



SATURN 8700 Specifications

Version 1.3

Notice



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FCC Compliance

This device (Saturn 8700) 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

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15, subpart C 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.

Changes or modifications in this equipment, not expressly approved by the party responsible for compliance (On Track Innovations Ltd,) could void the user's authority to operate the equipment.

FCC ID: JNX-OTI-SAT8700

Responsible Party:

On Track Innovations LTD..

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Revision history

Version	Description	Date
1.1	First version	28-June-2016
1.2	Updated photos, dimensions and technical specifications	10-July-2016
1.3	Add official models names (RS232, USB) at page 12. Minor text modifications.	11-July-2016

1 Introduction

The SATURN 8700 is an ultra-compact, certified payment NFC Reader based on oti's field proven technology which is specifically designed for payment and mass transit applications. Its compact design enables easy integration and installation in unattended self-service payment stations, such as ATMs, AVMs, TVMs, gaming and gambling machines, kiosks, access control gates and more.

The SATURN 8700 supports two SAM slots allowing the reader to access its own or external security elements such as Mifare Authentication SAM.

The SATURN 8700 is designed to be seated on any counter as an attended reader or alternatively can be installed as part of an unattended vending or service machine.

Three mounting options are available, PM (Panel Mount), FM (Flush Mount) and CM (Countertop Mounting), supporting various add-on mounting requirements.

SATURN 8700's plug-and-play design makes it easy to connect to any existing infrastructure and POS terminal, quickly upgrading it to contactless operations without disrupting ongoing business operations. In its USB configuration, the SATURN 8700 is USB powered, this option contributes to the easy installation and maintenance of the reader.



Figure 1-1: SATURN 8700 (PM)

1.1 Certified and Supported Applications

The SATURN 8700 is certified and supports the following contactless applications:

- **EMV**
 - Contactless EMV L1
- **VISA**
 - EMVCo L2 Book C-3 Kernel 3
- **MasterCard**
 - EMVCo L2 Book C-2 Kernel 2
- **American Express**
 - EMVCo L2 Book C-4 Kernel 4
- **Discover**
 - Discover ZipNetwork
- **Interac**
 - Interac Flash
- **SoftCard**
 - SoftCard (ISIS) SmartTap
- **Apple Pay**
- **Android Pay**
- **Mifare**
 - Mifare Ultralight
 - Mifare Classic
 - Mifare DESFire
- **Transparent (Pass-Through) Communication**
 - ISO/IEC 14443 Type A - Transparent Proximity
 - ISO/IEC 14443 Type B - Transparent Proximity
 - ISO/IEC 15693 Vicinity (optional) - Transparent Vicinity
- **Felica**
 - Felica JIS: X6319-4
- **NFC IP1 ISO 18092**
 - Initiator
 - Target (active only)
- **Other**
 - Additional proprietary applications



1.2 Supported Standards

The SATURN 8700 is compatible with the following standards:

- FCC
- CE
- UL
- RoHS compliance
- ISO 9001: 2008
- ISO/IEC 18092 NFC IP1
- ISO/IEC 14443 Proximity Type A&B
- ISO/IEC 15693 Vicinity
- Mifare
- MasterCard TQM label
- IPX5



2 Basic Contactless Operation

When a valid contactless payment card is presented to the reader, the reader performs a payment transaction with the contactless card. If the transaction is accepted, the unit will display a row of 4 LEDs that light up in sequence and the reader buzzer will inform the user about the transaction verdict. The reader then communicates the transaction data to the Host (POS).

A landing zone logo, lighted by the reader, on the graphic overlay indicates where the contactless card or tag should be presented.

The interactive LEDs and Buzzer give the user an indication of the transaction status.



Figure 2-1: SATURN 8700 landing zone and LEDs

3 Technical Specifications

3.1 Product Features

General

- Flexible, software configurable, certified intelligent reader solution
- oti advanced Host – Reader TLV based protocol
- Contactless transparent communication support
- Modular design by Hardware and Software
- Tamper-proof remote software update
- Available as OEM

RF Interface

- Bi-directional RF interface between Reader and Contactless devices
- Carrier frequency: 13.56 MHz
- Data rate: Up to 848Kbs

Communication Links

- USB 2.0 – full speed, CDC, mini USB connector
- RS 232, 8 data bits, no parity, 1 stop bit, full 8-bit binary data. Client defined baud rate

Connectors:

Either a JST 10 pin ZPD interface, located in the back of the reader and contains a Power, RS232, USB and External buzzer lines.

