TURCK

Industrial
Automation

USER MANUAL
RFID SYSTEM

SET-UP
IN PROFIBUS-DP

BLident®

Edition 12/08

0 About this manual

1 The TURCK *BL ident*®-system

2 Mounting and installation

3 Startup of a TURCK *BL ident*®-system

Safety instructions!

Prior to installation work

- Switch device to zero voltage
- Protect device from restart
- Determine voltage free state
- Earth and short-circuit
- Cover or construct a barrier around neighboring parts/components under voltage
- Please follow the respective instructions for mounting the device.
- Only staff appropriately qualified per EN 50 110-1/-2 (VDE 0105 Section 100) may handle the device/system.
- When performing the installation, please pay heed to the requirement of conducting a statical discharge on your person prior to touching the device.
- The function earth (FE) must be connected to the protective earth (PE) or the potential equalization. The builder is responsible for the design of this connection.
- Connection -and signal lines are to be installed in such a way that inductive and capacitive controls may not have a diminishing impact on automation functions.
- Automation engineering equipment and its service components are to be installed in such a way that they are protected from accidental operation.
- In order to prevent that a line or wire breakage on the signal side does not lead to undefined states in the automation equipment, respective safety measures are to be implemented on the hard- and software side during the I/O coupling operation.
- Please ensure a safe, electrical isolation of the low voltage with a 24 volt supply. Only use power supplies that meet the requirements per
  IEC 60 364-4-41 or rather HD 384.4.41 S2 (VDE 0100 Section 410).
- Variations or rather deviations of the supply voltage from the nominal value may not exceed the tolerance limits specified in the technical data, otherwise function errors and dangerous conditions can not be ruled out.
- EMERGENCY STOP per IEC/EN 60 204-1 must remain active in all operational states of the automation equipment. Unlocking the EMERGENCY STOP feature must not initiate a restart operation.
- Built-in devices for housings or cabinets may only be operated or serviced when they are installed, and table devices or portables only when the housing is closed.
- Precautions are to be made so that a program may be correctly restarted after it has been interrupted by voltage drops and power failures. Here dangerous operating conditions must not occur also short-term. If need be, force EMERGENCY STOP.
- At locations where occurring failures of the automation equipment may cause injury to persons or damage to property, external measures must be taken that also guarantee or rather force a safe operational status in case of error or breakdown (for example, with the help of independent limit value switches, mechanical locks, etc.).
- The electrical installation must be done per the respective instructions (for example, line diameter, fuse protection, earthing equipment conductor).
- Only qualified, expert staff may complete all work related to transport, installation, startup and maintenance. (Follow IEC 60 364 or rather HD 384 or DIN VDE 0100 and national accident prevention regulations).
- Keep all covers and doors closed during operation.

0 About this manual

Concept of documentation

The first chapter of this manual provides an overview of the TURCK *BL ident*®-system.

The second chapter contains all information for mounting and installation.

The first part of the third chapter contains instructions for the start-up of a *BL ident*®-system with the help of the standard function component "Proxy Ident Function Block". The second part contains a start-up instruction diagram of the interface-module with the accessory "-S". A SIMATIC S7/-300 Station (Siemens) is used to demonstrate the sample start-ups. The SIMATIC basic software STEP 7 is used.

The fourth chapter includes an excerpt of the "Proxy Ident Function Block" specifications.

Explanations of used symbols

Warning

This symbol appears next to an alert which points to a source of danger. This may refer to injury of persons and damage to systems (hard- and software).
For the user this symbol means: Please, proceed with extreme caution.

Attention

This symbol appears next to an alert which points to a potential source of danger. This may refer to possible injury of persons and damage to systems (hard- and software) and installations.

Note

This symbol appears next to general instructions which point out important information concerning the procedure for one or more operational steps.

The relevant instructions may facilitate the work and may help prevent redundancy caused by incorrect operational steps, for example.

Attention

Please, consider it mandatory to read this chapter because safe handling of electrical devices should not be left to chance.

This manual contains the required information for the start-up of the TURCK *BL ident* ®-system.
The concept was specifically created for qualified staff with the necessary technical know-how.

Intended use

Warning

The devices described in this manual must be used only in the intended applications found in this manual and the respective technical description, and only together with certified external devices and -components.

The correct and safe operation of the devices is based on the prerequisite of proper transport, storage, assembly and mounting, as well as carefully operation and maintenance.

Instructions for project planning / installation of product

Warning

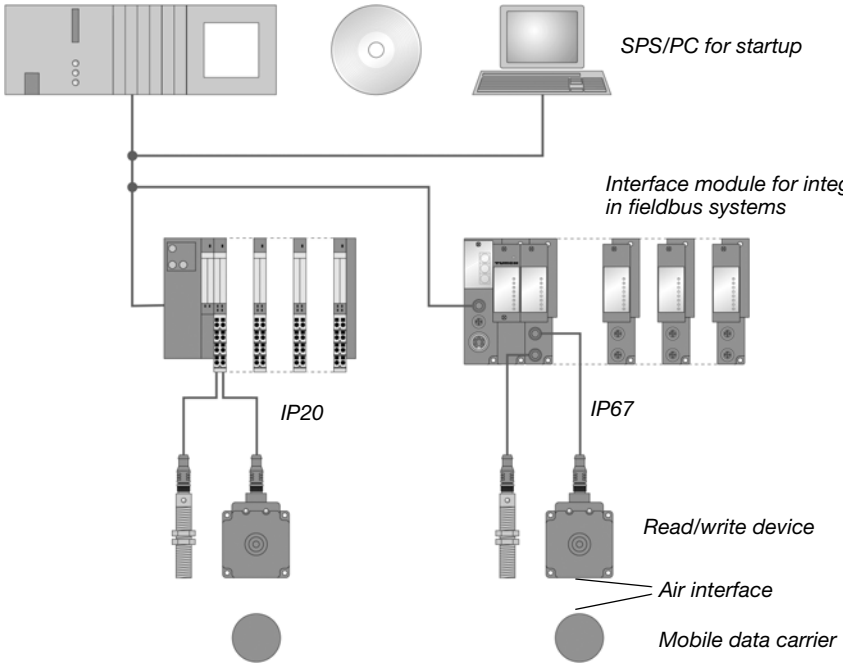
It is imperative that the instructions be followed for the safety and accident prevention for the respective application.

1 The TURCK *BL ident*®-system

Schematic diagram of the identification system *BL ident*®

The TURCK *BL ident*®-system has multiple levels. Each level offers opportunities for variation. An application that is adjusted to the complete system is possible.

Figure 1: System overview



Support for *BL ident*®-projects

The following software and documents will provide additional support for project planning, installation and startup:

- For simulation and optimization of an application, please access the internet and go to http://www.turck.com..for a free "*BL ident*®-simulator".
- D101583 - "Installation of the *BL ident*®-system" - This manual contains the technical details of the available TURCK-data carriers and the TURCK read/write devices.
- D101581 - "Interface module for fieldbus connection". This manual describes the professional operation of the *BL ident*®-interface modules.
- D101607 - This manual contains a software description of a so-called "handheld" (programming device) which allows Read and Write access of data independent of location.
- D101585 - This manual contains a hardware description of a so-called "handheld" (programming device) which allows Read and Write access of data independent of location.
- D101640 - "Startup of the CoDeSys for programmable gateways"
- D101642 - "Startup with DeviceNet™"
- D101644 - "Startup with EtherNet/IP™"
- D101648 - "Startup in PROFINET"

The list of manuals may be downloaded from the internet.

Networking with *BL ident*®-systems

Based on the possibility to integrate *BL ident*®-systems in (existing) bus-systems, the opportunity exists to network together multiple *BL ident*®-systems.

Valid are the guidelines for the maximum extension of the respective, active bus system.

A PROFIBUS-DP-system with no repeater may include, for example, a max. 31 stations and 1 master.

Identification systems with radio frequency technology (RFID)

RFID is an abbreviation for radio frequency identification.

A RFID-system consists of a data carrier, a device for Read and Write access to the data carrier, as well as other devices used for data transfer and processing.

The transfer of data from the data carrier to the read/write head occurs contact-free with the help of electromagnetic waves. The type of transmission is insensitive to dirt and temperature fluctuations.

The data carriers may be directly affixed to a product. This is why the term "mobile data memory" is used as well. Other terms for the data carrier are TAG or transponder. The data content may consist of production and manufacturing data. The data that identifies the product is important here. This is where the description "identification system" comes from.

Further reaching possibilities are a result of the fact that the data content can be changed by writing to the data carrier. Because of this production-/manufacturing processes can be retraced. Logistics/distribution may be optimized.

The "identification systems" may be integrated into (existing) fieldbus automation systems (for example PROFIBUS-DP). The connection to the respective fieldbus system is done with suitable interface modules.

Standardized software components (for example, the Proxy Ident Function Block PROFIBUS-DP) make system integration and startup easy.

Performance characteristics and applications of the *BL ident*®-system

To meet the requirements of a variety of applications, the TURCK *BL ident*®-system offers multiple possibilities for combining data carriers and read/write heads, as well as interface modules to connect automation systems (for example, PROFIBUS-DP). Software components make integration and startup easy.

Performance characteristics of the TURCK *BL ident*®-system are as follows:

Protection class

Some data carriers, as well as the applicable read/write heads have a high mechanical protection class (for example,**IP67**) and therefore may be used in the toughest industrial applications.

The read/write heads are also available in IP69K (wash-down design).

Connection to the fieldbus-system is realized with suitable TURCK interface modules. The interface-modules for CANopen are available in the protection class IP20. TURCK connection cables with the suitable protection class complement the identification system.

Temperature-resistant data carriers up to 210°C are available for the high temperature range.

Life cycle

The life cycle is a result of the possible Read/Write operations to the data carrier.

FRAM data carriers can provide for an **unlimited** number of Read operations and 10^{10} Write operations.

EEPROM data carriers can provide for an **unlimited** number of Read operations and 10^4 or 10^5 Writer operations.

The data carriers do not require batteries.

Transfer frequency

The TURCK *BL ident*®-system operates with a transfer frequency of 13.56 MHz in the HF-band or with a country-specific transfer frequency in the UHF-range (860-960 MHz) between the data carriers and the read/write heads.

HF: Systems that operate with this transfer frequency are to a large extent insensitive to electromagnetic interferences. Therefore the 13.56 MHz transfer frequency has developed into the standard in many RFID applications.

UHF: Systems in this frequency band gain higher read/write ranges compared to HF, typically several meters. The carrier frequencies are country-specific, and in Europe, for example, they are between 865 and 868 MHz.

Models

Data carriers

HF: For the HF-operating frequency, TURCK supplies round, flat data carriers, for example, with 16, 20, 30 and 50 mm diameters.

The high temperature data carriers have a cylindric design (for example, 22 x 125 mm).

Inlays and adhesive labels have a foil thickness (size, for example, 43 x 43 mm).

Special designs are suitable for installation in and mounting on metal. Other designs are data carriers in a glass cylinder housing or as a flat bank card format. Some data carriers have holes so that they may be affixed with screws.

UHF: Data carriers for UHF have different designs and mounting possibilities and are optimized for either small housing dimensions or large data transfer ranges. Data carriers with high protection class, also for the application in the field, are available, as well as data carriers for direct mounting on metal or imprinted tags.

TURCK supplies customer-specific data carrier solutions upon request.

Read/write heads

HF: Read/write heads are available in different designs, from the standard unified threads M18 and M30 to cuboid designs Q14, CK40, Q80, S32XL including Q80L400 and Q350 for long distances of up to 500 mm.

UHF: Different cuboid designs are available, for example as compact read/write head in a housing with approx. 100 mm x 80 mm x 35 mm edge length (L x W x D) or in dimensions approx. 240 mm x 240 mm x 40 mm for high data transfer ranges of several meters. The read/write heads have protection class IP67 and are suitable for the application in the field. The quality of the air-data transfer between data carrier and read/write head is continuously checked, also when in operation. Each disturbance of the air interface is immediately diagnosed and signalled per LED-chain.

Memory slot

The memory capacity of the data carrier for the HF-range is 64 or 128 byte (48 or 112 byte user data) with an EEPROM-memory and 2 or 8 kbyte (2000 or 8000 byte user data) with a FRAM-memory. For the UHF-range there is an EEPROM-data carrier with 110 byte (94 byte user data).

FRAM: (Ferroelectric Random Access Memory), non-volatile, longer life cycle because of a greater number of Read/Write operations and faster Write operations compared to EEPROM.

EEPROM: (Electrically eraseable programmable read only memory), non-volatile.

The data carrier for the HF-operating frequency meet the communication standard ISO 15693.

The data carriers in the UHF-frequency band meet the communication standard ISO 18000-6C and EPCglobal Class 1 Gen 2.

Speed of data carrier to read/write head

Note

The speed with which the data carrier can pass by the read/write head is influenced by the data volume to be processed and varies according to the respective combination of read/write head and data carrier that is being used.
This is why numerical data for max. speed and data volumes can only be seen as examples!

The speed with which the data carrier can pass by the read/write head may be increased, for example, with the data carrier TW-R50-K2 and the read/write head TN-CK40-H1147 to up to 2.5 m/s for 8 bytes at a distance of 36 mm. With the help of the "*BL ident*®-simulator" (see below) the application parameters "speed", "data volume" and "range" can be changed. The optimum combination read/write head and data carrier for the respective application is apparent in the simulator.

The simulator is online at http://www.turck.com.. In any case, please follow the instructions including limits in this chapter.

Note

Next to the data processing time in the read/write head, the processing time within the complete installation of the identification system must also be taken under consideration.(„System overview" page 1-2). Depending on the application, the time for data transfer and processing within the complete installation may vary!
If your application requires a fast sequence of data carriers, it may be necessary to decrease the speed with which the data carrier passes by the read/write head.
When in doubt, we recommend to empirically determine the possible speed!

Note

The transfer curves (max. read/write distance, length of transfer zone) only represent typical values and test lab conditions.
Because of component tolerances, installation situation of the application, ambient conditions and interferences caused by materials (especially metals) the distances that can be reached may differ up to 30 %.
This is why it is absolutely necessary to test the application (especially during Read and Write when movement occurs) under real conditions!
In addition, the recommended distance from data carrier to read/write head should be complied with if possible in order to gain errorless read/write operations despite of possible discrepancies.
Depending on the actual transfer curve of the respective application, the parameters of reachable pass over speeds (Read and Write on the Fly) and the max. transferable data volume also change.

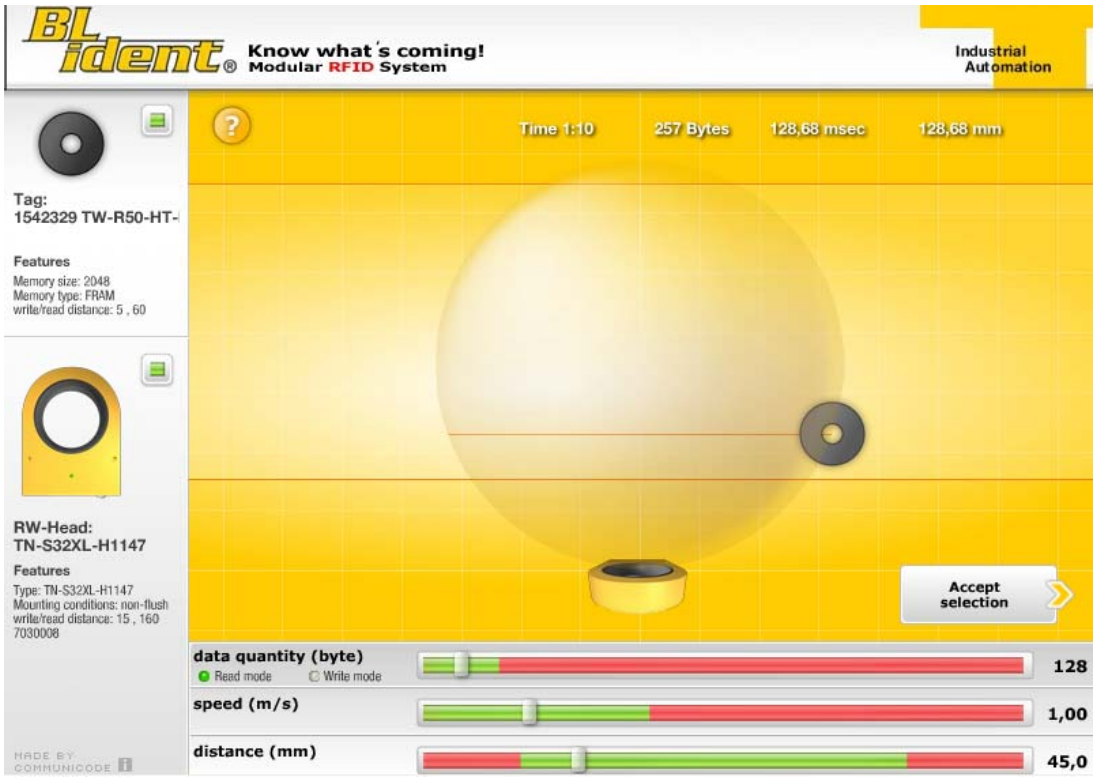
Read range / Write range

The reachable read/write distances depend on the respective combination of data carrier and read/write head. The possible read/write distance is influenced by the data volume to be written and to be read, and by the speed with which the data carrier passes by the read/write head. The read/write heads that use UHF-operating frequencies will reach a distance of several meters. Read/write heads that operate with 13.56 MHz (HF) transfer frequencies will reach shorter distances. Here the longest distance (approx. 500 mm) will be reached with the model TNLR-Q350-H1147 if a round data carrier with a 50 mm diameter is used.

With the help of the software "*BL ident*®-simulator" the application parameters "speed", "range" and "data volume" may be changed. Therefore an optimum combination read/write head and data carrier may be selected for the appropriate application.

You may find the simulator online at http://www.turck.com..

Figure 2: BL ident®-simulator



Compatibility

All technical data refer to the *BL ident*®-system, this means to the combination of *BL ident*®-data carriers, read/write heads and interface modules. Entirely different values may be valid for data carriers of other manufacturers. This is why external products may only be used after they have been released by TURCK.

Applications (examples):

The performance characteristics described in the prior chapter support the application of a TURCK *BL ident*®-system in the following industries:

- Automobile
- Transport and handling
- Machine building
- Food and beverages
- Chemical industry
- Pharmaceutical and petrochemical industries

The application in all areas is possible here, like:

- Assembly lines
- Materials handling
- Industrial manufacturing
- Inventory and storage
- Logistics
- Distribution
- Consignment
- Transport logistics

2 Mounting and installation

Interfaces with the protection class IP20

Diagrams and designs of the interface modules

The *BL ident*®-PROFIBUS-interface is available with 2, 4, 6, 8 channels. Interface modules with the add-on "S" (Simple) stand for a user-friendly startup opportunity. With a Write or Read command 8 byte can be transferred. Interface modules without the add-on "S" offer a higher number of possible commands and a large data transfer volume per command.

