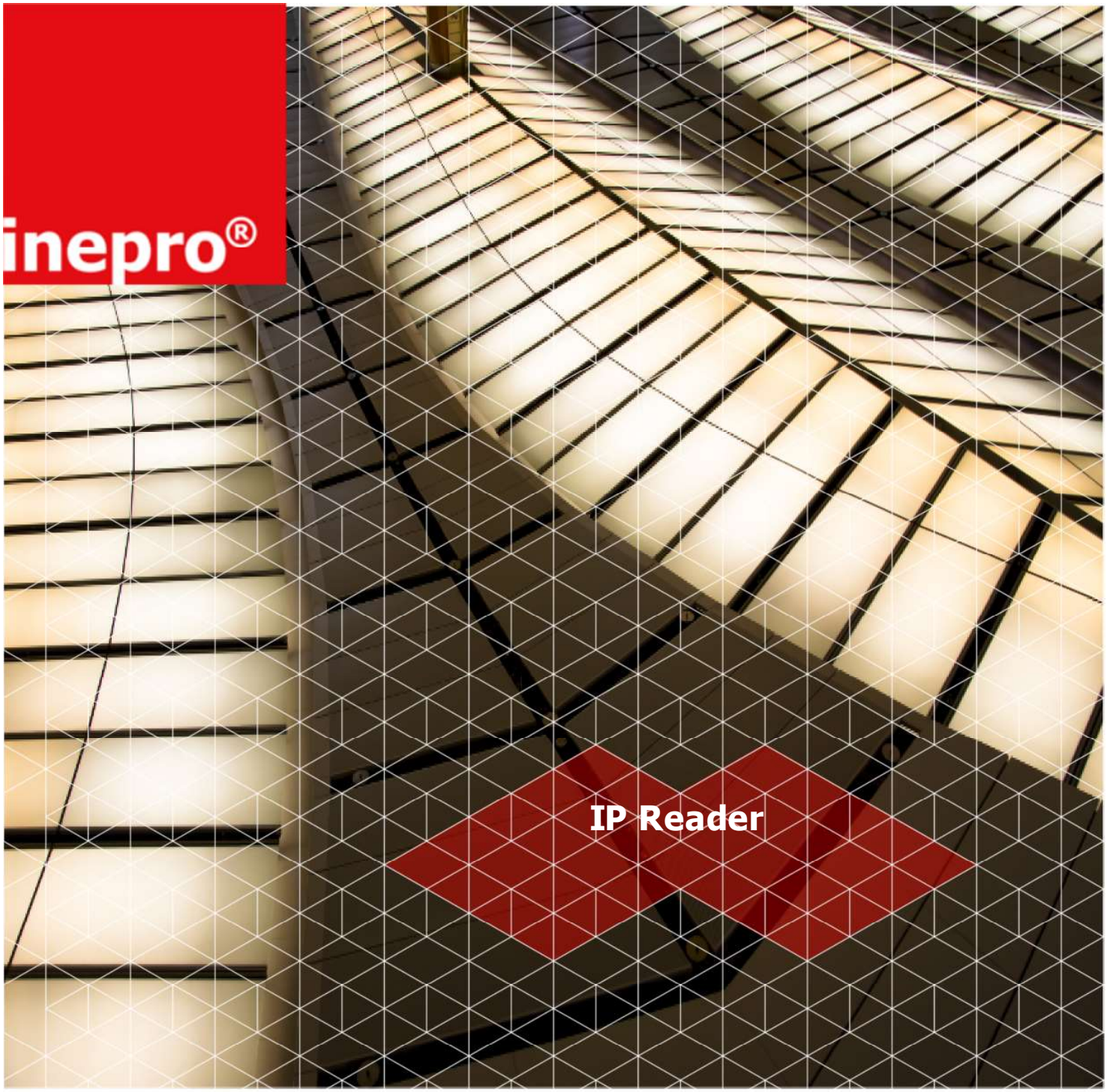
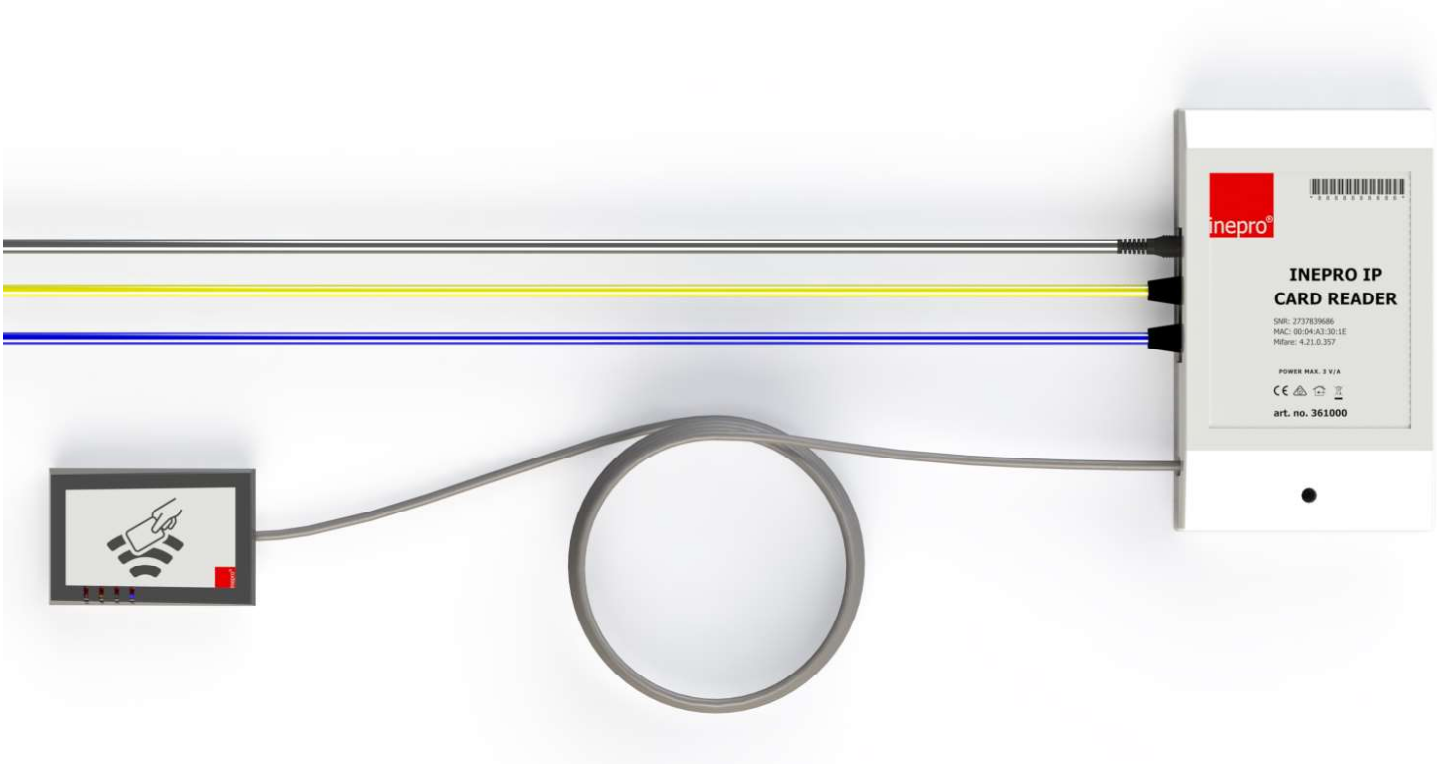


Technical Manual | IP Reader

IP Reader

the most versatile card reader solution



Congratulations on your selection of the Inepro IP Reader. We are certain you will be pleased with your purchase of the most versatile card reader solution.

