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# **Fiscal Printer DATECS VG 550**

## **Technical Manual**

The 3.01 CG Version of this manual is prepared for country: "CG" - Monte Negro

This Manual is related to Firmware Version 3.01 dated 11jun2009

### **INTRODUCTION**

The fiscal device functions under the control of an application program, and communicates with it via an asynchronous serial channel for connection to the RS232 interface.

Its purpose is to execute a previously defined set of commands, which are logically arranged depending on the type of operations, which have to be executed. This utility program doesn't have direct access to the resources of the fiscal device, but can download data, connected with the state of the fiscal device and the fiscal memory.

The fiscal device performs the following operations:

- Save the fiscal number of the fiscal device
- Save the fiscal parameters - like the tax number of the person, registered for taxation, the date of starting operations etc.
- Save information about the owner, his/her address, names etc.
- Save data on the sum of the sales and generating client's receipts
- Save data on the daily turnover in the fiscal memory and generate daily report
- Generate reports on completed sales and the contents of the fiscal memory
- Print reports, generated by the application
- Returns data to the application program.

## TAXATION CATEGORIES AND CALCULATION OF VAT

Each separate sale is recalculated in relation to a given taxation category (VAT), which defines the tax rate, applicable to the base price for the formation of the sale price. The fiscal printer works with 6 categories at the most and they are marked with the first letters of the alphabet of the respective country, for which the fiscal printer (FP) has been set-up.

In the case of Monte Negro these letters would be A, B, C, D, E, F,

For each of the tax groups a tax rate is selected (in percents) which should be an integer number, not greater than 99. The commands for selling accept the capital letters A, B, C, D, E, F as parameters.

The net value of the sales is calculated with the help of the formula:

**NET\_value = TRUNC (SALE\_value / (1 + TAX\_rate)).**

The function TRUNC return the whole part of the digit.

The value of the tax sum due is calculated with the help of the formula:

**TAX\_value = SALE\_value - NET\_value**

## OPERATION MODES OF THE FISCAL DEVICE

The fiscal device can work in two modes.

### **1. Tutorial mode – non fiscal mode.**

The device has not been fiscalized. All data, necessary for its normal functioning has been entered and recorded in the fiscal memory with the exception of the tax number of the owner. Client's receipts may be opened and issued but they always contain a note, that they are not fiscal. Daily financial reporting and clearing can be done, but this is not recorded in the fiscal memory.

**In non fiscal mode you can not do programered tax rate and in this mode fiscal printer is not for use.**

### **2. Normal mode of operation – fiscal mode.**

The device is fiscalized. The tax number of the owner has been entered into the fiscal memory. All financial regulations will be applied.

## **THE DIFFERENT STATES OF THE FISCAL PRINTER**

The fiscal printer can have several different states and the transitions between them are not always possible. The control of the printer and the transitions between the states, when this is possible, are controlled by the application program on the HOST (PC), which must be coordinated with the used protocol. When this protocol has not been applied correctly, the printer may shift into an undesirable state, or it is moving through a given state may be skipped, leading it to enter the ERROR state.

### **A. INITIAL STATE**

In this state, the date and time can be set, the serial number, the number of the fiscal module and the code of the country can be entered.

These operations are performed, before the device is given to its owner, by an authorized service specialist.

The following commands must be performed in the order in which they are presented: 61 , 91.

After these operations the printer must be switched OFF and then switched ON again.

### **B. AFTER FORMATTING THE FISCAL MEMORY**

In this state, the type of the currency and the tax rates are entered.

This is the state, in which the fiscal devices are stored in the warehouse of the manufacturer.

The commands that follow are performed in the following order: 83, 96.

After these operations are performed the fiscal printer can be handed over to the client, who will use it.

### **C. WHEN HANDED OVER TO THE CLIENT**

In this state, the Header and the Footer are set up - this is the beginning and the end of each separate receipt.

The command 43 has to be performed as many times as the number of the lines entered.

### **D. TUTORIAL MODE**

The Owner Registration number must be entered using command 98. This is the state, in which the fiscal printer is until it is fiscalized. The issuing of receipts is possible but it should be borne in mind, that even client's receipts are marked as "non-fiscal".

Daily fiscal reports and clears is not possible.

A tax number is entered, but it is not recorded in the fiscal memory.

### **E. FISCALIZED FISCAL PRINTER**

Fiscal receipts can be issued in this state and they will be marked as such. Before fiscalization, the Owner Registration Number has to be entered and the fiscalization command executed: 98 and 72

### **F. IRREVERSIBLE ERROR IN THE FISCAL PRINTER**

This is the state, in which the printer will be in case of a serious technical or logical error in the device, as well as an error, due to the complete lack of the module "fiscal memory".

What is needed is a clearing of the RAM (the fiscal memory is taken out, the device is switched on and switched off after that).

A new fiscal memory module is then installed, because the one, which was in operation, before the error occurred, is switched to the READ-ONLY mode.

Recordings in the fiscal memory are impossible in this mode. These operations should be performed by a service specialist.

Events, which may possibly lead to this state, are:

- An impossibility for performing a correct entry into the fiscal memory,
- Finding an illegal entry into the fiscal memory,
- Failure to find or identify its fiscal memory module.

## A detailed description of the commands

### 21h (33) Display clear text

Syntax	no data
Reply	no data

If a fiscal receipt is opened, only the lower line is cleared.

### 23h (35) Display text on the lower line

Syntax	Text
Reply	no data

Text A text of 20 symbols is sent directly to the display. Before it, a command is issued for the positioning and clearing of the lower line.

### 26h (38) Open a non-fiscal receipt

Syntax	no data
Reply	AllReceipt, ErrCode

AllReceipt The number of all issued receipts (fiscal and non-fiscal) from the last fiscal closure to the present moment (4 Bytes).

ErrCode when command has been unsuccessful (1 Byte).

1. The fiscal memory is not formatted.
2. There is an opened fiscal receipt.
3. A non-fiscal receipt has been opened already.
4. The RTC is not correct.

FP performs the following operations:

1. Header is printed out.
2. The tax number of the operator is printed out.
3. A reply is received, containing AllReceipt.

### 27h (39) Close a non-fiscal receipt

Syntax	no data
Reply	AllReceipt

AllReceipt The number of all issued receipts (fiscal and non-fiscal) from the last fiscal closure to the moment (4 Bytes).

