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1 Introduction

1.1 Aim of the Document

This document describes the use of the 'ECR Interface for the Swiss EFT/POS System' (VEZ Specification - reference [I1]) as the ECR Interface to be used for the Swiss Electronic Purse (IEP) system - "CASH". The document is principally intended for designers of ECRs and assumes a prior knowledge of the VEZ Specification. It can therefore be seen as an appendix to the VEZ Specification and has correspondingly been given the supplementary designation VEZ 5.1A.

1.2 Structure of the Document

Chapter 2 supplies a brief introduction to the "CASH" IEP system. The important differences between this and the Swiss EFT/POS system are described. Chapters 3 to 7 describe the message sequences involved in the use of the VEZ messages with the Electronic Purse Terminal (EPT) to achieve the desired functionality. Chapter 8 summarises the application messages used and chapter 9 gives an overview of the data link messages. Chapter 10 describes the use in power-saving systems. Chapter 11 details the selection of the VEZ interface. Chapter 12 describes the user (card holder) interface.

Chapter 13 provides the minimum acceptance procedure which must be completed when testing the integration of the EPT at the point of sale.

1.3 Terms and Abbreviations

Term/Abbreviation	Meaning
Body	Fill Component in the Jackson Notation
CC	Connection Confirmation (Data Link Layer Message)
Conf	Confirmation Message
CR	Connection Request (Data Link Layer Message)
CSM	Card Security Module
DC	Disconnection Confirmation (Data Link Layer Message)
DR	Disconnection Request (Data Link Layer Message)
ECR	Electronic Cash Register
EFT/POS	Electronic Funds Transfer at Point Of Sale
EPT	Electronic Purse Terminal
FS	Functional Specification
ID	Identity, Identification (number)
IEP	Intersector Electronic Purse (= value card)
LOG File	File in the EPT containing entries relating to EPT events
MDB	Multi-Drop Bus (protocol for vending machines)
N'OK'	Not 'OK' (not correct)
'OK'	'OK' = correct
PSV	Payserv
PSVIC	Vending-IEP Communication (protocol for vending machines)
REJ	Reject (Data Link Layer Message)

Term/Abbreviation	Meaning
Req	Request Message
RR	Receive Ready (Data Link Layer Message)
SWDL	Software Download
Txt	Text
VEZ	Verband Elektronischer Zahlungsverkehr (protocol for ECRs)

1.4 Reference documents

Reference	Title	Version	Document-ID
[I1]	ECR Interface for the Swiss EFT/POS System	V5.1 (23.12.92)	VEZ Doc. No. 13101.01

2 Introduction to the "CASH" System

2.1 Overview

The "CASH" IEP itself is based upon a microprocessor chip implanted into a plastic card. The chip will be available on many types of plastic cards e.g. ec cards and banks' own cards as well as non-bank cards. As far as the "CASH" IEP system is concerned, all chips, and therefore cards, behave exactly the same when used for making purchases.

The card holder can load the chip with "electronic value", e.g. at an ATM, and then spend the "electronic value" to obtain goods and services at merchants participating in the system who have installed the necessary EPTs.

When making a purchase, a purchase transaction is carried out in which "electronic value" is transferred from the IEP to the EPT. The EPT accumulates the "electronic value" from many transactions and this is then transferred, as required, to Payserv in a process called a collection.

Payserv processes the collection data and performs the central clearing operation which results in the "electronic value" being credited to the merchant's bank account.

2.2 Differences between the EFT/POS and IEP Systems

2.2.1 Prepaid

The IEP system is a prepaid system. This means the "electronic value" is purchased by the card holder in advance of its use. Some card holders will typically use money from their bank accounts to purchase the "electronic value". Others, e.g. children without bank accounts, may purchase "electronic value" with cash, or have it purchased for them by other people with bank accounts.

The "electronic value" collected by the merchant in the EPT is cashed-in, resulting in money being paid into the merchant's bank account, at some later point in time after the transactions have been performed.

This is therefore very different to the EFT/POS situation where the transfer of money from card holder's bank account to merchant's bank account takes place, in effect, at the time of the transaction. Also, the EFT/POS system can only be used by those card holders with suitable bank accounts.

2.2.2 Offline

The purchase transaction in the IEP system is carried out offline. This means that at the time of the transaction, all the necessary security and authorisation checks are carried out locally between the IEP and the EPT.

Because the IEP is mainly intended to be used in low value transactions, as a replacement for cash and coins, there is no verification of the card holder, e.g. with a PIN code. This all makes for a very speedy transaction.

The effective loss to the card holder, if the IEP is lost, is limited to the "electronic value" held in the IEP at that moment in time, i.e. the same as with cash.

In contrast, the EFT/POS system is an online system. At the time of the transaction, not only are all security and authorisation checks made between the terminal and Payserv, or other card-issuer institution, but the card holders must confirm their identities by entering their PIN codes. These precautions are necessary because the transaction is effectively giving direct access to the card holder's bank account.

2.2.3 Collection

The data from the purchase transactions is initially stored in a transaction log file in the EPT and must be sent to Payserv for processing and crediting. This process is known as collection and can be performed in one of two ways:

- 1) Direct, online, from the EPT to Payserv.
In this case, the EPT either has an in-built modem or is attached to an external modem and uses this to call the Payserv host computer (telecollection) or has a special collection device (network collection) which handles the communication between the Payserv host and the EPT by itself.
- 2) Indirect, initially offline, from the EPT to an intermediate device and then from the intermediate device online to Payserv.
In this case, the data from the EPT is collected from the device using, for example a portable PC or a Velocard. The collecting device is later connected to a telephone line and uses a modem to transfer the collection data to Payserv. The collecting device can first collect data from many EPTs and can then transfer all the data sets in one session online to Payserv.

Again, this is different from the usual situation with EFT/POS, where each transaction is sent immediately and online to Payserv or the appropriate processor.

2.2.4 Final Balances

The crediting of the "electronic value" accumulated in the EPT is based upon the concept of final balances.

A final balance is an EPT operation which computes the sum of the amounts from all transactions which have occurred at the EPT since the last final balance and writes this sum, along with the date and time and a serial number for this final balance, into a special final-balance entry in the terminal transaction log.

A final balance entry is used at Payserv to initiate a credit, for the amount of the final balance, to the merchant's bank account. This gives the merchant a means of controlling the credits independent of the interval between collections. For example, the merchant may wish to have a credit for each day's business and therefore creates a final balance every day, although the collections are performed on a weekly basis.

Only transactions which have been included in a final balance will be included in a credit. The value of transactions which are collected, but not yet included in a final balance, will be held over until the next collection that includes the necessary final balance.

2.3 Electronic Purse Terminals - Functional Overview

2.3.1 Terminal Types

There are several different types of EPTs.

Some of them are intended for attended use and are controlled by the merchant, either directly by using the integrated keyboard or indirectly via an electronic interface. The electronic interface will most usually be used to connect the EPT to an ECR. The 'VEZ' protocol is supported in all terminal types for this purpose.

Other types of EPT are intended for integration into vending machines, i.e. for use in primarily unattended situations. This type of EPT is controlled only via an electronic interface, which is used to connect the EPT to the vending machine. The 'PSVIC' and 'MDB' protocols are provided in these terminal types for this purpose.

All EPT types contain a card reader, used to communicate with the chip in the IEP, a security module (CSM), used to make the EPT specific to the merchant, a customer display, used to give guidance or information to the card holder, and one or more buttons which the card holder can use to obtain information or to control the operation of the EPT.

2.3.2 Normal Purchase Transactions

The usual transaction process consists basically of the following steps:

- 1) Displaying the transaction price
- 2) Requesting the IEP card
- 3) Inserting the IEP card
- 4) Performing the transaction
- 5) Displaying the result
- 6) Removing the IEP card
- 7) Communicating the result

The card holder may press the information button 'INFO' at any time while the IEP card is inserted. This causes the IEP balance to appear on the card holder display for a short time.

The transaction price is transferred to the EPT, either via the merchant's keyboard or the electronic interface. The invitation to insert the IEP card is displayed in the default customer language set in the EPT.

When the card is inserted, the authenticity of the IEP is checked.

If these checks prove to be in order, then the card holder is asked to press the 'OK' key.

The transaction is then started. The IEP validity date and balance are checked, and the IEP is then debited, and the transaction is recorded in the transaction log in the IEP.

The transaction is recorded in the memory of the EPT (the accumulated "electronic value" is incremented and the transaction log entry is written) and the card holder display indicates the success of the transaction.

If the transaction fails, this fact is displayed together with an explanation.

The result of the transaction is also displayed on the merchant's display and/or returned via the electronic interface, but only when the card has been removed from the reader (to help prevent the card holder from forgetting to take the card back).

Notes:

- 1) If the IEP is withdrawn during the critical phase of the transaction between the debit of the IEP and the credit of the EPT, then the EPT indicates to the card holder that the IEP should be reinserted in order to continue and complete the transaction.
- 2) The current IEP is not able to perform a refund transaction on the EPT, i.e. "electronic value" cannot be transferred from the EPT to the IEP.

2.3.3 Interim Balances

Special entries can be created in the EPT transaction log to register interim balance calculations.

An interim balance entry contains the sum of all amounts for all transactions in the EPT transaction log which have been registered since the last interim balance was calculated. Additionally, the entry also contains the number of transactions concerned, the date and time the balance was calculated and a reference number for the interim balance entry (incremented by 1 for each new interim balance performed).

The interim balance entries can be used by the merchant to check the takings on the EPT, for example during a shift, or during the time that one operator is using the terminal.

Interim balance entries are purely informative and are the responsibility of the merchant. They are not sent to Payserv in the collection data and therefore have no effect upon the clearing and crediting operations in the system.

Interim balances are requested to be calculated explicitly via either the merchant keyboard or the electronic interface (only 'VEZ' and 'PSVIC' protocols).

2.3.4 Final Balances

Special entries can be created in the EPT transaction log to register final balance calculations.

A final balance entry contains the same items as the interim balance entry but is calculated over all transactions which have been registered since the last final balance entry and has a reference number for final balance entries (incremented by 1 for each new final balance performed).

