Standard communication with Lantech machines

INDEX

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1 Introduction

This document gives an description how to setup communication with a Lantech machine. It's intended for software engineers who are setting up the communication with the Lantech machine.

In chapter two you find an overview of the available standard communication signals depending on the Lantech machine type. Chapter three gives a more detailed description of these signals.

Chapter 4 and 5 are given a detailed description how to setup the communication for a PN/PN coupler or a CP-Card.

Finally in chapter 6 a description is given how communication can be tested.

2 Standard signals per machine type

The following table gives an overview of standard available communication signals for every machine type.

Standard communication signals		Case erectors						Case sealers				Tray		
	Signal description	C-1000-2000-Tape	C-1000-2000-Hotmelt	CI-1000-2000-Tape	CI-1000-2000-Hotmelt	MFC-Tape	MFC-Hotmelt	CS-1000-Tape	CS-1000-Hotmelt	CS-Random	CSRHS	TE	LA	LF
Customer output / Lantech input	Communication alive (1 Hz clock pulse)	X	X	X	X	X	X	X	X	X	X	X	X	X
	Outfeed free	X	X	X	X	X	X	X	X	X	X	X	X	X
	Upstream active								X					
	Remote start	X	X	X	X	X	X	X	X	X	X	X	X	X
	Remote stop	X	X	X	X	X	X	X	X	X	X	X	X	X
	Request case from blank magazine 1					X	X							
	Request case from blank magazine 2					X	X							
	Request case from blank magazine 3					X	X							
	Request case from blank magazine 4					X	X							
Customer input / Lantech ouput	Communication alive (1 Hz clock pulse)	X	X	X	X	X	X	X	X	X	X	X	X	X
	Ready to receive							X	X	X			X	X
	Machine running	X	X	X	X	X	X	X	X	X	X	X	X	X
	Machine failure	X	X	X	X	X	X	X	X	X	X	X	X	X
	Blank magazine almost empty	X	X	X	X							X	X	X
	Blank magazine empty	X	X	X	X							X	X	X
	Tape almost empty	X		X		X		X		X	X			
	Tape failure	X		X		X		X		X	X			
	Glue unit almost empty		X		X		X		X			X	X	X
	Ready for case request					X	X							
	Acknowledge case request					X	X							
	Ready to outfeed case					X	X							
	Outfeed case from blank magazine 1					X	X							
	Outfeed case from blank magazine 2					X	X							
	Outfeed case from blank magazine 3					X	X							
	Outfeed case from blank magazine 4					X	X							
	Blank magazine 1 empty					X	X							
	Blank magazine 1 almost empty					X	X							
	Case at blank magazine 1 not released					X	X							
	Blank magazine 2 empty					X	X							
	Blank magazine 2 almost empty					X	X							
	Case at blank magazine 2 not released					X	X							
	Blank magazine 3 empty					X	X							
	Blank magazine 3 almost empty					X	X							
	Case at blank magazine 3 not released					X	X							
	Blank magazine 4 empty					X	X							
	Blank magazine 4 almost empty					X	X							
	Case at blank magazine 4 not released					X	X							

Lantech

3 Signal description

This chapter gives a description of the standard communication signals. Not all signals are used in every machine. The table in chapter 2 gives an overview of the used signals for each machine type.

3.1 Lantech inputs / Customer outputs

This paragraph gives a description of the Lantech input communication signals.

3.1.1 Communication alive (1 Hz clock pulse)

To verify that the communication is working correctly, Lantech checks for an alive pulse. If the pulse is missing a warning message is shown on the HMI.

3.1.2 Outfeed Free

A low signal indicates that the downstream system is not able to receive a case or tray. When the Lantech machine is in running state and the signal is high, Lantech will outfeed cases or trays. When the Lantech machine is in running state and the signal is low, Lantech will not outfeed cases or trays. For the Multi Format case erector see also timing diagram paragraph 3.3.2.

3.1.3 Upstream active

This signal is typically used with case sealers. A low signal indicates that an upstream system is not active.

3.1.4 Remote start

A rising edge will give the same response as pressing the start button on the machine.

3.1.5 Remote stop

A rising edge will give the same response as pressing the stop button on the machine.

3.1.6 Request case from blank magazine x

This signal is typically for a Multi Format Case Erector. A high signal indicates that a case must be erected and folded from blank magazine 'x'. Where 'x' stands for a blank magazine number. See also timing diagram paragraph 3.3.1

3.2 Lantech output / Customer input

This paragraph gives a description of the Lantech output communication signals.

3.2.1 Communication alive (1 Hz clock pulse)

A 1hz pulse signal so the customer can verify if the communication is alive.

3.2.2 Ready to receive

A high signal indicates that the Lantech machine is ready to receive a case.

3.2.3 Machine running

A high signal indicates that a start command is given and the Lantech machine is running state. When the blank magazine is empty or no cases are entering the machine, the machine will still stay in running state. Also when the outfeed free signal is low the machine will stay in running state.