FP performs the following operations:

1. Prints a footer
2. The logical number, date and time of the document is printed.
3. Wide print is used to print out "NON-FISCAL RECEIPT" and if the printer has been fiscalized - "INTERNAL RECEIPT".
4. A reply is received, containing AllReceipt.

If SW 1.1 has been raised, the command is not performed, because a non-fiscal receipt is being opened.

### **24h (42) Print a non-fiscal free text**

Syntax Text  
Reply no data

Text Text up to 30 characters

If SW 1.1 is raised, this means that a non-fiscal receipt is opened and the text is not printed out.

### **2Bh (43) Set header and footer and options**

Syntax <item><text>  
Reply depends from the Syntax

Item One symbol with the following content:  
"0" to "7" is the number of the line entered.  
The lines of the header are from 0 - 5 and the footer from 6 - 7.  
"P" enter printing options.  
"C" Auto cutter function On/OFF. Default status is defined by SW1.  
"L" Graphic LOGO printing On/OFF. The Logo is defined by command (115)  
"I" Allows to read the parameters, which we have set earlier by command 43.

Text Text up to 36 symbols, where:

If <item> is a number from 0 to 7 - this is the text of the respective line

If <item> = "P" - 4 symbols "0" or "1", where "0" forbids and "1" permits the respective option. In the order of the symbols, the options are:

[1] prints an empty line before the "header".

[2] prints an empty line after the tax number.

[3] prints an empty line after "header"

[4] prints a dividing line before the total sum.

If <item> = "L" - one symbol "0" or "1", where "0" forbids and "1" permits the first and second line of the Graphic LOGO.

If <item> = "C" - one symbol "0" or "1" where "0" forbids and "1" permits auto cutting function.

The "header" consists of 6 lines of text, which is printed out at the beginning of each fiscal or non-fiscal receipt. The normal functioning of the printer demands the entry of at least a "header" of two lines.

The "footer" is of 2 lines, printed at the end of each receipt.

This command must be executed at most 8 times in order to enter all the lines of the "header" and "footer".

### **2Ch (44) Printer Paper feed**

Syntax [Lines, [Option]]  
Reply no data

Lines	The number of lines to which the paper will be fed. This should be a positive number, not greater than 99 (1 or 2 Bytes). If this parameter is missing 1 line feeding is assumed.
Option	Defines which paper to be fed: "0" no effect "1" Only receipt paper is fed "2" Only journal paper is fed "3" Both papers are fed.

**2Dh (45) Printer Auto cut of receipts**

Syntax	no data
Reply	Result
Result	"P" Successful cut "F" Fail cut

This command is used to cut the receipt. It should be noted, that the application program will take care to move the receipt at least with 2 lines forward. Otherwise the end of the receipt will be cut. If the printer is in Auto cutting mode, it will position the paper automatically. In this case it is not necessary to use this command.

When the cutter is blocked, the paper must be taken out of the cutter and to execute this command. This will put the cutter in a home position.

**2Fh (47) Display text on the upper line**

Syntax	Text
Reply	no data
Text	Up to 20 characters, sent directly to the display. Before that, a command for positioning and clearing the upper line is entered. The command is rejected when a fiscal receipt is opened or SW3 is OFF.

**30h (48) Open a fiscal (client's) receipt**

Syntax	<OpCode>, <OpPwd>, <TillNmb>[, Invoice]
Reply	AllReceipt, FiscReceipt
OpCode	Operator number (1 to 8)
OpPwd	Operator password (4 - 6 digits)
TillNmb	Operator's place number
AllReceipt	Number of all issued receipts (fiscal or not) from the last fiscal closure (4 Bytes).
FiscReceipt	The number of all issued fiscal receipts from the last fiscal closure (4 Bytes).

The Fiscal Printer performs the following operations:

1. Prints "header",
2. Prints Tax Number,
3. Print number and name of operator and work place.
4. Return of AllReceipt and FiscReceipt.

The command will not be successfully completed when:

1. There is an opened fiscal or non-fiscal receipt
2. The maximum number of daily receipts has been issued.
3. No free fiscal memory.
4. Failure of the fiscal memory.
5. No code or operator password.
6. "Header" contains less than 2 lines.
7. All tax rates are "0".
8. No tax number entered.
9. Incorrect operator password.

When incorrect operator passwords are entered for 3 times, the printer stops functioning and must be switched off and on again for continuing work.

### **32h (50) Get Tax Rates within period**

Syntax            [<Start>, <End>]  
Reply             TaxInfo

Start             The date of the start of the period – DDMMYY (6 Bytes).  
End                The date of the end of the period - DDMMYY (6 Bytes).

The comma is obligatory when start and end are entered. In case the data field is empty, the information of the last entered rates is recovered.

TaxInfo           PAA,BB,CC,DD,EE,FF,GG,HH,DDMMYY if tax rates are at least once programmed, and "F" if tax rates are not programmed, where "P" means "PASS" and after that, all rates are counted out as well as the date of their entry.

The command print a tax rates history report.

### **33h (51) Display Subtotals**

Syntax            <Print><Display>[, Perc]  
Reply             SubTotal, TaxA, TaxB, TaxC, TaxD, . . . . , TaxH

Print             = "1" the value of subtotal will be printed,  
Display           = "1", the value of the subtotal will be displayed,  
Perc               Displays the value in percent of the discount or surcharge over the currently accumulated sum.  
SubTotal         The sum of the current fiscal receipt (up to 10 Bytes)  
TaxX...           The sum of taxes under category X (up to 10 Bytes)

The sum of all sales, registered in the fiscal receipt to the moment.  
The sum can be printed at demand. The calculated sum is returned to PC as well as accumulated sums for each tax category.

If a surcharge or discount is entered, it is printed out on a separate line and the accumulated sums in the different tax groups are respectively corrected.

### **34H (52) Register and display sales**

Syntax	[Sign]<PLU>[#<Price>] [*<Amount>] [, <DiscP>;<DiscA>]
Reply	no data
Sign	One byte "+" or "-"
PLU	PLU number. Integer from 1 - 65023 (5 digits)
Amount	Optional parameter, defining the quantity. The default value is 1.000. The length of this parameter is 8 digits (no more than 3 after the decimal point).
Price	Replaces the programmed single price only for this sale. Optional.
DiscP	Discount or surcharge in percents. Optional.
DiscA	Discount or surcharge percent in absolute value. Optional.

