DCR to Site Controller Protocol

Version 1.3d

10 April 2014

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Summary of changes

Changes resulting in document revisions will be summarized in this table in reverse chronological sequence.
Revision numbers and letters will highlight the text changed in new document versions.

Date	Version	Modified By	Modifications
15 June 2004	1.00a	M.Yaşar Orhon	First Release
26 November 2006	1.01d	"	Added Transaction CD151 (ECR Plate)
08 October 2009	1.02b	"	Added CD152 (Loyalty Info to ECR command).
10 February 2010	1.02c	"	Added CD153 (Slip Data to ECR command).
01 April 2010	1.02e	"	Revized CD152, removed CD152

Acronym Table

The following table contains a list of acronyms used in this document.

Acronym	Definition
DCR	Distributed Communication Router
ECR	Electronic Cash Register
CRC	Cyclic Redundancy Check
PIN	Personal Identification Number
PPU	Price Per Unit
STP	Submerged Turbine Pump
FP	Filling Point (a set of one or more hoses, of which only one can be active at any time)
VID	Vehicle Identification Device (*TTS)
CID	Customer Identification Device (*MTS)
MPD	Multi Product Dispenser (a single physical device which may contain one ore more fueling points)
MPP	Multi Product Pump
LCD	Liquid Crystal Display
IFS	Intelligent Fueling Systems
SCU	Site Controller Unit
CL	Current Loop
MCU	Micro Controller Unit

General descriptions

The standard data link is based on a master/slave relationship, where the master polls the slaves. If the master wants to send data to a slave, it sends a block with data instead of a poll. if the slave wants to send data it answers with data on a poll. Half duplex is used.

The protocol is code transparent and byte oriented. The protocol required for DCR implemantation shall provide for variable length messages.

Data format

Data transfer	Asynchronous
Bit rate	9600 / 19200 bits per socond
Data bits	8
Stop bits	1
Parity	Odd

Note :
A MARK corresponds to loop current “ON” (45mA), a SPACE corresponds to loop current “OFF” (0 mA).
S4S protocol shall not be baud-rate dependent. A baud rate of 19200 shall be possible, alternatively 9600, if distance and type of wiring are restrictive.

Interface requirements

Explosion proofing :
As fuel dispensers are located in a hazardous area, mechanical and electrical components of the interface, and its installation and service must satisfy relevant hazardous area equipment standards.

Cable characteristics :
Current loop cabling should satisfy the following requirements :

Insulation 500 Vdc (min.)
Loop length 400 meters (max.)
Loop resistance 10 Ohms (max.)
Input inductance 100 uH (max. at any terminals)
Input capacitance 10 nF (max. at any terminals)

while a separate twisted pair should be regarded as the ideal cabling solution, acceptable performance is usually obtained from non-twisted pairs in the same conduit (or even the same sheath) as pump/dispenser power and control cables.

Voltage and Current levels :
Loop current 45 mA +/- 5%
Open circuit voltage 40 Vdc +/- 5%

Note 1:
The maximum allowable voltage drop across any loop tranceiver (either in a pump/dispenser or a controller) at a loop current of 45mA is 2.0 Volts.

Note 2:
While common mode voltages are likely to have little effect on data integrity, common mode voltage levels should be below 50Vdc to minimise personnel and property hazards.

Galvanic isolation

Galvanic isolation may be required in each unit

Data rate

DCR Serial protocol shall not be baud-rate dependent. A baud rate of 19200 shall be possible, alternatively 9600, if distance and type of wiring are restrictive.

Code transparence

Code transparence for 8 bit data is achieved by Data Link Escape (DLE) insertion. DLE insertion is needed when any data byte or CRC has the value SF(Stop Flag).

Transmitting device transmit DLE before SF is transmitted in the data field. Receiving device check when receiving SF, if previous received character was DLE. If so DLE is over written by the received SF in the line buffer.

Inserted DLE's are not included in the CRC-calculation.

Reliable data transfer

DCR Serial protocol must provide for reliable data transfer. Error checking to be implemented by CRC16 (CCITT).
Parity checking is required on each byte.

Operational specifics

DCR Serial protocol shall operate half-duplex and transmit data in asynchronous start-stop format.

Buffer size

Buffer size is aplication dependent. However, maximum is 256 byte including control characters. Different slaves can have different buffer size.

Control characters in the protocol

ETX	03h	End of Text
DLE	10h	Data Link Escape
SF	FAh	Stop Flag

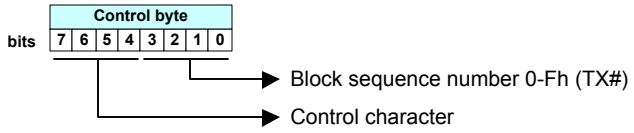
Some abbreviation explanations :

ADR Slave device address for message (00h-0FFh).

CRC-1 LSB of CRC-16 word. CRC is calculated from the first byte in the message (ADR) to the last data byte. CRC is initialized to 0000h.

CRC-2 MSB of CRC-16 word.

CTRL Control character and block sequence number.



Different control characters :

POLL	20h
DATA	30h-3Fh
IAP	40h
NAK	50h-5Fh
EOT	70h-7Fh
ACK	C0h-CFh
ACKPOLL	E0h-EFh

The master has one independent TX# for each slave. Each slave has one TX#. When data is sent from the master or the slave a new TX# is generated for each new data block. The TX# is then returned from the master or the slave in ACK, NAK, EOT or ACKPOLL. Slave answering EOT at POLL contains 0 in TX#. TX# is initiated to 0 after restart of protocol and then incremented by one for each successfully transmitted data block. TX# wraps around to 1 after Fh.