3.2.4 Machine failure

A high signal indicates that the Lantech machine is in a failure state.

3.2.5 Blank magazine almost empty

A high signal indicates that the blank magazine is almost empty. The blank magazine must be filled in the short term otherwise the machine will not produce cases or trays..

3.2.6 Blank magazine empty

A high signal indicates that the blank magazine is empty. When the machine is running it will not produce until the blank magazine is refilled.

3.2.7 Tape almost empty

A high signal indicates that the tape roll is almost empty. Replace the tape roll shortly otherwise the machine will give a tape failure.

3.2.8 Tape failure

A high signal indicates that the tape is broken or tape roll is empty.

3.2.9 Glue unit almost empty

A high signal indicates that the glue unit is almost empty.

3.2.10 Ready for case request

Signal is typically for a Multi Format Case Erector. A high signal indicates that the machine is ready for a case request signal. See also timing diagram paragraph 3.3.1

3.2.11 Acknowledge case request

Signal is typically for a Multi Format Case Erector. A high signal indicates an acknowledge on the case request signal. See also timing diagram paragraph 3.3.1

3.2.12 Ready to outfeed case

Signal is typically for a Multi Format Case Erector. A high signal indicates that a case is ready for outfeed. See also timing diagram paragraph 3.3.2

3.2.13 Outfeed case from blank magazine 'x'

Signal is typically for a Multi Format Case Erector. A high signal indicates the case at the outfeed comes from blank magazine 'x'. Where 'x' stands for a blank magazine number. See also timing diagram paragraph 3.3.2.

3.2.14 Blank magazine 'x' empty.

Signal is typically for a Multi Format Case Erector. 'x' stands for a blank magazine number. For description of the signal see paragraph 3.2.6.

3.2.15 Blank magazine 'x' almost empty

Signal is typically for a Multi Format Case Erector. 'x' stands for a blank magazine number. For description of the signal see paragraph 3.2.5.
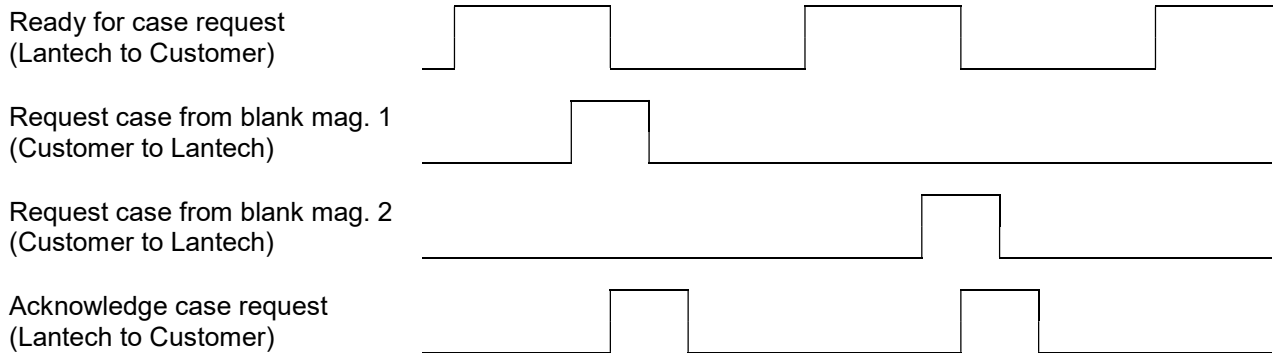
3.2.16 Case at blank magazine 'x' not released

Signal is typically for a Multi Format Case Erector. 'x' stands for a blank magazine number. A high signal indicate that cases on the blank magazine 'x' are not released for production. Case can be released for production on the HMI of the machine.

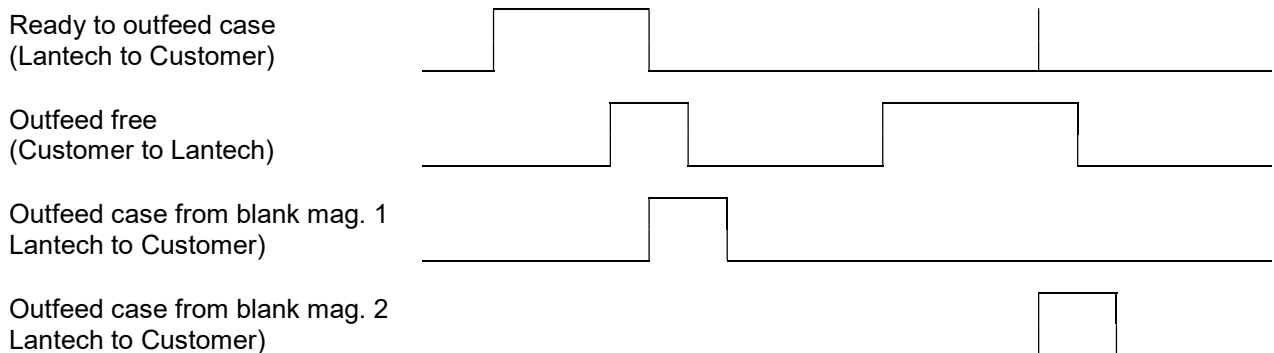### 3.3 Timing diagrams Multi Format Case Erector signals

