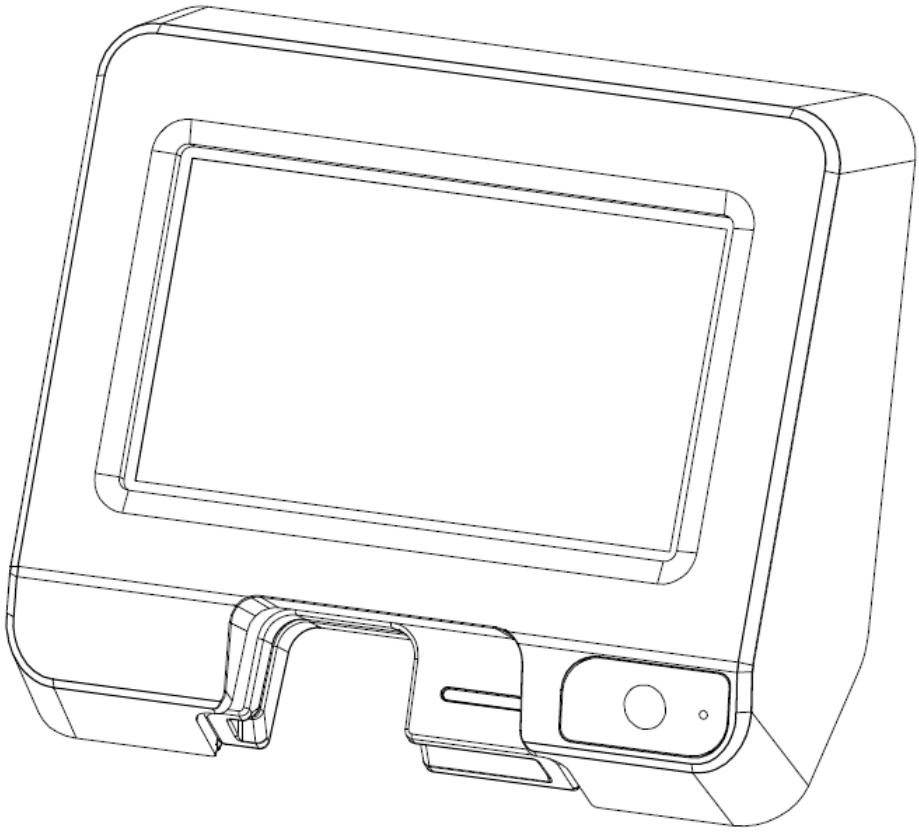
Product Manual

IM20 UNATTENDED PAYMENT TERMINAL PRODUCT MANUAL



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Revision History

Version	Contents	Author	Date
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This document is meant to aid in the installation and operation of the IM20 unattended payment terminal.

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1 Product Overview

1.1 Glossary

Table 1: Terms and Definitions

Term	Definition
UPM	Unattended Payment Module
EPP	Encrypting PIN Pad
SCR	Secure Card Reader
ESD	Electrostatic Discharge
GND	Ground
LCD	Liquid Crystal Display
MDB	Multidrop Bus
USB	Universal Serial Bus
RS232	Recommended Standard 232
RAM	Random Access Memory
MCU	Microcontroller Unit
CPU	Central Processing Unit
SAM	Secure Access Module
SIM	Subscriber Identity Module

1.2 Product Introduction

The IM20 unattended payment terminal is a POS terminal designed to operate in self-service environments. This device is designed to be used in a variety of indoor or outdoor settings, such for vending, parking, ticketing or self-service checkout registers.

By combining a wide variety of payment options such as magnetic strip cards, smart cards, contactless cards and devices as well as 1D/2D code scanning, the IM20 provides a comprehensive solution to cashless payments. The IM20 is also designed to operate in a wide range of temperatures, repel the ingress of dust and water, resist physical impacts, and disperse electrostatic discharges. These are all qualities that allow the device to be installed in a wide variety of outdoor or indoor locations

