

9.19 General description of the module RWH_RW

This module allows the user to

- Read the UID of the transponder over the antenna at process interface IO-1 ... IO-4.
- Read the user data area of the transponder over the R/W head at process interface IO-1 ... IO-4.
- Write to the user data area of the transponder over the R/W head at process interface IO-1 ... IO-4.
- Read the diagnostic information of the Evaluation Unit.

PLC process data output (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	Res	DR	Res	UR	RD	WR	AO	Res
2	Data byte 1							
3	Data byte 2							
..	...							
19	Data byte 18							
20	Data byte 19							

Description Byte 1, "Control byte":

Bit	Bit name	Bit = 1	Bit = 0
0	Res	Reserved	
1	AO	„Antenna field Off“ request	„Antenna field on“ request
2	WR	W Rite data to the user data area of the transponder	No command
3	RD ⁽¹⁾	R eaD data from the user data area of the transponder	No command
4	UR ⁽²⁾	Mode "Access to the User data aRea of the transponder" selected	Mode "Read UID of the transponder" selected
5	Res	Reserved	
6	DR	Evaluation Unit D iagnosis R ead, set by the controller to fetch the diagnosis, signaled by the Evaluation Unit in the Diag-Status bit	No command
7	Res	Reserved	

⁽¹⁾ Bit must be set dependent on the mode "Read cyclically" or "Read edge controlled".

⁽²⁾ When the mode is changed the data within the process data image is set to default value 0x00. The successful mode change can be evaluated with bit "UD" within the process data image byte 1.

Remark:

The bits WR, RD, DR are edge controlled bits. The change from state "0->1" activates the command request. The state "1" forces the DTE102 to hold the response data. The state "0" forces the DTE102 to set the data within the Process data input from Byte 2...20 to default value "0x00".

It is not allowed to the set bits WR, RD, DR simultaneously, because the module can handle only one request! Otherwise an error message is created (Diag = 1)

Description Byte 2...20, "Data byte 1...19":

Dependent on the selected mode this data area contains command data to send to the Evaluation Unit.

PLC process data input (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	UD	RD-RDY	WR-RDY	AI	TP
2	Data byte 1							
3	Data byte 2							
..	...							
19	Data byte 18							
20	Data byte 19							

Description Byte1, "Status byte":

Bit	Bit name	Bit = 1	Bit = 0
0	TP	Transponder present	Transponder not present
1	AI	Antenna field inactive	Antenna field active. This bit shall be set if the antenna is switched on by the SLK.
2	WR-RDY	Write data to user data area of the transponder ready	No command started or write data to user data area of the transponder not ready or error occurred.
3	RD-RDY ⁽¹⁾	Read data from the user data area of the transponder ready	No command started or read data from the user data area of the transponder not ready or error occurred
4	UD	Mode "Access to the user data area of the transponder" active	Mode "Read UID of the transponder" active
5	Reserved	-	-
6	DR-RDY	Diagnostics read response from Evaluation Unit is ready and available in the response buffer. Coding: Byte 2: Number of diagnosis events Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2, ⁽²⁾ Byte 7: ...	Reading not started or Evaluation Unit diagnosis data not ready
7	Diag	Evaluation Unit diagnosis occurred, but not yet written in the response buffer. The response buffer contains still transponder data. The diagnosis data will be copied in the response buffer, after detecting that the DR control bit is set by the controller.	No diagnosis available.

⁽¹⁾ Bit set dependent on the selected mode "Read cyclically" or "Read edge controlled".

⁽²⁾ Coding of diagnosis event see table 17...23.

Description Byte 2...20, "Data byte 1...19":

Dependent on the selected mode this data area contains the response data read from the Evaluation Unit or the diagnosis information.

9.20 Mode “Read UID of the transponder”

PLC process data output (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR ⁽³⁾	0	UR ⁽¹⁾ = 0	RD ⁽²⁾	0	AO	0
2	Not used							
...								
20	Not used							

In this mode the UID of the transponder can be read.