3.3.1 Case request

When the case erector is able to handle a request, signal 'Ready for case request' is activated. As soon as a request is done by signal 'Request case from blank magazine 'x' the Ready for case request' signal is deactivated. The request is acknowledge by the signal 'Acknowledge case request'. When the customer receives this signal the request signal must be lowered which will be acknowledged by deactivating 'the 'Acknowledge case request' signal. As soon as the machine is ready for a new request, the communication principle is started again.

Ready for case request
(Lantech to Customer)

Request case from blank mag. 1
(Customer to Lantech)

Request case from blank mag. 2
(Customer to Lantech)

Acknowledge case request
(Lantech to Customer)

3.3.2 Case outfeed

When the case erector has created a case (closed by glue or tape), the signal 'Ready to outfeed case' is activated. The case stays in the side belts until the signal 'Outfeed free' is activated. As soon as the case is released the signal 'Outfeed case from blank magazine 1' or 'Outfeed case from blank magazine 2' is set. When the case has past the outfeed sensor this signal is reset.
When the 'Outfeed free' signal is already set before the 'Ready to outfeed case' is set, the case will be not be stopped in side belts but is directly feed out. The signal 'Ready to outfeed case' maybe to shortly high for notifying.

Ready to outfeed case
(Lantech to Customer)

Outfeed free
(Customer to Lantech)

Outfeed case from blank mag. 1
Lantech to Customer)

Outfeed case from blank mag. 2
Lantech to Customer)

4 Siemens PN/PN coupler

When the option "PN/PN Coupler communication" is ordered a PNPN coupler will be placed for communication. With this option the Lantech machine network and customer network are separated so they cannot influence each other.

4.1 PN/PN coupler configuration

The customer must adapt the X2 side of the PN/PN coupler in the plc configuration. There are two possibilities to do this. The first option is to add a preconfigured PN/PN coupler with a GSD file. The second option is to add a PN/PN coupler from the hardware catalog and configure it manually.

4.1.1 Use a preconfigured PN/PN coupler with GSD file

Follow the following steps to add a pre-configured PN/PN coupler.

- Import de Lantech GSD file in TIA portal via Options → Manage General Station Description files (GSD).
- Select the imported GSD file in hardware catalog. (Tip, search for "preconf").
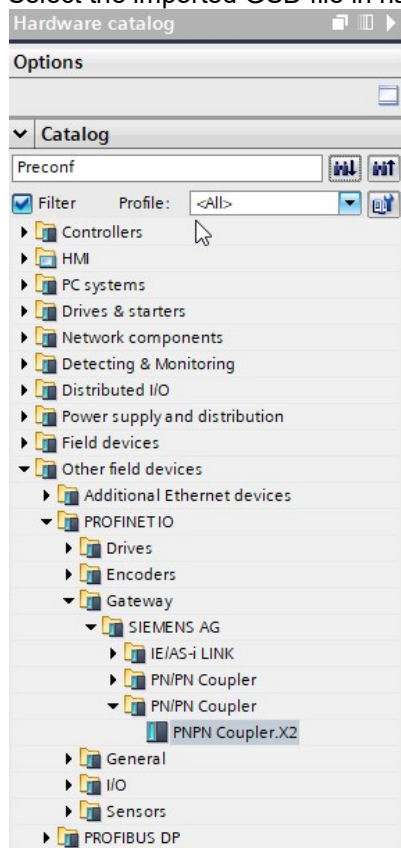
- Connect it to the plc network
- Configure the Ethernet addresses.

4.1.2 Manually configure a PN/PN coupler

Follow the following steps to manually configure a PN/PN coupler.

- In Tia Portal add PN/PN coupler, 6ES7 158-3AD10-0XA0 V4.2, to the your project.
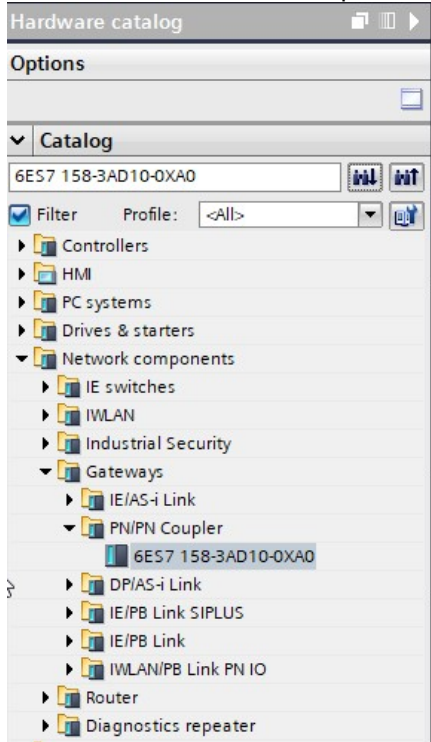
- Connect the X2 side of the PN/PN coupler to the plc network.
- Configure the Ethernet addresses from the X2 side of the PN/PN coupler.
- Configure the transfer mapping settings from the X2 side as followed.

