

EM4 MODBUS TCP/IP ADDRESSING

CROUZET TOUCH TUTORIAL









SUMMARY

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- Modbus TCP/IP: CTS ⇔ em4 ETHERNET Bit Addressing Example
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TERMINOLOGY



Terminology

- Crouzet Touch \rightarrow Touchscreen of the Crouzet Automation nano-PLC range
- CTS = Crouzet Touch Soft \rightarrow Programming software of the Crouzet Touch range
- BIN/DEC Converter \rightarrow Binary (16-bit) to decimal (16-bit integer) convertor
- TCP/IP → Transmission Control Protocol / Internet Protocol



CROUZET TOUCH TO EM4 ETHERNET (MODBUS TCP/IP) WIRING



Crouzet Touch to em4 ETHERNET (Modbus TCP/IP) Wiring



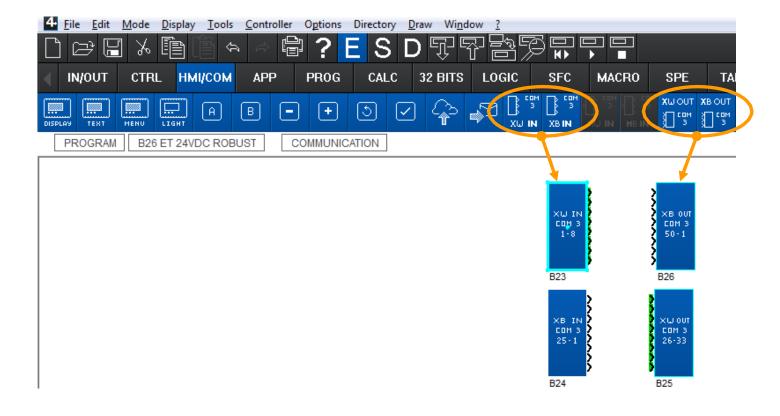
- The screens with Ethernet TCP / IP communication are CTP104-E, CTP107-E and CTP110-E
- To connect the screen to the em4 nano PLC, use a standard Ethernet cable (CAT5e or higher)



EM4 ETHERNET (MODBUS TCP/IP) ADDRESSES (REMINDER)



em4 ETHERNET (Modbus TCP/IP) Addresses (reminder)



Drag and drop the *COM* 3 functions into your worksheet.

 $XW IN \Rightarrow$ Word input from network, 8 inputs each, can be used 3 times, allows to enter 24 words into an em4 program.

XB IN \Rightarrow Bit input from network, 8 inputs each, can be used 2 times, allows to enter 16 bit into an em4 program.

 $XW OUT \Rightarrow$ Word output to network, 8 outputs each, can be used 3 times, allows to make 24 words accessible to a network.

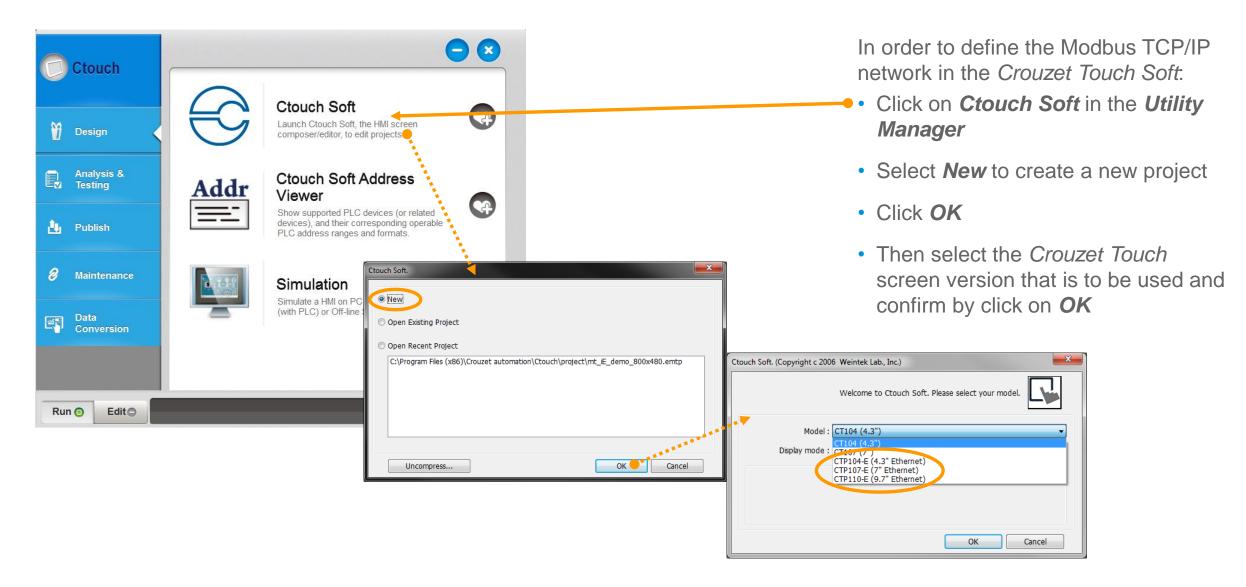
 $XB \ OUT \Rightarrow$ Bit output to network, 8 outputs each, can be used 2 times, allows to make 16 bit accessible to a network.



