

Mapping of Specific I/O

Introduction

In many cases a PLC or external devices are used to control a robot. There are specific external input bits that can be “remapped” to associate an outside signal with a robot function. This document will assist in finding and mapping some of the most used specific I/O signals.

Specific I/O - Background

A list of a system’s Specific I/O signals can be found in section 4 of the YRC1000 [Concurrent I/O](#) Manual. Signals beginning #4xxx are used to *change* the operating condition of the robot. Signals beginning #5xxx *report on* the operating condition of the robot. The Specific I/O can also be accessed on the Standard Pendant and Smart Pendant (using THE Classic Interface IN/OUT section.) The Specific Inputs & Specific Outputs have their own selections.

A brief list of the most used Specific I/O signals:

Inputs:	Bit Address	Specific Input #
External Servos On	#40045	030
External Hold	#40067	048
Call Top of Master	#40070	049
External Start	#40044	029

Outputs:	Bit Address	Specific Output #
Servos On	#50073	052
Running	#50070	049
Top of Master Job	#50020	009

Example Mapping

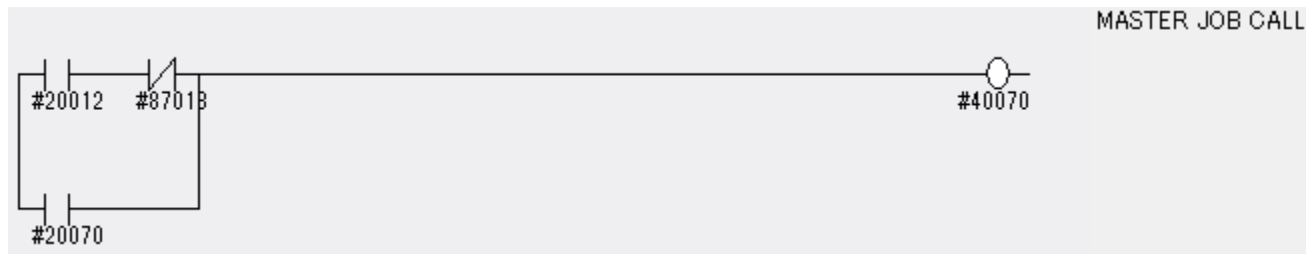
Specific I/O may already be used in the Concurrent I/O ladder. A search in both the System & User ladders may be required to determine if a specific bit is already in use. If the bit is in the User ladder, a simple modification to that rung may be all that is required. See the example below of the standard Master Job call rung in the User ladder. We will show the ladder rung and then the corresponding ladder commands in each example

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```
STR #20012  
AND-NOT #87013  
OUT #40070
```

Adding an OR instruction for and external input via Ethernet (#20070)



```
STR #20012  
AND-NOT #87013  
STR #20070  
OR-STR  
OUT #40070
```

If a Specific input bit is not being used (such as #40045), a rung will need to be added to User Ladder.



```
STR #20071  
OUT #40045
```

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Some Specific Input bits are use in the System ladder which cannot be modified. In these cases, there will be an Auxiliary bit (#7xxxx) defined. See the example below regarding External Start, in the System Ladder. This rung cannot be edited. But there is an Auxiliary bit #70010 being used. That is currently set as a relay in the user ladder.

System rung for External Start



```
STR #70010  
AND #50070  
OUT #40044
```

User rung to set #70010



```
STR #20010  
AND-NOT #87013  
OUT #70010
```

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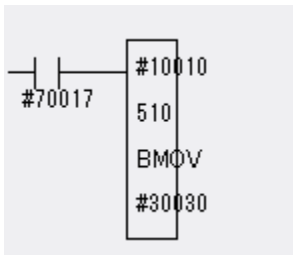
Below is shown a User rung adding external input #20072 to trigger #70010 which triggers #40045 for External Start.



```
STR #20010  
AND-NOT #87013  
STR #20072  
OR-STR  
OUT #70010
```

Specific Outputs require more work in the ladder because of the need to break out BMOV statements. (A BMOV is a “Block Move” of multiple source bytes to a destination.) Breaking up the BMOV will make the external outputs available for remapping. The BMOV instruction below is mapping 510 General Purpose output groups (bytes) to 510 External output groups. The BMOV must be broken up, to be able to re-define the mapping for individual bits.

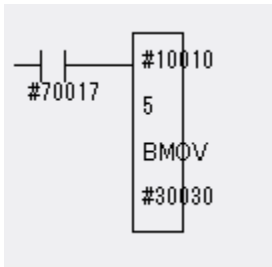
Original BMOV



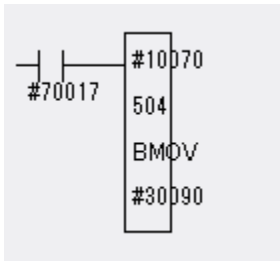
```
STR #70017  
BMOV #10010, 510, #30030
```

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New BMOV changing number of groups to 5



A second BMOV instruction will need to be added to continue to map the remaining output groups. I am only extracting a single group for this example.



STR #70017

BMOV #10070, 504, #30090

This will leave external bits #30080-#30087 available for remapping.

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Below I have mapped #50070 (Running bit) to External #30080. Letting the PLC know the system is running.



STR #50070
OUT #30080

Continue mapping the other bits your system requires.



STR #50070
OUT #30080
STR #50073
OUT #30081
STR #50020
OUT #30082

Do not forget to map the remaining bits of the group that were not used.

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STR #10063
OUT #30083
STR #10064
OUT #30084
STR #10065
OUT #30085
STR #10066
OUT #30086
STR #10067
OUT #30087