



Data Model 5.0 for Public Transport – “Interface Initiative”

VDV Standard Interface, Duty Roster

Part B:

Transfer of

- Roster information
- Driver allocations
- Vehicle parking positions
- Training requirements

To an AVMS

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General editing:

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Technical editing:

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Date	Author	Modification	New version
15.11.2004	W. Bruns	Date fields from decimal (7) to (8) AVMS column removed	-
13.01.2005	W. Bruns	Insertion of "Abstell_Strang" (parking lane) element. Replaced DDMMYYYY with YYYYMMDD Driver number data type decimal (6) Text change "Training": driving license	-
21.02.2005	W. Bruns	Insertion of KST_NR Modification of elements <i>AUSBILDUNG NR</i> , <i>AUSBILDUNG_KUERZEL</i> , <i>AUSBILDUNG_NAME</i> to fit with ÖPNV Data Model: <i>QUALIF_KZ</i> , <i>QUALIF_KUERZEL</i> , <i>QUALIF_TEXT</i>	
07.03.2005	W. Bruns	Notes on UM_UID (block ID), dispatch status and duty creation code elements added	

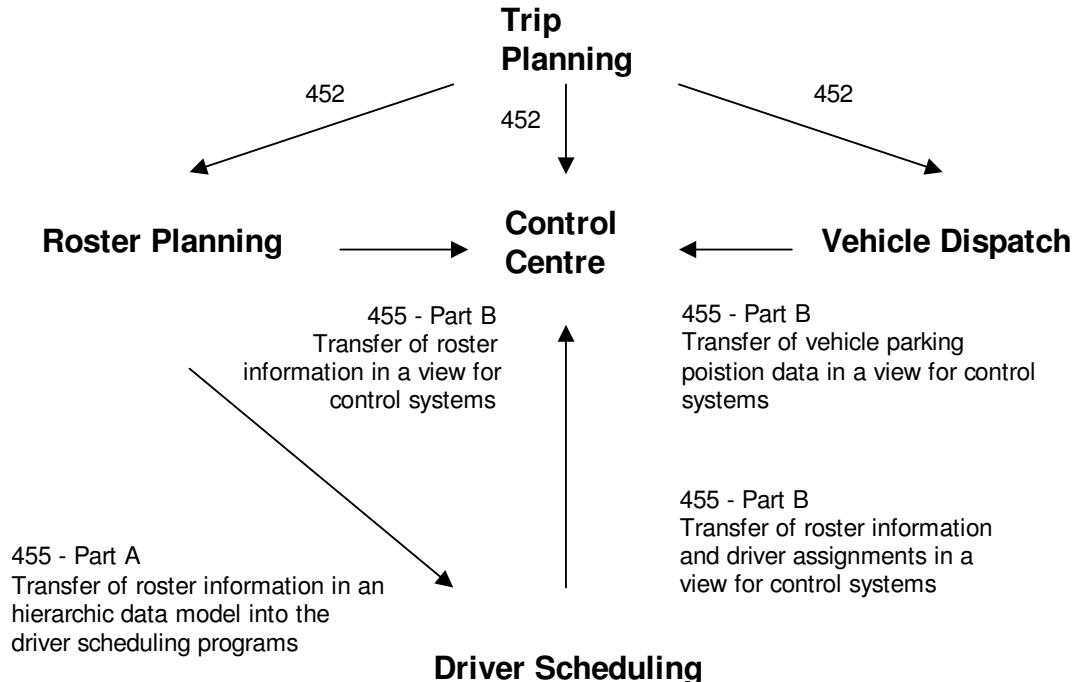
1 Foreword

This document is an extension of VDV Recommendation 455. The information contained in the original recommendation is not repeated here, but can be applied in the same way as the transfer of data concerning vehicle parking positions, driver assignments and rosters to an AVMS as described here. This is valid in particular for the definitions, limitations and general descriptions in Recommendation 455 Part A.

2 Introduction

The aim of the VDV 455 - Part B interface is to make the rosters, driver assignments and parking positions, which are derived from the duty planning, driver scheduling or vehicle management systems available to the control system. This information is used in the control computer for roster, driver assignment and vehicle lists, duty start, relief monitoring and duty monitoring functions.

