Documentation Cashregister Sales.

Database cashregister:

```
cashregister=# \d
          List of relations
 Schema |   Name   | Type  |  Owner
--------+----------+-------+----------
 public | accounts | table | postgres
 public | articles | table | postgres
 public | buttons  | table | postgres
 public | loss     | table | postgres
 public | params   | table | postgres
 public | payments | table | postgres
 public | sales    | table | postgres
(7 rows)

cashregister=# \d accounts
                        Table "public.accounts"
  Column   |         Type          | Collation | Nullable |        Default
-----------+-----------------------+-----------+----------+-----------------------
 barcodeID | character varying(8)  |           | not null |
 firstname | character varying(20) |           |          | ''::character varying
 lastname  | character varying(30) |           |          | ''::character varying
 access    | integer               |           |          | 1
 callname  | character varying(20) |           |          | ''::character varying
Indexes:
    "barcodeID_pkey" PRIMARY KEY, btree ("barcodeID")
```

```
cashregister=# \d articles
                                Table "public.articles"
       Column        |         Type          | Collation | Nullable |          Default
---------------------+-----------------------+-----------+----------+---------------------------
 barcode             | character varying(13) |           | not null |
 description         | character varying(50) |           |          | ''::character varying
 item_price          | double precision      |           |          | 0
 item_stock          | double precision      |           |          | 0
 item_unit           | character varying(6)  |           |          | ''::character varying
 minimum_stock       | double precision      |           |          | 0
 order_size          | double precision      |           |          | 0
 location_warehouse  | character varying(8)  |           |          | ''::character varying
 article_group       | character varying(40) |           |          | ''::character varying
 thumbnail           | character varying(50) |           |          | ''::character varying
 category            | integer               |           |          | 0
 order_balance       | double precision      |           |          | 0
 order_status        | boolean               |           |          | true
 mutation_date       | character varying(10) |           |          | ''::character varying
 annual_consumption_1 | double precision     |           |          | 0
 annual_consumption_2 | double precision     |           |          | 0
 VAT                 | character varying(4)  |           |          | 'high'::character varying
Indexes:
    "barcode_pkey" PRIMARY KEY, btree (barcode)
    "barcode_idx" btree (barcode)
```

```
cashregister=# \d buttons
                          Table "public.buttons"
   Column   |         Type          | Collation | Nullable |        Default
------------+-----------------------+-----------+----------+-----------------------
 buttonID   | integer               |           | not null |
 buttontext | character varying(30) |           |          | ''::character varying
 barcode    | character varying(13) |           | not null | ''::character varying
Indexes:
    "buttonID_pkey" PRIMARY KEY, btree ("buttonID")
```

