756-IA16	
1771-IBD	Х														1756-IB16	
1771-IAD		Y													1756-IH16I	
1771-IMD		Y													1756-IM16I	
1771-IBN			Z												1756-IB32	
1771-IAN			Z												1756-IA32	
				Y											1756-IA16I	
1771-1016				Y											1756-IH16I	
1771-IQ16				Y											1756-IB16I	
1771-IVN					Z										1756-IV32	
1771-OAD						Х									1756-OA16	
1771-OBD						Х									1756-OB16E	
Two 1771-IA/IA2							ХEЗ								1756-IA16	
1771-OBD								S1@							Two 1756-OC8	
1771-OBN									Z						1756-OB32	
1771-OD16										Y					1756-OA16I	
1771-OW16											Y				1756-OW16I	
1771-OW												Y			1756-OX8I	
1771-OAN													S3@		Two 1756-OA16	
1771-OA														U	1756-OA8E	

How To Use Matrix

A) In the left most column, find the catalog number of the 1771 digital I/O module

- B) Follow that row to the right most column to find the compatible 1756 I/O module. In some cases more than one module exists. Review the matrix carefully and review the I/O module Installation Manuals with attention to the specifications to determine full compatibility.
- C) Find the column in the row you selected that contains a capital letter (e.g. X) and/or letters/numbers (XE & S1). The catalog number of the 1492 1771-to-1756 Converter is listed at the top of that column. The capital letters/letter or number/letter from the row and column intersection indicates the last character(s) of the catalog number for the 1492 cable that connects from the converter module to the 1756 I/O module (right most column). The FULL cable catalog number is 1492-CONCAB^① xx, where xx is the above letter/number or letter/number combination, except for XE selection (1492-C ① ② XE

Footnotes:

- ① Three digit number to indicates cable length in meters and tenths of meters (005=0.5 meters). Available lengths = 1.0 (010) and 0.5 (005) meters
- 2 Three digit number to indicates cable length in meters and tenths of meters (005=0.5 meters). Available lengths = 1.0 (010) and 0.5 (005) meters
- ③ One conversion module required for each 1771-IA/IA2 module. The 1492-C(1)(2)XE cable provides the two 1771 (8-pt) module into one 1756 (16-pt) module conversion.
- ④ The two 1756-OC8 (S1) or 1756-OA16 (S3) must be located directly next to each other in the 1756 chassis.
- S An F at the end of the conversion module catalog number indicates it is fused to match the functionality of the 1771 module being replaced.
- © To understand any issues concerning I/O module compatibility refer to the conversion module wiring diagrams and the specific I/O module's Installation Manual especially the specification and wiring instruction sections.

Appendix C

Selection Table for 1771-to-1756 Analog I/O Swing-Arm Converter Module and Pre-Wired Cable

	Cat. N	lumber	s: 1492	Conve							
1771 Analog I/O Module	1492-CM1771-LA001	1492-CM1771-LA002	1492-CM1771-LA003	1492-CM1771-LA004	Future	Future	Future	Future	Future	Future	Compatible② 1756 Analog I/O Module
1771-IFE (S-ended voltage)	А										1756-IF16 (S-ended voltage)
1771-IFE (S-ended current)	В										1756-IF16 (S-ended current)
1771-IFE (Diff. voltage)		С									1756-IF16 (Diff. voltage)
1771-IFE (Diff. current)		D									1756-IF16 (Diff. current)
1771-OFE1			Е								1756-OF6VI
1771-OFE2			Е								1756-OF6CI
1771-IR				F							1756-IR6I

How To Use Matrix

A) In the left most column, find the catalog number of the 1771 analog I/O module.

- B) Follow that row to the right most column to find the compatible 1756 I/O module. Review the matrix carefully and review the I/O module Installation Manuals with attention to the specifications to determine full compatibility.
- C) Find the column in the row you selected that contains a capital letter (e.g. A). The catalog number of the 1492 1771-to-1756 Converter is listed at the top of that column. The capital letter from the row and column intersection indicates the last character of the catalog number for the 1492 cable that connects from the converter module to the 1756 I/O module (right most column). The FULL cable catalog number is 1492-CONACAB^①x, where x is the above letter.

Footnotes:

- \odot Three digit number to indicates cable length in meters and tenths of meters (005=0.5 meters). Available lengths = 1.0 (010) and 0.5 (005) meters.
- ② To understand any issues concerning I/O module compatibility refer to the conversion module wiring diagrams and the specific I/O module's Installation Manual especially the specification and wiring instruction sections.



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