POS Network Management

Contents

Introduction

A payment terminal (Point-of-Sale, POS) is a hardware-software device used for making transactions with bankcards.

The POS controller is a WAY4™ NetServer software component (channel).

The POS controller ensures POS network interaction with the processing centre. This interaction includes receiving and processing messages from POS terminals, searching for and registering necessary information in the WAY4 database, sending POS terminals response messagesfor operation results, etc.

This document is intended for WAY4 system administrators (bank and processing centre employees) responsible for configuring the POS network.

When working with this document, it is recommended to use the following resources from the OpenWay documentation series:

- "Acquiring Module. User Manual"
- "Terminal Key Management"
- "WAY4™ NetServer"
- "Acquiring Module. Terminal Device Attribute Setup"
- "Importing and Exporting Advanced Applications R2 (XML Format)"
- "Configuring Dynamic Key Change on POS Terminals in WAY4™" (provided according to an additional agreement with OpenWay).
- "POS Management Server. Administrator Manual".
- "Scheduler Manual".
- "Standing Payment Orders".

The following notation is used in the document:

- Field labels in screen forms are shown in *italics.*
- Screen form button labels are encased in square brackets, such as [Approve].
- Sequences for selecting user menu items are given with arrows, as in Issuing → Contracts Input & Update.
- Sequences for selecting system menu items, are given with a different type of arrow, for example Database => Change password.
- Key combinations used when working with DB Manager are shown in angular brackets as in <Ctrl>+<F3>.
- Warnings about potentially hazardous situations or actions are marked with the  sign.
- Messages marked with the  sign contain information about important features, additional options or the best use of certain system functions.

Chapter 1. POS Controller Dictionaries

Dictionaries are important sources of information used in WAY4 operation. Dictionaries are tables stored in the database that contain information of one type, for example, the POS types dictionary, POS messages dictionary, etc.

Two types of dictionary are used in WAY4:

- Custom – dictionaries whose content may be modified by the user.
- Fixed – dictionaries whose content can only be modified by the WAY4 vendor; in some cases, dictionary data can be modified by authorised specialists of the bank or processing centre, under the supervision of WAY4 vendor representatives.

Custom POS Dictionaries

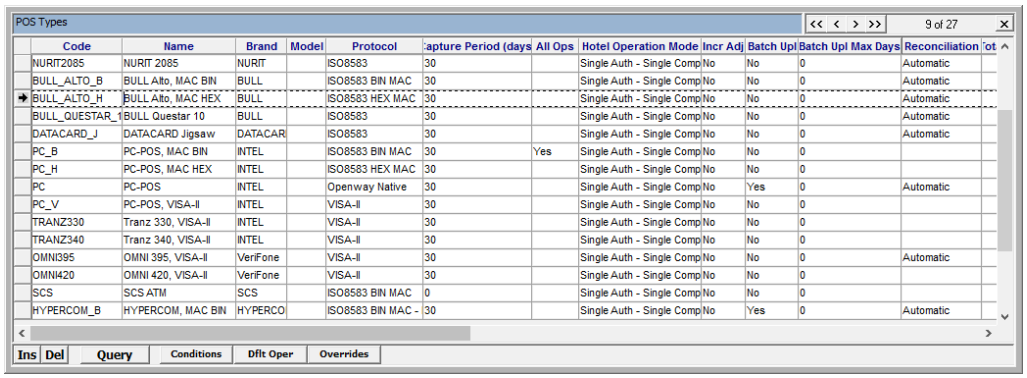
POS Types Dictionary

All types of POS terminals interacting with WAY4 must be registered in a special POS Types dictionary.

A POS type is selected from a list during device configuration (see the section "Information about Devices" of the document "Acquiring Module User Manual").

The POS Types dictionary is accessed by selecting the user menu item "Full → Configuration Setup → Merchant Device Setup → POS Types".

Selecting this item opens the "POS Types" grid form (see Fig. 1).


POS Types

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Code	Name	Brand	Model	Protocol	apture Period (days	All Ops	Hotel Operation Mode	Incr Adj	Batch Upl	Batch Upl Max Days	Reconciliation	ot
NURIT2085	NURIT 2085	NURIT		ISO8583	30		Single Auth - Single Comp	No	No	0	Automatic	
BULL_ALTO_B	BULL Alto, MAC BIN	BULL		ISO8583 BIN MAC	30		Single Auth - Single Comp	No	No	0	Automatic	
BULL_ALTO_H	BULL Alto, MAC HEX	BULL		ISO8583 HEX MAC	30		Single Auth - Single Comp	No	No	0	Automatic	
BULL_QUESTAR_1	BULL Questar 10	BULL		ISO8583	30		Single Auth - Single Comp	No	No	0	Automatic	
DATACARD_J	DATACARD Jigsaw	DATACAR		ISO8583	30		Single Auth - Single Comp	No	No	0	Automatic	
PC_B	PC-POS, MAC BIN	INTEL		ISO8583 BIN MAC	30	Yes	Single Auth - Single Comp	No	No	0		
PC_H	PC-POS, MAC HEX	INTEL		ISO8583 HEX MAC	30		Single Auth - Single Comp	No	No	0		
PC	PC-POS	INTEL		Openway Native	30		Single Auth - Single Comp	No	Yes	0	Automatic	
PC_V	PC-POS, VISA-II	INTEL		VISA-II	30		Single Auth - Single Comp	No	No	0		
TRANZ330	Tranz 330, VISA-II	INTEL		VISA-II	30		Single Auth - Single Comp	No	No	0		
TRANZ340	Tranz 340, VISA-II	INTEL		VISA-II	30		Single Auth - Single Comp	No	No	0		
OMNI395	OMNI 395, VISA-II	VeriFone		VISA-II	30		Single Auth - Single Comp	No	No	0	Automatic	
OMNI420	OMNI 420, VISA-II	VeriFone		VISA-II	30		Single Auth - Single Comp	No	No	0		
SCS	SCS ATM	SCS		ISO8583 BIN MAC	0		Single Auth - Single Comp	No	No	0		
HYPERCOM_B	HYPERCOM, MAC BIN	HYPERCO		ISO8583 BIN MAC -	30		Single Auth - Single Comp	No	Yes	0	Automatic	

Ins Del Query Conditions Dflt Oper Overrides

Fig. 1. Table of POS types registered in the system

This table contains the following fields:

- *Code* – terminal type code used when loading acquiring module applications (see the document "Importing and Exporting Advanced Applications R2 (XML Format)").
- *Name* – POS type name in WAY4.
- *Brand* – POS manufacturer brand name: Bull, Datacard, Hypercom, Intel, Nurit, Olivetti, SCS, VeriFone, etc.

- *Model* – POS model.
- *Protocol* – protocol name (see "POS Protocols").
- *Capture Period (days)* – period (in calendar days) following the date of a preauthorization ("Pre-Auth") during which its confirmation ("Authorization Confirmation") or reversal ("Pre-Auth Reversal") is expected. When this period expires, processing of operations related to "Pre-Auth" will be completed with the error "Capture period expired". The "0" value indicates that the period is not limited.
- *All Ops* – the "Yes" value in this field allows all operations compatible with this terminal type for be enabled for this POS type (according to the settings in the form "Operations for <POS terminal name>", see the section "Configuring Executable Operations"). It is not recommended to set the "No" value in this field.

   When the "No" value is set in the *All Ops* field, a custom list of operations will be used for the terminal. This functionality is obsolete and remains for backward compatibility.

   It is recommended to limit the list of allowed operations for a POS terminal on the device Service Package level (see the document "WAY4™ Service Packages").
- *Hotel Operation Mode* – hotel operation mode (class of operations related to deferred payment for services when the final amount is generated according to the results of using these services; for example: car rental, hotel room booking, etc., with the ability to prolong the term of using the service):
  - "Single Auth – Single Compl" – preauthorisation ("Pre-Auth") is made, after which the "Authorization Confirmation" operation is executed, corresponding to authorisation (the amount of the financial operation may differ from the amount of preauthorisation; either increased or decreased).
  - "Multiple Auth – Single Compl" – several preauthorisation operations are executed sequentially (for example, when a guest extends his or her hotel stay) after which the final operation "Authorization Confirmation" is executed, generating a financial document (the amount of the financial document may be smaller or larger than the amount of preauthorization documents created earlier).
  - "Multiple Auth – Multiple Compl" – mode in which several preauthorisation operations "Pre-Auth" and several "Authorization Confirmation" operations are executed sequentially. The procedure for processing operations is determined by the sequence of client and hotel personnel actions. For example, the hotel may make intermediate "Authorization Confirmation" operations, debiting funds from the client account for additional services after a certain number of days following the first or subsequent authorizations. The amount of generated financial documents may differ from the amount blocked on the card for authorizations belonging to this chain.

Support of processing operations in "Multiple Auth – Multiple Compl" mode is optional functionality and is provided according to a separate agreement with the WAY4 vendor.

WAY4 supports the capability to process several chains of hotel operations made with the same card if settlement operations ("Authorization Confirmation") were made in an order differing from that of preauthorisations. For example, a client, using the same card within a certain time interval reserves several hotel rooms, uses services related to them and pays for them at different points in time. In this case, authorization and settlement operations are linked by a booking number that must be transmitted by the hotel's POS terminal.

For the corresponding terminal type, limits can be set on the permissible difference between the amounts of preauthorization and the final financial operation. If the amount of the financial operation does not meet these conditions, this operation will be declined. Limits are set in the "Conditions for <POS terminal name>" form (opened by clicking the [Conditions] button).

The absence of limits assumes that the amount of a financial operation must correspond exactly to the amount of the preauthorization operation(s). This condition is significant for ""Single Auth – Single Compl" or "Multiple Auth – Single Compl" scenarios. For "Multiple Auth – Multiple Compl" mode, it is mandatory to specify a limit for the permissible difference in operation amounts. Otherwise, it is not guaranteed this mode will operate correctly.

"Multiple Auth – Multiple Compl" mode is not intended for processing e-commerce operations in which a client makes one payment (one preauthorization) for purchases through a merchant aggregator's interface but the goods are shipped separately (several settlement operations). Support of such operations ("Single Auth – Multiple Compl") is optional functionality and is provided according to an additional agreement with the WAY4 vendor. There is no guarantee WAY4 will operate correctly if "Multiple Auth – Multiple Compl" is used to support partial shipments.

- *Incr Adj* – the "Yes" value in this field allows an adjustment document increasing the transaction amount to be created (for the "Hypercom" protocol).
- *Batch Upl* – the "Yes" value in this field enables the mode to maintain this type of POS terminal's financial cycles in WAY4 (generation of operation counters, reconciliation and export of totals (Batch Upload)).
- *Reconciliation* – reconciliation mode (for more information, see the section Reconciliation"). This parameter regulates processing of possible discrepancies between data generated online and data received on upload through the POS Management Server ("Batch Upload" operation):
  - "Automatic" – adjustment documents for automatic processing are generated (*Posting Status* = "Waiting"). Documents are generated on the condition that the transaction information received on upload is correct.

- "Manual All" (default) – adjustment documents are generated that must be processed manually (*Posting Status* = "Under Workflow");
- "Manual Reversal" – adjustment documents are generated; only reversal documents must be manually processed.

For more information on the principles of generating reconciliation documents, see Table 1.

Table 1. Principles of generating reconciliation documents

Discrepancy	Operation Type	Reconcilation		
		Automatic	Manual Reversal	Manual All
The operation is present in the upload (according to Batch Upload data), but is missing according to online data	All	A document with the "Waiting" status is created	A document with the "Waiting" status is created	A document with the "Under Workflow" status is created
The operation is missing in the upload (according to Batch Upload data), but is present in online data online	Direct Transaction	A reversal document with the "Waiting" status is created	A reversal document with the "Under Workflow" status is created	A reversal document with the "Under Workflow" status is created
	Reversal	The status of a reversal document is changed to "Rejected"	The status of a reversal document is changed to "Under Workflow"	The status of a reversal document is changed to "Under Workflow"

If an online operation registered in the database is missing in upload and "Automatic" mode is set, a reversal document is only created for a document in the "Posting" status. If a document was in the "Waiting" status, a reversal document is not created and depending on the value of the global parameter SOFT_BATCH_UPLOAD:

- "N" (default) – the document goes to the "Rejected" status.
- "Y" – the document goes to the "Suspended" status.

- *Totals Calculation Scheme* – mode for calculating totals. Possible values are: "0" (default) or "1" (mode №1), "2" (mode №2) (see "Totals Calculation Modes"). The recommended value is "2".

  Note that POS software must support the selected scheme.