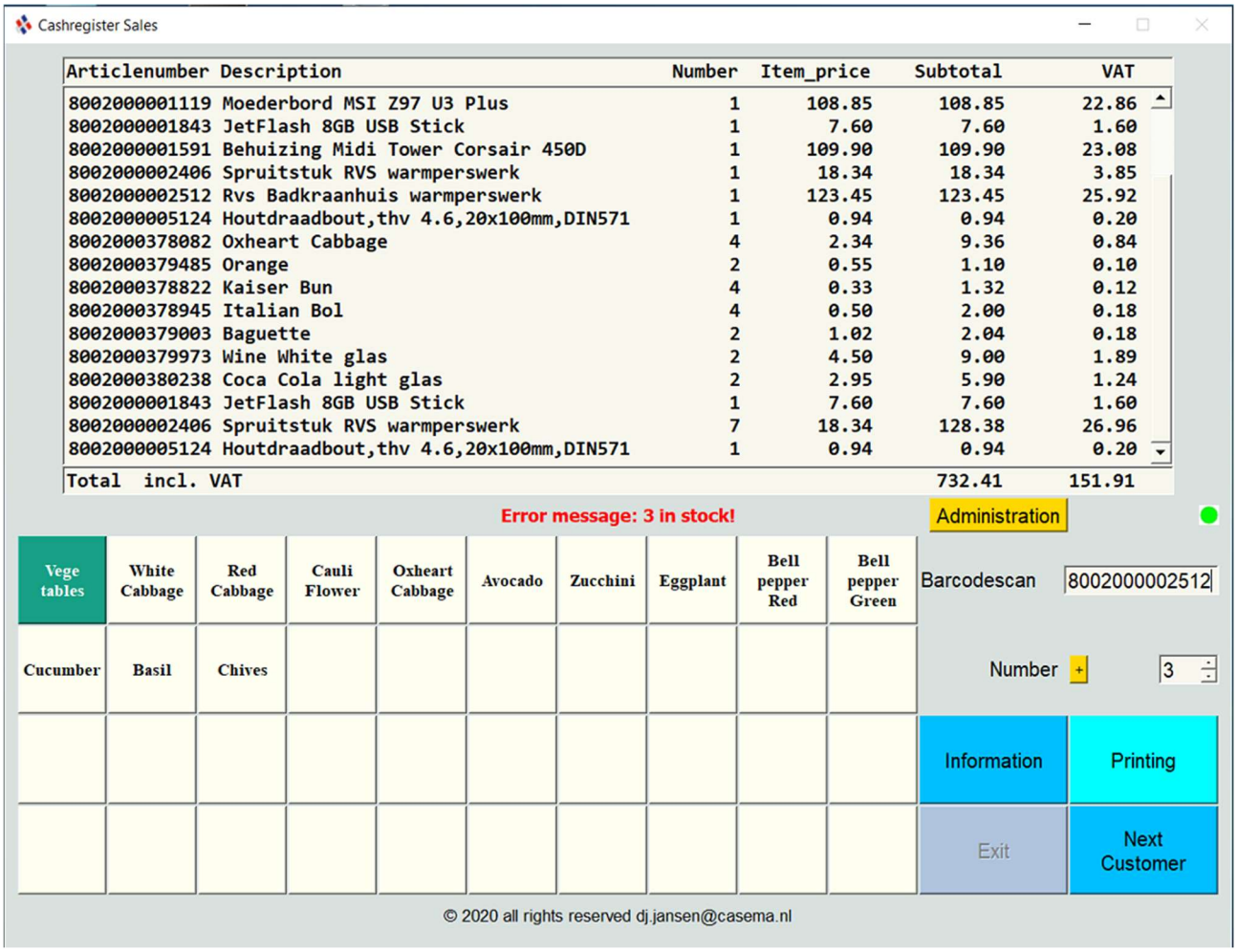
```
cashregister=# \d loss
                            Table "public.loss"
  Column   |         Type          | Collation | Nullable |        Default
-----------+-----------------------+-----------+----------+-----------------------
 lossID    | integer               |           | not null |
 number    | double precision      |           |          | 0
 category  | character varying(22) |           |          | ''::character varying
 bookdate  | character varying(10) |           |          |
 barcode   | character varying(13) |           |          |
Indexes:
    "lossID_pkey" PRIMARY KEY, btree ("lossID")
    "fki_barcode_fkey" btree (barcode)
Foreign-key constraints:
    "barcode_fkey" FOREIGN KEY (barcode) REFERENCES articles(barcode)
```

```
cashregister=# \d params
                          Table "public.params"
   Column    |         Type          | Collation | Nullable |        Default
-------------+-----------------------+-----------+----------+-----------------------
 paramID     | integer               |           | not null |
 item        | character varying(20) |           |          | ''::character varying
 value       | double precision      |           |          | 0
 buttongroup | character varying(30) |           |          | ''::character varying
Indexes:
    "paramID_pkey" PRIMARY KEY, btree ("paramID")
```

```
cashregister=# \d payments
                          Table "public.payments"
    Column     |         Type          | Collation | Nullable |        Default
---------------+-----------------------+-----------+----------+-----------------------
 payID         | integer               |           | not null |
 kind          | character varying(25) |           |          | ''::character varying
 amount        | double precision      |           |          | 0
 bookdate      | character varying(10) |           |          | ''::character varying
 paydate       | character varying(10) |           |          | ''::character varying
 instance      | character varying(25) |           |          | ''::character varying
 accountnumber | character varying(25) |           |          | ''::character varying
 ovorderID     | integer               |           |          | 0
Indexes:
    "payID_pkey" PRIMARY KEY, btree ("payID")
```

```
cashregister=# \d sales
                              Table "public.sales"
    Column     |          Type          | Collation | Nullable |        Default
---------------+------------------------+-----------+----------+-----------------------
 ID            | integer                |           | not null |
 receiptnumber | integer                |           |          | 0
 barcode       | character varying(13)  |           |          | ''::character varying
 description   | character varying(40)  |           |          | ''::character varying
 number        | double precision       |           |          | 0
 item_price    | double precision       |           |          | 0
 sub_total     | double precision       |           |          | 0
 sub_vat       | double precision       |           |          | 0
 callname      | character varying(20)  |           |          | ''::character varying
 mutation_date | character varying(10)  |           |          | ''::character varying
Indexes:
    "ID_pkey" PRIMARY KEY, btree ("ID")
```