We want to help you get the best result from your IP Reader. This manual contains information on how to do that; please read it carefully. Due to continuous product improvements this manual is subject to changes without notice.

We strongly recommend you read the license agreement to fully understand its coverage and your responsibilities of ownership.

Your Inepro dealer is dedicated to your satisfaction and will be pleased to answer your questions and your concerns.

Best wishes,
Inepro BV.

IP Reader

Revision number R 6. This revision of the manual can be applied to products with version Rev. 3 or higher.

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Table of Contents

Directives

ATTENTION!!

Read this manual carefully before installing the Card Reader!

Mains connection

Before connecting the appliance to the mains, check that the mains supply voltage corresponds to the voltage printed on the type plate of the adapter. If the mains voltage is different, consult your supplier.

Guarentee

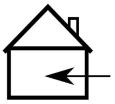
No guarantee can be given if safety regulations are not followed.

Changes and/or mdodifications

Changes and/or modfications wchh have not been approved by the responsible party can void the user's authorty to operate the equitement.

Security

Always disconnect the power supply before handling anything inside the device.



Indoor User Only

This device may only be used indoors.

FCC Federal Communications Commission - US

This device is complies with part 15 of the FCC rules, operation is subject to two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, includng interference that may cause undesired operation.

CE Conformité Europeène (Conform European Norm)

This device is in conformity with the EMC directive and low-voltage directive.

Conformité d'Industrie Canada

Appareil concernés:
MCR708, MCR708G, DCR708, DCR708G

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Confirm Canada Industries

Relevant Devices:
MCR708, MCR708G, DCR708, DCR708G

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

End of life directives

Inepro is paying a lot of attention to environmentally-friendly production. Your new device contain materials which can be recycled and reused. At the end of its life specialised companies can dismantle the discarded device to recycle the reusable materials and to minimise the amount of materials to be disposed of. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into and outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Part I

Introduction

Introduction

In this manual you find the instructions to install and configure your IP-reader. This manual is meant for all the Inepro IP-readers.
This manual, the IP reader hardware and software are subject to change, make sure you have the latest version of this manual, because the older versions may have become obsolete.

Function

The purpose of the IP reader is to read the unique ID contained in the card that is presented to the reader and transfer this ID to a server. In most cases this data will be the card serial number. To facilitate this a variety of card reader software module have been developed. Our configuration tool will enable you to change the setting on the IP reader board.

Topics

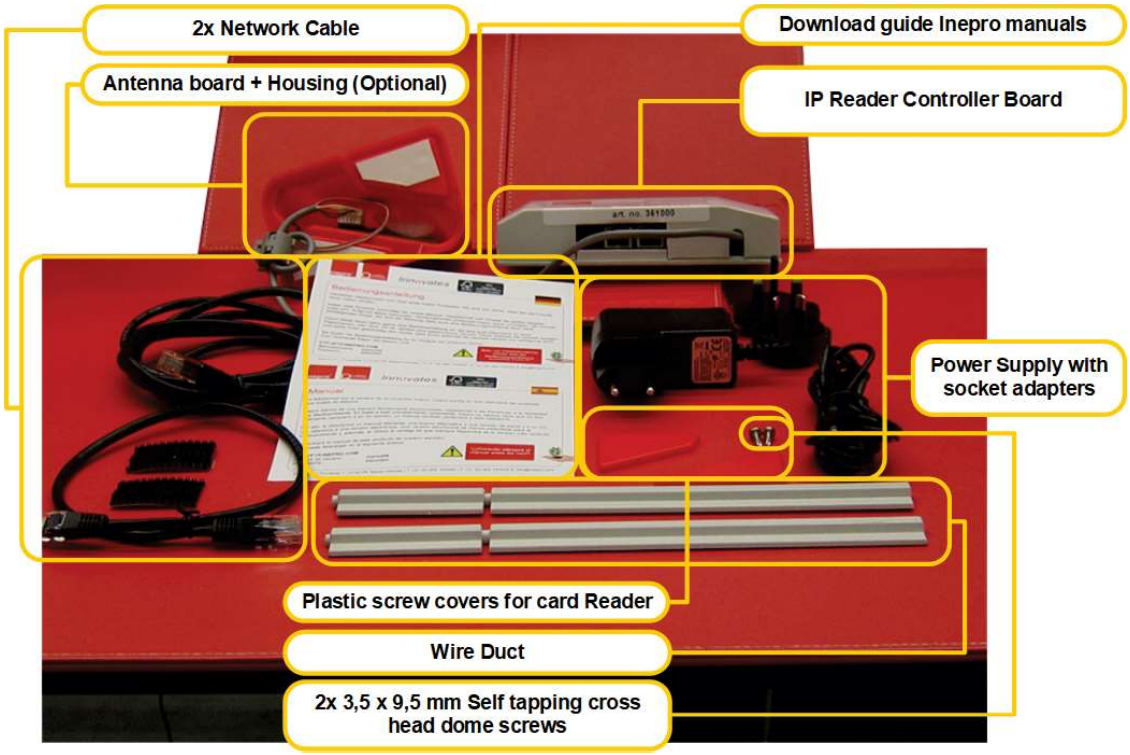
The following topics will be addressed:

1. The components in the IP-reader set
2. The operating procedures
3. Communication
4. Network Connections
5. Status LED's
6. Software configuration settings
7. Connecting to the Business Server

Components

Part II

Components



The IP Reader consists of the following components:

- Red Card Reader Housing
  - Red Antenna Box
  - Antenna Box Cap 1 / Red
  - Antenna Box Cap 2 / Red

- Controller Box

- Wire Duct - Grey

- Network Cables
  - Network Cable UTP C5E Patch Black (0,5mtr.)
  - Network Cable UTP C5E Patch Black (2,0mtr.)

Components

- Power Supply AC/DC 12 Volts, 7 Watt
  - Power Supply Unit
  - 3x Socket Adapter

- Screw set
  - 2x Screw self tapping cross head dome 3,5 x 9,5 mm

- Download Guide Inepro Manuals

Check Components

Please check if all the components are in the set before you continue with the installation and setup.