The final balance entries in the transaction log can be produced either explicitly via a command or automatically by the terminal itself. The following options are provided:

- 1) Explicitly, via the electronic interface.
(The necessary commands for this are available in the 'VEZ' and 'PSVIC' protocols.)
- 2) Explicitly, via the merchant keyboard (where the EPT has one).

- 3) Automatically, upon collection.
(When a collection is initiated, a final balance is first computed and written into the transaction log and then the collection is performed.)
- 4) Automatically, at preset time intervals.
(The final balance will be computed at the set time, either on the set day of the month, m, or every n days beginning on a set day of the month, m.)

2.3.5 Collections

A collection is basically a transfer of "electronic value" from the terminal's memory to the acquiring service at Payserv.

There are currently 4 collection methods:

- 1) **Telecollection:** This uses either the built-in modem or an external compatible modem connected to the EPT to transfer via the PSTN (Public Switched Telephone Network) direct, online, to Payserv.
- 2) **Offline Collection:** This is performed in two stages:
Stage 1: A collection device (e.g. a PC) connected to the EPT at the moment of the collection obtains and temporarily stores the data from the EPT.
Stage 2: The collection device is connected to the Payserv host, e.g. via a PC modem and the PSTN.
The collection data from several purchase devices can be collected using a single collection device.
A specific offline collection software (Veloboss) is available for the PC.
- 3) **Velocollection:** This is performed in four stages:
Stage 1: The Velocard is inserted into the EPT, which initiates the collection. The Velocard obtains and temporarily stores the data from the EPT.
Stage 2: The Velocard is connected to a PC. The data is transferred from the Velocard to the PC.
Stage 3: The PC is connected to the Payserv host, e.g. via a PC modem and the PSTN.
Stage 4: The data is transferred from the PC to the Velocard.
The collection data from several purchase devices can be collected using a single Velocard.
A specific velocollection software (Veloboss) is available for the PC.
- 4) **Network Collection:** The EPT is connected via the PSVIC interface to a collection device. The collection device is connected to the Payserv host, e.g. via modem and PSTN, and manages the collection by itself.

Desktop and portable EPTs must be programmed for PSVIC during offline and network collection, see also chapter 11.2, Desktop and Portable Terminals.

During a collection, information is transferred from the EPT to the Payserv host computer.

The information transferred during a collection currently is:

- The accumulated "electronic value".
- The log file containing the details of each transaction.
- Statistical information.

The information is checked by the Payserv host and the "electronic value", as determined by the final balance(s) contained in the log file, is then credited to the bank account associated with the terminal.

To complete a collection, information is also transferred in the other direction from the Payserv host computer to the EPT as follows:

- An acknowledgment of the receipt of the collection, which allows the EPT to erase the log file.
- Parameters for the next collection, e.g. latest date for the next collection.
- Security information (the IEP system is secured through a dynamically evolving security which requires frequent security updates).
- A red list, containing suspect cards, and an associated validity date for this red list. (The red list is expected to be empty due to the high security level of the purse system, however an empty red list also has a limited validity duration.) The red list must be updated or revalidated before its expiry otherwise the operation of the EPT will be suspended.

Notes:

- 1) An invalid red list causes the EPT to suspend purchase operations. All other EPT functions are available however. In particular, a collection may be performed, so as to obtain the update or revalidation of the red list and so to allow purchase operations to be resumed.
- 2) In the case of offline or velocollection, the information from host to EPT is transferred to the collection device first and then delayed until the next connection of the collection device to the EPT. The merchant must therefore ensure that the information arrives at the EPT within the time limit(s).
- 3) Also due to the delay in the receipt acknowledgment information arriving at the EPT when using offline or velocollection, the EPT can contain new transaction log entries in addition to the previous entries which have been collected but cannot yet be deleted. This may thus reduce the effective capacity of the EPT transaction log.

Each collection is allocated a collection number, which is incremented by 1 for each new collection performed. The attributes of a collection are the collection number, the number of transactions, the date on which the collection was initiated at the terminal and the date on which the corresponding receipt information was issued by the Payserv host. A history file in the EPT contains the attributes of previous collections, as well as previous interim and final balances, and has room for 50 entries. This file may be consulted via the merchant keyboard, or the electronic interface (fully via the 'PSVIC' protocol, partially via the 'VEZ' protocol).

The EPT will suspend purchase transactions if any one of the following conditions is reached:

- The transaction log has reached its maximum capacity.
- The accumulated "electronic value" has reached the maximum allowed by Europay or the merchant himself (whichever is less).
- The time-sensitive information of the EPT has expired.

A collection is then needed in order to make the EPT accept purchase transactions again.

In order to prevent a blocked EPT, in the case where the EPT has the possibility to perform a telecollection and the feature has not been disabled by terminal settings, it will attempt a telecollection automatically, at a time set by the Payserv host computer (normally during the night), if one of the following conditions is met:

- The transaction log has been filled to a set percentage of the maximum capacity.
- The accumulated "electronic value" has reached a set percentage of the maximum allowed by Europay or the merchant himself (whichever is least).
- The time remaining before a collection should be performed has reached a set percentage of the maximum time interval allowed by Europay.
- A request to 'collect next night' has been made via either the merchant keyboard or the electronic interface (only 'PSVIC' protocol).

The set percentage mentioned above is initially set by Europay when terminals are issued, but may be changed by the merchant if desired. A second percentage setting is also available which causes the EPT to attempt a telecollection immediately. An immediate collection can also be initiated explicitly.

If a collection does not succeed (e.g. because there is a telecommunication problem), the EPT will perform a set number of retries to achieve a successful collection.

3 Technical Details About VEZ 5.1 Usage

3.1 Definitions

Certain terms and functions are found within the VEZ 5.1 specifications which are to be interpreted here to correspond to the particular requirements of the EPT.

VEZ 5.1 Term / Function	Description
Class 2 Terminal	The EPT always operates as a Class 2 Terminal (i.e. full ECR integration, no additional equipment for printing of tickets or entering of amounts).
Sequential Processing	The EPT only operates in the Sequential Processing mode.
Service Activation	Start of an 'interim balance period'.
Service Deactivation	End of an 'interim balance period'. The EPT calculates the interim balance values and enters them in its internal log.
EFT Payment	A payment made with the electronic purse.
Balance	End of a 'final balance period'. The EPT calculates the final balance values and enters them in its internal log.

3.2 Main differences from VEZ 5.1 for EFT/POS

Printing of tickets

It is **not essential** to print a separate ticket for an electronic purse transaction. (The receipt (if any) printed by the ECR may refer to a payment with the purse, if desired).

Transaction Abort or Reversal

It is **not possible to abort, cancel or reverse** a purchase transaction that has been completed with the electronic purse.

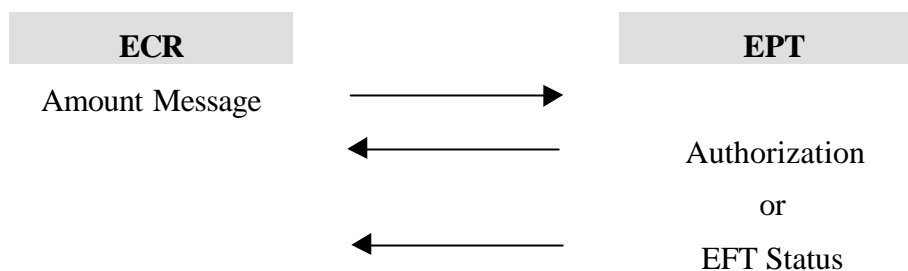
ECR Status as last step in the Transaction Sequence

If the EPT has authorised the transaction and the 'Authorization Message' has been successfully transmitted to the ECR (i.e. accepted with 'Receive Ready'), then as far as the EPT is concerned the transaction processing is finished.

The ECR Status is **not sent** to the EPT.

Should the ECR Status be 'NOT 'OK'', then the ECR must resolve the problem situation itself (using suitable organisational or technical measures).

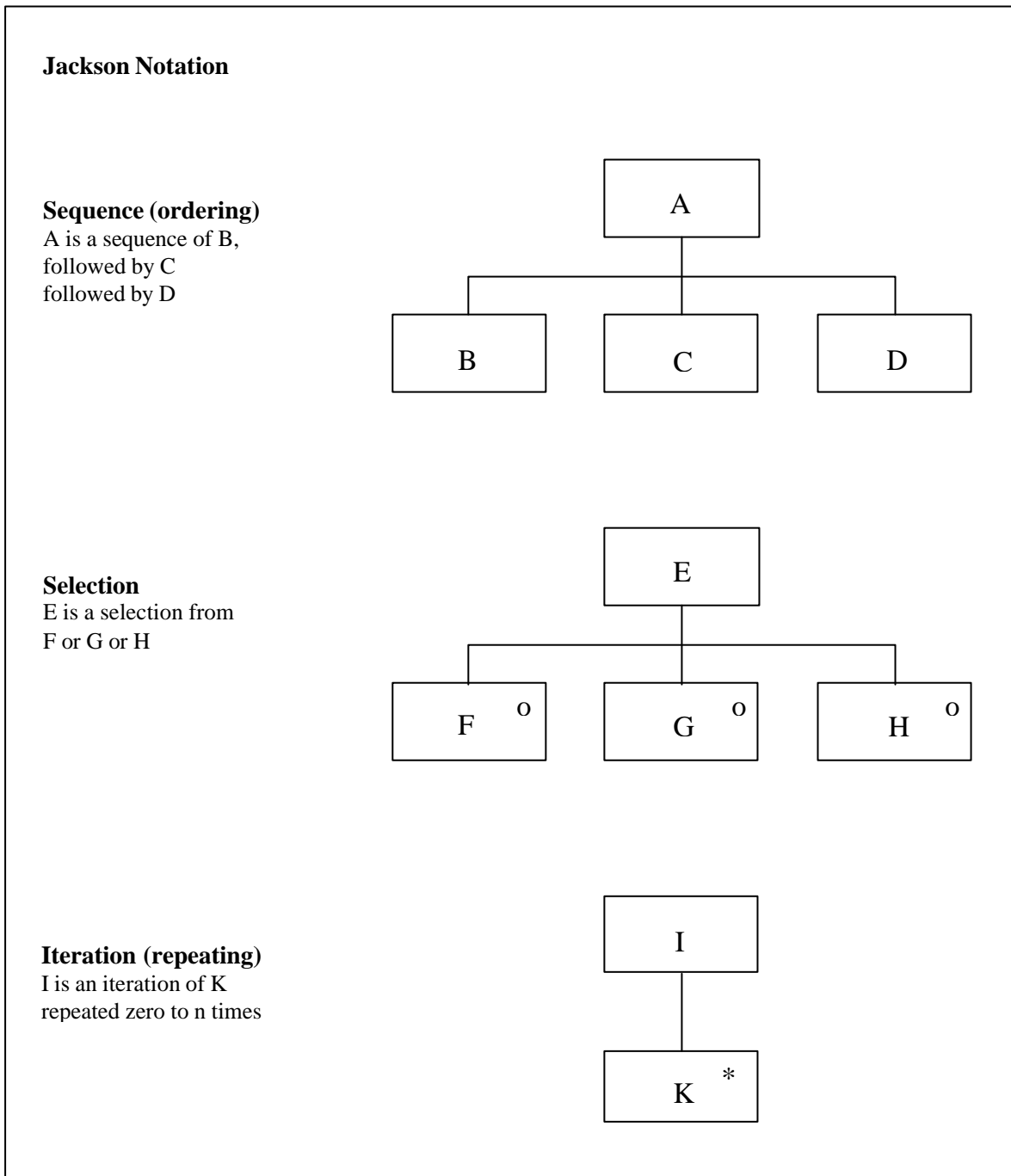
The application message sequence for a payment transaction with the electronic purse is thus as follows:



3.3 Sequence Diagrams

The sequences of events for the individual functions are described in these specifications by the use of Jackson diagrams. The following diagram explains the basic constructions in the Jackson diagrams.

(Note that the diagrams always show the sequence of events as seen by the ECR.)



4 'Service Activation' Function

4.1 Functional Description

The registration of the cashier at the ECR (for example by input of cashier number or password) initiates the 'Service Activation' function.

The 'Service Activation' function indicates to the EPT the start of a new 'interim balance period'.

The 'interim balance period' serves to synchronize the payment totals held by the ECR and the EPT. This allows the 'cashing-up' by the sales staff to be simplified.

The counters held by the ECR and EPT for financial flow control are reset to zero.

The entering of a transaction amount via the EPT keyboard is inhibited once the 'Service Activation' function has been successfully completed.

From release 15 and higher the service activation remains active, even after a power failure, and must be closed before the keyboard can be used!

4.1.1 Exception Handling

- 1) If the 'Service Activation' function is performed during an already initiated 'interim balance period', then the EPT will perform the interim balance calculation and make an interim balance entry in its transaction log. A new 'interim balance period' will effectively be started.
This could occur, for instance, if there is a problem with the ECR and the sales staff must re-register at the ECR although the EPT is still in the 'Open Mode'.
- 2) The 'Service Activation' may not be possible on the EPT due to the following reasons:

Event	Description
'Reject' message from the EPT or Communications time-out (after 3 tries)	The EPT is busy, e.g. with a collection or a SWDL or because an IEP has just been inserted.
	Problem in the physical connection (cabling) between EPT and ECR.
	Communications disturbance.
	EPT power is off.

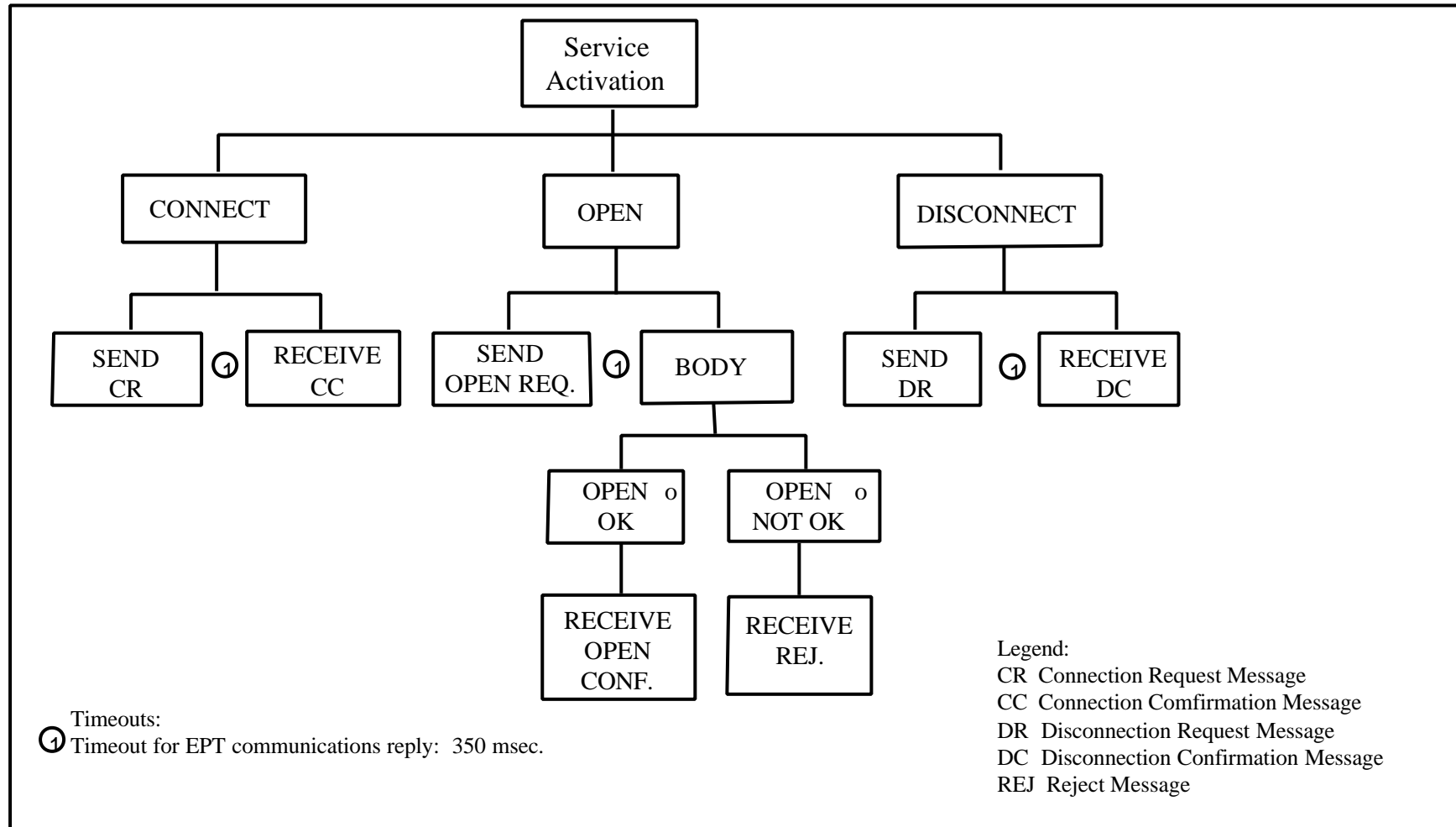
If the reason for the problem is displayed on the cashier display, then the cashier should take the corresponding measures.

If no reason is displayed then the 'Service Activation' function should be tried again.

If the further attempt is unsuccessful then the physical connection (cabling) should be checked.

The registration of the sales staff at the ECR must always be possible, even if the 'Service Activation' cannot be successfully completed with the EPT.

4.2 Sequence Diagram for 'Service Activation'



4.3 Application Messages for 'Service Activation'

4.3.1 Opening Request Message

EI1	Opening Request Message
from / to	ECR — EPT

Field Name	Format	Value	Description
Message Code	2X1	01H	--
ECR Number	4P2		This is stored in the EPT.
Operator Number	4P2		This is ignored.
HF Flag	2P1	(00H)	This is ignored. (Should be 00H = no transfer of Head and Foot needed for the Ticket.)

4.3.2 Opening Confirmation Message

EI2	Opening Confirmation Message
from / to	EPT — ECR

Field Name	Format	Value	Description
Message Code	2X1	02H	--
ECR Number	4P2		The value stored in the EPT.
Terminal Type	2P1	20H	2 = Class 2 Terminal; 0 = Sequential Processing.
Card Elements Number	2P1	1H	Only one card type (the IEP) is processed.
ECR Sequence Number	6P3	01H	The EPT transfers the value 1 to the ECR at every 'Service Activation'. The ECR takes over this number and uses it for the first transaction with subsequent incremental numbering of the transactions thereafter.
Receipt Head	S40		Not present.
Receipt Foot	S40		Not present.
Date	6D3		Not present.
Time	4H2		Not present.

5 'Service Deactivation' Function

5.1 Functional Description

The 'Service Deactivation' function is initiated when a cashier logs off from the ECR.

The 'Service Deactivation' function indicates to the EPT the end of an 'interim balance period'. The EPT performs the interim balance calculation and makes an interim balance entry in its transaction log.

The 'interim balance period' serves to synchronize the payment totals held by the ECR and the EPT. This allows the 'cashing-up' by the sales staff to be simplified.

The counters held by the ECR and EPT are transferred and checked in the EPT.

Once the 'Service Deactivation' function has been completed successfully, it is possible to enter a transaction amount via the EPT keyboard and complete a purchase transaction locally on the EPT. (Care must be exercised with this however, since any transactions made in this way are not, of course, registered in the ECR and the balance totals held in the ECR and EPT may therefore now not agree.)

5.1.1 Exception Handling

The 'Service Deactivation' may not be possible on the EPT due to the following reasons:

Event	Description
'Reject' message from the EPT or Communications time-out (after 3 tries)	The EPT is busy, e.g. with a collection or a SWDL or because an IEP has just been inserted.
	Problem in the physical connection (cabling) between EPT and ECR.
	Communications disturbance.
	EPT power is off.

