



Product Manual
TZ CF Interconnect Modules
Models: CloudPoint 7110CF
CloudHub 7120CF
CloudHub Plus RFID 7121CF

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Table of Contents

1	TZ CF Interconnect Modules Overview	3
1.1	<i>Contents</i>	3
1.2	<i>Network Example</i>	4
1.3	<i>Electrical Connections</i>	5
1.4	<i>Limitations</i>	7
1.5	<i>Typical Power Consumption</i>	8
2	Typical Operation of a TZ CF Device Network	9
2.1	<i>TZ CF Device Network Overview</i>	9
2.2	<i>TZ CF Polling and Logging</i>	10
2.3	<i>Opening CloudHub or CloudPoint-Connected Devices via AUXINI</i>	10
2.4	<i>Opening Devices via RFID with a CloudHub Plus RFID</i>	11
3	TZ CF Interconnect Modules Installation	12
3.1	<i>Mounting the TZ CloudPoint and TZ CloudHub</i>	12
3.2	<i>Wiring and Termination</i>	12
4	Caution.....	13
5	Disclaimer.....	13
6	Use of Information Contained in This Document.....	13
Appendix 1: TZ CloudPoint 7110CF Performance Characteristics.....		14
Appendix 2: TZ CloudHub 7120CF Performance Characteristics.....		15
Appendix 3: TZ CloudHub Plus RFID 7121CF Performance Characteristics		16

1 TZ CF Interconnect Modules Overview

Welcome to the TZ CF Interconnect Modules Product Manual. This document includes information regarding the following TZ products: CloudPoint 7110CF, CloudHub 7120CF, and CloudHub Plus RFID 7121CF. These interconnect modules are designed to manage networks of up to 64 devices.

As the sole network controllers, the interconnect modules described in this manual are used in a variety of applications—from securing A/V racks to controlling access to retail presentation furniture, home and office cabinetry, desk drawers, and doors.

1.1 Contents

Table 1 outlines the items shipped with each interconnect module:

TZ CloudPoint	TZ CloudHub	TZ CloudHub Plus RFID
1 x CloudPoint 7110CF Network Controller	1 x CloudHub 7120CF Network Controller	1 x CloudHub Plus RFID 7121CF Network Controller
1 x 12V .84A Power Supply	1 x 12V .84A Power Supply	1 x 12V .84A Power Supply
1 x screw terminal block	2 x Screw Terminal Blocks	2 x Screw Terminal Blocks
1 x USB Cable	1 x USB Cable	1 x USB Cable
		5 x RFID cards

Table 1: Interconnect module contents

1.1.1 CloudPoint Interconnect Module

The CloudPoint is a TZ CF to USB translator with a single port, and requires a PC for the network to operate. The CloudPoint communicates with a TZ networks using a single RJ-45 port.

The TZ CloudPoint is intended for networks with a dedicated PC, while the TZ CloudHub and CloudHub Plus RFID are the network controllers intended for situations when a PC cannot or should not be permanently connected to the network.



Figure1: CloudPoint interconnect module

1.1.2 CloudHub and CloudHub Plus RFID

The CloudHub and the CloudHub Plus RFID communicate with their TZ networks using four independent RJ-45 ports and four independent RS-485 drivers. The ports are independent in order to increase distance and ensure

reliability of the network. They also have on-board microcontrollers which allow them to operate either with a PC or as a stand-alone network controller.

The CloudHub Plus RFID adds an internal Radio-Frequency Identification (RFID) reader, so devices can be triggered using authorized RFID cards without extra hardware.



Figure 2: CloudHub interconnect module

A PC running the TZ Device Manager software is required to set up a device network and make use of the CloudHub. This software can be downloaded through TZ's website at www.tz.net/downloads.

1.2 Network Example

CloudHubs and CloudPoints are intended to control, monitor, and log all events that take place in a TZ device network. A TZ device network consists of one controller and up to 64 devices, all of which are connected with Category 5 (Cat5) cabling and possibly CloudLink modules. Some systems may include sensors, additional switches, and additional trigger-access modules. The network illustrated in Figure 3 allows its administrator to distribute unique RFID cards to authorized personnel of their choice.