Communication

Part III

Communication

Communication between the card reader and the IP Controller Board

The communication between one of the supported card reader and the IP Controller board is done by a protocol (a definition of communication codes or language by which they can communicate). Many manufacturers of readers have defined their own communication protocol.
To comply to those protocols the IP reader software is adapted to the applied protocol.

Communication between the server and the IP Controller Board

Inepro has defined it's own protocol for communication between the IP controller board and the server.
To ensure the security of the card data an AES (Advanced Encryption Standard) encryption is applied to the data.

Encryption

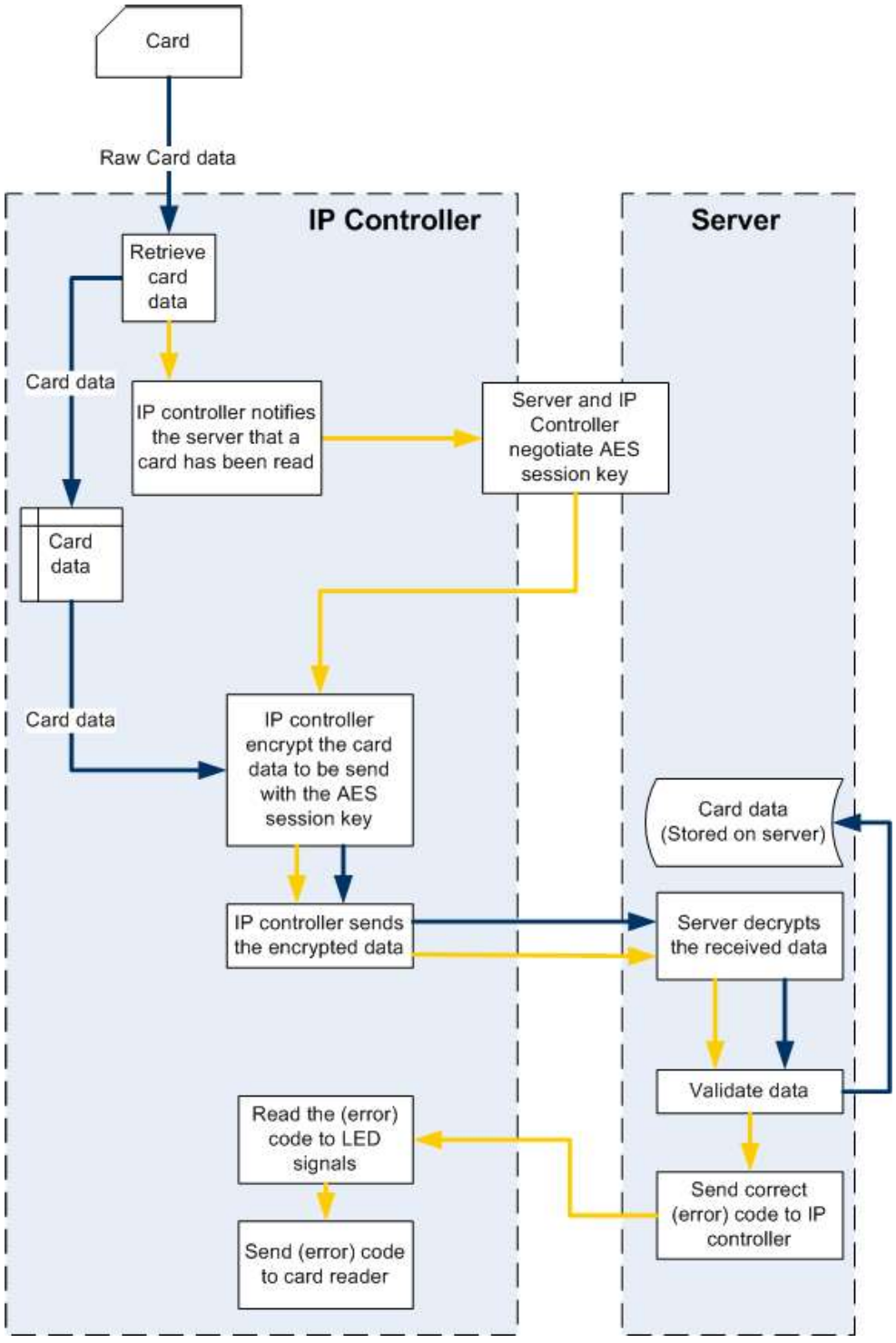
The encryption key is renewed with every connection so it is not possible for another device than the IP controller board to present card data to the server. With every connection the server will send a new AES key to the IP controller board. This encryption key is received by the IP controller board and used to encrypt the data before it is transmitted to the server.
A time-out for the data to arrive at the server is set at 10 seconds. If the server does not respond within this time, the protocol will be cancelled and the data will not be processed.

Alternative server

It is possible to set up a second server for the IP reader. This allows the IP reader to look for an alternative server if the main server does not respond.

Communication

IP Reader encryption protocol



Network Connections

Part IV

Network Connections

Switch

On the IP controller board there are two network connectors. The IP controller board can be used as a switch because of the Ethernet switch chip on board and can be placed between a wall outlet and an existing Ethernet device (like a printer or multifunctional device).

Power over Ethernet (PoE)

If the power supply adapter is used both connectors can be used normally to connect to the wall outlet and the Ethernet device. But the IP controller board can also be supplied with energy by a Power over Ethernet switch. In this case the connection from the PoE switch must be made to the "PoE" Ethernet connector, the Ethernet device can be connected to the "no PoE" connector.

If the cables are connected falsely (ie. the PoE switch is connected to the "no PoE" Ethernet connector), nothing will be damaged. In that case the IP controller won't have energy and will not operate. Switching the Ethernet cable to the "PoE" connector will activate the IP controller board.

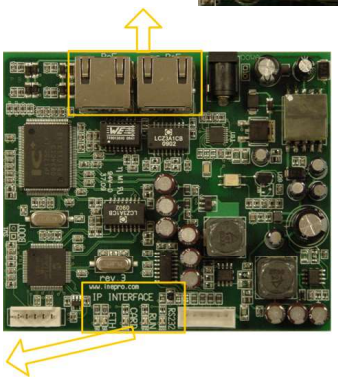
Network Connections

IP READER OVERVIEW

Power over Ethernet	**No Power over Ethernet**
Orange LED = Blinking	Orange LED = On
Green LED = On	Green LED = Blinking

IP Controller Board Ethernet Connections

IP Controller Board



IP Controller Board LED's

--> **RS232** Led on = Communication between card reader and controller board is OK.

--> **RUN** led on = Program in the micro on the IP controller board runs correctly.

--> **CARD** led on = controller board detects card being presented to card reader.