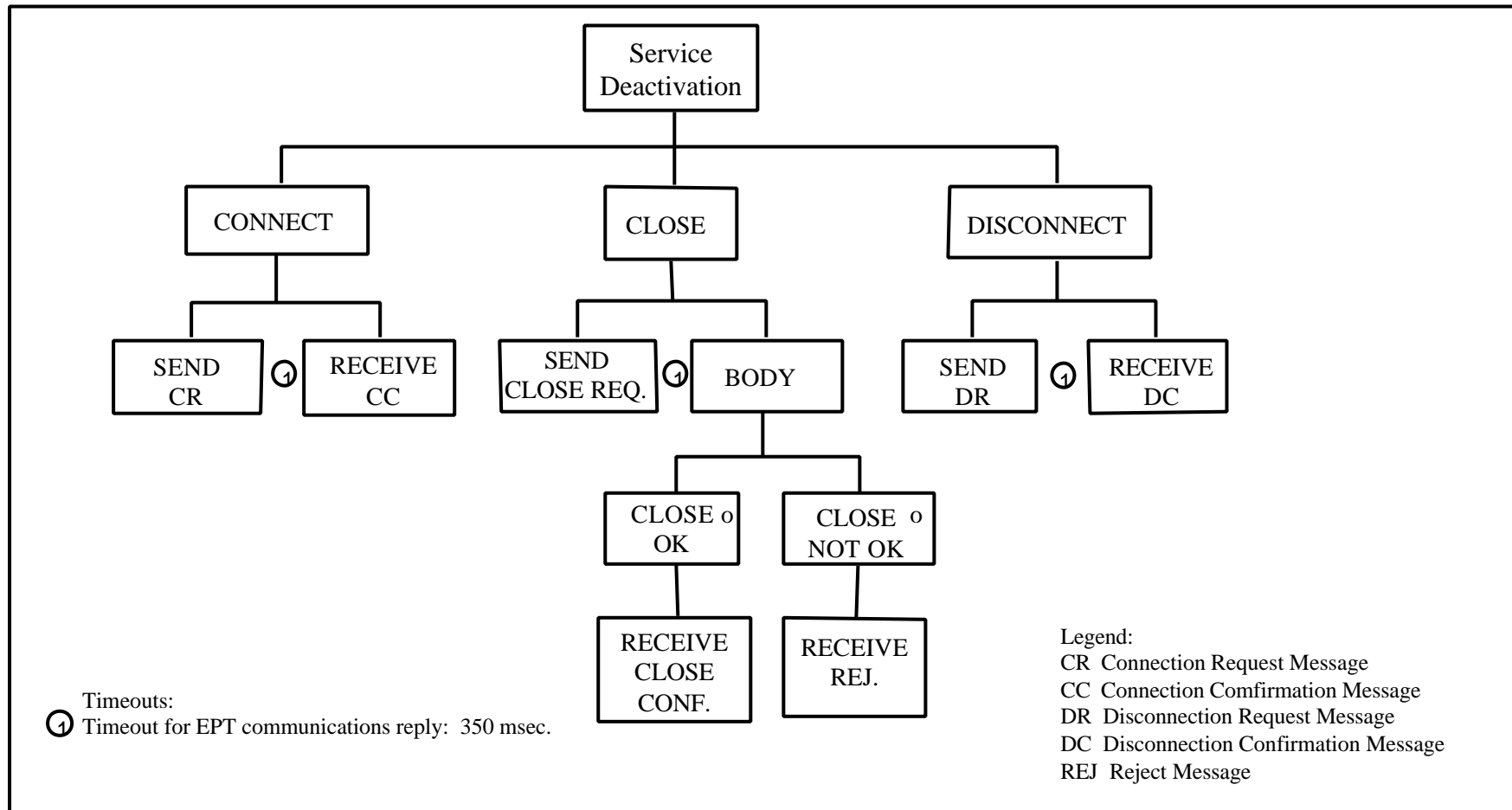
If the reason for the problem is displayed on the cashier display, then the cashier should take the appropriate measures.

If no reason is displayed then the 'Service Deactivation' function should be tried again.

If the further attempt is unsuccessful then the physical connection (cabling) should be checked.

It must always be possible for the sales staff to log off from the ECR, even in the case where the 'Service Deactivation' cannot be successfully completed with the EPT.

5.2 Sequence Diagram for 'Service Deactivation'



5.3 Application Messages for 'Service Deactivation'

5.3.1 Closing Request Message

EI3	Closing Request Message
from / to	ECR — EPT

Field Name	Format	Value	Description
Message Code	2X1	03H	--
ECR Number	4P2		This number is compared in the EPT with the value stored at the last Service Activation.
ECR Total Amount	10P5		The ECR total of all IEP transactions performed during the shift since the last Service Activation. This is used in the EPT to perform the financial flow control. (Refer to VEZ 5.1 specification, Appendix 3).

5.3.2 Closing Confirmation Message

EI4	Closing Confirmation Message
from / to	EPT — ECR

Field Name	Format	Value	Description
Message Code	2X1	04H	--
ECR Number	4P2		Value stored in the EPT.
EFT Total Amount	10P5		The EPT total of all IEP transactions performed during the shift since the last Service Activation.
Finance Control Flag	1P1		If the EPT has detected a financial error during the shift since the last Service Activation difference, then this flag will be set to 01H. (Refer to VEZ 5.1 specification, Appendix 3.)

6 'EFT Payment' Function

6.1 Functional Description

The 'EFT Payment' function is initiated when the ECR payment function is carried out (e.g. on a cash register by pressing the payment key for "CASH").

The transaction amount is transferred to the EPT using the 'Amount Message'.

The requested amount is displayed and the customer is asked to insert the IEP into the EPT. After the customer has inserted the IEP and pressed the 'OK' button, the EPT performs the transaction. After the EPT has performed the transaction, it asks the customer to remove the IEP.

If the transaction amount is successfully debited from the IEP and credited to the EPT, then this is indicated to the ECR via the 'Authorization Message'. If the transaction cannot be completed on the EPT (e.g. due to insufficient value in the IEP), then this is indicated to the ECR via the 'EFT Status Message'. Note that the result is not sent until either the IEP has been removed from the EPT, or one of the EPT timeouts (30 seconds after payment or 60 seconds after amount message) has occurred.

See also chapter 12.2, Display States.

The transaction details are stored in the transaction log in the EPT.

Remember that it is not possible to abort, cancel or reverse a debit transaction once this has been completed with the IEP.

The totals for the financial flow control are exchanged and checked by the EPT. If a difference is detected then the following actions are initiated (refer also to VEZ 5.1 specification, Appendix 3):

- 1) The 'Finance Control Flag' is set (see 'Closing Confirmation Message');
- 2) The EPT takes on the ECR total for further synchronisation checks;

6.1.1 Exception Handling

The 'EFT Payment' may not be possible on the EPT due to the following reasons:

Event	Description
'EFT Status' message from the EPT	A problem, as described in 6.1.2, has occurred. The ECR should indicate this on the cashier display.
'Reject' message from the EPT or Communications time-out (after 3 tries)	The EPT is busy, e.g. with a collection or a SWDL or because an IEP has just been inserted.
	Problem in the physical connection (cabling) between EPT and ECR.
	Communications disturbance.
	EPT power is off.

If the reason for the problem is displayed on the cashier display, then the cashier should take the corresponding measures.

If no reason is displayed then the 'EFT Payment' function should be tried again.

If the further attempt is unsuccessful then the physical connection (cabling) should be checked.

6.1.2 Application Error Messages ('EFT Status')

The application error messages are transmitted to the ECR via the 'EFT Status Message'.

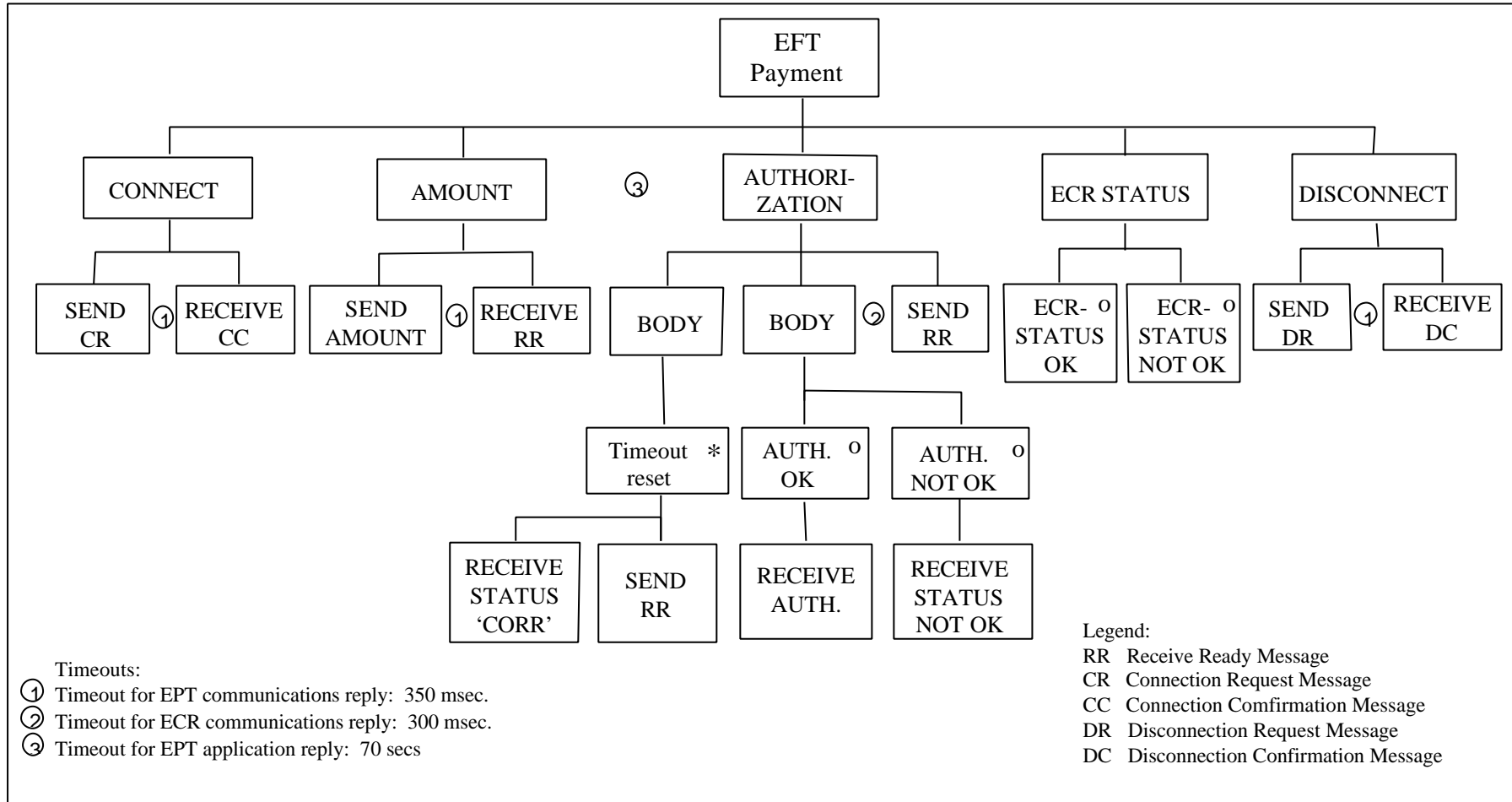
This message includes a text string which is to be displayed on the ECR. The texts are mostly as defined in VEZ 5.1 with small changes made for the IEP. The language of the texts can be chosen by a setting in the EPT.