Figure 3: BL ident®-Interface modules with the protection class IP20 (2- and 8-channeled)

Table 1: BL ident®-Interface modules with the protection class IP20

Product description	Identnummer
TI-BL20-DPV1-2	1545004
TI-BL20-DPV1-4	1545005
TI-BL20-DPV1-6	1545006
TI-BL20-DPV1-8	1545007
TI-BL20-DPV1-S-2	1545074
TI-BL20-DPV1-S-4	1545075
TI-BL20-DPV1-S-6	1545076
TI-BL20-DPV1-S-8	1545077

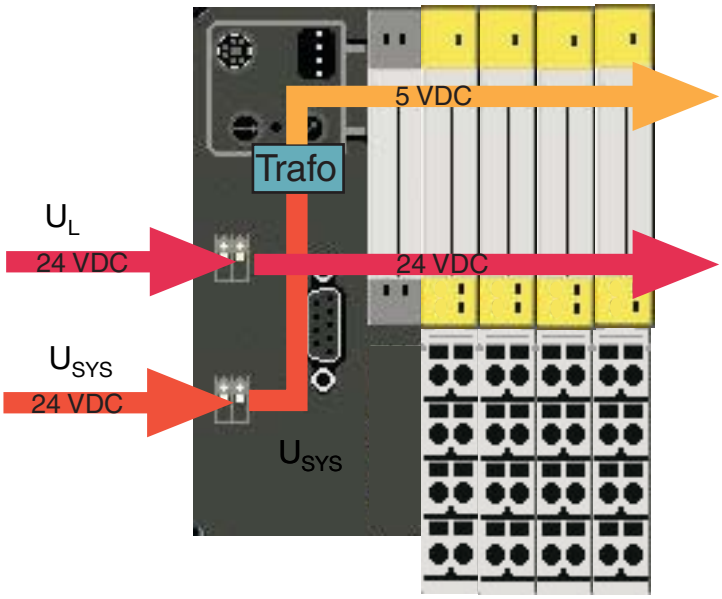
Supply voltage

The supply of the *BL ident*®-interface module is done via both connection terminals U_L and U_{SYS} (field supply and system supply). A voltage in the range 18 to 30 VDC (nominal value 24 VDC) is connected to each of the 2-pole screw terminals.

In the transformed state the **system supply** is 5 VDC (from 24 VDC) and can supply a max. 1.5 A. This voltage is internally transmitted with the wire pair of the 7-wire module bus and serves to supply the module electronics on the module bus side.

The **field supply voltage** is 24 VDC and can supply a max. 10 A. This voltage is led through the interface module via a conductor line. The module electronics on the fieldbus side and the connected read/write device are fed by the field supply voltage ("Connections of read/write heads" page 2-8).

Figure 4: Supply of the BL ident®-interface module



Fieldbus connection

A SUB-D-connection supports the communication of the gateways via the fieldbus PROFIBUS-DP.

Figure 5: PROFIBUS SUB-D-connection

Attention

A SUB-D-connector with special shield and certified per PROFIBUS-standard is needed for fieldbus transfer because of the high transfer speed!

Attention

If the *BL ident*®-interface module is used as the first or last participant in the bus communication, the use of a special bus connector with built-in or shiftable terminating resistance is mandatory!

Ready-made PROFIBUS-cables from TURCK with a connector type certified per PROFIBUS-standard can be found in the TURCK-catalog "Fieldbus Technology" D301052.

If the *BL ident*®-interface module is used as the first or last participant in the bus communication (at one end of the bus segment), a connection of type **D9T451-**x**M*** must be used. The SUB-D-connectors of these connector types have an integrated terminating resistance and **a** connected PROFIBUS-cable.
The SUB-D-connectors for the TURCK-connections of type **D9-451-**x**M-**x**M*** have an integrated terminating resistance and **two** PROFIBUS-connectors.

*x indicates the length of the connected PROFIBUS-cable(s).

As an example, the pin assignment of the female connector is displayed here:

Figure 6: SUB-D female connector (top view)

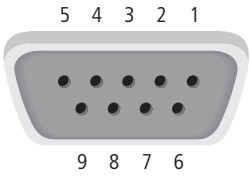


Table 2: Pin assignment SUB-D female connector on gateway

Pin No.	Signal name	Description
1	PE	Shield connection/function earth
2	not-assigned	
3	RxD/TxD-P	Received-/Send Data-P
4	CNTR-P/RTS	Request to send
5	DGND	Data reference potential
6	VP	+ 5 VDC for the external bus connection
7	not-assigned	
8	RxD/TxD-N	Received-/Send Data-P
9	not-assigned	

Attention

No equalizing current must flow across the shield. For this purpose a safe system must be created for potential equalization!

Addressing

Addressing is done via the two decimal rotary switches on the fieldbus side (gateway) of the fieldbus interface.

Both switches are housed together with the service interface under a cover.

Figure 7: Decimal rotary switch for addressing on PROFIBUS-DP

Attention

A max. 99 addresses (01 to 99) can be assigned with the switch ADDRESS. Each address can only be assigned once in the entire bus structure. Bus address 00 must not be used.
Other participants of the entire bus structure can also be assigned to addresses from 100 to 125. The bus addresses 000, 126 and 127 must never be assigned!

The rotary switches are marked with H for High (higher value point) and L for Low (lower value point).

BL20-GW-DPV1:

- Switch L is used to set L $x10^0$ (L = 0 to 9).
- Switch H is used to set H x 10^1 (H = 0 to 9).

Note

After addressing the protective cover above the decimal rotary switches must be closed again.

Attention

If the *BL ident* ®-interface module is used as the first or last participant in the bus communication, the use of a special bus connector with built-in or shiftable terminating resistance is mandatory!

Service interface

The service interface connects the *BL ident*®-interface module with the PC. With the software I/O-ASSISTANT the interface module can be projected and diagnostic messages can be indicated.

A special ready-made cable must be used to connect the service interface to the PC.

- BL20-connection cable (I/O-ASSISTANT-ADAPTERCABLE-BL20/BL67)

Connection with BL20-cable

The BL20-cable has a PS/2-connector (connection of female connector to gateway) and a SUB-D female connector (connection of connector to PC).

Figure 8: PS/2-connector on the connection cable to the gateway (top view)

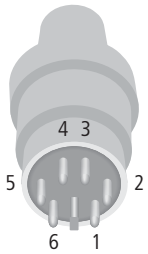


Figure 9: 9-pole SUB-D female connector on the connection cable to the PC (top view)

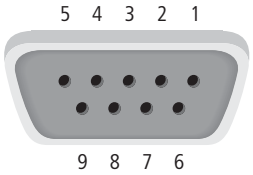
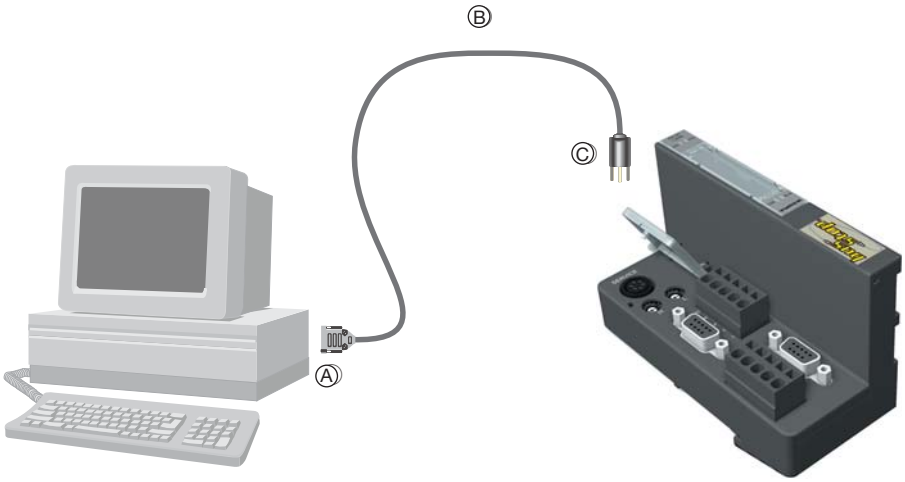


Table 3: Pin assignment PS/2- and SUB-D-interface

Pin	BL20 Gateway - PS/2 female connector	Sub-D-interface on PC	Pin
1	CLK	DTR, DSR	4, 6
2	GND	GND	5
3	DATA	–	–
4	n.c. (DATA2)	RxD	2
5	+5 V	RTS	7
6	n.c. (CLK2)	TxD	3

Figure 10: Connection between PC and BL20-gateway via the BL20-connection cable



A *SUB-D female connector*
B *BL20-connection cable*
C *PS/2-connector*

Connections of read/write heads

Ready-made connection cables

The following table displays ready-made connection cables with a coupling to connect the read/write head and an open end to connect to the spring-type terminals of the interface module. The spring-type terminal connection to the interface module is explained in paragraphs "Connection terminals when using the connection cables RK4.5T... and WK4.5T.." page 2-10 and "Connection terminals when using the connection cables FB4.5T..." page 2-10.

Table 4: Ready-made connection cables (BL20)

Type description (Identnummer)	**Coupling[A)] straight = g angled = a**	**2 m**	**5 m**	**10 m**	**25 m**	**50 m**
RK4.5T-2/S2500 (8035244)	g	x				
RK4.5T-5/S2500 (6699206)	g		x			
RK4.5T-10/S2500 (6699207)	g			x		
RK4.5T-25/S2500 (6699421)	g				x	
RK4.5T-50/S2500 (6699422)	g					x
WK4.5T-2/S2500 (8035245)	a	x				
WK4.5T-5/S2500 (6699208)	a		x			
WK4.5T-10/S2500 (6699209)	a			x		
WK4.5T-25/S2500 (6699423)	a				x	
WK4.5T-50/S2500 (6699424)	a					x
For the food and beverage range (FB = Food and Beverage) - IP69K						
FB-RK4.5T-5/S2502 (8036404)	g		x			
FB-RK4.5T-10/S2502 (8036405)	g			x		
FB-RK4.5T-25/S2502 (8037011)					x	

A *The "Coupling" is used to connect the read/write head*

Characteristics of the connection cables of type RK.. and WK...

- Shielded
- PUR outer jacket, PVC-, silicone- and halogen-free
- Highly flexible
- Crosslinked by irradiation, resistant to weld flash, oils
- High mechanical durability
- Approval

Characteristics of connection cables of type FB....

- Shielded
- PVC outer jacket
- Approval,

Connection cables for installing a coupling

The cable "CABLE-BLIDENT-100M" suitable for *BL ident*® can be assembled by the user. For this purpose please install the M12-coupling "B8151-0/9" (6904604) to connect the read/write head.

Note

When connecting the coupling, please note the column "Color Mapping RK4.5T... and WK4.5T.." of "Pin assignment for connection cables:" page 2-30!

Note

Please close the open end of the connection cable per the following two paragraphs!

Connection terminals when using the connection cables RK4.5T... and WK4.5T..

Figure 11: Connection of read/write head (transceiver) for connection cables RK4.5T... and WK4.5T...

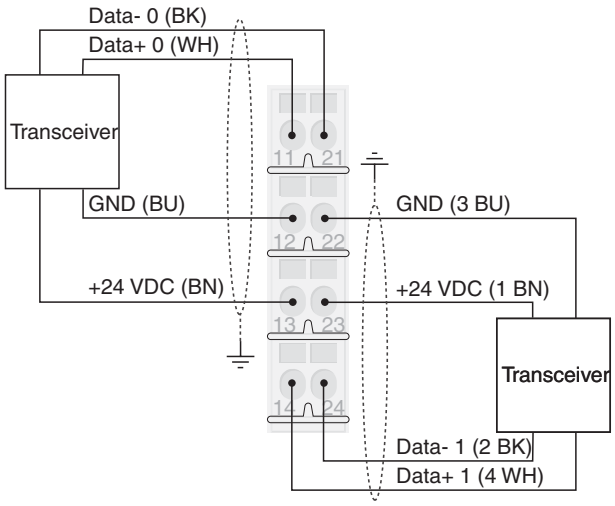


Table 5: Color mapping of the connection cables RK4.5T... and WK4.5T...

Signal	Color mapping
$V_{r/w\ head}$	Brown (BN)
GND	Blue (BU)
Data-	Black (BK)
Data+	White (WH)

Connection terminals when using the connection cables FB4.5T...

Figure 12: Connection of read/write head (transceiver) for connection cables FB4.5T...

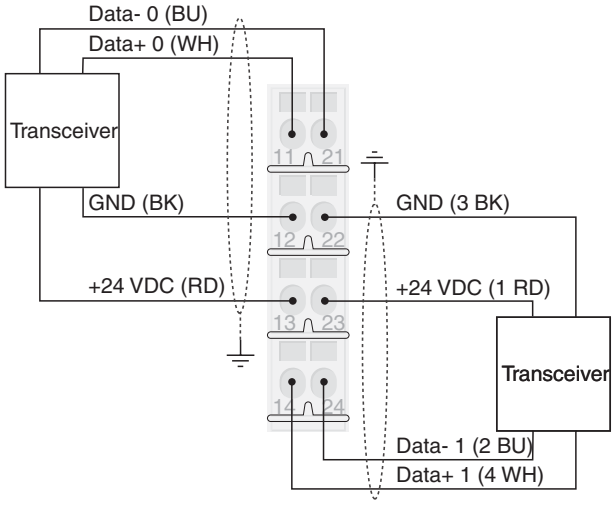


Table 6: Color mapping of the connection cables FB4.5T...

Signal	Color mapping
$V_{r/w\ head}$	Red (RD)
GND	Black (BK)
Data+	White (WH)
Data-	Blue (BU)

Diagnostics via LEDs

LEDs of the fieldbus side

Table 7: Fieldbus side

LED	Status	Meaning	Remedy
GW	green	5 VDC operating voltage present, firmware active, gateway ready for operation and sending	– -
	green blinking, 1 Hz **and** LED IOs: red	Firmware inactive	– Re-upload the firmware! Please call your TURCK-contact person.
	green blinking, 4 Hz	Firmware active, hardware of gateway defective.	– Replace the gateway.
	green blinking, 1 Hz	U_{SYS}: Undervoltage or overvoltage U_L: Undervoltage	– Please check whether the voltage supply is within the allowed range.
IOs:	**green**	Configured constellation of the module bus participant corresponds to the real one; communication is active.	– -
	green blinking, 1 Hz	Station is in the Force mode of the I/O-ASSISTANT.	– Please deactivate the Force mode of the I/O-ASSISTANT
	red and LED "GW" OFF	Controller is not ready for operation or Vcc-level is not in the required range	– Please check the bus refreshing module at the right side next to the gateway and its wiring. When the power supply voltage is wrongly connected, please call your TURCK contact person.
	red	Module bus not ready for operation.	– Please check whether the single BL20 modules are correctly installed.

Table 7: (cont.) Fieldbus side

LED	Status	Meaning	Remedy
	red blinking, 1 Hz	Inadaptable modification of the real constellation of the module bus participant	– Please compare the projection of your BL20 station to the real constellation. – Please check the assembly of your BL20 station for defective or wrongly plugged electronic modules.
	red/green blinking,1 Hz	Adaptable modification of the real constellation of the module bus participant	– Please check the BL20 station for pulled or new modules that are not projected.
	red blinking, 4 Hz	No communication via the module bus	– Please check whether the guidelines for supply module applications have been followed.
DIA	OFF	Gateway does not send diagnostics	– -
	red blinking, 1 Hz	Gateway sends expanded diagnostics.	– Please check the single electronic modules of your BL20 station for diagnostic messages. – Please check the diagnostic messages of your PLC-software.
	red	Gateway generates static diagnostics.	– Please check the single electronic modules of your BL20 station for diagnostic messages. – Please check the diagnostic messages with your PLC-software.
Bus	OFF	Fieldbus not in operation.	– Please wait until the firmware download is completed. – After completion of the download: Hardware error, replace the gateway.
	green	Communication between gateway and PROFIBUS-DP master is error-free.	– -

Table 7: (cont.) Fieldbus side

LED	Status	Meaning	Remedy
	red	Bus error on gateway.	– Please check whether the PROFIBUS-DP is terminated with an active terminating resistance when the BL20 gateway is the last participant in the bus topology. – Please check the PROFIBUS-DP connector for tight fit, or rather check the direct wiring connections. All connections must be correct, and they must have a tight fit. – Please check the cable to the PROFIBUS-DP master for damages and correct connection. – Please check whether the correct bit transfer rate is set in the PLC master. – Please compare the projection of the station to the existing module list.
	red blinking, 1 Hz	Invalid station addresses set.	– Please set the correct station address via the hex-rotary switch/ decimal rotary switch.

LEDs for the RFID-connections

Table 8: RFID-connections

LED	Status	Meaning	Remedy
DIA	OFF	Normal data exchange	
	red	Module bus communication failure	Please check whether more than two neighboring electronic modules were pulled. Relevant are those modules which are positioned between the gateway and this particular module.
	red blinking, 0.5 Hz	Diagnostics present	
RW 0 RW 1	OFF	No Tag in received range	
	green	Tag in received range	
	green blinking, 1 Hz	Data transfer from / to Tag	
	red	Error in read/write head	
	red blinking, 2 Hz	Short circuit read/write head supply	

Diagnostic messages and parameterization of the gateway

A full description of the gateway diagnostic messages and the parameterization possibilities can be found in the manuals:

"BL20-PROFIBUS-DP" D300822

"BL67/BL20 - DPV1-Gateway" D300955 Updated Manual for DPV1

Parameterization of the BL20-2RFID-A/BL20-2RFID-S-modules

BL20-2RFID-A

At this time parameterization is not needed.

BL20-2RFID-S

The only parameter "Bridging Time Kx[n*4ms]" must only be changed/adjusted when a certain error message appears at startup ("Parameter" page 3-65):

Diagnostic messages of *BL ident*®-channels

Possible software diagnostic messages (I/O-ASSISTANT):

Table 9: Diagnostics of Ident-module

Diagnostic byte and bit		Description I/O-ASSISTANT	DPV1-Error-code
Diagnostic-channel 1			
0	0	reserved	
	1	reserved	
	2	"Overload" (Ident Overcurrent - the supply of the read/write head (transceiver) is switched off).	4
	3 to 7	reserved	
1	0	"Hardware failure" (Transceiver hardware error)	21
	1 to 2	reserved	
	3	"Undervoltage" (Transceiver voltage supply error)	2
	4 to 7	reserved	

Table 9: (cont.) Diagnostics of Ident-module

Diagnostic byte and bit		**Description I/O-ASSISTANT**	**DPV1-Error-code**
Diagnostic-channel 2			
2	0	reserved	
	1	reserved	
	2	"Overload" (Ident Overcurrent - the supply of the read/write head (transceiver) is switched off).	4
	3 to 7	reserved	
3	0	"Hardware failure" (Transceiver hardware error)	21
	1 to 2	reserved	
	3	"Undervoltage" (Transceiver voltage supply error)	2
	4 to 7	reserved	

Technical data

Warning

This device may cause radio interference in living quarters and small industry (living-, business- and commercial areas, small business). In this case the user may be asked to implement respective measures at his own expense.

Attention

The auxiliary supply must meet the requirements of the safety low voltage (SELV = Safety extra low voltage) per IEC 364-4-41.