The data suppliers create the views in the form of ÖPNV interface files and transfer these to the control system either manually or automatically. The records contain a validity date and can be made available to the control computer in advance or on the day of their validity. During the automatic import process, the data is checked for plausibility and consistency, after which it becomes available in the control system.



3 Compatible Products

The software products listed in this chapter support this interface, in accordance with our knowledge at the time of printing this VDV recommendation. However, we can assume that further manufacturers now support this interface or are at least in the process of implementing it. It is advisable however to **specify support of VDV 455 Recommendation Part B in any request for tenders.**

3.1 Usage Matrix of the Relations

In addition to a compatibility with the interface description published in this recommendation, the successful coupling of two products demands that the source system can supply all relations that are required by the target system.

In the case of data exchange, all tables included in the VDV Standard AVMS Roster Interface are transferred. Depending on which products are taking part, some tables can be supplied empty.

The following tables show the relations that are supported by the various products.

3.2 Data Export Table

Products:	Depot management	MOBILE-PLAN (init)	DIVA (mdv)	INTERPLAN (PTV)	MICROBUS (IVU)	EPON (ISIDATA)	BON (IVU)
Roster		X	X	X	X	X	
Drivers				X	X		
Vehicle parking	X						X
Training							
Allocation of training qualifications to drivers							
Tips	Implemented according to contract					From March 2005 with epon version 19.2	

3.3 Data Import Table

Products:	VICOS-LIO (VDO)	MICROBUS (IVU)	MOBILE- AVMS (init)	BON (IVU)
Roster	X		X	X
Drivers	X		X	X
Vehicle parking		X		X
Training				
Allocation of training qualifications to drivers				

4 Interface Description

4.1 Layout of the Data Model

The data descriptions are organised in accordance with the information content in 5 tables:

- Roster,
- Driver,
- Vehicle parking,
- Training and
- Assignment of training qualifications to drivers.

The significance of the relations themselves are characterised in short descriptions including their attributes. Data types and key properties of the attributes are listed in the tables.

4.1.1 Notation

- The **attributes in bold typeface** are the key attributes, which are used for data matching with the AVMS.
These fields are used in the AVMS for allocation of the duty segments to the schedule information.
- The key property of the attribute is denoted with a 'P', if it is the primary key. Generally however there is a combined key, which means that the record can only be uniquely identified when all key attributes are viewed together. In addition, the attributes which permit unique access to a record are denoted with a 'C'.
- Attributes, which were not available in ÖPNV Data Model Version 4.1 are shown in the description of the relations in *italics*.
- The value ranges may be different (usually bigger) than those in Data Model 4.1. These are not highlighted.

4.1.2 Data Types

The data types used in the AVMS Roster interface description are taken from the ÖPNV Data Model Version 4.1. They are explained again here using suitable examples:

decimal (x) Decimal value where x denotes the maximum number of places

char(x) Character string where x is the maximum number of useful characters

Boolean Logic type: 0 = FALSE / 1 = TRUE

4.1.3 Value Ranges

The expressions to describe the value ranges in the AVMS Roster interface description are defined as follows:

ISO 8859-1 This character set is described in the VDV Recommendation "File Format for Data Transmission"

NULL (ZERO) This attribute setting corresponds to the zero value in the database, i.e. the attribute has no content. In the interface files such values appear as digit '0'.

(x) If a system is unable to supply the described attribute, the attribute is set with the value x.

4.1.4 Times

All times are managed in seconds.

4.2 Data Model

4.2.1 Roster

Description: The Roster table contains all duty segments with driver allocation, which are transferred to the AVMS.