CROUZET TOUCH SOFT- DEFINING THE MODBUS TCP/IP NETWORK



Crouzet Touch Soft - Defining the Modbus TCP/IP Network





Crouzet Touch Soft - Defining the Modbus TCP/IP Network

System Parameter Settings Printer/Backup Server Time Sync./DST e-Mail Recipes Cellular Data Network Device Model General System Setting Security Non-ASCII Fonts Extended Memory Device list : What's my IP ? No. Name Location Device type Interface I/F Protocol Local HMI Local CTP107-E (7" - -	In the System Parameter Settings define the Device (the network) • In PLC type select Crouzet Autor em4 Ethernet Modbus TCP/IP	·
New Project description :	Name : MODBUS TCP HMI PLC Location : Local Settings * Select Local for a PLC connected to this HMI, or Remote for a PLC connected through another HMI. PLC type : MODBUS RTU V.3.00, MODBUS_RTU.e30 I/F : RS-232 Open PLC Connection Gui MODBUS IDA * Support off-line simulation on HMI (use LB-12358) * Support communications between HMI and PLC in pass-through mode Model	 em4 Ethernet Modbus TCP/IP em4 Modbus RS485 Interface RTU M3 FBD SLIN/SLOUT M3 XN05 TCP/IP M3 XN05 TCP/IP
SCADA software can indirectly access PLC data via MODBUS TCP/IP Server on HMI. (Add a MODBUS TCP/IP Server first and enable [MODBUS TCP/IP Gateway])	* Set LW-9903 to 2 to enhance the speed of download/upload PLC program in pass-through mode COM : COM1 (9600,E,8,1) Settings	In case of bit communication only: If your application requires to
Address Mapping Table PLC HMI SCADA	PLC default station no. : 1 Default station no. use station no. variable Use broadcast command How to designate the station no. in object's address ? Interval of block pack (words) : 5 Address Range Limit	exchange more than 16 bit in or 16 bit out with the Crouzet Touch, select MODBUS TCP/IP (Zero-based Addressing) which is listed under MODBUS IDA.
OK Annuler Aide	Max. read-command size (words) : 120 Data Conversion Max. write-command size (words) : 120 OK Cancel	It includes the <i>4x_bit</i> function allowing to read/write a bit in a register.
		See chapter page 27

Crouzet Touch - em4 Modbus TCP/IP Addressing June 2017



Crouzet Touch Soft - Defining the Modbus TCP/IP Network

Name : MODBUS TCP	 Click Settings to define address)
Location : Local Settings * Select Local for a PLC connected to this HMI, or Remote for a PLC connected through another HMI.	 The IP address of Cround need to be different but
PLC type : Crouzet em4 Ethemet Modbus TCP/IP ↓ V.1.00, CROUZET_EM4_TCPIP.e30 I/F : Ethernet	
* Support off-line simulation on HMI (use LB-12358)	IP Address Sett 1gs
IP : 192.168.1.36, Port=502 Settings	IP address : 192 . 168 . 1 . 36 Port no. : 502
PLC default station no. : 1 Default station no. use station no. variable Use broadcast command	
How to designate the station no. in object's address ?	Timeout (sec) : 1.0 Turn around delay (ms) : 0
Interval of block pack (words) : 32 Max. read-command size (words) : 120 Max. write-command size (words) : 120	The number of resending commands : 0
OK Cancel	ОКС