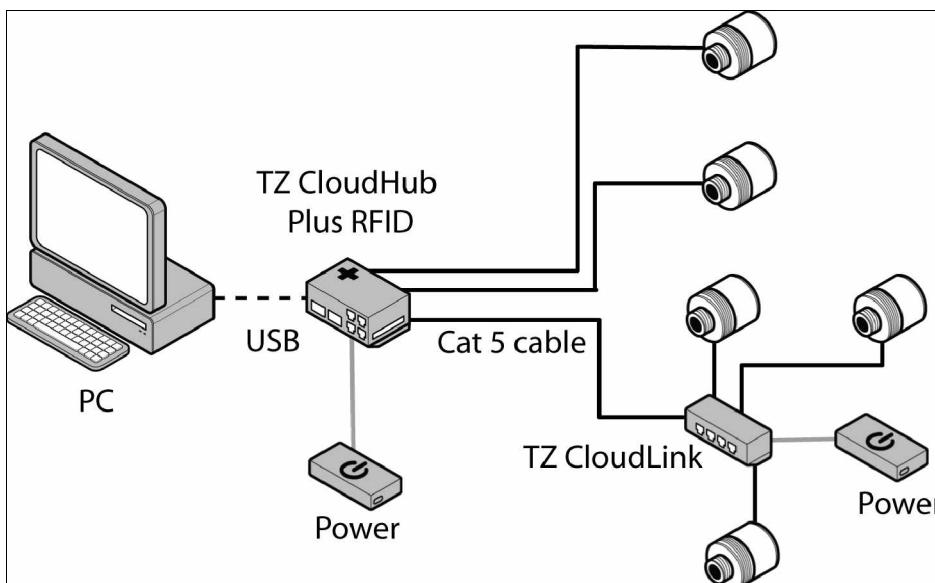


Figure 3: Network containing a TZ CloudHub Plus RFID controller and five devices

The network example above allows its administrator to distribute unique RFID cards to authorized personnel of their choice. Conceptually, the interconnect module in Figure 3 could also be a CloudHub if RFID capabilities are not needed. Similarly, a CloudPoint may be substituted as well if a PC can remain connected at all times. The main functions, i.e., monitoring the network, checking when RFIDs are presented, deciding when to give access to users, providing different commands to Radials throughout the network, and logging all network activity can be performed by any of these three interconnect modules.

Every application is different. TZ solutions offer the flexibility to accommodate multiple situations. Consult the TZ System Application literature for examples.

1.3 Electrical Connections

The CloudPoint and CloudHub have several different electrical connections, as outlined below and shown in Figures 4 and 5.

1.3.1 CloudPoint Electrical Connections

- § There is one power port which accepts a 2.1 mm center positive barrel plug. ***Note: This is only required if a device is directly connected.**
- § There is one mating header for a block of screw terminals used to make a direct connection with the auxiliary inputs and outputs of any device directly connected to the CloudPoint. Pin definitions for this terminal is discussed in Section 1.3.3.
- § The CloudPoint has a few additional LEDs that indicate when it is transmitting or receiving RS-485 commands. If a single device is attached, the status of that device is indicated by the Device Status LED.

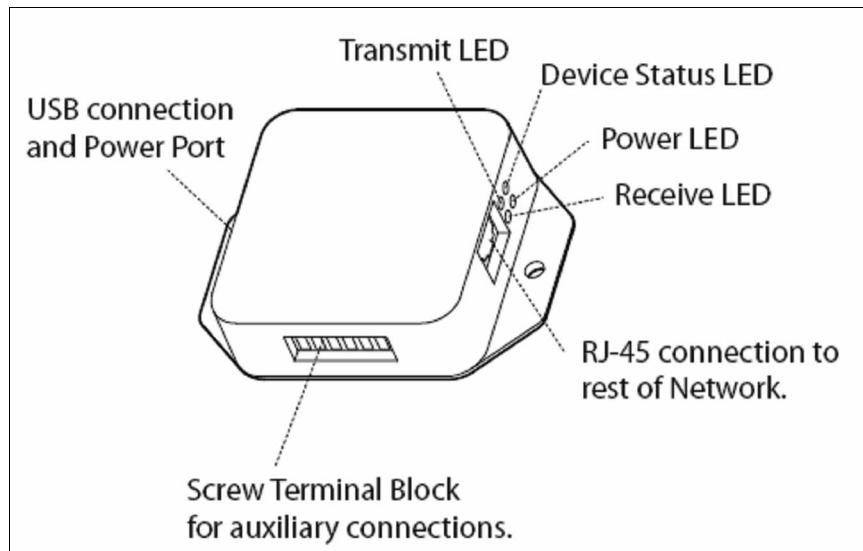


Figure 4: CloudPoint electrical connections

1.3.2 CloudHub and CloudHub Plus RFID Electrical Connections

- § There are two separate power ports which accept 2.1 mm center positive barrel plugs. Either plug can be used, but if a high level of redundancy is required, a battery backup or second power supply from an independent power circuit can be connected to the other port.

