KW2D with Ethernet/IP
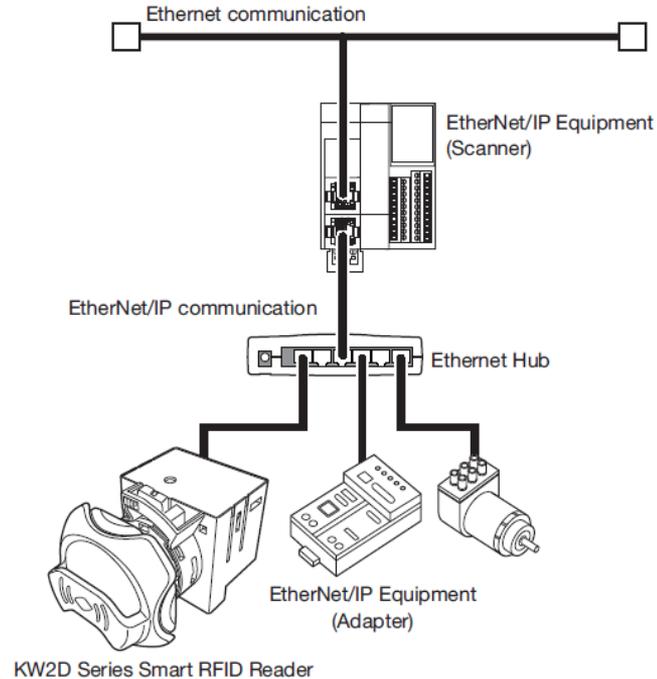
December 2025
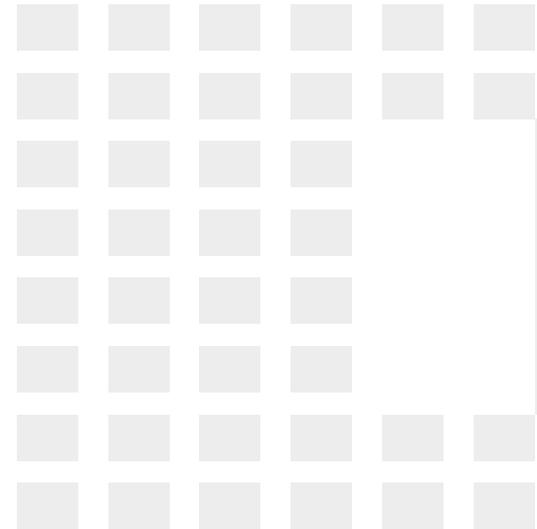
EtherNet/IP: EtherNet/IP stands for "Ethernet Industrial Protocol", which is an industrial multi-vendor network that uses Ethernet.

Multi-vendor networks between EtherNet/IP devices:

EtherNet/IP specifications for KW2D:

Items			Specifications
Supported protocols			EtherNet/IP communication (adapter)
Supported ports			Ethernet port
Action			Targeted equipment
Port number			44818 (Class 3), 2222 (Class 1)
Vendor ID			159
I/O message communication functions	Number of CIP connections		3 bottles[*1]
	CIP connection points	Number of settings	4 pieces
		IN	Instance ID: 100 (36 words)
		OUT	Instance ID: 200 (36 words)
			Instance ID: 198 (for Input Only)
			Instance ID: 199 (for Listen Only)
	RPI (communication cycle)		10 to 2000ms
	CIP Connection Type		Exclusive Owner/Input Only/Listen Only
Explicit message communication function	Class 3 (connection type)	Server	Support (number of CIP connections: 3[*2])
		Clients	Unsupported
	UCMM	Server	Support (number of CIP connections: 3[*2])
		Clients	Unsupported

*1 The maximum number of connections is 3 in total with the CIP connections used in the class 3 (connection type) explicit message communication function.

*2. The maximum number of connections is 3 in total with the CIP connections used in I/O message communication function.