Or a mini USB connector located at the back of the reader and supports USB only. In this configuration the reader is 5VDC USB powered.

User Interface

- Push Button: x2
- 4 Payment indication LEDs: Monochrome
- Contactless logo: RGB
- Audio: Speaker
- IN/OUT Signals:
 - Audio OUT
 - Digital IN
 - Digital OUT

Power Requirements

- 8VDC - 40VDC (Onboard Switch Mode Power Supply) or 5VDC via USB connector

Max power consumption

- Less than 3W (RF signal on) with 8-40VDC supply
- Less than 2.5W (RF signal on) with 5VDC supply from USB bus

SAM Interface

- Two micro SIM Slots

Security

- High security encryption system (3DES/AES/RSA) protects the reader's operating system
- Vandalism-proof PKI protected software update mechanism
- DUKPT (Derived Unique Key Per Transaction) support
- Offline PIN Authentication support
- Secure boot loader (firmware update) protocol

3.2 Product Technical Specifications

The performance/electrical specifications for each feature of the SATURN 8700 reader are given in the table [below](#).

Table 3-1: Performance/Electrical Specifications

Feature	Specification
■ RF Interface:	
RF Carrier Frequency	13.56 MHz
RF Output	450mW (@50ohm load)
■ Micro SIM push-push Interface	
■ Communication Links:	
USB, RS232	
■ USB:	
2.0 Full speed	CDC
■ Connectors	
USB only	Mini USB connector
Full interface	JST 10 pin P/N BM10B-ZPDSS
■ Indicators:	
Monochrome LED	Four programmable on-board LEDs
RGB LED	Contactless logo illumination
Audio speaker	Multi tone differential drive buzzer
■ Electronic Board Power Requirements:	
8VDC – 40VDC, Pmax<3W	On-board switching power supply
5VDC, Pmax<2.5W	From USB bus in USB only
■ Mechanical:	
Dimensions (On panel / Flush) (See Figure 5-1 and Figure 5-2)	H – 78.6 / 85.4 mm W – 61.0 / 67.8 mm D – 21.3 / 21.3 mm
Weight	125 gr.
■ Temperature:	
Operating	-20°C to 70°C (-4°F to 158°F)
■ Environment:	
IP rating	IPX5
Vibrations	10 ÷ 200 Hz @ 2.0G
Static pressure	Front panel: >50N/cm ² Side panels: >100N/cm ²



Warning: Power supply minimum requirements

Keeping the DC supply voltage within the specified allowed range is crucial to guarantee proper operation of the equipment. The use of AC rectified power supply source, which is not properly filtered, forms a risk of too low voltage dips and hence should be avoided. It is highly recommended to check this issue with proper tools (e.g. oscilloscope) during the reader installation. For more details contact **oti** technical team via **oti**'s sales representatives.

4 Reader models

4.1 SATURN 8700 RS232

The RS232 interface is implemented using a JST 10 pin connector (JST P/N BM10B-ZPDSS).

Connector pin designation:

1. RS223 Rx
2. RS232 Tx
3. USB D-
4. Buzzer 1
5. USB D+
6. Buzzer 2
7. GND (direct)
8. Vin
9. 5V
10. GND Ext (via common mode choke)

Note: USB communication and external buzzer activation are not in OTI's standard products portfolio.

4.2 SATURN 8700 USB

The USB model has a mini-USB connector on the back in the panel mount options or at the bottom of the reader in the desk top models. The USB connector provides communication and power to the reader.

Note: Both models are available in either PM or FM housing options. The CM housing support only the USB model.

4.3 Interface cables

4.3.1 RS232 cable

A JST 10 pin connector (JST P/N BM10B-ZPDSS) is available to access the reader full interface.

