ISC CAM PLC Example Projects

This document describes how to implement the communication with ISC CAM in the line PLC program. Intralox provides example projects for Siemens Tia Portal (15.1/16) and Rockwell Studio 5000. These projects are intended to give an example on how to communicate with ISC CAM and get all important information to the line PLC.

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1.0 Device configuration

There are two devices included on the example project. If more are necessary, please see point 5.0 on how to add more devices. If only one device is required, the second device can just be removed.

1.1 Ip-address

If IP-address needs to be changed, please do so in the device configuration.

ISC-CAM_145 [Business Logic F	N Device] 📴 Properties 🚺 Info 🚺 🗓 Diagnostics 🖬 🗏
General IO tags Sys	em constants Texts
▶ General	Add new subnet
 PROFINET interface [X1] 	
Identification & Maintenance	IP protocol
Module parameters	
	 Set IP address in the project
	IP address: 192 . 168 . 1 . 145
	Subnet mask: 255 . 255 . 0
	Synchronize router settings with IO controller
4	Use router
	Router address: 0 . 0 . 0 . 0
	IP address is set directly at the device
	PROFINET
	Generate PROFINET device name automatically
	PROFINET device name: isc-cam_145
	Converted name: isc-camxb145150d

Figure 1 Ip address in TIA portal

General Conr	nection Module Info			
Type:	ETHERNET-MODULE Generic Ethem	et Module		
Vendor:	Rockwell Automation/Allen-Bradley			
Parent:	Local	Connection Dom		
Name:	ISC_CAM_145	Connection Para	Accombly	
Description:	inc.com/b145150d		Instance:	Size:
2000,000	ISC-Callixb 145 1500	Input:	101	48 (16-bit)
	×	Output:	110	16 (16-bit)
Comm Format: Data - INT V		Configuration:	106	1 (8-bit)
Address / H	ost Name	-		
IP Addre	ss: 192 . 168 . 1 . 145	Status Input:		
◯ Host Nar	ne:	Status Output:		
Status: Offline	ОК	Cancel	Apply	Help

Figure 2 Ip address in Studio 5000

1.2 Assigning device name

TIA portal: in order to connect to the device properly, go to device configuration and assign the device name.

CPU 1215C	SC-CAM_145 Business Logic P LinePLC1	Is ISC-CAM_146 Business Logic P LinePLC1	Device configuration Change device Write IO-Device name to Micr Start device tool	o Memory Card
PN/IE_1			¥ Cut ∰ Copy ∰ Paste	Ctrl+X Ctrl+C Ctrl+V
			X Delete Rename Assign to new DP master / IO Disconnect from DP master s Highlight DP master system /	Del F2 controller system / IO system / IO system
			Compile Download to device	Ctrl+K
			Go offline Contract of the second sec	Ctrl+M Ctrl+D perands Ctrl+Shift+C
			Export module labeling strip: Properties	S Alt+Enter

Studio 5000: This step is not required on Studio 5000.

Figure 3 Assigning device name in TIA portal

1.3 Communication speed

The default communication speed between ISC CAM and the line PLC is set on Tia portal to automatic and Studio 5000 to 10ms. This value may be changed in order to optimize the line PLC, this can be done in the device configuration.

▶ General	>	 IO cycle 			
▼ PROFINET interface [X1]		Undate time			
General	o puate time				
Ethernet addresses		Calculate update time	Calculate update time automatically		
 Advanced options 					
Interface options	4	Update time: 2.000	O Set update time manually		
Media redundancy			2.000	ms 💌	
Real time settings	-				
Port 1 [X1 P1 R]		Adapt undate time when send clock changes	Adapt undate time when send clock changes		
Port 2 [X1 P2 R]					
Identification & Maintenance					
Module parameters		watchdog time			

Figure 4 Tia portal

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General Connection Module Info
Requested Packet Interval (RPI): 10.0 🖨 ms (1.0 - 3200.0 ms)
Major Fault On Controller If Connection Fails While in Run Mode
Use Unicast Connection over EtherNet/IP
Module Fault
Status: Offline OK Cancel Apply Help

Figure 5 Studio 5000

1.4 IO-modules

Each device should have 48 Words data coming in and 16 Words/INT data going out. These values should not be changed.

2.0 Device specific blocks

Each device has 3 separate blocks dedicated to the device. In these blocks the necessary communication and data handling is happening.

Tia Portal: each device has its own folder.

Studio 5000: Each device has blocks named after them.



Figure 6 Tia portal device blocks

Figure 7 Studio 5000 device blocks

2.1 Data

Tia Portal: For the data, you can see the different DB's with the information. **Studio 5000:** For the data, you can see the different tags on Controller tags.

 Program blocks 	
💣 Add new block	DB_M001_ISC_CAM_Status
Main_NotFinal [OB1]	DB_M002_ISC_CAM_Status
📲 Startup [OB100]	DB Constants
🔵 DB_Global [DB4]	v bb_constants
▶ 🔚 000-099_General	DB_General_HMI
▼ 🔁 100-199_Machine_001	▶ DB_Global
M001_Faults [FB16]	DB_M001_Comms
🔤 M001_Main [FB18]	DB_M002_Comms
MO01_Maintenance [FB19]	
DB_M001_HMI [DB12]	
DB_M001_Status [DB11]	DB_M002_HMI
🥃 iDB_M001_Main [DB13]	DB_Maintenance_M001
▶ 🔚 200-299_Machine_002	 DB_Maintenance_M002

Figure 8 Tia portal

Figure 9 Studio 5000

3.0 HMI tags

On the DB for HMI you can access all the parameters that can be handy to use on a HMI.