EtherNet/IP adaptors are of two kinds:
1. I/O Message Communication (target) function
2. Class3/UCMM Communication

I/O Message Communication function:

It is a function that allows EtherNet/IP devices to cyclically read and write data with each other. The target unit for reading/writing data is called a CIP connection poi

We are going to look at I/O Message communication function in this presentation

Class3/UCMM Communication function:

Communication in which the target executes and responds to the service requested by the originator.

EthernetNet/IP

I/O Message Communication function:

It is a function that allows EtherNet/IP devices to cyclically read and write data with each other. The target unit for reading/writing data is called a CIP connection point.

A CIP connection is a virtual communication line between EtherNet/IP devices.
There are 3 types
1. Exclusive owner (Requires CIP connection ; Send & Receive can be done b/e Target and Originator)
2. Input Only (Requires CIP connection; Only sends data from Target to Originator)
3. Listen Only (Does not require CIP connection; Only data from Target to Originator)

In our case of KW2D:

Originator(PLC)

Target(KW2D)

Memory Assignment

Input Assembly (Instance ID: 100)
KW2D RFID Reader to host device (originator)

Address	Bit position	Contents	Description	Initial value (decimal)
0	0[1]	Verification result OK	When a tag list is registered: Turns on if the verification result is pass.	0
	1[1]	Verification result failure	Turns on if the RFID tag verification result is failure.	0
	2	Host communication status	Indicates the communication status of the host communication. 0: Communicating, 1: No communication	0
	3	RFID reader setting status	Indicates whether the KW2D Series Smart RFID Reader has basic settings (project). 0: Has settings, 1: No settings	0
	4	Tag list status	Indicates whether the KW2D Series Smart RFID Reader has a tag list. 0: Has a tag list, 1: No tag list	0
	5	Reserved		0
	6	Reserved		0
	7	RFID operation status	Indicates the operation status of the KW2D Series Smart RFID Reader. 0: Running, 1: Stopped	0
	8[1, 2]	Authority D1	Indicates the authority of the detected RFID tag. 1 to 255: Authority	0
	9[1, 2]	Authority D2		0
	10[1, 2]	Authority D3		0
	11[1, 2]	Authority D4		0
	12[1, 2]	Authority D5		0
	13[1, 2]	Authority D6		0
	14[1, 2]	Authority D7		0
	15[1, 2]	Authority D8		0
1	0[1]	KW2D special tag detection	0: KW2D Series special tag not detected, 1: KW2D Series special tag detected	0
	1 to 15	Reserved		0
2	0 to 15	Reserved		0
3	0 to 15	Reserved		0
4	-	Reserved		0

Memory Assignment

Input Assembly (Instance ID: 100)
KW2D RFID Reader to host device (originator)