2 Product Specifications

2.1 Device Illustration

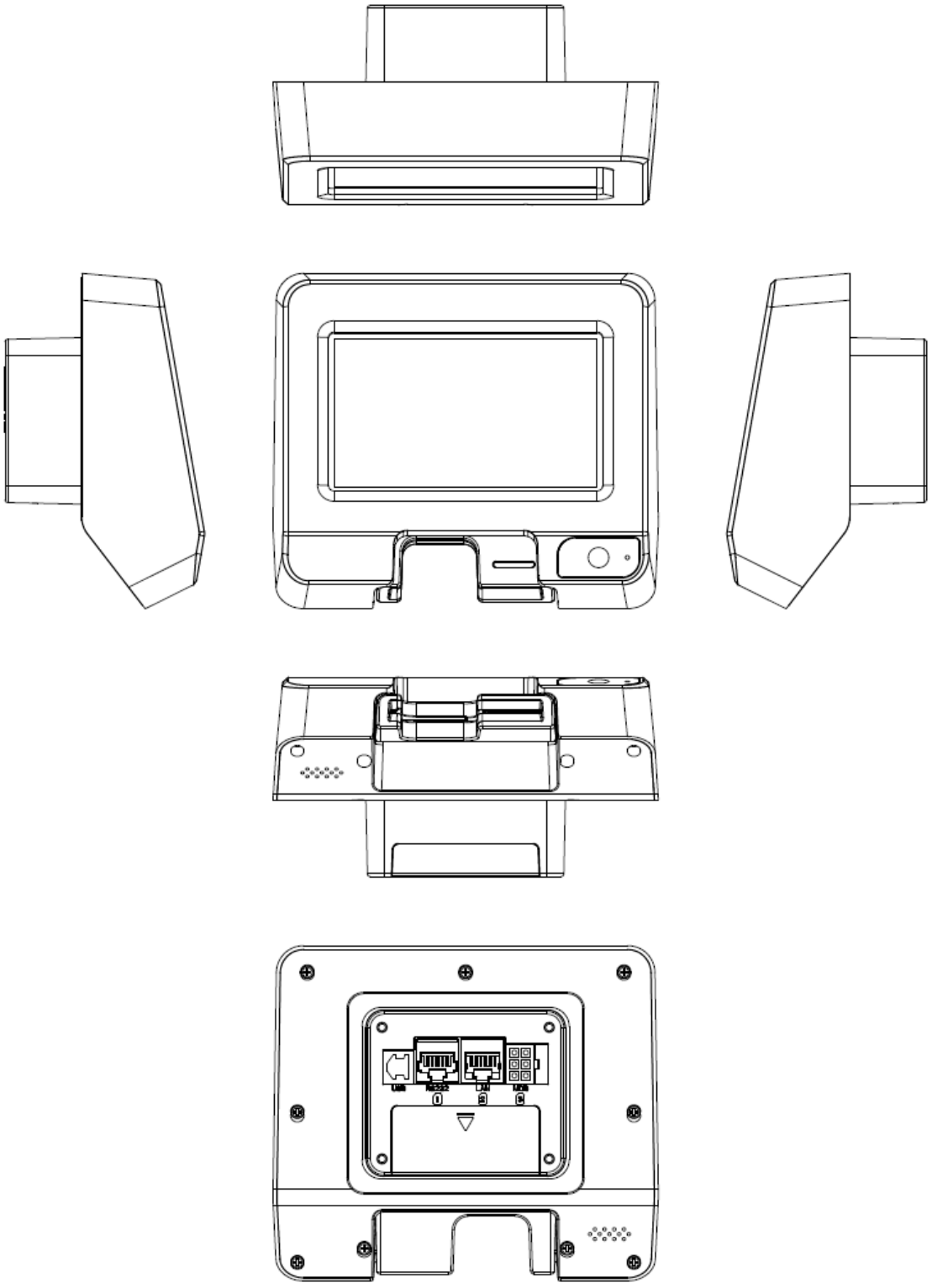

Figure 1: view from all sides

2.2 Device Specifications

Table 2: IM20 Device Module Outline

Module	Specifications	
CPU	ARM A7	
operating system	Linux (Prolin)	
memory	256MB DDR3 SDRAM 128MB NAND Flash	
display	4.3" TFT color display 480 x 272 pixels capacitive touchscreen	
audio	built in speaker	
card readers	magnetic strip card reader	triple track
	smart card reader	ISO7816 compatible EMV2000 L1 & L2 compliant PBOC3.0 compliant
	contactless card reader	reads ISO14443 Type A/B cards reads Mifare cards reads NFC devices
wireless communications	Bluetooth	
	Wi-Fi	
SAM card slot	3 micro-SIM (3FF) 5V SAM card slots	
external ports	USB Type B	
	RS232	
	MDB	
	Ethernet	
power source	5 VDC (USB) 9 to 42 VDC (MDB)	
code scanner	0.3 MP resolution fixed focus camera reads most standard 1D/2D codes	
operating environment	temperature	-20°C ~ 70°C
	humidity	5% ~ 95% (without condensation)
storage environment	temperature	-30°C ~ 70°C
	humidity	5% ~ 95% (without condensation)

2.2.1 Components, Interface, and Ports

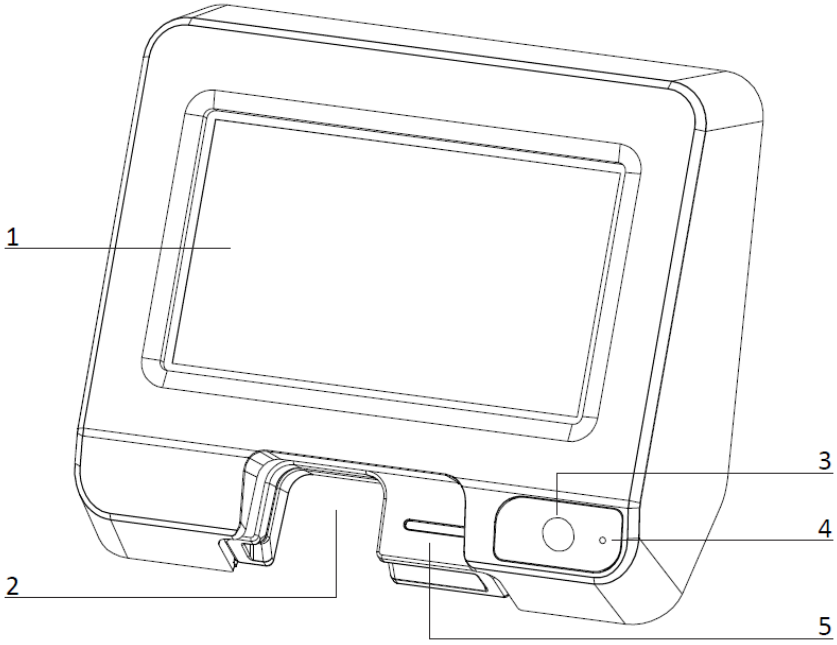

Figure 2: components, interface, and ports (front)

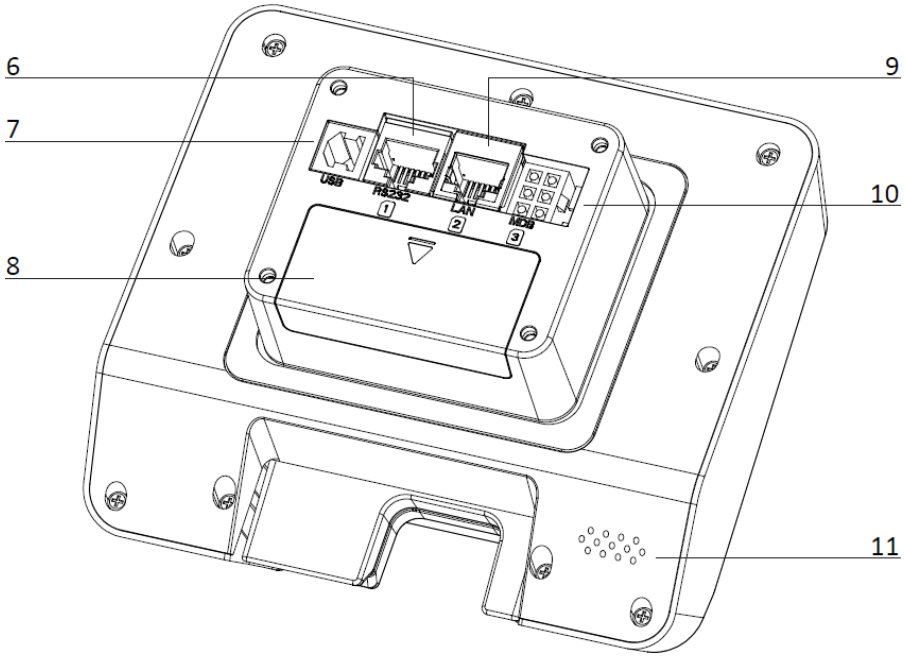

Figure 3: components, interface, and ports (back)

1. LCD touchscreen
2. hybrid card reader
3. camera
4. camera locator light
5. indicator lights
6. RS232 (RJ45 port)
7. USB Type B port
8. SAM card slot cover
9. Ethernet (RJ45 port)
10. MDB port
11. speaker

2.2.2 Output Connectors

RS232: Recommended Standard 232 (RS232) is a protocol for serial communication. The IM20 has a RJ45 port that uses RS232 with the following pinout:

Table 3: RS232 pinout

pin	signal
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

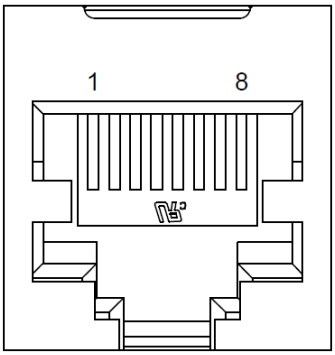

Figure 4: RS232 (RJ45 port)

USB: Universal Serial Bus (USB) is a widely adopted communication protocol used across a broad range of electronic devices. The IM20 has a USB 2.0 Type-B port available for use, it can accept 5 V input to power the device.

Table 4: USB pinout

pin	signal
1	VIN
2	D-
3	D+
4	GND

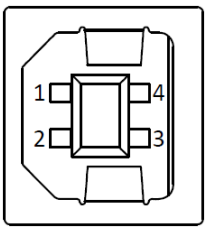

Figure 5: USB Type-B port

MDB: Multidrop Bus (MDB) is a communication protocol commonly used in the vending machine industry. The IM20 has a MDB port and can communicate to a vending machine controller as well as accept an input voltage of 9 V to 42 V.

Table 5: MDB pinout

pin	signal
1	POWER_IN
2	GND
3	NC
4	MASTER_RX
5	MASTER_TX
6	COM (D_GND)

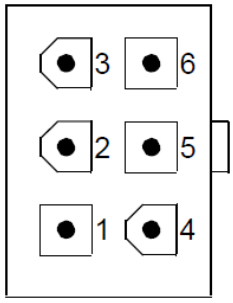

Figure 6: MDB port

Ethernet: Ethernet is a common networking protocol for local area networks. The IM20 has an Ethernet port that it can use to connect to a wired LAN.