Approvals and testing of the interface module

Table 10: Approval and testing per EN 61131-2

Approvals	
CE	
cULus	
UL	
Ambient temperature	
Operating temperature	0 to +55 °C /32 to 131 °F
Storage temperature	-25 to +85 °C / -13 to 185 °F
relative humidity	5 to 95 % (internal), Level RH-2, no condensation (at 45 °C storage)
Vibration test	per EN 61131
Shock test	per IEC 68-2-27
Dumping and falling	per IEC 68-2-31 and free fall per IEC 68-2-32
Electromagnetic compatibility	per EN 61131-2
Protection class	IP20
Reliability	
Lifespan MTBF	120000 h
Pull/plug cycles of electronic modules	20

Note

Additional technical specifications for the tests and for TURCK products of the BL20 product family can be found in the catalog "BL20 - Modular I/O Bus Terminal System" (D300417) and the Manual "BL20 - PROFIBUS-DP Hardware and Projection" (D300822).

Gateway connection level

Table 11: Technical data of the fieldbus side

Description	Value
Field supply U_L A)	("Supply voltage" page 2-3)
U_L Nominal value (range)	24 VDC (per 61131-2)
I_L Max. field supply current	10 A
Current from field supply per 2-channel RFID-module (no actuator/sensor supply) C)	100 mA
Current from field supply to feed read/ write heads (for details please refer to technical data for read/write heads)	< 250 mA
Isolation voltage – U_L against U_{SYS} – U_L against fieldbus – U_L against FE	500 V_{rms}
Connection technology	2-pole screw terminal
System supply U_{SYS} B)	("Supply voltage" page 2-3)
U_{SYS} nominal value (range)	24 VDC (18 to 30 VDC)
I_{SYS} (at I_{MB} = 1,2 A / U_{SYS} = 18 VDC)	max. 900 mA
Nominal current from U_{SYS} to supply gateways	430 mA
Nominal current from U_{SYS} to supply a 2-channel RFID-module C)	30 mA
Isolation voltage (U_{SYS} against U_L / U_{SYS} against fieldbus / U_{SYS} against FE)	500 V_{rms}
Physical interfaces	
Transfer speed fieldbus	9,6 kbps to 12 Mbps
Connection technology fieldbus	SUB-D female connector
Fieldbus termination	external
Address range fieldbus	1...99
Address range fieldbus	2 rotary switches
Service interface	PS/2 female connector for I/O-ASSISTANT
Connection technology power supply	Screw connection
Passive LWL-adaptors are connectable	Current consumption max. 100 mA

Table 11: (cont.) Technical data of the

Description	Value
Isolation voltage – Fieldbus against U_{SYS} – Fieldbus against U_L – Fieldbus against FE	500 V_{rms}
Fieldbus shield connection	Via SUB-D connector

A *The current consumption from the field supply U_L is the sum of:*
Current consumption read/write head × number of read/write heads
+
current consumption per 2-channel RFID-module × number of modules

B *The current consumption from the system supply U_{SYS} is the sum of:*
Current consumption of the gateway
+
current consumption per 2-channel RFID-module × number of modules

C *To supply the RFID-module electronics current is used from the field supply U_L as well as the system supply U_{SYS}.*

Connection level of read/write head

Table 12: Technical data

Description	Value
Number of channels	2
Nominal voltage from supply terminal	24 VDC
Nominal current from field supply	≤100 mA
Nominal current from module bus	≤30 mA
Power loss, typical	≤1 W
Inputs/Outputs	
Transfer rate	115.2 kbps
Cable length	50 m
Cable impedance	120 Ω
Potential isolation	Isolation of electronics and field level via optocoupler
Utilization factor	1
Sensor supply	250 mA per channel, short circuit protected
Sum current (via both channels)	500 mA
Number of diagnostic byte	4 (BL67-2RFID-A, BL67-2RFID-S)
Number of parameter byte	8 (BL67-2RFID-A, BL67-2RFID-S)
Number of input byte	4 (BL67-2RFID-A) 24 (BL67-2RFID-S)
Number of output byte	4 (BL67-2RFID-A) 24 (BL67-2RFID-S)
Transfer type	serial differential transfer to read/write head
Data buffer receive/send	8/8 kbyte
Connection technology read/write heads	Spring-type terminal
Protection class	IP 20
Stripped isolation length	8 mm
max. terminal range	0.5 to 2.5 mm^2
Conductor suitable for clamping	
"e" one-wire H 07V-U	0.5 to 2.5 mm^2
"f" fine-wire H 07V-K	0.5 to 1.5 mm^2
"f" with wire end sleeves per DIN 46228/1 (wire end sleeves crimped on gas-tight)	0.5 to 1.5 mm^2

Table 12: (cont.) Technical data

Description	Value
Plug gauge per IEC 947-1/1988	A1
Measuring data per VDE 0611 Part 1/8.92/IEC 947-7-1/1989	
Measuring voltage	250 V
Measurement current	17.5 A
Measurement diameter	1.5 mm^2
Measurement surge voltage	4 kV
Degree of pollution	2

Interfaces with the protection class IP67

Diagrams and designs of the interface modules

The *BL ident*®-PROFIBUS-DP-interface is available with **2, 4, 6, 8** channels.

Interface-Module with the add-on "-**S**" (Simple) stand for a user-friendly startup opportunity. With a Write or Read command 8 byte can be transferred. Interface modules without the add-on "S" offer a higher number of possible commands and a large data transfer volume per command.

Figure 13: BL ident®-interface modules with the protection class IP67

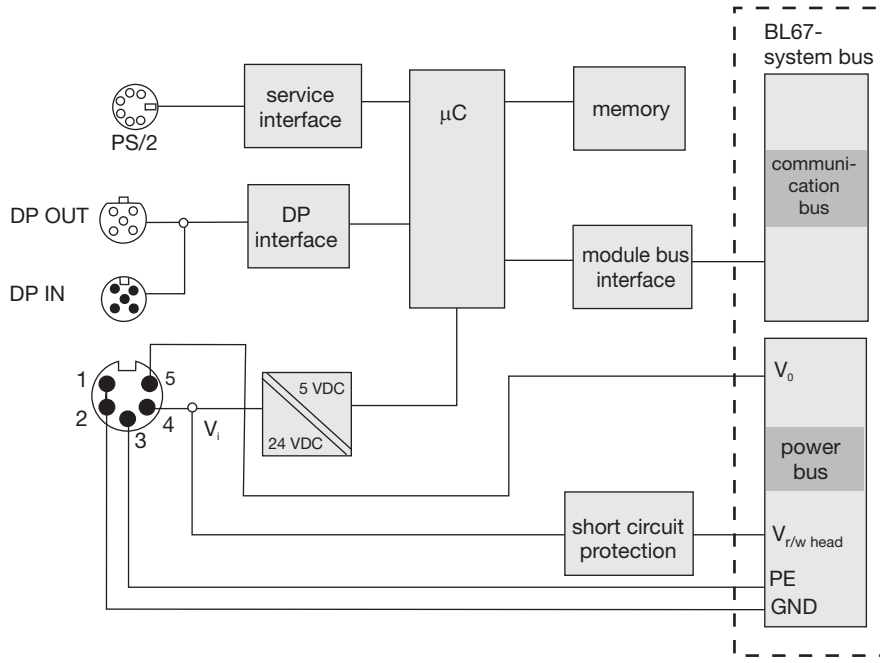
Table 13: Designs of the BL ident®-interface modules with the protection class IP67

Product description	Identnummer
TI-BL67-DPV1-2	1545028
TI-BL67-DPV1-4	1545029
TI-BL67-DPV1-6	1545030
TI-BL67-DPV1-8	1545031
TI-BL67-DPV1-S-2	1545106
TI-BL67-DPV1-S-4	1545107
TI-BL67-DPV1-S-6	1545108
TI-BL67-DPV1-S-8	1545109

Principle switching diagram

The following diagram shows among other things how the voltages V_I(Pin 4) and V_O (Pin 5) from the programmed Ethernet-gateways are used and then transmitted:

Figure 14: Principle switching diagram of the interface module



Supply voltage

The interface module is supplied via the 7/8"-connector with the imprint "Power".

Figure 15: 7/8"-connector

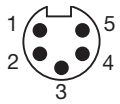


Table 14: Pin assignment of the 7/8"-connector

Pin-Nr.	Color	7/8"	Description
1	black	GND	
2	blue	GND	
3	green/ yellow	PE	Protective earth
4	brown	V_I (U_B)	Feeding in of nominal voltage for inputs (sensor supply $V_{S/L\text{-}head}$); from it the system supply is won.
5	white	V_I (U_B)	Feeding in of nominal voltage for outputs (in case of the BL67-2RFID-module supplies the microcontroller at the fieldbus side).

The "Principle switching diagram of the interface module" page 2-23 shows how the voltages V_I (4) and V_O (5) are used by the interface module and then transmitted.

The read/write heads are supplied via the voltages $V_{S/L\text{-}head}$ (V_I). This connection is overload- and short circuit protected.

The LED "V_I" page 2-33 indicates when an error occurs with this voltage.

Ready-made cables for PROFIBUS-DP can be found in the appendix of the TURCK catalog "Fieldbus Technology" D301052.

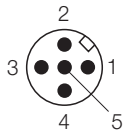
Fieldbus connection

M12-bus connection

The *BL ident*®-interface module is connected to the PROFIBUS-DP via M12 x 1-connector, 5-pole, inverse coded.

- M12 x 1-connector to connect to the arriving bus line:

Figure 16: PBDP-connector - "DP IN"



- M12 x 1-female connector to connect the exiting bus cable:

Figure 17: PBDP-female connector - "DP OUT"

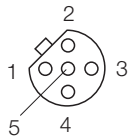


Table 15: Pin assignment of M12 x 1-connector

Pin-No.	M12 x 1	Description
1	5 V	Supply of external devices
2	A	(+)-Data cable; Received-/Send-Data-P; green
3	GND	Data reference potential
4	B	(–)-Data cable; Received-/Send-Data-N; red
5	Shield	Shield connection/function earth

Attention

No equalizing current must flow across the shield. For this purpose a safe system must be created for potential equalization!

Bus termination

If the *BL ident*®-interface module is used as first or last participant in the bus communication (at the end of a bus segment), the fieldbus must be terminated. The gateway itself offers no opportunity to terminate the fieldbus. The female connector that connects to the exiting bus cable (DP-OUT) must be terminated with a connector with integrated terminating resistance (for example RSS4.5-PDP-TR, Ident-No. 6601590 as passive terminating resistance or PDP-TRA, Ident-No.: 6825346 as active terminating resistance).

Note

The bus termination is done externally with a connector with integrated terminating resistance.

Addressing

Addressing of the *BL ident*®-interface module on the PROFIBUS-DP is done via three decimal rotary switches next to the service interface.

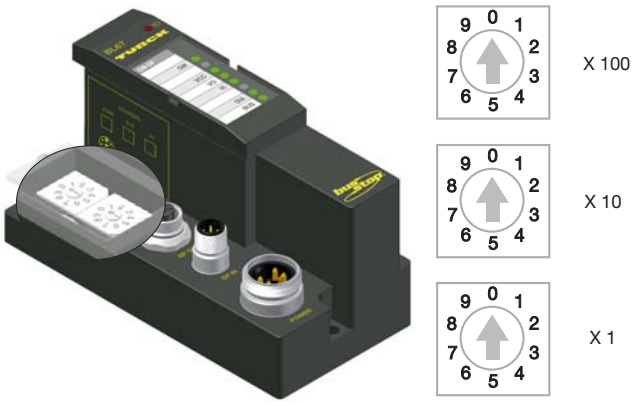


Figure 18: Decimal rotary switches for setting the PROFIBUS-DP address

Attention

A max. 125 addresses (001 to 125) can be issued. Each address can only be issued once in the entire bus structure.
Bus addresses 000, 126 and 127 must not be used.

Attention

After addressing the protective cover above the switches must be tightly screwed on again.
Please pay attention to the seal of the protective cover to protect it from damage or from moving out of place.
The protection class IP67 can only be guaranteed when the cover is correctly closed.

Service interface

The service interface connects the *BL ident*®-interface module to a PC. With the software I/O-ASSISTANT the interface module can be projected and diagnostic messages can be indicated.

The service interface must be connected to the PC with a special, ready-made cable to be used for this purpose.

- TURCK connection cable (**I/O-ASSISTANT-cable BL20/BL67**; Ident No.: 6827133)

The cable has a PS/2-connector (for connecting the female connector to gateway) and a SUB-D female connector (for connecting the connector to the PC).

Figure 19: PS/2-connector on the connection cable to the gateway (top view)

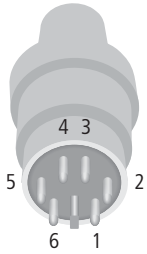


Figure 20: 9-pole SUB-D female connector on the connection cable to the PC (top view)

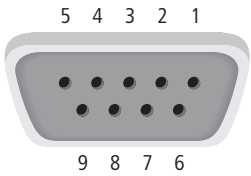
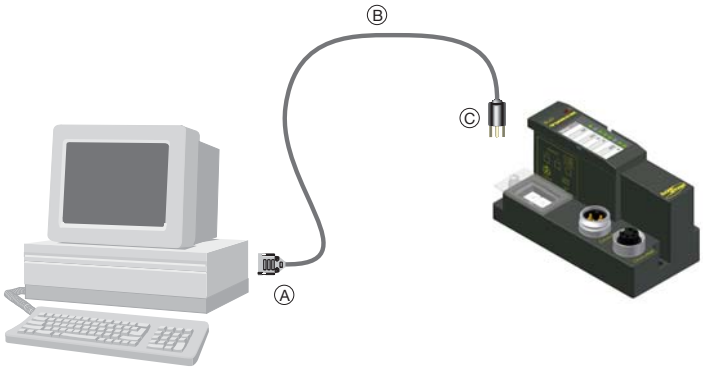


Figure 21: Connection between PC and BL67-interface module with the TURCK connection cable



Pin assignment

The table shows the pin assignment when using the PS/2-cable:

Table 16: Pin assignment with PS/2-cable

PS/2			**9-pole serial interface on PC**	
Pin-No.	Standard PS/2-connector	BL67 gateway PS/2-female connector	Pin-No.	**Connector**
1	CLK	+5 V (from gateway)	4, 6	DTR, DSR
2	GND	GND	5	GND
3	DATA	not protected	–	–
4	n.c. (DATA2)	TxD	2	RxD
5	+5 V	/CtrlMode	7	RTS
6	n.c. (CLK2)	RxD	3	TxD

Connections of read/write heads

Ready-made connection cables with coupling and connector

Table 17: Ready-made connection cables (BL67)

Type description (Ident-No.)	**Coupling**[A] straight = g angled = a	**Connector**[B] straight = g	2 m	5 m	10 m
RK4.5T-2-RS4.5T/S2500 (6699200)	g	g	x		
RK4.5T-5-RS4.5T/S2500 (6699201)	g	g		x	
RK4.5T-10-RS4.5T/S2500 (6699202)	g	g			x
WK4.5T-2-RS4.5T/S2500 (6699203)	a	g	x		
WK4.5T-5-RS4.5T/S2500 (6699204)	a	g		x	
WK4.5T-10-RS4.5T/S2500 (6699205)	a	g			x
Type description (Ident-No.)	**Coupling**[A] **straight = g angled = a**	**Connector**[B] **straight = g**	**0.3 m**	**25 m**	**50 m**
RK4.5T-0.3-RS4.5T/S2500 (6699210)	g	g	x		
RK4.5T-25-RS4.5T/S2500 (6699211)	g	g		x	

RK4.5T-50-RS4.5T/S2500 (8035246)	g	g			x
WK4.5T-25-RS4.5T/ S2500 (6638425)	a	g		x	
WK4.5T-50-RS4.5T/ S2500 (6638426)	a	g			x

A *The "Coupling" is used to connect the read/write head*
B *The "Connector" is plugged into the interface module.*

Ready-made connection cables with coupling

The "Coupling" is used to connect the read/write head. M12-connectors BS8151-0/9 (6904613) are used to connect the interface module.

Note

When installing the connectors, please pay attention to "Pin assignment for connection cables:" page 2-30!

Table 18: Ready-made connection cables (BL67)

Type description (Ident-No.)	Coupling[A)] straight = s angled = a	2 m	5 m	10 m	25 m	50 m
RK4.5T-2/S2500 (8035244)	s	x				
RK4.5T-5/S2500 (6699206)	s		x			
RK4.5T-10/S2500 (6699207)	s			x		
RK4.5T-25/S2500 (6638421)	s				x	
RK4.5T-50/S2500 (6638422)	s					x
WK4.5T-2/S2500 (8035245)	a	x				
WK4.5T-5/S2500 (6699208)	a		x			
WK4.5T-10/S2500 (6699209)	a			x		
WK4.5T-25/S2500 (6699423)	a				x	

Table 18: Ready-made connection cables (BL67)

Type description (Ident-No.)	Coupling[A] straight = s angled = a	2 m	5 m	10 m	25 m	50 m
WK4.5T-50/S2500 (6638424)	a					x
For the food and beverage range (FB = Food and Beverage) - IP69K						
FB-RK4.5T-5/S2502 (8036404)	s		x			
FB-RK4.5T-10/S2502 (8036405)	s			x		
FB-RK4.5T-25/S2502 (8037011)	s				x	

A *The "Coupling" is used to connect the read/write head*

Connection cables for installing a connector and a coupling

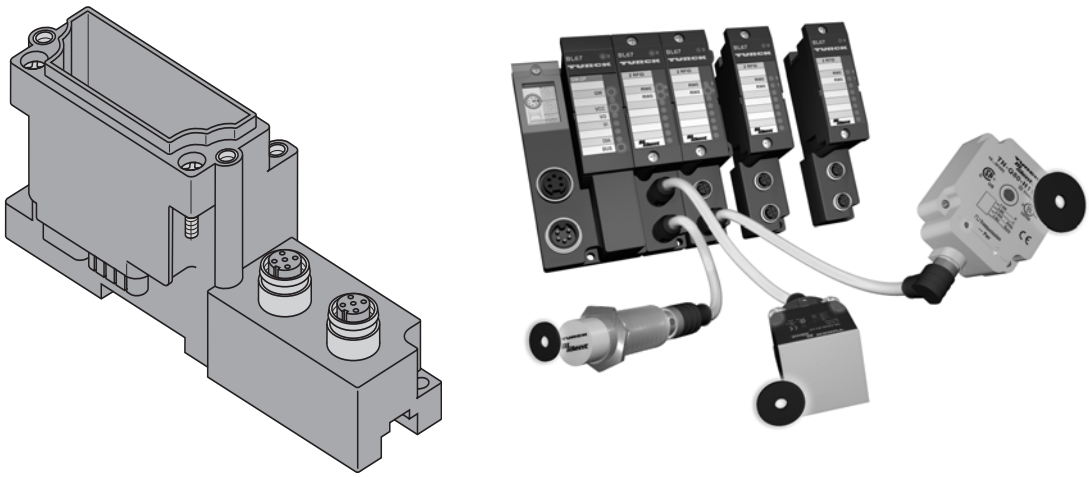
The *BL ident*® suitable cable "CABLE-BLIDENT-100M" can be self-assembled. For this purpose install the M12-connector "BS8151-0/9" (6904613) to connect the interface module, and the M12-coupling "B8151-0/9" (6904604) to connect the read/write head.

Note

When installing the connector and the coupling, please pay attention to "Pin assignment for connection cables:" page 2-30!