Address	Bit position	Contents	Description	Initial value (decimal)
5[*1], [*2]	-	RFID operation status	Indicates the operation status of the KW2D Series Smart RFID Reader. 0: Running, 1: Stopped	65535
6[*1]	-	Authority D1	Indicates the authority of the detected RFID tag. 1 to 255: Authority	0
7[*1]	-	UID	Stored in order of upper byte (1st character) and lower byte (2nd character)	0
8[*1]	-	UID	Stored in order of upper byte (3rd character) and lower byte (4th character)	0
9[*1]	-	UID	Stored in order of upper byte (5th character) and lower byte (6th character)	0
10[*1]	-	UID	Stored in order of upper byte (7th character) and lower byte (8th character)	0
11[*1]	-	UID	Stored in order of upper byte (9th character) and lower byte (10th character)	0
12[*1]	-	Reserved		0
13[*1]	-	Reserved		0
14[*1]	-	Reserved		0
15[*1]	-	Name 1	Stored in order of upper byte (1st character) and lower byte (2nd character)	0
16[*1]	-	Name 1	Stored in order of upper byte (3rd character) and lower byte (4th character)	0
17[*1]	-	Name 1	Stored in order of upper byte (5th character) and lower byte (6th character)	0
18[*1]	-	Name 1	Stored in order of upper byte (7th character) and lower byte (8th character)	0
19[*1]	-	Name 1	Stored in order of upper byte (9th character) and lower byte (10th character)	0
20[*1]	-	Name 1	Stored in order of upper byte (11th character) and lower byte (12thvcharacter)	0
21[*1]	-	Name 1	Stored in order of upper byte (13th character) and lower byte (14thvcharacter)	0
22[*1]	-	Name 1	Stored in order of upper byte (15th character) and lower byte (16th character)	0
23[*1]	-	Name 1	Stored in order of upper byte (17th character) and lower byte (18th character)	0
24[*1]	-	Reserved		0
25[*1]	-	Name 2	Stored in order of upper byte (1st character) and lower byte (2nd character)	0
26[*1]	-	Name 2	Stored in order of upper byte (3rd character) and lower byte (4th character)	0
27[*1]	-	Name 2	Stored in order of upper byte (5th character) and lower byte (6th character)	0
28[*1]	-	Name 2	Stored in order of upper byte (7th character) and lower byte (8th character)	0
29[*1]	-	Name 2	Stored in order of upper byte (9th character) and lower byte (10th character)	0
30[*1]	-	Name 2	Stored in order of upper byte (11th character) and lower byte (12th character)	0
31[*1]	-	Name 2	Stored in order of upper byte (13th character) and lower byte (14th character)	0
32[*1]	-	Name 2	Stored in order of upper byte (15th character) and lower byte (16th character)	0
33[*1]	-	Name 2	Stored in order of upper byte (17th character) and lower byte (18th character)	0
34	-	Number of detections	Stores the number of times an RFID tag has been detected.	0
35	-	Locking operation time	Down counting	0

Memory Assignment

Output Assembly (instance ID: 200)
Host device (originator) to KW2D RFID Reader

Address	Bit position	Contents	Description	Initial value (decimal)
0	0	Stop RFID command	Stops KW2D Series Smart RFID Reader detection processing of RFID tags. Restores original operation when canceled. 0: Cancel stop command, 1: Stop command	0
	1	Forcibly cancel lock command	Cancels the lock operation. 0: No cancel lock operation command, 1: Turn on cancel lock operation command	0
	2	Forcibly stop timer for lock time command	Stops the timer for the lock time. 0: No command, 1: Turn on stop timer for lock time command	0
	3	Reserved		0
	4	Reserved		0
	5	Reserved		0
	6	OK command	ON: Turn on OK command, OFF: No command	0
	7	Failure command	ON: Turn on failure command, OFF: No command	0
	8	Enable manual control of buzzer	Controls the buzzer. 0: Disable manual control of buzzer, 1: Enable manual control of buzzer	0
	9	Control buzzer	Turns the buzzer on/off. 0: Turn off buzzer, 1: Turn on buzzer	0
	10	Enable manual control of LEDs (red)	Controls the LEDs (red). 0: Disable manual control of LEDs (red), 1: Enable manual control of LEDs (red)	0
	11	Control LEDs (red)	Turns the LEDs (red) on/off. 0: Turn off LEDs (red), 1: Turn on LEDs (red)	0
	12	Enable manual control of LEDs (white)	Controls the LEDs (white). 0: Disable manual control of LEDs (white), 1: Enable manual control of LEDs (white)	0
	13	Control LEDs (white)	Turns the LEDs (white) on/off. 0: Turn off LEDs (white), 1: Turn on LEDs (white)	0
	14	Enable manual control of LEDs (green)	Controls the LEDs (green). 0: Disable manual control of LEDs (green), 1: Enable manual control of LEDs (green)	0
	15	Control LEDs (green)	Turns the LEDs (green) on/off. 0: Turn off LEDs (green), 1: Turn on LEDs (green)	0
1 to 3	0 to 15	Reserved		0
4 to 35	0 to 15	Reserved		0