Description byte 1, “Control byte”:

Bit	Value	Description	Remark
DR ⁽³⁾	0	No read request	Data byte 2 ... 20 of the process data input is set to 0x00.
	0->1	Read diagnosis of the Evaluation Unit	-
	1	Diagnosis read request active	DR must be kept on 1 until the command response is available.
UR ⁽¹⁾	0	Mode “Read UID” selected	Must be set to 0 for reading the UID of the transponder. (default value)
RD ⁽²⁾	0	UID no read request	UID length/data is cleared in data byte 2...20 of the PLC process data input.
	0->1	edge: UID read request	Starts the reading of the UID.
	1	UID hold request	RD must be kept on 1 until the command response is available. The UID length/data is transmitted in data byte 2...20 of the PLC process data input.
AO	0	“Antenna field on” request inactive	Activate the antenna field.
	1	“Antenna field off” request	Deactivate the antenna field.

⁽¹⁾ Mode can be changed every time if bit “RD” and “DR” is set to 0 => no command active.

⁽²⁾ The bit RD is only evaluated, if the channel parameter “Read edge controlled” is set. Otherwise the UID will be actualized continuously regardless of the setting of the Bit RD. A simultaneously activation of bit DR and RD is not allowed!

⁽³⁾ Ident Diagnosis is only available, if bit “Diag” within the response data is set. Otherwise the response data will return default data “0x00” within byte 2...20 of the response data.

Default value “Control byte”: 0x00

Mode: UID read, Antenna on. With default channel parameter “Read edge controlled” = 0x0 the UID is read cyclically without setting of any control bits.

PLC process data input (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	UD=0	RD-RDY ⁽¹⁾	0	AI	TP
2	UID data length read							
3	UID data byte 1 (MSBy)							
4	UID data byte 2							
...	...							
18	UID data byte 16							
19	0x00							
20	0x00							

Description Byte 1, "Status byte":

Bit	Value	Description	Remark
Diag.	0	No error detected	-
	1	Evaluation Unit diagnosis available	-
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from Evaluation Unit ready.	Error code: Byte 2: Number of diagnosis events Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2 Byte 7: ...
UD	0	Mode "Read UID" active	Feedback of the selected mode.
RD-RDY ⁽¹⁾	0	"UID read " not read or user parameter "Read edge controlled" not set or error occurred.	UID length/data is cleared in data byte 2...20 of the PLC process data input.
	1	Read of UID ready.	UID length/data is transmitted in data byte 2...18 of the PLC process data input.
AI	0	"Antenna field on" request active	-
	1	"Antenna field off" request active	-
TP	0	No transponder detected in front of the antenna	-
	1	Transponder is detected in front of the antenna	Bit is set as long the transponder is detected in front of the antenna, regardless of the setting of the channel parameter "Data hold time".

⁽¹⁾ The bit RD_RDY is only active, if the channel parameter "Read edge controlled" is set. Otherwise the UID is updated cyclically. The user can evaluate the detection of a new transponder by evaluating bit TP or byte "UID data length read".

Description Byte 2, "UID data length read":

UID data length read. Data length of the UID read from transponder. [bytes]

Remark: If no transponder is detected by the antenna this byte is set to 0x00.

Description Byte 3 ... 6/10/14/18, "UID data byte":

Read UID of the transponder with length of 32/64/96/128 bit. Unused bytes are set to 0x00.

If no transponder is detected by the antenna this data field is set to 0x00.

Description Byte 19 ... 20:

Always set to 0x00.

9.21 Mode “Read/write user data area of the transponder”

In this mode the user data area of the transponder can be read or written.

PLC process data output (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	0	DR ⁽³⁾	0	UR ⁽¹⁾	RD ⁽²⁾	WR ⁽²⁾	AO	0
2	Read / Write data length							
3	16 bit start address [D15...D8]							
4	16 bit start address [D7...D0]							
5	Not used / Write data byte 1							
..								
20	Not used / Write data byte 16							

Description Byte 1, “Control byte”:

Bit	Value	Description	Remark
DR ⁽³⁾	0	No read request	Data byte 2 ... 20 of the process data input is set to 0x00.
	0->1	Read diagnosis of the Evaluation Unit	-
	1	Diagnosis read request active	DR must be kept on 1 until the command response is available.
UR ⁽¹⁾	1	Mode “Read/write used data of the transponder” selected	Must be set to 1 for reading/writing the user data of the transponder
RD ⁽²⁾	0	No read request	Data byte 2 ... 20 of the process data input is set to 0x00.
	0->1	Read “user data of the transponder” request	-
	1	Read request active	RD must be kept on 1 until the command response is available.
WR ⁽²⁾	0	No write request	-
	0->1	Write “user data to the transponder” request	Data byte 5 ... 20 is written to the transponder.
	1	Write request active	WR must be kept on 1 until the command response is available.
AO	0	“Antenna field on” request inactive	Activate the antenna field.
	1	“Antenna field off” request	Deactivate the antenna field.

⁽¹⁾ Mode can be changed every time if bit “DR”, “RD”, “WR” = 0 => no command active.

⁽²⁾ A simultaneously activation of bit DR, WR and RD is not allowed!

⁽³⁾ Ident Diagnosis is only available, if bit “Diag” within the response data is set. Otherwise the Evaluation Unit will return default data “0x00” within byte 2...20 of the response data.

Description Byte 2, “Read / Write data length”:

Read data length or write data length, limited to a maximum number of 16 bytes.

Description Byte 3 ... 4, “16 bit start address”:

Start address of the transponder user data area where the data has to be read or written to.

Description Byte 5 ... 20, “Not used / Write data byte”:

In read mode this bytes are ignored.

In write mode the data to be written has to be copied in this data area.

(Write data bytes 1 ... 16)

PLC process data input (RWH RW):

Byte Nr.	Bit							
	7	6	5	4	3	2	1	0
1	Diag	DR-RDY	0	UD=1	RD-RDY	WR-RDY	AI	TP
2	Read / Write data length							
3	Read data byte 1 / Not used							
4	Read data byte 2 / Not used							
..	...							
18	Read data byte 16 / Not used							
19	0x00							
20	0x00							

Description Byte 1, "Status byte":

Bit	Value	Description	Remark
Diag	0	No error detected	-
	1	Evaluation Unit diagnosis available	Maybe channel related or channel independent error occurred.
DR-RDY	0	No diagnostic read request or diagnostic data not ready.	-
	1	Diagnostics read request from Evaluation Unit ready.	Error Code: Byte 2: Number of diagnosis events Byte 3: Function_Num, Byte 4: Error_Decode, Byte 5: Error_Code_1, Byte 6: Error_Code_2, Byte 7: ...
UD	1	Mode "Read/write used data of the transponder" active	Feedback of the selected mode.
RD-RDY	0	No command request detected or command execution active	Read length / Read data byte is cleared in data byte 2...17 of the PLC process data input.
	1	Command execution is ready.	<u>Diag bit is not set:</u> Command execution ok. Read length / Read data byte is set in data byte 2...17 of the PLC process data input. <u>Diag bit is set:</u> Command execution not ok. Read length / Read data bytes are set to zero.
WR-RDY	0	No command request detected or command execution active or error occurred.	-
	1	Command execution is ready.	-
AI	0	"Antenna field on" request active	-
	1	"Antenna field off" request active	-
TP	0	No transponder detected in front of the antenna	-
	1	Transponder is detected in front of the antenna	Bit is set as long the transponder is detected in front of the antenna, regardless of the setting of the channel parameter "Data hold time".

Description Byte 2, "Read / Write data length":

Read data length or write data length.

Description Byte 3 ... 20, "Read data byte 1 ... 16":

- In write mode this bytes are set 0x00.
- In read mode this data area contains the data of the user data area of the transponder. Unused bytes are set to 0x00.
- In read diagnosis mode this data area contains detailed error codes.