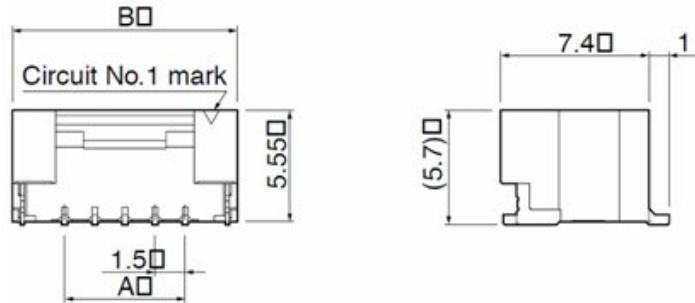


Figure 4-1: BM10B-ZPDSS Connector – Top Entry Type

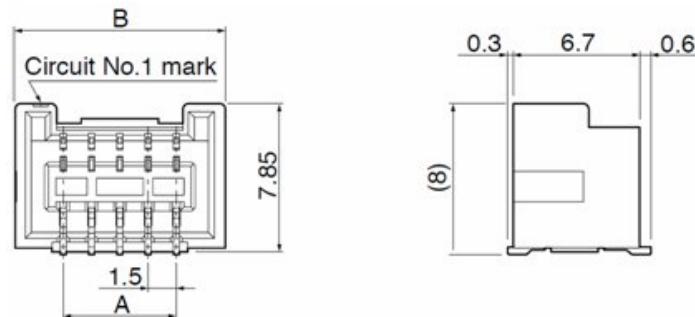


Figure 4-2: BM10B-ZPDSS Connector – Side Entry Type

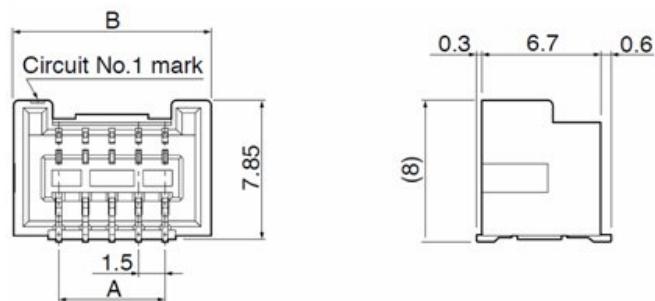


Figure 4-3: BM10B-ZPDSS Connector housing

4.3.2 USB Cable

The USB cable (1.8m) has a mini-USB upstream connector on the reader side and a USB downstream connector on the host side.

In this hardware configuration, the reader is USB powered, no additional power supply is required.

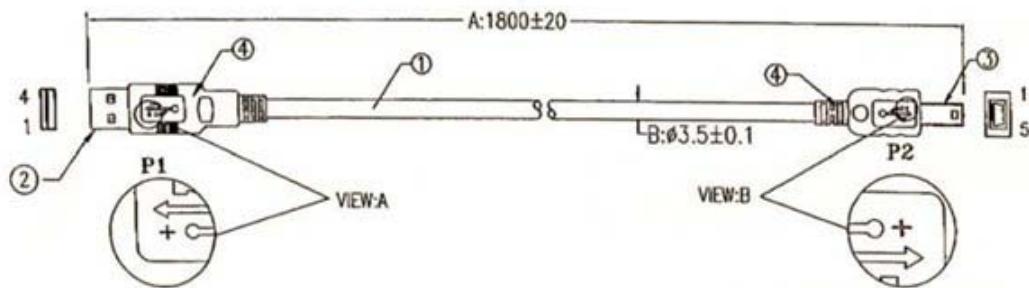


Figure 4-4: USB Cable

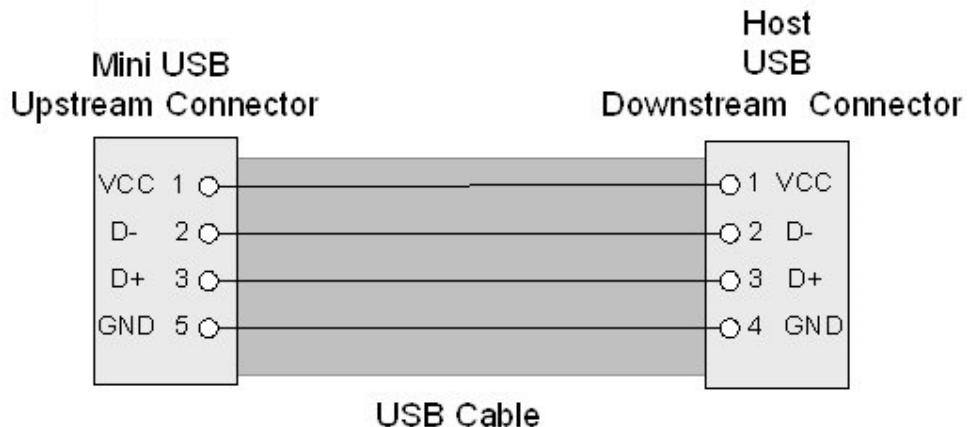


Figure 4-5: USB Connection

5 Dimensions

The reader's front and side view dimensions are given in this chapter.