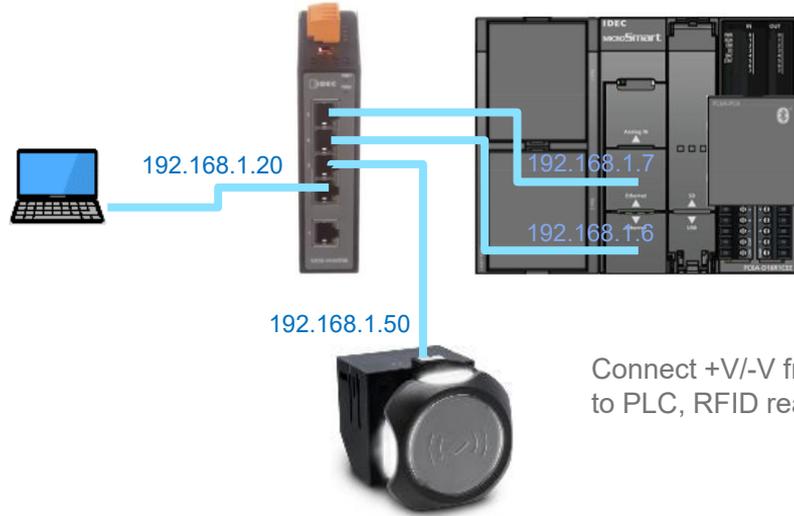# Requirements

Requirements: (Used for this procedure)

Hardware:
1. FC6A-D16R1CEE (PLC)
2. KW2D-R100Q4E (RFID Reader)
3. PS5R-VC24 (Power supply)
4. SX5E (Ethernet Hub)
5. CAT6 cables (4 nos)
6. RFID tag(Card type or KEYFOB type)

Softwares:
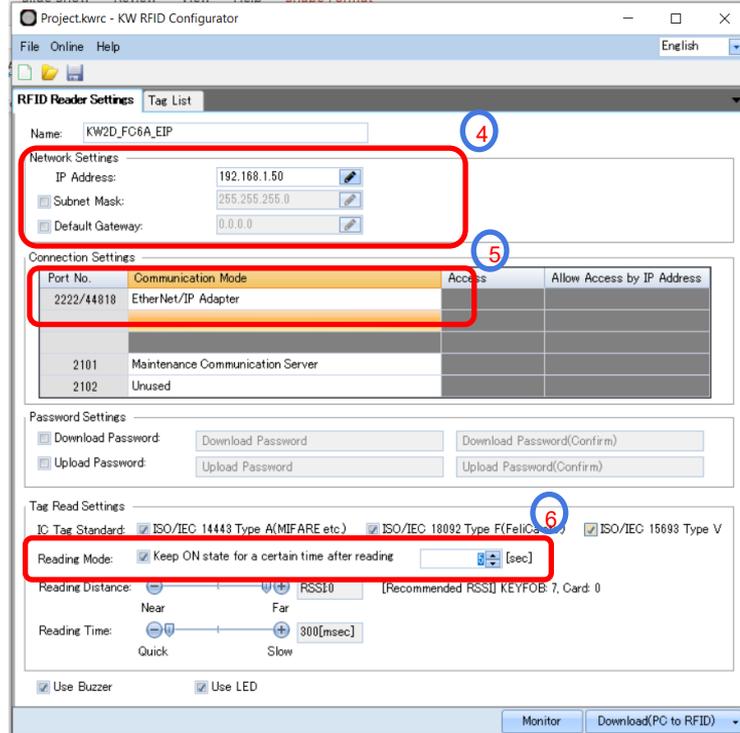1. WindLDR (Version 8.18)
2. KW2D Configurator (Version 1.1.1)

192.168.1.20

192.168.1.7

192.168.1.6

192.168.1.50

Connect +V/-V from PS5R power supply
to PLC, RFID reader & Ethernet Hub

Procedure

Configuration of KW2D:

1. Open KW2D Configurator software
2. Click on "File" -> Click on "New Project"
3. Enter Name: KW2D_FC6A_EIP (Not Mandatory option, can skip if not necessary)
4. Follow the steps --------------------→