- fine the communication parameters (IP
- Crouzet Touch, em4 and the computer but part of the same subnet

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Cancel

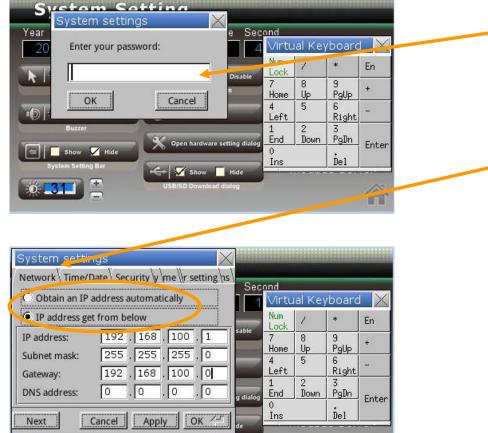


CROUZET TOUCH – IP ADDRESS PARAMETERS









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Enter default password 111111 using the virtual keyboard on the Crouzet Touch and press **OK**

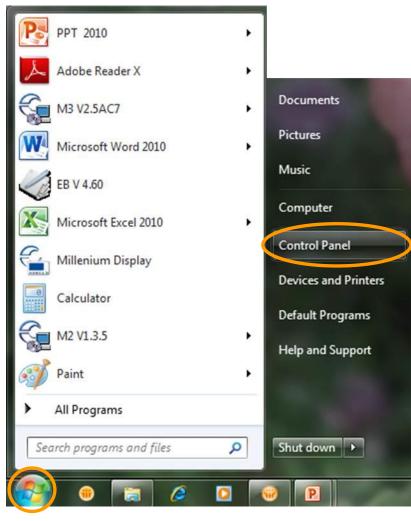
Select the *Network* tab :

- When we choose Obtain an IP adress automatically we don't have to configure the IP adress for the screen and computer.
- If we select the option *IP address get from below*, then enter the IP, subnet mask and gateway. After click on *Apply* button and *OK*

The **IP address** of Crouzet Touch, em4 and the computer need to be **different** but part of the **same subnet**



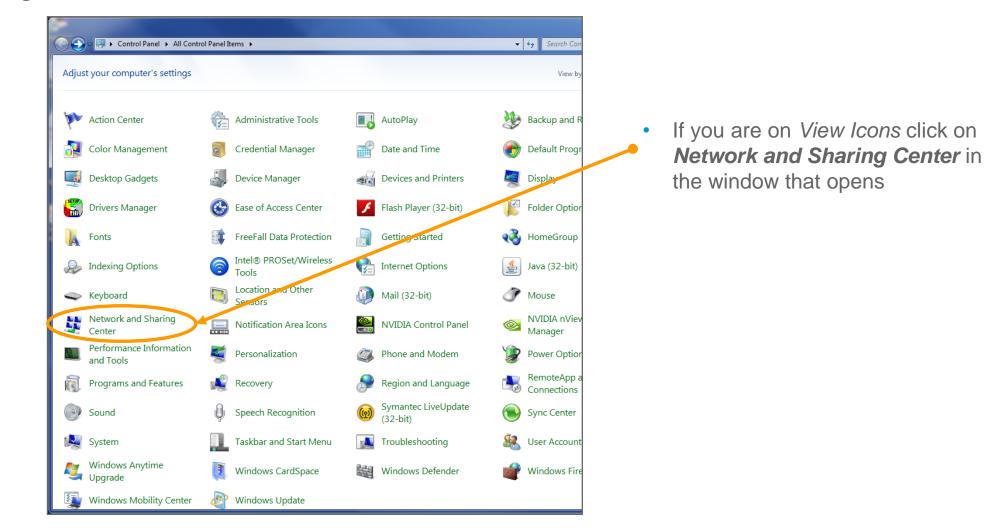
• Setting the IP address of the PC under Win7