- § There are four mating headers for blocks of screw terminals used to make direct connection with the auxiliary inputs and outputs of any devices directly connected to the CloudHub or CloudHub Plus RFID in the corresponding RJ-45 ports. Pin definitions for these terminals are discussed in Section 1.3.3. For exact electrical details, refer to the manual of the device connected to the CloudHub or CloudHub Plus RFID. For devices that are connected in larger networks via CloudLink modules (i.e., auxiliary I/O), connections can be made at the corresponding CloudLink. Refer to the manual of the device in question for more detail.
- § There is a USB 1.1 / 2.0 B-type connection which allows the CloudHub or CloudHub Plus RFID to communicate with any PC running the TZ Device Manager
- § There are four ports that accept RJ-45 (8P8C) plugs that are used to make connections to the device network. ***Note: These accept exactly the same Category 5 (Cat 5) cabling often used in computer networks, but do not directly communicate with Ethernet or other computer networks, and should not be plugged into these ports; only the cabling from a TZ device network should be connected.**

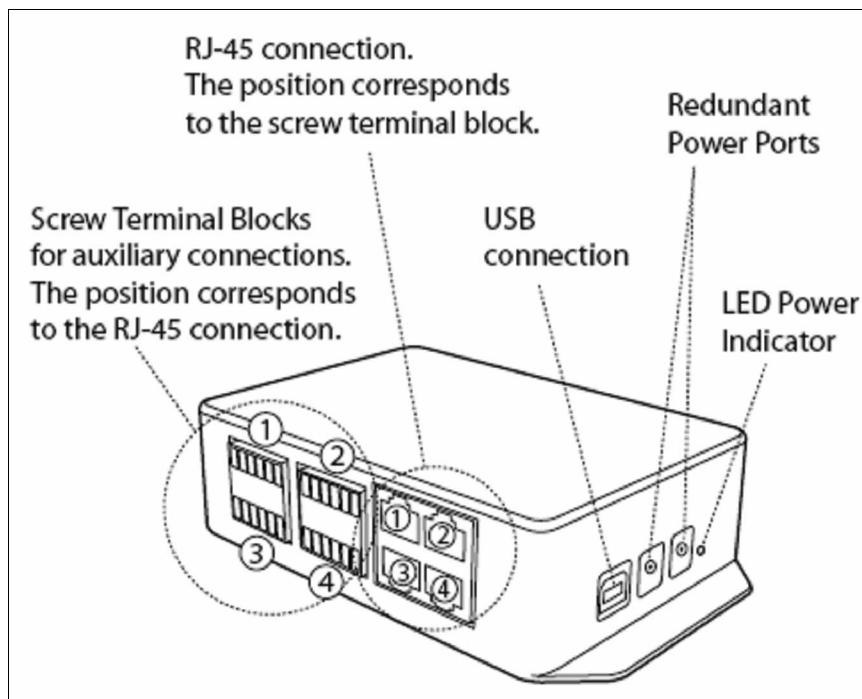


Figure 5: CloudHub and CloudHub Plus RFID electrical connections

1.3.3 Pin-out information for connected devices.

The CloudPoint, CloudHub, and CloudHub Plus RFID all have screw terminal blocks that allow connections to the auxiliary inputs and outputs of any device that is directly attached. The pin definition is summarized in Table 2 and shown in Figure 6. For devices that are connected in larger networks via CloudLink modules, there is no direct auxiliary input or output connection at the CloudPoint or CloudHub. Instead, connections can be made at the corresponding CloudLink. Refer to the CloudLink manual for more details.

Pin#	Designation	Function / Comment
1	AUXIN1	Device is typically programmed to open when AUXIN1 is switched from low (ground) to high (3.3V)
2	AUXIN2	Second auxiliary input
3	GND	Ground with reference to attached power supply.
4	AUXOUT1	Open drain low side FET output 1. Typically used to confirm status of device.
5	AUXOUT2	Second auxiliary output
6	+V	Voltage directly from the power supply plugged in to the CloudHub

Table 2: CloudPoint and CloudHub screw terminal pin-outs

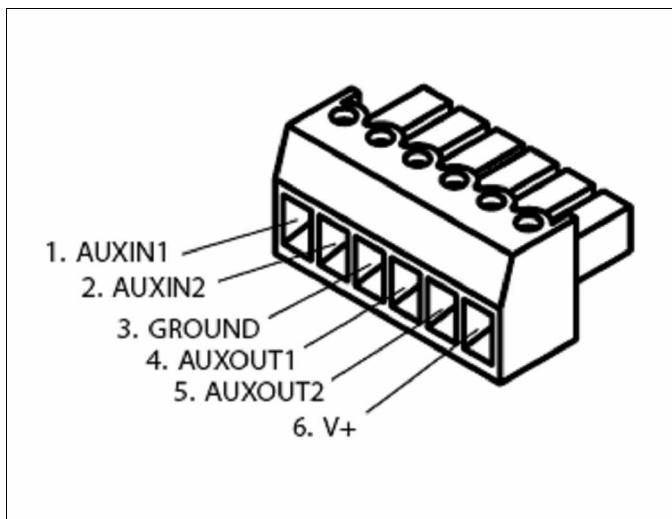


Figure 6: CloudPoint and CloudHub screw terminal pin-outs

1.4 Limitations

TZ Devices use more current during the short period of time they are triggered. The power supply that comes with the CloudPoint, CloudHub, or CloudHub Plus RFID is capable of simultaneously powering a maximum of two devices during this process. If the application requires more than two devices to trigger simultaneously, either re-wire the network with additional CloudLink modules or contact TZ for information on a larger power supply.

