Televend POS

User journeys and API description

Version 1.7

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Table of Contents

1 Document history 3
2 Abstract 4
3 Televend POS 5
4 Scenarios 6
4.1 Purchase on Televend POS 6
4.1.1 Timeouts 7
4.1.2 Payment method rejected 8
4.1.3 No connection to Televend Cloud 9
4.2 Payment reversal (Storno) 10
4.3 Account recharge 10
4.4 Onboarding 11
4.5 Balance check 11
4.6 Payout 11
5 API description 12
5.1 Interface Initialization 12
5.2 Interface deinitialization 12
5.3 Status polling 12
5.4 Customer pricing group 13
5.5 Authorization request 13
5.6 Request cancellation 14
5.7 Authorization callback 14
5.8 Payment reversal (Storno) 15
6 Deliverables 16

1 Document history

Version	Date	Author(s)	Change
0.1	October 16, 2019	Tea Jerman	First version. Intro and scenarios added.
0.2	October 18, 2019	Danijel Gorupec	Added API description.
0.3	October 21, 2019	Tea Jerman	Added details to scenario that includes Televend POS (purchase).
0.4	October 21, 2019	Dubravko Hendija	Added parameters in callback function to support discounts
0.5	October 22, 2019	Tea Jerman	Added details for payment reversal scenario. Updated details for authorization callback function. Removed finalization function. Added storno function.
1.0	December 2, 2019	Tea Jerman	Added deliverables and project timeline (chapter 6 & 7).
1.1	May 28, 2020	Danijel Gorupec	Added customer pricing group (5.4) and Interface deinitialization (5.2).
1.2	June 24, 2020	Danijel Gorupec	Updated chapters 5.5 and 5.6
1.3	July 2, 2020	Danijel Gorupec	Updated chapter 5.6
1.4	August 13, 2020	Danijel Gorupec	Updated chapter 5.7
1.5	October 13, 2020	Danijel Gorupec	Updated chapters 5.7 and 5.8
1.6	November 16, 2020	Danijel Gorupec	Updated chapter 5.4
1.7	July 29, 2021	Romana Rožić	Updated chapters 5.4, 5.5 and 5.7
1.8	November 29, 2021	Romana Rožić	Updated chapter 5.7

2 Abstract

Location owner would like to enable their employees to buy products on vending machines and in the canteen with RFID cards, mobile app and bank cards.

This document describes Televend POS solution that would be connected to the cash register and in addition to Televend Box connected in the vending machines provide all of the above-mentioned services.

3 Televend POS

Televend POS is a single box that integrates telemetry box, payment terminal, Bluetooth connectivity and NFC card reader. It should be connected to the power supply (220V) and it should be connected to the cash register by a serial connection (RS232). Televend POS is put on counter next to cash register. Televend DLL is software library for Windows which is integrated into the cash register so the cash register can initiate payment requests when cashier wants to charge customer.