--> **Green** led on = Ethernet connection with internal switch chip

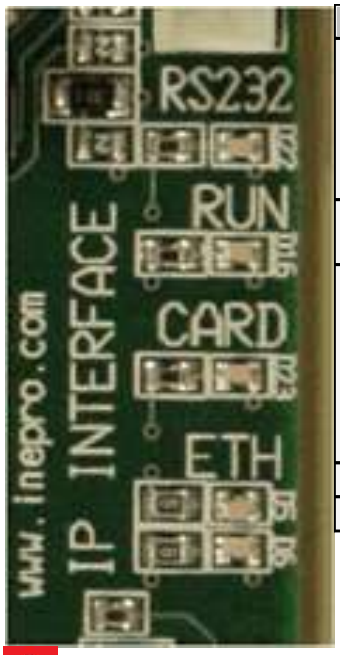
--> **Orange** led blinking = data being transferred trough Ethernet connection

LEDs (Light Emitting Diodes)

Part V

LEDs (Light Emitting Diodes)

IP Controller Board LED's



LED	Status	Display
RS232	Connection between card reader and IP Controller board.	Off
	Card reader (that does not allow access actively), sends data to the IP controller board. *1	On
RUN	Running OK	Blink every 0.5 sec.
CARD	Card present	On
	Card not present	Off
	Card reader cannot be actively accessed *1	
	The card data was presented to the server 2 seconds ago.	
ETH Green	Running OK	On
ETH Orange	Running OK	Blinking

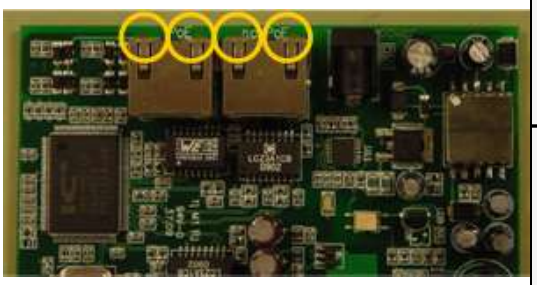
Footnotes:

***1. There are card readers that have a protocol installed where the controller board does not have to establish an active connection with the card reader. The card reader itself will generate a data string containing the card number. The IP controller board will receive this data string and, after encryption, redirect this data to the server. This situation can cause the CARD LED and the RS232 LED to behave differently.**

LEDs (Light Emitting Diodes)

IP Controller Board Ethernet Connector LED's

On each of the 2 Ethernet connectors on the IP controller board 2 LEDs are mounted with the same way of operating as a network switch/router.



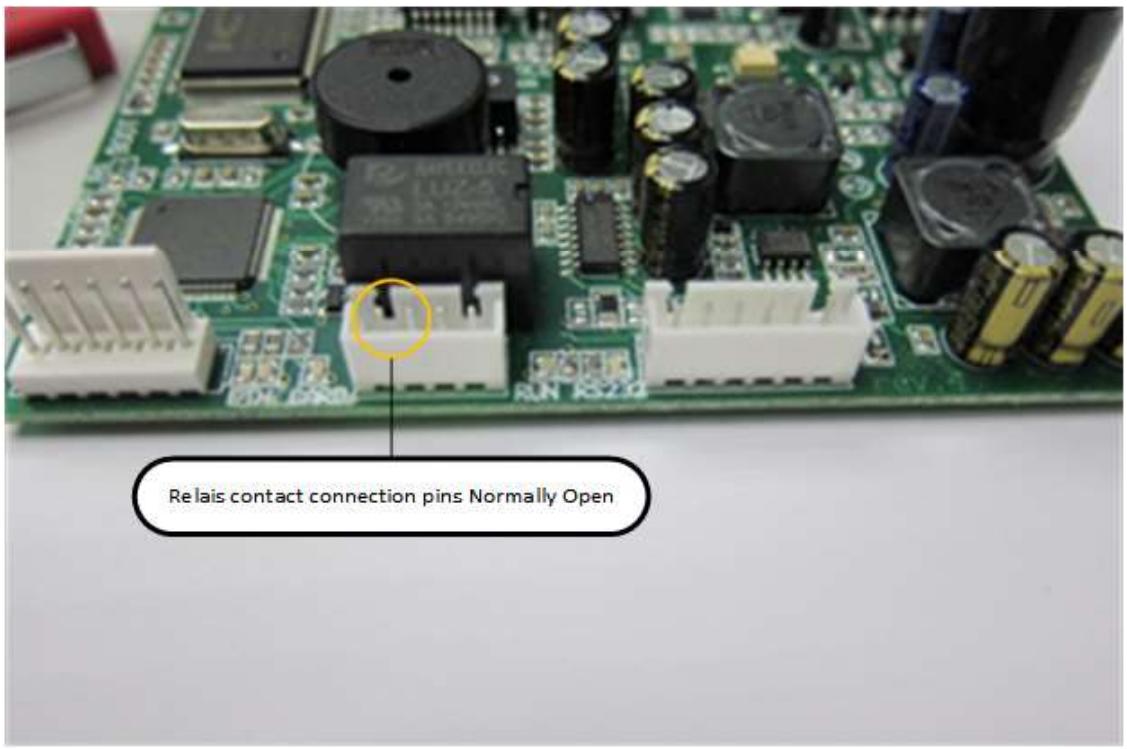
LED	Status	Display
Green (or orange PoE)	Connection exists	On
	Connection does not exist	Off
Orange (or green PoE)	Data is being transmitted	Blinking at transmission speed
	Bad or slow connection	Blinking at moderate speed, modulated on th data transmission blink signal

With the PoE connector, the status of the green LED will be that of the orange LED and vice versa.

Part VI

Relays

Connection relais on IP reader board:



Relay specifications

Type: LUZ-5 (RAYEX ELEC)
Maximum load AC: 2A 125Vac
Maximum load DC: 2A 24Vdc
Connection: Normally Open (contact pins are connected when the relay is activated)

Connector specifications

Type: B4B-XH-A JST-XH serie
Maximum load AC: 2A DC/AC
Maximum load DC: 250V AC/DC

Relays

PCB trace specifications (at a current of 2A)

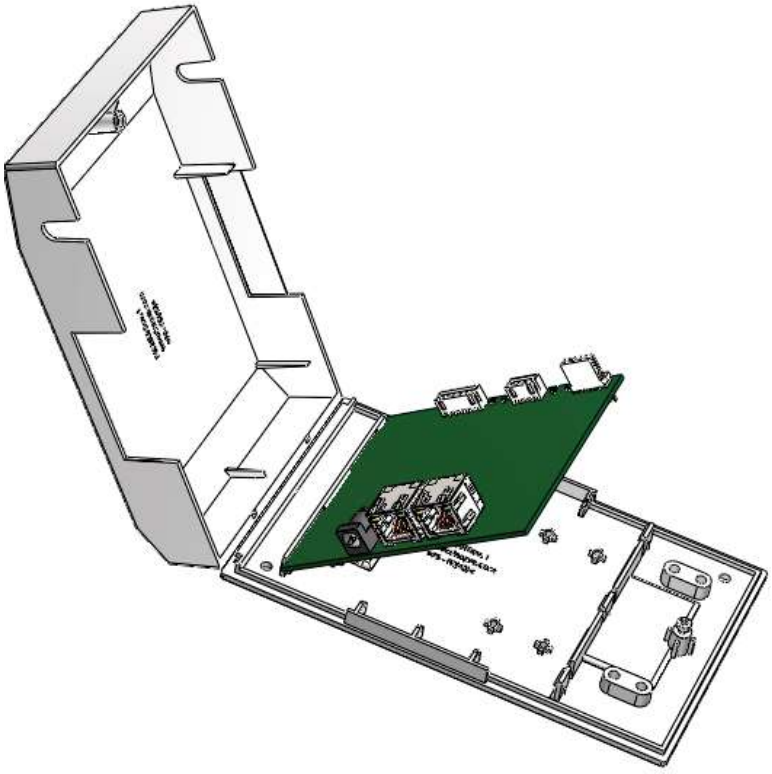
Trace width: 1.5mm
Copper thickness: 0.035 mm
Temperature increase: 9 degrees centigrade