- *Batch Upl Max Days* – maximum number of days with respect to the date of opening a cycle during which batch upload must be executed for this cycle. If upload was not executed within the set period, the POS terminal will be prohibited from further making online operations (until Batch Upload is executed). The "0" value means the period is not limited.
- *Strong Counters* – mode for checking POS counters:

  - "No" – amounts of internal POS counter values are compared with the amounts of counters in the database.
  - "Yes"– total financial amounts of internal POS counters are compared with the amounts of the corresponding counters in the database; the number of operations recorded by the corresponding counters is also compared.
- *Mac Type* – MAC (Message Authentication Code) calculation mode:
  - "Binary"
  - "Hexadecimal"
- *Key Hierarchy* – key hierarchy, see the document "Configuring Dynamic Key Change on POS Terminals in WAY4™" (optional feature, provided according to an additional agreement with OpenWay).
- *Key Idt Scheme* – key identification scheme, see the document "Configuring Dynamic Key Change on POS Terminals in WAY4™" (optional feature, provided according to an additional agreement with OpenWay).
- *Transaction Attributes* – additional parameters of a transaction.
- *Special Configuration* – list of tags affecting the processing of data received from POS (the ";" character is used as a delimiter). A list of some tags is provided in the document "Acquiring Module. Terminal Device Attribute Setup".

  The tag values specified in this field can be redefined depending on the transaction conditions in the "Overrides for <device type>" form that opens using the [Overrides] button (see the description for Fig. 5).
- *AutoRepeat/Reversal Time* – the period of time (in minutes) during which a request from a terminal to execute an operation is interpreted as an AutoRepeat, AutoReversal or AutoAdvice message, on the condition that:
  - An indicator of the corresponding automatic operation (AutoRepeat/AutoReversal/AutoAdvice) is set in the message.
  - The operation's STAN matches the corresponding number of the earlier operation.
  - The operation's amount matches the earlier operation.
  - If the parameter value is set to "0":For terminal types with Batch Upload capability (*Batch Upl* = "Yes"), the period is not limited.
  - For terminal types with *Batch Upl* = "No" – 1440 minutes (24 hours).
- *Repeat Time (min)* – this field is not used. It is shown for backward compatibility.

In this form, click the [Ins] button to add a record to this table; click [Del] to delete a record.

If an attempt is made to delete a "POS Types" table record that corresponds to a POS type for which a device contract is registered in WAY4 (see the section "Information about Device Contracts" of the document "Acquiring Module User Manual"), the following warning message may be displayed (see Fig. 2).

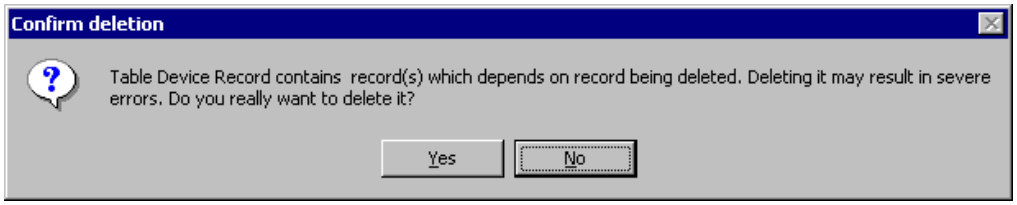


Fig. 2. Warning that an attempt has been made to delete a record to which device contracts refer

To confirm deletion, click [Yes]; to cancel deletion, click [No].

The [Conditions] button opens the "Conditions for <POS terminal name>" form containing a list of conditions for setting the permissible difference between the amounts of "Authorization Confirmation" and "Pre-Auth" operations.

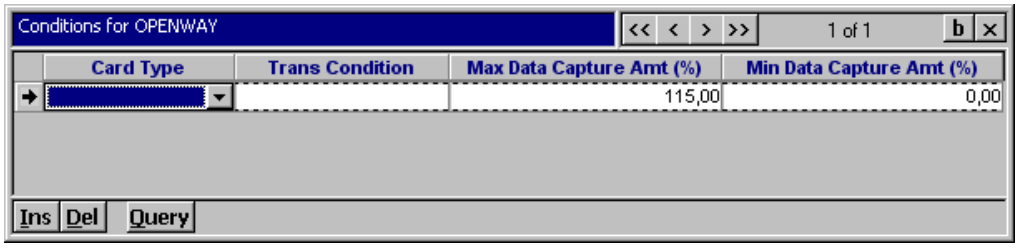


Fig. 3. List of conditions for executing operations

This table contains the following fields:

- *Card Type* – card contract type ("Full → Configuration Setup → Contract Types → Card Contract Types").
- *Trans Condition* – transaction condition; the "Transaction Conditions" dictionary contains a list of all conditions registered in WAY4.
- *Max Data Capture Amnt (%)* – maximum difference (as a percentage) in the value of an "Authorization Confirmation" operation from a "Pre-Auth" operation.
- *Min Data Capture Amnt (%)* – minimum difference (as a percentage) in the value of an "Authorization Confirmation" operation from a "Pre-Auth" operation.

In this form, click the [Ins] button to add a record to this table; click [Del] to delete a record.

The [Dflt Oper] button opens the "Dflt Oper for <POS terminal name>" form (see Fig. 4) containing a list of operations that will be applied by default to the terminal.

This setting is relevant if the *All Ops* field of the "POS Types" form (see Fig. 1) contains a value other than "Yes" (see "Configuring Executable Operations for POS Terminals". It is not recommended to set this value.

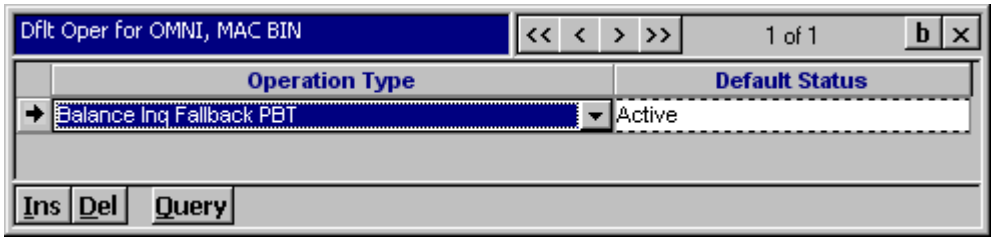


Fig. 4. List of default operations

This table contains the following fields:

- *Operation Type* – operation type. The "POS Operations" system dictionary contains a list of all POS operations.
- *Default Status* – operation status. The field may have the "Active", "Inactive" or "Closed" status.

In this form, click the [Ins] button to add a record to this table; click [Del] to delete a record.

The [Overrides] button opens the "Overrides for <device type>" form that is used to redefine the tag values set in the *Special Configuration* field for the corresponding terminal type depending on transaction conditions (see Fig. 5).

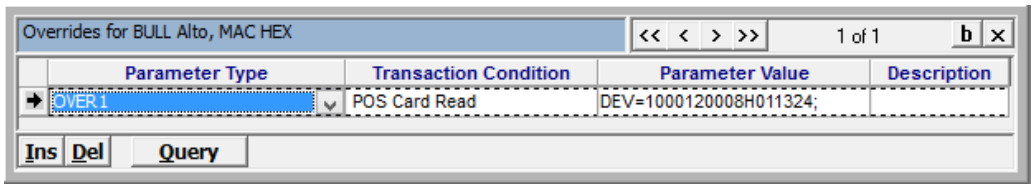


Fig. 5. Redefining the parameters for a terminal type

The form contains the following fields:

- *Parameter Type* – drop-down list to select a parameter type registered in WAY4.

  New parameter types can be registered in the "Device Configurator Item Type" form (the user menu item "Full → Configuration Setup → Merchant Device Setup → Device Configurator Item Type").

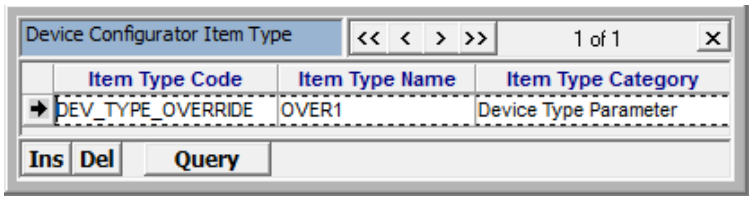


Fig. 6. Registering a configuration parameter type

  Parameter types to redefine tags in the *Special Configuration* field must be registered with the DEV_TYPE_OVERRIDE code.

- *Transaction Condition* – drop-down list to select a transaction condition registered in the "Transaction Conditions" system dictionary.
- *Parameter Value* – parameter value of the specified type that will be used in the appropriate transaction conditions; the example in Fig. 5 shows that when a transaction is made with a card on the devices of the corresponding type, the DEV tag's value will be redefined.

- *Description* – arbitrary description.

The [Ins] and [Del] button in the "Overrides for <device type>" form are used to add and delete records.

Fixed Dictionaries

POS Protocols Dictionary

POS protocols regulate message formats and rules for information exchange between POS terminals and the processing centre.

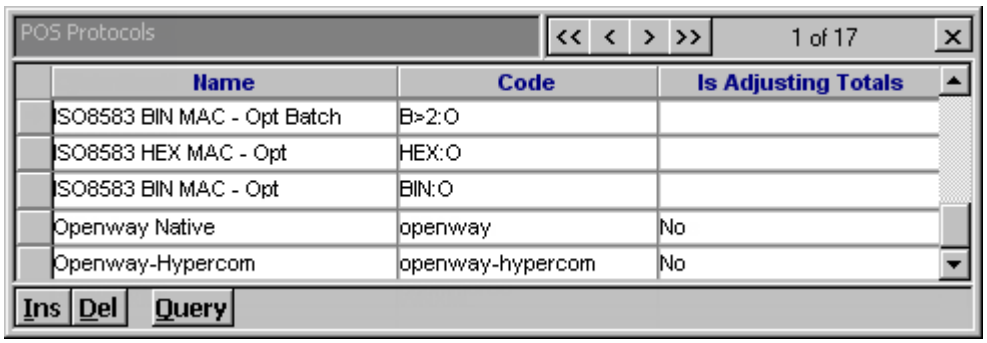


Fig. 7. Protocol types for information exchange between POS terminals and the processing centre

The protocol dictionary table (see Fig. 7) contains the following fields:

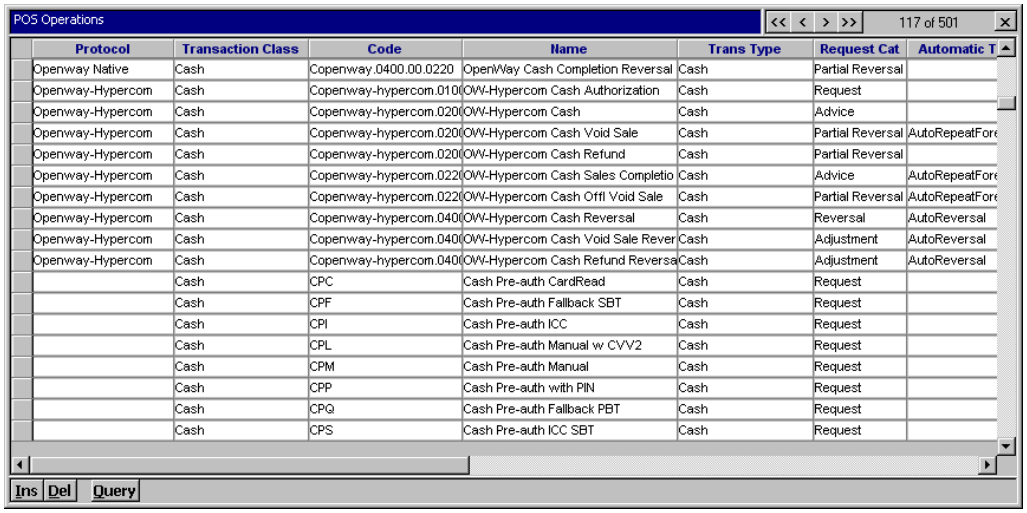
- *Name* – protocol name.
- *Code* – protocol code, unique within WAY4.
- *Is Adjusting Totals* – specifies the mode for recording reversals and adjustments in counters generated in a cycle. Possible values:
  - "Yes" – reversals and adjustments are recorded in the same counters as the original operations, decreasing the number of operations recorded by the counter and the total financial amount..
  - "No" – reversals (including adjustments) will be recorded in counters separate from those for the corresponding original operations.

Note that users are not permitted to change the values in this form's fields.

For terminals using an OpenWay protocol, the "Openway Native" protocol must be used. In other cases, it is recommended to contact OpenWay support for additional consultation.

POS Operations Dictionary

Each POS terminal contract in WAY4 is assigned a set of operations and a set of hardware components (see "POS Hardware Types") required to execute these operations.