The following sub-sections list the limitations associated with TZ CF interconnect modules:

1.4.1 CloudPoint Limitations

- § The TZ CloudPoint is primarily a USB/TZ CF protocol translator. As such, network monitoring is performed by a PC, which must remain powered and always connected. It also has only one RS-485 driver. Technically, it is capable of supporting a larger network, but its use of only one driver leaves it somewhat susceptible to noise.

1.4.2 CloudHub and CloudHub Plus RFID Limitations

- § The TZ CloudHub and CloudHub Plus RFID are designed to control small to medium device networks through TZ CF protocol. This means that the control and monitoring of the network is done by explicitly

checking each device. If the network is too large, then response time and polling frequency may not be appropriate. A network with 64 devices using the TZ CF protocols will typically check each device once every three seconds, which is the TZ recommended limit. For larger networks, refer to the CloudCom architecture and the TZ NF protocol.

1.5 Typical Power Consumption

The amount of current needed to run a CloudPoint, CloudHub or CloudHub Plus RFID depends how it is connected to the network. If it is connected directly to CloudLink modules (and these in turn power the connected devices), it will draw only the current necessary to run its internal electronics and send signals to and from the RS-485 network. However, it is often connected such that it directly supplies power to devices.

Table 3 lists the power consumption of the CloudHubs and CloudPoints as separate units that do not supply power to attached devices. If devices are connected and rely on the CloudHub for power, refer to the appropriate manual for data on the additional current draw.

	CloudPoint	CloudHub	CloudHub Plus RFID
Supply Voltage (Vdc)	12	12	12
Current (A)		0.045	0.045

*If the CloudHub supplies power directly to devices, refer to the appropriate device manual for information on the additional current draw

Table 3: CloudHub power consumption

2 Typical Operation of a TZ CF Device Network

CloudPoints and CloudHubs are intended to control, monitor, and log all events that take place in a TZ device network. A TZ device network consists of one controller and up to 64 devices, all of which are connected with Category 5 (Cat5) cabling and possibly CloudLink modules. Some systems may include sensors, additional switches, and additional trigger-access modules.[S1]

The main functions (monitoring and logging all network activity, deciding when to give access to users, giving the different commands to Radials throughout the network) can be performed by any of the three models. The primary difference between the models is that the CloudPoint must remain connected to an active PC, whereas a CloudHub can operate freely on its own, and a CloudHub Plus RFID operates like a CloudHub with an additional RFID reader conveniently inside.

Setting up a device network is done in conjunction with the TZ Device Manager. Reference the manual for the proper use of the software and for additional details regarding network setup.

2.1 [S2]TZ CF Device Network Overview

The easiest way to explain the flexibility and utility of intelligent fastening is to examine a simple device network as shown in Figure 7.

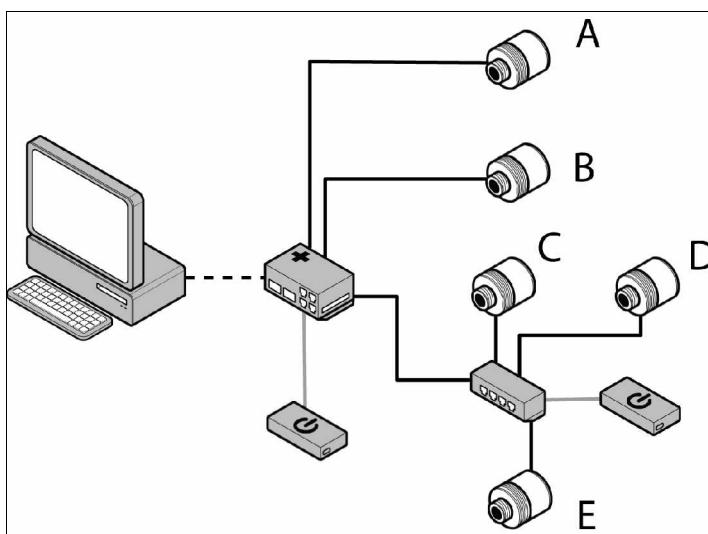


Figure 7: Network containing a TZ CloudHub Plus RFID controller and five devices

For convenience, the network is illustrated with a CloudHub Plus RFID interconnect module; however, the basic operation would be the same if the network utilized a CloudHub or CloudPoint interconnect module. Any of these units can be the root of the network since they all perform the following primary functions:

- § Monitor the network for any pertinent change in status
- § Decide when specific users should be granted access to designated areas
- § Log any changes in status within the network that would indicate whether a device has been opened or a user has tried to gain access
- § Supply power to devices that are directly connected, ***Note: If the network is large or if the devices are located an appreciable distance away, a separate power supply closer to the device is recommended.**

2.2 TZ CF Polling and Logging

The CloudHub or CloudPoint monitors its network of devices by constantly checking each one. This process is called polling. In the CloudHub (or in the attached PC in the case of a CloudPoint), there is a list of serial numbers and their corresponding devices, as well as other interconnect modules within the network.