Table: DIENSTPLAN (ROSTER)				
Key	Attributes of the relation	Data type	Value range	Description
P ₁	BASIS_VERSION (BASE_VERSION)	decimal (9)	>0	Name of the general version
P ₂	DIENST_GUELTIG_AM (DUTY_VALID_ON)	decimal(8)	>0	Operating day for which the data is valid Format: YYYY.MM.DD Corresponds to the block date. This is also valid for duty segments whose blocks begin on the previous day.
P ₃	ED_NR (DUTY_NR)	decimal (10)	1-2147483644	Unique numeric identification of a duty. As a duty segment only unique with DST_ANF_ZEIT
	ED_NAME (DUTY_NAME)	char(40)	ISO 8859-1	Operational name of the duty
	ED_DAUER (DUTY_DURATION)	decimal (6)	1- 129599	Total duration of the duty in seconds (info field)
	AUSBILDUNG_NR (TRAINING_NR)	decimal (4)	>0 (0)	Training required for this duty
	TAGESART_NR (DAY_TYPE_NO)	decimal (2)	1-99 (0)	Numeric identification of a day type When the day type cannot be supplied this field is set with 0
	DIENSTSTUECKART_NR (DUTY_SEGMENT_TYPE_NR)	decimal (1)	1-7	Name of the duty segment type 1: Service 2: Start up 3: Shut down 4: Break 5: Path 6: Reserve 7. Other
	KST_NR (COST_CENTRE_NR)	decimal (6)	>= 0	Name of the cost centre
	PAUS_REG_KZ (BREAK_REG_CODE)	char (1)	Free	Duty creation code; denotes the break regulation method applied to the duty (sixths, block break etc.) used, for example, for representing duties in roster diagrams on driver information terminals.
	TAETIGKEIT (ACTIVITY)	char(40)	ISO 8859-1	Attributing of the type/activity for this duty segment (e.g., taxi trip, foot path)

P4	DST_ANF_ZEIT (DS_START_TIME)	decimal (6)	0-129599 ²⁾	Time at which a duty segment starts. The time of day is specified in seconds after midnight. An operating day can last a maximum of 36 hours.
	<i>ANF_ONR_TYP_NR</i> <i>(START_LOC_TYPE_NR)</i>	decimal (2)	1-2	Location type of the start of the duty segment
	<i>ANF_ORT_NR</i> <i>(START_LOC_NR)</i>	decimal (6)	>0	Location number at the start of the duty segment
	ANF_ORT_REF_ORT (START_LOC_REF_LOC)	decimal (6)	1-9999 ¹⁾	Stop number at the start of the duty segment
	DST_END_ZEIT <i>(DS_END_TIME)</i>	decimal (6)	0-129599	Time at the end of a duty segment. The time of day is specified in seconds after midnight. An operating day can last a maximum of 36 hours.
	<i>END_ONR_TYP_NR</i> <i>(END_LOC_TYPE_NR)</i>	decimal (2)	1-2	Location type at the end of the duty segment
	<i>END_ORT_NR</i> <i>(END_LOC_NR)</i>	decimal (6)	>0	Location number at the end of the duty segment
	END_ORT_REF_ORT (END_LOC_REF_LOC)	decimal (6)	1-9999 ¹⁾	Stop number at the end of the duty segment
	DST_DAUER <i>(DS_DURATION)</i>	decimal (6)	1-129599	Duration of a duty segment in seconds
	UM_UID (BLOCK_NO)	decimal (8)	1-99999999 (0)	Name of the vehicle block or reference to the vehicle block on which the duty segment is served. Duty segments without service are denoted by vehicle block number = 0 ³⁾
	START_LIN_NR (START_RTE_NR)	decimal (3)	1-999 (0)	Route number of the route which is served first with this duty segment in this vehicle block. If the route number = 0, this represents a duty segment without service.
	START_LI_KU_NR (START_RTE_RUN_NR)	decimal (2)	1-99 (0)	Run number of the route on which the duty segment starts. If the run number is = 0, this represents a duty segment without service.
	<i>BEMERKUNG</i> <i>(COMMENTS)</i>	char(40)	ISO 8859-1	Free text concerning the duty or duty segment
	FAHRER_NR (DRIVER_NR)	decimal (5)	1-65532 (0)	Assigned driver. If no driver has been assigned to the duty segment, driver number 0 is used.