Click start menu, then Control Panel

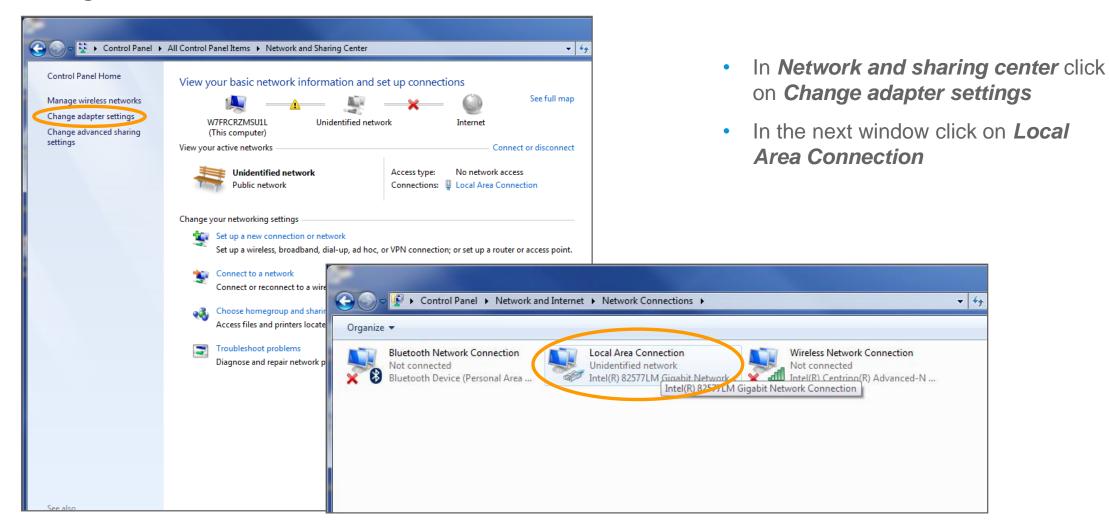


• Setting the IP address of the PC under Win7



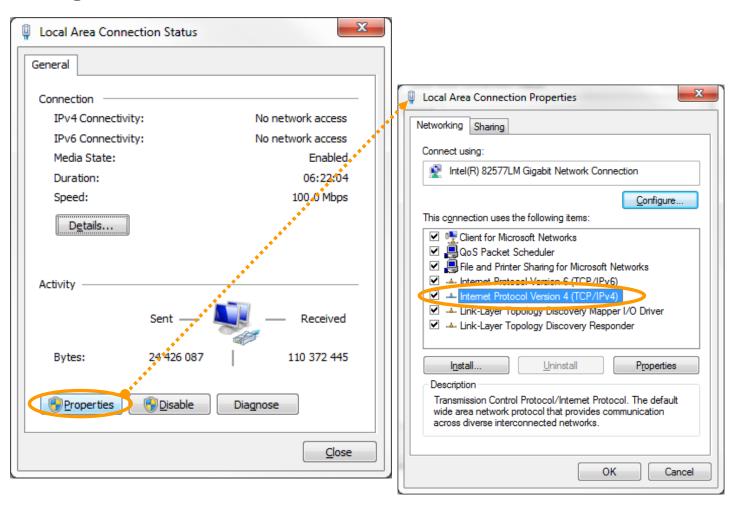


• Setting the IP address of the PC under Win7





• Setting the IP address of the PC under Win7



- Click on *Properties*
- Then double click on *Internet Protocol Version 4*



• Setting the IP address of the PC under Win7

Internet Protocol Version 4 (TCP/IPv4)	Properties	1
General Alternate Configuration	1	
You can get IP settings assigned auto this capability. Otherwise, you need to for the appropriate IP settings.		Internet Protoc
Obtain an IP address automatica	ally	
O Use the following IP address:		General
IP address: Sybnet mask:		You can get this capabilit for the appr
Default gateway:		Obtain
Obtain DNS server address auto	matically	IP addres
O Use the following DNS server add	dresses:	
Preferred DNS server:		Subnet m
Alternate DNS server:		Default g
Validate settings upon exit	Ad <u>v</u> anced	Obtain Obtain Obter Obtain Preferred
	OK Cancel	Alternate
		🗌 Valida