The CloudHub or CloudPoint constantly runs through every entity on this list and performs the following process:

1. A message is sent out to the first device in its list. This message is transmitted to every device in the RS-485 network to locate the device with the same unique address.
2. Every device in the network sees the polling message and checks the address against its own to determine whether it should respond or act further.
3. Only the device with the correct address will reply. That device sends back a response along the RS-485 connection that includes its basic status, current state, whether it is unlocked, and whether the mating stud is in place.
4. The CloudHub keeps this information for every device and permanently logs any changes in its Flash memory. A CloudPoint running a similar network will keep the log on the attached PC.

This process is repeated for every device in the network. The exact frequency depends on the size of the network as well as the quality of the RS-485 connection. The process is shown in Figures 8 and 9.

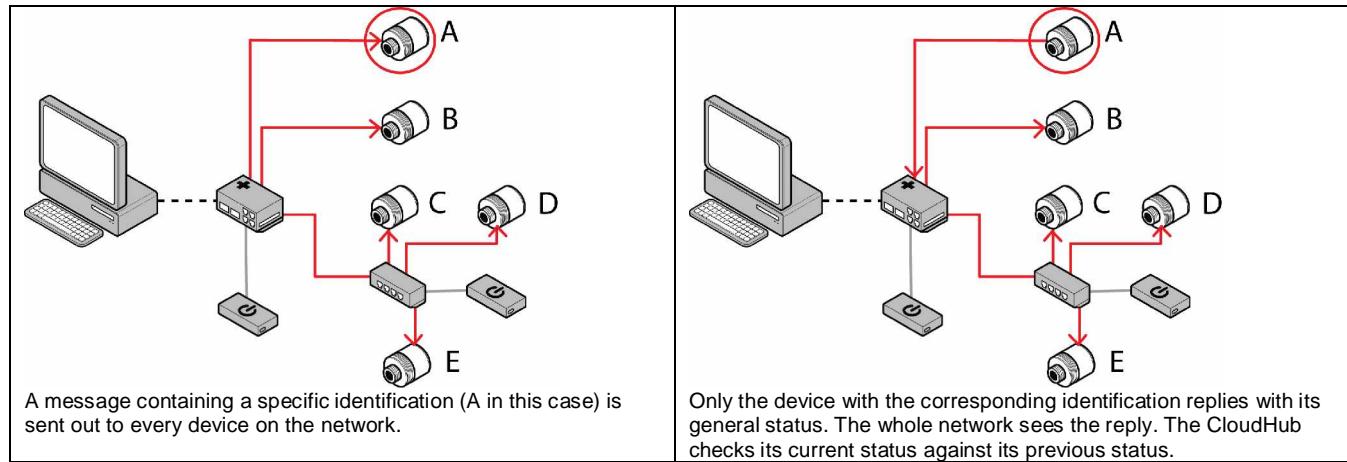


Figure 8: Polling through device network

Figure 9: Device command recognition and response

2.3 Opening CloudHub or CloudPoint-Connected Devices via AUXIN1

Depending on the application, there may be instances in which a user will want to open a device without having the CloudHub or CloudPoint directly issue a command (For example, a cabinet in a private residence that may not require strict security, but does require an audit trail, such as a medicine cabinet). Most TZ devices are engineered to allow for this behavior through connecting the AUXIN1 wire momentarily to ground through a switch or similar device. **Note: If this behavior is unwanted, it may be explicitly shut off or simply not wired.**

When the connection to ground is made, the device will release. The next time the device is polled, it will reply that it has opened. The CloudHub (or in the attached PC in the case of a CloudPoint) will then detect a change in the device's state and record the appropriate data (i.e., time, date, and device identity) in the Event Log tab located in the TZ Device Manager software.

2.4 Opening Devices via RFID with a CloudHub Plus RFID

The CloudHub Plus RFID includes an internal RFID reader to provide access to different parts of a network to different users. RFID cards serve as keys to multiple groups of devices at the same time. When setting up a network of devices and a CloudHub Plus RFID, a list of valid RFID cards is also loaded into the device. Each RFID may belong to up to seven groups at a time.

Each RFID acts as a specialized key by transmitting a unique identification code to the CloudHub Plus RFID when presented within three inches of the labeled surface.