- 1) With AVMS operation it is necessary to clarify whether the value range can be fully utilised. Many transport authorities use components whose stop numbers are restricted to the range 1-9999.
- 2) Because the relief times can be based on arrival or departure times in the duty planning, the relief info cannot be referenced with an accuracy measured in seconds, instead it lies within a time interval at the relief stop given by the departure time at the previous stop and the arrival at the following stop. This type of referencing facilitates different handling of the journey time control in the duty planning. A three minute lock-in range is used for depot exits and entries.
- 3) The **UM_UID** (BLOCK_NO) attribute can only be 0 for duty segments **without a vehicle connection** (e.g. standby). For all other duty segments (including OP duties, fill segments, preparation times etc.) it must be uniquely visible from the UM_UID which block the duty segments are to be assigned to. The UM_UID (BLOCK_NO) is the most important attribute for vehicle job planning and generally stretches across several ED_NR (DUTY_NR).

4.2.2 Driver

Description: With the Driver table the driver information is transferred to the AVMS. Use of the data fields depends on the data protection rules in place. This means that sometimes, not all the data elements are supplied.

Table: PERSONAL (PERSONNEL)				
Key	Attributes of the relation	Data type	Value range	Description
P ₁	BASIS_VERSION (BASE_VERSION)	decimal (9)	>0	Name of the general version
P ₂	FAHRER_NR (DRIVER_NR)	decimal (5)	1-65532	Unique numeric identification of a driver
	PERSONAL_NAME (PERSONNEL_SURNAME)	char(40)	ISO 8859-1	Driver surname
	PERSONAL_VORNAME (PERSONNEL_NAME)	char(40)	ISO 8859-1	Driver's first name
	PERSONAL_KENNUNG (PERSONNEL_CODE)	char(40)	ISO 8859-1	Alphanumeric driver code
	PERSONAL_STRASSE (PERSONNEL_STREET)	char(40)	ISO 8859-1	Street name
	PERSONAL_WOHNORT (PERSONNEL_CITY)	char(40)	ISO 8859-1	City
	PERSONAL_PRIVAT_TELEFON (PERSONNEL_LAND_LINE_NR)	char(40)	ISO 8859-1	Land line telephone number
	<i>PERSONAL_MOBIL_TELEFON</i> <i>(PERSONNEL_MOBILE_NR)</i>	char(40)	ISO 8859-1	Cell phone number

4.2.3 Vehicle Parking

Description:

In the Vehicle Parking table vehicle and parking place are assigned to every vehicle block and departure time.

As an alternative to the vehicle block, route and run of the depot exit can also be specified.

Table: FAHRZEUGABSTELLUNG (VEHICLE PARKING)				
Key	Attributes of the relation	Data type	Value range	Description
P ₁	BASIS_VERSION (BASE_VERSION)	decimal (9)	>0	Name of the general version
P ₂	GUELTIG_AB (VALID_FROM)	decimal(8)	>0	Operating day for which the data is valid Format: YYYY.MM.DD
P ₃	UM_UID (BLOCK_NO)	decimal (8)	1-99999999 (0)	Identification of the vehicle block ¹⁾
	START_LIN_NR (START_RTE_NR)	decimal (3)	1-.999 (0)	Route number of the route on which the vehicle block begins
	START_LI_KU_NR (START_RTE_RUN_NR)	decimal (2)	1-99 (0)	Run number of the route on which the vehicle block begins
	FRT_START (TRIP_START)	decimal (6)	0-129600	Departure time of the trip in seconds after 0:00
	FZG_NR (VEH_NR)	decimal (4)	>0	Vehicle identification <vehicle number>
	ABSTELL_STRANG (PARKING_LANE)	char (40)	ISO 8859-1	Lane in which the vehicle is parked
	ABSTELL_POS (PARKING_POS)	char (40)	ISO 8859-1	Position in the lane in which the vehicle is parked
	FZG_VERFUEG (VEH_AVAILABLE)	char (1)	free	Denotes the availability of the vehicle (dispatch status) (e.g. dispatched, defective, hired, depot backup etc.)

¹⁾ **UM_UID (BLOCK_NO) = 0** means that the vehicle is not currently assigned to any block

4.2.4 Training

Description: This table contains details on the training (qualifications) that are necessary in order to be able to carry out specific tasks. For example, a driver can only drive a specific type of vehicle when he has completed the necessary training (driving license) or he can only travel a particular route when he has sufficient knowledge of the route.