Table 6: Ethernet pinout

pin	signal
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

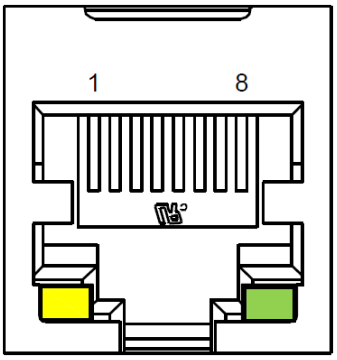

Figure 7: Ethernet port

2.2.3 SAM card Installation

The IM20 has three SAM card slots available for use.

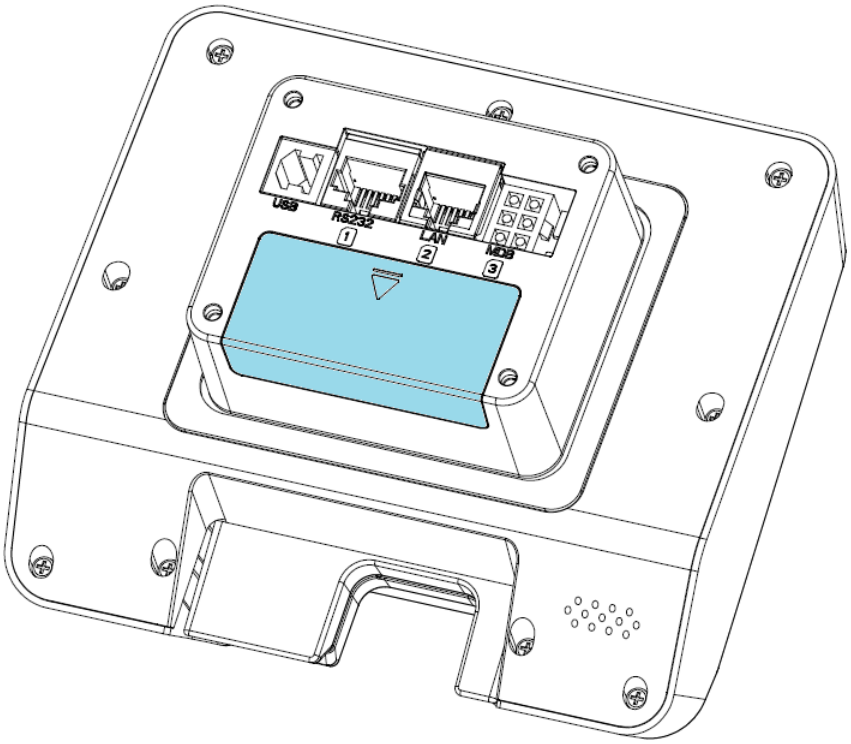

Figure 8 card slot cover (highlighted in teal)

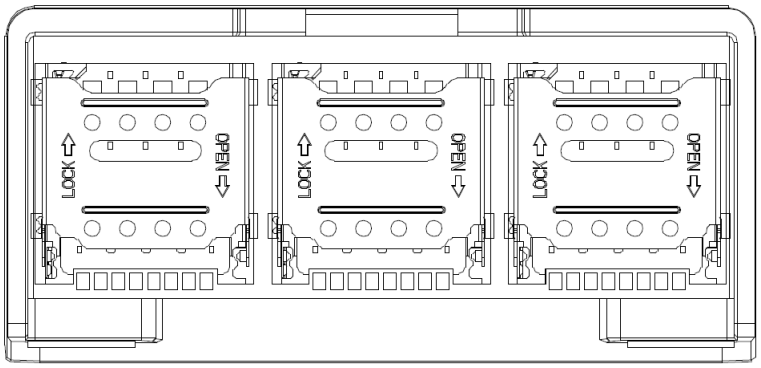

Figure 9: SAM card mounts

These three card mounts accept micro-SIM sized SAM cards and are normally hidden by a plastic cover on the back of the device. The cover can be slid open to reveal three SAM card mounts. From left to right, these mounts are for SAM card 1, SAM card 2, and SAM card 3.

In order to install a card, open the mount and insert the card into the slot with the contacts facing towards the IM20 and the clipped corner of the card to the upper left, then lock the mount with the card inside and replace the cover.

2.2.4 Touchscreen

The IM20 has a 4.3" LCD capacitive touchscreen located on its front face.

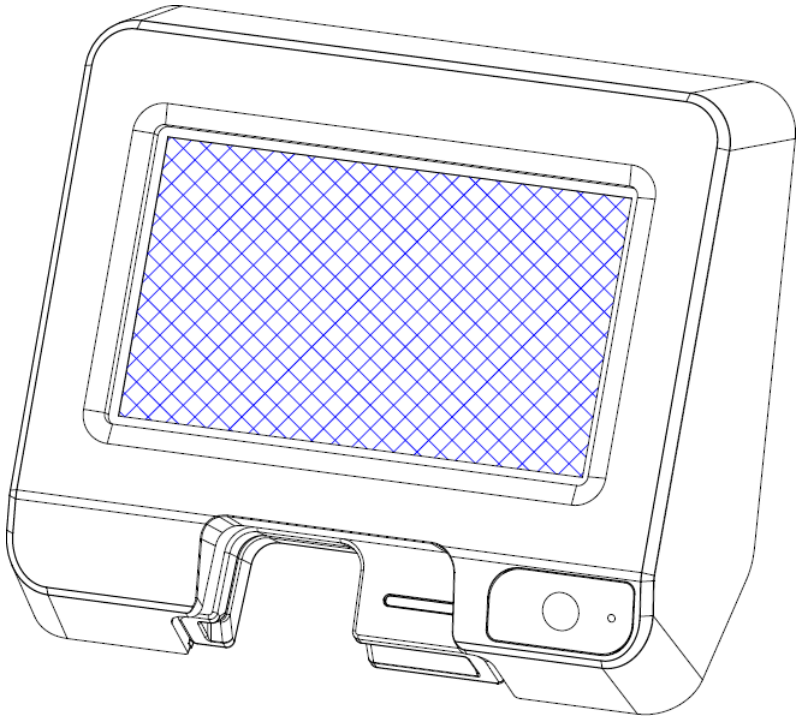

Figure 10: touchscreen (outlined in blue hatch)

This display has a resolution of 480 x 272 pixels, is equipped with an adjustable LED backlight, and is protected by a scratch resistant glass cover. This touchscreen functions as the primary user interface for the device as well as the primary mechanism for the device to display information to users. The brightness of the backlight is software controlled and divided into ten levels (1 through 10) going from least to most bright.

2.2.5 Camera

The IM20 has a VGA camera installed on the lower right side of its front face.

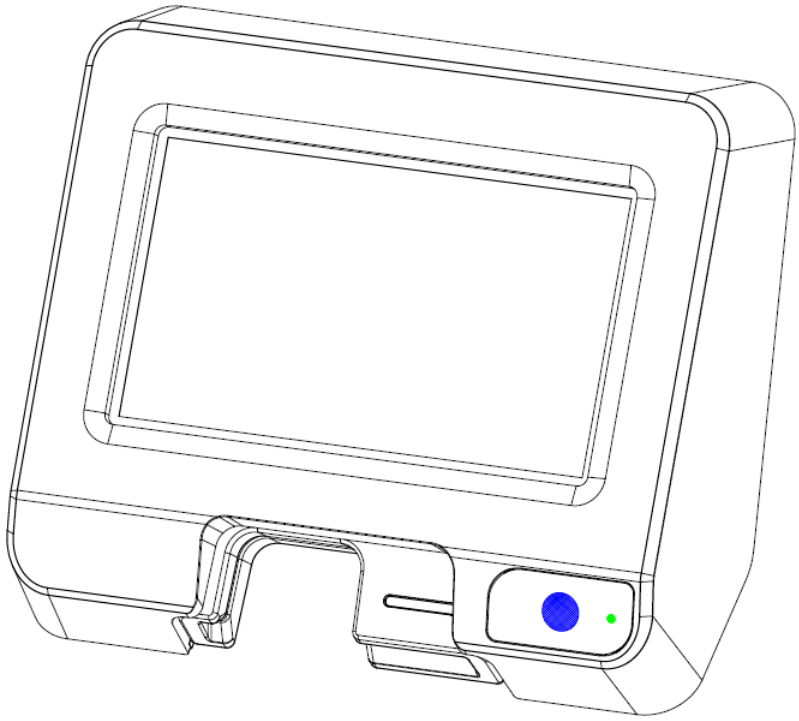

Figure 11: camera (in blue) and indicator LED (in green)

This fixed focus camera has a resolution of 640 x 480 pixels with a focal length of 2.59 mm. Its primary purpose is for 1D and 2D code scanning, and it is equipped with a green locator LED next to the camera lens to allow for easy placement of scanned items.