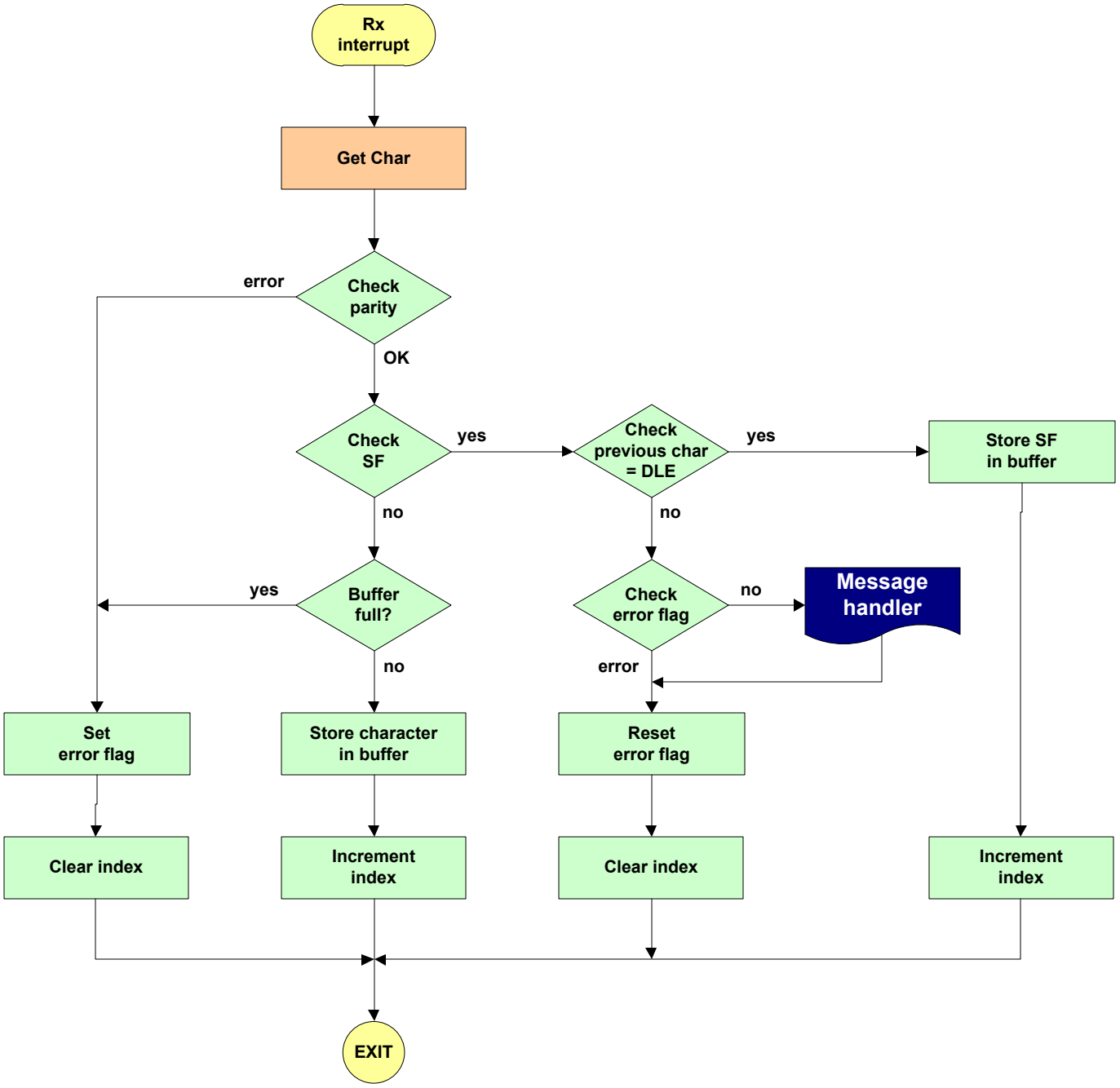
Messages from master to slave

POLL	:	ADR+CTRL+SF
DATA	:	ADR+CTRL+DATA1+DATAn+CRC-1+CRC-2+ETX+SF
ACK	:	ADR+CTRL+SF
NAK	:	ADR+CTRL+SF

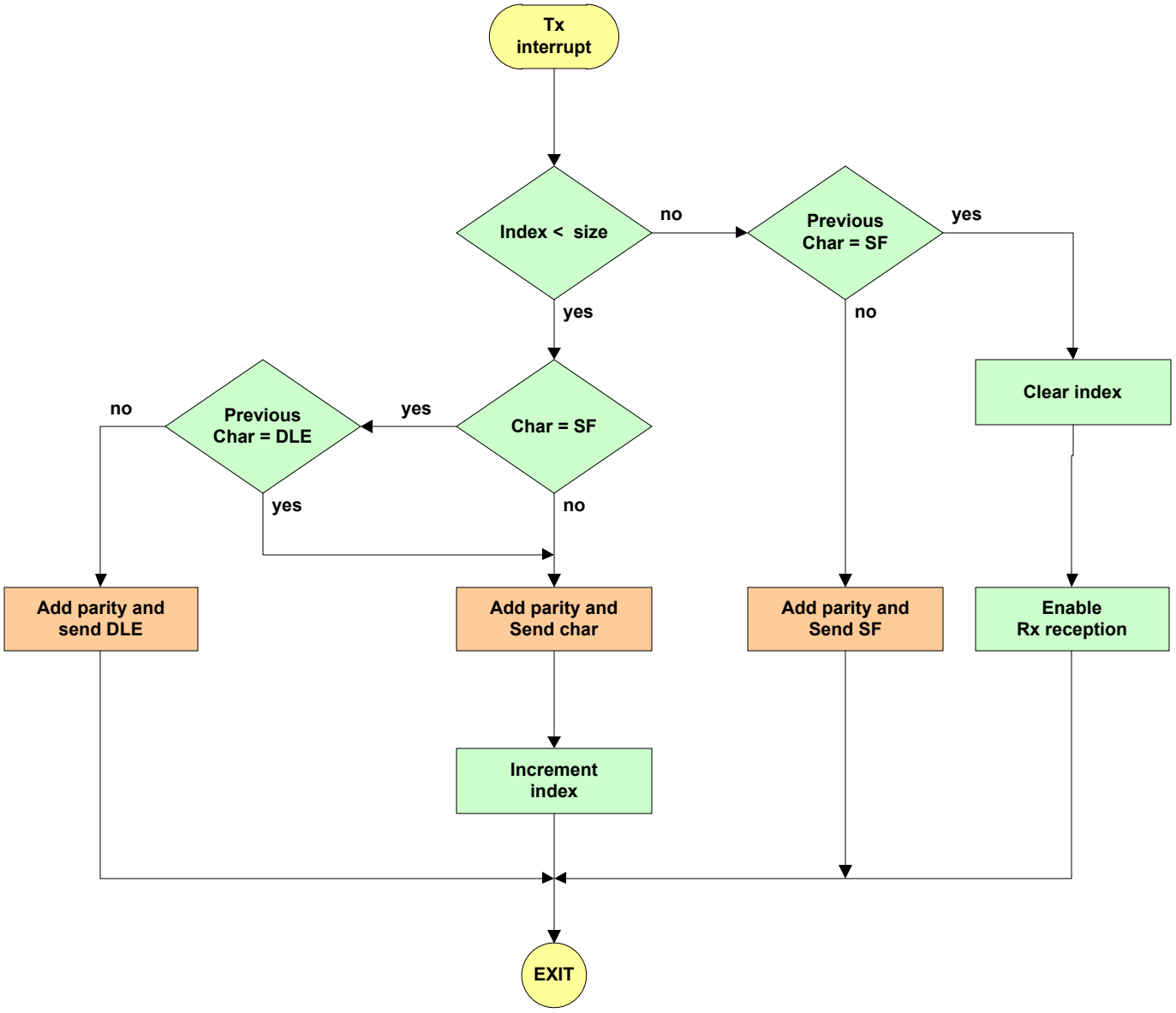
Messages from slave to master

EOT	:	ADR+CTRL+SF
DATA	:	ADR+CTRL+DATA1+DATAn+CRC-1+CRC-2+ETX+SF
ACK	:	ADR+CTRL+SF
NAK	:	ADR+CTRL+SF

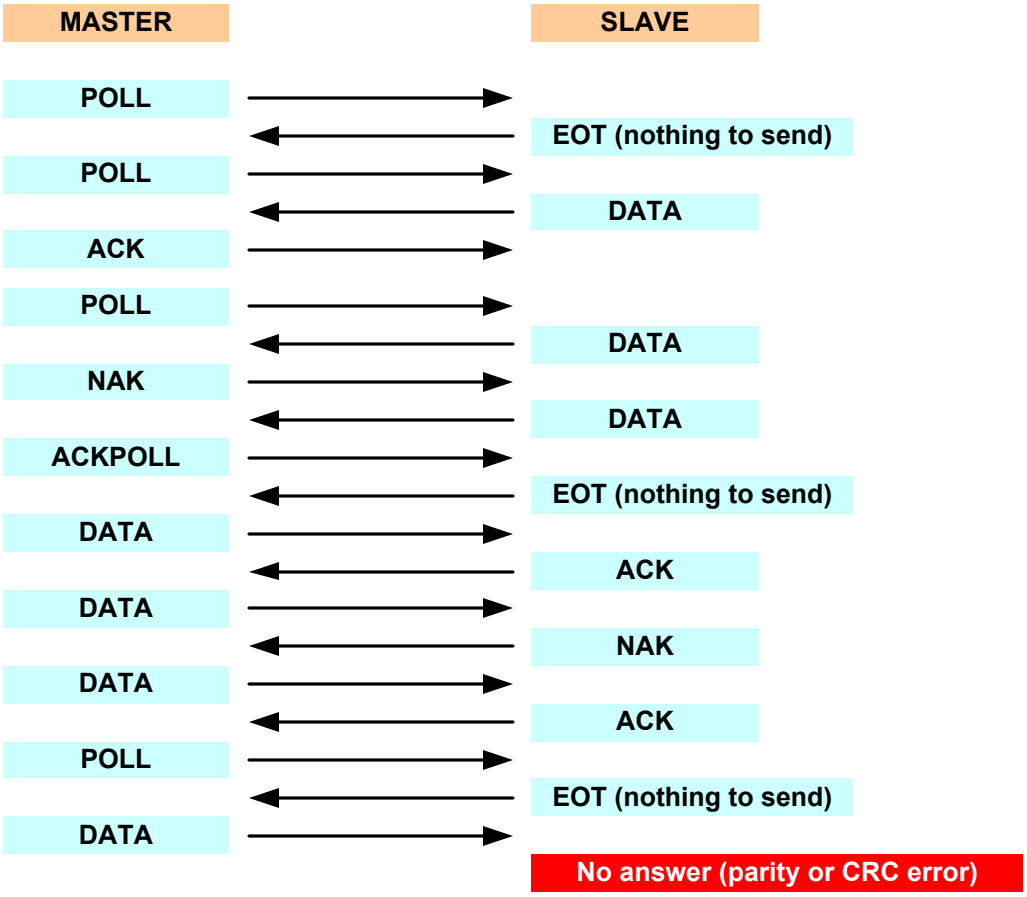
Rx interrupt flow chart



Tx interrupt flow chart



Possible answer alternatives



Error recovery

Error recovery is done when the expected block sequence number does not match the real one. It is done by both the master and the slave. This is a listing of all different situations when error recovery should be done. The TX#-check should be done in the following sequence.

1. TX# = tx Last received TX#. The transmitting unit did not get my last ACK. Skip data and answer ACK. Note that this must be done also when TX# = 0.

2. TX# = 0 The transmitting unit has been restarted. Initiate the expected TX# to 0, accept data and send ACK.

3. TX# <> tx Expected. If expected TX# = 0 this means that actual unit has been restarted and the expected TX# should be sent to the one just received. If so accept data and send ACK. Otherwise another error has occurred and the block should be answered with NAK.

NAK is sent if TX#-error is found in received data. The slave shall not answer at parity error or CRC-error.

The unit transmitting data has the responsibility to restart the communication procedure when NAK has been received 3 times for identical message.