DiscA and DiscP can't be used simultaneously in one command.

Character set is CE code table.

Display shows:

in the first line left – quantity, right – price

in the second line – name of article

### 35h (53)

### Register Payment

Syntax	<Line1> [<LF><Line2>] <Tab> [[<PaidMode>]] <[[Sign] Amount]>]
Reply	<PaidCode><Amount2>
Line1	A string of up to 25 Bytes, containing a text of the first line,
LF	LF, containing 0Ah
Line2	A string of up to 25 Bytes, containing a second line of text,
Tab	One byte, containing 09h,
PaidMode	An optional code, showing the form of payment, which can have the following values: "P" Payment in cash (by default), "N" Payment on credit, "C" Payments by cheques, "D" Payment by debit cards.

Depending on the code, the accumulated sums in the different registers may be required in the daily report.

Sign	One byte, with a value "+", showing the symbol "Amount" (the sum which will be paid),
Amount	The sum, which is being paid (up to 9 Bytes),
PaidCode	One byte -the result from the execution of the command. = F Error = E The calculated sub-total is negative. = D If the paid sum is smaller than the sum of the receipt. The residual amount for completing the payment is returned to Amount. = R If the paid sum is greater than the sum of the receipt a Change message appears and the change is returned to Amount. = I The sum under a given tax group has been negative and that is why an error has occurred. The current sub-total sum is returned to Amount.
Amount2	Up to 9 digits with a symbol. Depends on PaidCode.

This command causes the calculation of the sums on the fiscal receipt, the printing out of the sum with a specific font and showing it on the display. The printing of an additional text is also possible - for example, a text describing the form of payment.

The command will not be successful if:

1. A fiscal receipt has not been opened,
2. The accumulated sum is negative,
3. If one of the sums from the different tax groups is negative.

After the successful execution of the command, the fiscal printer will not perform the commands 49 and 51 within the opened receipt. It can however execute the command 53.

### **36h (54) Print a fiscal free text**

Syntax text  
Reply no data

Text a string of up to 30 bytes.

A fiscal receipt has to be opened. In the opposite case the text will not be printed and SW1 is raised. If the text is longer than 30 characters, the excess characters are rejected automatically

### **38h (56) Close a fiscal (clients) receipt**

Syntax no data  
Reply AllReceipt, FiscReceipt

AllReceipt Number of all receipts issued from the last daily report till this moment.

FiscReceipt Number of all fiscal receipts, issued from the last report till this moment.

The sums from the fiscal receipt are added to the daily sums in the RAM registers. The command will not be executed if:

1. A fiscal receipt is not opened,
2. Command 35H (53) is not successful,
3. The amount paid by command 53 is less than the Total Sum of the fiscal receipt.

### **39h (57) Cancel receipt**

Syntax no data  
Reply no data

The receipt can be cancelled (void) at once. A line filled with "\*" is printed, and the receipt is marked as non-fiscal. No data is added to the daily registers. The execution of the command is possible only before the first payment command (53).

### **3Ah (58) Register of an Article sale**

Syntax	[Sign]<PLU>[#<Price>] [*<Amount>] [, <DiscP>] [, <DiscA>];
Reply	no data
Sign	One byte "+" or "-"
PLU	PLU number. Integer from 1 - 65023 (5 digit)
Amount	Define the quantity. The default value is 1.000. The length of this parameter is 8 digits (no more than 3 after the decimal point).
Price	Replaces the programmed single price only for this sale. Optional.
DiscP	Discount or surcharge in percents. Optional.
DiscA	Discount or surcharge in absolute value. Optional.

DiscA and DiscP can't be used simultaneously in one command.

### **3Dh (61) Set Date and Time**

Syntax	<DD-MM-YY><space><HH:MM[:SS]>
Reply	no data

A date, earlier than the date of the last entry into the fiscal memory, cannot be set. Settings include the year 2099. After RESET of the memory, the command must be performed for the continuation of the normal work of the device. Date can be changed only in service mode.

### **3Eh (62) Get back date and time**

Syntax	no data
Reply	<DD-MM-YY><space><HH:MM:SS>

### **3Fh (63) Display Date and Time**

Syntax	no data
Reply	no data

The lower line of the display shows current date and time: DD-MM-YY HH:MM:SS.

### **40h (64) Info on the last fiscal closure**

Syntax	no data
Reply	N, Total, TaxX, TaxX. (1 - 8), Date
N	The number of the fiscal closure - 4 Bytes
Total	The sum of all sales without VAT (tax group SPACE) - 12 Bytes with symbol.
TaxX	Net sums on all VAT code - A, B, C, D, ...H - 12 Bytes with symbol.
Date	The date of the last fiscal closure - 6 Bytes. DDMMVY.

The command leads to transmitting the information on the last entry in the fiscal memory of the computer.

### **41h (65) Info on daily taxes**

Syntax	no data
Reply	Zrate, TaxA, TaxB... (up to 8)
Zrate	Not used and always +000000000000.
TaxX	The sums of each VAT code - A, B, C, D ... - 12 Bytes with a sign.

The net sums, divided in tax groups, are returned after the last fiscal closure until the moment of receiving the command.

#### **43h (67) Get daily statistics**

Syntax	no data
Reply	Zrate, NegTotal, NotPaid, FiscReceipt, AllReceipt
Zrate	It is normal to be filled with 0 - 12 Bytes.
NegTotal	The sum of all the sales at a negative price (void) - 12 Bytes with a mark.
NotPaid	The sum of all non-paid accounts (credit paid) - 12 Bytes with a mark. These are the sums from the filed Amount in the data of command 53, for which an "N" flag is shown through the data of the same command.
FiscReceipt	All issued fiscal receipts - 4 Bytes.
AllReceipt	All issued receipts up to the moment - 4 Bytes.

The sums, accumulated from the last fiscal closure to the command, are calculated and returned.

#### **44h (68) Get free fiscal closures**

Syntax	no data
Reply	Logical, Physical
Logical	The number of the logical places for closure - 4 Bytes,
Physical	Not used - repeats Logical counter.

The number of the free fiscal closures is returned.  
These fields record the daily report information with clearing.

#### **45h (69) Z-report or X-report**

Syntax	[<Option>][N][a]
Reply	Closure, FM_Total, TotalA, TotalB, ...

