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Quick Setup Guide: Coherix Predator 3D to Motoman YRC1000 Controller

Introduction

Coherix Predator 3D is a vision solution for solving adhesive and sealant bead inspection and process control problems. This is a laser-based solution, so it is not dependent on nor affected by the contrast between the bead and the part to perform the 3D bead detection. The predator 3D can incorporate the robots tool center point information, allowing automatic adjustments to their inspections to accommodate changes within the dispensing program. This allows on the fly changes to the speed of the dispensing path without having to update the inspection. This document is a step-by-step guide on configuring the Coherix predator 3D to Yaskawa's YRC1000 robot controller.
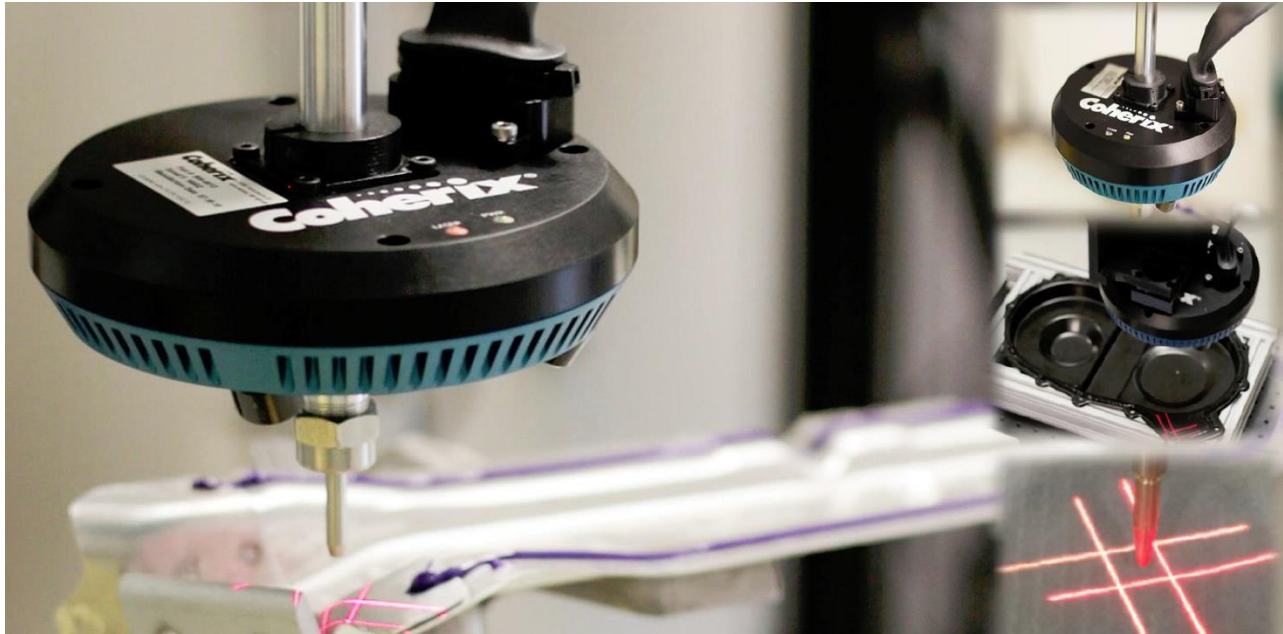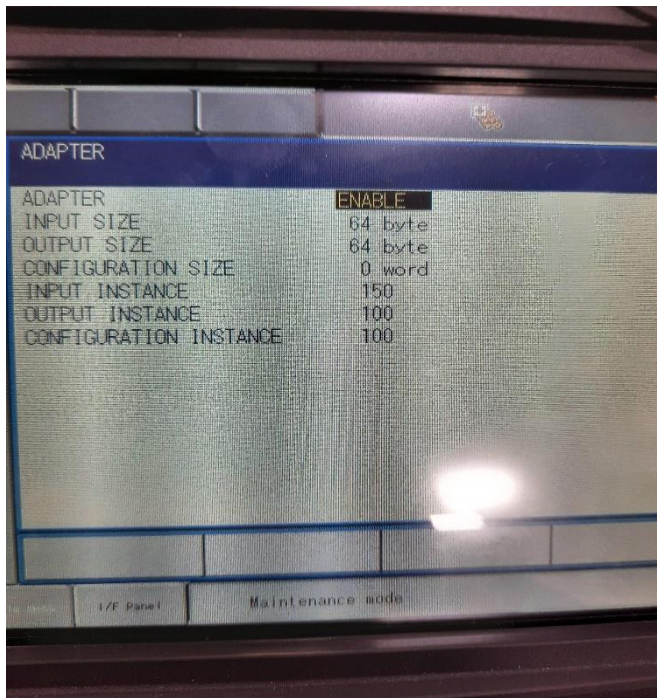
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Configuration Guide

1. Configure the Ethernet IP setting within maintenance mode for the Coherix device. Our controller **MUST** be configured as an adapter. The YRC1000 can communicate both multicast and unicast when setup as adapter - only multicast when setup as the scanner. Once in maintenance mode login to Safety Mode. The password is all 5's. Then navigate through the following tabs:

- System>Setup>Option Function>Ethernet/IP(CPU BOARD)>Adapter Details. Set the configuration to the values below.