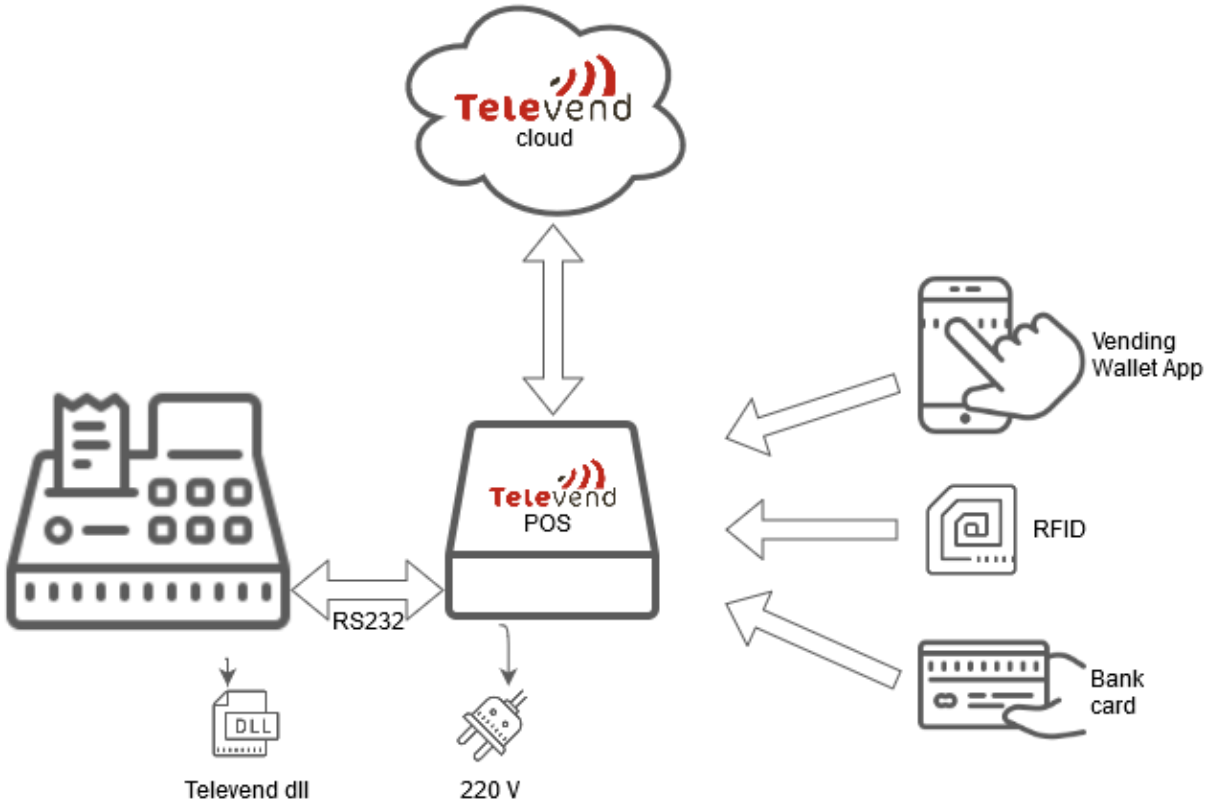

Figure 1

4 Scenarios

4.1 Purchase on Televend POS

Purchase can be used on cash register using:

- Televend Wallet mobile application
- Televend Wallet RFID closed loop card (HF 13.56MHz, optional LF 125kHz)
- Contactless NFC bank card (phase 2)
- Open loop mobile wallets (phase 2)

Following steps describe a successful purchase:

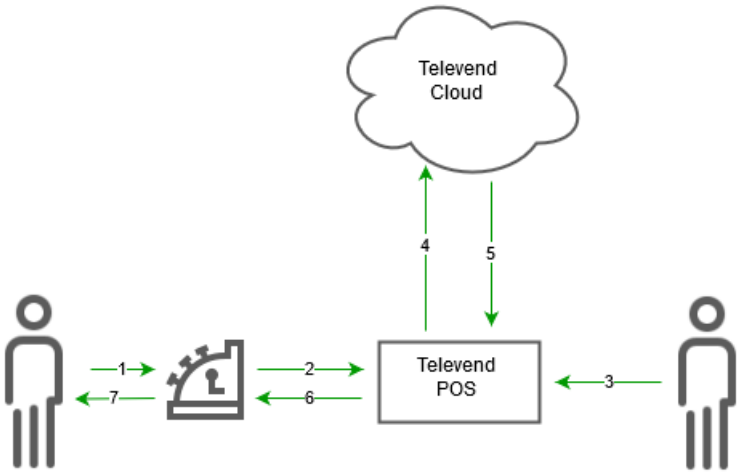

Figure 2

1. Cashier scans all products to get total price that needs to be paid and chooses cashless payment on the cash register.
2. Cash register sends the request for payment to Televend POS. Televend POS is now active and waits for user to tap with mobile, RFID or bank card.
3. User taps Televend POS with mobile, RFID or bank card.
4. Televend POS sends authorization and payment request to Televend cloud.
5. Televend Cloud replies with success.
6. Televend POS forwards success message to cash register.
7. Cash register prints out the receipt.

User can receive a discount for the purchase done via Televend POS. In that case, Televend POS will send the discounted price that was charged so it can be shown on the receipt.

Chapters 4.1.1 to 4.1.3 describe possible exceptions.

4.1.1 Timeouts

Televend POS has 35 seconds in total to complete the purchase. That includes time needed for the user to tap Televend POS with selected payment method and time needed for Televend POS to communicate with Televend cloud.

We propose that we reserve 20 seconds for user action and 15 seconds for communication between Televend POS and Televend cloud, but this can be discussed and configured differently.