2.2.6 IM20 Card Readers

The IM20 has a two in one smart card and magnetic strip card reader located on the bottom of the front face of the device.

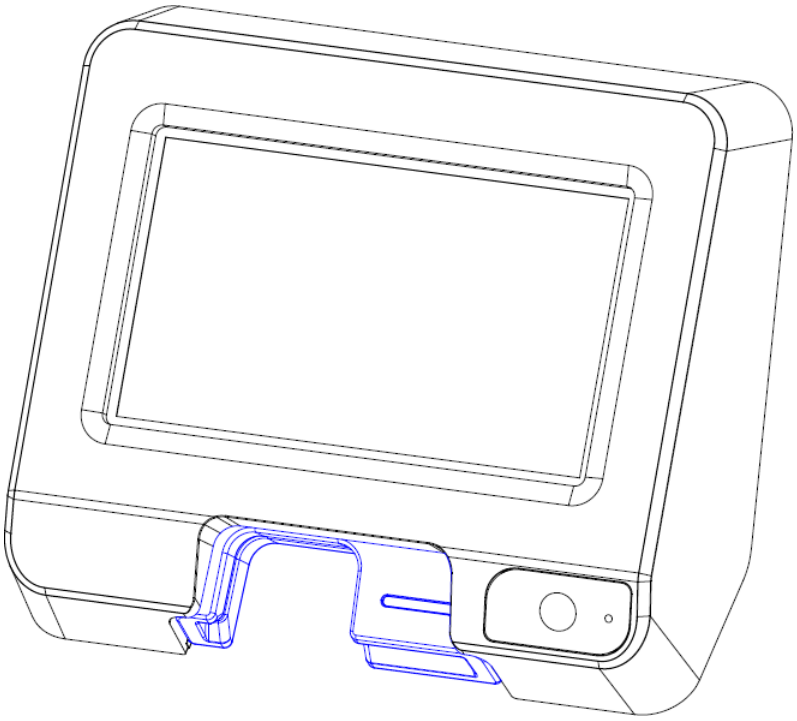

Figure 12 hybrid card reader (outlined in blue)

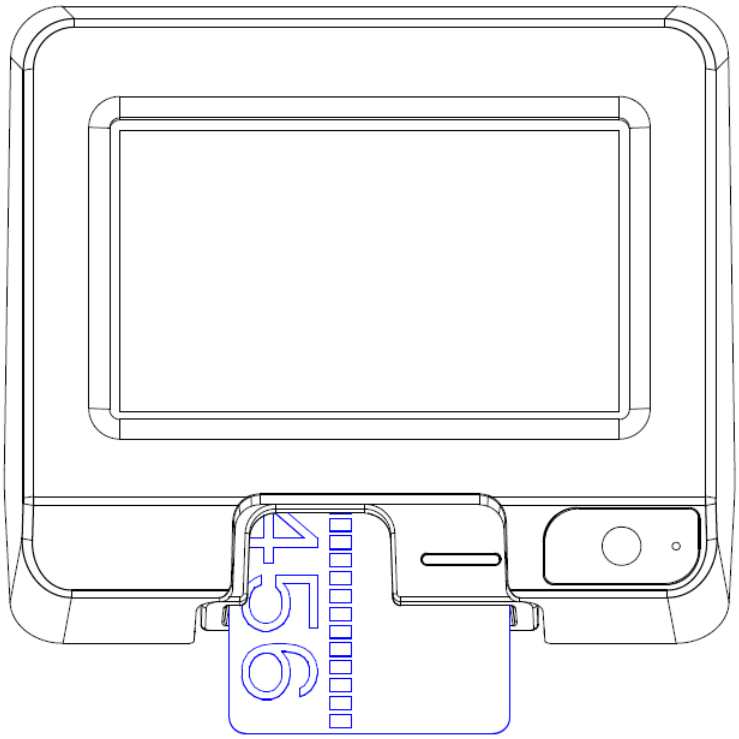

Figure 13 using the hybrid card reader (inserted card outlined in blue)

Magnetic Strip Card Reader

- triple track reading
- reads on insertion and removal
- lifecycle: over 500k reads
- supported cards: GB/T14916, GB/T15120, GB/T15694-1, ISO7812-2, and GB/T17552 standards.
- card reader use: Insert and then remove the card into the reader with the magnetic strip facing down and to the right as indicated in Figure 13 using the hybrid card reader (inserted card outlined in blue). Make sure that the card is fully inserted into the card reader.

Smart Card Reader

- conforms to ISO7816, PBOC3.0, and EMV2000 L1&L2
- reads 1.8V/3V/5V synchronous and synchronous cards
- lifecycle: over 500k reads
- card reader use: Insert the card fully into the reader with the metallic contacts facing up and towards the reader as indicated in Figure 13 using the hybrid card reader (inserted card outlined in blue). Make sure that the card is fully inserted into the card reader.

2.2.7 Contactless Card Reader

The IM20 has a contactless card reader with an RF antenna located on its front face. The read area for this card reader roughly corresponds to the touchscreen on the front of the device.

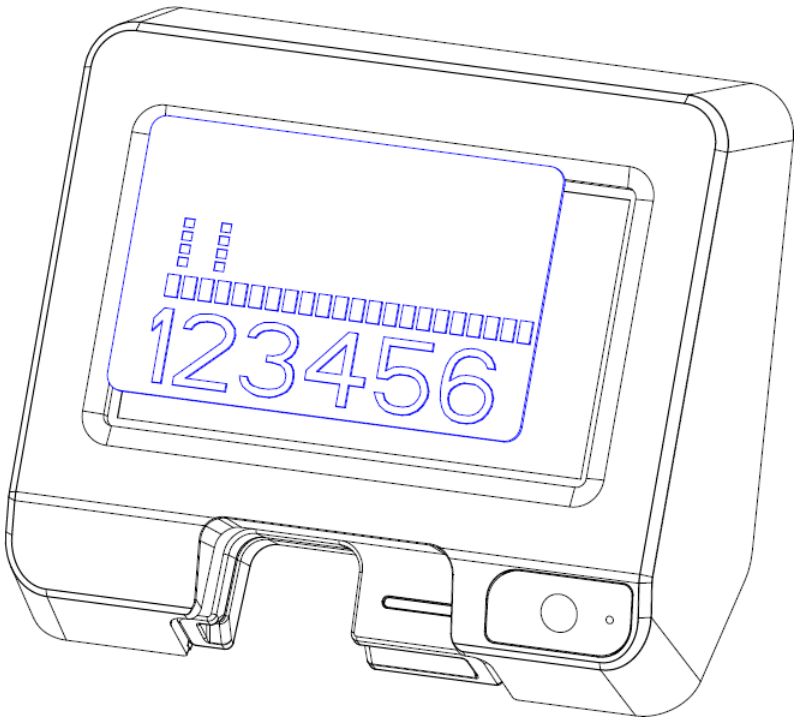

Figure 14 contactless card reader (contactless card outlined in blue)

Contactless Card Reader

- supports ISO14443 Type A/B
- card reader use: The contactless card reader reads cards and devices placed roughly parallel to the IM20 LCD screen anywhere from 0 to 4 cm above the surface of the screen (as indicated in Figure 14). For best results, place as close to the screen as possible and do center the card over the screen.