Protocol	Transaction Class	Code	Name	Trans Type	Request Cat	Automatic T
Openway Native	Cash	Copenway.0400.00.0220	OpenWay Cash Completion Reversal	Cash	Partial Reversal	
Openway-Hypercom	Cash	Copenway-hypercom.010(	OW-Hypercom Cash Authorization	Cash	Request	
Openway-Hypercom	Cash	Copenway-hypercom.020(	OW-Hypercom Cash	Cash	Advice	
Openway-Hypercom	Cash	Copenway-hypercom.020(	OW-Hypercom Cash Void Sale	Cash	Partial Reversal	AutoRepeatFore
Openway-Hypercom	Cash	Copenway-hypercom.020(	OW-Hypercom Cash Refund	Cash	Partial Reversal	
Openway-Hypercom	Cash	Copenway-hypercom.022(	OW-Hypercom Cash Sales Completio	Cash	Advice	AutoRepeatFore
Openway-Hypercom	Cash	Copenway-hypercom.022(	OW-Hypercom Cash Offl Void Sale	Cash	Partial Reversal	AutoRepeatFore
Openway-Hypercom	Cash	Copenway-hypercom.040(	OW-Hypercom Cash Reversal	Cash	Reversal	AutoReversal
Openway-Hypercom	Cash	Copenway-hypercom.040(	OW-Hypercom Cash Void Sale Rever	Cash	Adjustment	AutoReversal
Openway-Hypercom	Cash	Copenway-hypercom.040(	OW-Hypercom Cash Refund Reversa	Cash	Adjustment	AutoReversal
	Cash	CPC	Cash Pre-auth CardRead	Cash	Request	
	Cash	CPF	Cash Pre-auth Fallback SBT	Cash	Request	
	Cash	CPI	Cash Pre-auth ICC	Cash	Request	
	Cash	CPL	Cash Pre-auth Manual w CVV2	Cash	Request	
	Cash	CPM	Cash Pre-auth Manual	Cash	Request	
	Cash	CPP	Cash Pre-auth with PIN	Cash	Request	
	Cash	CPQ	Cash Pre-auth Fallback PBT	Cash	Request	
	Cash	CPS	Cash Pre-auth ICC SBT	Cash	Request	

Fig. 8. POS Operations Dictionary

The POS Operations Dictionary (see Fig. 8) contains the following fields:

- *Protocol* – protocol name (see "POS Protocols").
- *Transaction Class* – financial transaction type:
  - "Cash" – cash disbursement.
  - "Retail" – retail operation.
  - "Unique" – transaction at a casino, etc.
- *Code* – operation code.
- *Name* – operation name.
- *Trans Type* – transaction type.
- *Request Cat* – request/advice category of the document generated according to the transaction message.
  - "Request" – request to make a transaction.
  - "Advice" – notification that a transaction has been made.
  - "Reversal" – notification that a transaction has been reversed.
  - "Part Reversal" – notification of a transaction's partial reversal.
  - "Adjustment" – notification that the transaction amount has been adjusted.
  - "Post Advice" – message that can be sent after the transaction is executed.
- *Automatic Tag* – this field is filled in for operations that are executed automatically.
- *Category* – financial/authorisation message category.
- *Service Class* – transaction classification; this parameter specifies the way the document will be processed in WAY4; an empty value in this field means the default value "Transaction" is used.
- *Is Online* – specifies whether a request to the issuer is made when a transaction is executed.

- *Date* – method for determining transaction date:
  - "From Terminal" –transaction date and time is determined according to data received from the POS terminal.
  - "From Host" – transaction date and time is determined according to the time of the server processing the request received from the terminal.
- *Is Checked* – drop-down list for specifying whether a service card check is required (the "Yes" value) when executing credit transactions; the "No" value or an empty value specifies that when executing this transaction, the cashier's service card does not need to be checked.
- *Trans Cond* – drop-down list for specifying transaction execution conditions (used for backward compatibility).
- *Special Parameters* – special parameters of the transaction.
- *Document Tag* – additional tags in a document generated as a result of executing the operation.

⚠ Note that users are not permitted to change the values in the fields of the "POS Operations" form.

POS Hardware Types Dictionary

Each POS terminal contract in WAY4 has hardware components required for executing operations on the POS Terminal (see "POS Operations"). The list of POS hardware components contains "virtual" components.

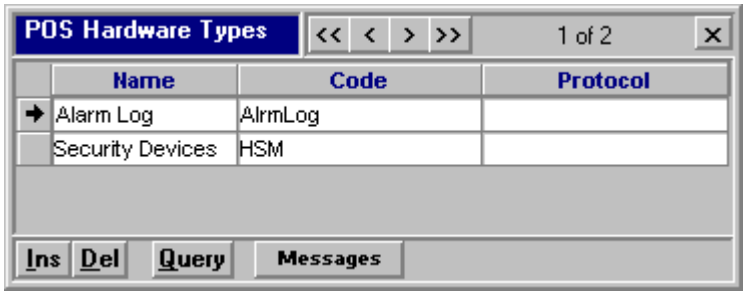


Fig. 9. POS Hardware Types Dictionary

The POS hardware dictionary (see Fig. 9) contains the following fields:

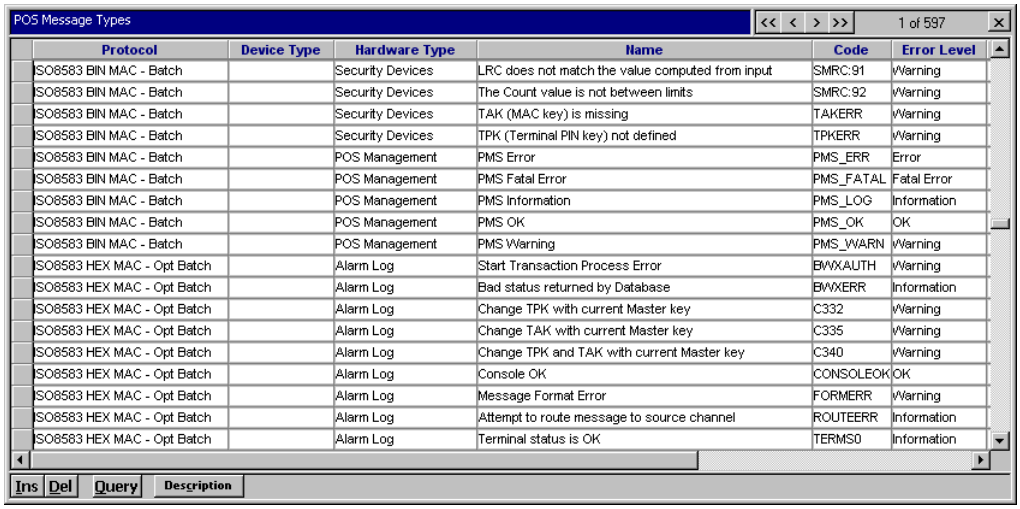
- *Name* – component name.
- *Code* – code of the component in WAY4.
- *Protocol* – the type of protocol for the component (this field is not filled in for components that are compatible with all registered protocol types).

⚠ Note that users are not permitted to change the values in this form's fields.

The [Messages] button opens the "Messages for <name of hardware component>" form, containing a list of messages generated in WAY4 when working with this component (see "POS Message Types").

POS Message Types Dictionary

When a POS terminal is in operation, certain messages may be generated in WAY4 corresponding to specific POS terminal components.


POS Message Types

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Protocol	Device Type	Hardware Type	Name	Code	Error Level
ISO8583 BIN MAC - Batch		Security Devices	LRC does not match the value computed from input	SMRC:91	Warning
ISO8583 BIN MAC - Batch		Security Devices	The Count value is not between limits	SMRC:92	Warning
ISO8583 BIN MAC - Batch		Security Devices	TAK (MAC key) is missing	TAKERR	Warning
ISO8583 BIN MAC - Batch		Security Devices	TPK (Terminal PIN key) not defined	TPKERR	Warning
ISO8583 BIN MAC - Batch		POS Management	PMS Error	PMS_ERR	Error
ISO8583 BIN MAC - Batch		POS Management	PMS Fatal Error	PMS_FATAL	Fatal Error
ISO8583 BIN MAC - Batch		POS Management	PMS Information	PMS_LOG	Information
ISO8583 BIN MAC - Batch		POS Management	PMS OK	PMS_OK	OK
ISO8583 BIN MAC - Batch		POS Management	PMS Warning	PMS_WARN	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Start Transaction Process Error	BWXAUTH	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Bad status returned by Database	BWXERR	Information
ISO8583 HEX MAC - Opt Batch		Alarm Log	Change TPK with current Master key	C332	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Change TAK with current Master key	C335	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Change TPK and TAK with current Master key	C340	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Console OK	CONSOLEOK	OK
ISO8583 HEX MAC - Opt Batch		Alarm Log	Message Format Error	FORMERR	Warning
ISO8583 HEX MAC - Opt Batch		Alarm Log	Attempt to route message to source channel	ROUTEERR	Information
ISO8583 HEX MAC - Opt Batch		Alarm Log	Terminal status is OK	TERMS0	Information

Ins Del Query Description

Fig. 10. Table of messages generated during POS terminal operation

The POS Message Types dictionary (see Fig. 10) contains the following fields:

- *Protocol* – name of protocol (see "POS Protocols"), for which this type of message may be generated. If the field is empty, a message may be generated for any protocol.
- *Device Type* – type of POS terminal registered in the system; this field is used to differentiate messages by device type; for example, when executing the same operation (with the same value in the *Code* field) on different types of POS terminals, messages with different values in the *Error Level* field may be generated.
- *Hardware Type* – POS terminal hardware component (see "POS Hardware Types"), for which the message is generated.
- *Name* – message description.
- *Code* – message code.
- *Error Level* – error severity level specified in the message generated by the controller or WAY4 during the corresponding procedures.
- *Group Code* – service field.
- *Security* – access level (number). Users in the group for which an access level number is specified that is equal to or more than the number in this field will have access to the operation.

  User group access levels are specified in the Security Level field of the "Constants for <group name>" form opened by clicking the [Constants] button in the "User Groups and Users - View" form (Full → DB Administrator Utilities → Users & Grants → User Groups and Users – View).
- *Usage Operation* – service field.

Note that it is not permitted to change the values in the fields of this form.

The [Description] button opens the "Description for <message description>" form, containing additional information for a message.

Chapter 2. POS Description and Configuration

Configuring POS Terminal Contracts

POS terminal contract parameters are described in the section "Information about Device Contracts" of the document "Acquiring Module User Manual".

Configuring Executable Operations for POS Terminals

Executable operations for POS terminals are configured using the "Operations for <POS terminal name>" form (see Fig. 11).

Functionality for configuring executable operations for POS terminals is obsolete and supported for backward compatibility.

It is recommended to limit the list of executable operations for a POS terminal on the device's Service Package level (see the document "WAY4™ Service Packages").

This form can be opened in two ways:

- After selecting the user menu item "Acquiring → POS/Imprinter Controller → POS Management", in the "POS Management" form that opens, select the required POS terminal and click the [Operations] button.
- After selecting the user menu item "Acquiring → Acquiring Contracts → Acquiring Contracts", select the required account contract, click the [Devices] button in the account contract form, select the POS terminal and click the [POS] button in the device contract form. The "POS for <POS terminal name>" form will open. Click the [Operations] button in this form.

The "POS Management" form is the same as the "POS for <POS terminal name>" form, a description of which is given in the section "POS Terminals" of the document "Acquiring Module User Manual".

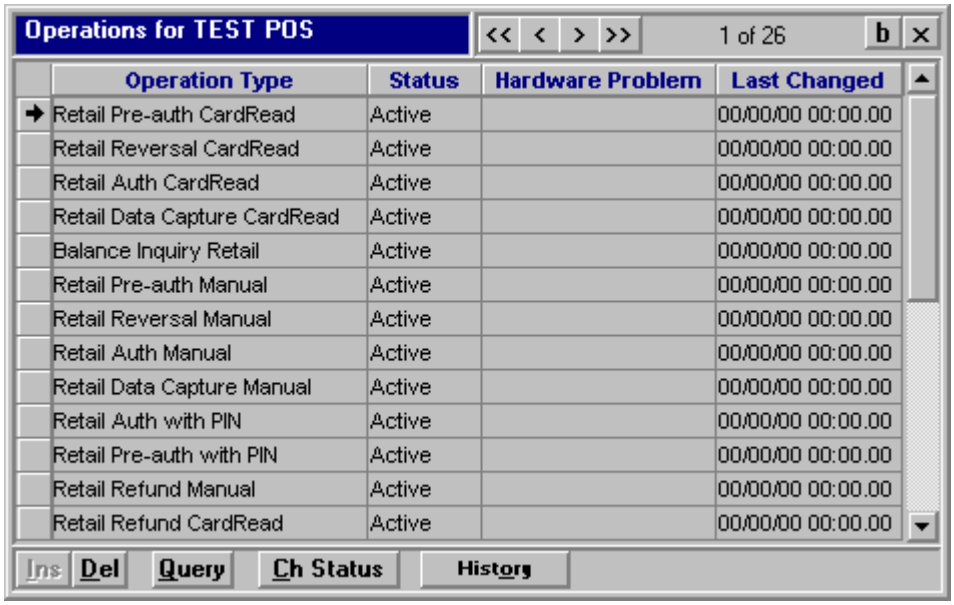

Fig. 11. List of executable operations for the POS terminal

To fill in the list of executable operations for the first time, click the [Setup] button in the device configuration form ("POS Management" or "POS for <POS terminal name>") and choose the "Check and Fill" context menu. The list of operations is generated with consideration of the following:

- If the "POS Types" form's *All Ops* field value is "Yes" for the corresponding terminal type (see "POS Types Dictionary"), the list is not filled in (all operations compatible with the protocol for this terminal type will be available for the POS terminal).
- If the *All Ops* field value differs from "Yes", the list will contain operations from the "POS Operations" list (see "POS Types Dictionary") available for this terminal type; all operations (with the exception of the case described in the next item) will have the "Closed" status.
- If operations permitted by default are defined for the corresponding terminal type (in the "Dflt Oper for <POS terminal name>" form), after the list has been loaded, these operations will have the "Active" status.