If user doesn't tap Televend POS in 20 seconds, there will be a timeout:

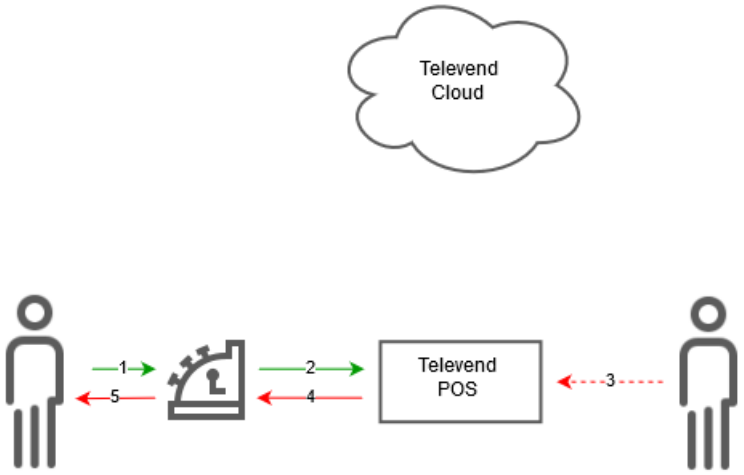

Figure 3

1. Cashier scans all products to get total price that needs to be paid and chooses cashless payment on the cash register.
2. Cash register sends the request for payment to Televend POS. Televend POS is now active and waits for user to tap with mobile, RFID or bank card.
3. User doesn't tap Televend POS with mobile, RFID or bank card in 20 seconds.
4. Televend POS sends timeout error to cash register.
5. Cash register displays an error.

Another case of timeout is when Televend POS doesn't receive a response from Televend Cloud for 15 seconds:

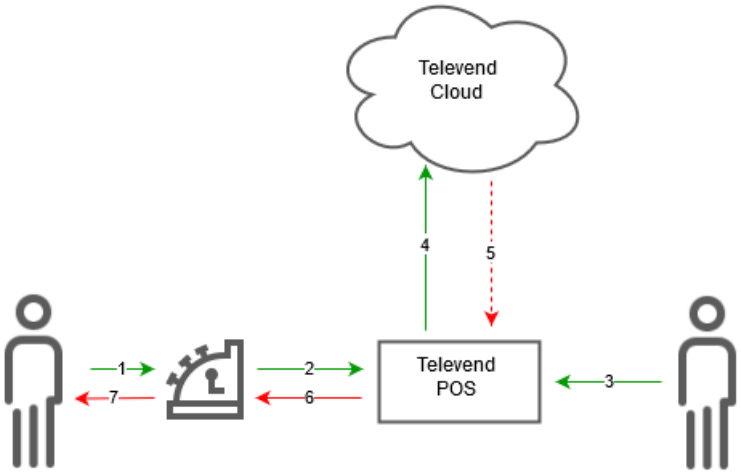

Figure 4

1. Cashier scans all products to get total price that needs to be paid and chooses cashless payment on the cash register.
2. Cash register sends the request for payment to Televend POS. Televend POS is now active and waits for user to tap with mobile, RFID or bank card.
3. User taps Televend POS with mobile, RFID or bank card (before 20 second time-out).
4. Televend POS sends authorization and payment request to Televend cloud.
5. Televend Cloud doesn't reply in 15 seconds.
6. Televend POS sends timeout error to cash register.
7. Cash register displays an error.

4.1.2 Payment method rejected

In some cases, Televend Cloud can reject payments request, for example:

- RFID is not registered in Televend Cloud,
- Insufficient funds in account,
- Account is blocked.

Following steps describes the flow in such scenarios:

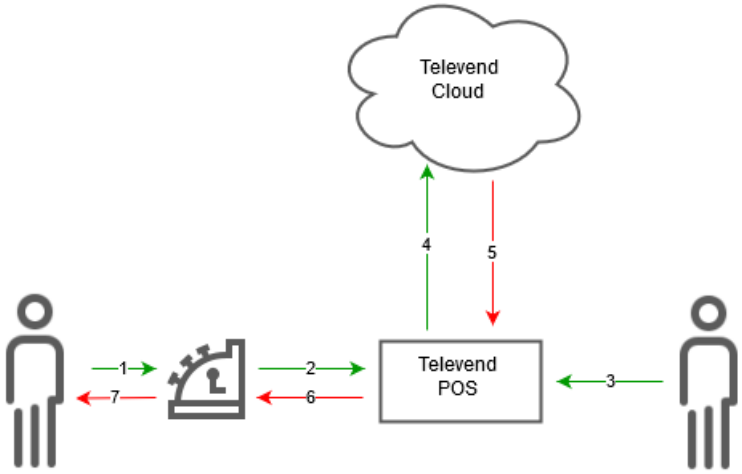

Figure 5

1. Cashier scans all products to get total price that needs to be paid and chooses cashless payment on the cash register.
2. Cash register sends the request for payment to Televend POS. Televend POS is now active and waits for user to tap with mobile, RFID or bank card.
3. User taps Televend POS with mobile, RFID or bank card.
4. Televend POS sends authorization and payment request to Televend cloud.
5. Televend Cloud denies authorization or payment request.
6. Televend POS forwards fail message to cash register.
7. Cash register displays an error.