Screenshot Cashregister frontend:



General remarks by the used database items.

The items are not specific for retail, nor amounts and prices are realistic and for becoming real values the data should be applied to a working company and the data should be dynamic.
As a result the data looks sometimes unreal.

CashRegister system.

The system detects if a logon barcode or a product barcode is scanned.
When no logon is established processing is blocked.
The red sign in the message bar below the display is showed.
By valid login the message bar show a green sign.
The logon is invisible with scanning.

With the logon from barcode accesslevel 3 a Administration button is activated. With this button and submenu accounts it is possible to generate other barcodes for logon purposes.
The barcodefield will be generated as 7 random digits by the program. (The 8th digit is a check number). The program will check and correct for duplicates. Access is default set on level 1, change if desired. If accesslevel is set to 0 processing is blocked for the employee.
The barcodelabel is saved in folder . /Barcodes/Accounts/
The first name, last name and callname of the employee must be inserted.
The callname field will be printed on the saleslip, it's also saved in the sales table.

When the account switch from level 1 to level 2 or level 3 or back the orderlines remains, so it's possible to book return goods with accepted account. If the account switches back the spinbox is reset to it's original state. When the login employee logs the barcode a second time, the employee is logged out.
When another employee logs his barcode, the logon is switched towards this employee.

Accesslevel 0: Operation blocked for the user.
Accesslevel 1. Normal operation. (No administration and no plusminbutton visible)
Accesslevel 2 . Expose an checkable button ± for return products. The spinrange from the spinbox changes from 1, 99 to – 1, – 99 with button checked.
Accesslevel 3. Expose the Administration button. Pressing this button reveals a combobox with 8 menulines. The items are:

Accounts
Submenu: New account
View / Change accounts
Articles
Submenu: Insert new articles,
View / Change articles
Imports new articles
Imports price-changes articles
Imports expired articles
View imports new articles
View imports price-changes articles
View imports expired articles
Booking loss articles
View loss articles

Sales View
Payments View / Pay.
Purchase
Submenu: Collecting purchases

View purchases
Printing purchases
Processing deliveries
View deliveries
Printing deliveries

Buttons
Submenu : Buttons new barcode
Buttons existing barcode
Parameters View / Change
Turnover
Submenu: Daily gross turnover
Monthly gross turnover
Yearly gross turnover

Articles

The table articles helds a column barcode (String 13 positions).
By inserting a new article a ean 13 barcode is generated. The first 2 numbers is the country code. The next 5 numbers are the company numbers, the following 5 numbers is the product number en the last number is a validity check number.
In this module is a image saved of the barcode in the folder ./Barcodes/Articles
This image can be printed for labeling the product or storage bin in the warehouse, so it's enabled for scanning.
With the program Sales, the sales can be established by scanning barcodes.
The amount can be set with the little spinbox. The amount can be filled with the little arrows, or turning the mouseweheel on the field. The amount can be set from 1 to 99. The amount is default set to 1.
The module scans the barcode, looks up in the database the articlenumber, description, price and counts the subtotals and VAT. When scanning is completed, a orderlist can be printed.
If a item cannot be provided with a barcode, it it possible to assign the product to a button.
Press the button, after setting the amount if more then one piece required.
See explanation under heading 'Programmable buttons'.
If scanning is not possible, in case of a damaged barcode, the barcode can be filled manually.
In this case the <Enter> must be pressed on the keyboard.