Similar to RFID cards, every device in the network is also assigned membership into the same groups, or in some cases, no groups at all. **Note: If a device is not assigned to a group, no RFID card can trigger the device, though it may still be opened by an RS-485 command that originates for some other reason, or because a switch has connected AUXIN1 to ground.**

Once a valid RFID card is presented, the CloudHub Plus RFID allows access by triggering all of the devices that belong to the same groups belonging to the RFID, and either opening them directly or putting them in the Push-to-Release mode.

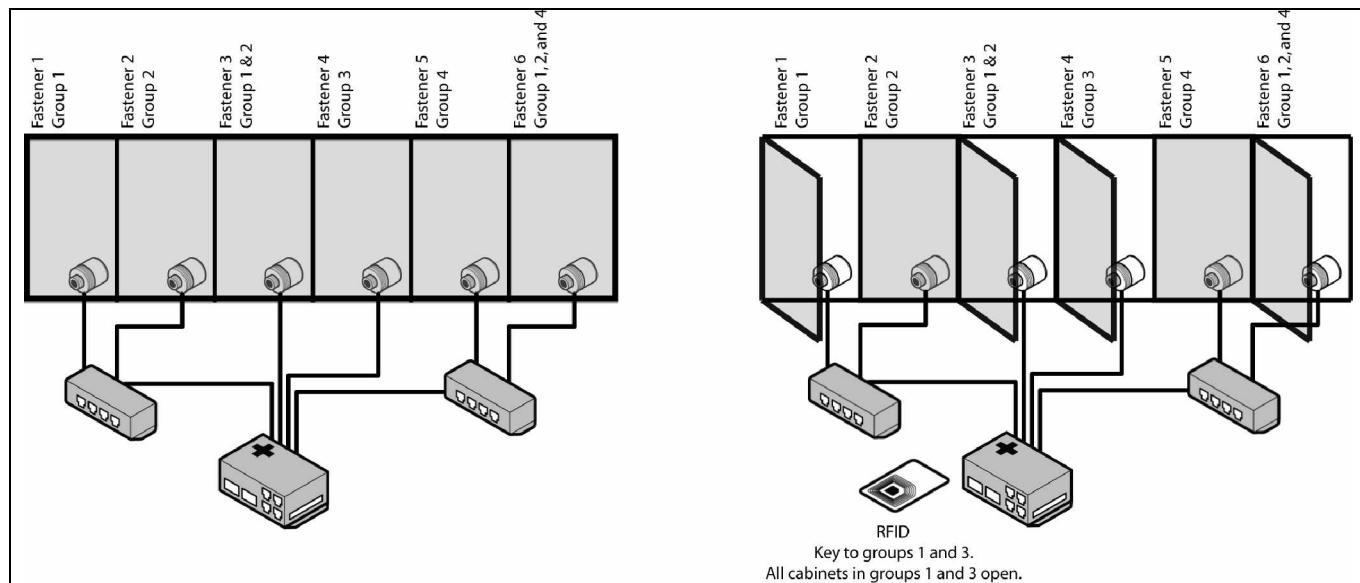


Figure 10: CloudHub Plus RFID access through RFID cards

If the devices are placed in the Push-to-Release mode, they will remain in that state until the same RFID card is again presented within two inches of the labeled surface. This same functionality is available through the use of a TZ RFID module, which can work with the CloudHub, CloudHub Plus RFID, or the CloudPoint, and can be located anywhere on the network.

Assigning RFID cards and devices to particular groups is accomplished through the TZ Device Manager. Refer to the TZ Device Manager manual for specific details.

3 TZ CF Interconnect Modules Installation

The CloudPoint, CloudHub, and CloudHub Plus RFID are all electronically secure products. As such, some care must be taken during general installation and with the policy and location of the device. Consider the following points:

- § The product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill metal or any other material that would produce metal shavings in the direct presence of the CloudHub or CloudPoint. If mounting to sheet metal or similar enclosure, perform all such steps with the CloudHub safely out of range of the chips and shavings produced.
- § The CloudPoint, CloudHub, and CloudHub Plus RFID are all security products, meaning that physical and unrestricted access could potentially compromise the security of the device network.
- § The CloudHub Plus RFID includes an RFID reader that requires it to be mounted in a way that the card or RFID card can be held within two inches of the labeled face. Failure to mount the interconnect module in this way will result in improper functionality.

3.1 Mounting the TZ CloudPoint and TZ CloudHub

The CloudPoint can be mounted through the use of two M4 (#8) screws located 76 mm apart. The CloudHub should be mounted through the use of two M4 (#8) screws located 140 mm apart. Refer to the Appendices for more detailed mechanical dimensions.