The following error codes may be sent by the EPT:

Code	Messages (GB, D, F, I)	Remarks
01H	MONEY OR OTHER CARD BAR ODER AND. KARTE ESPECES/OUTRE CARTE PAGASI IN CONTANTI	An invalid card was used.
02H	INSUFFICIENT BALANCE SALDO ZU KLEIN SOLDE INSUFFISANT SALDO INSUFFICIENTE	The IEP balance is less than the transaction amount.
04H	DOUBLE OPERATION DOPPELOPERATION OPERATION DOUBLE OPERAZIONE DOPPIA	The sequence number and amount of the current transaction ('AMOUNT MESSAGE') are identical to those in the previous, correctly completed transaction. The ECR must complete the current transaction correctly itself, since the customer has already paid (the IEP was successfully debited).
05H	STOPPED BY CUSTOMER ABBRUCH DURCH KUNDE INTEROMPU PAR CLIENT STOP DEL CLIENTE	The customer has stopped the transaction in progress by pressing the STOP button.
06H	CUSTOMER NOT READY KUNDE NICHT BEREIT CLIENT PAS PRET CLIENTE NON PRONTO	The customer has not pressed the 'OK' button on the EPT to confirm the payment, within the allowed time; or: the customer has not inserted the IEP within the allowed time.
09H	(No Text)	By transferring the 'EFT STATUS MESSAGE' with code 09H, the ECR timer will be reset (Reset Timeout). This code is not being used at the moment, but could be used in the future.
10H	PLEASE TRY LATER SPÄTER VERSUCHEN REESSAYER SVP. RIPROVARE TRA POCO	An EPT limit has been reached, e.g. the transaction log is full. Before a new transaction can take place, a collection must be carried out. The need for a collection is also indicated on the EPT.)
11H	"CASH" AMOUNT ZERO "CASH" BETRAG NULL "CASH" MONTANT ZERO IMPORTO "CASH" ZERO	The amount of the current transaction ('AMOUNT MESSAGE') is zero.

Code	Messages (GB, D, F, I)	Remarks
12H	NOT ALLOWED NICHT ERLAUBT OPERATION INVALIDE AZIONE NON VALIDA	The ECR has initiated an undefined function (e.g. cancel transaction).
13H	OPEN SHIFT SCHICHT ERÖFFNEN PRISE DE SERVICE ATTIVARE SERVIZIO	The ECR has sent a transaction request although the shift is closed as far as the EPT is concerned.
15H	WRONG ECR NUMBER FALSCHER KASSEN-NR. CODE CAISSE INCORR. CODICE CASSA ERRATA	The ECR has sent a message with an incorrect ECR number, i.e. the ECR number in the current transaction is not the same as that which was sent with at 'Service Activation'.

6.2 Sequence Diagram for 'EFT Payment'



6.3 Application Messages for 'EFT Payment'

6.3.1 Amount Message

EI5	Amount Message
from / to	ECR — EPT

Field Name	Format	Value	Description
Message Code	2X1	05H	--
ECR Number	4P2		Is compared in the EPT with the value stored at the last Service Activation.
ECR Sequence Number	6P3		Is temporarily stored to be used in the reply.
Amount	8P4		Amount for the IEP debit transaction.
Transaction Type	2X1	02H	Currently only the debit payment transaction is supported with the IEP. No other functions are allowed.
EFT Void / Ref. Number	6P3		Is ignored.
ECR Total Amount	10P5		The ECR total of all IEP transactions performed during the shift since the last Service Activation. Used in the EPT to perform the financial flow control (refer to VEZ 5.1 specification, Appendix 3).
Print Mode	2P1		Is ignored. It is not necessary to print a ticket for IEP transactions.
Customer Language	2P1		Is ignored.
Track Presence	2P1		Is ignored.
Track Read Method	S1		Is ignored.
Track 2 Data	40X20	--	Not present.
Track 3 Data	107X54	--	Not present.

6.3.2 Authorization Message

EI6	Authorization Message
from / to	EPT — ECR

Field Name	Format	Value	Description
Message Code	2X1	06H	--
ECR Number	4P2		Value stored in the EPT.
ECR Sequence Number	6P3		Value stored in the EPT.
Amount	8P4		Amount debited from IEP and credited to EPT.
Print Format	2P1	00H	= No Ticket to be printed.
Issuer Number	2P1	01H	= IEP "CASH".
Issuer Name	S24	"CASH"	(Left justified, filled with spaces (20H))
Card Number String	S30		Contains the 10-character Purse ID. (Left justified, filled with spaces (20H)).
Terminal ID	12P6		Contains first six digits of EPT terminal ID. (Right justified, filled with zeroes (0H)).
Terminal Sub ID	2P1		Last two digits of EPT terminal ID.
Bookkeeping Period	4P2		Current final balance number in the EPT.
Transaction/Ref. Number	6P3		EPT transaction number (SAM STAN).
Date	6D3		Current date as given by EPT clock.
Time	4H2		Current time as given by EPT clock.
Customer Language	2P1	00H	Not used.
EFT Total Amount	10P5		The EPT total of all IEP transactions performed during the shift since the last Service Activation.
EFT Void Number	6P3	00H	Not used.
Manufacturer ID	2P1	--	Not present.
Contract Number	10P5	--	Not present.
Authorization Number	S6	--	Not present.
Credit Cards Txt	S20	--	Not present.

6.3.3 EFT Status Message

EI8	EFT Status Message
from / to	EPT — ECR

Field Name	Format	Value	Description
Message Code	2X1	08H	--
ECR Number	4P2		Value stored in EPT.
Status Code	2X1		Contents as described in section 6.1.2 above.
Display Text	S20		Contents as described in section 6.1.2 above.
			<i>The remaining fields are only transferred in the case of a 'Double Operation'. The values are identical with those in the 'Authorization Message'.</i>
ECR Sequence Number	6P3		
Amount	8P4		
Print Format	2P1		
Issuer Number	2P1		
Issuer Name	S24		
Card Number String	S30		
Terminal ID	12P6		
Terminal Sub ID	4P2		NOTE: This field has a different length from that in the 'Authorization Message'. The contents are, however, the same!
Bookkeeping Period	4P2		
Transaction / Ref. Number	6P3		
Date	6D3		
Time	4H2		
Customer Language	2P1		
EFT Total Amount	10P5		
EFT Void Number	6P3		
Manufacturer ID	2P1	--	Not present.
Contract Number	10P5	--	Not present.
Authorization Number	S6	--	Not present.
Credit Cards Txt	S20	--	Not present.

7 'Balance' Function

7.1 Functional Description

The 'Balance' function is initiated when the ECR balance function is carried out. The EPT performs the final balance calculation and makes a final balance entry in its transaction log.

The final balance entry allows the totals in the ECR and EPT to be synchronized.

The final balance entries in the EPT transaction log are used to initiate the crediting of the transactions to the merchant's bank account.

The balance function uses a sequence of request and reply messages as follows:

Source	Message (Code)	Type	Contents
ECR	Balance Request (40H)	00.	
EPT	Balance Reply (41H)	01.	Date & time given by EPT clock.
ECR	Balance Request (40H)	01.	
EPT	Balance Reply (41H)	02.	Total for the IEP.
ECR	Balance Request (40H)	01.	
EPT	Balance Reply (41H)	02.	Grand total for EPT (identical to total for the IEP).
ECR	Balance Request (40H)	01.	
EPT	Balance Reply (41H)	03.	Date & time of previous final balance. Number of next final balance period.
ECR	Balance Request (40H)	01.	
EPT	Balance Reply (41H)	00.	End message.