4.1.3 No connection to Televend Cloud

In case Televend POS is offline and can't reach Televend Cloud, it will automatically send fail message to cash register:

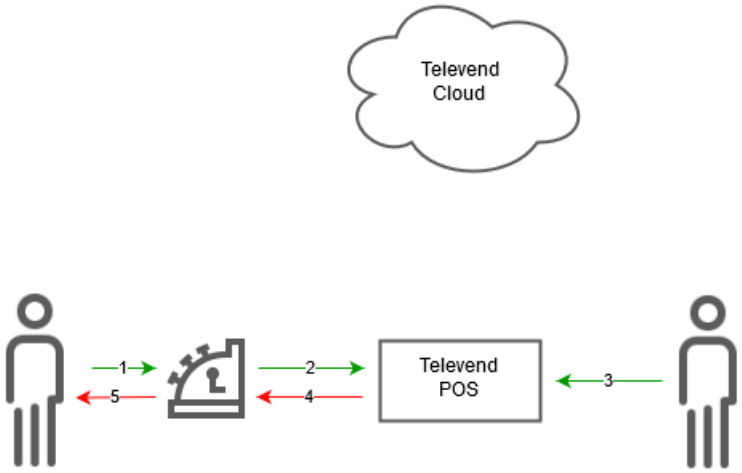

Figure 6

1. Cashier scans all products to get total price that needs to be paid and chooses cashless payment on the cash register.
2. Cash register sends the request for payment to Televend POS. Televend POS is now active and waits for user to tap with mobile, RFID or bank card.
3. User taps Televend POS with mobile, RFID or bank card.

4. Televend POS sends fail message to cash register because it is offline.
5. Cash register displays an error.

Televend POS will exceptionally allow one payment with RFID in offline mode. Other payment methods will be rejected just as other attempts of paying with RFID.

4.2 Payment reversal (Storno)

After a successful purchase, it is possible to request a payment reversal:

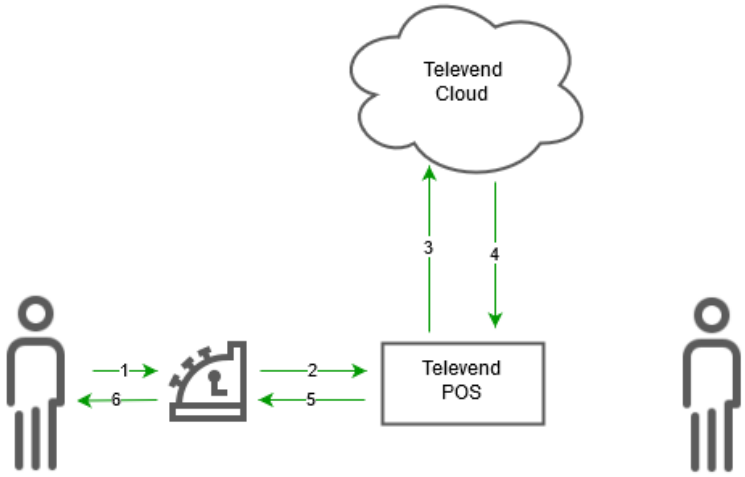

Figure 7

1. Cashier requests payment reversal on cash register.
2. Cash register sends the request for reversal to Televend POS.
3. Televend POS send payment reversal request to Televend Cloud.
4. After Televend Cloud does the reversal, it responds with success message.
5. Televend POS forwards success message to cash register.
6. Cash register prints out the receipt.

4.3 Account recharge

Account recharge can be done:

- Using Televend Wallet mobile application
  - By bank card within app
  - By cash or bank card on vending machines
- Using Televend Wallet enabled RFID
  - By cash or bank card on vending machines

4.4 Onboarding

User account can be created by:

- Registering with valid email in Vending Wallet mobile application,
- Tapping RFID on vending machine,
- Manually adding a new RFID account through Televend Wallet Web application by Seeberger.

4.5 Balance check

Account balance can be checked:

- Using Vending Wallet mobile application,
- By tapping RFID on vending machine (machine will display balance),
- At HR/reception desk using Televend Wallet Web application.

4.6 Payout

In case of closing an account, the remaining amount in the account can be paid out to user in cash on HR/reception desk using Televend Wallet Web application.

Before payout, user must be authenticated. Process is yet to be defined.