- Press the enter key to register the configuration. Proceed by continuing pressing the enter key to register the Coherix device within the IO Module and External IO allocation.
  In this example the external IO addressing for the Coherix is the following External Inputs=20720 External Outputs=30720



```
====================================================================================

EXTERNAL IO ALLOCATION(INPUT)

     ST#  CH  MAC ID  ADDR  BYTE  NAME

     ---------------------------------------------------------

#20010   0  0    0   0   5  ASF01

#20710  15  0   254   0   1  Ethernet/IP CPU

#20720  15  0    0   1  30  Coherix

====================================================================

EXTERNAL IO ALLOCATION(OUTPUT)

     ST#  CH  MAC ID  ADDR  BYTE  NAME

     ---------------------------------------------------------

#30010   0  0    0   0   5  ASF01

#30710  15  0   254   0   1  Ethernet/IP CPU

#30720  15  0    0   1  30  Coherix
```

2. By Default, the YRC1000 Controller IP Address is set to below if needed changed navigate through the following tabs and change accordingly.

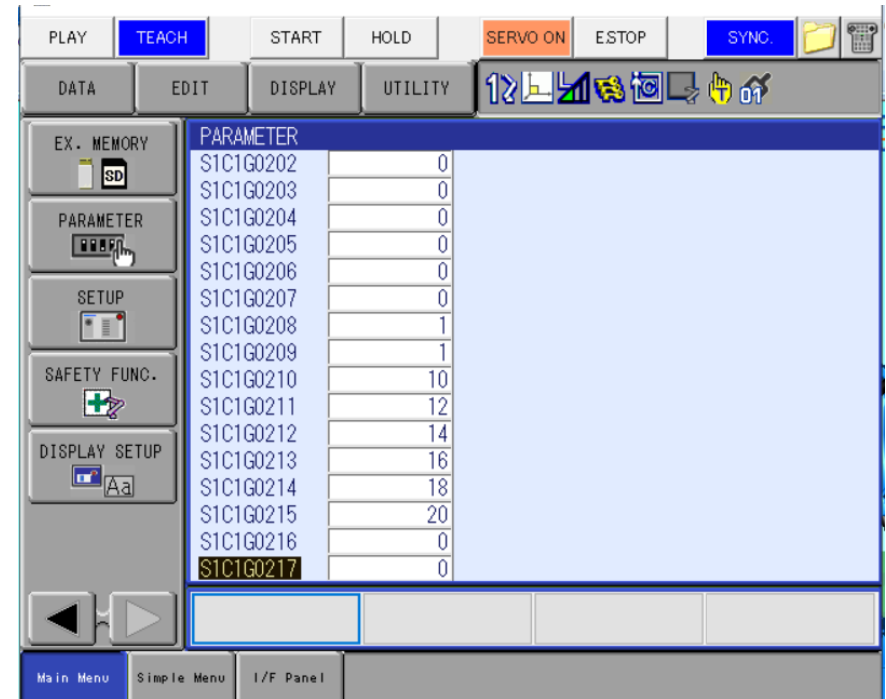- **System>Setup>Option Function>Lan Interface Settings**
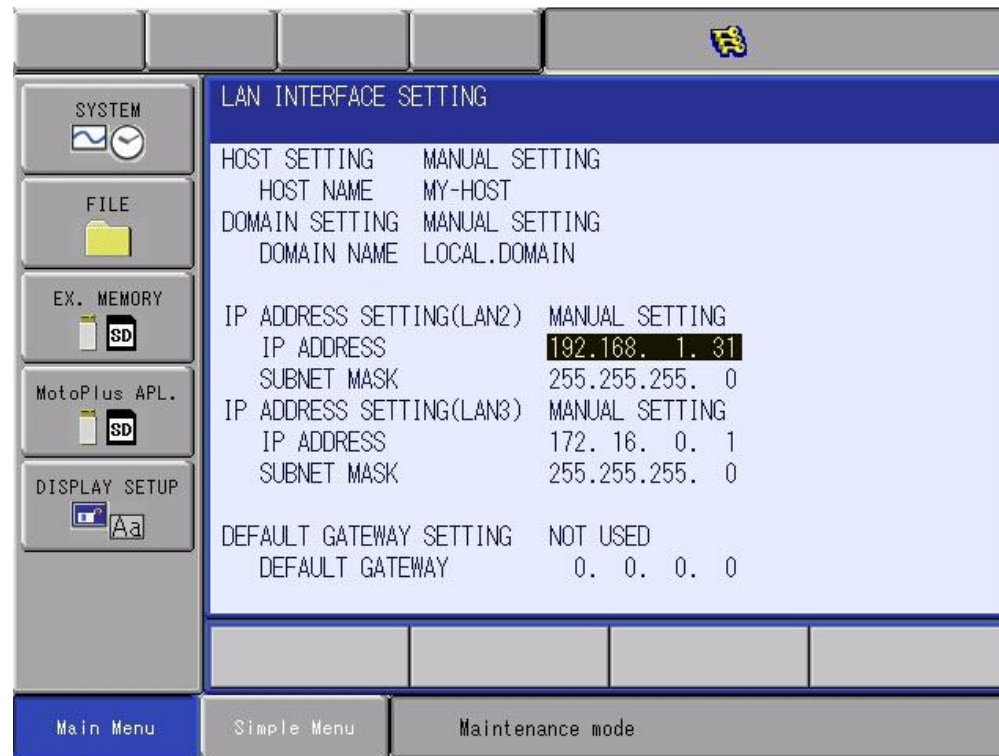
- After Configuring the settings perform a safety flash reset if required. This can be performed through the following tabs **File>Initialize>Safety Flash Reset.** Once done re-boot the YRC1000 controller into normal operation mode and login into Safety Mode.