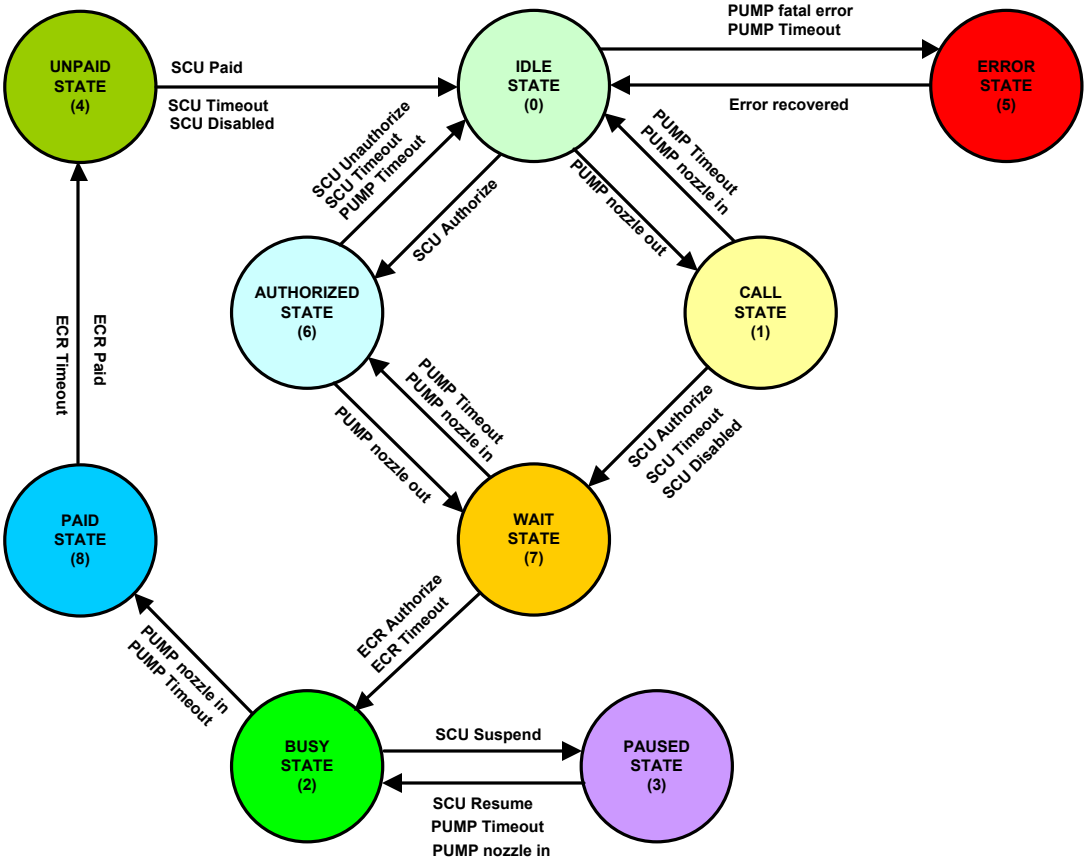
Timing

Each unit must be capable to receive characters at 19200 / 9600 baud without delays between characters. The master controls the timing. The slave must respond to a poll or data within 25 ms, i.e. transmit the first character after a complete poll or data. The slave must be capable to receive an ACK and a poll transmitted from the master as one continuous byte stream (two lines 3 bytes). In this case ACK and poll are for two different device addresses. If ACK and poll are for the same device then ACKPOLL is sent as one message (3 bytes).

Hardware

RS485 / Current-Loop with or without galvanic isolation

Pump status change diagram



In the following table the possible status changes are listed.

From Status	To Status	Comment
IDLE	CALL	*Pump nozzle out*
	AUTHORIZED	*SCU Authorize command*
	ERROR	*Pump communication timeout or Pump fatal error detected*
AUTHORIZED	WAIT	*Pump nozzle out*
	IDLE	*SCU Unauthorize command or SCU Timeout*
	ERROR	*Pump Timeout*
WAIT	AUTHORIZED	*Pump nozzle in or Pump Timeout*
	BUSY	*ECR Authorize command or ECR Timeout*
	ERROR	*Pump Timeout*
CALL	WAIT	*SCU Authorize command or SCU Timeout or SCU Disabled*
	IDLE	*Pump nozzle in*
	ERROR	*Pump Timeout*
BUSY	UNPAID	*Pump nozzle in or Pump Timeout*
	PAUSED	*SCU Suspend command*
PAUSED	BUSY	*SCU Resume command*
	PAID	*Pump Timeout or Pump nozzle in*
PAID	UNPAID	*ECR Paid command or ECR Timeout*
	IDLE	*SCU Paid command and ECR Paid or ECR Timeout*
UNPAID	IDLE	*SCU Paid command or SCU Timeout or SCU Disabled*
ERROR	IDLE	*Error Recovered*

General description

This document describes the communications interface to DCR.
This interface, which employs a current loop or RS485 as the data transmission medium, defines allowed states for DCR, allowed state transitions, and the commands and data that may be transmitted and received by DCR and the Console.

Only The protocol above the line protocol is described. From the line protocol, a device address and a buffer with data are received. All error handling e.g. CRC and parity check is made in the line protocol.

Each DCR has a device address (50h - CFh). A DCR shall handle a block if the block is addressed to the DCR. The test of device address is made in the line protocol.