7.1.1 Exception Handling

The 'Balance' may not be possible on the EPT due to the following reasons:

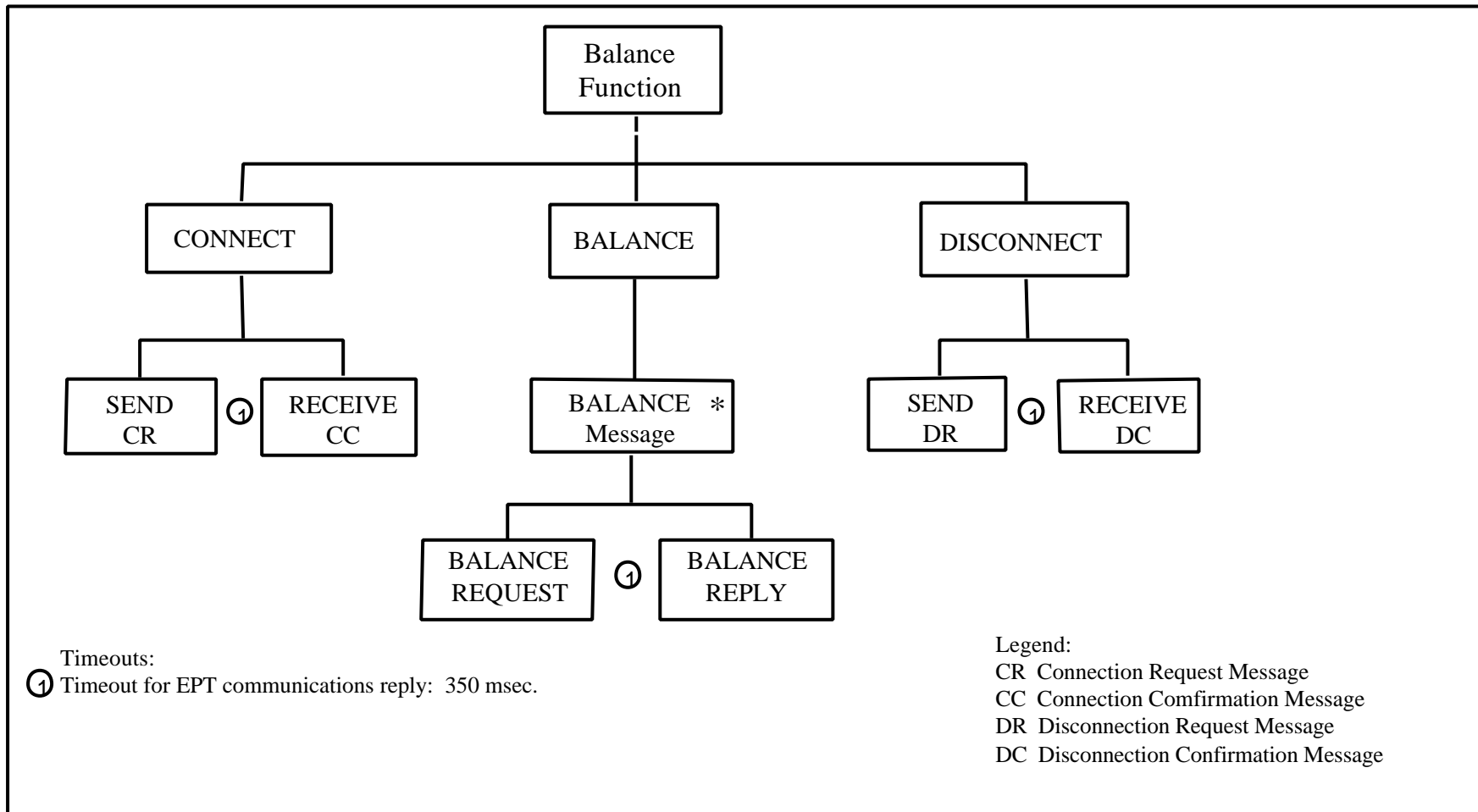
Event	Description
'Reject' message from the EPT or Communications time-out (after 3 tries)	The EPT is busy, e.g. with a collection or a SWDL or because an IEP has just been inserted.
	Problem in the physical connection (cabling) between EPT and ECR.
	Communications disturbance.
	EPT power is off.

If the reason for the problem is displayed on the cashier display, then the cashier should take the appropriate measures.

If no reason is displayed then the 'Balance' function should be tried again.

If the further attempt is unsuccessful then the physical connection (cabling) should be checked.

7.2 Sequence Diagram for 'Balance'



7.3 Application Messages for 'Balance'

7.3.1 Balance Request Message

EI9	Balance Request Message
from / to	ECR — EPT

Field Name	Format	Value	Description
Message Code	2X1	40H	--
ECR Number	4P2		Value is stored for reply.
Request Type	2P1		00 or 01

7.3.2 Balance Reply Message

EI10	Balance Reply Message
from / to	EPT — ECR

Field Name	Format	Value	Description
Message Code	2X1	41H	
ECR Number	4P2		Value stored in EPT.
Reply Type	2P1		01, 02, 03, 04 or 00.
Reply Type 01			
Date	6D3		Date as given by EPT clock.
Time	4H2		Time as given by EPT clock.
Reply Type 03			
Date	6D3		Date as given by EPT clock.
Time	4H2		Time as given by EPT clock.
New Period Number	4P2		Next (new) EPT final balance number.
Reply Type 02 or 04			
Issuer Number	2P1		01H = IEP "CASH". 00H = all.
Issuer Name	S24		"CASH" (for Issuer Number = 01H). "ALL" (for Issuer Number = 00H). (Left justified, filled with spaces (20H).
Terminal ID	12P6		Identification of the EPT group.
Period	4P2		EPT final balance number.
Debit Count	4P2		Number of transactions (IEP debits).
Debit Total	9P5		Total value of transactions.

Field Name	Format	Value	Description
Credit Count	4P2	0000H	Zero.
Credit Total	9P5	00--00H	Zero.
Void Count	4P2	0000H	Zero.
Void Total	9P5	00--00H	Zero.
Total Sign	1P1	00H	Positive.
Total Count	4P2		Debit Count + Credit Count + Void Count.
Total Amount	10P5		Debit Total - Credit Total - Void Total.

8 Summary of the Application Messages

No.	Message	Message Code	Sender	Receiver
EI1	Opening Request Message	01H	ECR	EPT
EI2	Opening Confirmation Message	02H	EPT	ECR
EI3	Closing Request Message	03H	ECR	EPT
EI4	Closing Confirmation Message	04H	EPT	ECR
EI5	Amount Message	05H	ECR	EPT
EI6	Authorization Message	06H	EPT	ECR
EI8	EFT Status Message	07H	EPT	ECR
EI9	Balance Request Message	40H	ECR	EPT
EI10	Balance Reply Message	41H	EPT	ECR

9 Overview of the Data Link Layer Messages

All definitions remain as per VEZ 5.1.

Field Name		Contents
Start Flag Sequence	SYN	16H
Data Link Escape	DLE	10H
Start of Text	STX	02H
Frame Type	FT	01H = CR Connection Request 02H = CC Connection Confirmation 03H = DR Disconnection Request 04H = DC Disconnection Confirmation 05H = RR Receive Ready 06H = REJ Reject 80H = Information Frame (Application Messages)
Frame Number	FN	
Not Used	NU	
Information Field	IF	Only present for Frame Type = 80H with contents according to application message
Data Link Escape	DLE	10H
End of Text	ETX	03H
Most Sig. Byte of CRC-16	CRC2	CRC computed using $x^{16} + x^{15} + x^2 + 1$ as polynomial.
Least Sig. Byte of CRC-16	CRC1	

10 Use in Power-saving Environments

(Note: This section relates to the EPT type intended for integration into vending machines.)

Certain systems in which the EPT is to be integrated may need to conserve power, e.g. vending machines powered from batteries charged from solar cells. With these systems it is possible to remove the power from the EPT when not in use.

If the EPT is used in a power-saving environment, it is highly recommended to use the PSVIC protocol because only this protocol is capable of handling all problems associated with power-saving environments.

10.1 Powering-on the EPT

To assist in determining when to power-on the EPT, the EPT provides an isolated contact-closure which is activated when a card is fully inserted into the EPT or one or more of the EPT buttons is pressed. The contact closure exists only for as long as the button is pressed or the card is fully inserted, i.e. the signal must be latched by the vending machine itself. The vending machine must guarantee that the power will be applied to the EPT when this contact-closure is detected and that the power will remain applied for a minimum of ten seconds. The vending machine manufacturer should determine if a longer minimum period is needed, depending, for example, upon the complexity of the vending machine.

Of course, the vending machine may also use its own signals, e.g. from buttons used to select products, to determine that the EPT should be powered-on. The same minimum power-on time must be guaranteed in this case also.

Once power is applied to the EPT, it performs its start-up procedures and the vending machine can test with Connection Requests to determine when the EPT is ready for operation. When Connection Confirmation is received, the vending machine can perform the 'Service Activation' function.

Note that the method to be used to perform the collections from the EPT may also determine when power is to be applied. If a manually controlled velocollection is to be made, then power should be switched on manually before starting the velocollection. If the collection is to be made automatically, either by the vending machine using the PSVIC offline collection messages or by a direct telecollection (i.e. with modem and telephone line), then the vending machine must apply power before starting the collection.

10.2 Powering-off the EPT

For all terminal types, if power has been applied in order to perform a collection then the power must remain applied at least until the collection or SWDL operation is fully completed (regardless of whether the operation is successful or not).

There is no way for the VEZ protocol to determine that a SWDL is running. In this case the power must be switched on under all circumstances (e.g. manually)!

10.2.1 EPT with ‘OK’ Button

If no customer actions indicate that a transaction is to be performed within the minimum power-on period (ten seconds or more as described above in 10.1) then the vending machine should perform the ‘Service Deactivation’ function following which power may be removed from the EPT. The vending machine must itself decide both how to interpret the customer actions and when the power should be left applied to the EPT in anticipation of a transaction.

However, once a transaction has been started, i.e. the ‘EFT Payment’ function sequence has been started, the vending machine must always keep the power applied to the EPT until at least ten seconds after the sequence is completed with Disconnection Confirmation from the EPT. This allows time for the EPT to display the transaction result to the customer. The vending machine may, of course, continue to apply power to the EPT if desired, e.g. if it anticipates a further operation with the EPT.

As described in section 6.1, the transaction result is normally sent after the transaction is completed and the IEP has been removed. It will, however, always be sent, even if the IEP has not been removed, if the EPT timeout (30 seconds) occurs.

Note that, in the case of an EPT with an ‘OK’ button, if it is the card which has been inserted and caused the power to be applied to the EPT, the card can remain in the reader until the transaction has been completed.

10.2.2 EPT without an ‘OK’ Button

In the case of an EPT without an ‘OK’ button the basic operation must be the same as that described above in 10.2.1.

It must be noted, however, that if it is the card that has been inserted and caused the power to be applied to the EPT, the card must then be removed from the reader before a transaction can be started. The vending machine should therefore allow more time for the card holder to do this.

11 Selecting VEZ Protocol in EPTs

11.1 Vending Machine Terminal Module

As described in section 2.3.1, the vending machine terminal module supports three protocols which may be used to perform purchase transactions, i.e. PSVIC, MDB and VEZ.

The selection of the protocol to be used for purchase transactions is performed with the initialization program Veloboss. The selection, once made, is stored in the terminal and in the CSM. Thus the setting is retained if the terminal hardware has to be replaced but the same CSM is used. Information about the Veloboss program and the terminal initialization procedure is provided in a separate document available from Europay.