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3. The following parameters will need to be set accordingly for capturing the robot's current position in cartesian coordinates via double word format.

S1CxG	Description
208	Enables/Disables the function for outputting the present Cartesian position (in the base coordinates) to registers. (command value) 0: disable 1: enable
209	Specifies the output size to the register. 0: output in 2 bytes 1: output in 4 bytes
210	Cartesian position (command value) X register number of output destination
211	Cartesian position (command value) Y register number of output destination
212	Cartesian position (command value) Z register number of output destination
213	Cartesian position (command value) Rx register number of output destination
214	Cartesian position (command value) Ry register number of output destination
215	Cartesian position (command value) Rz register number of output destination

PARAMETER	
S1C1G0202	0
S1C1G0203	0
S1C1G0204	0
S1C1G0205	0
S1C1G0206	0
S1C1G0207	0
S1C1G0208	1
S1C1G0209	1
S1C1G0210	10
S1C1G0211	12
S1C1G0212	14
S1C1G0213	16
S1C1G0214	18
S1C1G0215	20
S1C1G0216	0
S1C1G0217	0

- In the configuration above the current position is being written to the M-Registers below.

4. Getting the current position values from the M- Register to the Coherix device will require a robot CIO change. The CIO change will also implement the bits controlling the Block Data Counter, Block Data Time Stamp, and Block Data Verification. Please Follow the below mapping.