2.2.8 Speaker

The IM20 has a speaker unit located on the lower right corner of its back face.

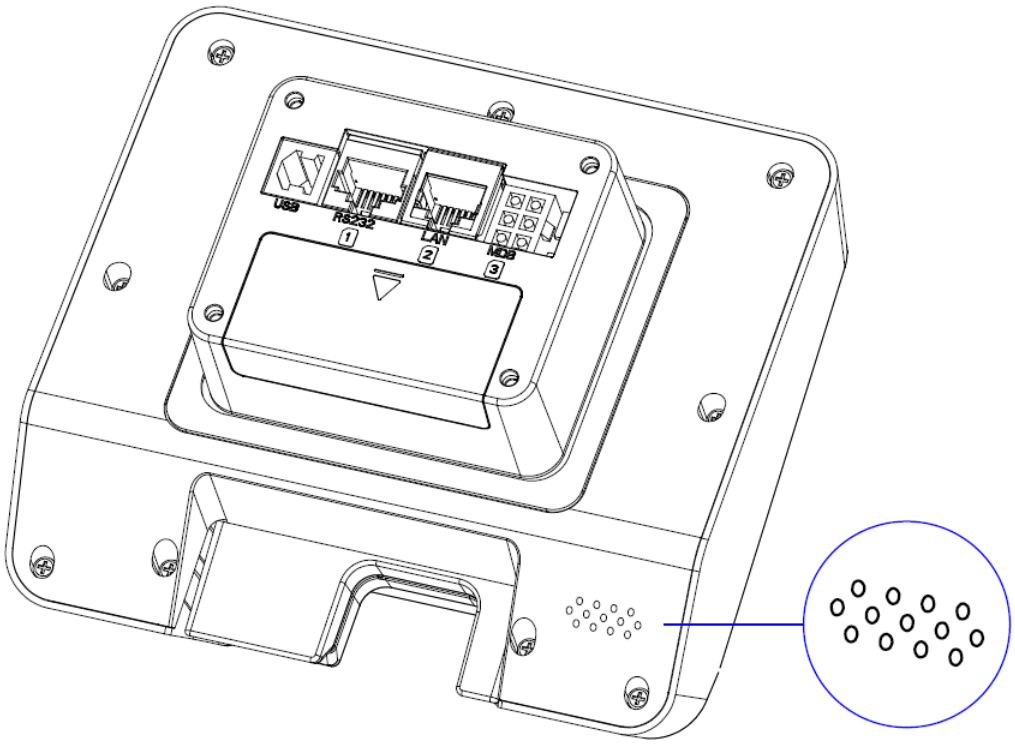

Figure 15 speaker (highlighted in blue)

The speaker is meant to be used to output various user prompts and indicator tones. Its volume is software controlled and divided into five levels (0 through 4) going from mute to maximum volume

- volume: maximum of 85dB at 10 cm
- signal: mono audio channel
- file format: .wav

2.2.9 Indicator LEDs

The IM20 has a RGB status indicator LED located on the lower portion of its front face, near the card reader slot.

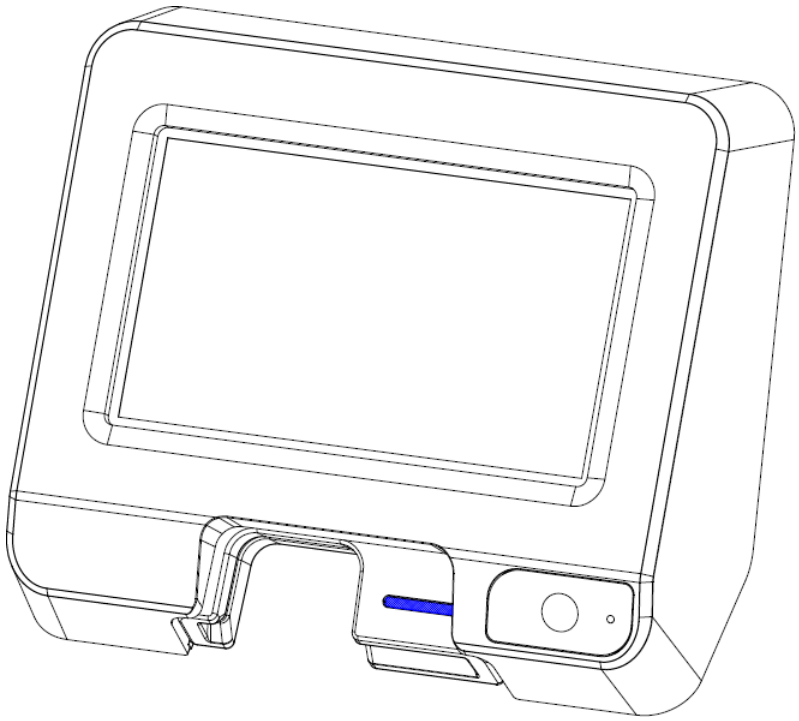

Figure 16 LED status indicator (highlighted in blue)

The operation of the LED status indicator is software controlled and depends on the specific configuration of the device. It can display an indicator light in red, green, or blue.

3 Accessories and Cables

3.1 Device Cables

USB Cable

A Type A to Type B USB cable is packaged with the IM20.

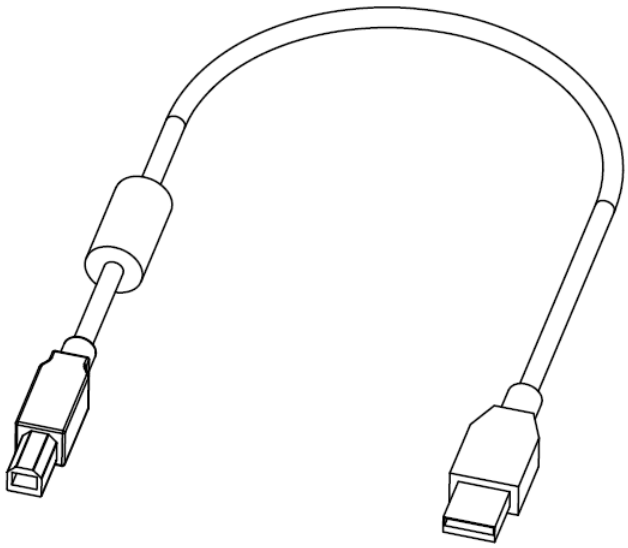

Figure 17 USB Type A to Type B cable

The USB cable packaged with the IM20 is used to allow the IM20 to connect to other devices or power sources through its USB Type B port.

RJ45 Cable

An RJ45 cable is not normally packaged with the IM20 but they are available upon request. Use only the cables provided by PAX, otherwise the pinout used may not matched what is needed by the RJ45 ports.

3.2 Device Interconnection

The IM20 is designed to be forward compatible with other PAX devices such as the CM20 communication module.