Hardware installation

Part VII

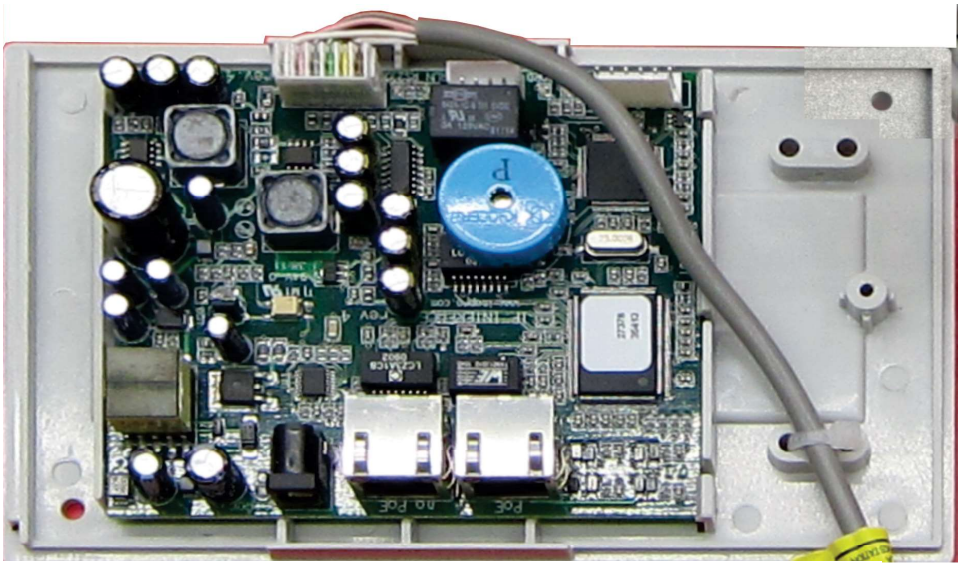
Hardware installation

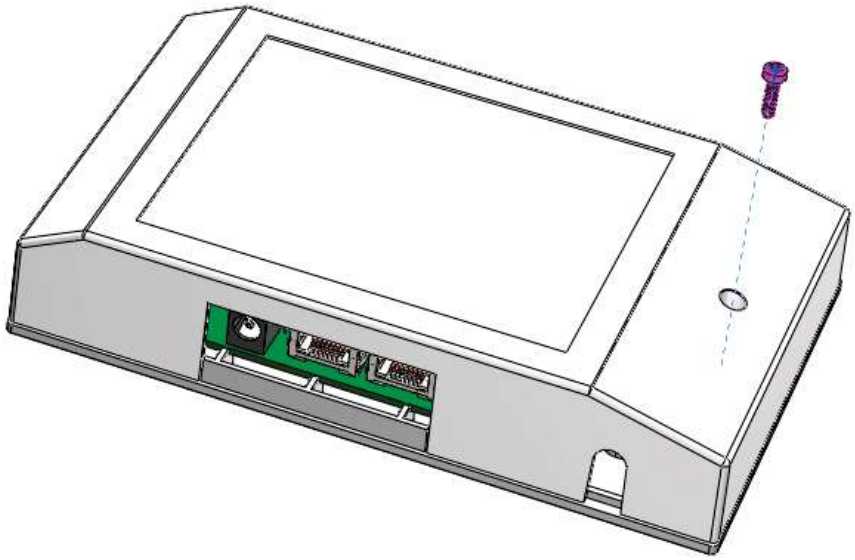
- Make sure the print board is securely connected in the housing.



- Connect the antenne board to the IP Reader Print board and use the cable clip to secure the cable to the housing.

Hardware installation





Network with PoE (power over Internet)

- Connect the network cable to the network connector marked PoE (the rightmost network connector in the picture above).

Network without PoE (normal network connection)

- Connect the network cable to the network connector marked no PoE (the rightmost network connector in the picture above).
- Place the power adapter cable in the black connector (shown on the left)
- Connect the adapter to a power socket.

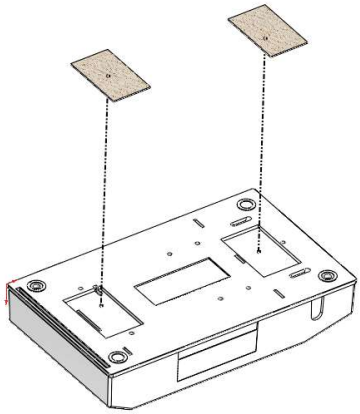
Place the Card Reader

- Stick the reader with the adhesive tape to the side of the machine and / or use the screws to attach it even more firmly.
- Place the cover over the screw holes.
- Strip the protection from the adhesive tape and use (parts) of the cable guides, to guide the cable to the back of the machine.

Hardware installation

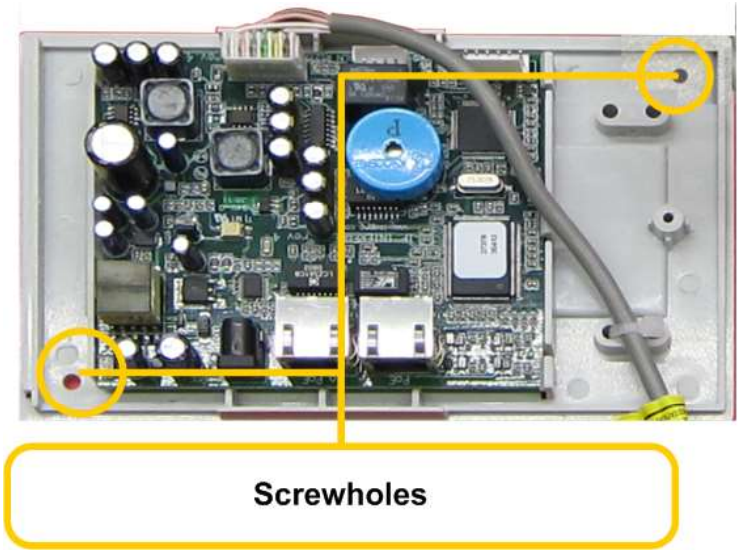
Place the IP-Card Reader print board

Attachment the IP-Card Reader print board with Velcro



- Clean the surface of the machine and the covers.
- Place the velcro on the covers and the machine.
- Place the IP-Reader Board on the velcro on the machine.