Robot to Predator3D Bits

	Bit (zero-based)	Bit (one-based)	Byte (zero-based)	Byte (one-based)	Interpretation	Name	Comment
30720	0	1	0	1	Boolean	Control: Reserved	
30721	1	2			Boolean	Control: Run Mode	Controls acquisition. Turn on before starting part and off once part is complete.
30722	2	3			Boolean	Control: Gun	Indicates when the dispenser is dispensing. This should be identical to the gun signal sent to the dispenser.
30723	3	4			Boolean	Control: Bypass Mode	
30724	4	5			Boolean	Control: Learn Mode	
30725	5	6			Boolean	Control: Acknowledge	Clears the Predator's inspection results (this is not typically used)
30726	6	7			Boolean	Control: E-Stopped	Tells the Predator3D that the robot has been e-stopped (not typically used)
30727	7	8			Boolean	Control: Reserved	
30730	8	9	1	2	Boolean	Control: Reserved	
30731	9	10			Boolean	Control: Reserved	
30732	10	11			Boolean	Control: Repair Mode	Tells the Predator3D that the robot is performing a repair mode scan.
30733	11	12			Boolean	Control: Reserved	
30734	12	13			Boolean	Control: Reserved	
30735	13	14			Boolean	Control: Reserved	
30736	14	15			Boolean	Control: Reserved	
30737	15	16			Boolean	Control: Reserved	
30740-30750	16-31	17-32	2-3	3-4	16-bit Unsigned Integer	Zone	Changes inspection criteria (currently not used).
30760-30770	32-47	33-48	4-5	5-6	16-bit Unsigned Integer	Speed	Speed of robot TCP (used when in Integer Speed mode, this is not common).
30780-30790	48-63	49-64	6-7	7-8	16-bit Unsigned Integer	Part Style	Indicates the current part being run.
30800-30810	64-79	65-80	8-9	9-10	16-bit Unsigned Integer	Feature	Indicates a feature on the part (currently not used).
30820-30830	80-95	81-96	10-11	11-12	16-bit Unsigned Integer	Control Timestamp	Robot timestamp for Run Mode and Gun signals.
M22=30840-30850	96-111	97-112	12-13	13-14	16-bit Unsigned Integer	Block Data Counter	Used to transmit robot position, reset to zero when setting Run Mode on
M24=30860-30870	112-127	113-128	14-15	15-16	16-bit Unsigned Integer	Block Data Timestamp	Used to transmit robot position.
M10-M11=30880-30910	128-159	129-160	16-19	17-20	32-bit DualWord16Float32	Position X (mm)	Used to transmit robot position.
M12-M13=30920-30950	160-191	161-192	20-23	21-24	32-bit DualWord16Float32	Position Y (mm)	Used to transmit robot position.
M14-M15=30960-30990	192-223	193-224	24-27	25-28	32-bit DualWord16Float32	Position Z (mm)	Used to transmit robot position.
M16-M17=31000-31030	224-255	225-256	28-31	29-32	32-bit DualWord16Float32	Angle X (deg)	Used to transmit robot position.
M18-M19=31040-31070	256-287	257-288	32-35	33-36	32-bit DualWord16Float32	Angle Y (deg)	Used to transmit robot position.
M20-21=31080-31110	288-319	289-320	36-39	37-40	32-bit DualWord16Float32	Angle Z (deg)	Used to transmit robot position.
M23=31120-31130	320-335	321-336	40-41	41-42	16-bit Unsigned Integer	Block Data Verification	Used to transmit robot position.

```
//*********************************************************
//        MOD FILE: Coherix
//        REV: 1.00
//*********************************************************
//   !FOR REFERENCE ONLY!

//  Base CIO File:  YRC1000_1ROBOT_GENERAL
////////////////////////////////////////////////////////
// Starting External Input Address
//    •External Input 20720
//
// Starting External Output Address
```

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```
//    •External Output 30720
//
// //////////////////////////////////////////////////
//
STR #70017
BMOV #10080,62,#30100    // Configured BMOV to the appropriate addressing of the Coherix device
GSTR #10700
GOUT #30720             // Robot to Coherix Control Bits Refer to the Coherix Mapping
GSTR #10710
GOUT #30730             // Robot to Coherix Control Bits Refer to the Coherix Mapping
GSTR #10720
GOUT #30740             // Robot to Coherix Zone Bits
GSTR #10730
GOUT #30750             // Robot to Coherix Zone Bits
GSTR #10740
GOUT #30760             // Robot to Coherix Speed Bits
GSTR #10750
GOUT #30770             // Robot to Coherix Speed Bits
GSTR #10760
GOUT #30780             // Robot to Coherix Part Style Bits
GSTR #10770
GOUT #30790             // Robot to Coherix Part Style Bits
GSTR #10780
GOUT #30800             // Robot to Coherix Feature Bits
GSTR #10790
GOUT #30810             // Robot to Coherix Feature Bits
GSTR #10800
GOUT #30820             // Robot to Coherix Control Timestamp Bits
GSTR #10810
GOUT #30830             // Robot to Coherix Control Timestamp Bits
STR #70017
MOV M010,W#30880        // Moving X position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M011,W#30900        // Moving X position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M012,W#30920        // Moving Y position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M013,W#30940        // Moving Y position M-Registers to Robots External Output bits to Coherix Device.
```

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```
STR #70017
MOV M014,W#30960        // Moving Z position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M015,W#30980        // Moving Z position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M016,W#31000        // Moving RX position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M017,W#31020        // Moving RX position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M018,W#31040        // Moving RY position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M019,W#31060        // Moving RY position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M020,W#31080        // Moving RZ position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M021,W#31100        // Moving RZ position M-Registers to Robots External Output bits to Coherix Device.
STR #70017
MOV M022,W#30840        // Moving Block Data Counter to Robots External Output bits to Coherix Device.
STR #70017
MOV M023,W#31120        // Moving Block Data Verification to Robots External Output bits to Coherix Device.
STR #70017
MOV M024,W#30860        // Moving Block Data Timestamp to Robots External Output bits to Coherix Device.
STR #70017
ADD 1,M022,M022         // Sending A running word Count Block Data Counter VIA Robots External Output bits to Coherix.
STR #70017
ADD 1,M023,M023             // Sending A running word Count Value for Block Data Verification VIA to Coherix Device
STR #70017
ADD 2,M024,M024             // Sending A running word Count Value for Block Data Time Stamp VIA to Coherix Device
STR #70017
BMOV #11120,399,#31140  // Configured BMOV to the appropriate addressing of the Coherix device
```

5. You should now be sending the robots current position/data control bits via the robot's external outputs.