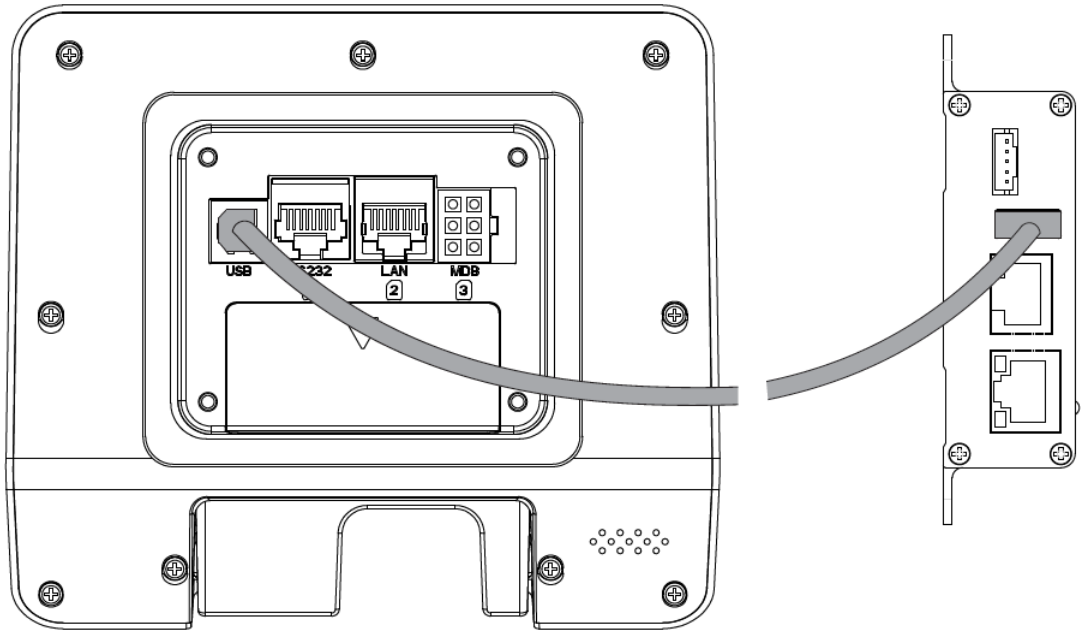

Figure 18 IM20 connected to CM20 with USB cable

The IM20 can connect to other PAX devices such as the CM20 through its MDB port. This allows the IM20 to have expanded functionality, potentially giving it access to resources such as an expanded selection of ports. To learn more about available devices that can be used with the IM20 contact your dealer.

4 Product Installation

4.1 Device Dimensions

The IM20 has the physical dimensions shown in Figure 19. Note that various cables plug directly into the back of the device, so greater clearance than shown for the back end of the device is needed to properly install an IM20 unit.

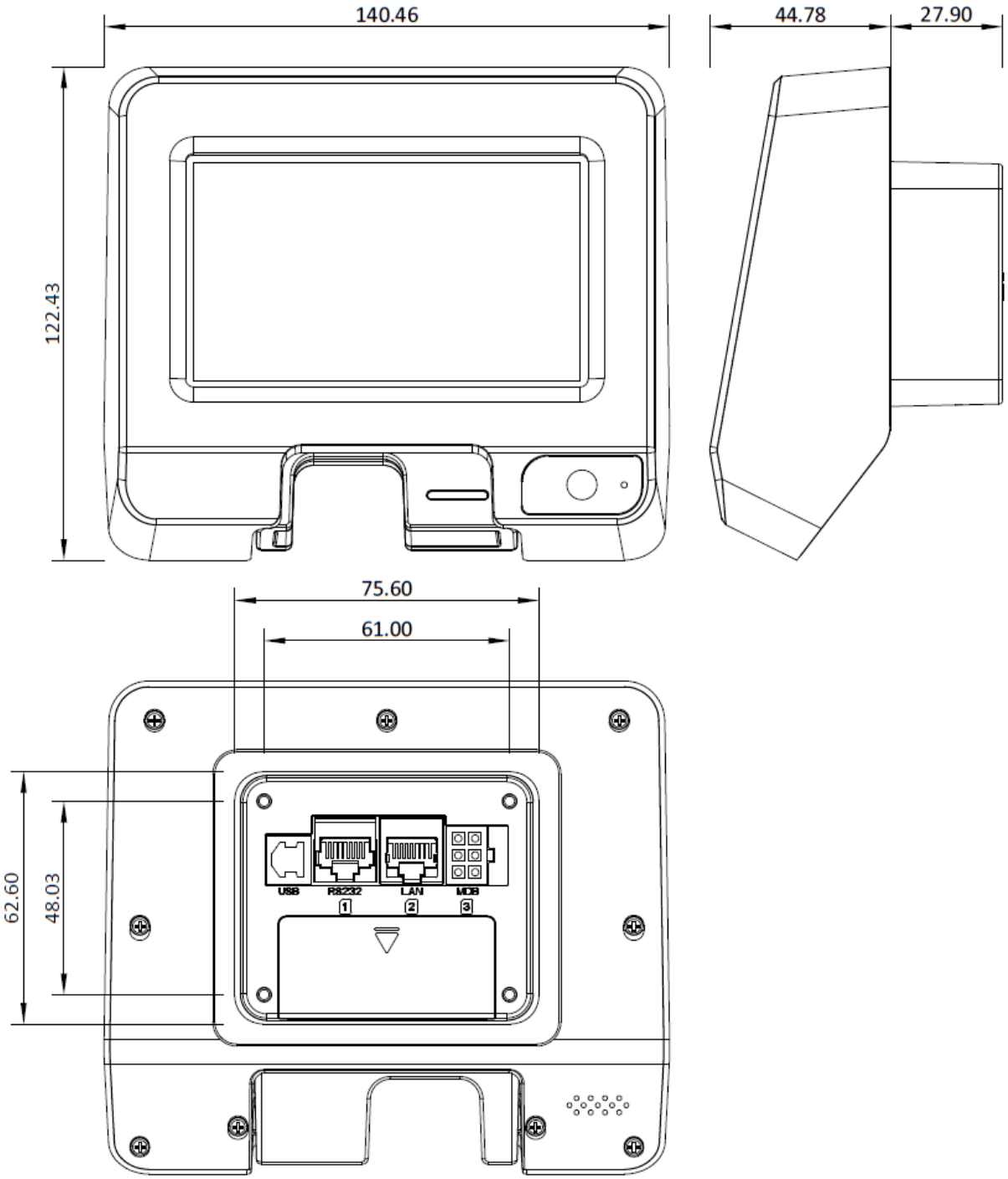

Figure 19 device dimensions (mm)

4.2 Mounting bracket

The IM20 is equipped with a detachable plastic mounting bracket that allows it to be fixed into place on a mounting plate.