Note that the offline and network collections are only performed with the PSVIC protocol and that this takes place via a separate interface port with a separate connector on the terminal. Thus, no selection procedure is required for this.

11.2 Desktop and Portable Terminals

The desktop and portable terminals have only one interface port and interface connector. This interface is set to 'power-on' to be in the mode which is stored in the CSM, i.e. VEZ or PSVIC.

It is possible to switch the interface from VEZ into PSVIC mode in order to perform an offline or network collection, which is only possible in PSVIC mode. Once this is completed, the interface may be returned into VEZ mode.

There are the following possibilities to switch the interface from VEZ into PSVIC mode and vice versa:

- To switch from VEZ into PSVIC, a VEZ Control Frame with a Frame Type value of 50h must be sent to the terminal.
If received correctly the terminal replies with a VEZ Control Frame with a Frame Type value of 51h and then switches into PSVIC mode.
If not received correctly the terminal replies with a VEZ REJ Control Frame and the terminal remains in VEZ mode.
- To switch from PSVIC into VEZ, one of the messages *pc_unsec_write* or *pc_vic_end* must be sent to the terminal. The use of these is described in the PSVIC documentation available from Europay.
- By the use of the keyboard (in both directions).
- By the use of Veloboss (in both directions)

12 EPT User Interface (VEZ)

12.1 Physical

The user interface of the EPT consists of two or three buttons and a display.

The EPT is available with or without 'OK' button. The 'OK' button, if present, is used to confirm the purchase transaction. Otherwise, without an 'OK' button, the insertion of the IEP when requested, with the amount to be paid being shown, is equivalent to the card holder indicating 'OK' to pay.

The 'STOP' button can be used to cancel a transaction, provided that the 'OK' button has not yet been pressed on an EPT with 'OK' button or the IEP has not yet been inserted in an EPT without 'OK' button.

The 'INFO' button can be pressed after the IEP has been inserted, in order to display the purse balance. This can be done before 'OK' is pressed or after the transaction, when the remove card message is displayed.

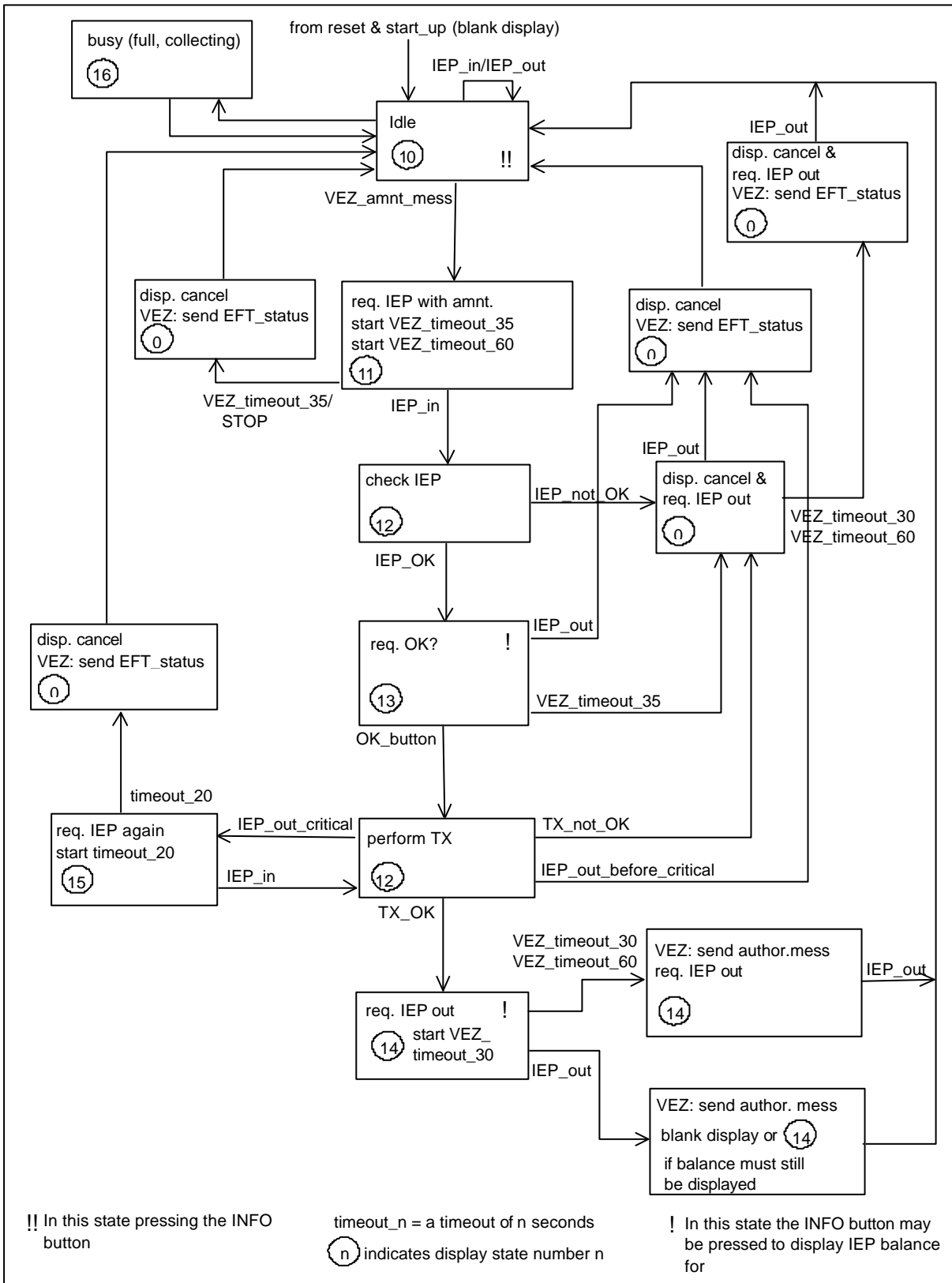
If the 'INFO' button is pressed before the IEP is inserted, then the EPT enters an information mode in which EPT data can be displayed or, if the IEP is inserted, the IEP balance and details of the last IEP transaction can be displayed.

The display shows user messages relating to the IEP and the operation of the EPT.

12.2 Display States

The following state transition diagram shows display states and indicates the operation of the EPT, as seen by the card holder from the messages displayed.

The display states are numbered and the messages displayed in these states are listed in the table in section 12.3.



12.3 User Messages

Listed here are the messages relating to the EPT operation, for the various display states.

If an IEP is inserted and the language code can be correctly read from this, then the messages are displayed in the corresponding language.

If no IEP is inserted, or if the language code cannot be read from an inserted IEP, then the messages are displayed in the default customer code set into the EPT.

12.3.1 Main Display Texts

Display State		German	French	Italian	English	Spanish	Display sequence	Display sequence
		1234567890123456	1234567890123456	1234567890123456	1234567890123456	1234567890123456	(one line)	(two lines)
10	Idle (no IEP inserted)	WILLKOMMEN	BIENVENUE	BENVENUTI	WELCOME	BIENVENIDO	a aa...	a a_,a_...
	Idle (IEP inserted)	CASH BEREIT	CASH PRETE	CASH PRONTA	CASH READY	CASH PRONTO	a a_a_...	a a_,_,a_,_...
11	Ask for card, amount shown	Fr 999.99 CASH Fr 999.99 BITTE Fr 999.99 BITTE CASH	Fr 999.99 CASH Fr 999.99 S.V.P. Fr 999.99 CASH S.V.P.	Fr 999.99 CASH Fr 999.99 P.F. Fr 999.99 CASH P.F.	Fr 999.99 CASH Fr 999.99 PLEASE Fr 999.99 CASH PLEASE	Fr 999.99 CASH Fr 999.99 PFAVOR Fr 999.99 CASH POR FAVOR	a (1s.) b (1s.) abab...	c d (1s.) cd,c_,cd,c_...
12	Check IEP, do TX	Fr 999.99 ...	Fr 999.99 ...	Fr 999.99 ...	Fr 999.99 ...	Fr 999.99 ...	a aa...	a a_,a_...
13	Ask if 'OK'	Fr 999.99 'OK'?' Fr 999.99	Fr 999.99 'OK'?' Fr 999.99	Fr 999.99 'OK'?' Fr 999.99	Fr 999.99 'OK'?' Fr 999.99	Fr 999.99 'OK'?' Fr 999.99	a (1s.) b (1s.) abab...	a (1s.) b (1s.) a_,b_,a_,b_...
14	Payment 'OK'	Fr999.99 BEZAHLT KARTE ENTNEHMEN	Fr999.99 PAYE RETIREZ LA CARTE	Fr999.99 PAGATI RITIRARE CARTA	Fr999.99 PAID REMOVE CARD	Fr999.99 PAGADO RETIRAR TARJETA	a (1s.) b (1s.) aabab...	a b (1s.) ab,a_,ab,a_...
	Payment 'OK', IEP balance low	Fr999.99 BEZAHLT SALDO Fr 999.99 KARTE ENTNEHMEN	Fr999.99 PAYE SOLDE Fr 999.99 RETIREZ LA CARTE	Fr999.99 PAGATI SALDO Fr 999.99 RITIRARE CARTA	Fr999.99 PAID BAL. Fr 999.99 REMOVE CARD	Fr999.99 PAGADO SALDO Fr 999.99 RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababacac...	a b (1s.) c (1s.) ab,ab,ac,a_,ac,a_...
15	IEP out when critical	ZAHLUNG UNFERTIG NOCHMALS KARTE	PAIEM. INACHEVE REINSEREZ CARTE	PAGAM.INCOMPIUTO REINSERIRE CARTA	PAYMENT INCOMPLETE REINSERT CARD	PAGO SIN FIN REINSERTAR TARJ.	a (1s.) b (1s.) abab...	a b (1s.) ab,a_,ab,a_...
16	Busy: collecting	MOMENT BITTE □□□	UN INSTANT SVP □□□	UN MOMENTO PREGO □□□	ONE MOMENT PLEASE □□□	MOMENTO P.FAVOR □□□	a aa...	a b ab,ab...
	Busy: otherwise	AUSSER BETRIEB	HORS SERVICE	FUORI SERVIZIO	OUT OF ORDER	FUERA SERVICIO	a aa...	a a_,a_...