Option            Optional parameter, controlling the type of the generated report  
 = "0" - A Z-report is performed. The contents of the registers for internal entry and cash-out are not printed. The print-out finishes with "FISCAL RECEIPT" or "NON-FISCAL RECEIPT", depending on whether the printer is fiscalized.  
 = "1" - A Z-report is performed. The contents of the registers for internal entry and cash-out is printed. The print-out finishes with "FISCAL RECEIPT" or "NON-FISCAL RECEIPT", depending on whether the printer is fiscalized.  
 = "2" - A daily report without clearing is performed (X-report). The print-out is performed with a logo "NON-FISCAL RECEIPT". The contents of the registers (internal deposit and cash-out) is not printed.  
 = "3" - Daily report without clearing (X-report). The print-out is performed with a logo "NON-FISCAL RECEIPT". The contents of the registers (internal deposit and

cash-out) is printed out. The same functions can be performed directly from the printer, if after "switch on the left button is pressed.

N	The presence of this symbol at the end of data, forbids clearing of operators data, when a Z-report is performed.
a	The presence of this symbol at the end of data, forbids clearing of sold articles data, when a Z-report is performed.
Closure	Number of the fiscal closure - 4 Bytes.
FM_Total	The sum of all sales (no VAT) - 12 Bytes with a mark.
TotalX	The sum of each tax category, A, B, C, ..., H - 12 Bytes with a mark.

#### **46h (70) Register Deposit and Cash-out**

Syntax	[Sign] [Amount]
Reply	ExitCode, CashSum, ServIn, ServOut
Amount	The sum to be registering (up to 9 Bytes). Depending on the mark of the digit it is interpreted as a deposit or a discount.
ExitCode	"P" - The order is entered. If the sum is "zero", the printer prints an internal receipt for registering the operation. "F" - The entry is forbidden. This happens when: in-cash volume is less than the entered internal cash-out, There is an opened fiscal or non-fiscal receipt,
CashSum	In-cash volume
ServIn	The sum from all commands " Internal deposits"
ServOut	The sum of all commands "Internal cash-out"

Changes the contents of the register for "in-cash" amounts.

Depending on the mark of the sum in question, it is accumulated in the register on internal cash deposit and discount. The information is not entered in the fiscal memory and is accessible until the daily closure. It is printed with the command 69 or when a daily report is initiated, without clearing from the printer itself.

#### **47h (71) Report on diagnostic info**

Syntax	no data
Reply	no data

This command prints an internal receipt, containing diagnostic information:

1. Prints the data and the version of the firmware.
2. Prints the check sum
3. Prints the speed of the serial port transfer.
4. Prints the position of the configuration keys and the number of the respective country,

Where the relations is as follows:

- |     |                                    |
|-----|------------------------------------|
| SW1 | Auto cutter On                     |
| SW2 | Not used                           |
| SW3 | Mode: Transparent display          |
| SW4 | Sets Baud rate: ON=9600, OFF=19200 |
5. Prints current date and time.
  6. Prints the number, date and time of the last "RAM RESET"

7. Prints the current temperature of the print heads.
8. Prints the total number of fields in the fiscal memory and the number of the free fields.
9. Prints the current date and time.

This command shall be executed when a receipt is opened and there is no paper. It can be executed by pressing "SEL" key while switching ON the printer.

Serial                      The FP Serial number - 8 byte. It should be the same as set by 5Bh (91).

**49h (73)                      Report detailed of fiscal memory (No-to-No)**

Syntax                      <Start>, <End>  
 Reply                        no data

Start                        Number of initial closure - 4 Bytes.  
 End                         Number of final closure - 4 Bytes.

Prints a detailed report of the fiscal memory within a range No-to-No

**4Ah (74)                      Get 36-bit status**

Syntax                      [Option]  
 Reply                        <S0><S1>-<S2><S3><S4><S5>

Option                      = W Expects the printing out of all buffers of the printer,  
                                  = X Does not wait for the printer.  
                                  = Sn Status byte N.

**4Ch (76)                      Status of Fiscal transaction**

Syntax                      [Option]  
 Reply                        Open, Items, Amount[, Tender]

Option                      = "T" will return the information on the current state of the account, which has to be paid by the client.

Open                        = "1" if a fiscal or non-fiscal receipt is opened / which is it can be established by the status bits,  
                                  = "0" if there is no opened receipt.

Items                        The number of the registered sales and the current or last fiscal receipt - 4 Bytes.

Amount                     The sum of the last fiscal receipt - 9 Bytes with a sign.

Tender                      The sum paid for the current or last receipt - 9 Bytes with a sign.

This command controls the application in PC to enter the status and if needed to recover and finish a fiscal operation, which was cut-off on emergency - for example at power failure.

**4Fh (79)                      Report summary of fiscal memory (date-to-date)**

Syntax                      <Start>, <End>  
 Reply                        no data

Start                        Starting date - 6 Bytes ( DDMMYY)

End                         Ending date - 6 Bytes ( DDMMYY)

The command calls the calculation and printing out of a short periodic financial report.

### **50h (80) Sound signal (beep)**

Syntax no data  
Reply no data

The printer generates a sound of ~ 200 ms length.

### **51h (81) Monthly report**

Syntax no data  
Reply no data

Prints a monthly report of the fiscal memory for the whole period of use.

### **53h (83) Set multiplier, decimal point, currency and allowed taxes**

Syntax <Decimals>, <Currency><Space>, <TaxMask>  
Reply no data

Decimals Can be 0 or 2.  
Currency Name is up to 6 symbols  
Space Space symbol (20h)  
Taxmask Is a 8-digit string, consisting of "1" and "0". Every digit represents one Tax Group ("A" to "H"). "1" means allowed tax, "0" means forbidden tax. Last two taxes are forbidden independent of the Taxmask and are not used.

Command is allowed only immediately after fiscal closure, before the first receipt.

### **59h (89) Test Fiscal memory**

Syntax <Test>  
Reply Result, Free

Test = T  
Result = P no error, = F error  
Free Memory size in Hex format.

The command tests the fiscal memory. There is place for 40 test records.

Pattern for recording is: 55h, AAh, 33h, CCh, 5Ah, A5h, 3Ch, C3h.

If SW 1.1 is raised, the fiscal memory has not been formatted or is in the read-only mode.