3.1 Faults

In faultbits you can see all separate alarms. These alarms are being triggered by the alarms coming from the ISC CAM. Alarms are staying high until they are being reset by the GeneralRestBtnCmd from the "DB_General_HMI".

Fault boolean will show if there is any fault present that have not been reset.

•	FaultBits	"dt_ISCCAM_Ala 🔳
	CommsAlarm	Bool
	Fault8Alarm	Bool
•	Fault9Alarm	Bool
•	Fault10Alarm	Bool
•	Fault11Alarm	Bool
•	Fault12Alarm	Bool
•	Fault13Alarm	Bool
	Fault14Alarm	Bool
•	Fault15Alarm	Bool
	FaultOAlarm	Bool
	Fault1Alarm	Bool
•	Fault2Alarm	Bool
	Fault3Alarm	Bool
	Fault4Alarm	Bool
	Fault5Alarm	Bool
•	Fault6Alarm	Bool
•	Fault7Alarm	Bool
	Fault	Bool

Figure 10 Faults

3.2 MaintenanceCounters

On maintenance counters you can see all the warnings that can be triggered with set thresholds. Each warning can be set up and reset individually. When the warning bit is high it means that parts of the equipment should be checked. For each maintenance point there is a standard threshold that is being setup on the 'Startup' block.

🔹 💌 Ma	intenanceCounters	"dt_ISCCAM_Maintenance"	
• •	Counters	Array[015] of "dt_ISCCAM_MaintenanceCounter"	
	 Counters[0] 	"dt_ISCCAM_MaintenanceCounter"	
	 Reset 	Bool	
	 WarningBit 	Bool	
	 MaintenanceThreshold 	DInt	
	 MaintenanceCountUnitINextMaintenance 	DInt	
	Counters[1]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[2]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[3]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[4]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[5]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[6]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[7]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[8]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[9]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[10]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[11]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[12]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[13]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[14]	"dt_ISCCAM_MaintenanceCounter"	
	Counters[15]	"dt_ISCCAM_MaintenanceCounter"	

Figure 11 Maintenance counters

List of all the maintenance warnings and the default threshold values:

<u>Counter</u>	Default Alarm frequency	Maintenance Warnings
Counters[0]	Every 8000 h	Check belt elongation. If Elongation >3%, replace belt
Counters[1]	Every 8000 h	Check the belt for contaminants. Clean if necessary (reduced friction, belt rollers not spinning)
Counters[2]	Every 8000 h	Check wearstrip thickness. Replace when below 1 mm
Counters[3]	Every 8000 h	Check helix rollers for contamination (reduced friction), spinning difficulties, orange sleeves coming off. Clean if necessary
Counters[4]	Every 8000 h	Check transfer rollers for contamination (reduced friction), spinning difficulties. Clean if necessary

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Counters[5]	Every 16000 h	Check return rollers for spinning difficulties or damages
Counters[6]	Every 16000 h	Check oil level on drive motor
Counters[7]	Every 8000 h	Check activation cylinder for smooth movement and wear signs on the bronze bushings. Clean the stem. Zone0
Counters[8]	Every 8000 h	Check activation cylinder for smooth movement and wear signs on the bronze bushings. Clean the stem. Zone1
Counters[9]	Every 8000 h	Check activation cylinder for smooth movement and wear signs on the bronze bushings. Clean the stem. Zone2
Counters[10]	Every 16000 h	Check pneumatic system for air leakage

4.0 Auxiliary sensors

Auxiliary sensor FB can be used to create alarms if any auxiliary sensors are being used. These sensors would be connected straight to the PLC.

You can find the auxiliary sensor FB in the following locations:

Tia portal: General folder – Auxiliary sensors. **Studio 5000**: Add-On Instructions



Figure 12 Tia portal

Figure 13 Studio 5000

Calling this function allows you to connect the signals from the sensor to the FB and get the active alarms.

Tia portal: Only applicable sensors can be connected.

Studio 5000: Any unused sensor input value needs to be set to 1.

The alarms can be reset with a reset signal. The output alarms can be connected to HMI tags.

5.0 Adding a new device

Follow these steps to add a new device to the project:

- 1. Add the device to hardware configuration and set up parameters as it is on the examples
- Tia portal: Copy folder of existing machine (100-199_Machine_001 / 200-299_Machine_002) and name it accordingly. Change the names of the blocks inside the folder as well.
 Studio 5000: copy the routines named per machine and change the names accordingly.



Figure 14 Tia portal



3. **Studio 5000:** Make sure the blocks are connected properly. In machine main routine, it needs to call the same machine maintenance and fault routines. Add necessary tags on the controller tags and make sure correct tags are referenced within the routines.

Tia portal: make sure that on the machine Main FB the correct HW ID is used when calling the communication FB.

4. Call the copied machine Main block to the main routine.



Figure 16 Tia portal

Figure 17 Studio 5000

5. Add the default threshold values for the maintenance notifications on the startup block.

Program blocks	
💣 Add new block	🔺 <u> Power-Up Handler</u>
🏰 Main [OB1]	🔺 🔓 Startup
🔁 Startup [OB100]	Parameters and Local Tags
DB_Global [DB4]	E StartupRoutine

Figure 18 Tia portal

Figure 19 Studio 5000