Protocol levels

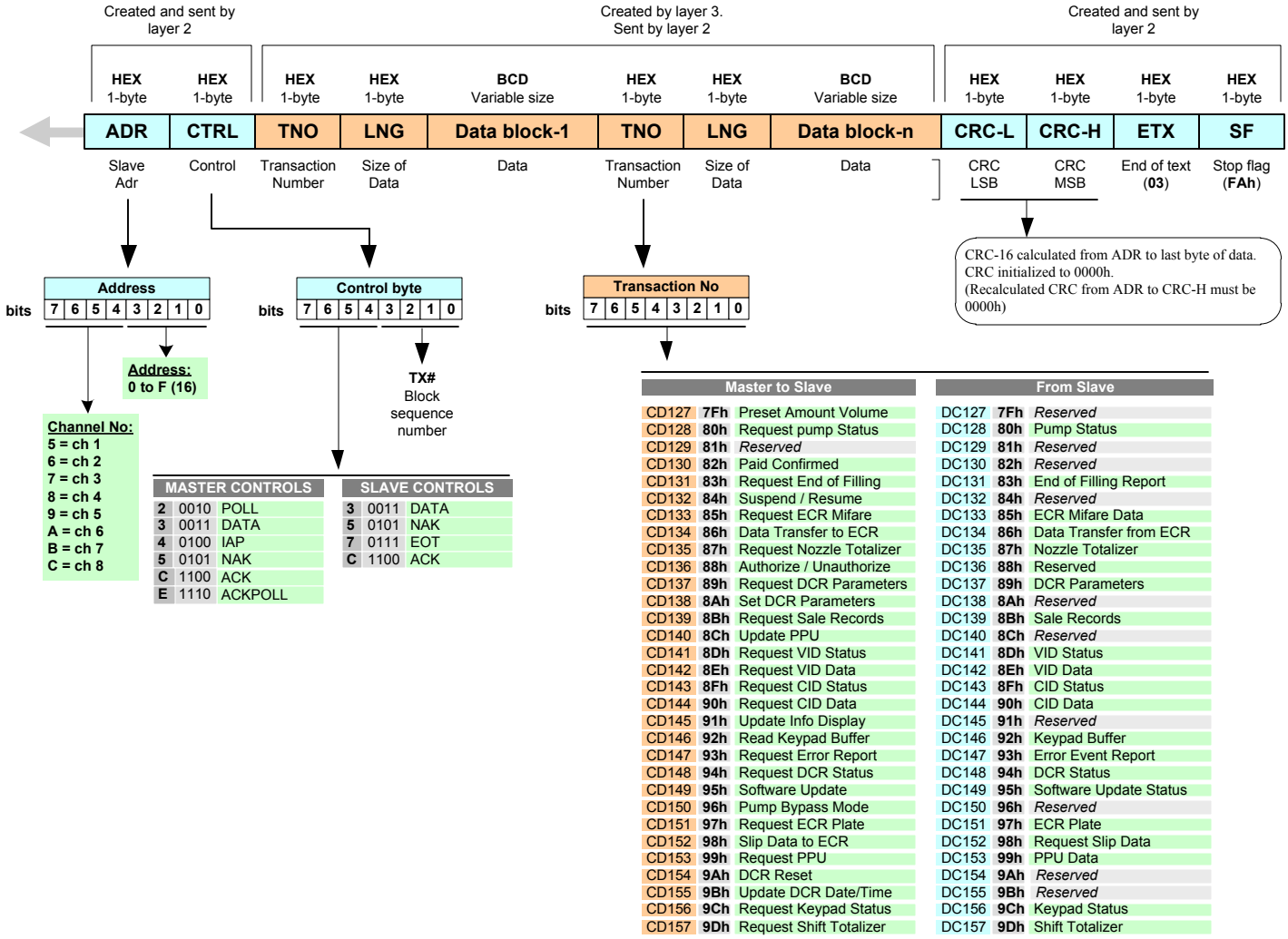
The protocol is divided into 3 levels :

Level 1	Electronic level.
Level 2	Line protocol level.
Level 3	Application level.

Level 2 is handling is polling of devices and transport of blocks that are created by level 3. Level 2 cheks that a block is transmitted correctly. The check is made with CRC, parity and block sequence number. If an error occurs, retransmission is handled by level 2.

At level 3 blocks are transmitted between DCR controller and Console. A block can contain one or more transactions that are specified in this document.

Message structure



Master to Slave			From Slave		
CD127	7Fh	Preset Amount Volume	DC127	7Fh	*Reserved*
CD128	80h	Request pump Status	DC128	80h	Pump Status
CD129	81h	*Reserved*	DC129	81h	*Reserved*
CD130	82h	Paid Confirmed	DC130	82h	*Reserved*
CD131	83h	Request End of Filling	DC131	83h	End of Filling Report
CD132	84h	Suspend / Resume	DC132	84h	*Reserved*
CD133	85h	Request ECR Mifare	DC133	85h	ECR Mifare Data
CD134	86h	Data Transfer to ECR	DC134	86h	Data Transfer from ECR
CD135	87h	Request Nozzle Totalizer	DC135	87h	Nozzle Totalizer
CD136	88h	Authorize / Unauthorize	DC136	88h	Reserved
CD137	89h	Request DCR Parameters	DC137	89h	DCR Parameters
CD138	8Ah	Set DCR Parameters	DC138	8Ah	*Reserved*
CD139	8Bh	Request Sale Records	DC139	8Bh	Sale Records
CD140	8Ch	Update PPU	DC140	8Ch	*Reserved*
CD141	8Dh	Request VID Status	DC141	8Dh	VID Status
CD142	8Eh	Request VID Data	DC142	8Eh	VID Data
CD143	8Fh	Request CID Status	DC143	8Fh	CID Status
CD144	90h	Request CID Data	DC144	90h	CID Data
CD145	91h	Update Info Display	DC145	91h	*Reserved*
CD146	92h	Read Keypad Buffer	DC146	92h	Keypad Buffer
CD147	93h	Request Error Report	DC147	93h	Error Event Report
CD148	94h	Request DCR Status	DC148	94h	DCR Status
CD149	95h	Software Update	DC149	95h	Software Update Status
CD150	96h	Pump Bypass Mode	DC150	96h	*Reserved*
CD151	97h	Request ECR Plate	DC151	97h	ECR Plate
CD152	98h	Slip Data to ECR	DC152	98h	Request Slip Data
CD153	99h	Request PPU	DC153	99h	PPU Data
CD154	9Ah	DCR Reset	DC154	9Ah	*Reserved*
CD155	9Bh	Update DCR Date/Time	DC155	9Bh	*Reserved*
CD156	9Ch	Request Keypad Status	DC156	9Ch	Keypad Status
CD157	9Dh	Request Shift Totalizer	DC157	9Dh	Shift Totalizer

CD127 Preset Amount / Volume

Command / Response Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**IDLE**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	7Fh	1	HEX	Transaction number
LNG	6	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = Any Nozzle 1 to n = Nozzle number (Max 5 nozzle)
PTYP	0~2	1	BCD	Preset type (0=unlimited, 1=Money, 2=Liter)
PVAL	n	4	BCD	Preset value

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

CD128 Request Pump Status

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	80h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)

State after nozzle accepts the command :	**None**
Response after POLL :	**DC128**

DC128 Pump Status

This transaction is sent by the DCR asynchronously when status changed.