  Active data status = Disabled
  Virtual slot 1: Type = OUT, Length = 2 byte
  Virtual slot 2: Type = IN, Length = 2 byte or 6 byte when it's a MFC machine.

  This screenshot shows an example of transfer mapping settings for a standard telegram.

4.2   Lantech standard telegram

The Lantech standard telegram is used for all Lantech case erectors, case sealers and tray equipment except the Multi Format Case Erector. The telegram for the MFC is described in paragraph 4.3.

Not all signals may be relevant, this is depending on the machine type as described in chapter 2.

	Byte	Bit	Description
Customer output / Lantech input	0	0	Communication alive (1 Hz clock pulse)
		1	Outfeed free
		2	Upstream active
		3	
		4	
		5	
		6	Remote start
		7	Remote stop
	1	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	
Customer input / Lantech ouput	0	0	Communication alive (1 Hz clock pulse)
		1	Ready to receive
		2	Machine running
		3	Machine failure
		4	
		5	
		6	
		7	
	1	0	Blank magazine almost empty
		1	Blank magazine empty
		2	Tape almost empty
		3	Tape failure
		4	Glue unit almost empty
		5	
		6	
		7	

4.3   Lantech MFC telegram

The Lantech MFC telegram is an extension on the Lantech standard telegram used for the Multi Format Case erector.

	Byte	Bit	
Customer output / Lantech input	0	0	Communication alive (1 Hz clock puls)
		1	Outfeed free
		2	
		3	
		4	
		5	
		6	Remote start
		7	Remote stop

	1	0	Request case from blank magazine 1
		1	Request case from blank magazine 2
		2	Request case from blank magazine 3
		3	Request case from blank magazine 4
		4	
		5	
		6	
		7	
Customer input / Lantech ouput	0	0	Communication alive (1 Hz clock puls)
		1	
		2	Machine running
		3	Machine failure
		4	
		5	
		6	
		7	
	1	0	
		1	
		2	Tape almost empty
		3	Tape failure
		4	Glue unit almost empty
		5	
		6	
		7	
	2	0	Ready for case request
		1	Acknowledge case request
		2	Ready to outfeed case
		3	Outfeed case from blank magazine 1
		4	Outfeed case from blank magazine 2
		5	Outfeed case from blank magazine 3
		6	Outfeed case from blank magazine 4
		7	
	3	0	Blank magazine 1 empty
		1	Blank magazine 1 almost empty
		2	Case at blank magazine 1 not released
		3	Blank magazine 2 empty
		4	Blank magazine 2 almost empty
		5	Case at blank magazine 2 not released
		6	Blank magazine 3 empty
		7	Blank magazine 3 almost empty
	4	0	Case at blank magazine 3 not released
		1	Blank magazine 4 empty
		2	Blank magazine 4 almost empty
		3	Case at blank magazine 4 not released
		4	
		5	
		6	
		7	
	5	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	

5 Siemens ET200SP CP-Card

When the option "CP-Card communication for ET200SP" is ordered an additional Communication Processor card (CP 1542SP-1) will be placed for communication. With this option the Lantech machine network and customer network are separated so they cannot influence each other.
In the CPU properties Lantech will enable the option "Permit access with PUT/GET communication from remote partner" to allow communication by the put and get instructions.

5.1   CP-card configuration

Depending if your machine is equipped with an HMI the CP-card can be configured by the HMI or by the plc's web server.

5.1.1   Configure by HMI

Lantech machines are equipped with different types of HMI so the screenshots in this document may not exactly match with your machine. The principles however are the same.