I	Internet Protocol Version 4 (TCP/IPv4) Properties				
ſ	General				
		wise, you need to	natically if your networ ask your network adm		
	Obtain an IP add	dress automatical	У		
	 Use the following 	g IP address:			
1	IP address:		192 . 168 . 100 . 1	0	
	Subnet mask:		255 . 255 . 255 . 0	J	
	Default gateway:		192.168.100.0	2	
	Obtain DNS serv	ver address auton	natically		
	Ouse the following	g DNS server add	resses:		
	Preferred DNS serv	ver:			
	Alternate DNS serv	ver:			
	Validate setting	ıs upon exit	Ad	vanced	
			ОК	Cancel	

To use a static IP address, tick Use the following IP address then enter the IP address, Subnet mask and Default gateway



MODBUS TCP/IP: CTS ⇔ EM4 ETHERNET WORD ADDRESSING EXAMPLE

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Modbus TCP/IP: CTS ⇔ em4 ETHERNET Word Addressing Example

Writing a value from Crouzet Touch to em4 ETHERNET

 \Rightarrow em4: COM 3, XW IN 8



 \Rightarrow CTS: Device type XWIN, Address 8 write address XW IN 8

PLC :	Crouzet em4 Ethernet Modbus TCP/IP
Device type :	XWIN
Address :	8
Address format :	DD [range : 1 ~ 24]

Reading a value by the Crouzet Touch from em4 ETHERNET

 \Rightarrow em4: COM 3, XW OUT 33



 \Rightarrow CTS: *Device type* XWOUT, *Address* 33 read address XW OUT 33

PLC :	Crouzet em4 Ethernet Modbus TCP/IP 🔹
Device type :	xwout -
Address :	33
Address format :	DD [range : 26 ~ 49]

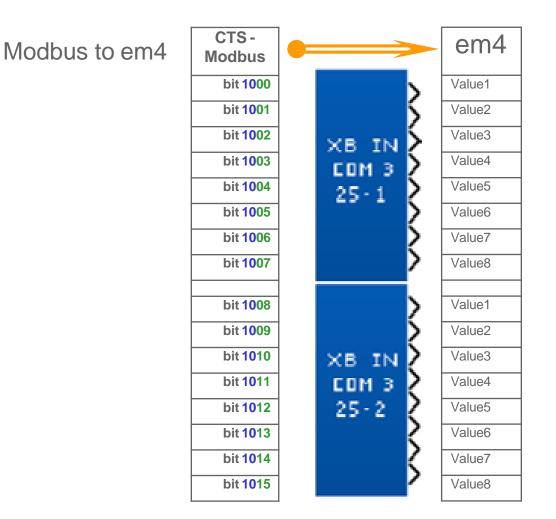


MODBUS TCP/IP: CTS ⇔ EM4 ETHERNET BIT ADDRESSING EXAMPLE



Modbus TCP/IP: CTS ⇔ em4 ETHERNET Bit Addressing Example

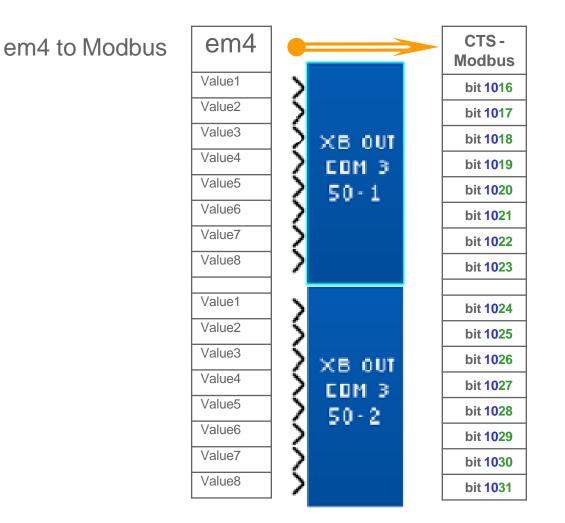
Crouzet Touch soft: write/read a bit to em4 ETHERNET via Modbus TCP/IP