3.2 Wiring and Termination

The reliability of a device network is dependent on the quality and length of the cabling used. It is recommended that exactly one terminator be used per independently driven branch of the network to control any electrical noise. ***Note: A CloudPoint contains only one independently driven branch, whereas a CloudHub or CloudHub Plus RFID contains four. See the TZ System Manual for more details.**

4 Caution

Changes or modifications not expressly approved by TZ could void the user's authority to operate the equipment. (FCC Code of Federal Regulations Title 47 Part 15.21)

The Cloud Hub Plus RFID 7121CF 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 to correct the interference by one or more of the following measures:

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

5 Disclaimer

This document is intended to provide basic technical information regarding TZ interconnect modules, including the CloudPoint 7110CF, CloudHub 7020CF, and CloudHub Plus RFID 7021CF.

This document is not meant to be an exhaustive statement of all relevant data. By using this document, however, you agree to accept and comply with the terms, conditions, notices and disclaimer contained in this document.

While Telezygology Inc. (TZ) has used all due care and skill to ensure that the information contained in this document is accurate, correct, and current at the time of publication, it does not warrant or represent that the information is free from errors or omissions, and does not accept responsibility for any defect in the information.

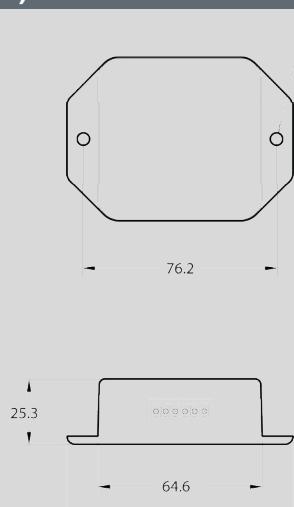
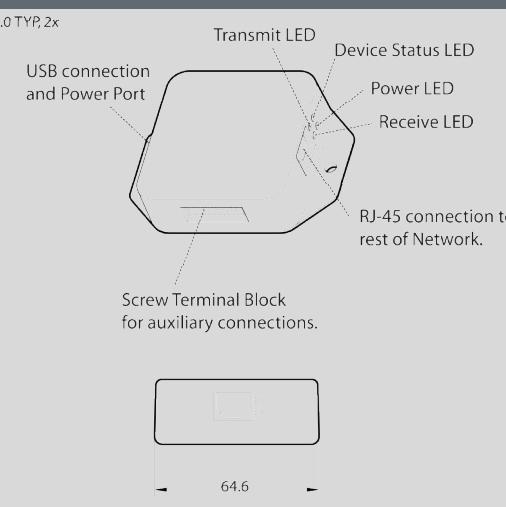
6 Use of Information Contained in This Document

Correct functioning of the TZ interconnect modules addressed in this manual requires consideration of how it is installed, how the network is constructed, system integration issues (such as networking for power and data), and subsequent programming for functionality.

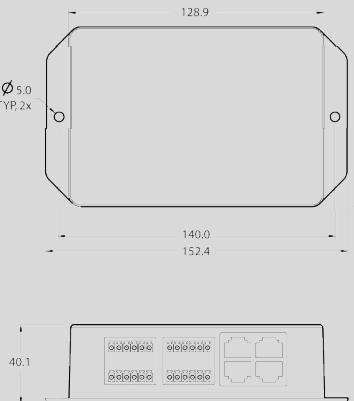
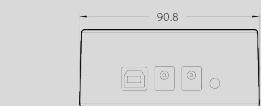
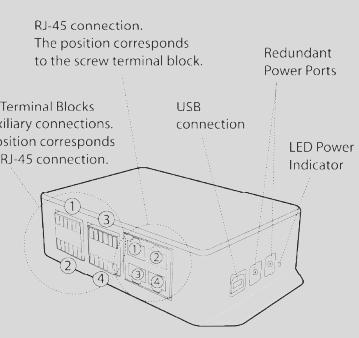
For the successful functioning of the mechanism as part of an integrated system, it is recommended that advice is sought from TZ regarding the application of the mechanism, its integration and its control system.

The interconnect modules described have not been tested or qualified for a specific application other than for compliance to the specification outlined. Specific qualification testing may be required for fit-for-purpose application design.