Table: AUSBILDUNG (TRAINING)				
Key	Attributes of the relation	Data type	Value range	Description
P ₁	BASIS_VERSION (BASE_VERSION)	decimal(9)	>0	Name of the general version
P ₂	QUALIF_KZ (QUALIF_NR)	decimal (4)	>0	Unique numeric identification of a training program (qualification code)
	QUALIF_KUERZEL (QUALIF_CODE)	char (6)		Short name for the training (qualification)
	QUALIF_TEXT (QUALIF_TEXT)	char (40)	ISO 8859-1	Full name of the training (qualification)
	GUELTIG_BIS (VALID_TO)	decimal(8)	>0	Training is valid to this date Format: YYYY.MM.DD

4.2.5 Allocation of Training to Drivers

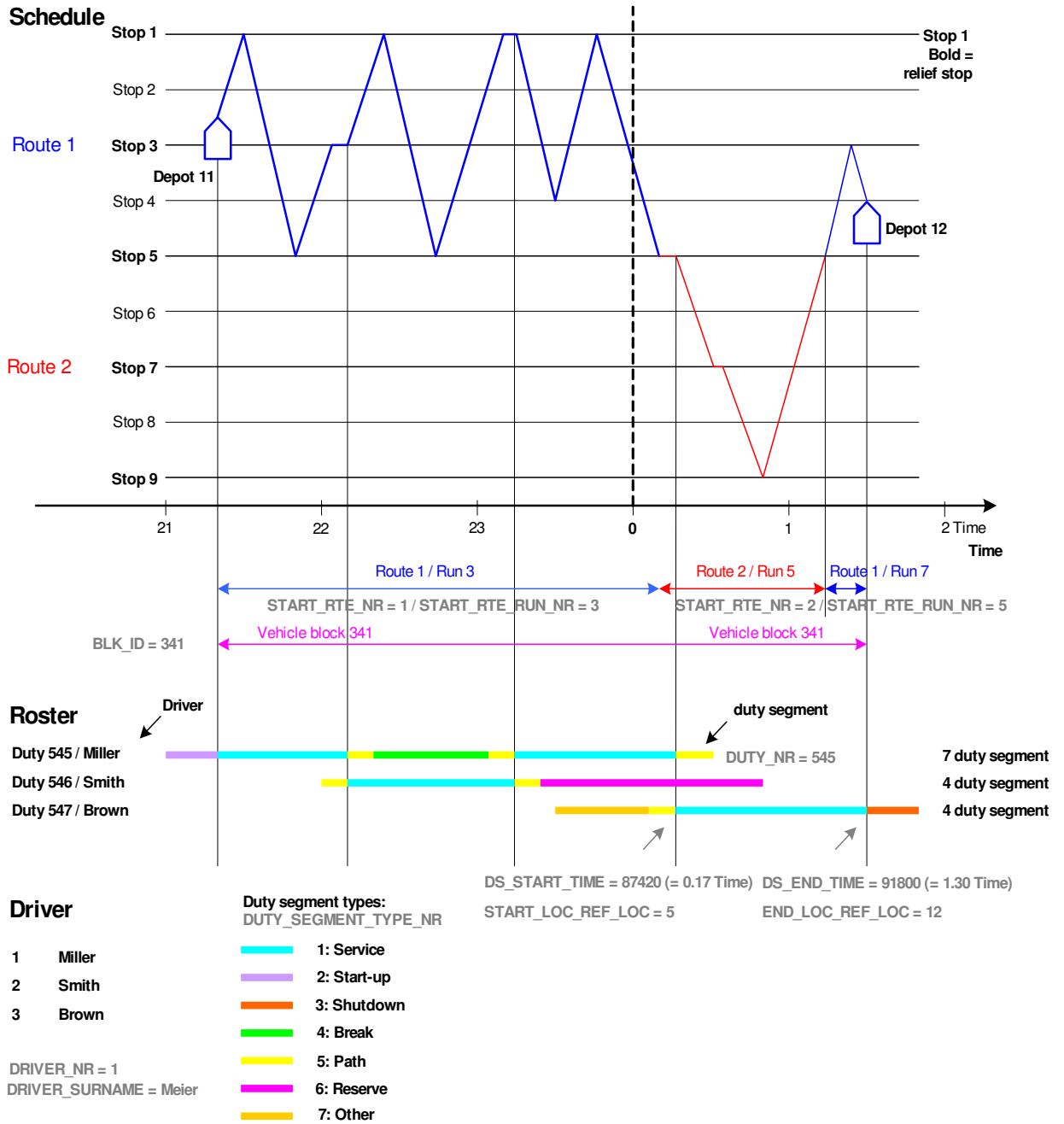
Description: This allocation table describes driver training