Connection level of the base module BL67-B-2M12

Figure 22: Connection level



Pin assignment for connection cables:

Figure 23: Pin assignment connector (left) and coupling (right)

Table 19: Pin assignment of BL67-2RFID

Channel	Pin assignment of the BL67-B-2M12	Pin assignment of the connector	Signal[B]	Color mapping [A] RK4.5T... and WK4.5T..	Color mapping [A] FB4.5T..
1	0.1	1	$V_{S/L\text{-}head}$ [B]	Brown	Red
	0.3	3	GND	Blue	Black
	0.2	2	Data-	Black	Blue
	0.4	4	Data+	White	White
2	1.1	1	$V_{S/L\text{-}head}$ [B]	Brown	Red
	1.3	3	GND	Blue	Black
	1.2	2	Data-	Black	Blue
	1.4	4	Data+	White	White

A *These specifications correspond to the BL ident® ready-made TURCK-connectors.*
B *"Supply voltage" page 2-23*

Diagnostics via LEDs

LEDs of the fieldbus side

Table 20: LED-displays

LED	Status	Meaning	Remedy
GW	off	CPU is not supplied by voltage.	Please check the supply voltage of the system connected to the gateway.
	green	Firmware active, gateway ready for operation and sending.	-
	green blinking, 1 Hz	Firmware inactive	If LED "**IOs**" red, firmware download needed.
	green blinking, 4 Hz	Firmware active, hardware of gateway defective.	Replace the gateway.
	red and LED "IOs" OFF	Controller is not ready for operation or V_{CC}-level is not in the required range → possible causes: – too many modules on gateway – short circuit in connected module – gateway defective	Please check the supply voltage of the system connected to the gateway and the wiring. Pull surplus modules. Replace the gateway if needed.

Table 20: (cont.) LED-displays

LED	Status	Meaning	Remedy
IOs:	OFF	CPU is not supplied by voltage.	Please check the supply voltage of the system connected to the gateway.
	green	Configured constellation of the module bus participant corresponds to the real one; communication is active.	-
	green blinking, 1 Hz	Station is in the Force mode of the I/O-ASSISTANT.	Please deactivate the Force mode of the I/O-ASSISTANT
	green blinking, 4 Hz	The allowed max. number of modules connected to the gateway has been exceeded.	Please check the number of modules connected to the gateway and pull surplus modules if needed.
	red and LED "GW" OFF	Controller is not ready for operation or V_{CC}-level is not in the required range → possible causes: – too many modules on gateway – short circuit in connected module – gateway defective	– Please check the supply voltage of the system connected to the gateway and the wiring. – Pull surplus modules. – Replace the gateway if needed.
	red blinking, 1 Hz	Not adaptable Modification of the real constellation of the module bus participant.	– Please compare the projection of your BL67 station to the real constellation. – Please check the assembly of your BL67 station for defective or wrongly plugged in electronic modules.
	red blinking, 4 Hz	No communication via the module bus	– At least 1 electronic module must be plugged in and able to communicate with the gateway.
	red/green blinking,1 Hz	Adaptable modification of the real constellation of the module bus participant.	– Please check the BL67 station for pulled or new modules that are not projected.
V_{CC}	-	CPU is not supplied.	– Please check the system supply on the gateway.
	green	Module bus and CPU o.k.	-

Table 20: (cont.) LED-displays

LED	Status	Meaning	Remedy
V_O	green	Supply of outputs o.k.	-
	green blinking,1 Hz	Undervoltage V_O; system is running.	– Please check the supply voltage of the system connected to the gateway.
	green blinking, 4 Hz	Overvoltage V_O; system is running.	
	OFF	Voltage supply missing	
V_I	green	V_I o.k.	-
	green blinking, 1 Hz	Undervoltage V_I; system is running.	– Please check the supply voltage of the system connected to the gateway.
	green blinking, 4 Hz	Overvoltage V_I; system is running.	
	red	Short circuit or overload on sensor supply $V_{S/L\text{-}head}$ → switching off the sensor supply	– An automatic restart occurs as soon as the error no longer exists.
	OFF	Voltage supply missing	– Please check the supply voltage of the system connected to the gateway.
DIA	OFF	Gateway does not send diagnostics.	–
	red	Gateway sends static diagnostics.	– Replace the gateway (hardware error).
	red blinking, 1 Hz	Gateway sends expanded diagnostics.	– Please check the single electronic modules of your BL67 station for diagnostic messages. – Please check the diagnostic messages of your PLC-software.

Table 20: (cont.) LED-displays

LED	Status	Meaning	Remedy
Bus	OFF	Fieldbus not in operation.	– Please wait until the firmware download is completed. – After completion of the download: Hardware error, replace the gateway.
	green	Communication between gateway and PROFIBUS-DP master is error-free.	–
	red	Bus error on gateway; there is no data exchange.	– Please check whether the address that was issued for the station in the project of the control software matches the address set on the module. – Please check whether the PROFIBUS-DP is terminated with an active terminating resistance when the BL67 gateway is the last participant in the bus topology. – Please check the PROFIBUS-DP-connector for tight fit. – Please check the cable to the PROFIBUS-DP master for damages and correct connection. – Please check whether the correct baud rate is set in the PLC master. – Please compare the projection of the station to the existing module list.
	red blinking, 1 Hz	A PROFIBUS-DP address that is not allowed has been set on the gateway.	– Please check the PROFIBUS-DP address set on the gateway. No allowed are: 000 and addresses > 125. Please refer to Chapter "Addressing" page 2-25.

LEDs for the RFID-connections

The LEDs are positioned on the modules above the connection level.

Table 21: RFID-connections

LED	Status	Meaning	Remedy
D	OFF	Normal data exchange	
	red	Module bus communication failure	Please check whether more than two neighboring electronic modules were pulled. Relevant are those modules which are positioned between the gateway and this particular module.
	red blinking, 0.5 Hz	Diagnostics present	
RW 0 RW 1	OFF	No Tag in received range	
	green	Tag in received range	
	green blinking,1 Hz	Data transfer from / to Tag	
	red	Error in read/write head	
	red blinking, 2 Hz	Short circuit read/write head	

Diagnostic messages and parameterization of the gateway

A full description of the gateway diagnostic messages and the parameterization possibilities can be found in the manuals:

"BL67 User Manual for PROFIBUS-DP" D300570 for DPV0

"BL67/BL20 - DPV1-Gateway" D300955 Updated Manual for DPV1

Parameterization of the BL67-2RFID-A/BL67-2RFID-S-modules

BL67-2RFID-A

At this time parameterization is not needed.

BL67-2RFID-S

The only parameter "Bridging Time Kx[n*4ms]" must only be changed/adjusted when a certain error message appears at startup "Parameter" page 3-65.

Diagnostic messages of *BL ident* ®-channels

Possible software diagnostic messages (I/O-ASSISTANT):

Table 22: Diagnostics of Ident-module

Diagnostic byte and bit		Description I/O-ASSISTANT	DPV1-Error-code
Diagnostic-channel 1			
0	0	reserved	
	1	reserved	
	2	"Overload" (Ident Overcurrent - the supply of the read/ write head (transceiver) is switched off).	4
	3 to 7	reserved	
1	0	"Hardware failure" (Transceiver hardware error)	21
	1 to 2	reserved	
	3	"Undervoltage" (Transceiver voltage supply error)	2
	4 to 7	reserved	
Diagnostic-channel 2			
2	0	reserved	
	1	reserved	
	2	"Overload" (Ident Overcurrent - the supply of the read/ write head (transceiver) is switched off).	4
	3 to 7	reserved	
3	0	"Hardware failure" (Transceiver hardware error)	21
	1 to 2	reserved	
	3	"Undervoltage" (Transceiver voltage supply error)	2
	4 to 7	reserved	

Technical data

Warning

This device may cause radio interference in living quarters and small industry (living, business- and commercial areas, small business). In this case the user may be asked to implement respective measures at his own expense.

Attention

The auxiliary supply must meet the requirements of the safety low voltage (SELV = Safety extra low voltage) per IEC 364-4-41.

Approvals and testing of the interface module

Table 23: Approvals and testing per EN 61131-2

Description	Value
Approvals	
CE	
cULus	
UL	
Ambient temperature	
Operating temperature	0 to +55 °C /32 to 131 °F
Storage temperature	-25 to +85 °C / -13 to 185 °F
relative humidity	5 to 95 % (internal), Level RH-2, no condensation (at 45 °C storage)
Vibration test	per IEC 61131-2
Shock test	per IEC 68-2-27
Dumping and falling	per IEC 68-2-31 and free fall per IEC 68-2-32
Electromagnetic compatibility	per IEC 61131-2
Protection class	IP 67
Reliability	
Lifespan MTBF	min. 120000 h
Pull/plug cycles of electronic modules	20

Note

Additional technical specifications for testing TURCK products of the BL67 product family can be found in the catalog "BL67 - Modular I/O Bus Terminal System in IP67" (BL67_D_d300574) and the manual "BL67–User Manual for PROFIBUS-DP" (D300570).

Gateway connection level

Table 24: Technical data of the fieldbus side

Description	Value
Supply for outputs	("Supply voltage" page 2-23)
V_O (U_L) nominal value (range)	24 VDC (18 to 30 VDC)
Max. field supply	10 A
Supply for inputs (also read/write heads) and system supply (transformed to 5 VDC)	
V_I (U_B) nominal value (range)	24 VDC (18 to 30 VDC)
I_{VI} (Safeguarding supply for inputs against overload and short circuit)	4 A
Current from V_I to supply the gateway	650 mA
Current from V_I to supply the 2-channel RFID-connection	130 mA
Current from V_I to supply the read/write heads (for details please refer to technical data for read/write heads)	< 250 mA
System supply (5 VDC from V_I)	
I_{MB} (Max. output current of module bus supply)	1.5 A
Physical interfaces	
Transfer speed fieldbus	9,6 kbps to 12 Mbps
Connection technology fieldbus	2 × M12, 5-pole, inverse coded
Fieldbus termination	external
Address range fieldbus	1...125
Address range fieldbus	3 decimal rotary switches
Service interface	PS/2 female connector for I/O-ASSISTANT
Connection technology power supply	5-pole 7/8"-connector

Connection level of read/write head

Table 25: Technical data for connection level to read/ write heads

Inputs/Outputs	
Number of channels	2
Transfer type	serial differential transfer to read/write head
Data buffer receive/send	8/8 kbyte
Transfer rate	115.2 kbps
Cable length	50 m
Cable impedance	120 Ω
Potential isolation	via optocoupler
Connection technology read/write heads	M12-coupling
Supply of read/write heads from V_I	500 mA per channel, short circuit protected
Sum current (via both channels)	500 mA
Nominal voltage V_I	24 VDC
Isolation voltage	
Module bus against field side	1000 VDC
Supply of read/write heads against data cables	0 VDC
Field supply against supply of read/write heads	0 VDC

3 Startup of a TURCK *BL ident*®-system

DPV1 startup example for A-modules with STEP7 and PIB

The startup of a *BL ident*®-system using the SIMATIC basic software Step 7 and the standard software component "Proxy Ident Function Block" (PIB) for interface modules with "A"-discs (for example, TI-BL20-DPV1-2) is described below.

A first startup should be easy, and it should be possible to do this with no programming skills. For this purpose, TURCK provides a project example. You may order the CD "BL IDENT-CD" with the project example directly from TURCK: Ident-No. 1545052

Hardware description of the project example

These hardware components were used for the following startup example:

- S7-control "CPU 315-2DP" (DPV1-capable CPU)
- *BL ident*®-Interface-module "TI-BL67-DP1-2"
- *BL ident*®-read/write head "TN-CK40-H1147"
- Data carrier "TW-R50-B128" (user data = 112 byte)

Please download D101583 which you may find in the download area of the TURCK website if you have questions or if you desire clarification concerning the read/write heads and the data carriers.

Memory requirements for a *BL ident*®-startup

Basic memory requirements

The basic memory requirements for the startup of the *BL ident*®-system using the Proxy Ident Function Block is:
14 kilobyte

Memory requirements per PIB-instance (Channel)

An instance of the Proxy Ident Function Block is created for each channel.

In addition to the basic memory requirements, each channel will need
0.6 kilobyte.

Memory requirements for the Read and Write data

The Proxy Ident Function Block (PIB) occupies one memory range as a send- and receive-buffer. The size of the memory range must be laid out according to the data volume when reading and writing.

With the *BL ident*®-system TURCK supplies PIB-versions to accommodate the different data volumes when reading and writing:

- PIB_1KB
- PIB_16K
- PIB_32K

The following calculation rule shows how the memory requirements for Read and Write are being calculated. Prerequisite is that the buffer is being used by multiple channels / instances. The memory requirements will significantly increase when each instance is assigned its own buffer. Upon completion of the calculation, you may select the function component suitable for your application.

The total data volume is the result of the following sum:

- Data volume which is read via all active channels and stored in a new "Only-Read Memory Range"
  Once it has been determined that the Read operation on the individual channels always occurs with an adequately long time offset, the memory range may be shared by the channels.
- Data volume which is read via all active channels and stored in a new "Only-Read Memory Range"
  Once it has been determined that the Read operation on the individual channels always occurs with an adequately long time offset, the memory range may be shared by the channels.
- Data volume which can repeat Read as well as Write data. The memory range is alternately used as Write memory range and Read memory range. The needed memory range may be reduced to half.

Note

Please ensure that in any case there is adequate time to hand off the data when you use the Read or Write memory for multiple channels and/or alternately for reading and writing.

Memory requirements for the hardware example

"Hardware description of the project example" page 3-3 offers two channels for connecting one read/write head each. The Read range and the Write range should have a separate layout.

The used data carrier may store max. 128 byte (112 byte user data). For the calculation max. 200 byte Read memory and 200 byte Write memory are factored in. Each channel then occupies 400 byte. Both channels **800 byte**.

For the **total memory requirements** the "Basic memory requirements" page 3-3 and the "Memory requirements per PIB-instance (Channel)" page 3-3 times two are added to 800 byte:

Total memory requirements
= 14 kilobyte + (2 x 0.6 kilobyte) + 800 byte = 16 kilobyte

Uploading the project example and downloading the active GSD-file

With the project example provided by TURCK you may simulate a first startup with ease. TURCK provides the project example on the CD "BL IDENT-CD" with the Ident-No.1545052

The project example is available as a ZIP-file. Please keep a copy of the ZIP format and log the file location.

You will need the active GSD-file to realize the configuration of the *BL ident*®-interface module. Please locate the active GSD-file at:

http://www.turck.com....

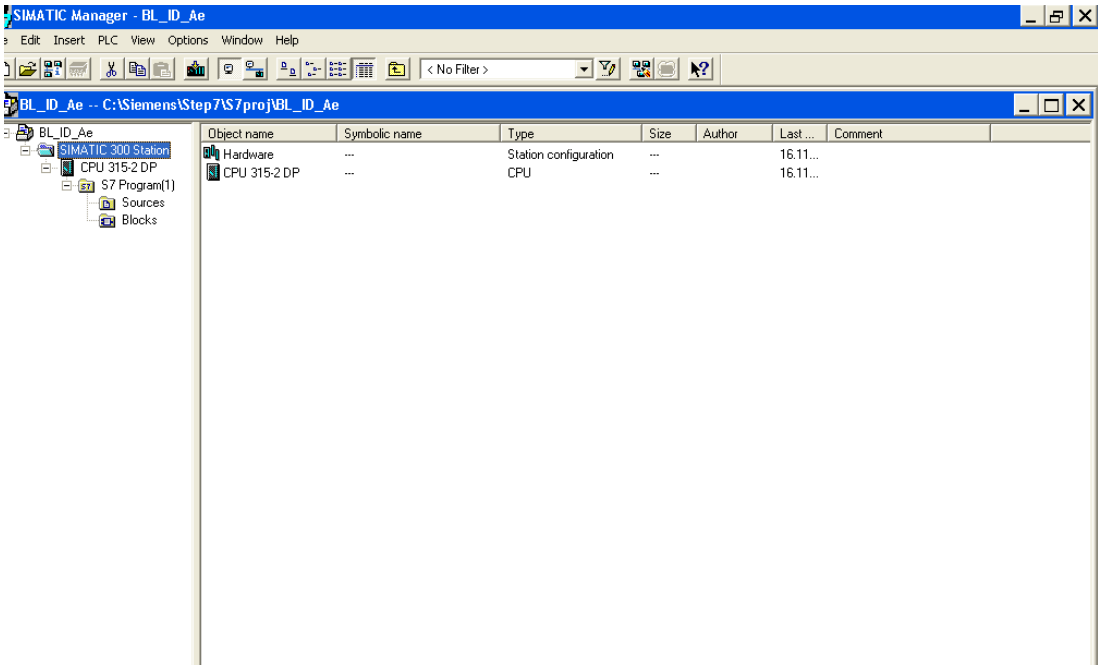
(Download > Direct search: "BL67-GW-DPV1"...)

You will be able to start up differing applications as well with the help of operating instructions provided in this document.

Start of the S7-software and upload of the project example

If need be, please actualize the GSD-file (prior or after start). Start the "SIMATIC basic software Step 7". After the start, the window of the "SIMATIC Manager" will become active.

Figure 24: After the start of the SIMATIC Manger



Please open the project example with the
File > Retrieve

Select from your directory the TURCK example file:

"BL_ID_A.zip"

The SIMATIC Manager will suggest a file location (end directory) for your *BL ident*®-test project. You may acknowledge it or change it. Acknowledge "Do you want to open these now?".

Hardware configuration and I/O-addresses

When double-clicking on "SIMATIC" in the file directory tree in the left side of the window, "Hardware" appears among others in the right side of the window. Here you may adjust the configuration settings when your hardware setup differs from the project example. By double-clicking on the PROFIBUS-DP-station (here BL67) you may see the hardware configuration.

You may change the I/O-addresses suggested by the SIMATIC Manager. Concerning the example it is beneficial if you keep the I- or rather Q-addresses "2...5" as recommended.

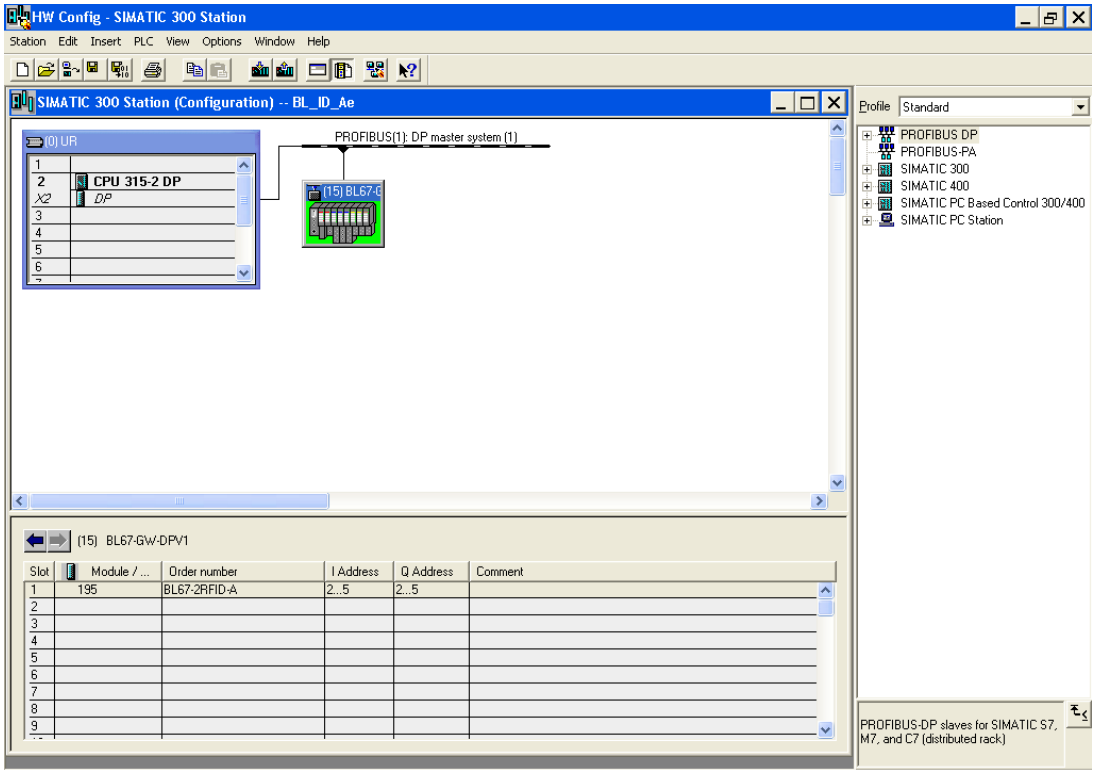
Note

When using the function block PIB it is necessary to choose the same value for input and output addresses.