Modbus TCP/IP: CTS ⇔ em4 ETHERNET Bit Addressing Example

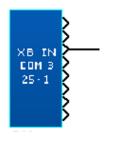
Crouzet Touch soft: reading a bit from em4 ETHERNET via Modbus TCP/IP





Modbus TCP/IP: CTS ⇔ em4 ETHERNET Bit Addressing Example

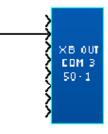
Writing a bit from the Crouzet Touch to em4 \Rightarrow em4: COM 3, XB IN 25-1, output Value 3



⇒ CTS: *Device type:* XBIN_Bit, *Address:* 1002 write address XB IN 25-1

PLC :	Crouzet em4 Ethernet Modbus TCP/IP 🔹	
Device type :	XBIN_Bit	
Address :	1002	
Address format : DDdd [range : 1000 ~ 1031, dd (bit no.) : 00 ~ 31]		

Reading a bit by the Crouzet Touch from em4 \Rightarrow em4: COM 3, XB OUT 50-1, input Value 2



⇒ CTS: *Device type:* XBOUT_Bit, *Address:* 1017 read address XB OUT 50-1

PLC :	Crouzet em4 Ethernet Modbus TCP/IP 🔹	
Device type :	XBOUT_Bit	
Address :	1017	
Address format : DDdd [range : 1000 ~ 1031, dd (bit no.) : 00 ~ 31]		



MODBUS TCP/IP (ZERO-BASED ADDRESSING): CTS ⇔ EM4 ETHERNET WORD ADDRESSING EXAMPLE AND BIT ADDRESSING EXAMPLE USING BIN/DEC CONVERTER FB'S



Modbus TCP/IP (Zero-based Addressing): CTS ⇔ em4 ETHERNET Word Addressing Example

Having chosen MODBUS TCP/IP (Zero-based Addressing) select the 4x function in *Device type* under *Settings* for CTS Objects communicating words, and the 4x_Bit function in *Device type* for Objects communicating a bit status

Writing a value from Crouzet Touch to em4 ETHERNET \Rightarrow em4: COM 3, XW IN 8

XW IN EDM 3 1-8

 \Rightarrow CTS: *Device type* 4x, *Address* 8 write address XW IN 8

PLC : MODBUS TCP/IP (Zero-based Addressing)
Device type : 4x
Address: 8
Address format : DDDDD [range : 0 ~ 65535]

Reading a value by the Crouzet Touch from em4 ETHERNET

 \Rightarrow em4: COM 3, XW OUT 33

ХШ ООТ СОМ 3 26-33

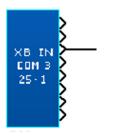
 \Rightarrow CTS: *Device type* 4x, *Address* 33 read address XW OUT 33

PLC :	MODBUS TCP/IP (Zero-based Addressing)	
Device type :	4x	-
Address :	33	
Address format :	DDDDD [range : 0 ~ 65535]	



Modbus TCP/IP (Zero-based Addressing): CTS ⇔ em4 ETHERNET Bit Addressing Example

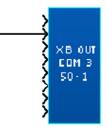
Writing a bit from the Crouzet Touch to em4 ETHERNET \Rightarrow em4: COM 3, XB IN 25-1, output Value 3



 \Rightarrow CTS: *Device type:* 4x_Bit, *Address:* 2502 write address XB IN 25-1

PLC :	MODBUS TCP/IP (Zero-based Addressing)	
Device type :	4x_Bit	•
Address :	2502	
Address format : DDDDDdd [range : 0 ~ 6553515, dd (bit no.) : 00 ~ 15]		

Reading a bit by the Crouzet Touch from em4 ETHERNET \Rightarrow em4: COM 3, XB OUT 50-1, input Value 2