### **5AH (90) Get a diagnostic information**

Syntax Calc  
Reply <FwRev><SP><FwDate><SP><FwTime>, <Chk>, <Switches>, <Country>, <Ser>, <FM>

Calc	if "1" , the control sum of the fiscal memory is calculated - 2 Bytes.
FwRev	The version of the software utility - 4 Bytes.
SP	Space 20h.
FwDate	The date of the software utility - DDMMYY - 7 Bytes.
Sp	Space (20h)
FwTime	Time of the software utility HHMM - 4 Bytes.
Chk	Control sum of the EPROM. A 4 byte string in hexadecimal format. If the control sum is 214Ah, it will be transmitted as 32h, 31h, 34h, 41h.
Switches	The keys from SW1 to SW4 - an 4 byte string with a "0" or "1".
Country	The number of the country - 1 byte.
Ser	Serial number - 8 Bytes.
FM	The number of the Fiscal Module - 8 Bytes.

### **5Eh (94) Report detailed of fiscal memory (date-to-date)**

Syntax	<Start>, <End>
Reply	no data
Start	Starting date - 6 Bytes ( DDMMYY)
End	Ending date - 6 Bytes ( DDMMYY)

The command prints out a detailed financial report on a period between two dates.

### **5Fh (95) Report summary of fiscal memory (no-to-no)**

Syntax	<Start>, <End>
Reply	no data
Start	Number of initial opening - 4 Bytes.
End	Number of final closure -4 Bytes.

The command prints out a summarized financial report on a period between two dates.

### **60h (96) Set Tax Rates**

Syntax	<TaxA>[, <TaxB>[ [, <TaxE>]...]
Reply	Result
TaxA	Tax A - Floating point with two digits after the decimal point
TaxB	Tax B - Floating point with two digits after the decimal point
TaxC	Tax C - Floating point with two digits after the decimal point
TaxD	Tax D - Floating point with two digits after the decimal point
TaxE	Tax E - Floating point with two digits after the decimal point
TaxF	Tax F - Floating point with two digits after the decimal point
TaxG	Tax G - Floating point with two digits after the decimal point
TaxH	Tax H - Floating point with two digits after the decimal point
	All other tax rates can be programmed with a percent value from 0.00 to 99.0 (two decimals allowed).
Result	= P no errors; = F errors.

This command is allowed only immediately after fiscal closure. Command can be executed successfully 30 times, because the fiscal memory has limited free space. Tax groups G and H are always disabled.

### **61H (97) Get Tax Rates**

Syntax	no data
Reply	TaxA, TaxB, TaxC, TaxD, ... TaxH
TaxX	The tax rate in % for the corresponding tax group.

### **63H (99) Get Owner Registration Number**

Syntax	no data
Reply	Text
Text	The Owner Registration Number is presented as a string

### **64h (100) Display free text in on the display**

Syntax	Text
Reply	no data
Text	Text of up to 40 symbols, which are sent to the display. If sending of ASCII symbols, smaller than 20h (control characters) to the display is needed, these symbols are increased to 40h and are preceded by 10h.

Example: in order to send "<ESC>K<0>" in 1Bh, 4Bh, 00h in the data field the following should be entered: 10h, 5Bh, 4Bh, 10h, 40h.

### **65h (101) Set operator's password**

Syntax	<OpCode>, <OldPwd>, <NewPwd>
Reply	no data
Op Code	Operator's password
OldPwd	Old password ( 4 - 6 digits)
NewPwd	New password (4 - 6 digits)

Enters one of the eight operator's password. The password will be asked when a fiscal receipt is opened. After three incorrect entries of a password, the printer will be blocked. It should be switched-off and then on to continue work. After initialization or clearing of the operational memory, all four passwords are "0000"

### **66h (102) Set operator's name**

Syntax	<OpCode>, <Pwd>, <OpName>
Reply	no data
OpCode	Operator's code
Pwd	Password (4 - 6 digits)
OpName	Name of the operator (up to 24 chars)

Enter one of the eight operator's names. The name and the number of the operator are printed at the beginning of each fiscal (client's) receipt. After three unsuccessful attempts for entering a password, the printer is blocked and has to be switched off and on again to continue work.

After initialization and clearing of the operational memory all four operator's names are empty strings.

### **67h (103) Info on the current receipt**

Syntax	no data
Reply	CanVd, TaxA, TaxB, TaxC, TaxD, ... TaxH
CanVd	is returning possible (sale with a zero mark) [0/1].
TaxX	Sum, accumulated under tax group X,

Provides information on accumulated sums under the different tax groups and weather the return of the registered items is possible.

### **68h (104) Reset Operators sales data**

Syntax	<Operator>, <Pwd>
Reply	no data
Operator	Operator number (1 ... 8)
Pwd	Operator's password (4 to 6 digits)

Clears the accumulated sums for the selected Operator. If the password is not a valid one, this command will be rejected.

### **69h (105) Report on Operators**

Syntax	no data
Reply	no data

For each Operator the printer will print Operator's name, Number of fiscal receipts, discounts, surcharge, accumulated sums, and returns.

### **6Ah (106) Set Drawer opening time**

Syntax	[<mSec>]
Reply	no data
mSec	Drawer opening pulse length ( from 5 to 25 msec)

User can set the length of the pulse for opening the Cash Drawer.

After the parameter is set it is recorded in the printer memory and will not be changed till a new execution of this command or if a RAM RESET is performed. After a Reset the default value is 15 msec.

**6Bh (107) Define and read an Articles**

Depending on the first letter of the data, this command has many functions:

I Information about articles.

Returns <Length>, <MaxPLU>, <PgmPLU>

Length Programmed articles name length

MaxPLU Total articles count (with this name length)

PgmPLU Currently programmed PLU count.

F - Find first PLU

Returns one letter error code, and if found, additionally data.

P<PLU>, <TaxGroup>, <Price>, <TAmount>, <DAmount>, <Name>

f - Find first sold PLU

Returns one letter error code, and if found, additionally data.

P<PLU>, <TaxGroup>, <Price>, <TAmount>, <DAmount>, <Name>

F: No more articles found.

N - Find next PLU

Returns one letter error code, and if found, additionally data.

P<PLU>, <TaxGroup>, <Price>, <TAmount>, <DAmount><Name>

F: No more articles found.

n - Find next sold PLU

Returns one letter error code, and if found, additionally data.

P<PLU>, <TaxGroup>, <Price>, <TAmount>, <DAmount><Name>

F: No more articles found.