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	80h	1	HEX	Transaction number
LNG	2 or 6	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = All Nozzles Off 1 to n = Nozzle number (Max 5 nozzle)
STA	n	1	BCD	Status
				00 = IDLE (The Pump handle is OFF) 01 = CALL (The Pump handle is ON, but not authorized) 02 = BUSY (The Pump is authorized and delivering) 03 = PAUSED (Delivering paused) 04 = UNPAID (The Pump has completed a delivery with Pump handle at OFF) 05 = ERROR (The Pump is ERROR condition or communication timeout) 06 = AUTHORIZED (Pending, wait ECR authorize and/or CALL in IDLE state) 07 = WAIT (Pending, wait ECR authorize in CALL state) 08 = PAID (Pending, wait ECR paid confirmation) 09 = KYB-CALL (The Pump handle is ON, Keypad Preset data ready) 0A = INACTIVE (Inactive Mode)
AMO	n	4	BCD	Filling Amount (Included only when BUSY state)

CD130 Paid Confirmed

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**UNPAID**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	82h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)

State after nozzle accepts the command :	**IDLE**
Response after POLL :	**DC128**

CD131 Request End of Filling Report

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**UNPAID**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	83h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)

State after nozzle accepts the command :	**None**
Response after POLL :	**DC131**

DC131 End of Filling Report

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	83h	1	HEX	Transaction number
LNG	n	1	HEX	Number of data bytes in the transaction
				If FTYP = Manual(06) : LNG=0Dh (except PLNO,FLEET,FID,RNO) *else : LNG=3Bh*
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
FTYP	n	1	BCD	Filling Type
				00 = Cash *01 = TTS* *02 = MTS* *03 = Barrel* *04 = Transfer* *05 = Test* *06 = Manual* *07 = Undefined* *08 = Credit Card* *09 = Loyalty*
FAMO	n	4	BCD	Filling Amount
FVOL	n	4	BCD	Filling Volume
PPU	n	3	BCD	Price Per Unit
PLATE	n	32	ASCII	Plate Number / Customer name
FID	n	12	ASCII	Fiscal ID number
RNO	n	2	BCD	Fiscal receipt number

CD132 Suspend / Resume

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**BUSY**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	84h	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)
CMD	n	1	BCD	Command
				0 = Suspend *1 = Resume*

State after nozzle accepts the command :	**PAUSED / BUSY**
Response after POLL :	**DC128**

CD133 Request ECR Mifare Data

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**CALL**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	85h	1	HEX	Transaction number
LNG	01h	1	HEX	Number of data bytes in the transaction
CMD	n	1	BCD	Command
				(Command) 0 = Read 1 = Clear

State after Nozzle accepts the command :	**None**
Response after POLL :	**DC133**

DC133 ECR Mifare Data

This transaction is sent by the DCR asynchronously at Mifare event or if the DCR receives the command "Request ECR Mifare".

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	85h	1	HEX	Transaction number
LNG	14h	1	HEX	Number of data bytes in the transaction
DATA	n	20	ASCII	Mifare Data

CD134 Data Transfer to ECR

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	86h	1	HEX	Transaction number
LNG	30h	1	HEX	Number of data bytes in the transaction
SDAT	n	48	ASCII	Data block

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

DC134 Data Transfer from ECR

This transaction is sent by the DCR asynchronously when ECR Transaction “Data Transfer to SCU” arrived.

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	86h	1	HEX	Transaction number
LNG	30h	1	HEX	Number of data bytes in the transaction
EDAT	n	48	ASCII	Data block

CD135 Request Totalizer

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	87h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (1 to 4 : DCR Pump Totals) (5 to 8 : Real Pump Totals for Pump 1 to 4) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)

State after nozzle accepts the command :	**None**
Response after POLL :	**DC135**

DC135 Nozzle Totalizer

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	87h	1	HEX	Transaction number
LNG	0Fh	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (1 to 4 : DCR Pump Totals) (5 to 8 : Real Pump Totals for Pump 1 to 4) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
TVOL	n	4	BCD	Volume Totalizer
TAMO	n	6	BCD	Amount Totalizer
QSALE	n	4	BCD	Quantity of sales

CD136 Authorize / Unauthorize

Command / Response Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**IDLE (for authorization), CALL (for unauthorization)**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	88h	1	HEX	Transaction number
LNG	n	1	HEX	Number of data bytes in the transaction
				If ATYP = TTS or MTS : LNG=30h *Else LNG =07h*
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)
PTYP	0~1	1	BCD	Preset type (0=unlimited, 1=Money, 2=Liter)
PVAL	n	4	BCD	Preset value
ATYP	n	1	BCD	Authorization type
				00 = Cash *01 = TTS* *02 = MTS* *03 = Barrel* *04 = Transfer* *05 = Test* *06 = Manual* *07 = Unauthorize* *08 = Credit Card* *09 = Loyalty*
PLATE	n	8	ASCII	Plate number
FLEET	n	32	ASCII	Customer name
VLD	n	1	BCD	Validation
				00 = Accepted *01 = Black List*

State after nozzle accepts the command :	**CALL (for authorization), IDLE (for unauthorization)**
Response after POLL :	**DC128**

CD137 Request DCR Parameters

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	89h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PPN	n	1	BCD	Parameter page no (0=all)

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

DC137 DCR Parameters

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	89h	1	HEX	Transaction number
LNG	25h	1	HEX	Number of data bytes in the transaction
DSTA	n	1	BCD	DCR Status
				Status Flags 7 6 5 4 3 2 1 0 **Bit 0 : Busy** **Bit 1 : Programming Mode** **Bit 2 : No Pump Connected** **Bit 3 : Manual Sales** **Bit 4 : SCU Enabled** **Bit 5 : Volume Decimal Point (1=3, 0=2)** **Bit 6 : 48-Hours Timeout** **Bit 7 : Always zero**
RTIME	n	6	BCD	Real Date/Time (YYMMDDhhmmss)
VER	n	6	ASCII	DCR Version Number
CTIME	n	8	ASCII	Last Compiled Date/Time
AUT	n	14	ASCII	Author of Code
PRO	n	1	BCD	Selected Protocol
				00 = Meksan/Wayne SU86 *01 = Petposan/Europump (Beta)* *02 = Petposan/Europump (S4)* *03 = Wayne/Vista* *04 = Mepsan (Unimep)* *05 = Tokheim* *06 = Gilbarco* *07 = Batchen* *08 = Pumalan* *09 = Baransay* *10 = Maser* *11 = Nouvo Pignone* *12 = Yakut* *13 = CSA* *14 = S&B Protocol* *15 = Mites*
DTYP	n	1	BCD	Selected Dispenser Type
				00 = Typ-111 *01 = Typ-122* *02 = Typ-133* *03 = Typ-144* *04 = Typ-112* *05 = Typ-113* *06 = Typ-114* *07 = Typ-222* *08 = Typ-244* *09 = Typ-266* *10 = Typ-288* *11 = Typ-224* *12 = Typ-226* *13 = Typ-228* *14 = Typ-212* *15 = Typ-224* *16 = Typ-236* *17 = Typ-248* *18 = Type-248* *19 = Type-2210* *20 = Type-2410* *21 = Undefined* *22 = Undefined* *23 = Undefined*