All the dimensions are in millimeters.

5.1 On Panel dimensions

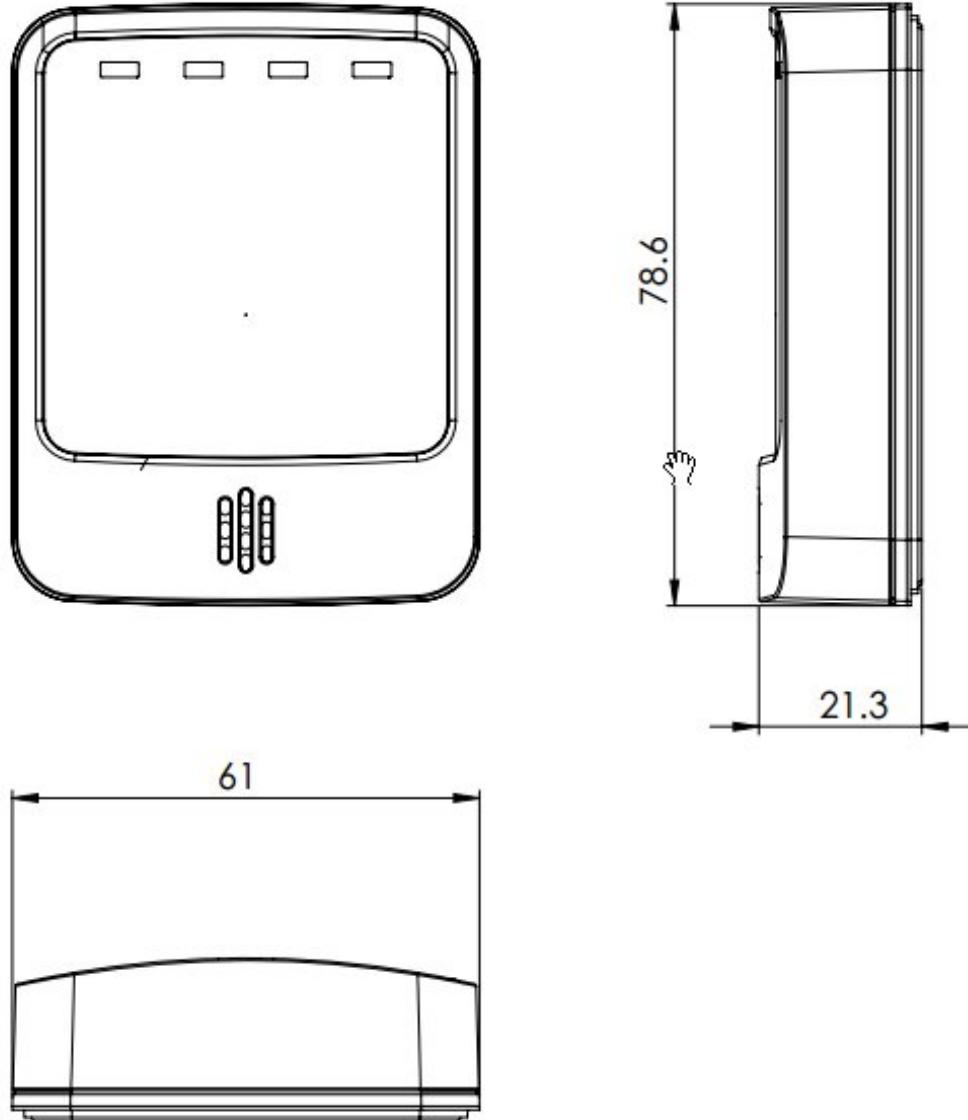


Figure 5-1: On Panel dimensions

5.2 Flush mount dimensions

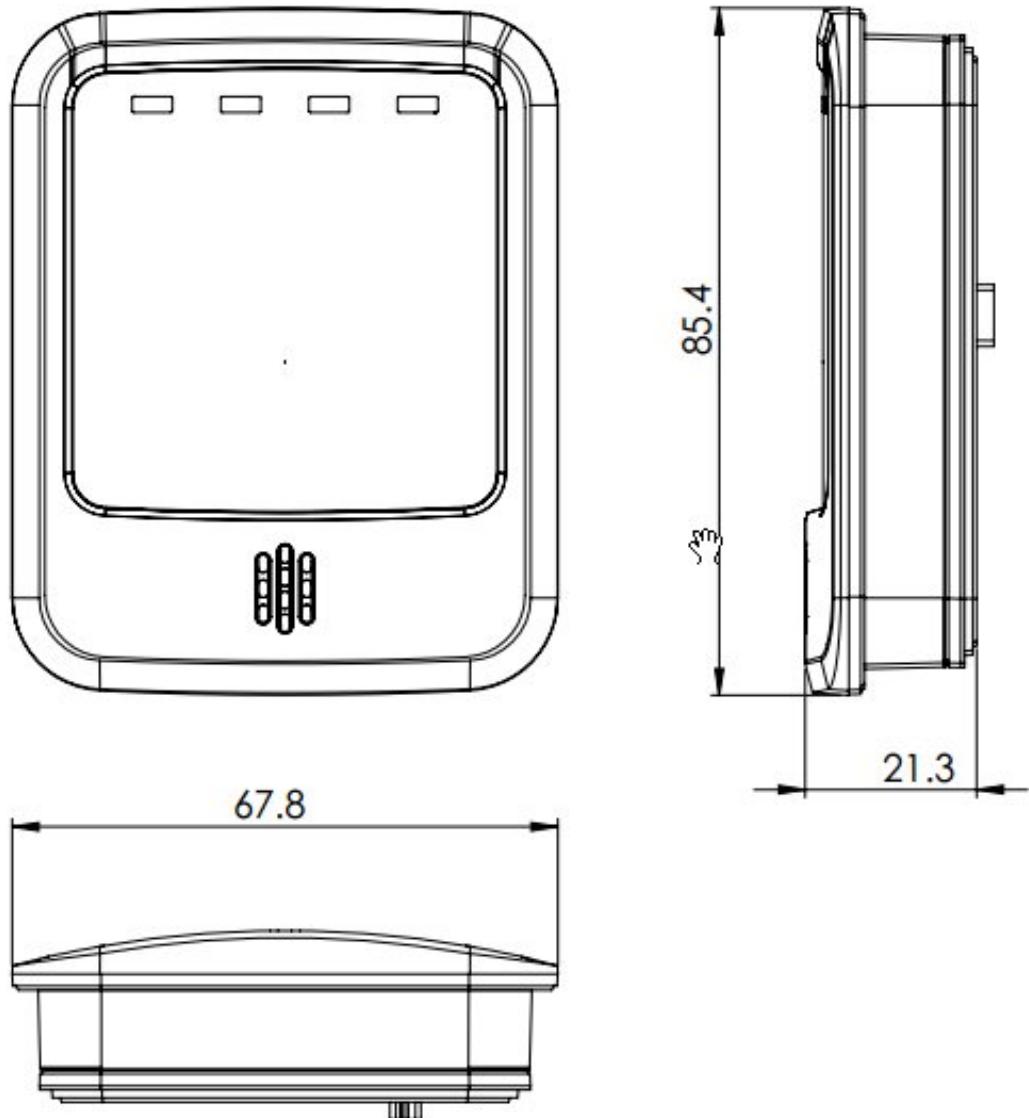


Figure 5-2:: Flush mount dimensions



Figure 5-3: SATURN 8700 Size Scale

6 SATURN 8700 Mounting

While the SATURN 8700 can be placed simply on the counter as a countertop reader connected to a terminal. It can also be mounted on an unattended devices such as ATM's and Vending Machines. This chapter describes the mounting options and procedures.