Transfer the configuration data to the automation system (PLC > Download).

Confirm the request for the module to be restarted..

Figure 25: Hardware-configurator



Setting up the function component PIB

In the project example the basic settings have been selected.

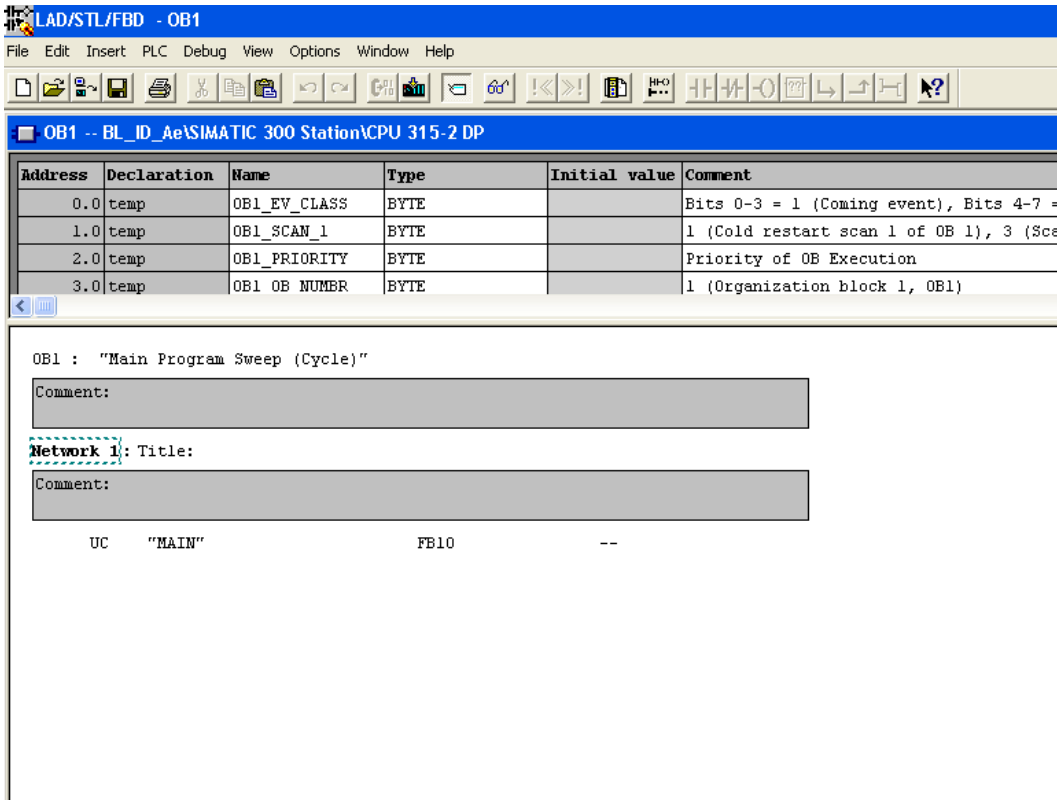
The following explanations will add to a more thorough understanding so that you may start up differing applications based on this project example as well.

Close the hardware-configurator if it remains open.

In the left window of the project tree, open the file "Blocks" (bottom point in the project tree). The component OB1 represents the top program level which is being cyclically processed by the CPU.

By double-clicking on OB1 you may see the program structure.

Figure 26: Top program level



The master program OB1 mainly accesses the FB10. Close the OB1 and double-click on FB10 in the Components file.

PIB variable table with the FB10

The FB10 assigns to the variables per the specifications (formal parameters) the variables for the PIB-instance of a channel.

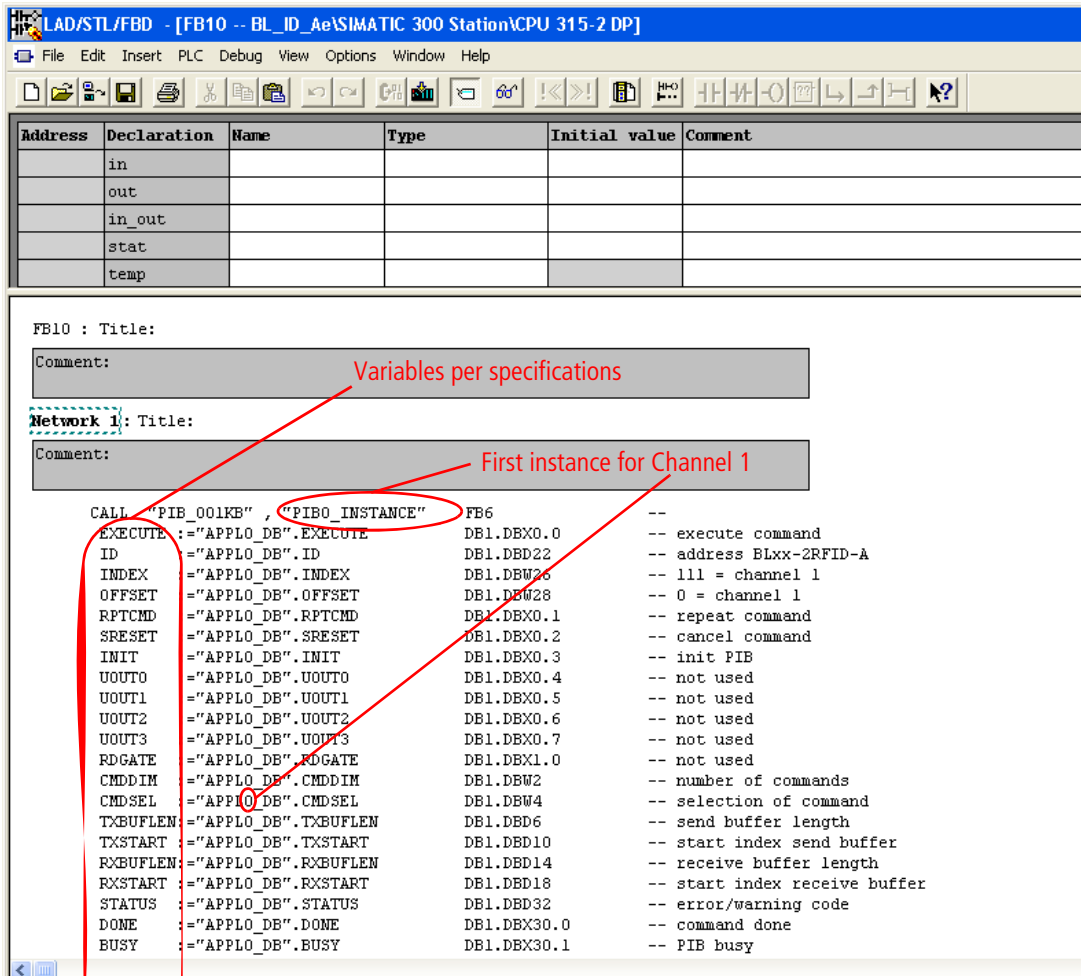
The explanations for all variables in this component are in "3 Definition of Proxy-Ident-Blocks (PIB)" page 4-6

In the TURCK project example 2 channels are available for a *BL ident*®-communication, and this is why two "instances" of the Proxy Ident Function Block are created.

The PIB-instance to the first channel is identified with "0". All variable names to the first instance also contain a "0".

The second channel is accordingly identified by "1", etc.

Figure 27: Variables to the first instance



Observation and control with the help of the variable table, vartable_pibX

Close the FB10 and open the variable table, vartable_pib0 with the help of the Components file. This table belongs to the first instance of the PIB and therefore to Channel 1.

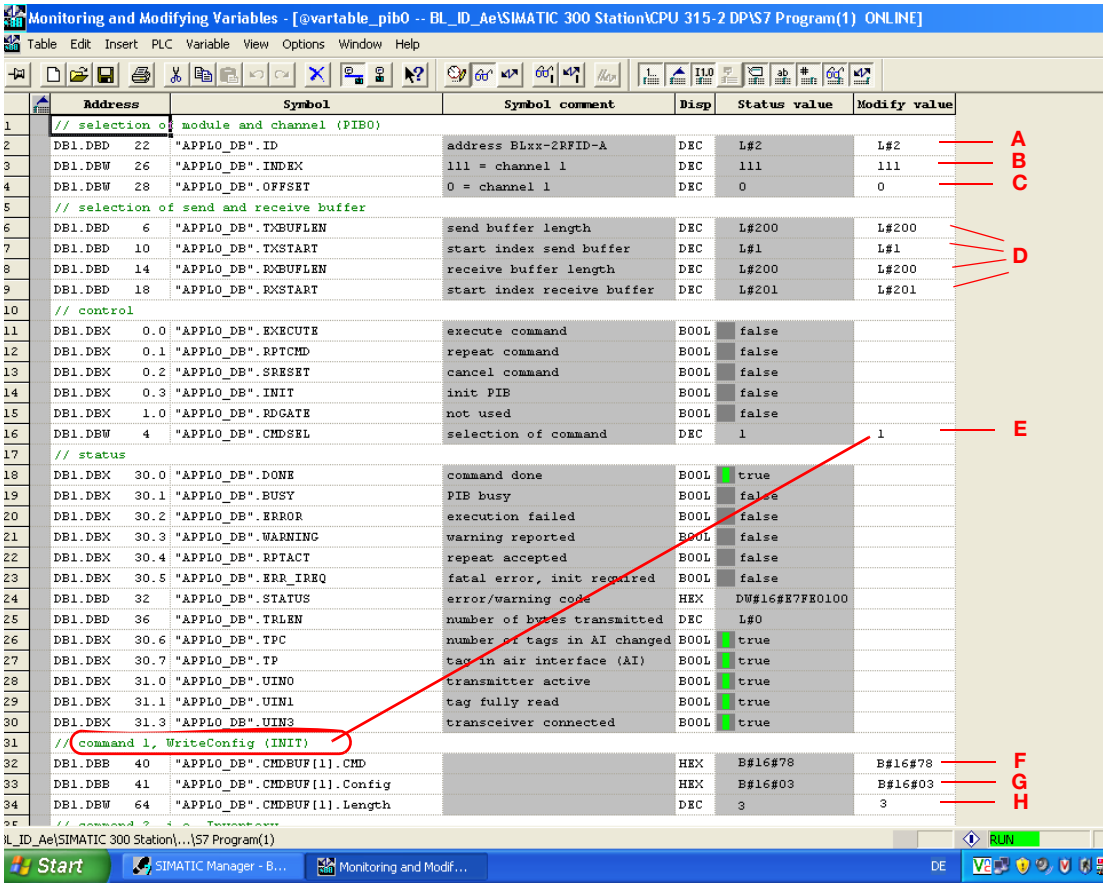
In order to read the status values and to upload the control values, activate the online connection to your control (PLC > Connect to > Direct CPU). The Mode "RUN" is displayed green at the bottom right of the window.

Please adjust the values that are described in the legend in points A through D in the column Control Values when your application differs from the project example.

Note

Load the values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

Figure 28: Entries into vartable_pib0



A *This is the start address for the BL ident®-process data of the first module. The "ID" (start address) for a second module must be "6", for a third "10" and for a fourth "14". The address range for each individual channel is first determined with the help of the Offset (legend point* **C***).*

B *The index "111" indicates that the next execution will cause a data transfer (also parameter data) to Channel 1. The index "112" refers to Channel 2. This is the case for* ***each*** *BL ident®-module of the station. Differing indices (for example, "113") create an error message**"DW#16#E7FE06xx" page 3-70**. These indices are being used universally (also parameter transfer data). The indices 101 and 102 which are to be specifically selected for parameter data transfer per the specifications are no longer used.*

C *This Offset is added to the start address (***A***). The calculated address refers to the process data of the channel. Here the Offset is "0" because vartable_pib0 belongs to the first channel. The process data for one BL ident®-channel contain 2 byte. The respective Offset in the vartable_pib1 which belongs to the second channel is "2".*

D *Here the buffer range for the Read and Write data for the first instance (first channel) is displayed. The* *"Memory requirements for the Read and Write data" page 3-3* *is limited with the selection of a PIB-1KB to a total of 1 kilobyte. Here it is indicated that the send buffer for the first channel occupies Range 1. The receive buffer occupies the Range 201 to 400*
for the second channel the Ranges 401 to 600 and 601 to 800 are being occupied respectively (compare vartable_pib1). The opportunity to use the memory range of multiple channels when an adequate time offset is present or to use Read and Write was not taken advantage off here.

E *Here you may enter 1, 2 or 3 if only one of three possible commands (see vartable_pibX: Commando 1, WriteConfig (INIT), Commando 2, for example, Inventory...) is to be executed. If initially only the Write-Config-Command (**"Write-Config" page 4-26**) is to be executed, "1" has already been entered here.*

F *The hexadecimal coding for the command "Write-Config" is 0×78.*

G *A configuration data change may be executed per the specifications (**"Config" page 4-26**)*
with the help of a Reset (0×01) (like in example),
or
with a combination of Reset and new configuration data (0×03).

H *The number of configuration data to be written.*
(Here it is 3 configuration data to the data carrier which will be explained more closely in the next paragraph).

Activation and deactivation of the read/write head using configuration data

By entering the values in E to H (page 3-9) you may prepare for Send Configuration Values.

In the TURCK project example the configuration values are already stored in "Send Data Field" of vartable_pib0. The Send Data Field is below the command range of vartable_pibX (here X = 0).

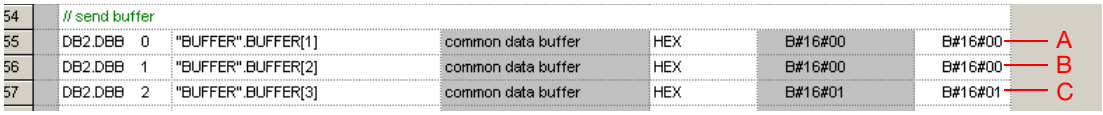
Only the value of the third configuration byte is of significance. Activation/Deactivation of read/write head is requested using this value and with the next initialization. An active read/write head creates an electromagnetic field (a signal is transferred with 13.56 MHz, for example). The command "Write-Config" page 3-41 is executed when initialization takes place.

After the initialization has been completed, activation and deactivation of read/write head is executed with the command "Write-Config" page 3-41 (0×78) and a "positive edge" of the control variables "APPL0_DB".EXECUTE". For executing the command, please follow the same instructions for Read and Write (for example, B"Write to data carrier / Channel 1" page 3-15).

Note

Load the values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

Figure 29: Send buffer of vartable_pib0



A *and*

B *It is not necessary to adjust these data fields. Initially the fields were available for entries concerning number of blocks and number of byte per block of the data carrier. Keep value 0×00. The value of the actively used data carriers are internally read and processed.*

C *The value 0x01 activates the transmitter (antenna) of the read/write head. The value 0x00 deactivates the transmitter.*

Initialization of the first channel

In the Chapter "Setting up the function component PIB" page 3-6 you have been introduced to the settings (control values) relevant for initialization. In case your *BL ident*®-project differs from the project example, an adjustment of the control values took place.

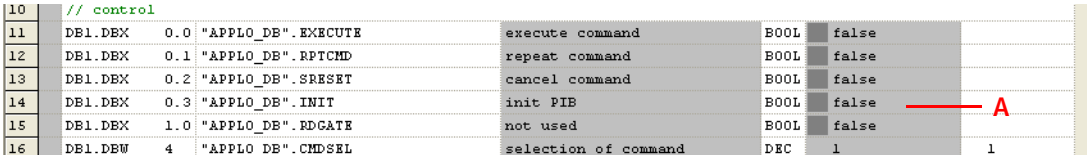
Note

Load into your control (Variable modify) all values which were described in the prior chapters ! With the help of the column Status Values (Variable monitor) please ensure that the control has accepted the values!

Now start initialization. Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

The command "Initialization" is executed with a "positive edge" of the control variable "APPL0_DB".INIT. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 30: Control field of vartable_pib0

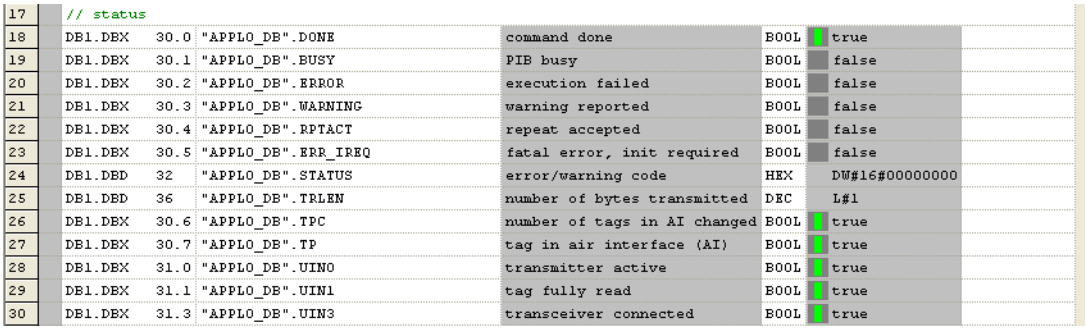


A *Initialization takes place with the positive edge (switch from false-> true or 0->1)*
With:
Variable > Modify or

the command "Initialization" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 31: Status Field of vartable_pib0



17	// status					
18	DB1.DBX	30.0	"APPL0_DB".DONE	command done	BOOL	true
19	DB1.DBX	30.1	"APPL0_DB".BUSY	PIB busy	BOOL	false
20	DB1.DBX	30.2	"APPL0_DB".ERROR	execution failed	BOOL	false
21	DB1.DBX	30.3	"APPL0_DB".WARNING	warning reported	BOOL	false
22	DB1.DBX	30.4	"APPL0_DB".RPTACT	repeat accepted	BOOL	false
23	DB1.DBX	30.5	"APPL0_DB".ERR_IREQ	fatal error, init required	BOOL	false
24	DB1.DBD	32	"APPL0_DB".STATUS	error/warning code	HEX	DW#16#00000000
25	DB1.DBD	36	"APPL0_DB".TRLEN	number of bytes transmitted	DEC	L#1
26	DB1.DBX	30.6	"APPL0_DB".TPC	number of tags in AI changed	BOOL	true
27	DB1.DBX	30.7	"APPL0_DB".TP	tag in air interface (AI)	BOOL	true
28	DB1.DBX	31.0	"APPL0_DB".UIN0	transmitter active	BOOL	true
29	DB1.DBX	31.1	"APPL0_DB".UIN1	tag fully read	BOOL	true
30	DB1.DBX	31.3	"APPL0_DB".UIN3	transceiver connected	BOOL	true

For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

The descriptions of some error codes of the status variables "APPL0_DB".STATUS especially in regards to the *BL ident*® specific errors you will find in"Warnings and error messages" page 3-68.