R<PLU>

Returns information about one PLU

Returns one letter error code, and if found, additionally data.

P<PLU>, <TaxGroup>, <Price>, <TAmount>, <DAmount>, <Name>

For all subcommands above:

TAmount contains the available in the printer quantity of this article.

DAmount contains the sold quantity of this article.

P<TaxGroup><PLU>, <Price>, <Amount>, <Name>

Defines a new PLU.

Command is allowed immediately after fiscal closure and if this PLU is currently not defined.

TaxGroup A capital letter from "A" to "H". Tax group must be enabled using command 83.

PLU An integer from 1 to 65023.

Price The single price – up to 3 decimals.

Amount The start quantity of the article. Every sales command will decrease this number.

Name Name of the article. Up to 24 symbols.

D - Deletes article or group of articles. Is allowed only immediately after fiscal closure. Has three forms:

D<PLU>

Deletes one PLU.

D<PLU1>, <PLU2>

Deletes all articles between PLU1 and PLU2 including the limits.

C<PLU>, <Price>

Changes article single price. This subcommand is allowed outside fiscal receipts.

A<PLU>, <Amount>

Adds Amount to the available quantity of the article. A floating point number with up to 3 decimals.

**6Dh (109) Print last receipt as duplicate**

Syntax <Count>

Reply no data

Count Number of receipt copies

Prints a copy of the last closed fiscal sales receipt. The copy is marked as an NON-FISCAL RECEIPT and immediately after the tax number another line is printed out, containing the sign "NON-FISCAL RECEIPT" in bold characters. The printer will not print a command more than once.

**6Eh (110) Get sales data**

Syntax no data

Reply Cash, Credit, Debit, Cheque, Closure, Receipt

Cash Paid in cash  
 Credit Credit payment  
 Debit Debit card payment  
 Cheque In cheques  
 Closure Current fiscal closure  
 Receipt Number of the next fiscal receipt

Returns the information for the distribution of the daily sum according to the terms of payment.

**6Fh (111) Articles Report**

Syntax <Option>

Reply ErrorCode

Option = "0" All programmed PLU's are printed with the available quantity for each.  
 = "1" All programmed PLU's are printed, but only with a number and unit price.  
 = "2" Only the PLU for which have sales records for the day are printed. For each PLU is printed – PLU number, Name, Unit price, Sold Quantity and Total turnover for this PLU.

The PLU's are sorted by their number. When a Daily report with clear is performed the sold quantity are cleared by default.

**70h (112) Get Operators data**

Syntax	Operator
Reply	Receipts, Total, Discount, Surcharge, Void, Name
Operator	Operator's number (from 1 to 8)
Receipts	Number of fiscal receipts issued by this Operator
Total	Number of sales and Total sum, divided by"
Discount	Number of discounts and Total sum of discounts
Surcharge	Number of surcharges and Total sum of surcharges
Void	Number of Voids and Total sum of Voids
Name	Operator's name
<b>71h (113)</b>	<b>Get the number of the last printed doc (receipt, reps)</b>
Syntax	no data
Reply	DocNum
DocNum	The number of the last printed document (7 digits)
<b>72h (114)</b>	<b>Info for a fiscal No or for a fiscal period</b>
Syntax	<Closure><Type>, Closure>]
Reply	ErrorCode, TaxX (X up to 8)
Closure	Number of fiscal record
Type	Type of requested information: "0" Sums according to Tax Groups "1" Net sums according to Tax Groups "2" Accumulated taxes for each Tax Group "3" TAX rates are returned "4" Sums according to Tax Groups for a certain period "5" Net sums according to Tax Groups for a certain period "6" Accumulated taxes for each Tax Group for a period
Closure	Number of fiscal record for "4", "5" and "6". for "0", "1", "2" and "3" this field should be empty.
ErrorCode	= "F" The record is with wrong checksum and is empty
TaxX...	Sum or percentage depending on Type
<b>73h (115)</b>	<b>Programming a Graphic LOGO</b>
Syntax	<RowNum>, <Data>
Reply	no data
RowNum	Shows the row which we are programming. From 0 to 95
Data	Graphic data. The data is transferred in hexadecimal format.

The length of the data is 54 Bytes. If they are less the line is filled with "zero".  
The command allows to define a Logo with 54 x 12 mm (432 x 96 dots). The printing of Logo is activated by command 43. The Logo is printed before the header on each fiscal or non fiscal receipt. In order to define the LOGO this command shall be repeated 96 times, once for each line of the Logo. After RAM Reset the Logo is empty.

## CURRENT STATE OF THE FISCAL PRINTER

The current state of the device is encoded in a field which is 6 Bytes long and is transferred to each message, issued from the fiscal printer. Each byte of this field is described as follows:

### Byte 0 General purpose

0.7 = 1 bit 7 is reserved  
 0.6 = 1 bit 6 is reserved  
 0.7 = 1 general error - this is OR of all errors, market with "#".  
 0.4 = 1# if the printing mechanism has defected,  
 0.3 = 1 not used  
 0.2 = 1 when the date and time have not been set after the last emergency clearing of the RAM,  
 0.1 = 1# invalid code of received command  
 0.0 = 1# syntax error in received data.

### Byte 1 General purpose

1.7 = bit 7 reserved,  
 1.6 = bit 6 reserved,  
 1.5 = printer cover is opened,  
 1.4 = 1# if the contents of the RAM is destroyed i.e., emergency clearing is performed,  
 1.3 = 1# not used.  
 1.2 = 1# when emergency clearing of the RAM has been performed,  
 1.1 = 1# if the execution of the command is not permitted in the current fiscal mode  
 1.0 = 1 when at the execution of the command the sums cause an overflow in some fields.

Status 1.1 will also be set and the transfer of the data will not be executed.

### Byte 2 General purpose

2.7 = 1 bit 7 reserved,  
 2.6 = 1 not in use,  
 2.5 = 1 when a non-fiscal receipt has been opened,  
 2.4 = 1 paper near end for Journal printer  
 2.3 = 1 when a fiscal receipt has been opened,  
 2.2 = 1 no paper for Journal printer  
 2.1 = 1 paper near end. Combined flag for both printers  
 2.0 = 1# no paper. Combined flag for both printers.