The SATURN 8700 mounting possibilities include 3 main options, as illustrated below:

1. **PM** - on panel mounting. **Rear RS232/USB cable connection.**
2. **FM** - flush mounting inside cutout in the panel. **Rear RS232/USB cable connection.**
3. **CM** - Countertop (Desktop) mounting. **PM with side USB cable connection.**

Different reader configuration allow mounting on the machine surface, flush with the machine surface or on the counter.



Figure 6-1: Flush and On Panel Mounting



Warning: Mounting on metal

Direct mounting of the reader on metallic/conductive panel requires special attention as it negatively affects the reader contactless performance. For more details contact **oti** technical team via **oti**'s sales representatives.

6.1 On Panel Mounting

The image below illustrates the SATURN 8700's on panel mounting option.

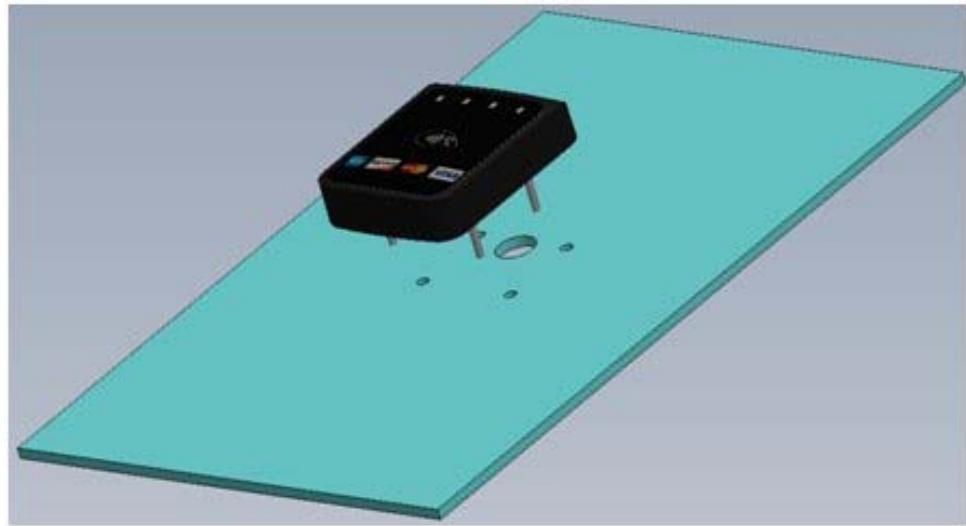


Figure 6-2: SATURN 8700 Mounting Studs

1. The SATURN 8700 is equipped with 4 mounting studs for front panel mounting.
2. The studs and cable are inserted through holes in the front panel. The nuts are fastened over the studs from the back of the front panel, protecting against potential attempts to dismantle the unit from the front.



Figure 6-3: SATURN 8700 Panel Mounting view

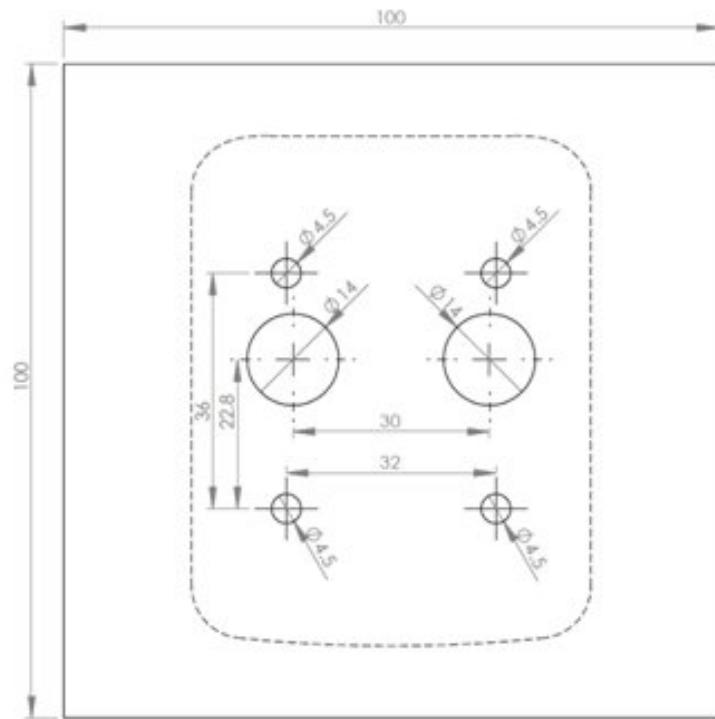


Figure 6-4: SATURN 8700 Panel Mounting Drilling Template

6.2 Flush Mounting

The image below illustrates the SATURN 8700's flush mounting option.