Procedure

Configuration of KW2D:

6. Click on " Tag List" tab. (For registering tags/UIDs)
7. There are two procedures to register tags
   ➢ Manually by clicking on "Add" button (or)
   ➢ Scanning each RFID tag to the reader (Follow procedure given below)

11. Once PC-KW2D are connected
12. Scan the tags on to the reader
13. Click on " Save unregistered UID to Tag List" to get them registered.
14. We can give "Authority" and names to each UIDs.
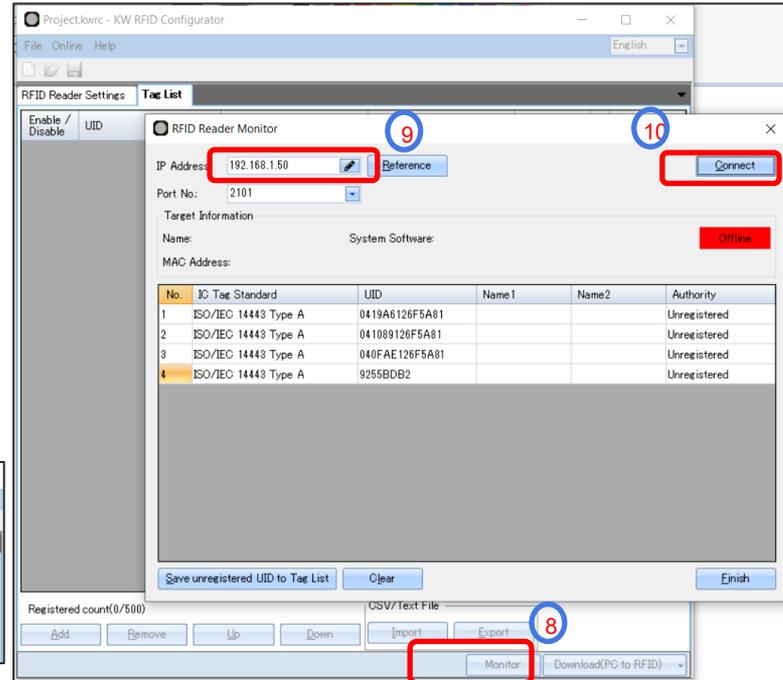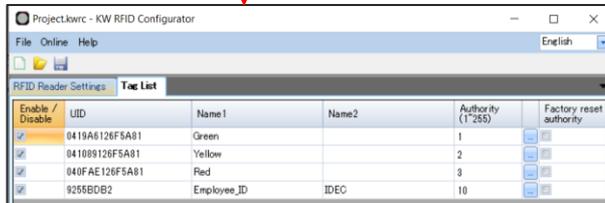
Configuration of KW2D:

15. After doing all settings, we have to write parameters to the RFID reader(KW2D)
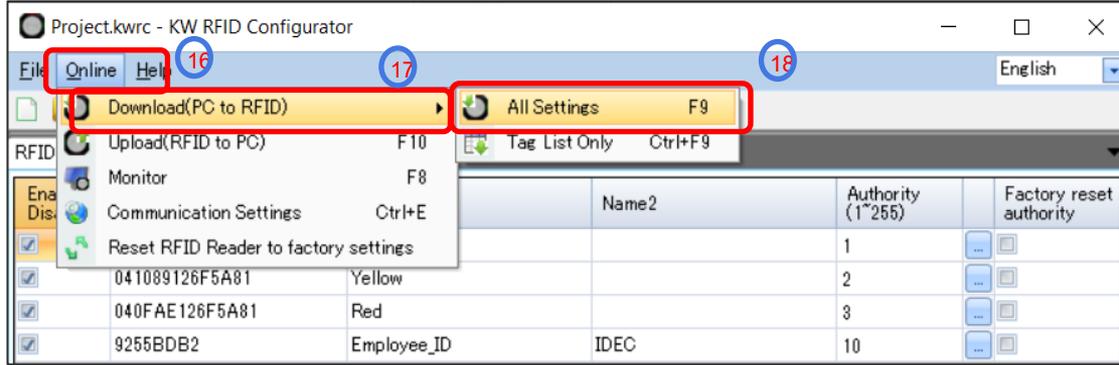
Configuration of WindLDR:

1. Open WindLDR software.
2. If Project Recovery window opens up, click on "Close".
3. Select the PLC model as " FC6A-D16XXCEE" (or select the model as per your usage)
4. Open Configuration-> Click on Ethernet Port 1 and sent IP address as shown below:
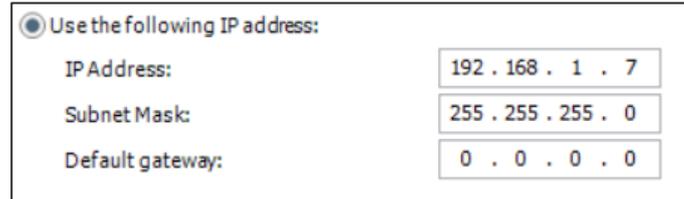
5. Click on Ethernet Port 2 on the left of selections to open it's settings, set the IP address as shown below:
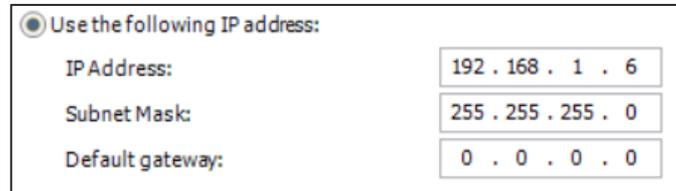
6. In the same Ethernet Port 2 settings, check the check-box of Ethernet/IP settings and click on "Configure"

Configuration of WindLDR:

7. Drag and drop EDS file of KW2D-Rx100Q4E to Scan list as shown in the step no.8 below.

Selecting Exclusive Owner; since we can Read & Write at the same time
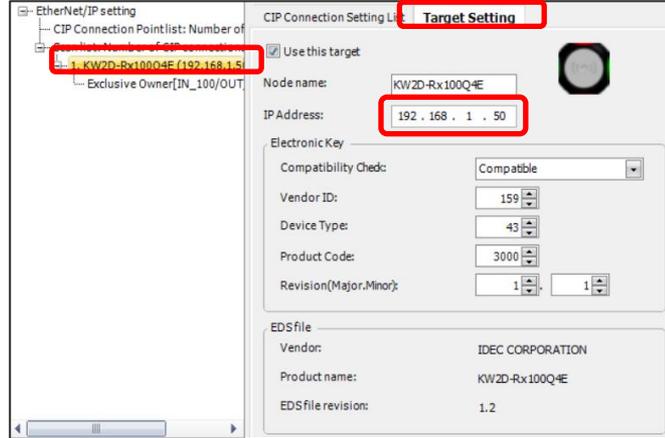
Do the settings as shown

Configuration of WindLDR:

11. Click on EtherNet/IP and check box " Turn ON EtherNet/IP Communication bit automatically" as shown below:

Configuration of WindLDR:

12. Click on KW2D-RX ->> Open "Target Setting" tab ->> enter IP address as shown below:

13. Click "OK" on EtherNet/IP settings window.
14. Click "OK" on the Function Area Settings.
15. Go to Online -> Click on Download (to download the PLC settings)

To Monitor the result, we can go to monitor to check the result in Data registers
1. D500~D535 (Values from KW2D)
2. D550~D585 (Values to KW2D)

Testing

1. Open "Batch Monitor" and "Custom" to check the results in WindLDR.
2. Scan an ID to check the results.

For Example, We have scanned Tag:

Enable / Disable	UID	Name1	Name2	Authority (1~255)	Factory reset authority
☑	9255BDB2	Employee_ID	IDEC	10	

1. You can observe the results for UID in registers D507 & D508, since it is 4 Byte length (result provided in D506). Also authority can be viewed in D505.
2. To Write commands take the help of Custom window.(as shown below with D550)