- Press "**F4**" function key **or** Button "**>**" to go to the operator options screen
- Press button "**>**" to go to the service options screen. Password = 3333
- Press button "**>**" to go to the engineering options screen.
- Press button "Line communication"
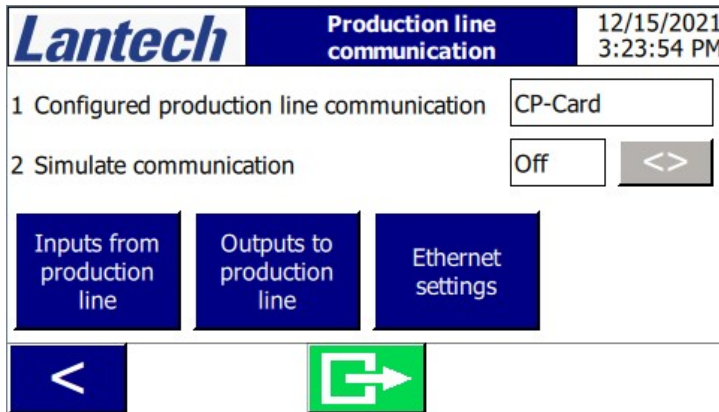
In first line the configured communication option is shown. This cannot be changed.
Simulate communication and the input /output buttons are described in chapter 6.
When CP-Card option is configured the button "Ethernet settings" is available.

- Press button "Ethernet settings".
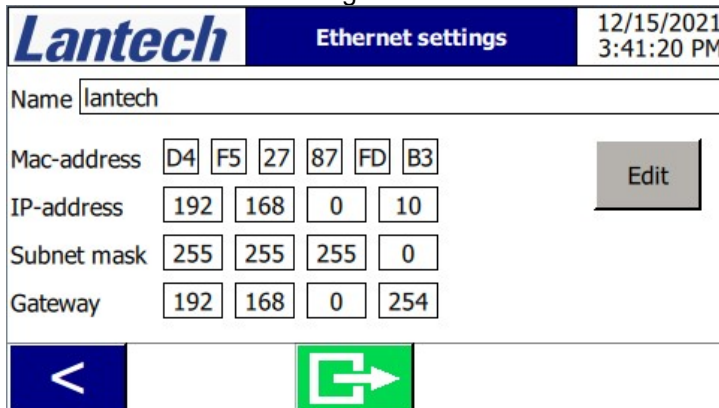
The current configured ethernet settings are shown.

After changing the settings it can take few seconds before the change are visable.

- Press button "Edit" to change the settings.

Press a green field to change the setting.

- When all fields are changed correctly press the Change button to accept the changes or press the Cancel button to undo the changes.

 Incorrect changes will not be accepted.
  IP-address and gateway address must be unique.
 IP-address and the Gateway must be in the same range as specified by the subnet mask.

5.1.2   Configure by web server

This option is only available when the machine is not equipped with an HMI.

- Connect an Ethernet cable between the CP-card and your computer.
- Lantech default IP-address CP-card is 192.168.0.10
- Set the IP address of your network card in the correct range.
- Try to ping the cp card. CMD → Ping 192.168.0.10
- When ping has found a connection open a address 192.168.0.10 in a browser.
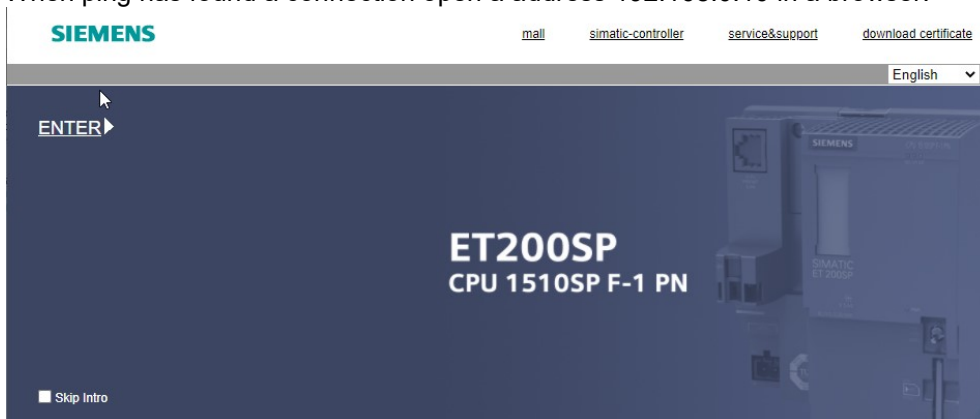
- Click ENTER
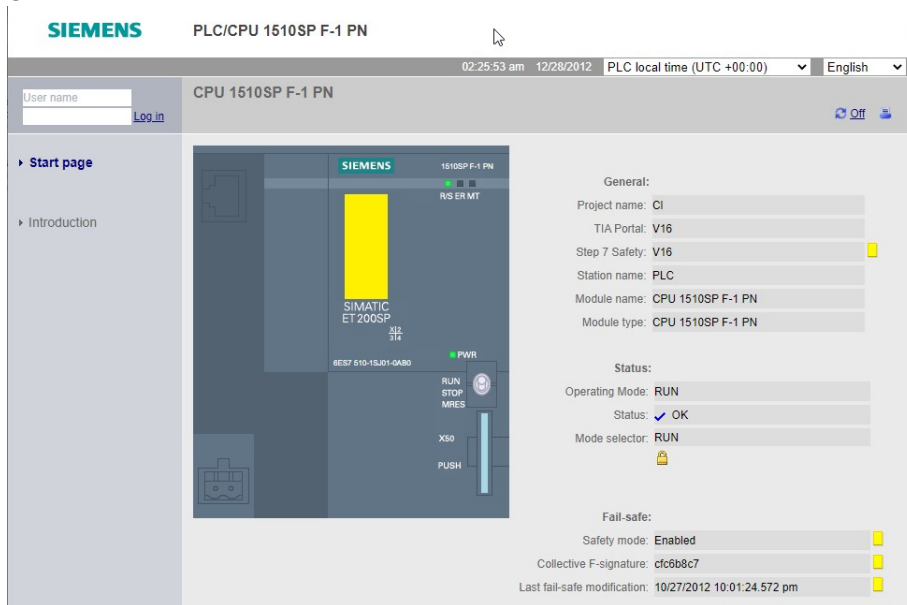
- User name: ipconfig
  Password: 3333