CD138 Set DCR Parameters

Command Syntax :

Valid DCR State :	**IDLE**
Valid Nozzle State :	**IDLE**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Ah	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
PPN	n	1	BCD	Parameter page no (1=Fiscal Mode)
DCRP	n	1	HEX	DCR Parameter (0=No Fiscal, 1=48 Hours, 2=Fiscal Mode)

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

CD139 Request Sale Records

Command Syntax :

Valid DCR State :	**All**
Valid Pump State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Bh	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
REC	n	2	BCD	Record number (0 – 399)

State after DCR accepts the command :	**None**
State after Pump accepts the command :	**None**
Response after POLL :	**DC139**

DC139 Sale Records

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Bh	1	HEX	Transaction number
LNG	37h	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
RNO	n	2	BCD	Record number (circular index pointer) total 400 records
FTYP	n	1	BCD	Filling type
				00 = Cash *01 = TTS* *02 = MTS* *03 = Barrel* *04 = Transfer* *05 = Test* *06 = Manual* *07 = Undefined* *08 = Credit Card* *09 = Loyalty*
TYP	n	1	BCD	Product Type number
PPU	n	4	BCD	Filling Price Unit
VOL	n	4	BCD	Filling Volume
AMO	n	4	BCD	Filling Amount
DATE	n	3	BCD	Date (YYMMDD)
TIME	n	3	BCD	Time (HHMMSS)
PLATE	n	32	ASCII	Plate number / Customer name

CD140 Update PPU

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Ch	1	HEX	Transaction number
LNG	4~n	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
PPU	n	3	BCD	Price Per Unit
PNZ	n	1	BCD	Pump & Nozzle number
PPU	n	3	BCD	Price Per Unit
PNZ	n	1	BCD	Pump & Nozzle number
PPU	n	3	BCD	Price Per Unit
>> Up to 4 Pump x 5 Nozzles				

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

CD141 Request VID Status

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Dh	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number

State after nozzle accepts the command :	**None**
Response after POLL :	**DC141**

DC141 VID Status

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Dh	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number
VSTA	n	1	BCD	VID Status
				00 = No VID 01 = Legal VID 02 = Illegal VID

CD142 Request VID Data

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Eh	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number

State after nozzle accepts the command :	**None**
Response after POLL :	**DC142**

DC142 VID Data

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Eh	1	HEX	Transaction number
LNG	4Ah	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number
VSTA	n	1	BCD	VID Status
				00 = No VID 01 = Legal VID 02 = Illegal VID
VID	n	8	BCD	VID Identity
VDAT	n	64	ASCII	VID Data

CD143 Request CID Status

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Fh	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number

State after nozzle accepts the command :	**None**
Response after POLL :	**DC143**

DC143 CID Status

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	8Fh	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number
CSTA	n	1	BCD	CID Status
				00 = No CID 01 = Legal CID 02 = Illegal CID

CD144 Request CID Data

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	90h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader Number

State after nozzle accepts the command :	**None**
Response after POLL :	**DC144**

DC144 CID Data

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	90h	1	HEX	Transaction number
LNG	4Ah	1	HEX	Number of data bytes in the transaction
RNO	n	1	BCD	Reader number
CSTA	n	1	BCD	CID Status
				00 = No CID 01 = Legal CID 02 = Illegal CID
CID	n	8	BCD	CID Identity
CDAT	n	64	ASCII	CID Data

CD145 Update Info Display

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	91h	1	HEX	Transaction number
LNG	1Bh	1	HEX	Number of data bytes in the transaction
BUZ	n	1	BCD	Buzzer (0=off, nn=beep duration)
DNO	n	1	BCD	Display number
LNO	n	1	BCD	Line number
DDAT	n	24	ASCII	Display data

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

CD146 Read Keypad Buffer

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	92h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
KNO	n	1	BCD	Keypad number

State after nozzle accepts the command :	**None**
Response after POLL :	**DC146**

DC146 Keypad Buffer

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	92h	1	HEX	Transaction number
LNG	21h	1	HEX	Number of data bytes in the transaction
KNO	n	1	BCD	Keypad number
KDAT	n	32	ASCII	Keypad data

CD147 Request Error Report

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	93h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
DEV	n	1	BCD	Device number
				00 = DCR 01 = Pump 1 02 = Pump 2 03 = Pump 3 04 = Pump 4 05 = ECR

State after nozzle accepts the command :	**None**
Response after POLL :	**DC147**

DC147 Error Event Report

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	93h	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
DEV	n	1	BCD	Device number
				00 = DCR 01 = Pump 1 02 = Pump 2 03 = Pump 3 04 = Pump 4 05 = ECR
ECODE	n	1	BCD	Error Code

CD148 Request DCR Status

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	94h	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
DCR	n	1	BCD	DCR number
TMO	n	1	BCD	SCU Timeout (0..99) 10 to 1000 seconds.

State after nozzle accepts the command :	**None**
Response after POLL :	**DC148**

DC148 DCR Status

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	94h	1	HEX	Transaction number
LNG	0Ch	1	HEX	Number of data bytes in the transaction
DCR	n	1	BCD	DCR number
STA	n	1	BCD	DCR Status
				00 = IDLE 01 = Manual Mode 02 = ECR Mode
SER	n	4	HEX	DCR Serial Number
FMOD	n	1	BCD	Fiscal Mode (00=No Fiscal, 01=48-Hours, 02=Fiscal)
VER	n	3	BCD	DCR Version
CRC16	n	2	HEX	DCR Firmware CRC16

NOT IMPLEMENTED !