9.22 Error Codes

Error codes are signaled with bit “Diag” within the Status byte of the response data of the Evaluation Unit. If more Diagnostic events are available, the channel can transfer up to 4 diagnostics simultaneously. The Hardware Diagnostic Events, which are device relevant, are indicated by the Diag Bit of all channels and the user may choose any of the channels to read out the diagnostic event. The inactive channel may transfer only hardware diagnostic events. See table 19, Error_Code_1 = 01h, 02h

Table 17: Error Code Function Number F1h

Error group	Function_ Num	Error Decode	Error Code 1	Error Code 2	Description
Tag/Transponder	F1h	FEh	01h	00h	Tag memory error (e.g. CRC error)
	F1h	FEh	02h	00h	Presence error (indicated by Evaluation Unit), tag has left the transmission window
	F1h	FEh	03h	00h	Address or command does not fit the tag characteristics (memory size) (indicated by Evaluation Unit)
	F1h	FEh	04h	00h	Tag is defective. (replace tag or battery)
	F1h	FEh	05h	00h	Tag memory overflow. UID > 16 bytes
	F1h	FEh	0Ah	00h	Access violation (e.g. block locked) refer to ISO18000-x
	F1h	FEh	0Bh	00h	General tag/transponder error which is not specified in detail
	F1h	FEh	0Ch	00h	Unknown internal error

Table 18: Error Code Function Number F2h

Error group	Function_ Num	Error Decode	Error Code 1	Error Code 2	Description
Air interface	F2h	FEh	01h	00h	Communication timeout at air interface (indicated by Evaluation Unit)

Table 19: Error Code Function Number F4h

Error group	Function_ Num	Error Decode	Error Code 1	Error Code 2	Description
Evaluation Unit	F4h	FEh	01h	00h	Power supply failure
	F4h	FEh	02h	01h	Allowed temperature exceeded
	F4h	FEh	03h	00h	Antenna not operating; timeout occurred
	F4h	FEh	04h	00h	Command buffer overflow (IO-Server Queue) (internal error)
	F4h	FEh	81h	00h	ID-Link Master inactive
	F4h	FEh	82h	00h	Internal IO-Port server error (internal error)
	F4h	FEh	83h	00h	IO-Port invalid parameter (internal error)
	F4h	FEh	86h	00h	Data not available for delayed C/Q inputs or delayed UID (internal error)
	F4h	FEh	87h	00h	IO-Port channel reconfiguration not allowed yet (internal error)
	F4h	FEh	88h	00h	IO-Port parameter selector flag not set (internal error)
	F4h	FEh	89h	00h	General error detected from ID-Link Master
	F4h	FEh	8Ah	00h	CRC error detected from ID-Link Master
	F4h	FEh	8Bh	00h	Object not found detected from ID-Link Master
	F4h	FEh	8Ch	00h	Data size invalid detected from ID-Link Master
	F4h	FEh	8Dh	00h	IO-Port channel is reconfigured

Table 20: Error Code Function Number F4h (cont.)

Error group	Function_Num	Error Decode	Error Code 1	Error Code 2	Description
Evaluation Unit	F4h	FEh	90h	00h	IO-Port channel is invalid
	F4h	FEh	90h	01h	Short circuit at output driver detected
	F4h	FEh	90h	02h	Undervoltage at output driver detected
	F4h	FEh	90h	03h	Overload at of output driver detected
	F4h	FEh	90h	04h	Overtemperature at output driver detected
	F4h	FEh	90h	05h	Line break to Read/Write head
	F4h	FEh	90h	06h	Upper limit reached at output driver
	F4h	FEh	90h	07h	Undervoltage at C/Qo detected
	F4h	FEh	90h	08h	Antenna failure detected
	F4h	FEh	90h	09h	Antenna communication error
	F4h	FEh	90h	0Ah	I ² C communication error
	F4h	FEh	90h	0Bh	I ² C communication parity error
	F4h	FEh	91h	00h	IO-Port parameter selector flag contains invalid bits
	F4h	FEh	92h	00h	ID-Link Master detects invalid parameter
	F4h	FEh	93h	00h	Internal error: generic error in SysCtrl

Table 21: Error Code Function Number F5h

Error group	Function_Num	Error Decode	Error Code 1	Error Code 2	Description
Communication User - Evaluation Unit	F5h	FEh	08h	00h	Command from another user being processed (indicated by Evaluation Unit)
	F5h	FEh	80h	00h	More than one command requested by user DR,WR,Diag

Table 22: Error Code Function Number F6h

Error group	Function_Num	Error Decode	Error Code 1	Error Code 2	Description
Command error	F6h	FEh	03h	00h	Invalid command parameter (e.g. data range)