Table: ZUORDNUNG_AUSBILDUNG_PERSONAL (ALLOCATION_TRAINING_DRIVER)				
Key	Attributes of the relation	Data type	Value range	Description
P ₁	BASIS_VERSION (BASE_VERSION)	decimal (9)	>0	Name of the general version
P ₂	FAHRER_NR (DRIVER_NR)	decimal (4)	>0	Unique numeric identification of a driver
P ₃	QUALIF_KZ (QUALIF_NR)	decimal (4)	>0	Unique numeric identification of training (qualification)

5 Sample Data

This section explains the connections in the interface definition on the basis of a simple application example. Building on a schedule with a block, several duties are formed, which are then assigned to drivers. (We have avoided any consideration of layover times for reasons of simplicity.) The interface files for the represented graphic are described in the following section.

5.1 Graphical Overview



5.2 Data Tables

5.2.1 ROSTER

```

src; "VICOS-LIO-Data - VDV Export";15.02.2004; 14:43:27
chs; "ISO8859-1"
ver; "1.0"      <- Version of the exporting system (e.g. VICOS-LIO);
ifv; "1.0"     <- Version of the export program (e.g. VICOS-LIO-Data VDV-Export);
dve; "VBZ"    <- Code representing the transport authority;
fft; "LIO"
tbl; "ROSTER"
atr; DUTY_VALID_ON;DUTY_NR; DUTY_NAME; DUTY_DURATION; TRAINING_NR; DAY_TYPE_NO; DUTY_SEGMENT_TYPE_NR;
ACTIVITY; DS_START_TIME; START_LOC_TYPE_NR; START_LOC_NR; START_LOC_REF_LOC; DS_END_TIME;
END_LOC_TYPE_NR; END_LOC_NR; END_LOC_REF_LOC; DS_DURATION; BLOCK_NO; START_RTE_NR; START_RTE_RUN_NR;
COMMENTS; DRIVER_NR
frm; char[20]; num[10.0]; char[40]; num[6.0]; num[4.0]; num[2.0]; num[1.0]; char[40]; num[6.0]; num[2.0]; num[6.0]; num[6.0]; num[6.0];
num[2.0]; num[6.0]; num[6.0]; num[6.0]; num[8.0]; num[3.0]; num[2.0]; char[40]; num[6.0]
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 2; "Start-up"; 75600; 2; 1101; 11; 76800; 2; 1101; 11; 1200; 0; 0; 0; "Start-up"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 1; "Service"; 76800; 2; 1101; 11; 79800; 1; 301; 3; 3000; 341; 1; 3; "Service"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 5; "Path"; 79800; 1; 301; 3; 80400; 2; 1101; 11; 600; 0; 0; 0; "Path"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 4; "Break"; 80400; 2; 1101; 11; 83100; 2; 1101; 11; 2700; 0; 0; 0; "Break"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 5; "Path"; 83100; 2; 1101; 11; 83700; 1; 101; 1; 600; 0; 0; 0; "Path"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 1; "Service"; 83700; 1; 101; 1; 87300; 1; 501; 5; 3600; 341; 1; 3; "Service"; 1
rec; "20040215"; 545; "Duty 545"; 12600; 2; 4; 5; "Path"; 87300; 1; 501; 5; 88200; 2; 1101; 11; 900; 0; 0; 0; "Path"; 1
rec; "20040215"; 546; "Duty 546"; 10200; 2; 4; 5; "Path"; 79200; 2; 1101; 11; 79800; 1; 301; 3; 600; 0; 0; 0; "Path"; 2
rec; "20040215"; 546; "Duty 546"; 10200; 2; 4; 1; "Service"; 79800; 1; 301; 3; 83700; 1; 501; 5; 3900; 341; 2; 5; "Service"; 2
rec; "20040215"; 546; "Duty 546"; 10200; 2; 4; 5; "Path"; 83700; 1; 501; 5; 84300; 2; 1101; 11; 600; 0; 0; 0; "Path"; 2
rec; "20040215"; 546; "Duty 546"; 10200; 2; 4; 6; "Reserve"; 84300; 2; 1101; 11; 89400; 2; 1101; 11; 5100; 0; 0; 0; "Reserve"; 2
rec; "20040215"; 547; "Duty 547"; 8400; 2; 4; 7; "Other"; 84600; 2; 1101; 11; 86700; 2; 1101; 11; 2100; 0; 0; 0; "Other"; 3
rec; "20040215"; 547; "Duty 547"; 8400; 2; 4; 5; "Path"; 86700; 2; 1101; 11; 87300; 1; 501; 5; 600; 0; 0; 0; "Path"; 3
rec; "20040215"; 547; "Duty 547"; 8400; 2; 4; 1; "Service"; 87300; 1; 501; 5; 91800; 2; 1201; 12; 4500; 341; 1; 7; "Service"; 3
rec; "20040215"; 547; "Duty 547"; 8400; 2; 4; 3; "Shutdown"; 91800; 2; 1201; 12; 93000; 2; 1201; 12; 1200; 0; 0; 0; "Shutdown"; 3
end; 15
eof; 1