**Byte 3 State of the keys**

- 3.7 = 1 bit 7 is reserved
- 3.6 = 1 not in use,
- 3.5 = 1 not in use
- 3.4 = 1 not in use
- 3.3 = 1 if SW 4 is ON, Baud rate is set up.
- 3.2 = 1 if SW 3 is ON, transparent display mode is set up
- 3.1 = 1 not in use
- 3.0 = 1 if SW 1 is ON, Auto cutting is selected.

**Byte 4 For the fiscal memory**

- 4.7 = 1 bit 7 is reserved
- 4.6 = 1 bit 6 is reserved
- 4.5 = 1 OR of all mistakes in fiscal memory, marked by "\*" by Bytes 4 and 5,
- 4.4 = 1\* no free space in fiscal memory,
- 4.3 = 1 when there is free space for less than 50 fiscal closures,
- 4.2 = 1 when there is no fiscal memory module
- 4.1 = 1 not in use,
- 4.0 = 1\* error when recording in the fiscal memory

**Byte 5 For the fiscal memory**

- 5.7 = 1 bit 7 is reserved,
- 5.6 = 1 bit 6 is reserved,
- 5.5 = 1 when the serial number and fiscal number are programmed,
- 5.4 = 1 when at least one of the tax rates fields is programmed,
- 5.3 = 1 when the device is fiscalized,
- 5.2 = 1\* not in use
- 5.1 = 1 when the fiscal memory is formatted,
- 5.0 = 1\* when the fiscal memory is in the "Read Only" mode.

## **POWER FAILURE**

The printer status is reflected in its internal status Bytes at all times. When it is switched on (after a power OFF), the commands 74 and 76 initiate the utility program to gather information on the status of the device.

The utility program must make a decision about the future behavior of the printer, depending on its status. It is guaranteed, that the fiscal memory will not be destroyed from the power failure and that the accumulated sums in the operational memory will remain valid. If the Power Failure occurs when the printer is printing, after the Power is recovered the printer will print "POWER FAIL" with double width characters and will finish the printing.

If the Power failure occurs when the printer is making a "DAILY REPORT", after the Power is recovered the printer will print "REPEAT CLOSURE" and will restart the command.

## **A. ISSUING NON-FISCAL RECEIPTS**

The receipt is opened, the text is printed and the receipt is closed. Commands 38 (26h), 39 (27h) and 42 (2Ah) are used.

## **B. FISCAL RECEIPTS**

First, a fiscal receipt is opened, then sales are registered, the payment is done and finally, the receipt is closed.

Commands – 48 (30h), 58 (3Ah), 51 (33h), 53 (35h), 54 (36h), 56 (38h) are used.

A daily financial report and clearing is performed in order to enter the information into the fiscal memory. The command 69 (49H) are used.

## **GENERATING REPORTS**

Reports are generated only by the fiscal printer and after receiving the command from the PC. The client's program cannot perform any changes on the reports when they are generated – they look exactly as they have been set up in the fiscal memory.

Initiation is done with the commands:

50 (32h) - report for tax changes and decimal point changes

69 (45h) - daily financial report with or without clearing,

108 (6Ch) - daily fiscal report with or without clearing and printing of the article sums.

79 (4Fh) / 95 (5Fh) - short financial report - date to date and number to number of the fiscal recording,

73 (49h) / 94 (5Eh) - periodic financial report - date to date and number to number on a fiscal recording.

## LOW LEVEL PROTOCOL

### A. Protocol type - Master (Host)/ Slave

The fiscal printer executes the commands, sent to it from the Host, and returns a message depending on the character of the result. The fiscal printer cannot initiate communication. Only reports, resulting from the execution of given commands, are sent to the Host. Messages in the protocol are either "packed" messages or single Bytes.

The fiscal printer maintains communication via RS232 interface at speeds of: 19200, 9600 b/s, 8N1. Speed is set from SW4

### B. Order of the messages

Host sends a packed message, containing the command, sent to the printer.

The fiscal printer executes the operation and returns a packed answer.

Host must wait for the printer's answer before sending another message.

The protocol uses non-packed codes with a length of one byte for processing the necessary pauses and error mistakes.

### C. Non-packed messages, time-out

Given normal operation of all Host messages, Slave answers not later than 60 ms, with a packed message or with a single-byte code. Host must have 500 ms time-out for getting the message from Slave. If, during this time, no answer comes, the message is repeated with the same logical number and the same command. After several unsuccessful attempts, Host indicates, that there is either no connection with the fiscal printer or that there is a hardware error.

Non-packed messages contain one byte and are:

- a. NAK 15 h

This code is sent from Slave, when there is an error in the control sum or in the form of the received message. When Host receives a NAK, a new message, with the same logical number, is transmitted.

- b. SYN 16 h

This code is sent by Slave, when the execution of the command is received needs more time. SYN is dispatched every 60 ms until the packed message is ready for an answer.

### D. Packed messages

Host to printer (Send)

```
<01><len><seq><cmd><data><05><bcc><03>
```

Printer to Host (Receive)

```
<01><len><seq><cmd><data><04><Status><05><bcc><03>
```

Where:

```
<01>          preamble
```

length 1 byte  
value 01h

<len> number of Bytes from <01> (without it) up to <05>(incl.) plus a fixed shift of 20h.  
length 1 byte  
value 20h - 7Fh

<seq> logical number of the frame  
length 1 byte  
value 20h-7Fh

The fiscal printer records the same <seq> in the reply message.  
If the FP receives a message with the same <seq> as the last message received, it will not perform an operation, but will repeat the last message it has sent.

<cmd> code of the command.  
length 1 byte  
value 20h-7Fh

The FP writes the same <cmd> in the message reply. If the printer receives a non-existing code, it replies with a "packed message" with zero length of the data field and sets the respective status bit.

<data> - data:  
length 0 - 91 Bytes for Host to Printer  
0 - 84 Bytes for Printer to Host  
value 20h-FFh

The format length of the data field depends on the command.  
If the command has no data, then the length of this field is zero.  
If there is a syntax mistake, the data is set up with the respective status bit and a "packed message" is returned with zero length of the data field.

<04> divider (only for Printer to Host messages)  
length 1 byte  
value 04h

<status> - the field with the current state of the fiscal device.  
length 6 Bytes  
value 80h - FFh

<05> post amble  
length 1 byte  
value 05h

<bee> control sum (0-FFFFh).  
length 4 byte  
value 30h - 3Fh

The sum includes from <01> and without it to <05> including.  
 Every digit from the two Bytes is sent with an added 30h.  
 For example, the sum 1AE3h is presented as 31h, 3Ah, 3Eh, 33h.