To delete an operation from the list of executable operations, select the required row in the table and click [Del].

An operation can also be prohibited by changing its status. To do so, click the [Ch Status] button. Clicking this button changes the status of the executable operation from "Active" to "Closed".

The *Last Changed* field contains the date and time the operation's status was last changed.

The [History] button in the "Operations for <POS terminal name>" form (see Fig. 11) opens a form with the operation's status change history.

The list of executable operations can be restored after rows are deleted from the table in the device configuration form ("POS Management" or "POS for <POS terminal name>") by clicking the [Setup] button and selecting the context menu item "Check and Fill".

Specifying Encryption Keys

Encryption keys are created by the security officer using encryption equipment and include a fixed number of digits.

Encryption keys are only stored in WAY4 and the PIN pad encrypted under another key. A check value is used to verify the encryption key. This value is only specified by the encryption key value and does not depend on how it was encrypted.

The "Keys for <POS terminal name>" form (see Fig. 12) is used to specify encryption keys. This form is opened by clicking the [Keys] button in the device configuration form ("POS Management" or "POS for <POS terminal name>").

The "POS Management" form is the same as the "POS for <POS terminal name form>", described in the section "POS Terminals" of the document "Acquiring Module User Manual".

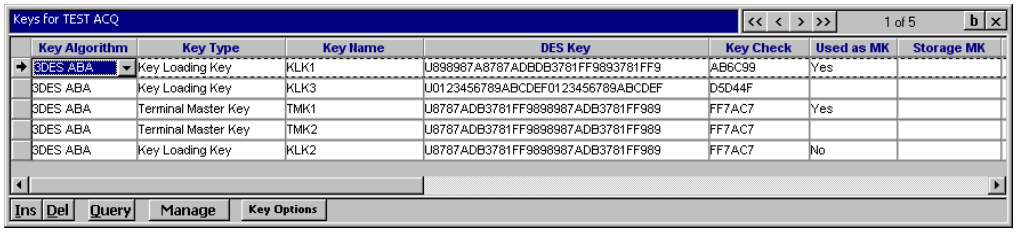

Fig. 12. Form for specifying POS terminal encryption keys

This form contains the following fields:

- *Key Algorithm* – encryption algorithm for which this key will be used.
- *Key Type* – encryption key type selected from a list generated from the "PM Key Types" system dictionary.
- *Key Name* – encryption key name.
- *DES Key* – encryption key value.
- *Key Check* – encryption key check value.
- *Used As MK* – specifies whether the key will be used as the master key.
- *Storage MK* – specifies the master key used to encrypt this key when sending it to the terminal.
- *Serial Number* – key identifier distinguishing it among keys of the same type.
- *Is Active* – specifies (when the "Yes" value is set) that the encryption key can be used; an empty value in this field corresponds to the "No" value.
- *Date From* – the start date of the interval during which this key can be used.
- *Date To* – the end date of the interval during which this key can be used.
- *Max Usage* – a number specifying how many times this encryption key can be used.
- *Max Wrong Attempts* – number of attempts to incorrectly use the key before it is blocked.

- *Wrong Attempts Threshold* – when this value is exceeded, a signal about incorrect attempts to use the key will be made.
- *Current Usage* – the current value of this encryption key's usage counter.
- *Wrong Attempts* – counter of attempts to use the key incorrectly.
- *Storage Form* – the form in which the key is stored in the database.
- *Key Code* – the *Key Type* value shown in the form specified in the *Storage Form* field.
- *Parent Key* – parent key.
- *Add Data*. – additional data.

The [Manage] button in the "Keys for <POS terminal name>" form (see Fig. 12) opens the "DES Management Mode" form used for manual generation of keys (see Fig. 13).

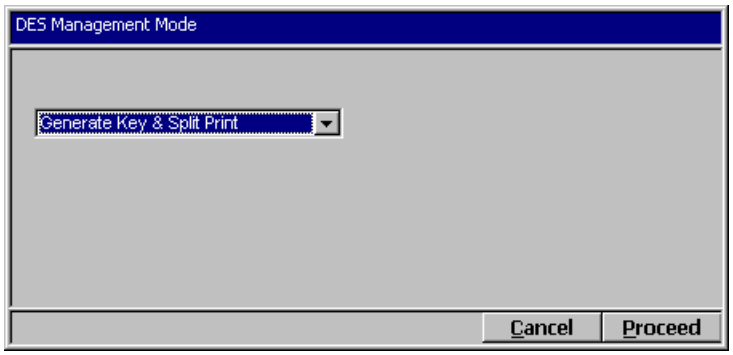

Fig. 13. Form for manual generation of keys

To confirm changes, click the [Proceed] button, to cancel, click [Cancel].

The [Key Options] button in the "Keys for <POS terminal name>" form (see Fig. 12) opens the "Key Options for Terminal PIN Key" form, used to store and enter key parameters (see Fig. 14).

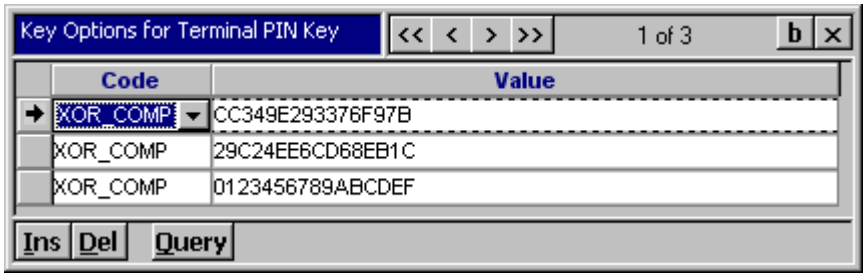

Fig. 14. Additional key parameters

This form contains the following fields:

- *Code* – key parameter code.
- *Value* – code value.

In this form, click the [Ins] button to add a record to this table; click [Del] to delete a record.

Enabling MAC Mode

To enable MAC (Message Authentication Code) mode, set the "Mandatory" value in the *Mac Status* field of the device configuration form ("POS Management" or "POS for <POS terminal name>"). The mode is disabled if the "None" value is set in this field.

The "POS Management" form is the same as the "POS for <POS terminal name form>", described in the section "POS Terminals" of the document "Acquiring Module User Manual".

Mandatory PIN Mode

To enable the mode for mandatory PIN entry when executing any operation on a POS terminal, set the "Mandatory" value in the *PBT Status* field of the device configuration form ("POS Management" or "POS for <POS terminal name>"). If the "Optional" value is set in this field, a PIN is only required for operations for which PIN entry is mandatory. When the "None" value is set in this field, operations for which PIN entry is mandatory cannot be executed on this POS terminal.

The "POS Management" form is the same as the "POS for <POS terminal name form>", described in the section "POS Terminals" of the document "Acquiring Module User Manual".

A value in this field can be redefined depending on a *Transaction Condition* using the DEV tag (Subfield YYYY, see the document "Acquiring Module. Terminal Device Attribute Setup") specified as the value that redefines the parameter for the corresponding device type (see "POS Types Dictionary"). If at least one of the bits:

- 4th bit – "Online PIN (default for simple PIN)"
- 5th bit – "(reserved) OffLine PIN clear"
- 6th bit – "(reserved) Offline PIN encrypted (default for offline PIN)"

is specified in "Subfield YYYY", this is interpreted as *PBT Status*="Optional". If none of these bits are specified in the redefining parameter, the "None" value is used. DEV tag values have a higher priority than the value of the *PBT Status* fields.

Connecting POS Terminals

The scheme for connecting POS terminals to WAY4 is shown in Fig. 15.

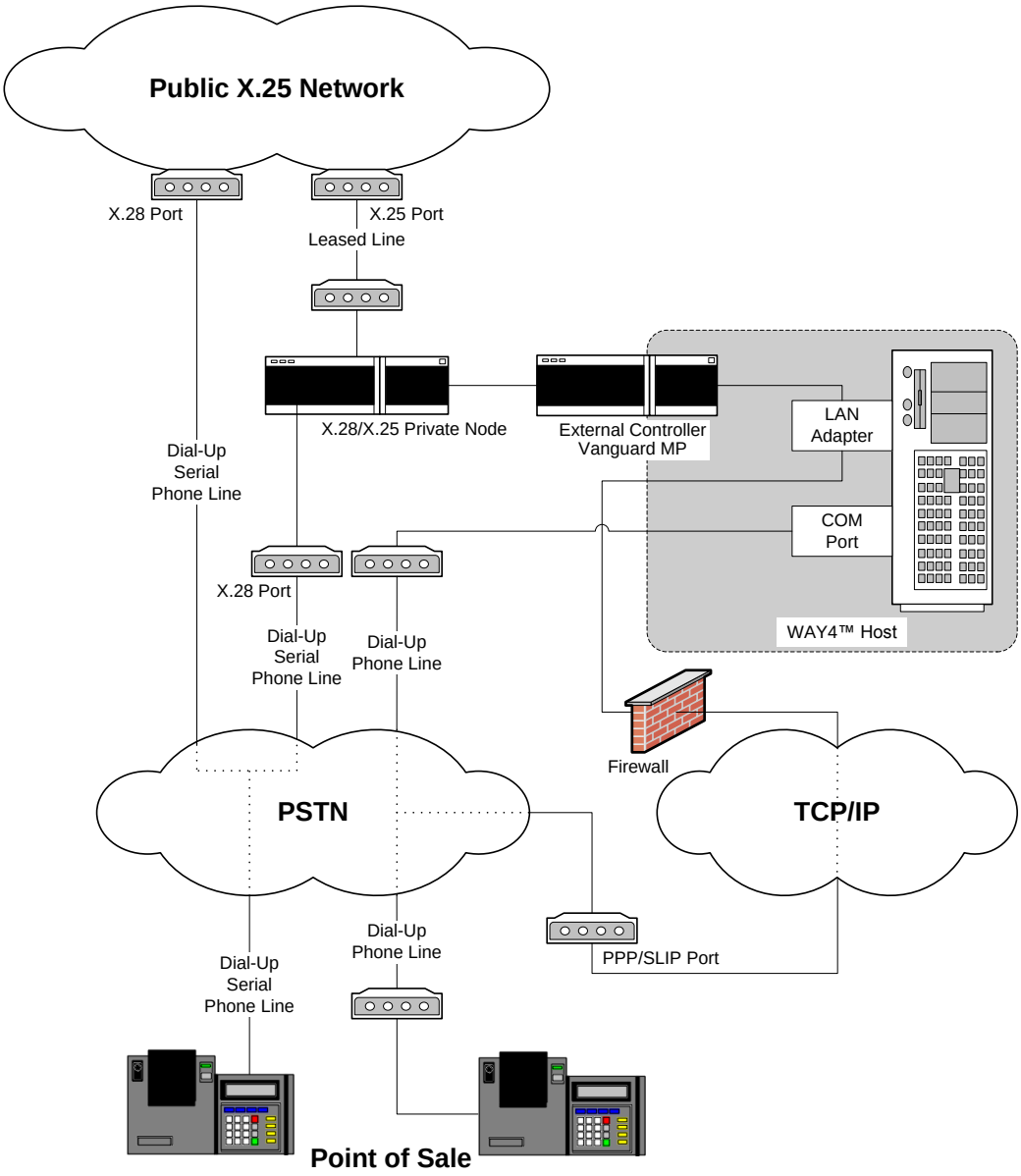

Fig. 15. Options for connecting POS terminals to WAY4

In the current version of WAY4, the following types of POS terminal connections are used:

- X.25 protocol leased line.
- X.28 protocol dial-up line.
- Leased telephone line.
- Dial-Up telephone line.
- TCP/IP connection.

Downloading Software to POS Terminals

The procedure for downloading software depends on the POS type. More detailed information can be found in the administrator manual for the corresponding terminal type.