Figure 6-5: SATURN 8700 Flush Mount

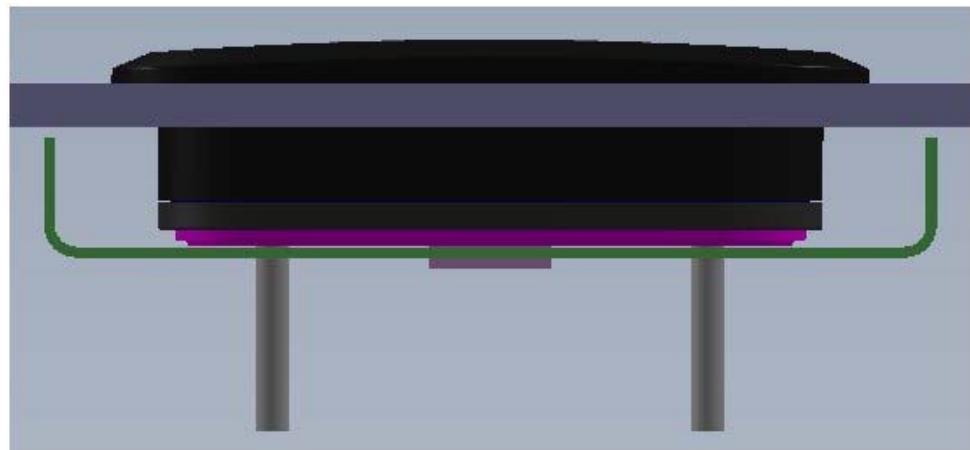


Figure 6-6: SATURN 8700 Flush Mounting – Top View

1. The SATURN 8700 can be mounted flush with the front panel surface.
2. The flush mounting option requires a 63x80 mm cutout in the center of the non-metallic section of the front panel.
3. A mounting holder (green) in the back of the reader is tighten the device to the panel. A gasket that is separated between the device cover and the panel keep it waterproof.



Figure 6-7: SATURN 8700 Flush Mounting – Side View



Figure 6-8: SATURN 8700 Flush Mounting – Rear View

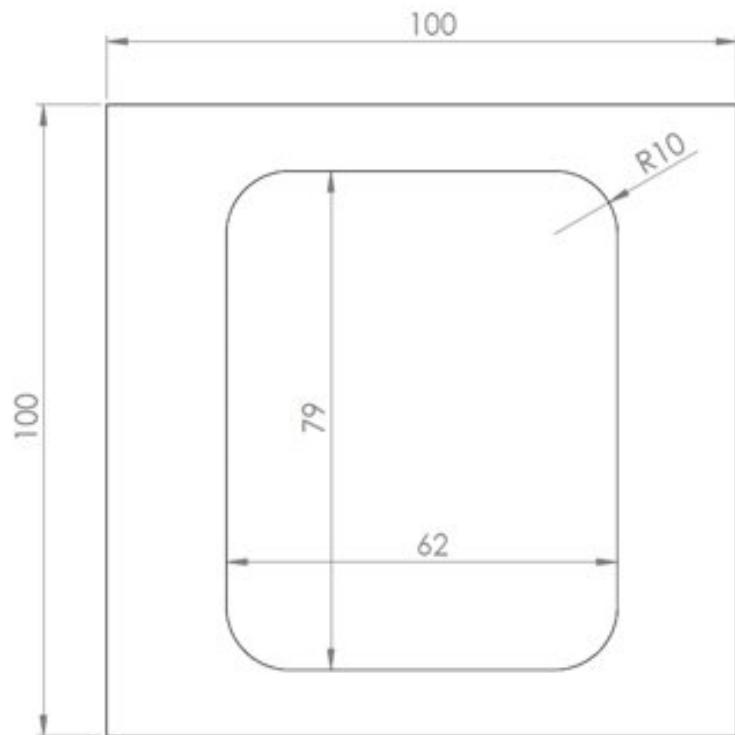


Figure 6-9: SATURN 8700 Flash Mounting - Cutout

7 Contact Us

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