- Click Log In
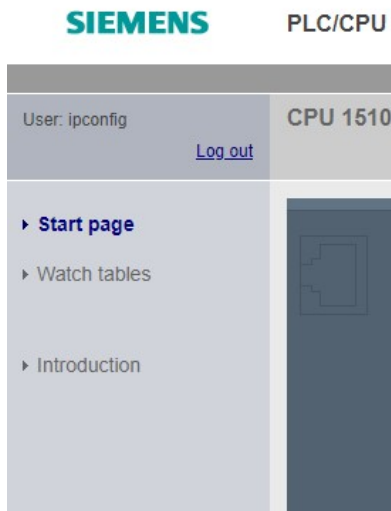
- Click Watch table

Configure CP Card

Watch tables				
Configure CP card ∨				

Name	Address	Format	Value	Modify value	
"Line communication new".LineCom_Control.WebServer.AssignIP		Bool ∨	FALSE		Apply
"Line communication new".LineCom_Control.WebServer.Done		Bool ∨	FALSE		Apply
"Line communication new".LineCom_Control.WebServer.Error		Bool ∨	FALSE		Apply
"Line communication new".LineCom_Control.WebServer.Status		Hex ∨	16#0070_0000		Apply
"Line communication new".LineCom_Control.WebServer.Err_Loc		Hex ∨	16#0000_0000		Apply
"Config".Hmi."CP-Card"."IP-address"[0]		DEC ∨	192		Apply
"Config".Hmi."CP-Card"."IP-address"[1]		DEC ∨	168		Apply
"Config".Hmi."CP-Card"."IP-address"[2]		DEC ∨	0		Apply
"Config".Hmi."CP-Card"."IP-address"[3]		DEC ∨	10		Apply
"Config".Hmi."CP-Card".Subnet[0]		DEC ∨	255		Apply
"Config".Hmi."CP-Card".Subnet[1]		DEC ∨	255		Apply
"Config".Hmi."CP-Card".Subnet[2]		DEC ∨	255		Apply
"Config".Hmi."CP-Card".Subnet[3]		DEC ∨	0		Apply
"Config".Hmi."CP-Card".GateWay[0]		DEC ∨	192		Apply
"Config".Hmi."CP-Card".GateWay[1]		DEC ∨	168		Apply
"Config".Hmi."CP-Card".GateWay[2]		DEC ∨	0		Apply
"Config".Hmi."CP-Card".GateWay[3]		DEC ∨	254		Apply

Fill in the correct IP settings bij entering the correct setting in the modify/value field and then press the apply button. The values have to be changed and applied one by one.

Note:
IP-address and gateway address must be unique.
IP-address and the Gateway must be in the same range as specified by the subnet mask.

After entering the correct settings they have to be assigned to the CP-card. This can be done by apply a "1" to the AssignIP bit. After setting the AssignIP bit to "1" it will be automatically reset to "0". The Done and Error bits are showing if the assignment was successful. If there is an error the Status and Err_Loc words are giving information about the cause of error. Information about the Status and Err_Loc code can be found in the TIA-portal help of instruction T_CONFIG.

Rename CP Card

Rename the name of the CP-Card is possible by selecting the "Rename CP Card" watch table.

Name	Address	Format		Value	Modify value	
Watch tables Rename CP card ▾						
"Config".Hmi."CP-Card".Name[1]		Character	▾	'l'		Apply
"Config".Hmi."CP-Card".Name[2]		Character	▾	'a'		Apply
"Config".Hmi."CP-Card".Name[3]		Character	▾	'n'		Apply
"Config".Hmi."CP-Card".Name[4]		Character	▾	't'		Apply
"Config".Hmi."CP-Card".Name[5]		Character	▾	'e'		Apply
"Config".Hmi."CP-Card".Name[6]		Character	▾	'c'		Apply
"Config".Hmi."CP-Card".Name[7]		Character	▾	'h'		Apply
"Config".Hmi."CP-Card".Name[8]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[9]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[10]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[11]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[12]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[13]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[14]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[15]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[16]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[17]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[18]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[19]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[20]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[21]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[22]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[23]		Character	▾	'$00'		Apply
"Config".Hmi."CP-Card".Name[24]		Character	▾	'$00'		Apply

Fill in the correct name bij entering the correct character in the modify/value field and then press the apply button. The characters have to be changed and applied one by one.