Configuring Software for Working with Encryption Keys

For PIN-based transactions (PBT), master keys and PIN block (a PIN block is a part of a message containing PIN data) encryption keys must be generated. These keys must be entered in the PIN pad, POS terminal and WAY4 database. Zone PIN block encryption keys must be generated and placed in the POS controller's configuration file (the CHANNEL_ZPK parameter in the NetServer channel configuration).

PIN block encryption keys (TPK – Terminal Pin Key) must be contained in POS terminals and the corresponding records in the WAY4 database. TPK keys may be stored in the POS terminal's RAM only when encrypted under the master key contained in the PIN pad. Each POS terminal must have its own PIN block encryption key. All PIN pads must have different master keys. TPK keys in POS terminals must correspond to the keys in the database.

For more information about working with encryption keys, see "Working with Encryption Keys in OpenWay".

Chapter 3. POS Controller Configuration and Operation

The POS controller is a software complex operating on NetServer. It is used to support interaction between a POS network and the processing centre. A POS channel is NetServer process that serves online requests from POS terminals. One POS channel can process requests from many POS terminals.

Request Types and Request Processing

Request Types

Authorisation

When this request is executed, an authorisation code and response code are received from the card's issuing bank and the specified amount is blocked in the cardholder's account. A receipt with the transaction results and corresponding amounts must be printed on the terminal. The cardholder does not have to sign the receipt, since this is not a financial transaction.

Retail/Cash

This is the basic POS terminal operation. When this request is executed, an authorisation code and response code are received from the issuing bank and the corresponding amount is blocked in the cardholder's account. A receipt with the transaction results and corresponding amounts must be printed on the terminal. If the operation is signature-based (SBT), the receipt must be signed by the cardholder. The receipt is the main document if results are disputed. After this operation, the corresponding NetServer process automatically generates a repayment request to the issuing bank.

Authorisation Confirmation

This request confirms that an authorisation was made earlier. The corresponding NetServer process generates a repayment request to the issuing bank. A receipt with the results and amounts of the transaction must be printed on the terminal. If the operation is signature-based (SBT), the receipt must be signed by the cardholder; moreover, the receipt is the main document if results are disputed.

Balance Inquiry

This operation allows information about a cardholder's account balance to be received without generation of financial messages. For purposes of confidentiality, the results may only be displayed on the PIN pad screen, and the cardholder must be able to delete the information from the screen after viewing.

Ministatement

This operation allows information about a cardholder's most recent transactions to be received. This operation is always PIN based. The cardholder can select the account type for which the most recent transactions will be checked.

Credit

This operation allows a cardholder to credit his/her account. This operation always requires the cashier's service card and entry of the cashier card's PIN (PIN-Based), and the message must contain the authentication code (MAC).

The message for this operation must contain data from the magnetic stripe of the cashier's service card in the fields of the second (or first) track of the magnetic stripe, and the cashier's PIN in the PIN block. The number of the bankcard or data from the second track of the card's magnetic stripe of the credit operation target is sent to the acquirer as additional information about the operation.

The bankcard is not authenticated when executing this operation.

Reconciliation

Reconciliation takes place on a POS terminal when closing a billing cycle at a merchant or cash dispensing point.

For correct reconciliation, the terminal must be assigned the correct reconciliation type in device configuration forms ("POS Management" or "POS for <POS terminal name>"). For the specified terminal types, the value of the *Batch Upl* field in the POS Types dictionary must be "Yes" (see Fig. 1 in the section "POS Types").

The "POS Management" form is the same as the "POS for <POS terminal name form>", described in the section "POS Terminals" of the document "Acquiring Module User Manual".

For the OpenWay Native protocol, reconciliation is executed as described below.

All online and offline operations executed since the last reconciliation was completed are stored in the POS terminal memory. In this case, offline operations are understood to be operations executed on the POS terminal autonomously without a connection to the POS controller. In addition, operations executed on POS terminals operating on earlier versions of the protocol are also considered offline (in this case, when executing operations, online authorisation was made, but financial operation data was not transmitted online).

Reconciliation for online and offline operations is executed separately as follows.

When closing a cycle, the POS terminal sends the POS controller a message with the totals for online financial operations (message type "0500"). If the totals sent by the terminal and those in the WAY4 database correspond, a message is sent to the terminal with the response code "00" (reconciled). Otherwise, the response code "95" is sent to the terminal (not reconciled).

If the online totals were reconciled and no offline operations were executed on the POS terminal, reconciliation is finished.

If the online totals were reconciled and offline operations were executed on the POS terminal, the POS terminal initiates the Batch Upload operation (upload data on offline operations, message type "0220").

If NetServer is used, the Batch Upload operation is executed using WAY4 POS Management Server software (see the document "POS Management Server Administrator Manual").

If the online totals were not reconciled, the POS terminal executes the Batch Upload operation for online operations (message type "0320") and for offline operations, if there were any.

After executing Batch Upload, the terminal sends the POS controller a message with the totals of all operations (message type "0520"). In this case, a response message about reconciliation results is not sent to the POS terminal.

Refund

This operation is used to credit a cardholder account. It is executed if the original transaction cannot be cancelled, for example, because of a negative response to a cancellation request. The message for this operation must contain a reference to the original transaction (retail transaction, cash disbursement or authorisation) in field 37. The refund amount can differ from the original transaction amount. This operation cannot be cancelled.

Utility Payment

This operation is used to pay for services (for example, utilities) from a cardholder's account using a standing payment order created for the card contract. The payment recipient account is specified in the standing payment order.

Credit Voucher

This operation is used to credit a cardholder account that was debited as a result of a retail transaction executed earlier. This operation is used when information about the original transaction (RRN) is not available to execute a cancellation. This operation can be cancelled.

Universal Reversal

A message for this operation is sent when an operation that has already been executed must be reversed. The operation can be reversed manually by the cashier or automatically by the POS terminal to cancel the last operation executed, for example, in time-out cases when the POS terminal did not receive a response from the POS controller within a specified time period.

Universal Bill Payment

A message for this operation is sent if a payment has been made to a billing system such as a mobile operator. Payments can be made by card or cash.

Keys Change

A message for this operation is sent if terminal encryption keys must be changed.

This feature is optional and is provided according to a separate agreement with OpenWay.

Request Check

Every request received from a POS terminal is checked for whether it can be executed.

Parameters of the POS terminal registration records in the database and device Service Package parameters are used for checking.

Checking by POS terminal registration record parameters:

- Permission to execute this operation on this POS terminal is checked in the list of permissible operations (see "Configuring Executable Operations").

- Permission to execute this operation at this time is checked according to the values of the *Business Hours from*, *to* fields of the registration record form; if these fields are not filled in, operations on the POS terminal can be executed at any time.
- Protection of the request by a digital signature is checked if the "Mandatory" or "Optional" value is specified in the *MAC Status* field of the device configuration form ("POS Management" or "POS for <POS terminal name>") (see the section "Enabling MAC Mode").

  If the "None" value is specified in the *MAC Status* field of the device configuration form for the POS ("POS Management" or "POS for <POS terminal name>") (see the section "Enabling MAC Mode") a request containing a digital signature will be rejected.
- The presence of PIN data in the request is checked if the "Mandatory" or "Optional" value is specified in the *PBT Status* field of the device configuration form for the POS ("POS Management" or "POS for <POS terminal name>") (see the section "Mandatory PIN Mode").

  If the *PBT Status* field of the device configuration form ("POS Management" or "POS for <POS terminal name>") (see the section "Mandatory PIN Mode") for the POS terminal contains the "None" value, a request containing PIN data will be rejected.

The "POS Management" form is the same as the "POS for <POS terminal name form>", described in the section "POS Terminals" of the document "Acquiring Module User Manual".

The POS terminal's Service Package parameters are used to check whether the transaction currency is allowed.

If any of these checks are failed, the transaction will be declined with the corresponding response code.

Cancellation, authorisation confirmation and refund operations require checks concerning operation history (presence of an original transaction, correspondence of amounts, etc.). If these checks are failed, a negative response will be sent for the transaction.

If all checks are passed, necessary POS terminal and merchant data are added to the request after which it is sent to the corresponding NetServer channel for processing, for example to the ON-US service channel or payment system channel (VISA, MasterCard, and others).

POS Channel Description

POS channels serve online requests received from POS terminals.

Depending on the set of terminals, their number, and exchange intensity, one or several POS channels are set up.

POS controller configuration file is used to describe POS channel parameters. It is a special XML file whose name is specified in the NetServer main configuration file (server.xml).

Configuring HOST-POS Transport Connection

Configuration data for the POS terminal connection with the POS controller is usually found in the POS channel configuration file configured by the WAY4 vendor.

Chapter 4. Monitoring the POS Network

The acquirer monitors the POS network in order to prevent malfunctions.

The monitoring procedure is executed using the user menu item "Acquiring → POS/Imprinter Controller → POS Monitor".

Before starting to monitor the POS network, ensure that the required financial institution is set in the status bar. If the user is granted privileges to work with several financial institutions, select "Acquiring → POS/Imprinter Controller → Set Financial Institution" from the user menu to select the required values.

POS State

To analyze the state of POS terminals, select the user menu item "Acquiring → POS/Imprinter Controller → POS Monitor".

The "POS Monitor" form will be displayed (see Fig. 16).

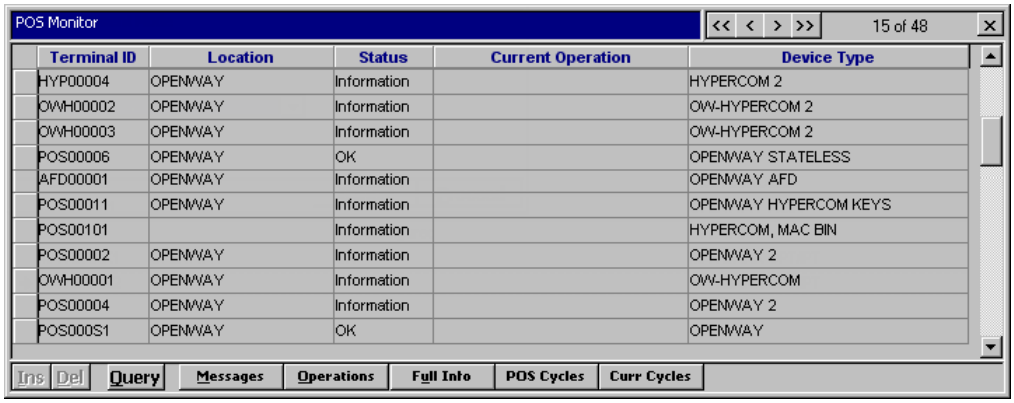

Fig. 16. Information about the state of POS terminals

This form contains the following columns:

- *Terminal ID* – unique identifier of the POS terminal in WAY4.
- *Location* – POS terminal location
- *Status* – POS terminal status (see "POS Status").
- *Current Operation* – current operation being executed by the POS terminal.
- *Device Type* – POS terminal type registered in WAY4 and described in the "POS Types" dictionary ("Configuration Setup → Merchant Device Setup → POS Types").

For additional information about the state of POS terminals, and to change the status of a POS terminal, use the following control buttons:

- [Messages] – opens a form containing a list of messages from the time the POS terminal was registered in WAY4.
- [POS Cycles] – opens a form with information on the history of POS terminal cycles (see "POS Cycle History").

- [Curr Cycles] – opens a form with information on the POS terminal current cycle (see "Current POS Cycle").
- [Operations] – opens the "Operations for <POS terminal name>" form, containing a list of operations available at the present time for this device, specifying the status of each operation (see "Operations with POS Terminals").
- [Full Info] – opens the "Full Info for <POS terminal name>" form, containing information about device parameters (see the section "POS Terminals" of the document "Acquiring Module User Manual").

POS Status

In the *Status* column of the "POS Monitor" form (see Fig. 16 in the section "POS State") the following POS terminal statuses are possible:

- OK – the POS terminal is functioning correctly.
- Information – the POS terminal is functioning correctly, however the status of one or several operations changed.
- Not configured – the POS terminal is not configured, operations cannot be executed.
- Warning – errors occurred during POS terminal operation. Click the [Messages] button to view messages on malfunctions.
- Closed – the corresponding device's contract is closed (see the section "Closing Contracts" of the document "Acquiring Module. User Manual").

To determine the reason for a change in POS status, see the message form or list of operations.

Operations with POS Terminals

The list of operations with a POS terminal is available after selecting the required POS from the list in the "POS Monitor" form (see Fig. 16 in the section "POS State") and clicking the [Operations] button.

The "Operations for <POS terminal name>" form will be displayed (see Fig. 17).

⚠ Changing the status of a POS terminal is obsolete functionality supported for backward compatibility.

Use this form as described in the section "Configuring Executable Operations".