A complete description of the status data can be found in "Warnings and error messages" page 3-68 and"3.1.3 Error and Warning Concept" page 4-13.

Reset the variable "APPL0_DB".INIT to "false" after successful initialization.

With:
Variable > Modify or

"false" again becomes status value.

Read of UID from data carrier / Channel 1

Each RFID-data carrier receives a "UID" page 5-4 (unique identifier) by the manufacturer. The UID reproduces a worldwide unique TAG-ID No. and has 8 byte. Chapter "Access to the data ranges of the data carriers" page 3-75 shows the memory structure of the different data carriers.

Read of the UID is executed with the command "Inventory". In the TURCK project example, the command code 0x69 to inventory has been already entered into the field "Command 2". The comprehensive description of the command code is at "Inventory" page 4-29.

Figure 32: Command 2 of vartable_pib0

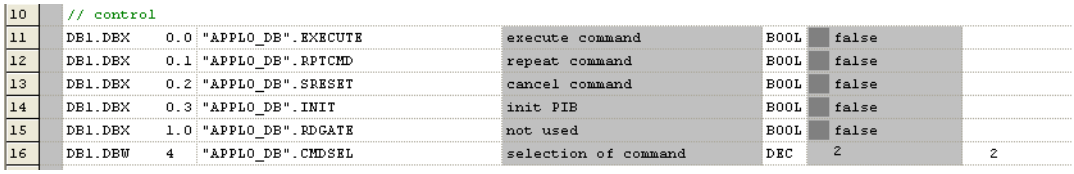
6	DB1.DBB	78	"APPL0_DB".CMDBUF[2].CMD		HEX	B#16#69 B#16#69
7	DB1.DBW	102	"APPL0_DB".CMDBUF[2].Length		DEC	0
8	DB1.DBD	104	"APPL0_DB".CMDBUF[2].StartAddress		DEC	L#0
9	DB1.DBB	108	"APPL0_DB".CMDBUF[2].Attributes		HEX	B#16#00 B#16#00

Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Most likely the control value "APPL0_DP".CMDSEL of the vartable_pib0 still has the value "1" because you have executed "Initialization" with command 1 as the final step.

Now enter "2" for this control value to select the command 2.

Figure 33: Control Field of vartable_pib0



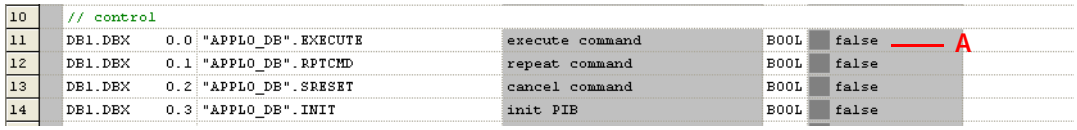
10		// control						
11		DB1.DBX	0.0	"APPL0_DB".EXECUTE	execute command	BOOL	false	
12		DB1.DBX	0.1	"APPL0_DB".RPTCMD	repeat command	BOOL	false	
13		DB1.DBX	0.2	"APPL0_DB".SRESET	cancel command	BOOL	false	
14		DB1.DBX	0.3	"APPL0_DB".INIT	init PIB	BOOL	false	
15		DB1.DBX	1.0	"APPL0_DB".RDGATE	not used	BOOL	false	
16		DB1.DBW	4	"APPL0_DB".CMDSEL	selection of command	DEC	2	2

Note

Load **all** values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Initialization" is displayed with a "positive edge" of the control variable "APPL0_DB".EXECUTE". You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 34: Control Field of vartable_pib0



10		// control						
11		DB1.DBX	0.0	"APPL0_DB".EXECUTE	execute command	BOOL	false	A
12		DB1.DBX	0.1	"APPL0_DB".RPTCMD	repeat command	BOOL	false	
13		DB1.DBX	0.2	"APPL0_DB".SRESET	cancel command	BOOL	false	
14		DB1.DBX	0.3	"APPL0_DB".INIT	init PIB	BOOL	false	

A *"Inventory" takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Inventory" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

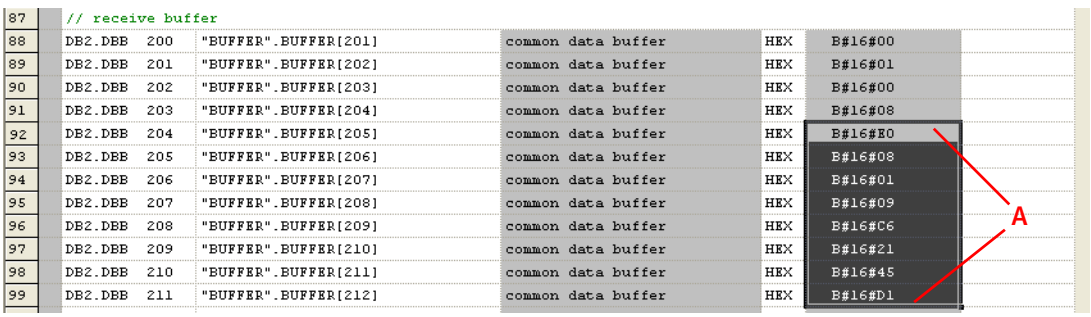
For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

At "Inventory" 8 UID data byte are received. Here the transferred data is "APPL0_DB".TRLEN = "12" long.

You may find a complete description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

Now you may read the "Unique Identifier / UID" in the received data field of the vartable_pib0.

Figure 35: The UID in the received data field



87		// receive buffer						
88		DB2.DBB	200	"BUFFER".BUFFER[201]	common data buffer	HEX	B#16#00	
89		DB2.DBB	201	"BUFFER".BUFFER[202]	common data buffer	HEX	B#16#01	
90		DB2.DBB	202	"BUFFER".BUFFER[203]	common data buffer	HEX	B#16#00	
91		DB2.DBB	203	"BUFFER".BUFFER[204]	common data buffer	HEX	B#16#08	
92		DB2.DBB	204	"BUFFER".BUFFER[205]	common data buffer	HEX	B#16#E0	
93		DB2.DBB	205	"BUFFER".BUFFER[206]	common data buffer	HEX	B#16#08	
94		DB2.DBB	206	"BUFFER".BUFFER[207]	common data buffer	HEX	B#16#01	
95		DB2.DBB	207	"BUFFER".BUFFER[208]	common data buffer	HEX	B#16#09	
96		DB2.DBB	208	"BUFFER".BUFFER[209]	common data buffer	HEX	B#16#C6	
97		DB2.DBB	209	"BUFFER".BUFFER[210]	common data buffer	HEX	B#16#21	
98		DB2.DBB	210	"BUFFER".BUFFER[211]	common data buffer	HEX	B#16#45	
99		DB2.DBB	211	"BUFFER".BUFFER[212]	common data buffer	HEX	B#16#D1	

A *The 8 byte comprising UID is stored in the received data buffer starting with byte 5. Byte 5 reflects the MSB and byte 12 the LSB of the UID. Byte 1 and 2 always display 0×0001 for BL ident®. Bulk reading systems will indicate here which of the data carriers has been actively read from the "Bulk". Together byte 3 and 4 display the length of the UID (here: 0×0008).*

Reset the variable "APPL0_DB".EXECUTE to "false" after the successful reading of the UID.

With:
Variable > Modify or

"false" again becomes status value.

Write to data carrier / Channel 1

This chapter explains the writing of 32 byte data with discretionary content to your RFID data carrier.

Writing to the data carrier of the first channel is possible after "Initialization of the first channel" page 3-12 has been completed.

In this example we have selected data which can be easily recognized during the following "Read from data carrier / Channel 1" page 3-17.

Writing of data is executed with the command "Physical_Write" (dt.: physical writing). Enter the command code 0x71 for Physical_Write into the field "Command 3" of the vartable_pib0. A full description of this command code is at "Physical_Write" page 4-25.

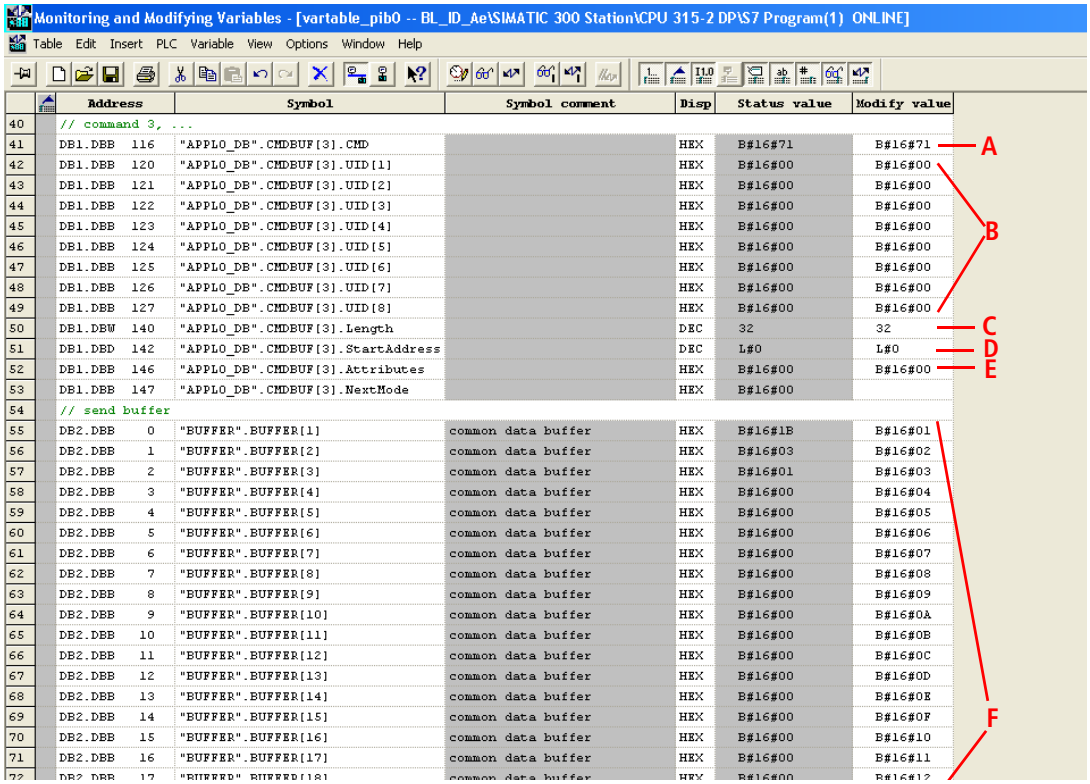
Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Now enter "3" for the control value "APPL0_DB".CMDSEL of the vartable_pib0 to select the command 3.

In the send data field enter 32 byte as hexadecimal numbers. Following writing we will explain reading. We enter the number series: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B... 20 which will be easily recognizable for us.

You may enter the hexadecimal digits as single-digits or double digits and without additional format instructions (B#16#..). The SIMATIC Manager adapts to the suitable format.

Figure 36: Preparations of the vartable_pib0 for writing.



Monitoring and Modifying Variables - [vartable_pib0 -- BL_ID_Ae\SIMATIC 300 Station\CPU 315-2 DP\S7 Program(1) ONLINE]

Table Edit Insert PLC Variable View Options Window Help

	Address	Symbol	Symbol comment	Disp	Status value	Modify value	
40	// command 3, ...						
41	DB1.DBB 116	"APPLO_DB".CMDBUF[3].CMD		HEX	B#16#71	B#16#71	A
42	DB1.DBB 120	"APPLO_DB".CMDBUF[3].UID[1]		HEX	B#16#00	B#16#00	B
43	DB1.DBB 121	"APPLO_DB".CMDBUF[3].UID[2]		HEX	B#16#00	B#16#00	
44	DB1.DBB 122	"APPLO_DB".CMDBUF[3].UID[3]		HEX	B#16#00	B#16#00	
45	DB1.DBB 123	"APPLO_DB".CMDBUF[3].UID[4]		HEX	B#16#00	B#16#00	
46	DB1.DBB 124	"APPLO_DB".CMDBUF[3].UID[5]		HEX	B#16#00	B#16#00	
47	DB1.DBB 125	"APPLO_DB".CMDBUF[3].UID[6]		HEX	B#16#00	B#16#00	
48	DB1.DBB 126	"APPLO_DB".CMDBUF[3].UID[7]		HEX	B#16#00	B#16#00	
49	DB1.DBB 127	"APPLO_DB".CMDBUF[3].UID[8]		HEX	B#16#00	B#16#00	
50	DB1.DBW 140	"APPLO_DB".CMDBUF[3].Length		DEC	32	32	C
51	DB1.DBD 142	"APPLO_DB".CMDBUF[3].StartAddress		DEC	L#0	L#0	D
52	DB1.DBB 146	"APPLO_DB".CMDBUF[3].Attributes		HEX	B#16#00	B#16#00	E
53	DB1.DBB 147	"APPLO_DB".CMDBUF[3].NextMode		HEX	B#16#00		
54	// send buffer						
55	DB2.DBB 0	"BUFFER".BUFFER[1]	common data buffer	HEX	B#16#1B	B#16#01	F
56	DB2.DBB 1	"BUFFER".BUFFER[2]	common data buffer	HEX	B#16#03	B#16#02	
57	DB2.DBB 2	"BUFFER".BUFFER[3]	common data buffer	HEX	B#16#01	B#16#03	
58	DB2.DBB 3	"BUFFER".BUFFER[4]	common data buffer	HEX	B#16#00	B#16#04	
59	DB2.DBB 4	"BUFFER".BUFFER[5]	common data buffer	HEX	B#16#00	B#16#05	
60	DB2.DBB 5	"BUFFER".BUFFER[6]	common data buffer	HEX	B#16#00	B#16#06	
61	DB2.DBB 6	"BUFFER".BUFFER[7]	common data buffer	HEX	B#16#00	B#16#07	
62	DB2.DBB 7	"BUFFER".BUFFER[8]	common data buffer	HEX	B#16#00	B#16#08	
63	DB2.DBB 8	"BUFFER".BUFFER[9]	common data buffer	HEX	B#16#00	B#16#09	
64	DB2.DBB 9	"BUFFER".BUFFER[10]	common data buffer	HEX	B#16#00	B#16#0A	
65	DB2.DBB 10	"BUFFER".BUFFER[11]	common data buffer	HEX	B#16#00	B#16#0B	
66	DB2.DBB 11	"BUFFER".BUFFER[12]	common data buffer	HEX	B#16#00	B#16#0C	
67	DB2.DBB 12	"BUFFER".BUFFER[13]	common data buffer	HEX	B#16#00	B#16#0D	
68	DB2.DBB 13	"BUFFER".BUFFER[14]	common data buffer	HEX	B#16#00	B#16#0E	
69	DB2.DBB 14	"BUFFER".BUFFER[15]	common data buffer	HEX	B#16#00	B#16#0F	
70	DB2.DBB 15	"BUFFER".BUFFER[16]	common data buffer	HEX	B#16#00	B#16#10	
71	DB2.DBB 16	"BUFFER".BUFFER[17]	common data buffer	HEX	B#16#00	B#16#11	

A *Here the code is entered for the command which is to be executed next with command 3. You may find an overview of all possible commands at "3.1.4 Commands" page 4-23.*
The command code 0×71 is used for the command to write to a physically present TAG "Physical_Write".

B *This data field has 8 byte and may contain an UID. This UID is always compared to the UID of the TAG when values ≠ 00 have been entered here.*
Ensure that here all 8 byte have the value "00" if you do not wish to execute the UID comparison function.

C *Here you may enter the number of byte which are to be transferred from the send data field. The number of possible byte depends on the size of the send data field (page 3-10) and the memory capacity of the used TAGs. In this TURCK example 32 byte are written to the TAG (112 byte). The size of the send data field is 200 byte.*

D *With the help of this address, each byte on the TAG may be explicitly accessed as start address. In this example the start address L#0 is selected. If you use a different data carrier than the one in this project example, please pay attention to the paragraph "User data ranges of the data carrier versions" page 3-75.*

E *With these "Attributes" some commands may be specified more closely. This value is not considered with the Write and Read command.*
In "3.1.4 Commands" page 4-23 you will find an overview for all possible commands and the possibilities to more closely specify them via "Attributes". In any case, please also pay attention to "Definitions within the command and diagnostics levels" page 3-40.

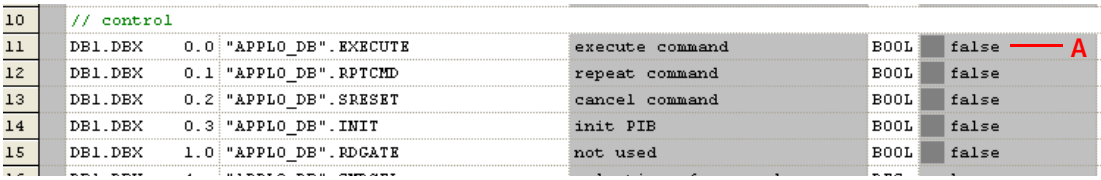
F *Into this send data field, enter the data which you would like to use to write to your TAG with.*

Note

Load all the field values "Control", "Command 3" and "Send Data Field" into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Physical Write" is realized with a "positive edge" of the control variable "APPL0_DB".EXECUTE. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 37: Control Field of vartable_pib0



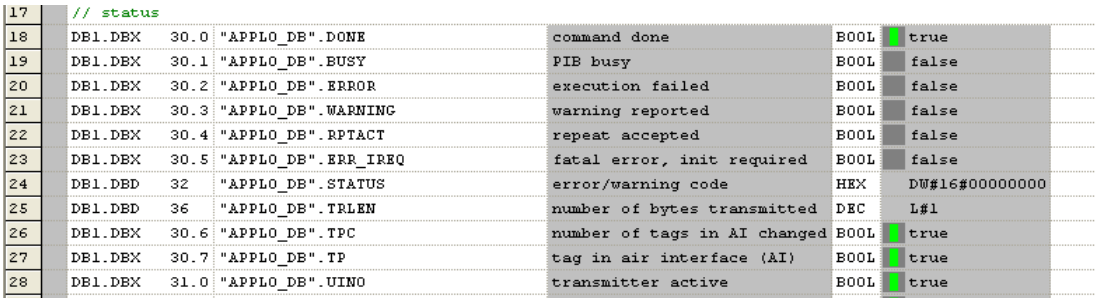
A *"Physical_Write" takes place with the positive edge (switch from false-> true or 0->1)*

With:
variable >modify or

the command "Physical_Write" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 38: Status Field of vartable_pib0



For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

You may find a complete description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

Reset the variable..."APPL0_DB".EXECUTE to "false" after the write operation was successful.

With:
Variable > Modify or

"false" again becomes status value.

Read from data carrier / Channel 1

This chapter explains the reading of 32 byte data with discretionary content from your RFID data carrier.

Reading from the data carrier of the first channel is possible after "Initialization of the first channel" page 3-12 has been completed.