The name must end with a $00 character. This can be entered by setting the format of the character to Hex and enter a "0" zero at the Modify Value field followed by apply.

To assign the name to CP-Card the Assign-IP bit in the Configure CP Card watch table must be set to "1". See also the description in the configure CP-Card section.

5.2 Lantech standard telegram

The Lantech standard telegram is used for all Lantech case erectors, case sealers and tray equipment except the Multi Format Case Erector. The telegram for the MFC is described in paragraph 5.3.
With the Siemens put and get instructions you can access the DB and read or write the described signals.

Not all signals may be relevant, this is depending on the machine type as described in chapter 2.

	DB400		
	Byte	Bit	Description
Customer output / Lantech input	0	0	Communication alive (1 Hz clock pulse)
		1	Outfeed free
		2	Upstream active
		3	
		4	
		5	
		6	Remote start
		7	Remote stop
	1	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	
Customer input / Lantech ouput	10	0	Communication alive (1 Hz clock pulse)
		1	Ready to receive
		2	Machine running
		3	Machine failure
		4	
		5	
		6	
		7	
	11	0	Blank magazine almost empty
		1	Blank magazine empty
		2	Tape almost empty
		3	Tape failure
		4	Glue unit almost empty
		5	
		6	
		7	

5.3 Lantech MFC telegram

The Lantech MFC telegram is an extension on the Lantech standard telegram used for the Multi Format Case erector. With the Siemens put and get instructions you can access the DB and read or write the described signals

	DB400		
	Byte	Bit	
Customer output / Lantech input	0	0	Communication alive (1 Hz clock pulse)
		1	Outfeed free
		2	
		3	
		4	
		5	
		6	Remote start
		7	Remote stop
	1	0	Request case from blank magazine 1
		1	Request case from blank magazine 2
		2	Request case from blank magazine 3
		3	Request case from blank magazine 4
		4	
		5	
		6	
		7	
Customer input / Lantech ouput	10	0	Communication alive (1 Hz clock pulse)
		1	
		2	Machine running
		3	Machine failure
		4	
		5	
		6	
		7	
	11	0	
		1	
		2	Tape almost empty
		3	Tape failure
		4	Glue unit almost empty
		5	
		6	
		7	
	12	0	Ready for case request
		1	Acknowledge case request
		2	Ready to outfeed case
		3	Outfeed case from blank magazine 1
		4	Outfeed case from blank magazine 2
		5	Outfeed case from blank magazine 3
		6	Outfeed case from blank magazine 4
		7	
	13	0	Blank magazine 1 empty
		1	Blank magazine 1 almost empty
		2	Case at blank magazine 1 not released
		3	Blank magazine 2 empty
		4	Blank magazine 2 almost empty
		5	Case at blank magazine 2 not released

		6	Blank magazine 3 empty
		7	Blank magazine 3 almost empty
	14	0	Case at blank magazine 3 not released
		1	Blank magazine 4 empty
		2	Blank magazine 4 almost empty
		3	Case at blank magazine 4 not released
		4	
		5	
		6	
		7	
	15	0	
		1	
		2	
		3	
		4	
		5	
		6	
		7	

6 Testing communication

The HMI provides functions for testing communication.

Press "F4" function key to go to the operator options screen.
Press ">" to go to the service options screen (Use password 3333 when requested).
Press ">" to go to the engineering option screen, the next screen will be opened.
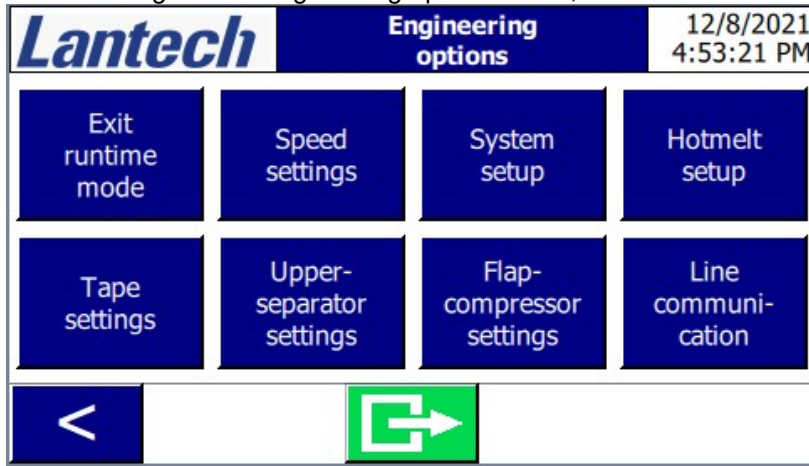
Press "Line communication" , this opens the product line communication screen.