CD150 Pump Bypass Mode

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**Idle**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	96h	1	HEX	Transaction number
LNG	n	1	HEX	Number of data bytes in the transaction
Pass	n	4	BCD	Password
Mode	n	1	BCD	01=Entry, 00=Exit
Size	n	1	HEX	Command Set size
CMD	n	n	any	Command Set (Max.64-Byte) * Real Pump protocol string

Response Syntax : *From Pump (Real Pump Protocol String.)*

CD151 Request ECR Plate

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	97h	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)

State after nozzle accepts the command :	**None**
Response after POLL :	**DC151**

DC151 ECR Plate

This transaction is sent by the DCR asynchronously when ECR Transaction “Authorize / Unauthorize” arrived. (if ECR+ protocol selected)

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	97h	1	HEX	Transaction number
LNG	21h	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number (Max. 4 pump) **LSD** (Nozzle number) 0 = MPD 1 to n = Nozzle number (Max 5 nozzle)
PLATE	n	32	ASCII	Plate Number / Customer name

CD152 Slip Data to ECR

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	98h	1	HEX	Transaction number
LNG	25h	1	HEX	Number of data bytes in the transaction
PMP	n	1	BCD	Pump Number (1-4)
TYP	n	1	BCD	Slip Type (0=Loyalty, 1=POS, 2=Info)
TLINE	n	1	HEX	Total Line Number (1 to 64 line)
CHR	n	1	BCD	Character Type of Line (0=Normal, 1=Bold)
LINE	n	1	HEX	Line number (1 to 64 line)
INFO	n	32	ASCII	Data block

State after nozzle accepts the command :	**None**
Response after POLL :	**None**

DC152 Request Slip Data

This transaction is sent by the DCR Asynchronously.

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	98h	1	HEX	Transaction number
LNG	03h	1	HEX	Number of data bytes in the transaction
PMP	n	1	BCD	Pump Number (1-4)
TYP	n	1	BCD	Slip Type (0=Loyalty, 1=POS, 2=Info)
LN	n	1	HEX	Request Line number

CD153 Request Unit Price

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	99h	1	HEX	Transaction number
LNG	01h	1	HEX	Number of data bytes in the transaction
PMP	n	1	BCD	Pump Number (1~4)

State after DCR accepts the command :	**None**
State after Pump accepts the command :	**None**
Response after POLL :	**DC153**

DC153 Unit Price

This transaction is sent by the DCR asynchronously at change of a value or if the DCR receives the command "Request Unit Price".

Command Syntax :

Valid DCR State :	**All**
Valid Pump State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	99h	1	HEX	Transaction number
LNG	10h	1	HEX	Number of data bytes in the transaction
PMP	n	1	BCD	Pump number (1~4)
PRI1	n	3	BCD	Price for Nozzle-1
PRI2	n	3	BCD	Price for Nozzle-2
PRI3	n	3	BCD	Price for Nozzle-3
PRI4	n	3	BCD	Price for Nozzle-4
PRI5	n	3	BCD	Price for Nozzle-5

Data is sent in packed BCD with MSB in first byte.

CD154 DCR Reset

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Ah	1	HEX	Transaction number
LNG	01h	1	HEX	Number of data bytes in the transaction
RST	n	1	BCD	0 = Software Reset, 1 = Hardware Reset

State after DCR accepts the command :	**None**
State after Pump accepts the command :	**None**
Response after POLL :	**None**

CD155 Update DCR Date/Time

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Bh	1	HEX	Transaction number
LNG	06h	1	HEX	Number of data bytes in the transaction
DATE	n	3	BCD	Date (YYMMDD)
TIME	n	3	BCD	Time (HHMMSS)

State after DCR accepts the command :	**None**
State after Pump accepts the command :	**None**
Response after POLL :	**None**

CD156 Request Keypad Status

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Ch	1	HEX	Transaction number
LNG	1	1	HEX	Number of data bytes in the transaction
PNO	n	1	BCD	Pump Number (1~4)

State after nozzle accepts the command :	**None**
Response after POLL :	**DC156**

DC156 Keypad Status

This transaction is sent by the DCR asynchronously when status changed.

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Ch	1	HEX	Transaction number
LNG	18h	1	HEX	Number of data bytes in the transaction
PNO	n	1	BCD	Pump Number (1~4)
PTYP	0~2	1	BCD	Preset type (0=unlimited, 1=Money, 2=Liter)
PVAL	n	4	BCD	Preset value
PAYM	n	1	BCD	Payment type (1=Cash, 2=Credit, 3=Custom)
TAGT	n	1	BCD	TAG Type
				00 = No Tag 01 = Mifare Ultralight 02 = Mifare Standard 1K 03 = Mifare Classic 4K 0xFF = Unknown Tag Type
PTAG	n	8	HEX	Pumper Card Serial
CTAG	n	8	HEX	Customer Card Serial

CD157 Request Shift Totalizer

Command Syntax :

Valid DCR State :	**All**
Valid Nozzle State :	**All**

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Dh	1	HEX	Transaction number
LNG	2	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
SHF	1	1	HEX	0=Read Shift Totals, 1=Set Shifts Totals

State after nozzle accepts the command :	**None**
Response after POLL :	**DC157**

DC157 Shift Totalizer

Response Syntax :

SYMBOL	WORDS	# BYTES	TYPE	INTERPRETATION
TRANS	9Dh	1	HEX	Transaction number
LNG	25h	1	HEX	Number of data bytes in the transaction
PNZ	n	1	BCD	Pump & Nozzle number
				MSD (Pump number) 0 = Illegal 1 to n = Pump number **LSD** (Nozzle number) 0 = Illegal 1 to n = Nozzle number (Max 5 nozzle)
DATE	n	3	BCD	Shift Date (YYMMDD)
TIME	n	3	BCD	Shift Time (HHMMSS)
CVOL	n	4	BCD	Current Volume Totalizer
CAMO	n	6	BCD	Current Amount Totalizer
SVOL	n	4	BCD	Shift Volume Totalizer
SAMO	n	6	BCD	Shift Amount Totalizer
DVOL	n	4	BCD	DCR Volume Totalizer
DAMO	n	6	BCD	DCR Amount Totalizer