Appendix 1: TZ CloudPoint 7110CF Performance Characteristics

CHARACTERISTICS – TZ CLOUDPOINT 7110CF	
Physical and Mountings	
Dims: 63.5mm (88.9 mm with flange) x 63.5mm x 25.4mm (2.5" (3.5" with flange) x 2.5" x 1.0")	Weight: 75g
Mounting: via 2 X M4 (#8) screws through flange or adhesive on bottom surface (not included).	
CAUTION: This product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill or otherwise produce metal shavings around electronic equipment.	
Environmental & Performance	
Operating temperature: -15°C - +55°C (5°F - 131°F)	Survival temperature: -55°C - +85°C (-67°F - +185°F)
Humidity (operating): 95% RH at 50°C (122°F)	Non combustible
Ingress Protection: IP 21	
Electrical	
Accepts 9.0 – 32.0 VDC supply voltage, depending on devices	2.1mm diameter, center positive, barrel power plug
12V 1A power supply included.	
RS-485 multi-drop communications interface via RJ-45	USB 1.1/2.0
1 x RJ-45 connection: Can extend network with TZ CloudLink modules.	
Screw terminal pin-out: 1: AUX-IN1, 2: AUX-IN2, 3: Gnd, 4: AUX-OUT1, 5: AUX-OUT2, 6: +V	
One pluggable screw terminal block included to make additional electrical connections with devices.	
Pushbutton triggering of attached devices by connecting AUXIN1 to GND via switch or similar.	
RJ-45 pin-out: 1: +Coms, 2: -Coms, 3: AUX-OUT1, 4: AUX-IN1, 5: Gnd, 6: AUX-OUT2, 7: AUX-IN2, 8: +V	
Four Indicator LEDs: Transmit, Receive, Power, and Device Status.	
Standards Compliance	
FCC Part 15, CE, IC	
RoHS compliant, One Year Limited Warranty	
Dimensions (in mm)	
	

Appendix 2: TZ CloudHub 7120CF Performance Characteristics

CHARACTERISTICS – TZ 7120CF CLOUDHUB	
Physical and Mountings	
Dims: 128.9mm (152.4mm with flanges) x 90.8mm x 40.1mm (5.1" (6" with flanges) x 3.6" x 1.6")	Weight: 190g
Mounting: via 2 X M4 (#8) screws through flange or adhesive on bottom surface (not included).	
CAUTION: This product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill or otherwise produce metal shavings around electronic equipment.	
Environmental & Performance	
Operating temperature: -15°C - +55°C (5°F - 131°F)	Survival temperature: -55°C - +85°C (-67°F - +185°F)
Humidity (operating): 95% RH at 50°C (122°F)	Non combustible
Ingress Protection: IP 21	
Electrical	
Supply voltage: 9.0 – 32.0 VDC One 12V 1A power supply included.	2 x 2.1mm diameter, center positive, power input jacks for redundancy
RS-485 multi-drop communications interface via RJ-45	USB 1.1/2.0
4 x RJ-45 connections: TZ7105CF CloudLink modules can be used to extend the network from any connection.	
RJ-45 pin-out: 1: +Coms, 2: -Coms, 3: AUX-OUT1, 4: AUX-IN1, 5: Gnd, 6: AUX-OUT2, 7: AUX-IN2, 8: +V	
Four pluggable screw terminal blocks included to make additional electrical connections with devices.	
Screw terminal pin-out: 1: AUX-IN1, 2: AUX-IN2, 3: Gnd, 4: AUX-OUT1, 5: AUX-OUT2, 6: +V	
Pushbutton triggering of attached devices by connecting AUX-IN1 to Gnd via switch or similar.	
Standards Compliance	
FCC Part 15, CE, IC RoHS compliant, One Year Limited Warranty	
Dimensions (in mm)	
DO NOT SCALE	
	
	

Appendix 3: TZ CloudHub Plus RFID 7121CF Performance Characteristics

CHARACTERISTICS – TZ CLOUDHUB™ Plus RFID 7121CF

Physical and Mountings

Dims: 128.9mm (152.4mm with flanges) x 90.8mm x 40.1mm (5.1" (6" with flanges) x 3.6" x 1.6")

Weight: 190g

Mounting: via 2 X M4 (#8) screws through flange or adhesive on bottom surface (not included).

CAUTION: This product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill or otherwise produce metal shavings around electronic equipment.

Environmental & Performance

Operating temperature: -15°C - +55°C (5°F - 131°F)

Survival temperature: -55°C - +85°C (-67°F - +185°F)

Humidity (operating): 95% RH at 50°C (122°F)

Non combustible

Ingress Protection: IP 21

Electrical

Supply voltage: 9.0 – 32.0 VDC

2 x 2.1mm diameter, center positive, power input jacks for redundancy

One 12V 1A power supply included.

RS-485 multi-drop communications interface via RJ-45

USB 1.1/2.0

4 x RJ-45 connections: TZ7105CF CloudLink modules can be used to extend the network from any connection.

RJ-45 pin-out: 1: +Coms, 2: -Coms, 3: AUX-OUT1, 4: AUX-IN1, 5: Gnd, 6: AUX-OUT2, 7: AUX-IN2, 8: +V

Four pluggable screw terminal blocks included to make additional electrical connections with devices.

Screw terminal pin-out: 1: AUX-IN1, 2: AUX-IN2, 3: Gnd, 4: AUX-OUT1, 5: AUX-OUT2, 6: +V

Pushbutton triggering of attached devices by connecting AUX-IN1 to Gnd via switch or similar.

RFID

EM4001 125KHz 64 bit

Standards Compliance

FCC Part 15, CE, IC

RoHS compliant, One Year Limited Warranty

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Dimensions (in mm)

DO NOT SCALE