The program checks if 13 numbers are filled and checks the validy check number.
The module provides a display with heading and 16 product lines.
The lines are scrolling, if more then 16 lines are added.
Below the display screen the totals including VAT and total VAT is displayed.
If the thirst scan is established the close button is blocked, until next client button is pressed.
Printing of the order is possible until the button next client is pressed.
In the print module the total price and total VAT is counted and printed in the tail heading.
After the next client button is pressed the print button and the next client button is blocked, until the first scan for the next client is established. By scanning the table sales is filled with the order receipt number, article number, description, amount, price, subtotal and subVAT, also in the table articles the stock data is updated.
With pressing the next client button the table afdrachten (payments) is filled with the totals of VAT.

By scanning is checked on 5 error conditions:
1. The checksum of the barcode is wrong. (wrong barcode or damaged)
2. The product is not in the range of the company.
3. Too little stock for the orderline.

4. Error message if not logged on.
5. Operation blocked for this user.

The errors are showed below the product display in the color red.
With choise 3, also the amount of current stock is showed.

For return goods a ± button is added.
This button is visible if the logon barcode is valid as code 2 or code 3 . See **Accounts.**
If the button (checkable) is set on – the spinbox range change from -1 to -99.
The logon can be switched from access 1 to access 2 or 3 and back with remaining of the orderlines, so it's possible to book return goods by a competent person.

Articles Request/change

With this menuchoice a tableview from the articles table sorted on barcode is shown.

Change articles:
By clicking on the first field a article form is opened for changing article items.
The fields order_size and minimum_stock are also once a year calculated by the program, but can be overruled intermediate. Also item_stock can be filled for new articles, or for test purposes. Normally this should be handled by imports of delivery lists. So handle with care.

The calculation of this items is established by the Camp formula:

Camp formula: $Q = \sqrt{2DF/HP}$
Stands for:

Q = Quantity

- D = Demand / year (table articles)
- F = Fixed Costs (order costs conversion costs) (from table params)
- H = Stock costs as a percentage of the price (from table params)
- P = Price of the product (from table articles)

The annual_consumption is counted by the article usage in a year.
Even year annual_consumption_1
Odd year annual_consumption_2
By starting of a new year the oldest year of annual consumption is set to 0, so the counting restarts, with this column, so always the last year is preserved for calculation of stock.

It is possible to influence the minimum stock and order size by changing the paramID 5 and 6 (Ordercosts and surcharge for interest and storage)
The params 3 and 4 are changed by the program. So leave it untouched by normal operation.

Sales Request

With this menuchoice a tableview from the sales sorted on receiptnumber is shown.

Payments Request/Paying

With this menuchoice a tableview from the payments towards instances sorted on not payed and receiptnumber is shown.
With this menuchoice is it also possible to book a payment towards instances by clicking on the thirst field from the payments request tableview. This action opens a payform with a checkbox pay. By checking this box the payment is booked with the paydata. After this booking is done the checkbox is disabled for checking and the text from the box is changed in payed.

Importing.

Imports will be common in retail for expired products, price changes and new items.
So we will produce some lists and modules for importing these items.
New items will been added, expired items will been deleted and price changes will been executed.

The import files have a fixed layout for the lines, I have chosen this, because csv files are difficult due to the many punctuation marks in the description fields of the used database.
Templates are provided in folder ./forms/Imports/Templates/

The layout for changed prices:
barcode,item_price per line.
Filename: prices_<dateofmakingday> without extension.
Folder ./forms/Imports/Prices/

The layout for new products:
barcode,description,item_price,item_unit,article_group,thumbnail,category,VAT per line.
Filename: new_<dateofmakingday> without extension.
Folder ./forms/Imports/New/

The layout for expired products:
barcode per line.