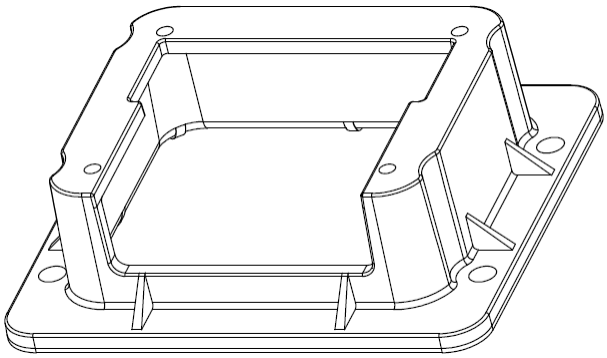

Figure 20 mounting bracket, front side (outward oriented face)

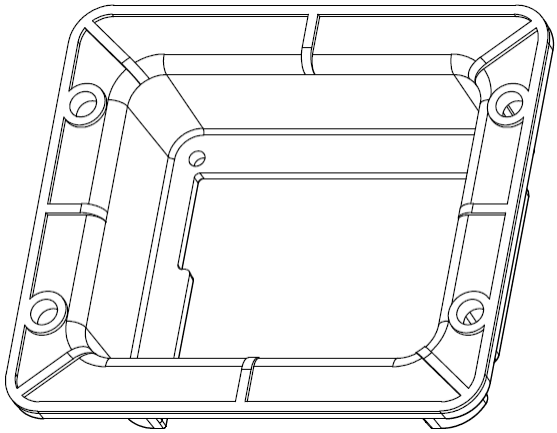

Figure 21 mounting bracket, back side (inward/device oriented face)

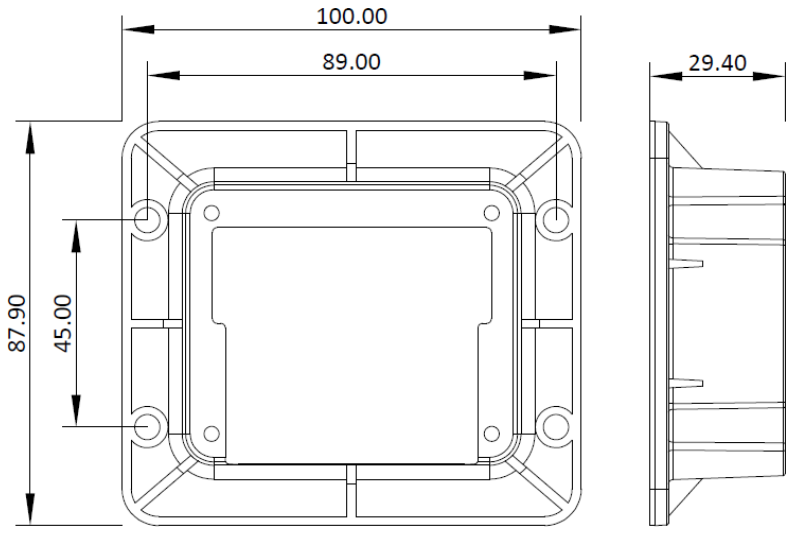

Figure 22 mounting bracket dimensions

4.3 Mounting Plate Dimension

The IM20 is designed to be mounted on vertical surfaces through a mounting plate.

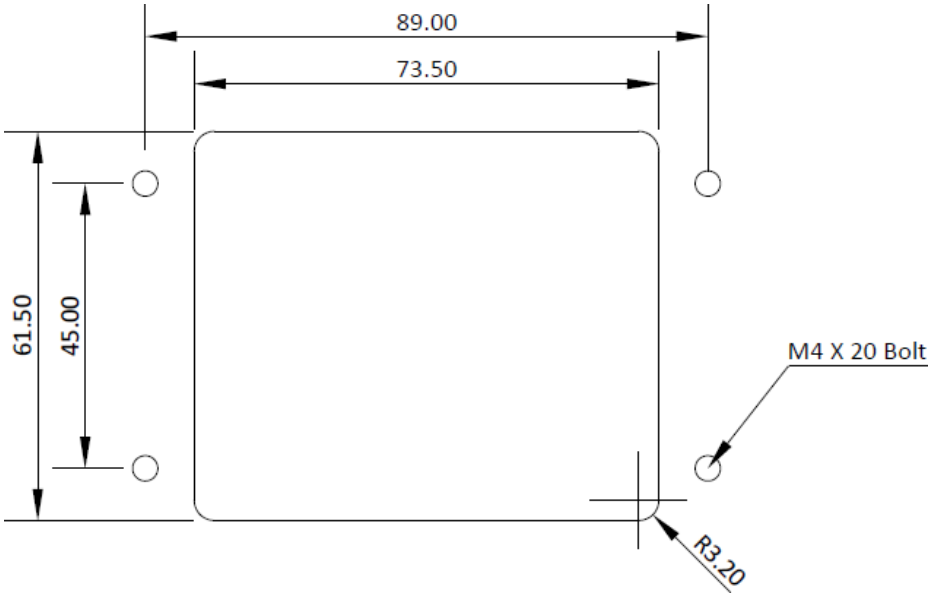

Figure 23 mounting plate dimensions (mm)

The mounting plate must have the dimensions given above to hold the device in place and allow it to be installed. The M4 bolts should extrude from the back of the mounting plate to allow for the mounting bracket to slot into place.

4.4 Device Installation

Installing the mounting bracket

The first step to installing the IM20 as part of an unattended payment terminal is to secure the mounting bracket onto the mounting plate. The back of the mounting plate should have four M4 bolts that correspond to the four outer mounting points on the mounting bracket. Slid the mounting bracket onto the four bolts with its front side facing outwards from the mounting plate, then use four M4 screws to secure it in place.

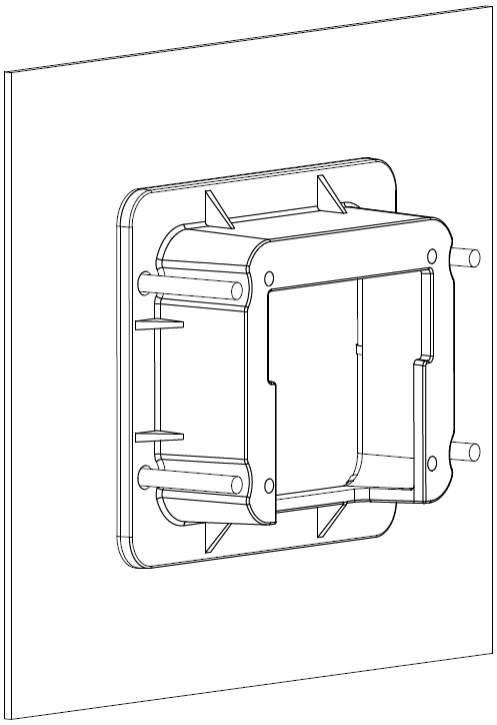

Figure 24 attaching the mounting bracket to the mounting plate

Installing the IM20 unit

After the mounting bracket is secured to the mounting plate, insert the IM20 unit through the front of the mounting plate into the mounting bracket. Then apply a torque of 0.6 ~ 0.8 Nm to the four M3 screws to secure the IM20 to the mounting bracket through its four inner mounting points.