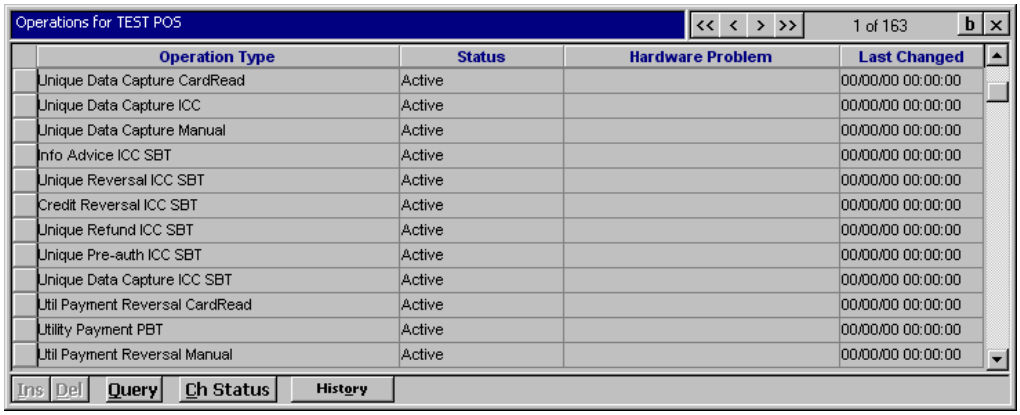

Fig. 17. List of operations with a POS terminal

Working with POS Cycles

Information about operations made at a POS terminal is recorded in the WAY4 database by special counters used during specific time intervals (cycles). WAY4 supports management of two cycle types:

- "Batch Upload" – counters accumulate in a POS terminal's financial cycles in order to record online and offline operations for subsequent reconciliation with terminal data.

  Only financial transactions ("Advice", "Reversal" or "Adjustment" category) are recorded in a cycle.

  Management of this type of cycle includes setting *Batch Upl* = "Yes" for the terminal type (see "POS Types Dictionary").

- "All Documents" – information is recorded for all operations made at the POS terminal during a calendar day (regardless of transaction category and the status of documents generated in WAY4).

  Management of this type of cycle includes:

  - For all terminal types – the value of the global parameter ALLD_CYCLE_ON is set to "Y".
  - For a specific terminal type – the tag ALLD_CYCLE_ON=Y is set in the *Special Conditions* field of the corresponding POS type dictionary record (see "POS Types Dictionary").

A "Batch Upload" cycle is defined by the interval between two reconciliation operations (see "Reconciliation"). A new cycle is created when the first operation is executed following the reconciliation operation, regardless of its result.

"All Documents" cycles are limited by a calendar day. A new cycle is created when the first operation is made each new calendar day.

Usually, a "Batch Upload" cycle is organized according to the following scheme:

- When it is opened, a cycle has the "Active" status (i.e. in the "POS Cycles for <POS terminal name>" form, see Fig. 19, the value of the *Cycle Event* field is "Active"). This status remains until reconciliation is executed.

- The cycle is closed and reconciliation for online operations is executed on the POS terminal (see "Reconciliation").
- If reconciliation was successful (i.e. online operation counter values stored in the database correspond to counter values received from the POS terminal) the cycle gets the "Closed" status. If offline operations were also executed on the POS terminal during the cycle:
  - The POS terminal initiates the Batch Upload procedure (the current cycle gets the "Uploading" status). The values of cycle counters are corrected resulting from upload of data to the database.
  - After the Batch Upload procedure has been executed, another reconciliation procedure is executed (now the new counter values are considered). As a result, the cycle gets the "Closed" status (reconciliation successful) or "In Doubt" (reconciliation not successful).
- If reconciliation was not successful, or if even one offline operation was executed:
  - The cycle gets the "In Doubt" status.
  - The Batch Upload procedure is started (the POS terminal uploads data for online and offline operations (if any)) and the current cycle gets the "Uploading" status.
  - After executing the Batch Upload procedure, the reconciliation procedure is repeated.
  - If the totals received from the Batch Upload procedure were reconciled, the cycle gets the "Closed" status; otherwise, it gets the "In Doubt" status.
- If reconciliation is still not successful after the aforementioned operations are executed, it is possible to close the cycle on the host's side by clicking the [Actions] button in the "POS Cycles for <POS terminal name>" form (see Fig. 18).

Current POS Cycle

A POS terminal's current cycle:

- Has the "Active" status (*Cycle Event* = "Active", see Fig. 19 in the section "POS Cycle History"), i.e., an active cycle.
- Is the "All Documents" type and has the "Closed" status as a result of manually closing the cycle before the next operation made on the POS terminal is processed.
- Is the "Batch Upload" type and has the "Closed" or "In Doubt" status as a result of closing the cycle and reconciliation up to the time the next transaction is processed for an operation executed on the POS terminal. This cycle is current in the interval between closing the cycle and executing the first operation causing a new cycle to be opened.

To access information about a POS terminal's current cycles, use the "Curr Cycles for <POS terminal name>" form (see Fig. 18), opened from the parent form "POS Monitor" (see Fig. 16 in the section "POS State") by selecting the

row corresponding to the required terminal and clicking the [Curr Cycles] button.

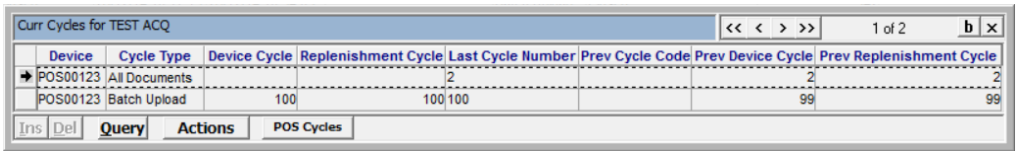

Fig. 18. Current cycle for a POS terminal

This form contains the following fields:

- *Device* – POS terminal identifier.
- *Cycle Type* – cycle type ("Batch Upload" or "All Documents").
- *Device Cycle* – current cycle number (if the cycle is closed, this field will be empty).
- *Replenishment Cycle* – same value as in the *Device Cycle* field.
- *Last Cycle Number* – last number assigned to the cycle; the number of an active cycle will be used, if there is such a cycle.
- *Prev Cycle Code* – number assigned to the cycle as a result of reconciliation; usually the value in this field increases with each cycle closed. The value is filled in according to the cycle code received from the POS terminal.
- *Prev Device Cycle* – if this is an active cycle ("Active"), this field contains the number of the previous cycle; after reconciliation (in the "Closed" or "In Doubt" status) – the number of the current cycle.
- *Prev Replenishment Cycle* – corresponds with the value in the *Prev Device Cycle* field.

This form contains the following control buttons:

- The [Actions] button opens a context menu containing the following items:
  - "Replenishment" – close a cycle in the "Active" status.

    ⚠ It is not recommended to use this button to close cycles in statuses other than "Active".

  - "Reset Code" – reset the value of the cycle code (*Prev Cycle Code).*
- [POS Cycles] – button for access to information on the POS cycle history (see "POS Cycle History").

POS Cycle History

The "POS Cycles for <POS terminal name>" form (see Fig. 19) contains information about the POS terminal cycle history. This form is opened from the "POS Monitor" form (see Fig. 16 in the section "POS State") or from the "Curr Cycles for <POS terminal name>" form (see Fig. 18 in the section "Current POS Cycle") by clicking the [POS Cycles] button.

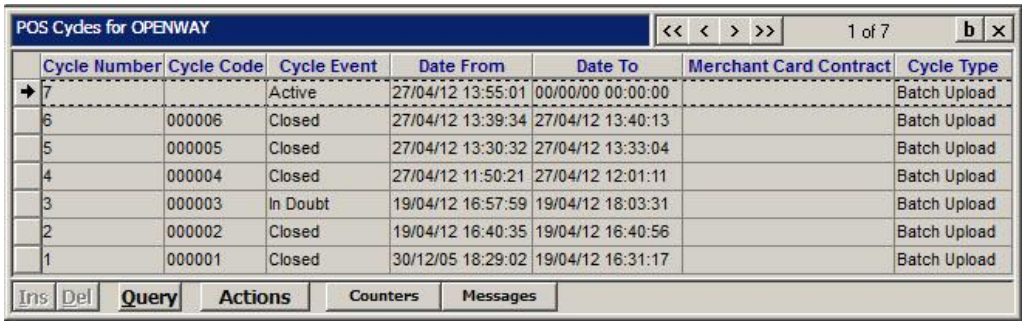

Fig. 19. POS cycle history

The rows of this table correspond to POS cycles, and the columns contain the following information:

- *Cycle Number* –POS cycle serial number assigned by WAY4.
- *Cycle Code:*
  - For a "Batch Upload" cycle, this is the number assigned to the cycle as a result of reconciliation based on data from the POS terminal; usually, the value in this field increases with each closing of a cycle.
  - For an "All Documents" cycle, this is the date (in YYYYMMDD format) operations recorded in the cycle were made.
- *Cycle Event* – POS cycle status. This field may have the following values:
  - "Active" – the cycle is active.
  - "In Doubt" – discrepancies were found during reconciliation.
  - "Uploading" – uploading in process (Batch Upload procedure is being executed).
  - "Replenishment" – the cycle was closed in the "Active" status (see "Closing a Cycle").
  - "Closed" – the cycle is closed ("Closing a Cycle").
- *Date From* – start date and time of cycle.
- *Date To* – for "Batch Upload" cycles, the date and time of reconciliation (with subsequent transfer of the cycle to the corresponding status); for "All Documents" cycles, the cycle closing date and time; for a current cycle, this field contains null values.
- *Merchant Card Contract* – cashier service card number.
- *Cycle Type* – cycle type.

The [Counters] button opens the "Counters for <POS terminal name>" form (see Fig. 20) with information on the state of cycle counters.

"Batch Upload" Cycle Counters

"Batch Upload" cycle counter values are used during reconciliation (see the section "Reconciliation").

For the OpenWay Native protocol, each counter accumulates information about the number and total financial amount of operations grouped by three attributes:

- "Direction" – direction of funds activity (Debit\Credit).
- "Request Category" – (Advice\Reversal).
- "Currency" – operation currency.

Rules for recording different operation types in counters are specified by the mode for calculating totals (see "Totals Calculation Modes").

For reconciliation to be successful, counter values stored in the database must correspond to those received from the POS terminal.

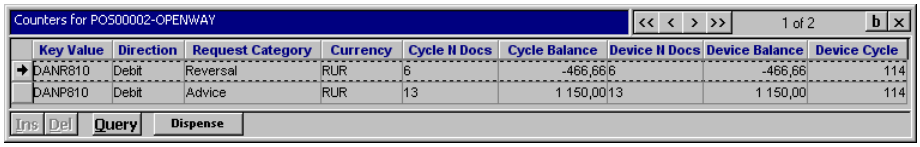

Fig. 20. State of "Batch Upload" cycle counters

For "Batch Upload" cycles, the "Counters for <POS terminal name>" form (see Fig. 20) contains the following information:

- *Key Value* – this value is generated automatically based on the values of other fields.
- *Direction* – transaction direction:
  - "Credit" – cardholder account is credited.
  - "Debit" – cardholder account is debited.
- *Request Category* – request category:
  - "Advice" – execute an operation.
  - "Reversal" – reversal (adjustment) of an operation.

    For protocols with *Is Adjusting Totals* = "Yes", reversals are recorded in the same counters as original operations.
- *Currency* – operation currency.
- *Cycle N Docs* – number of operations recorded by the corresponding WAY4 counter (both in the process of registering online operations and in the Batch Upload process).
- *Cycle Balance* – total financial amount of operations recorded by the corresponding WAY4 counter.
- *Device N Docs* – number of operations recorded by the corresponding POS terminal counter (obtained during reconciliation).
- *Device Balance* – total financial amount of operations recorded by the corresponding POS terminal counter (obtained during reconciliation).

  If for this terminal type (see Fig. 1 in the section "POS Types") "standard" mode for checking counters is set (*Strong Counters* = "No"), during checking, the values of the *Cycle Balance* and *Device Balance* fields are compared. If for this terminal type, "strong" mode for checking counters is set (*Strong Counters* = "Yes"), the values of the *Cycle N Docs* and *Device N Docs* fields will also be compared during the check.

- Device Cycle – current cycle number.

The [Dispense] button in the "Counters for <POS terminal name>" form (see Fig. 20) opens the "Dispense for …" form (see Fig. 21), containing detailed information about operations.

This form is used to obtain information about the operations from which the *Cycle N Docs* and *Cycle N Balance* counter values were taken, for example, in analyzing a situation when counter values did not correspond in reconciliation.