Filename: expired_<dateofmakingday> without extension .
Folder ./forms/Imports/Expired/

The imports are executed by the importmenu.

The extension .txt is added after processing, so the file is blocked for processing and available for viewing.

Write off Loss.

Clicking on the first field of the tableview opens a form loss.
With this form the warehouse differences, damaged products, obsolete products or shelf life products can be written off. Fill in number of products and choose category of loss. The products are booked in the table loss and reduced from stock.

Programmable Buttons.
Accessable with the admin button (security level 3)

There are 5 buttongroups each with 39 programmable buttons with the thirst button (colored differently) as a group button to switch between the buttongroups .
The groupbuttons can be provided or changed with your proprietary grouptext in the table params paramID 7 (button-group 1), 8 (button-group 2) , 9 (button-group 3) , 10 (button-group 4) or 11 (button_group 5).
Buttontext until 9 positions (plus one linefeed) per line over maximum 3 lines.

With the menuchoice Buttons define you will get a submenu 'New barcode' or 'Existing barcode'
The thirst choice calls a form there a new barcode is generated and fields for a new article must be filled in, also in this form the buttontext can be inserted or erased.
Minimal the fields description, price, buttonnumber and buttontext must be completed.

The second choice displays the barcode table. By browsing to the barcodeproduct and clicking on the thirst field a form is opened for inserting buttonnumber and buttontext. By accepting the buttonnumber with it's text the button is linked to the chosen barcodenumber.

The buttons for group 1 are 1-39, the buttons for group 2 are 41-79, the buttons for group 3 are 81-119, the buttons for group 4 are 121-159 and the buttons for group 5 are 161-199.
The numbers 0, 40, 80, 120, 160 are reserved for groupbuttons, the buttontext of the groupbuttons can be changed or erased with the module parameters.

The buttontext is until 9 positions per line (plus one linefeed) over maximum 3 lines.
If a button with a existing text is choosen the text is replaced and the button is linked towards the new barcodenumber.
The new buttontext becomes visible after a restart of the program.

Purchases.

The purchases will been established by a list, which is gathered from the articles, where minimum stock is less than stock plus order balance and the item is not on order (order_status = True)

As soon as the list is produced for ordering the order_status of the ordered items is blocked until delivery is done. (order_status = False)

After delivery a list is gathered from approved items. The fields on this list are barcode and delivered amounts.
This list is imported and the amounts are added to stock, the order_balance is reduced and order status is released (order_status = True)
The extension .txt is added after processing, so the delivery import is blocked for processing and available for viewing.

The order and delivery lists are stored for printing or reference views.

Parameters.

With this menuchoice a tableview from the params table sorted on paramID is shown and with clicking on the thirst field you can change item and value and for the buttons buttontext.
Parameters 1 and 2 are for VAT surcharges high and low, zero is set hardcoded.
Parameters 3 and 4 are set by the system so leave it untouched, except for test purposes.
Parameter 5 is charge for ordercosts
Parameter 6 is surcharge for storage , interest costs and loss for shelf life and theft.
Parameters 7, 8 ,9, 10 and 11 are respectively for buttongroup 1, 2, 3 ,4 and 5 buttongrouptext.

Request gross turnover.

Gross turnover countings daily (add period as "yyyy-mm-dd")
monthly (add period as 'yyyy-mm")
yearly (add period as 'yyyy")
If a period is ongoing the counts are made until the date or time of execution.
Countings are made and showed for totals gross turnover and totals of VAT.

Addition networks:
As a database system is used posgreSQL, which make it possible to use this application as a client server application with several point of sales.

I have not tested this because i don't have a network available. But with the right IP configuration this should be a piece of cake with a little knowledge of networking.
The server can easily host on Linux.

The application sales.py is ported and tested for Windows and Ubuntu (might work with other Linux operation systems too).