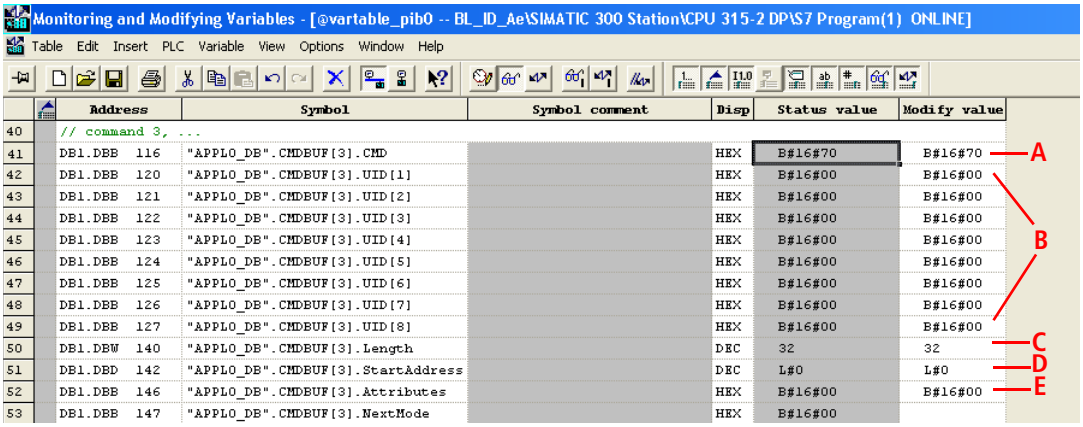
In the prior chapter you wrote data (arbitrary) to the data carrier with the command "Physical_Write". In this chapter you will read the same data with the "Physical_Read"-command (dt.: physical reading) from the data carrier.

Enter the command code 0x70 for Physical_Read into the field "Command 3" of the vartable_pib0. A full description of this command code is at "Physical_Read" page 4-24.

Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Now enter "3" for the control value "APPL0_DB".CMDSEL of the vartable_pib0 to select the command 3.

Figure 39: Preparations of the vartable_pib0 for reading



A *Here the code is entered for the command which is to be executed next with command 3. You may find an overview of all possible commands at "3.1.4 Commands" page 4-23.*
The command code 0×71 is used for the command to read from a physically present TAG "Physical_Read".

B *This data field has 8 byte and may contain an UID. This UID is always compared to the UID of the TAG when values ≠ 00 have been entered here.*
Ensure that here all 8 byte have the value "00" if you do not wish to execute the UID comparison function.

C *Here you may enter the number of byte which are to be transferred into the send data field. The number of possible byte depends on the size of the received data field (page 3-10) and the memory capacity of the used TAGs. In this TURCK example 32 byte are written to the TAG (112 byte). The size of the received data field is 200 byte.*

D *With the help of this address, each byte on the TAG may be explicitly accessed as start address. The start address L#0 is selected in this example. If you use a different data carrier than the one in this project example, please follow Chapter "User data ranges of the data carrier versions" page 3-75.*

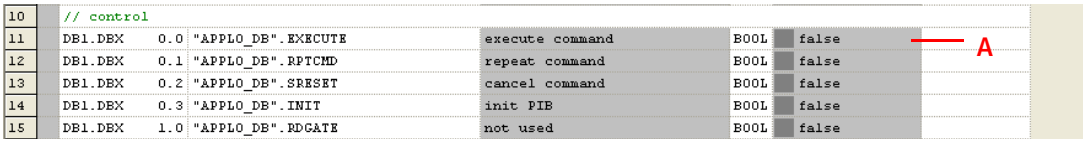
E *With these "Attributes" some commands may be specified more closely. This value is not considered with the Write and Read command.*
In "3.1.4 Commands" page 4-23 you will find an overview for all possible commands and the possibilities to more closely specify them via "Attributes". In any case, please also pay attention to "Definitions within the command and diagnostics levels" page 3-40.

Note

Load all the field values "Control" and "Command 3" into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Physical Read" is realized with a "positive edge" of the control variable "APPL0_DB".EXECUTE. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 40: Control field of vartable_pib0



A *"Physical_Read" takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Physical_Read" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 41: Status Field of vartable_pib0

17	// status					
18	DB1.DBX	30.0	"APPL0_DB".DONE	command done	BOOL	true
19	DB1.DBX	30.1	"APPL0_DB".BUSY	PIB busy	BOOL	false
20	DB1.DBX	30.2	"APPL0_DB".ERROR	execution failed	BOOL	false
21	DB1.DBX	30.3	"APPL0_DB".WARNING	warning reported	BOOL	false
22	DB1.DBX	30.4	"APPL0_DB".RPTACT	repeat accepted	BOOL	false
23	DB1.DBX	30.5	"APPL0_DB".ERR_IREQ	fatal error, init required	BOOL	false
24	DB1.DBD	32	"APPL0_DB".STATUS	error/warning code	HEX	DW#16#00000000
25	DB1.DBD	36	"APPL0_DB".TRLEN	number of bytes transmitted	DEC	L#1
26	DB1.DBX	30.6	"APPL0_DB".TPC	number of tags in AI changed	BOOL	true
27	DB1.DBX	30.7	"APPL0_DB".TP	tag in air interface (AI)	BOOL	true
28	DB1.DBX	31.0	"APPL0_DB".UIN0	transmitter active	BOOL	true
29	DB1.DBX	31.1	"APPL0_DB".UIN1	tag fully read	BOOL	true

For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

Here the received data size is "APPL0_DB".TRLEN = "32".

You may find a full description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

In the received data field of the vartable_pib0 you may find the data read by the TAG:

Figure 42: Received data field of the vartable_pib0 after successful reading.

87	// receive buffer					
88	DB2.DBB	200	"BUFFER".BUFFER[201]	common data buffer	HEX	B#16#01
89	DB2.DBB	201	"BUFFER".BUFFER[202]	common data buffer	HEX	B#16#02
90	DB2.DBB	202	"BUFFER".BUFFER[203]	common data buffer	HEX	B#16#03
91	DB2.DBB	203	"BUFFER".BUFFER[204]	common data buffer	HEX	B#16#04
92	DB2.DBB	204	"BUFFER".BUFFER[205]	common data buffer	HEX	B#16#05
93	DB2.DBB	205	"BUFFER".BUFFER[206]	common data buffer	HEX	B#16#06
94	DB2.DBB	206	"BUFFER".BUFFER[207]	common data buffer	HEX	B#16#07
95	DB2.DBB	207	"BUFFER".BUFFER[208]	common data buffer	HEX	B#16#08
96	DB2.DBB	208	"BUFFER".BUFFER[209]	common data buffer	HEX	B#16#09
97	DB2.DBB	209	"BUFFER".BUFFER[210]	common data buffer	HEX	B#16#0A
98	DB2.DBB	210	"BUFFER".BUFFER[211]	common data buffer	HEX	B#16#0B
99	DB2.DBB	211	"BUFFER".BUFFER[212]	common data buffer	HEX	B#16#0C
100	DB2.DBB	212	"BUFFER".BUFFER[213]	common data buffer	HEX	B#16#0D
101	DB2.DBB	213	"BUFFER".BUFFER[214]	common data buffer	HEX	B#16#0E
102	DB2.DBB	214	"BUFFER".BUFFER[215]	common data buffer	HEX	B#16#0F
103	DB2.DBB	215	"BUFFER".BUFFER[216]	common data buffer	HEX	B#16#10
104	DB2.DBB	216	"BUFFER".BUFFER[217]	common data buffer	HEX	B#16#11
105	DB2.DBB	217	"BUFFER".BUFFER[218]	common data buffer	HEX	B#16#12
106	DB2.DBB	218	"BUFFER".BUFFER[219]	common data buffer	HEX	B#16#13
107	DB2.DBB	219	"BUFFER".BUFFER[220]	common data buffer	HEX	B#16#14
108	DB2.DBB	220	"BUFFER".BUFFER[221]	common data buffer	HEX	B#16#15
109	DB2.DBB	221	"BUFFER".BUFFER[222]	common data buffer	HEX	B#16#16
110	DB2.DBB	222	"BUFFER".BUFFER[223]	common data buffer	HEX	B#16#17
111	DB2.DBB	223	"BUFFER".BUFFER[224]	common data buffer	HEX	B#16#18

Reset the variable..."APPL0_DB".EXECUTE to "false" after the read operation was successful.

With:
Variable > Modify or

"false" again becomes status value.

DPV0 startup example for C-modules with STEP7 and PIB

The startup of a *BL ident*®-system using the SIMATIC basic software Step 7 and the standard software component "Proxy Ident Function Block" (PIB) for interface modules with "C"-discs (for example, TI-BL20-DPV0-2) is described below.

A first startup should be easy, and it should be possible to do this with no programming skills. For this purpose, TURCK provides a project example. You may order the CD "BL IDENT-CD" with the project example directly from TURCK: Ident-No. 1545052

Hardware description of the project example

These hardware components were used for the following startup example:

- S7-control "CPU 315-2DP"
- *BL ident*®-Interface-module "TI-BL67-DP0-2"
- *BL ident*®-read/write head "TN-CK40-H1147"
- Data carrier "TW-R50-B128"

Please download D101583 which you may find in the download area of the TURCK website if you have questions or if you desire clarification concerning the read/write heads and the data carriers.

Memory requirements for a *BL ident*®-startup

Basic memory requirements

The basic memory requirements for the startup of the *BL ident*®-system using the Proxy Ident Function Block is:
22 kilobyte

Memory requirements per PIB-instance (Channel)

An instance of the Proxy Ident Function Block is created for each channel.

In addition to the basic memory requirements, each channel will need
1.8 kilobyte.

Memory requirements for the Read and Write data

The Proxy Ident Function Block (PIB) occupies one memory range as a send- and receive-buffer. The size of this memory range must be laid out according to the data volume when reading and writing.

With the *BL ident*®-system TURCK supplies PIB-versions to accommodate the different data volumes when reading and writing:

- PIB_001KB_CYC
- PIB_016KB_CYC
- PIB_032KB_CYC

The following calculation rule shows how the memory requirements for Read and Write are being calculated. Prerequisite is that the buffer is being used by multiple channels / instances. The memory requirements will significantly increase when each instance is assigned its own buffer. Upon completion of the calculation, you may select the function component suitable for your application. The total data volume is the result of the following sum:

- Data volume which is read via all active channels and stored in an "Only Read Memory Range".
- Data volume which is written via all active channels and stored in an "Only Write Memory Range".
- Data volume which can repeat Read as well as Write data. The memory range is alternately used as Write memory range and Read memory range. The needed memory range may be reduced to half.

Memory requirements for the hardware-example

"Hardware description of the project example" page 3-21 offers two channels for connecting one read/write head each. The Read range and the Write range should have a separate layout.

The used data carrier can store max. 128 byte. For the calculation max. 200 byte Read memory and 200 byte Write memory are factored in. Each channel then occupies 400 byte. Both channels **800 byte**.

For the **total memory requirements** the "Basic memory requirements" page 3-21 and the "Memory requirements per PIB-instance (Channel)" page 3-21 times two are added to 800 byte:

Total memory requirements
= 22 kilobyte + (2 x 1.8 kilobyte) + 800 byte = 26.4 kilobyte

Upload of the project example and download of the active GSD-file5

With the project example provided by TURCK you may simulate a first startup with ease. TURCK provides the project example on the CD "BL IDENT-CD" with the Ident-No.1545052

The project example is available as a ZIP-file. Please keep a copy of the ZIP format and log the file location.

You will need the active GSD-file to realize the configuration of the *BL ident*®-interface module. Please locate the active GSD-file at:

http://www.turck.com....

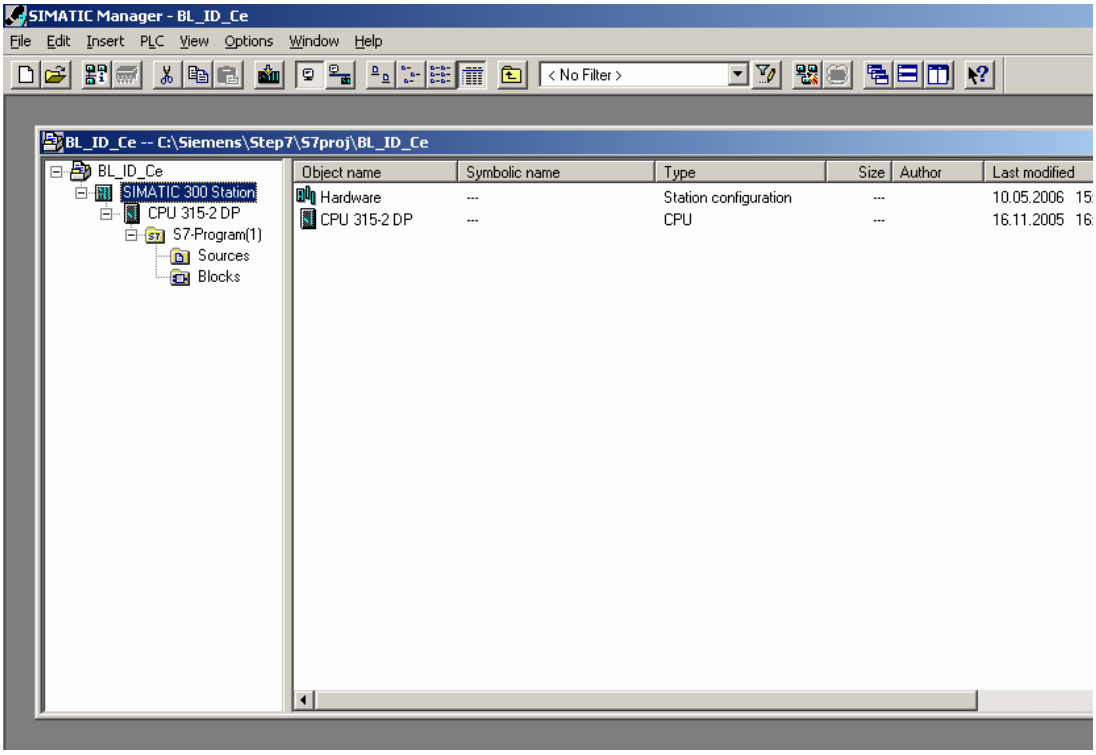
(Download > Direct search: "BL67-GW-DPV"...)

You will be able to start up differing applications as well with the help of operating instructions provided in this document.

Start of the S7-software and upload of the project example

If need be, please actualize the GSD-file (prior or after start). Start the "SIMATIC basic software Step 7". After the start, the window of the "SIMATIC Manager" will become active.

Figure 43: After the start of the SIMATIC Manger



Please open the project example with the
File > Retrieve

Select from your directory the TURCK example file:

"BL_ID_C.zip"

The SIMATIC Manager will suggest a file location (end directory) for your *BL ident*®-test project. You may acknowledge it or change it. Acknowledge "Do you want to open these now?"..

Hardware-configuration and I/O-addresses

When double-clicking on "SIMATIC" in the file directory tree in the left side of the window, "Hardware" appears among others in the right side of the window. Here you may adjust the configuration settings when your hardware setup differs from the project example. By double-clicking on the PROFIBUS-DP-station (here BL67) you may see the hardware configuration.

You may change the I/O-addresses suggested by the SIMATIC Manager. Concerning the example it is beneficial if you keep the I- or rather the Q-addresses "2...33" as suggested.

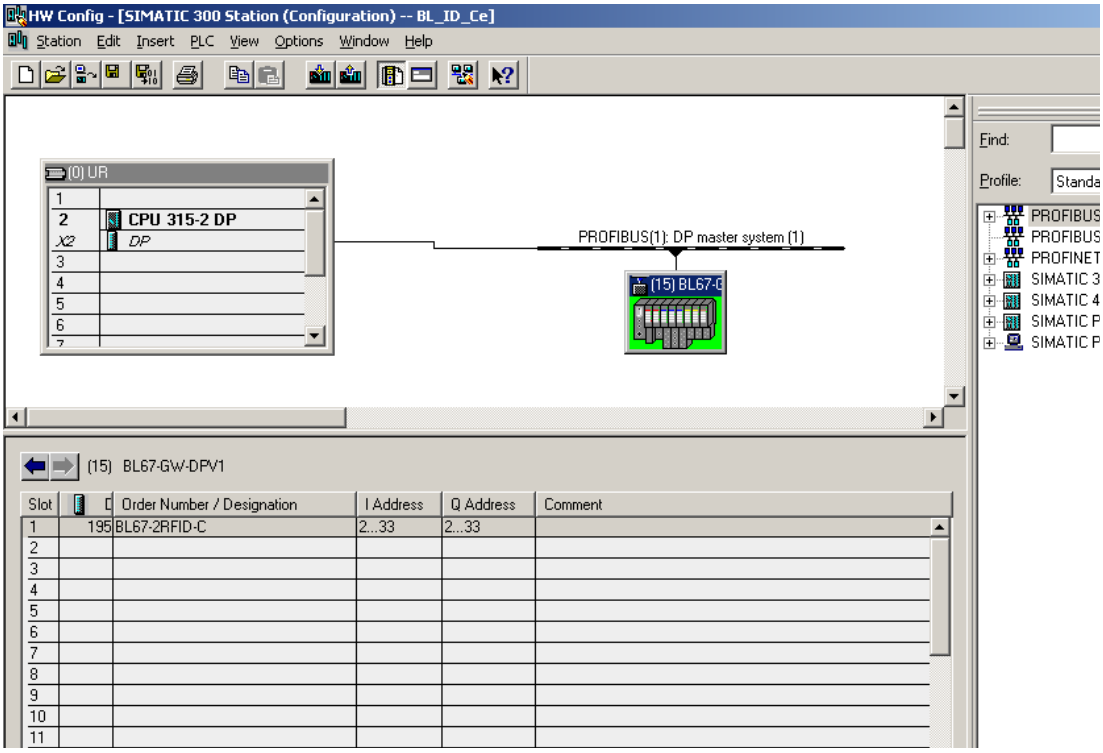
Note

When using the function block PIB it is necessary to choose the same value for input and output addresses.

Transfer the configuration data to the automation system (PLC > Download).

Confirm the request for the module to be restarted.

Figure 44: Hardware-configurator



Setting up the function component PIB

In the project example the basic settings have been selected.