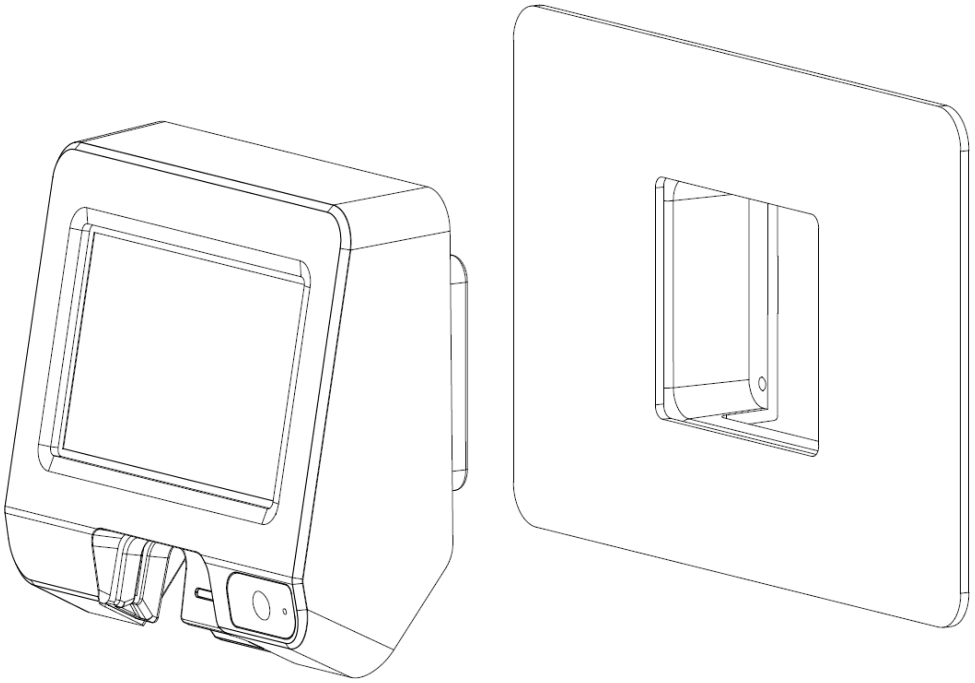

Figure 25 inserting the IM20 unit into the front of the mounting plate

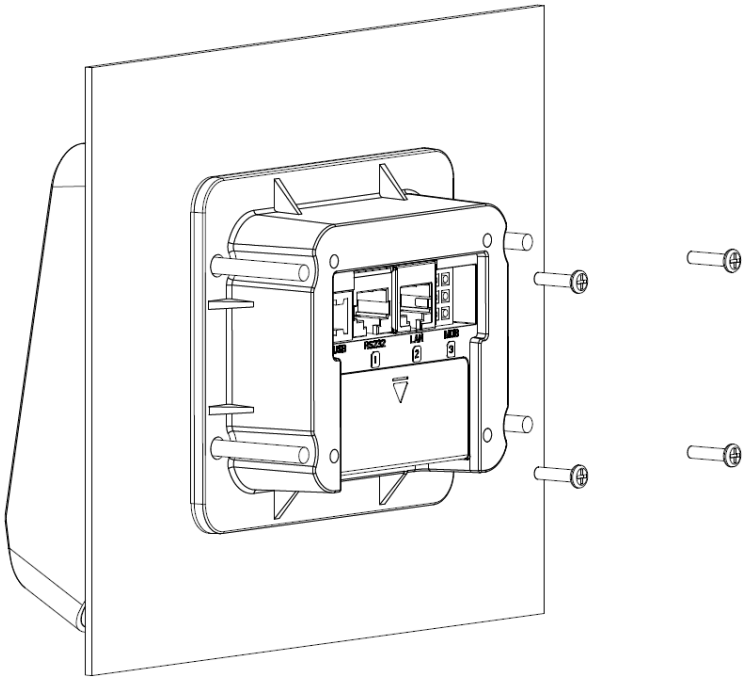

Figure 26 securing the IM20 unit in place with the four M3 screws

5 Product Services

5.1 FAQ

display

Q:	Why is screen so bright/dim?
A:	The brightness of the screen be adjusted; the level of illumination provided by the backlight can be changed in the device settings.

Q:	Why is the screen blank after startup?
A:	If the PAX logo appears during the startup procedure, check that whatever applications installed into the device are operating properly. If the PAX logo does not appear, contact an agent from your local vendor to repair the device.

touchscreen

Q:	What should I do if the touchscreen is unresponsive or begins lagging?
A:	First confirm that the surface of the screen is free from liquids, if there is a protective plastic film over the screen, remove that as well before attempting to use the device again. Check to see if there are any metallic objects touching the screen and if there is a source of magnetic waves near the device. If there are, remove the metallic objects and keep the device away from any sources of magnetic waves before attempting to use it again.

camera and code scanner

Q:	What should I do if the code scanner is not working?
A:	Confirm that the code you are scanning is placed properly with the locator light next to the camera, and maintain a distance of approximately 10 cm from the camera lens. Also make sure that the barcode or QR code being scanner is not covered, stained, or otherwise damaged. If there are signs of damage, replace the code being scanned. Check to see if the camera lens is clean, if there is a protective plastic film over the lens, remove that as well before attempting to use the camera again. If reading the code off of an electronic display, increase the resolution or screen brightness before attempting to read the code again. If there is no damage to the code, it's possible that the device does not support the code you are attempting to scan, in which case you should contact an agent from your local vendor for possible solutions.

card readers

Q:	What should I do if the smart card reader is not working?
A:	First check to see if the smart card has been inserted fully and oriented properly, the proper use of the smart card reader is outlined in 2.2.6. Also check the metallic contacts on the smart card for signs of corrosion or other damage and attempt to use another card to determine whether the problem is a defective card. Then check the card reader to see if there is foreign matter clogging the card reader slot, the card reader can be cleaned using standard cleaning cards to prevent buildup of dirt and debris. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q:	What should I do if there a transaction error when using a smart card?
A:	If a smart card is properly read by the card reader but the device indicates that there is a transaction error or that the card is not supported, attempt to use another card for the transaction instead or consult the service provider that issued that card to resolve the problem. Before attempting to use a smart card, make sure that the device is not near any object producing a strong electromagnetic field. Such conditions may interfere with the device when it attempts to read the smart card.

Q:	What should I do if the contactless card reader is not working?
A:	First check to see if the card or device being used has contactless functionality. If it does, then make sure the card or device is placed and oriented properly, the proper use of the contactless card reader is outlined in 2.2.7. Also avoid placing the device near metallic objects or nearer than 20 cm to another device with a contactless card reader. Afterwards, attempt to read another contactless card to determine whether the problem is a defective card. Last of all manually enter the card information to process the transaction and confirm that the device has malfunctioned. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q:	What should I do if the magnetic strip card reader is not working?
A:	First check to see if the magnetic strip card has been oriented and read properly, the proper use of the magnetic strip card reader is outlined in 2.2.6. Then attempt to use another card for the transaction instead to determine whether the problem is a defective card. Last of all manually enter the card information to process the transaction and confirm that the device has malfunctioned. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q:	What should I do if there a transaction error when using a magnetic strip card?
A:	If a magnetic strip card is properly read by the card reader but the device indicates that there is a transaction error or that the card is not supported, attempt to use the IC card reader for the transaction instead or consult the service provider that issued that card to resolve the problem. Before attempting to use a magnetic strip card, make sure that the device is not near any object producing a strong electromagnetic field. Those conditions may interfere with the device when it attempts to read the magnetic strip card.

Q:	What should I do if the device does not detect a SAM card?
A:	First confirm that a SAM card has been installed into the terminal. Then check to see if the card is damaged or if the contacts are tarnished. If the contacts are dirty, clean them and check whether that resolves the problem. Lastly, check to see if the SAM card is properly mated with the device, attempt to use another card to see if that resolves the problem.

communication modules

Q:	What should I do if the USB port is not working?
A:	First confirm that there are no foreign objects present in the USB port and that the USB cable is fully plugged into the port. Also make sure that the cable used follows USB specifications, attempt to use another cable if possible. Check to see if the USB drivers are present and up to date.

Q:	What should I do if there are errors while using the USB port?
A:	Use the USB cable packaged with the IM20 unit instead of a third party cable. Do not use an USB hub, directly attach the cable to whatever device is being linked.

Q:	What should I do if there are errors while using the Wi-Fi module?
A:	First confirm that the Wi-Fi module and the router is turned on, and that the router is broadcasting a signal with sufficient strength. Then check that the network setting is compatible with the device you wish to use (the IM20 uses DHCP). Make sure that the name and password of the network you are attempting to connect to are both correct. Check to see if the network you are attempting to connect to only accepts preset IP or MAC addresses; if so, add the IM20 to the list of devices allowed on the network. You can determine if an error with that specific router or network by attempting to connect to another network instead. If the device is connected to a network but there is no internet access, check that the network is connected to the internet. Finally, you can attempt to place the device closer to the router or restart the device and attempt to connect to the network again.