Attachment the IP-Card Reader print board with screws



- Use the two self tapping screws to secure the bottom cover to the machine.

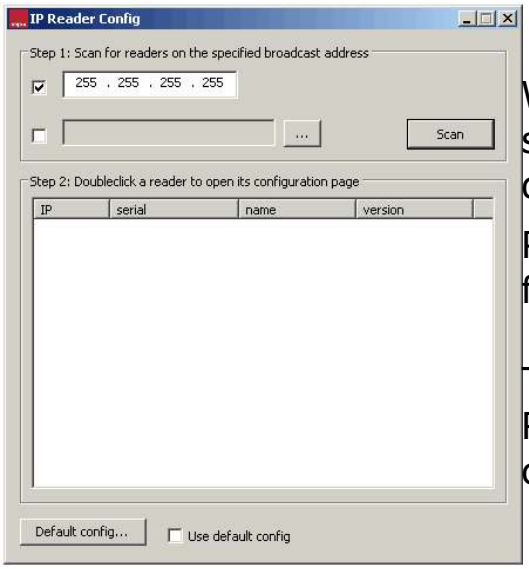
Software configuration settings

Part VIII

Software configuration settings

The IP Reader Config Tool

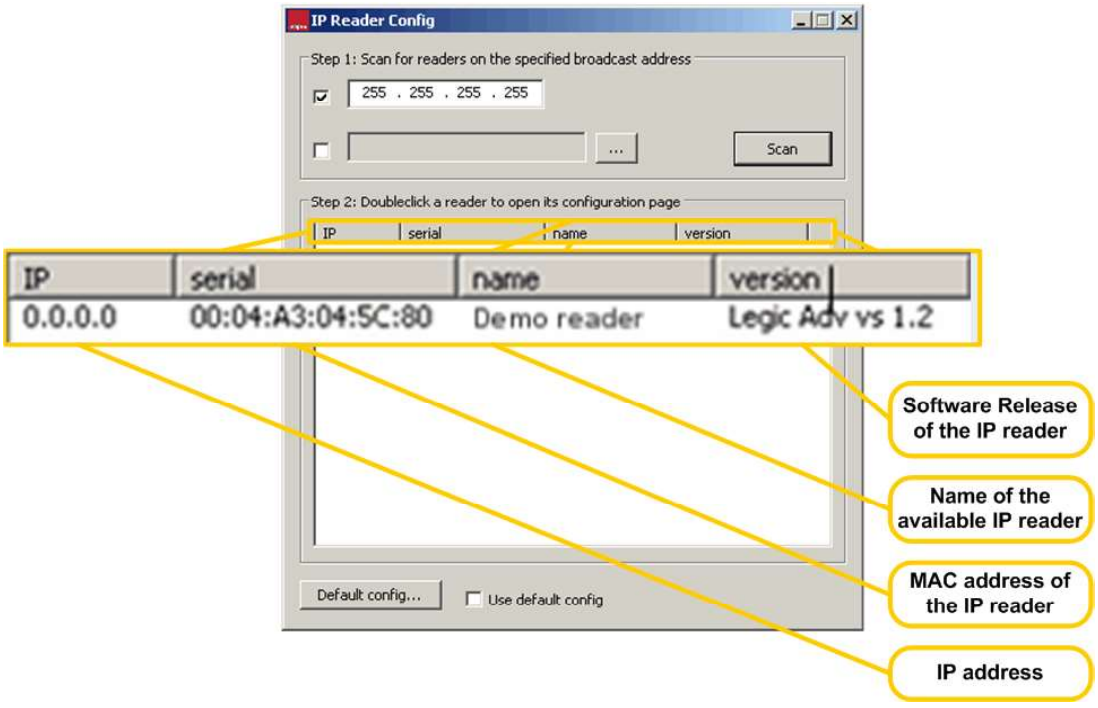
The configuration settings can be managed using the IP card reader config tool.



When you start the configuration set-up program this screen will be displayed.

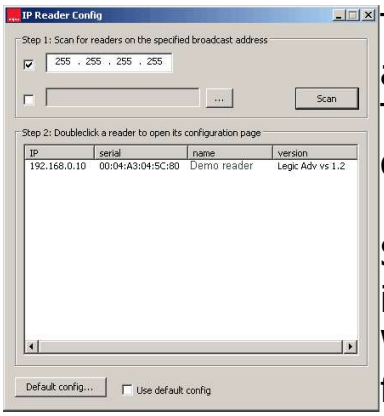
Press the Scan button to search for connected IP Readers.

This next screen will display the IP Readers that were found by the configuration set-up program.



Software configuration settings

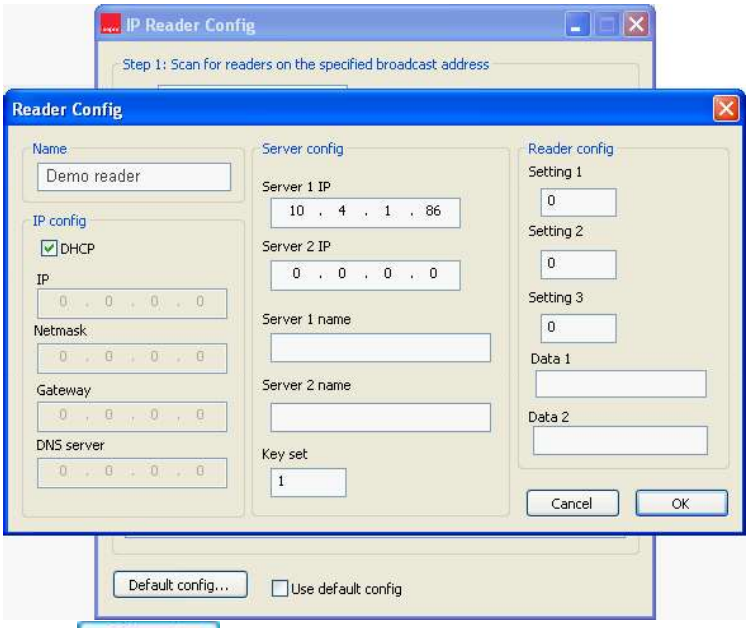
Please note that the IP address of the IP Reader has not been applied (0.0.0.0).
Provided the DHCP server is up and running, the next screen will be displayed



The DHCP server has found the IP Reader and has displayed the host name "PoE Test". The IP-address is also retrieved and displayed.

Select an IP Reader by double-clicking on the intended IP Reader info line in the list.
When the IP Reader information has been found the next screen will be displayed.

This screen is divided into 4 distinct areas: "Name", "IP config", "Server config" and "Reader config":



The Cancel button will exit this window without any processing.
The OK button sends the new configuration to the IP Reader.