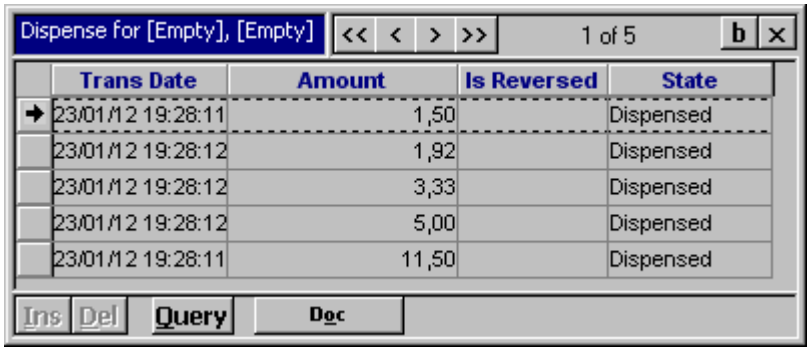

Fig. 21. Detailed information about operations

The "Dispense for…" form (see Fig. 21) contains the following fields:

- *Trans Date* – transaction date and time.
- *Amount* – transaction amount.
- *Is Reversed* – indicates a reversal (adjustment) operation. Possible values:
  - "Reversing" – the operation reverses an operation that has not been confirmed by the Batch Upload procedure. The "Reversed" value is specified for the unconfirmed operation in the State field.

    A similar value is set for an adjustment operation if the protocol with Is Adjusting Totals = "Yes" is used (in this case, adjustments are recorded in the same counter as original operations).
  - "Adjusting" – the operation adjusts an earlier operation. The value is set if the adjustment is recorded in the same counter as the original operation (the protocol with Is Adjusting Totals = "Yes" is used).
- *State* – operation state. This field can have the following values:
  - "Dispensed" – the operation was executed online.
  - "Marked" – an operation that was not configured during initial reconciliation is awaiting confirmation during Batch Upload (the operation remained in the "Dispensed" state until upload was started). If the POS terminal confirms execution of this operation by uploading the corresponding data, the state will change to "Matched".
  - "Reversed" – the operation was reversed, as final reconciliation (after Batch Upload) did not confirm its execution.
  - "Closed" – the operation was confirmed as the result of initial reconciliation of online operations or reconciliation after execution of the "Batch Upload" procedure.

The [Doc] button makes it possible to get information about a document created in WAY4 for an operation selected from the list (opens the "Doc for Dispense for…" form).

"All Documents" Cycle Counters

Unlike "Batch Upload" cycles, in an "All Documents" cycle, one counter is used that accumulates information for all operations made at the POS terminal during a calendar day (see Fig. 22).

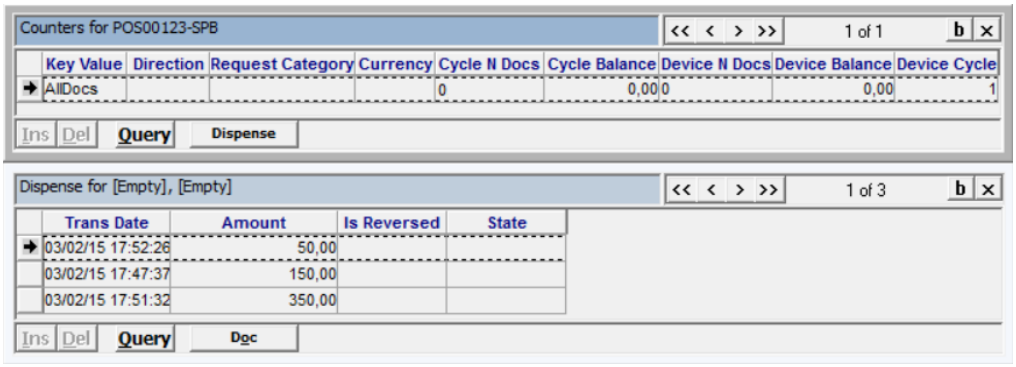

Fig. 22. Counter and list of corresponding "All Documents" cycle operations

For "All Documents" cycles, the "Counters for <POS terminal name>" form contains the following information:

- *Key Value* –the "AllDocs" value.
- *Device Cycle* – number of the current cycle.

The remaining fields in an "All Documents" cycle are not filled in.

- The [Dispense] button in the "Counters for <POS terminal name>" form opens the "Dispense for …" form containing detailed information about operations:*Trans Date* – operation date and time.
- *Amount* – operation amount.

The remaining fields are not filled in for the "AllDocs" counter.

The [Doc] button makes it possible to get information about a document created in WAY4 for an operation selected from the list (opens the "Doc for Dispense for…" form).

Closing a Cycle

A POS terminal cycle is closed in WAY4 as follows:

- Automatically:
  - for "Batch Upload" cycles – if reconciliation is successful (initial reconciliation of online operations or final reconciliation when the Batch Upload procedure is completed), the cycle will transfer to the "Closed" status.
  - For "All Documents" cycles – when the first operation is made in a new calendar day a new cycle opens and the current one will be transferred to the "Closed" status.
- Manually:

- If an active cycle (*Cycle Event* = "Active") must be closed, the cycle must first be transferred to the "Replenishment" status. To do so, in the "Curr Cycles for <POS terminal name>" form, click the [Actions] button and select the "Replenishment" item from the context menu. A cycle is transferred from *Cycle Event* = "Replenishment" to "Closed" status using the [Actions] button in the "POS Cycles for <POS terminal name>" form.
- If a cycle in the "In Doubt" status must be closed (discrepancies in counter values as the result of initial reconciliation of online operations or Batch Upload), use the [Actions] button in the "POS Cycles for <POS terminal name>" form.

Generating Reimbursement

In general, merchants are reimbursed as follows. When processing contracts (for example, when closing the banking day), documents for POS operations are processed that have been confirmed by reconciliation when closing a billing cycle, and if processing is successful, their status becomes "Posted". According to due normalisation settings, an entry is made for funds between "Merchant Receivable" and "Merchant Current" accounts. Funds are transferred to merchant accounts when standing payment orders set up in WAY4 for "Merchant Current" accounts are processed.

If the global parameter WAIT_BATCH_UPLOAD is set (see the document "WAY4™ Global Parameters"), documents for operations waiting for confirmation by the "Batch Upload" procedure are not included in processing; therefore, it is possible that the corresponding amounts will not be included in the current normalisation. If documents are confirmed by the "Batch Upload" procedure and the value of the global parameter USE_CUT_OFF_TIME is "B", the value of the *Cut-Off Time* parameter will be considered when processing documents (see the section "POS Terminals" of the document "Acquiring Module. User Manual").

If turnover must be reflected in a "Merchant Receivable" account within a billing cycle, the "ENTRY_GROUPING" tag is used. To do so, in the appropriate Account Scheme (menu item "Full → Configuration Setup → Products → Acquiring Products → Acquiring Account Schemes") specify the value "ENTRY_GROUPING=BY_BATCH;" in the *Template Details* field for the "Merchant Receivable" account.

Reimbursement of a merchant can also be initiated when a final message is received with data about online operations (message type "0500") that were made in the billing cycle.

If the value of the global parameter SETTLE_MERCHANT_BY_POS_CYCLES is "Y", regardless of a cycle's reconciliation results, a job will be generated to reimburse the merchant and the job will be processed according to its place in the existing queue. The parameter SETTLE_MERCHANT_BY_POS_CYCLES can also be defined (in ascending order of priority) by a tag with the same name for a specific financial institution (the *Special Parms* field of a financial institution's form) or contract (the *Add Info* field of a contract's form) (see the document "WAY4™ Global Parameters").

To run the reimbursement procedure, use the menu item "Acquiring → POS / Imprinter Controller → Acq Cycle Settlement". The procedure to process the queue of reimbursement jobs can be scheduled (see the document "Scheduler Manual".

⚠ The procedure for processing the job queue must not overlap with the standard procedure for processing documents.

The merchant reimbursement procedure includes the following:

- Processing documents that were generated in billing cycles (according to the number of the cycle and contract specified in the job).

  ⚠ Cycle numbers in documents may not be registered in ways that differ from standard mechanisms for numbering cycles.

  If for some reason a cycle document was not processed (it got the "Decline" status), it is assumed that after errors have been fixed, the document will be processed by the standard procedure; for example, closing the banking day, and that reimbursements for the document will be generated according to normalisation settings in the "Merchant Receivable" account type.

  Similarly, documents for operations waiting for "Batch Upload" to be performed will be processed by the next standard procedure only after the cycle has been closed, and reimbursements will be generated according to "Merchant Receivable" normalisation settings.

- Entry between "Merchant Receivable" and "Merchant Current" accounts.
- Processing standing payment orders with the "BY_BATCH;" tag (in the *Posting Details* field, see the document "Standing Payment Orders") that are configured for "Merchant Current" accounts.

To support functionality for unscheduled reimbursement, set the tag "ENTRY_GROUPING=BY_BATCH;" for the "Merchant Receivable" account type (as described earlier) and configure the corresponding payment orders with the "BY_BATCH;" tag for "Merchant Current" accounts.

Chapter 5. Working with Encryption Keys in OpenWay Software

Encryption keys are generated using HSM hardware (see the document "Host Security Module RG7000 Operation and Installation Manual").

Generating Keys

The key generation procedure is described in the document "Terminal Key Management".

WAY4 supports the automatic key change procedure. This functionality is provided according to a separate agreement with the WAY4™ vendor.

Entering the Master Key in the PIN Pad

For information on entering the master key in the PIN pad, see the administrator manual for the appropriate terminal type.

Entering TPK in the WAY4 Database

To process PIN-based transactions (PBT), the terminal's encrypted TPK key and its check value must be entered in the corresponding WAY4 database record (see "Specifying Encryption Keys"). To do so, the encrypted TPK value received by the HSM and recorded in the log must be entered in the *Des Key* field of the terminal command record. The *Check Value* field is filled in with the corresponding TPK check value. Ensure that the key values in the database and the terminal PIN pad correspond. For information about the *PBT Status* parameter, see "Mandatory PIN Mode".

Entering TPK and Check Values in Terminals

For information about entering TPK and check values in terminals, see the administrator manual for the appropriate terminal type.

Entering TAK in the Terminal Database

To process transactions requiring MAC signatures, the terminal's encrypted TAK key and its check value must be entered in the corresponding WAY4 database record (see "Specifying Encryption Keys"). The *Check Value* field of the TAK is filled in with the corresponding TAK check value. Ensure the key values in the database and the terminal PIN pad correspond. For information about the *MAC Status* parameter, see "Enabling MAC Mode".

Entering TAK and Check Values into Terminals

For information about entering TAK and check values in terminals, see the administrator manual for the appropriate terminal type.

Chapter 6. Request Transmission Scenarios

An online request from a POS network is received for processing by the POS controller (WAY4™ Host).

In most cases, the request is sent to a payment system network (NET) or Host-to-Host channel. On-us transactions are processed in WAY4.

Typical request transmission scenarios can be grouped as follows:

- Deferred confirmation authorisation.
- Retail/cash.
- Information request

Deferred Confirmation Authorisation

Request transmission scenarios for deferred confirmation authorisation are shown in figures Fig. 23 – Fig. 26.

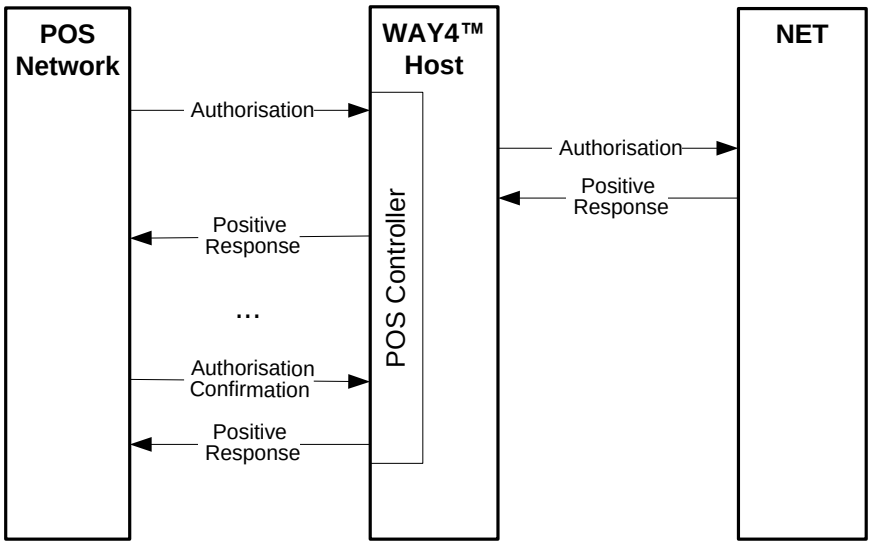

Fig. 23. Successful authorisation in the external network with deferred financial advice