```

5.2.2 PERSONNEL

```

mod; YYYY/MM/DD; HH:MM:SS; aligned
src; "VICOS-LIO-Data - VDV Export";15.02.2004; 14:43:27
chs; "ISO8859-1"
ver; "1.0"      <- Version of the exporting system (e.g. VICOS-LIO);
ifv; "1.0"     <- Version of the export program (e.g. VICOS-LIO-Data VDV-Export);
dve; "VBZ"    <- Code representing the transport authority;
fft; "LIO"
tbl; "PERSONNEL"
atr; DRIVER_NR; PERSONNEL_SURNAME; PERSONNEL_NAME; PERSONNEL_CODE; PERSONNEL_STREET; PERSONNEL_CITY;
PERSONNEL_LAND_LINE_NR; PERSONNEL_MOBILE_NR
frm; num[6.0]; char[40]; char[40]; char[40]; char[40]; char[40]; char[40]; char[40]
rec; 1; "Mayer"; "William"; "MW01"; "Sample Street 1"; "CH 9999 City Town"; "01234567891"; "09876543211"
rec; 2; "Miller"; "Thomas"; "MT02"; "Sample Street 2"; "CH 9999 City Town"; "01234567892"; "09876543212"
rec; 3; "Smith"; "Harold"; "SH03"; "Sample Street 3"; "CH 9999 City Town"; "01234567893"; "09876543213"
end; 3
eof; 1

```

5.2.3 VEHICLE PARKING

```
mod; YYYY/MM/DD; HH:MM:SS; aligned
src; "VICOS-LIO-Data - VDV Export";15.02.2004; 14:43:27
chs; "ISO8859-1"
ver; "1.0"      <- Version of the exporting system (e.g. VICOS-LIO);
ifv; "1.0"     <- Version of the export program (e.g. VICOS-LIO-Data VDV-Export);
dve; "VBZ"    <- Code representing the transport authority;
fft; "LIO"
tbl; "VEHICLE PARKING"
atr; VALID_FROM; BLOCK_NO; START_RTE_NR; START_RTE_RUN_NR; TRIP_START; VEH_NR; PARKING_LANE; PARKING_POS
frm; char[20]; num[8.0]; num[3.0]; num[2.0]; num[6.0]; num[4.0]; char [40] ; char [40]
rec; "20040215"; 341; 1; 3; 76800; 4711; A23; 14
end; 1
eof; 1
```