Name

Key	Description
Name	The name of this IP reader (like 'Printer Q745') This name will also be used as host name, it is sent to the DHCP server and DNS server if they are enabled.

IP config

Key	Description
Dynamic Host Configuration Protocol	Enabled if DHCP be used, disabled if the network information need to be filled out manually.
IP	The IP-address for the IP reader.
Netmask	The netmask (only used when using subnetting, ask your system administrator, if you're not sure). Standard value 255.255.255.0
Gateway	The IP address of the gateway (The gateway is de server that is located between two networks, like the Internet and your local network). It is usually the same address as the DNS server.
Domain Name System	The IP address of the server with the Domain Name System, the system that transforms names to IP-addresses and vice versa.

Server config settings

Key	Description
Server 1 IP	The address of the server that the IP reader should contact.
Server 2 IP	The address of the back-up server that the IP reader should contact. It will be contacted if the first server does not respond.
Server 1 name	When DNS is used the name of the server can be entered, the IP-address value for this server will be ignored, and retrieved from the DNS server.
Server 2 name	When DNS is used the name of the server can be entered, the IP-address value for this server will be ignored, and retrieved from the DNS server
Key set	Key set will give the possibility to set the encryption key between the IP reader and the server. At the time of writing the value as not yet used and should always be set to '1'.

Reader config settings

Key	Description
Setting 1	These settings will be addressed below.
Setting 2	
Setting 3	
Data 1	
Data 2	

These fields will be used for retrieving the card reader data. The values entered here are dependent on the card that is used.

Note: The raw data is supplied without conversion. Below you will find the data that applies to the data supplied in a decimal format.

Software configuration settings

These are the setting for the currently supported readers:

Wiegand:

Setting	Description	Value	Description	Bits	Facility code
Setting 1	Card ID. Because of the applied interface it is possible that different card readers are connected with this communication protocol. To be able to differentiate the different card type the card type can be entered here.	-	-	-	-
Setting 2	Protocol Type. The different Wiegand readers are able to read card with different protocols. The IP reader software will enable you to select one of the protocols. (Remark "all types" in setting 0 means All types except 2 and 128-255.)	0	All types except value 2 and 128-255	-	-
		1	H10301	26	8 bit
		2	H10302	37	none
		3	H10304	37	16 bit
		4	H10306	34	16 bit
		5	C1000	35	12 bit
		8	ARAS 36	36	16 bit
		128	NFP	37	16 bit
		129	NFP1	36	15 bit
		130	PAL	34	0 bit
		131	PAH	27	0 bit
		255	RAW	--	0 bit
Setting 3	Facility code. This is a part of the data delivered by the Wiegand protocol. If the value here is other then '0', then the IP reader will check if the code on the card is present. If the value is '0' the facility code is not checked.	-	-	-	-
Data 1	Not applicable	-	-	-	-
Data 2	Not applicable	-	-	-	-

i Note: The facility code is never send to the server.

Multi tag:

Setting	Description	Value	Card Types	Behaviour
Setting 1	IP reader will read the following protocols: EM4x02, EM4x05, EM4x50, hitag1, hitag2, Q5 and Ti-RFID. Because of the emulation of the EM4x02 card and the EM4x05 card by the Q5 card, these different settings of Setting 1 are supported.	0	EM4x50, hitag1, hitag2, Q5 and Ti-RFID	-
		1	EM4x02, EM4x05, EM4x50, hitag1, hitag2 and Ti-RFID	-
		3	EM4x02, EM4x05, EM4x50, hitag1, hitag2 and Ti-RFID	The card data of the EM4x02 cards will be processed and send in reversed order.
		5	EM4x02, EM4x05, EM4x50, hitag1, hitag2 and Ti-RFID	The card data of the EM4x05 cards will be processed and send in reversed order.
		7	EM4x02, EM4x05, EM4x50, hitag1, hitag2 and Ti-RFID	The card data of the EM4x02 and EM4x05 cards will be processed and send in reversed order.
Setting 2	Not applicable	-	-	-
Setting 3	Not applicable	-	-	-
Data 1	Not applicable	-	-	-
Data 2	Not applicable	-	-	-

⚠ Warning: Processing and sending of data in reversed order not tested for the EM4x05 cards.

Mifare:

Setting	Description	Value	Card Types
Setting 1	The Mifare reader supports the 4 bytes Mifare card serial number and 7 bytes Desfire card serial number. Setting 1 will be used to determine if the order of the 4 bytes Mifare card serial number should be reversed. Only 4 bytes of the Desfire card serial number are used to calculate the decimal card number.	0	Card serial number is calculated from the raw data in the reversed order.
		1	Card serial number is calculated from the raw data in the normal order.
Setting 2	Not applicable	-	-
Setting 3	Not applicable	-	-
Data 1	Not applicable	-	-
Data 2	Not applicable	-	-

Software configuration settings

Legic:

Setting	Description	Value	Card Types
Setting 1	The IP reader supports: Legic Prime Legic Advant Mifare (classic) Mifare Desfire ISO 15695 Setting 1 will be used to determine if the order of the card serial number should be reversed for the Mifare Classic For ISO 15695 and Mifare Desfire are not influenced by these settings	0	Card serial number is calculated from the raw data in the reversed order.
		1	Card serial number is calculated from the raw data in the normal order.
Setting 2	Legic Prime Read Setting	0	Standard Legic Prime number
		1	Reversed Legic Prime number
Setting 3	Not applicable	-	-
Data 1	Not applicable	-	-
Data 2	Not applicable	-	-

Note: When you can't find your card reader type in these tables, please contact Inepro for the settings for your reader. They will send you the latest version of this manual.

Inepro Business Server (Optional)

Part IX

Inepro Business Server

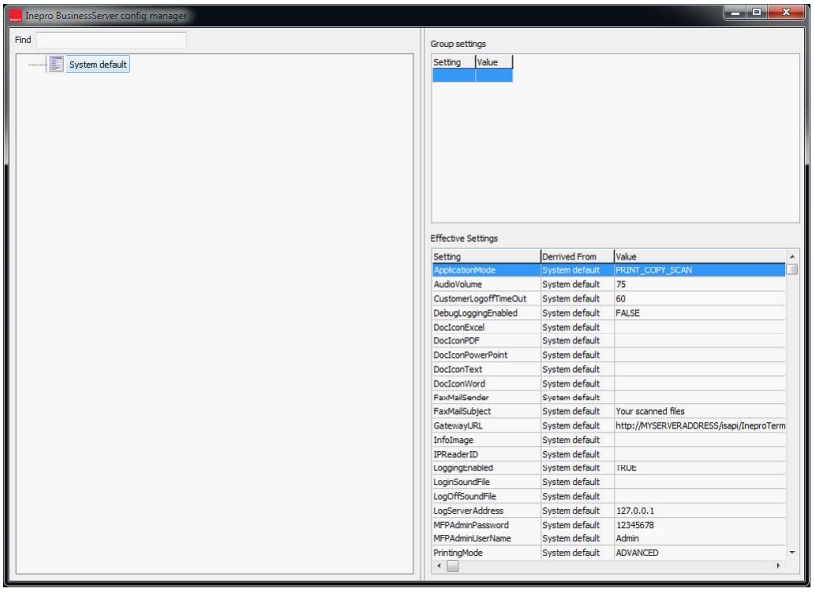
The Inepro Business server is a module in the Inepro Back Office suite that is the central communication server for most of our software. All hardware and software is able to register and communicate via this server. If your system uses an Inepro Business Server you should follow these instructions to register your IP reader with it, otherwise skip this chapter, you have finished installing your IP reader.