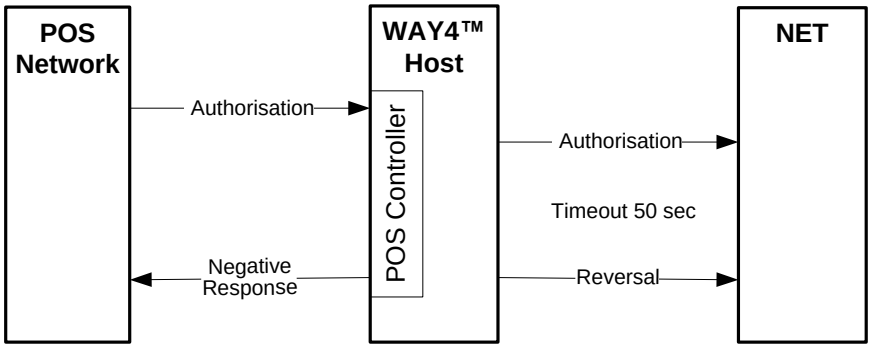

Fig. 24. Timeout

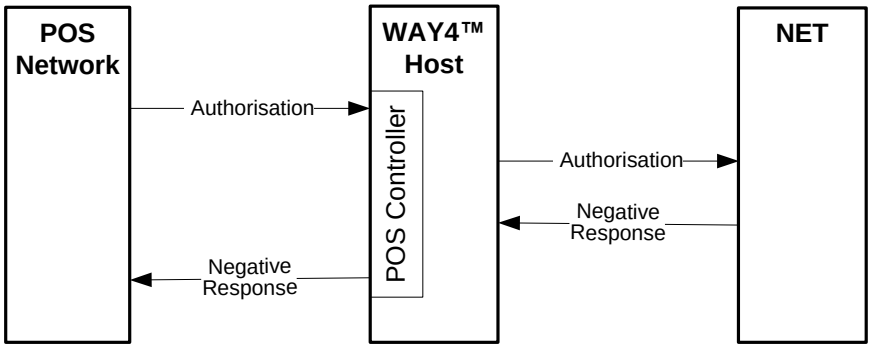

Fig. 25. Negative authorisation response from the external network

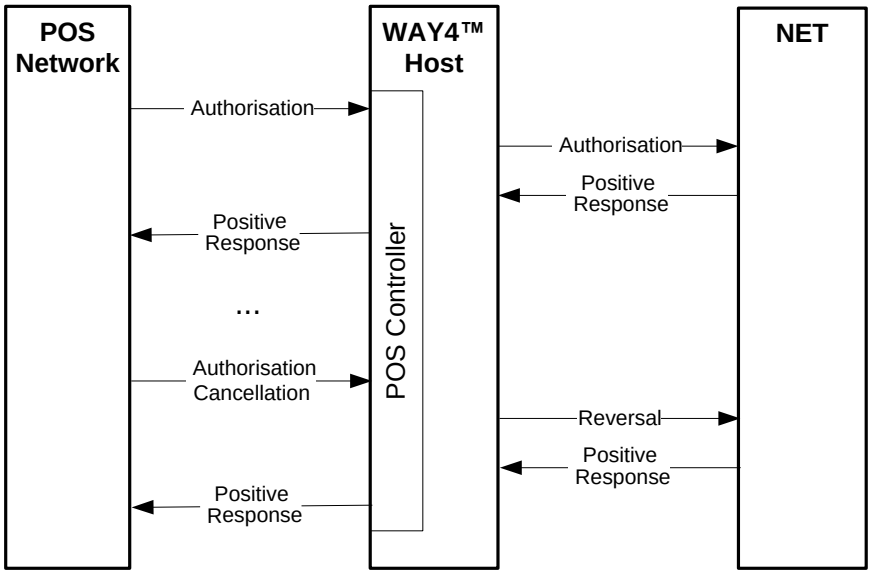

Fig. 26. Cancellation of previous authorisation in the external network

Retail/Cash

Request transmission scenarios for retail/cash operations are shown in figures Fig. 27 – Fig. 30.

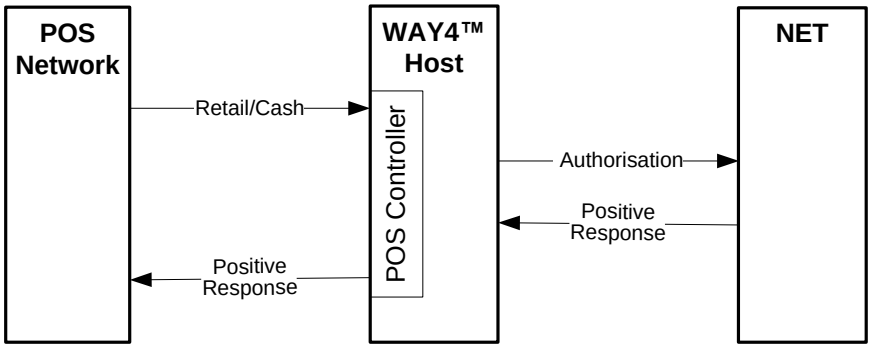

Fig. 27. Successful retail operation (no additional financial requests from the POS network are required)

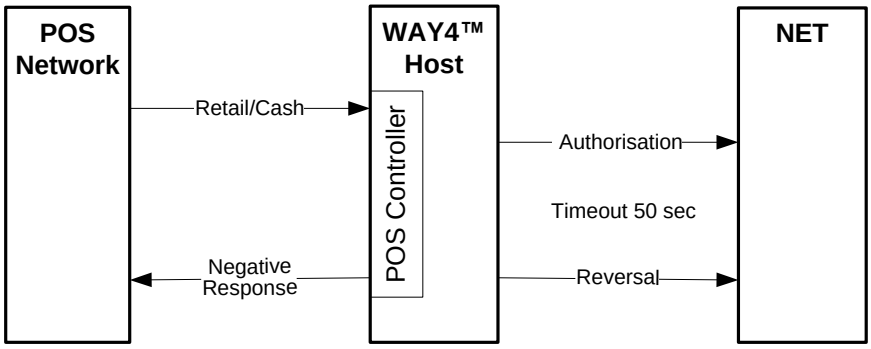

Fig. 28. Timeout

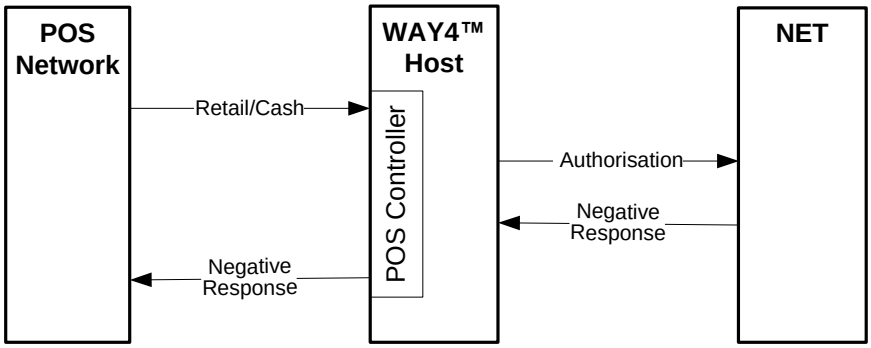

Fig. 29. Negative authorisation response from the external network; the retail/cash operation is prohibited

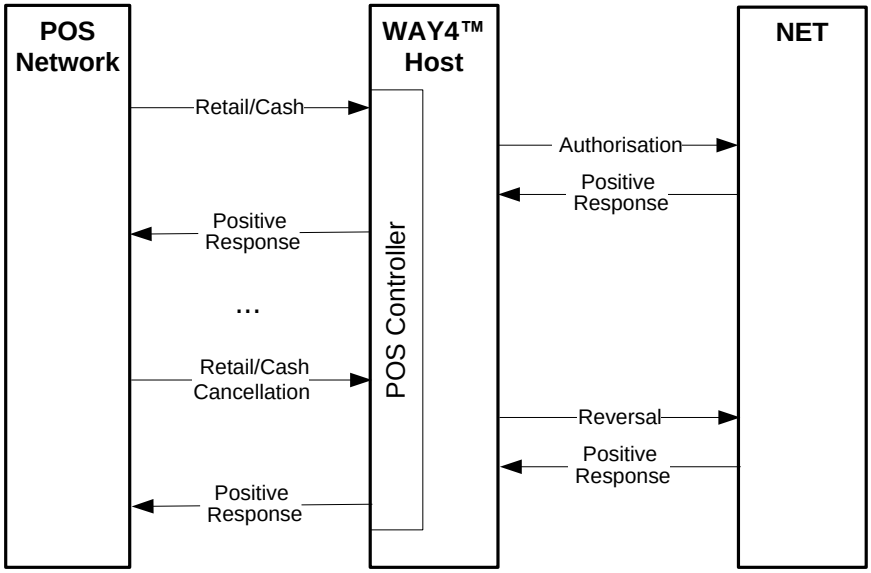

Fig. 30. Successful cancellation of the previous successful retail/cash operation

Balance Inquiry

Request transmission scenarios for balance inquiries are shown in figures Fig. 31 and Fig. 32.

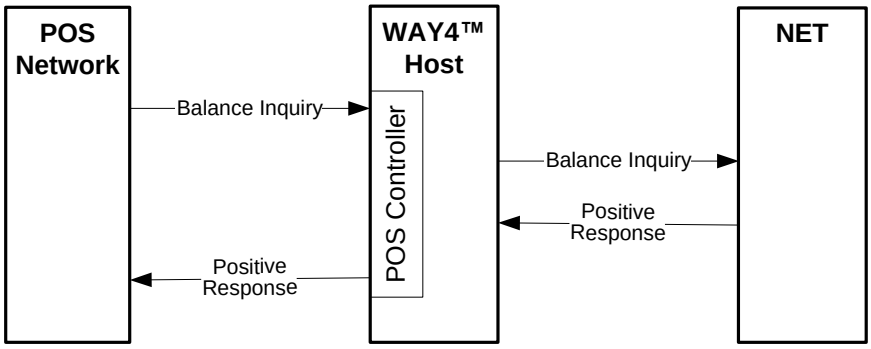

Fig. 31. Successful balance inquiry in the external network

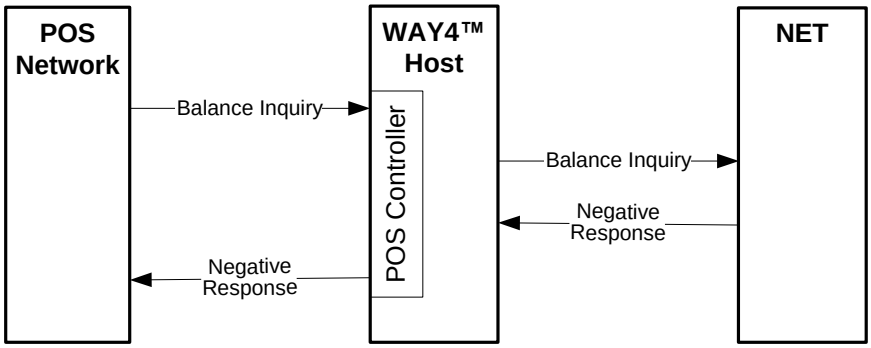

Fig. 32. Negative balance inquiry response from the external network

Chapter 7. Totals Calculation Modes

For each available currency type in a POS terminal in WAY4, the following operation counter types are maintained: Advice Debit, Reversal Debit, Advice Credit, Reversal Credit. Information about counter values is provided in the "Counters for..." form (see Fig. 20 in the section "POS Cycle History"). Totals calculation modes determine the correspondence between operation types and the types of counters in which they are recorded.

There are two totals calculation modes; each of which has its own table for comparing the operation type and the name of the counter used to record this operation.

Table 2. Correspondence between operation type and counter name for calculation mode "№1"

Counter Type	Authorisation Type
Advice Debit	Purchase/Cash Authorisation Confirmation Purchase with Cash Back Universal Bill Payment Advice (cash and cash)
Reversal Debit	Universal Reversal on Purchase/Cash Universal Reversal Advice on Purchase/Cash Universal Reversal on Authorisation Refund
Advice Credit	Credit Credit Voucher
Reversal Credit	Universal Reversal on Credit

Pre-Authorization and Utility Payment operations are non-financial operations and are not considered during comparison. Original operations that were automatically reversed by the terminal and their reversals (Automatic Reversal) are considered in counters.

Table 3. Correspondence between operation type and counter name for calculation mode "№2"

Counter Type	Authorisation Type
Advice Debit	Purchase/Cash Authorisation Confirmation Purchase with Cash Back Universal Bill Payment Advice (card and cash) Pre-paid purchase AFD Completion
Reversal Debit	Universal Reversal on Purchase/Cash Universal Reversal on Authorisation Confirmation Universal Reversal on Purchase with Cash Back Universal Reversal on Universal Bill Payment Advice (card and cash) Universal Reversal on Pre-paid purchase Universal Reversal on AFD Completion Refund

Counter Type	Authorisation Type
Advice Credit	Credit Credit Voucher
Reversal Credit	Universal Reversal on Credit Universal Reversal on Credit Voucher

Pre-Authorization and Utility Payment operations are non-financial operations and are not considered during comparison. Neither original operations that were automatically reversed by the terminal nor their reversals (Automatic Reversal) are considered in counters.