6.1 Production line communication screen
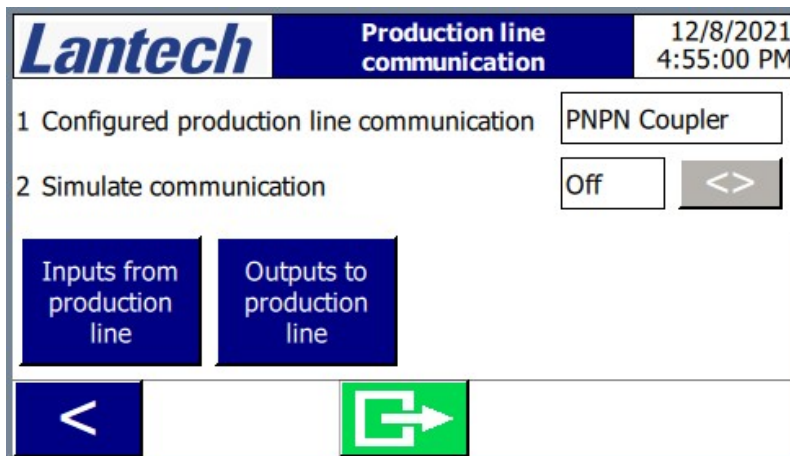
Line 1 shows the Lantech configured line communication for the machine. This setting can not be changed.

Line 2 shows the settings of line communication simulation. The setting can be toggled with the button. Simulation can be use full when communication is not yet established. Outfeed free and upstream active signals will be simulated so the machine is able to run.

With the buttons "Input from production line" and Outputs to production line" the status of the signals can be shown and forced.

6.2   Inputs from production line
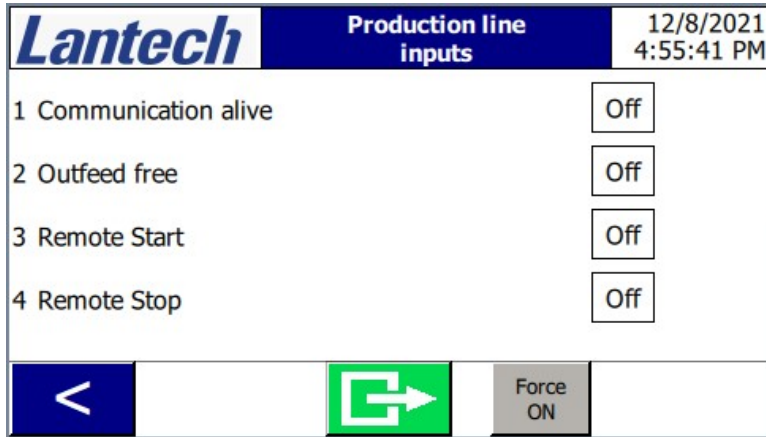
In the production line inputs screen the status of the lantech input communication signals is shown.

With the Force button the communication will be interrupted and input signals can be toggled manually to test their function.
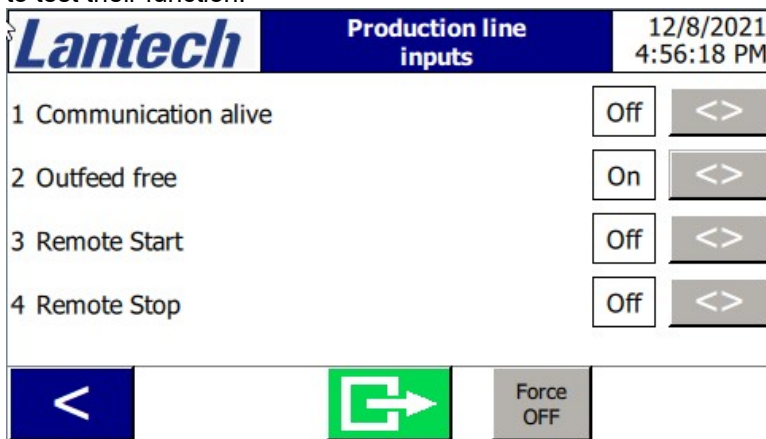
6.3 Outputs from production line

In the production line outputs screen the status of the lantech output communication signals is shown.

With the Force button the communication will be interrupted and output signals can be toggled manually to test their function.

7 Document versions

Version	
V1.0	• First published version
V1.1	• Split Columns C1000-1000, CI, CS-1000, MFC in signal overview into separate columns for tape and hotmelt. Remove upstream active signal by CS-Random, CS-1000-T and CSRHS • Remove glue unit almost empty signal at CS-Random and CS-1000-T • Add ready to receive signal to LA and LF • Add MFC timing diagrams