Warning! The Inepro Business Server is an optional Inepro Back Office Suite module. You will not need or be able to execute these instructions if you do not posses this module. If you do not posses this module, please skip this chapter. The symbol in our manuals will tell you that a module is optional.

Inepro Business Server (Optional)

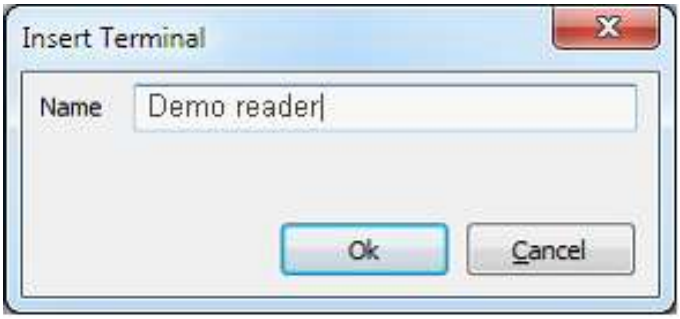
Connect the IP reader to the Inepro Business server

1. Start the Inepro Business Server Config settings manager (this will be installed in the Back Office Suite directory, by default in the 'C:\Program Files\Inepro' directory).



2. Right-click on 'System default' and choose 'Insert' from the menu.
3. A new group will be created that can be named. For each IP reader such a group will have to be created.

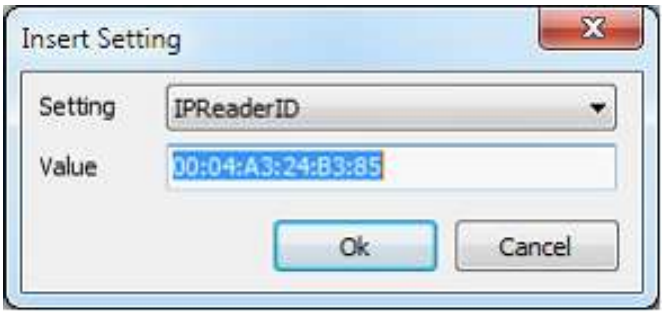
4. Right-click on the group that you have just created and pick 'Create print release terminal'. The pop-up window below appears:



5. The name of this IP reader (like 'Printer Q745') This name will be shown in the Inepro Back Office Manager in the Terminal menu.

6. Click on the group and right-click 'Group Settings'. A menu will be shown, choose 'Insert'.

The pop-up window below appears:



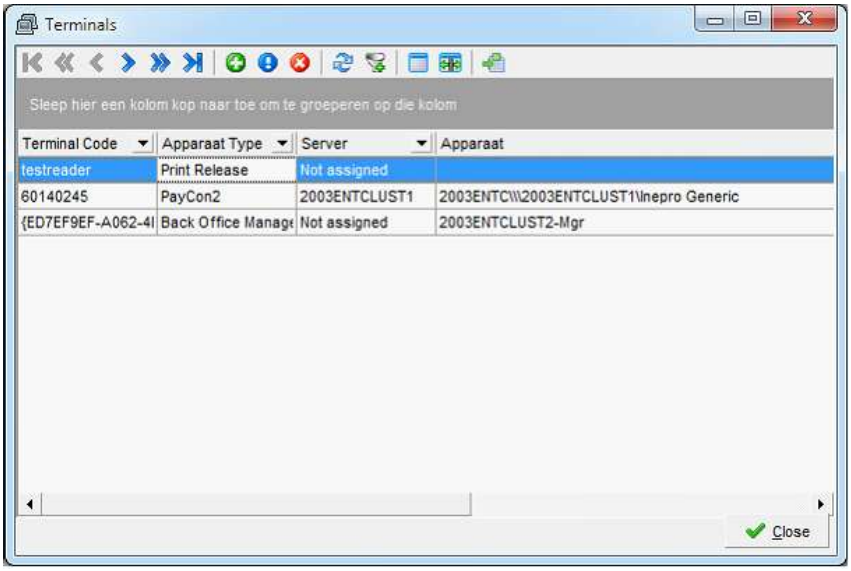
7. Choose the setting 'IPReaderID'.
8. Retrieve the IP Reader serial (MAC address) from the IP Config Tool and insert it in the 'Value' field.
9. Click on OK and the reader is registered in the Inepro Back Office Suite.
10. Repeat this process for all the other readers.

11. When you have finished registering the IP readers, restart the Business server.

Inepro Business Server (Optional)

Connect to the Inepro Back Office Manager

12. After the Business server has started again you should be able to find the reader that have been registered in the Inepro Back Office Manager in the 'Advanced' -> 'Terminals' menu :



13. These terminals can now be connected to a Multi functional, like you would connect a PayCon terminal.
14. Refer to the Inepro Back Office Manager manual for more details on connecting a terminal to a DocuPRO device.
15. Refer to the Business Server manual for more detail on the working and configuration of the Business Server
16. Refer to the IP-reader manual for more details of the IP-readers.

Specifications

Part X

Specifications

Power

Power Supply (via adapter)	Switch regulated, high efficiency 12V DC adapter 1VA
Power Supply (via PoE)	Confirm IEEE 802.3 AF specifications
Operation Voltage Range DC (via adapter)	10 to 20V DC
Operation Voltage Range DC (via PoE)	40 to 60V DC
Power Consumption	At maximum (depending on hardware configuration, like card reader) 3 VA

Housing

Material	PC / ABS crash-, flame-, and scratch-resistant plastic
Colour Antenna Board Housing	Red
Colour Controller Board Housing	Light Grey
Dimensions Controller Board Housing	11,5 x 16 x 3,4 (W x H x D)
Dimensions Antenna Board Housing	7,9 x 7,5 x 12,1 (W x H x D)

Local Area Network (LAN)

Connector (Both)	RJ-45
Network Interface (Both)	Confirm IEEE 802.3, 100Base-T
Transmission Speed (Both)	100 Mbps
Power over Internet (PoE)	Confirm IEEE 802.3 AF
IP-Address	DHCP client or static IP

Environmental conditions

Operating Requirements	Suitable for indoor use only

Notes

Part XT

Notes

This area is meant for the reader's notes:

Notes