12.3.2 Cancel Texts (display state 0):

Display State		German	French	Italian	English	Spanish	Display sequence	Display sequence
		1234567890123456	1234567890123456	1234567890123456	1234567890123456	1234567890123456	(one line)	(two lines)
0	IEP not correct	KARTE VERKEHRT? KARTE OHNE CASH? KARTE ENTNEHMEN	CARTE FAUX COTE? CARTE SANS CASH? RETIREZ LA CARTE	VOLTARE CARTA? E' CARTA CASH? RITIRARE CARTA	CARD WRONG WAY? NOT CASH CARD? REMOVE CARD	TARJ. AL REVES? TARJ. SIN CASH? RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababcabc...	a (1s.) b (1s.) c (1s.) ac, bc, ac, bc...
	STOP, timeout, IEP out (not critical)	ABBRUCH KEINE ZAHLUNG KARTE ENTNEHMEN	ANNULATION PAS DE PAIEMENT RETIREZ LA CARTE	INTERRUZIONE NESSUN PAGAMENTO RITIRARE CARTA	CANCELLED NO PAYMENT REMOVE CARD	CANCELADO NO REMUNERACION RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababcabc...	a (1s.) b c (1s.) ba, ba, bc, ba, bc...
	IEP balance too low	SALDO UNGENÜGEND KEINE ZAHLUNG KARTE ENTNEHMEN	SOLDE INSUFF. PAS DE PAIEMENT RETIREZ LA CARTE	SALDO NON BASTA NESSUN PAGAMENTO RITIRARE CARTA	BALANCE TOO LOW NO PAYMENT REMOVE CARD	SALDO. INSUF. NO REMUNERACION RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababcabc...	a (1s.) b c (1s.) ba, ba, bc, ba, bc...
	IEP in red list	CASH VERWEIGERT KEINE ZAHLUNG KARTE ENTNEHMEN	CASH REFUSEE PAS DE PAIEMENT RETIREZ LA CARTE	CASH RIFIUTATA NESSUN PAGAMENTO RITIRARE CARTA	CASH REJECTED NO PAYMENT REMOVE CARD	CASH DENEGADO NO RENUMERACION RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababcabc...	a (1s.) b c (1s.) ba, ba, bc, ba, bc...
	IEP expired	CASH VERFALLEN KEINE ZAHLUNG KARTE ENTNEHMEN	CASH ECHUE PAS DE PAIEMENT RETIREZ LA CARTE	CASH SCADUTA NESSUN PAGAMENTO RITIRARE CARTA	CASH EXPIRED NO PAYMENT REMOVE CARD	CASH CADUCADO NO REMUNERACION RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) ababcabc...	a (1s.) b c (1s.) ba, ba, bc, ba, bc...
	IEP <i>pur_locks_online</i> set	LADUNG UNFERTIG NEULADEN NOETIG KEINE ZAHLUNG KARTE ENTNEHMEN	CHARGE INACHEVEE RECHARGEZ SVP PAS DE PAIEMENT RETIREZ LA CARTE	CARICO NONFINITO RICARICARE PF NESSUN PAGAMENTO RITIRARE CARTA	LOAD UNFINISHED NEW LOAD NEEDED NO PAYMENT REMOVE CARD	CARGA INACABADA CARGAR OTRA VEZ NO REMUNERACION RETIRAR TARJETA	a (1s.) b (1s.) c (1s.) d (1s.) abcdabcd...	a (1s.) b (1s.) c d (1s.) ca, cb, cd, ca, cb, cd...
	(possible) IEP problem	CASH DEFEKT? KARTE ENTNEHMEN	ANOMALIE CASH? RETIREZ LA CARTE	CASH DIFETTOSA? RITIRARE CARTA	CASH FAULTY? REMOVE CARD	CASH DEFECTUOSO? RETIRAR TARJETA	a (1s.) b (1s.) aabab...	a b (1s.) a, a, ab, a, ab...

Note: The line indicating 'REMOVE CARD' is only displayed until the card is removed. The cancel texts are always shown at least twice, even if the card has been removed, except for the first condition (IEP not correct) which is only shown while the card is inserted.

13 Acceptance Procedure

There is no official certification to be performed when the EPT has been integrated into a vending system.

The following acceptance procedure should, however, be gone through, either by the manufacturer of the vending system or by the integrator of the CASH terminal, to ascertain that the integration has been correctly implemented to a minimum acceptable standard.

Note that this procedure is only intended to test the payment function and that not all possible uses of the VEZ messages or EPT features are included.

Note also that if the vending system is modified later, e.g. with a new software release, this acceptance procedure should be repeated for the new system.

(The term 'vending system' is used here to apply to the system to which the EPT is connected. This could be, for example, a vending machine or an ECR.)

No.	To be tested:	Test procedure:	Expected results:
1	Start-up:	Power-on of vending system and EPT: a) first vending system then EPT; b) first EPT then vending system; c) vending system and EPT together;	Correct establishment of VEZ communications: via Connection Request / Connection Confirmation messages
2	Normal transactions:	Several transactions are performed with valid IEPs loaded with sufficient value: All card holder actions are performed correctly; Various transaction amounts are used.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction 'OK', via the 'Authorization Message', sent when card removed; IEP balance correctly debited by transaction amount; Goods/services correctly supplied by and result correctly indicated on vending system.
3	Abnormal transactions: cancelled with 'STOP'	A transaction is performed with a valid IEP loaded with sufficient value: All card holder actions are performed correctly except that: - on an EPT with 'OK': the IEP is inserted then 'STOP' is pressed instead of 'OK'; - on an EPT without 'OK': 'STOP' is pressed instead of inserting the IEP.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction not 'OK', via 'EFT Status Message', sent either when card removed (EPT with 'OK') or 'STOP' pressed (EPT without 'OK'). IEP balance not debited; Goods/services not supplied by, and result correctly indicated on, vending system.
4	Abnormal transactions: cancelled by timeout	A transaction is performed with a valid IEP loaded with sufficient value: All card holder actions are performed correctly except that: - on an EPT with 'OK': the IEP is inserted but 'OK' is not pressed; - on an EPT without 'OK': the IEP is not inserted.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction not 'OK', via 'EFT Status Message', sent after EPT timeout (35 secs.); IEP balance not debited; Goods/services not supplied by, and result correctly indicated on, vending system.
5	Abnormal transactions: cancelled by premature withdrawal of IEP	A transaction is performed with a valid IEP loaded with sufficient value: All card holder actions are performed correctly except that: - on an EPT with 'OK': the IEP is removed too soon after pressing 'OK'; - on an EPT without 'OK': the IEP is removed too soon after inserting it; The IEP is not reinserted while the EPT is displaying the message requesting card reinsertion.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction not 'OK', via 'EFT Status Message', sent after timeout; (IEP balance may or may not have been debited); Goods/services not supplied by, and result correctly indicated on, vending system.

No.	To be tested:	Test procedure:	Expected results:
6	Abnormal transactions: interrupted by premature withdrawal of IEP but IEP reinserted in order to complete transaction successfully	A transaction is performed with a valid IEP loaded with sufficient value: All card holder actions are performed correctly except that: - on an EPT with 'OK': the IEP is removed too soon after pressing 'OK'; - on an EPT without 'OK': the IEP is removed too soon after inserting it; The IEP is reinserted while the EPT is displaying the message requesting card reinsertion, i.e. before the timeout occurs.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction 'OK', via 'Authorization Message', sent when card removed for second time, i.e. after transaction actually completed; IEP balance correctly debited by transaction amount; Goods/services correctly supplied by, and result correctly indicated on, vending system.
7	Abnormal transactions: insufficient value loaded in IEP	A transaction is performed with a valid IEP not loaded with sufficient value: The transaction amount must be greater than the IEP balance; All card holder actions are performed correctly.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction not 'OK', via 'EFT Status Message', sent when card removed; IEP balance not debited; Goods/services not supplied by, and result correctly indicated on, vending system.
8	Abnormal transactions: IEP not removed after successful transaction	A transaction is performed with a valid IEP loaded with sufficient value: All card holder actions are performed correctly, except that the card is not removed when requested at the end of the transaction.	Correct amount displayed on EPT; Correct transaction result, i.e. transaction 'OK', via 'Authorization Message', sent when EPT timeout (30 secs.) occurs; IEP balance correctly debited by transaction amount; Goods/services correctly supplied by, and result correctly indicated on, vending system.
9	Recovery to break in communications: use of ECR Sequence Number	A transaction is performed with a valid IEP loaded with sufficient value: When the 'Amount Message' has been received by EPT the communications connection to the vending system is removed (EPT is to remain under power); All card holder actions are performed correctly and the transaction is completed correctly; The communications connection is restored with the vending system before the vending system timeout occurs.	Correct amount displayed on EPT; IEP balance correctly debited by transaction amount; Vending system repeats 'Amount Message', with same ECR Sequence Number, after timeout, to obtain 'EFT Status Message' type 'Double Operation'; Goods/services correctly supplied by, and result correctly indicated on, vending system.
10	Operation during collections:	A collection is started, under the correct conditions for the type of collection to be used in the vending system; Attempts to perform transactions are made on the vending system while the collection is taking place.	Transactions are not performed while the collection is taking place; Vending system does not attempt to reset or remove power from EPT while the collection is taking place.

No.	To be tested:	Test procedure:	Expected results:
11	Application & removal of power to EPT in idle (only applies to power-saving environments, see section 10)	When power is not applied to the EPT, one of the buttons is pressed.	Power is applied to the EPT for at least ten seconds.
12	Application & removal of power to EPT during transaction (only applies to power-saving environments, see section 10)	When power is not applied to the EPT, a normal transaction is started by user action, e.g. by selection on the vending system; All card holder actions are performed correctly, i.e. the transaction is completed correctly and the IEP is removed at the end of the transaction, when requested by the EPT.	Power is correctly applied to EPT when initiated by user action; Correct amount displayed on EPT; Correct transaction result, i.e. transaction 'OK', via 'Authorization Message', sent when card removed; IEP balance correctly debited by transaction amount; Goods/services correctly supplied by and result correctly indicated on vending system; Power not removed from EPT until at least ten seconds after the IEP has been removed.