<03>	terminator
length	1 byte
value	03h

## **E. Composing messages, syntax and used symbols.**

A. The data field depends on the type of command

B. The parameters, sent to the printer, may be divided by commas and/or may have fixed length.

C. A comma between the parameters means it is obligatory.

When the different parameters are closed in <> they are obligatory, although they are not visible in the message.

When a given parameter is closed in [] it is not obligatory.

The brackets themselves are not visible in the message.

Example: When in the data field we write - 2500, 100, Text, then in that area there are:

2D 32 35 30 30 2C 31 30 30 2C 54 65 78 74 - hexadecimal digits represent the ASCII value.

**List of fiscal commands – alphabetic order**

hex				?	Prg	FUNCTION
21h	(33)	D		<b>Y</b>		Display clear text
23h	(35)	D		<b>Y</b>		Display a text on lower line of the display
26h	(38)	S				Open a non-fiscal receipt
27h	(39)	S				Close a non-fiscal receipt
2Ah	(42)	S				Print a non-fiscal free text
2Bh	(43)	I		<b>Y</b>	<b>PI</b>	Set header and footer.
2Ch	(44)	S		<b>Y</b>		Printer Paper feed
2Dh	(45)	S		<b>Y</b>	<b>SA</b>	Printer Auto cut of receipts
2Fh	(47)	D				Display a text on upper line of display
30h	(48)	S			<b>SA</b>	Open a fiscal (client's) receipt
32h	(50)	Inf				Get Tax Rates within period
33h	(51)	S		<b>Y</b>	<b>SA</b>	Display Subtotal
34h	(52)	S			<b>SA</b>	Register and display sales
35h	(53)	S		<b>Y</b>	<b>SA</b>	Register Payment
36h	(54)	S	P			Print a fiscal free text
38h	(56)	S		<b>Y</b>	<b>SA</b>	Close a fiscal (client's) receipt
39h	(57)	S				Cancel a fiscal receipt
3Ah	(58)	S		<b>Y</b>	<b>SA</b>	Register of an Article sale
3Dh	(61)	I	S	<b>Y</b>	<b>PI</b>	Set date and time
3Eh	(62)	Inf	G	<b>Y</b>	<b>PI</b>	Get back date and time
3Fh	(63)	D				Display date and time
40h	(64)	Inf				Info on last fiscal closure
41h	(65)	Inf				Info on daily taxes
43h	(67)	Inf		<b>Y</b>		Get daily statistics
44h	(68)	Inf		<b>Y</b>		Get free Fiscal No
45h	(69)	S		<b>Y</b>	<b>SA</b>	Fiscal closure (Z- or X-report)
46h	(70)	X	Reg			Register deposit and cash-out
47h	(71)	X	Rep	<b>Y</b>	<b>FR</b>	Report of diagnostic info
49h	(73)	FR		<b>Y</b>	<b>FR</b>	Report detailed of the fiscal memory (No-to-No)
4Ah	(74)	Inf		<b>Y</b>		Get 36-bit status
4Ch	(76)	S				Fiscal Transaction Status
4Fh	(79)	FR		<b>Y</b>	<b>FR</b>	Report summary of the fiscal memory by the date
50h	(80)					Sound
51h	(81)	FR		<b>Y</b>	<b>FR</b>	Monthly report
53h	(83)	I		<b>Y</b>	<b>PI</b>	Set Multiplier, Decimals, Currency and allowed taxes
59h	(89)	X				Test Fiscal Memory
5Ah	(90)	Inf		<b>Y</b>	<b>PI</b>	Get the diagnostic information
5Eh	(94)	FR		<b>Y</b>	<b>FR</b>	Report detailed of the fiscal memory (date-to-date)
5Fh	(95)	FR		<b>Y</b>	<b>FR</b>	Report summary of the fiscal memory (No-to-No)
60h	(96)	I		<b>Y</b>	<b>PI</b>	Set Tax Rates
61h	(97)	Inf		<b>Y</b>	<b>PI</b>	Get Tax Rates
62h	(98)	I		<b>Y</b>	<b>PI</b>	Set Owner Registration Number
63h	(99)	Inf		<b>Y</b>	<b>PI</b>	Get Owner Registration Number
64h	(100)	D				Display free text on display
65h	(101)	I	S	<b>Y</b>		Set operator's password

66h	(102)	I	S	<b>Y</b>		Set operator's name
67h	(103)	Inf	G			Information on a current receipt
68h	(104)	I	S	<b>Y</b>		Reset operators sales data
69h	(105)	FR	Rep	<b>Y</b>	<b>FR</b>	Report on operators
6Ah	(106)	X	S			Set Drawer opening time
6Bh	(107)	I				Define and read of Article
6Dh	(109)	S	Prt			Print last receipt as duplicate
6Eh	(110)	Inf		<b>Y</b>		Get sales data
6Fh	(111)	FR		<b>Y</b>	<b>FR</b>	Articles report
70h	(112)	Inf				Get operators data
71h	(113)	Inf		<b>Y</b>		Get number of the last printed document
72h	(114)	Inf				Information for a fiscal record or for a fiscal period
73h	(115)	I				Programming of graphic LOGO

### The set of symbols for the Fiscal Printer

		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0				0	@	P	"	P	A	P	a	p				
1			!	1	A	Q	a	Q	Б	С	б	с					
2	2		"	2	B	R	b	R	В	Т	в	т					
3	4	3	C	S	c	S	Г	У	г	у							
4	\$	4	D	T	d	T	Д	Ф	д	ф							
5	%	5	E	U	e	u	Е	Х	е	х							
6	&	6	F	V	f	v	Ж	Ц	ж	ц							
7	"	7	g	W	g	w	З	Ч	з	ч							
8	(	8	H	X	h	x	И	Ш	и	ш							
9	)	9	I	Y	I	y	Й	Щ	й	щ							
A	*	:	J	Z	j	z	К	Ъ	к	ъ							
B	+	;	K	[	k	{	Л	Ы	л	ы							
C	,	<	L	\	l		М	Ь	м	ь							
D	-	=	M	]	}	}	Н	Э	н	э							
E	.	>	N	^	n	~	О	Ю	о	ю							
F	/	?	0	_	o		П	Я	п	я							