5 API description

A simple API proposal to interface the Televend Cashless POS is sketched here.

The Televend Cashless POS device is connected to the host (a Windows PC) over an RS232 cable.

The interface is implemented in a single Windows DLL file. The DLL should have sufficient running rights to control one serial port and to run one thread. Memory and CPU usage are expected to be insignificant.

5.1 Interface Initialization

This function must be called first. It should be called only once after the DLL is loaded.

Function prototype:

```
int TelevendInit (int serial_port_number, TelevendCallback callback);
```

Parameters:

- serial_port_number - the serial port used by the DLL (example: 3 -> 'COM3')
- callback - pointer to a function that will receive payment authorization approval/denial

Return values:

- 0 - initialization OK
- 1 - initialization failed

5.2 Interface deinitialization

This function can be used to de-initialize the interface.

Function prototype:

```
void TelevendDeinit(void)
```

5.3 Status polling

This function can be called at any time to receive the current status of the Televend Cashless POS system.

Note: Use of this function is optional.

Function prototype:

```
int TelevendStatus(void);
```

Return values:

- 0 - idle
- 1 - approving
- 2 - waiting finalization
- -1 - not initialized
- -2 - no communication

5.4 Customer pricing group

This function may be called to obtain additional information customer pricing group, his available credit and his identification number. The function will start returning this data after the customer has tapped his card or established a mobile app session. Usually, the cash register will frequently poll this function to check whether the customer has presented his card/mobile.

Function prototype:

int TelevendGetPricingGroup(unsigned int *AvailableCredit, unsigned uint64_t *CardID)

Parameters:

AvailableCredit - pointer to unsigned int (32-bit) variable that receives customer available credit. Not all payment medias can return this data - in this case it can be set to 0 (credit not known) or 0xFFFFFFFF (credit hidden).

CardID - point to unsigned int (32-bit) variable that receives card identification number. Not always available - in this case it might be shortened or zero.

Return values:

-1 - not initialized

-2 - no communication

-4 - pricing group unknown/not-available

1...5 - customer pricing group (1-5)

5.5 Authorization request

This function is called to request the payment authorization. It is typically called immediately after the cashier selects a cashless payment option.

Function prototype:

int TelevendRequest(*int* amount);

Parameters

amount - the requested amount in minimal monetary units (for example 100 = 1.00 EUR).

The amount can also be a negative number when a negative vend (customer's

account recharge) is requested.

Return values:

- 0 - request accepted (the callback function will be called for approval/denial)
- -1 - not initialized
- -2 - no communication
- -3 – busy

Note: For statistical purposes, this function should be called, with amount 0, even if POS gives a 100% discount sale.

5.6 Request cancellation

This function can be called to cancel an authorization request.

Note: This function can also be called after the customer presented his/her card, but before the authorization was requested - in this case the pending payment session will end.

Function prototype:

void TelevendCancel(*void*);

5.7 Authorization callback

The DLL will call this callback function to approve or deny the authorization request. The callback function will be called in less than 35 seconds after the request was made.

Function prototype

void (*TelevendCallback)(int result, int payment_type, int discount, int total_amount, uint64_t transactionID);

Parameters:

- result
    - 0 - payment approved
    - -1 payment authorization timeout
    - -2 payment authorization rejected - not enough credit
    - -3 no response from the Televend box (local communication failure).
    - -4 payment canceled by user
    - -5 to -8 – reserved for future use
    - -9 – payment denied with unspecified reason
- payment_type
    - 0 – close loop mobile wallet
    - 1 – close loop RFID card
    - 2 – open loop payment (bank card, Apple pay, Google pay)
- discount
    - the amount discounted due to promotions or loyalty program
- total_amount
    - total amount of purchase (amount charged plus discounted amount)

- transactionID
  - 64-bit reference number given by Televend Cloud; this is used in case of payment reversal

5.8 Payment reversal (Storno)

This function is called by host to reverse the original transaction.

Function prototype:

```
int TelevendStorno(uint64_t transactionID);
```

Parameters:

- Transaction ID
  - 64-bit reference number of original transaction (given by Televend Cloud) that needs to be reversed.

Return values:

0 – OK (reversal done)

-1 – not OK (reversal unsuccessful)

-2 - not OK (no communication with the Televend box)

-3 - not OK (busy; authorization still in progress)

6 Deliverables

1. DLL (PC)
2. Test app PC
3. FW with support for DLL
4. POS232 cable
5. Mifare test cards
6. Televend AC/DC power cable
7. Tpay01 (high-frequency Mifare)