 \Rightarrow CTS: *Device type:* 4x_Bit, *Address:* 5001 read address XB OUT 50-1

PLC :	MODBUS TCP/IP (Zero-based Addressing)	
Device type :	4x_Bit	
Address :	5001	
Address format :	DDDDDdd [range : 0 ~ 6553515, dd (bit no.) : 00 ~ 15]	



Modbus TCP/IP (Zero-based Addressing): CTS ⇔ em4 ETHERNET Bit Addressing via Converter

Crouzet Touch soft: write/read a bit to em4 ETHERNET via Modbus TCP/IP (Zero-based Addressing)

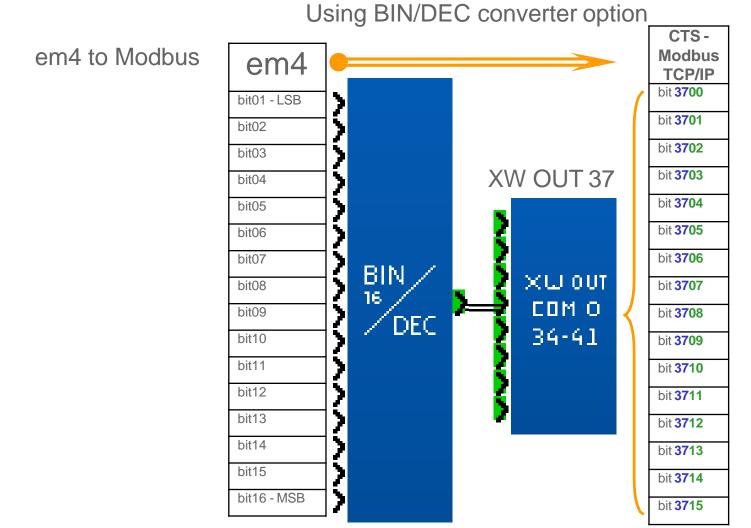
Using DEC/BIN converter option CTS-Modbus to em4 **Modbus** em4 **TCP/IP** bit **1100** bit01 - LSB bit **1101** bit02 bit **1102** bit03 bit **1103** bit04 bit **1104** bit05 XW IN 11 bit **1105** bit06 bit **1106** bit07 DEC bit **1107** bit08 ∕ 16 BIN bit **1108** $\times \omega$ in bit09 bit **1109** COM O bit10 bit **1110** 9-16 bit11 bit **1111** bit12 bit **1112** bit13 bit **1113** bit14 bit 1114 bit15 bit **1115** bit16 - MSB

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Modbus TCP/IP (Zero-based Addressing): CTS ⇔ em4 ETHERNET Bit Addressing via Converter

Crouzet Touch soft: reading a bit from em4 ETHERNET via Modbus TCP/IP (Zero-based Addressing)

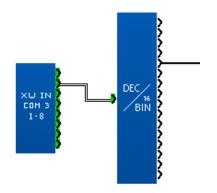




Modbus TCP/IP (Zero-based Addressing): CTS ⇔ em4 ETHERNET Bit Addressing via Converter

Writing a bit from the Crouzet Touch to em4 ETHERNET

 \Rightarrow em4: COM 3, XW IN 2, bit 05

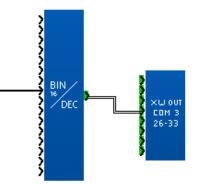


⇒ CTS: *Device type:* 4x_Bit, *Address:* 204 write address XW IN 2

PLC :	MODBUS TCP/IP (Zero-based Addressing)
Device type :	4x_Bit
Address :	204
Address format :	DDDDDdd [range : 0 ~ 6553515, dd (bit no.) : 00 ~ 15]

Reading a bit by the Crouzet Touch from em4 ETHERNET

 \Rightarrow em4: COM 3, XW OUT 29, bit 08



 \Rightarrow CTS: *Device type:* 4x_Bit, *Address:* 2907 read address XW OUT 29

PLC :	MODBUS TCP/IP (Zero-based Addressing)
Device type :	4x_Bit
Address :	2907
Address format :	DDDDDdd [range : 0 ~ 6553515, dd (bit no.) : 00 ~ 15]

THANK YOU FOR YOUR ATTENTION

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