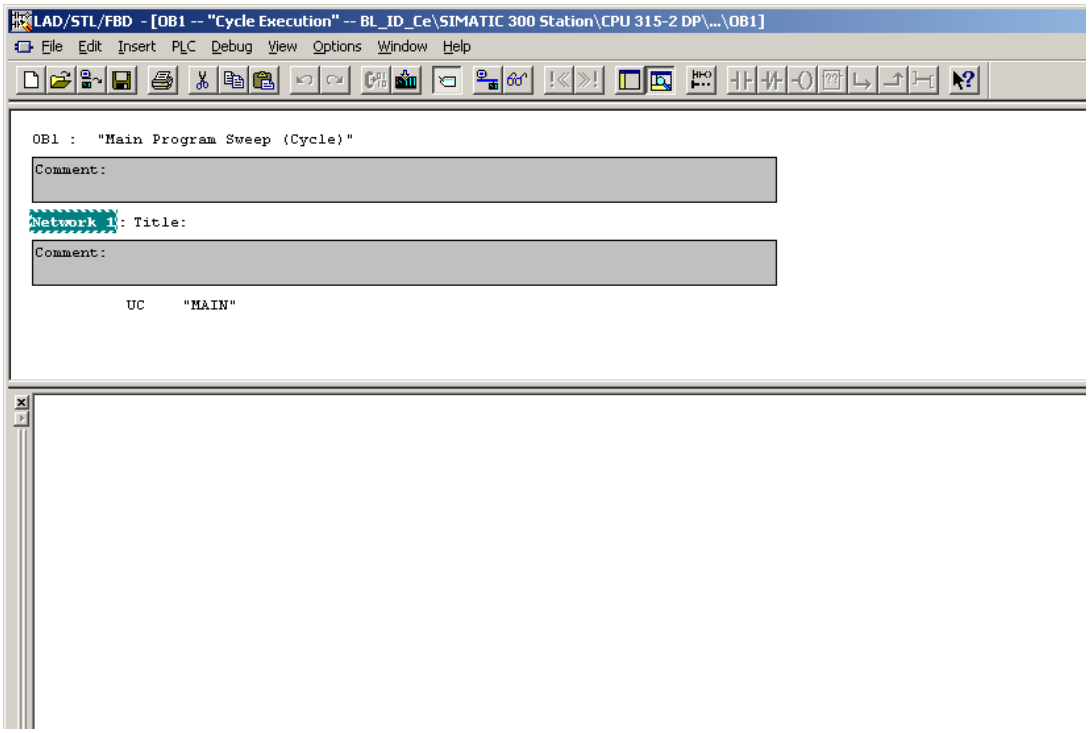
The following explanations will support the comprehensive understanding so that you may also start up differing applications based on this project example.

Close the hardware-configurator if it remains open.

In the left window of the project tree, open the file "Blocks" (bottom point in the project tree). The component OB1 represents the top program level which is being cyclically processed by the CPU.

By double-clicking on OB1 you may see the program structure.

Figure 45: Top program level



The master program OB1 mainly accesses the FB10. Close the OB1 and double-click on FB10 in the Components file.

PIB variable table with the FB10 10

The FB10 assigns to the variables per the specifications (formal parameters) the variables for the PIB-instance of a channel.

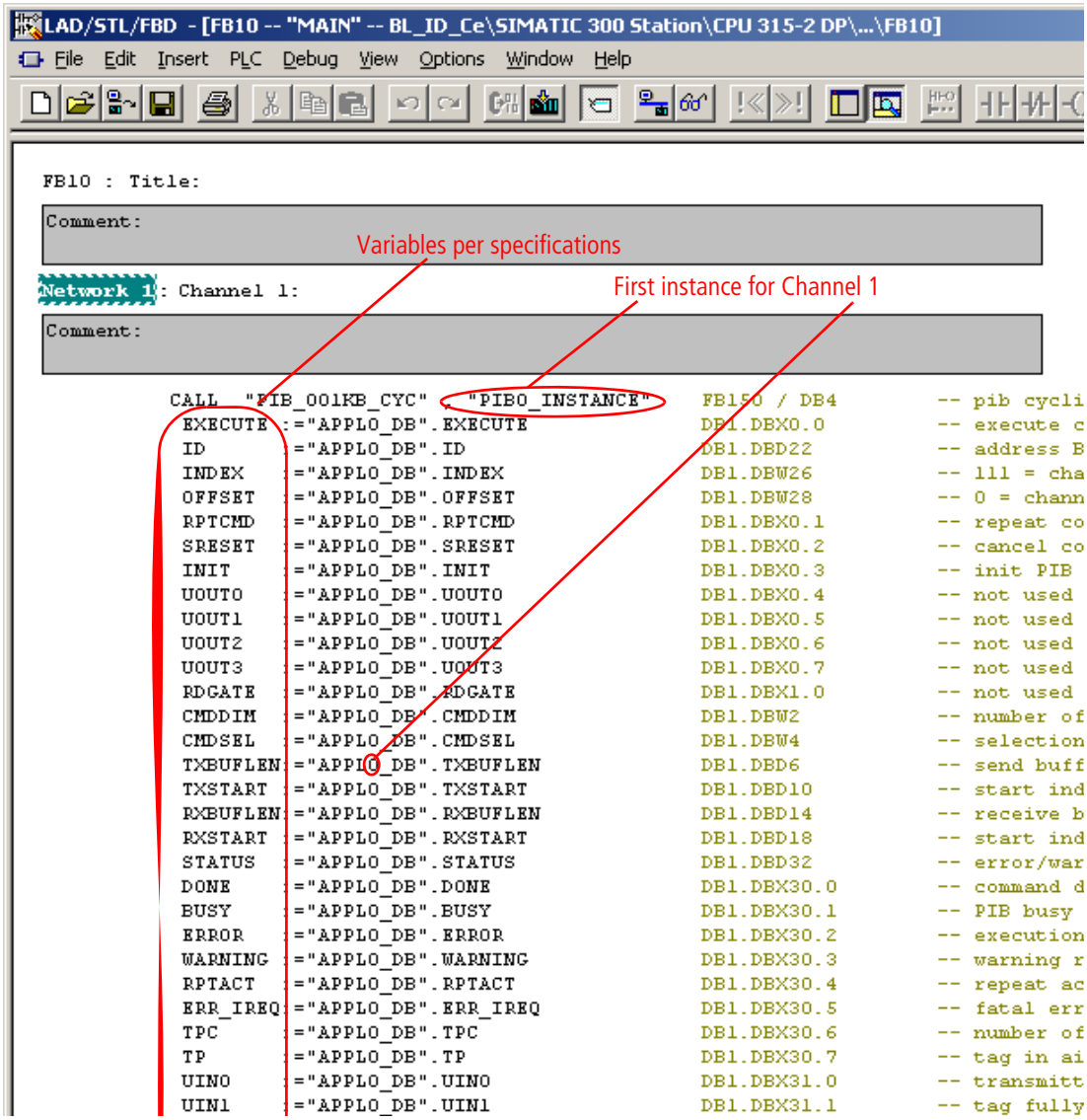
The explanations for all variables in this component are in "3 Definition of Proxy-Ident-Blocks (PIB)" page 4-6

In the TURCK project example 2 channels are available for a *BL ident*®-communication, and this is why two "instances" of the Proxy Ident Function Block are created.

The PIB-instance to the first channel is identified with "0". All variable names to the first instance also contain a "0".

The second channel is accordingly identified by "1", etc.

Figure 46: Variables to the first instance



Observation and control with the help of the variable table, vartable_pibX

Close the FB10 and open the variable table, vartable_pib0 with the help of the Components file. This table belongs to the first instance of the PIB and therefore to Channel 1.

In order to read the status values and to load the control values, activate the online connection to your control (PLC > Connect to > Direct CPU). The Mode "RUN" is displayed green at the bottom right of the window.

Please adjust the values that are described in the legend in points A through D in the column Control Values when your application differs from the project example.

Note

Load the values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

Figure 47: Entries into vartable_pib0

Var - vartable_pib0

Table Edit Insert PLC Variable View Options Window Help

	Address	Symbol	Symbol comment	Displa	Status value	Modify value	
1	// selection of module and channel (PIB0)						
2	DB1.DBD 22	"APPL0_DB".ID	address BLxx-2RFID-C	DEC		L#2	A
3	DB1.DBW 26	"APPL0_DB".INDEX	111 = channel 1	DEC		111	B
4	DB1.DBW 28	"APPL0_DB".OFFSET	0 = channel 1	DEC		0	C
5	// selection of send and receive buffer						
6	DB1.DBD 6	"APPL0_DB".TXBUFLEN	send buffer length	DEC		L#200	D
7	DB1.DBD 10	"APPL0_DB".TXSTART	start index send buffer	DEC		L#1	
8	DB1.DBD 14	"APPL0_DB".RXBUFLEN	receive buffer length	DEC		L#200	
9	DB1.DBD 18	"APPL0_DB".RXSTART	start index receive buffer	DEC		L#201	
10	// control						
11	DB1.DBX 0.0	"APPL0_DB".EXECUTE	execute command	BOOL			
12	DB1.DBX 0.1	"APPL0_DB".RPTCMD	repeat command	BOOL			
13	DB1.DBX 0.2	"APPL0_DB".SRESET	cancel command	BOOL			
14	DB1.DBX 0.3	"APPL0_DB".INIT	init PIB	BOOL			
15	DB1.DBX 1.0	"APPL0_DB".RDGATE	not used	BOOL			
16	DB1.DBW 4	"APPL0_DB".CMDSEL	selection of command	DEC		1	E
17	// status						
18	DB1.DBX 30.0	"APPL0_DB".DONE	command done	BOOL			
19	DB1.DBX 30.1	"APPL0_DB".BUSY	PIB busy	BOOL			
20	DB1.DBX 30.2	"APPL0_DB".ERROR	execution failed	BOOL			
21	DB1.DBX 30.3	"APPL0_DB".WARNING	warning reported	BOOL			
22	DB1.DBX 30.4	"APPL0_DB".RPTACT	repeat accepted	BOOL			
23	DB1.DBX 30.5	"APPL0_DB".ERR_IREQ	fatal error, init required	BOOL			
24	DB1.DBD 32	"APPL0_DB".STATUS	error/warning code	HEX			
25	DB1.DBD 36	"APPL0_DB".TRLEN	number of bytes transmitted	DEC			
26	DB1.DBX 30.6	"APPL0_DB".TPC	number of tags in AI changed	BOOL			
27	DB1.DBX 30.7	"APPL0_DB".TP	tag in air interface (AI)	BOOL			
28	DB1.DBX 31.0	"APPL0_DB".UIN0	transmitter active	BOOL			
29	DB1.DBX 31.1	"APPL0_DB".UIN1	tag fully read	BOOL			
30	DB1.DBX 31.3	"APPL0_DB".UIN3	transceiver connected	BOOL			
31	// command 1, WriteConfig (INIT)						
32	DB1.DBB 40	"APPL0_DB".CMDBUF[1].CMD		HEX		B#16#78	F
33	DB1.DBB 41	"APPL0_DB".CMDBUF[1].Config		HEX		B#16#01	G
34	DB1.DBW 64	"APPL0_DB".CMDBUF[1].Length		DEC		0	H

A *This is the start address for the BL ident®-process data of the first module. The process data for a BL ident®-module in the cyclic data exchange comprise 32 byte in total. The "ID" (start address) for a second module must be therefore "34" here, for a third "66" and for a fourth "98". The address range for the channel relevant 2 byte process data of the respective channel is only determined with the Offset (legend point* **C***).*

B *The index "111" indicates that the next execution will cause a data transfer (also parameter data) to Channel 1. The index "112" refers to Channel 2. This is the case for each BL ident®-module of the station. Differing indices (for example, "113") create an error message"DW#16#E7FE06xx" page 3-70. These indices are being used universally (also parameter transfer data). The indices 101 and 102 which are to be specifically selected for parameter data transfer per the specifications are no longer used.*

C *This Offset is added to the start address (***A***). The calculated address refers to the process data that belongs to one channel. Here the Offset is "0" because vartable_pib0 belongs to the first channel. The respective Offset in the vartable_pib1 which belongs to the second channel is always "2".*

D *The buffer range for the Read and Write data for the first instance (first channel) is displayed here. The "Memory requirements for the Read and Write data" page 3-3 is limited with the selection of a PIB_001KB_CYC to a total of 1 kilobyte. Here it is indicated that the send buffer for the first channel occupies Range 1. The receive buffer occupies the Range 201 to 400*
for the second channel the Ranges 401 to 600 and 601 to 800 are being occupied respectively (compare vartable_pib1).

E *Here you may enter 1, 2 or 3 if only one of three possible commands (see vartable_pibX: Command 1, WriteConfig (INIT), Command 2, for example, Inventory...) is to be executed. If initially only the Write-Config-Command ("Write-Config" page 4-26) is to be executed, "1" has already been entered here.*

F *The hexadecimal coding for the command "Write-Config" is 0×78.*

G *The configuration data change may be executed per the specification ("Config" page 4-26)*
via a Reset (0×01),
via writing of the new data (0×02)
with a combination of Reset and new configuration data (0×03) (like in the example).

H *The number of configuration data to be written.*
(here it is 3 configuration data to the data carrier which will be explained more closely in the next paragraph).

Activation and deactivation of the read/write head using configuration data

By entering the values in E to H (Figure 47:, page 3-27) you have made the preparations for sending the configuration values.

In the TURCK project example the configuration values are already stored in "Send Data Field" of vartable_pib0. The Send Data Field is below the command range of vartable_pibX (here X = 0).

Only the value of the third configuration byte is of significance. Activation/Deactivation of read/write head is requested using this value and with the next initialization. An active read/write head creates an electromagnetic field (a signal is transferred with 13.56 MHz, for example). The command "Write-Config" page 3-41 is executed during initialization.

After the initialization has been completed, activation and deactivation of read/write head is executed with the command "Write-Config" page 3-41 (0×78) and a "positive edge" of the control variables "APPL0_DB".EXECUTE. For executing the command, please follow the same instructions for Read and Write (for example, B"Write to the data carrier / Channel 1" page 3-33).

Note

Load all values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

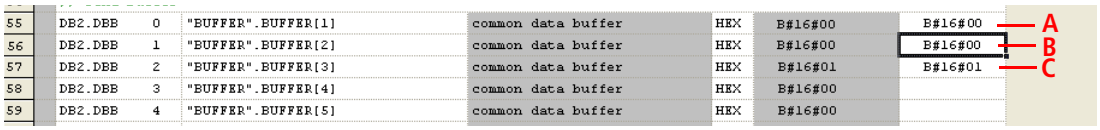


Figure 48: Send Data Field of vartable_pib0

A *and*

B *It is not necessary to adjust these data fields. Initially the fields were available for entries concerning number of blocks and number of byte per block of the data carrier. Keep value 0×00. The value of the actively used data carriers are internally read and processed.*

C *The value 0x01 activates the transmitter (antenna) of the read/write head. The value 0x00 deactivates the transmitter.*

Initialization of the first channel

In the Chapter "Setting up the function component PIB" page 3-6 you have been introduced to the settings (control values) relevant for initialization. In case your *BL ident*®-project differs from the project example, an adjustment of the control values took place.

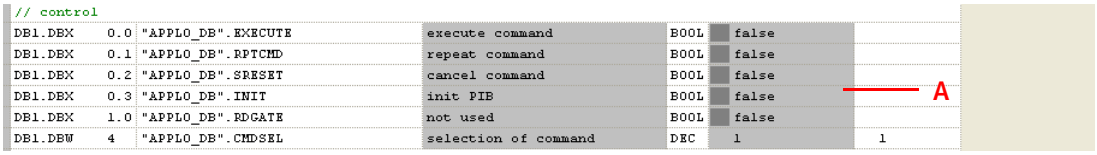
Note

Load into your control (Variable modify) all values which were described in the prior chapters ! With the help of the column Status Values (watch variable) please ensure that the control has accepted the values!

Now start initialization. Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

The command "Initialization" is executed with a "positive edge" of the control variable "APPL0_DB".INIT. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 49: Control field of vartable_pib0



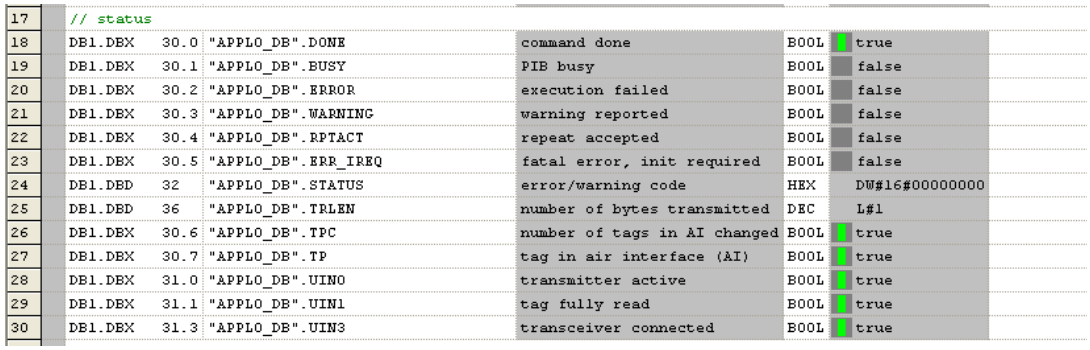
A *Initialization takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Initialization" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 50: Status Field of vartable_pib0



17		// status				
18	DB1.DBX	30.0	"APPL0_DB".DONE	command done	BOOL	true
19	DB1.DBX	30.1	"APPL0_DB".BUSY	PIB busy	BOOL	false
20	DB1.DBX	30.2	"APPL0_DB".ERROR	execution failed	BOOL	false
21	DB1.DBX	30.3	"APPL0_DB".WARNING	warning reported	BOOL	false
22	DB1.DBX	30.4	"APPL0_DB".RPTACT	repeat accepted	BOOL	false
23	DB1.DBX	30.5	"APPL0_DB".ERR_IREQ	fatal error, init required	BOOL	false
24	DB1.DBD	32	"APPL0_DB".STATUS	error/warning code	HEX	DW#16#00000000
25	DB1.DBD	36	"APPL0_DB".TRLEN	number of bytes transmitted	DEC	L#1
26	DB1.DBX	30.6	"APPL0_DB".TPC	number of tags in AI changed	BOOL	true
27	DB1.DBX	30.7	"APPL0_DB".TP	tag in air interface (AI)	BOOL	true
28	DB1.DBX	31.0	"APPL0_DB".UIN0	transmitter active	BOOL	true
29	DB1.DBX	31.1	"APPL0_DB".UIN1	tag fully read	BOOL	true
30	DB1.DBX	31.3	"APPL0_DB".UIN3	transceiver connected	BOOL	true

For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

The descriptions of some error codes of the status variables "APPL0_DB".STATUS especially in regards to the *BL ident*® specific errors can be found in "Warnings and error messages" page 3-68.

A complete description of the status data can be found in "Warnings and error messages" page 3-68 and"3.1.3 Error and Warning Concept" page 4-13.

Reset the variable "APPL0_DB".INIT to "false" after successful initialization.

With:
Variable > Modify or

"false" again becomes status value.

Read of UID from data carrier / Channel 1

Each RFID-data carrier receives a "UID" page 5-4 (unique identifier) by the manufacturer. The UID repeats a worldwide unique TAG-ID No. and has 8 byte.

Read of the UID is executed with the command "Inventory" (dt.: Inventory). In the TURCK project example, the command code 0x69 to inventory has been already entered into the field "Command 2". The comprehensive description of the command code is at "Inventory" page 4-29.

Figure 51: Command 2 of vartable_pib0

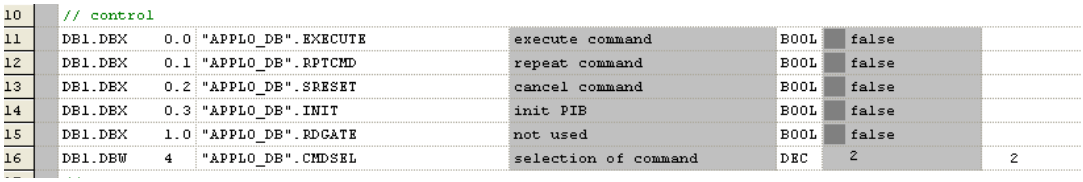
35		// command 2, i.e. Inventory				
36	DB1.DBB	78	"APPL0_DB".CMDBUF[2].CMD		HEX	B#16#69 B#16#69
37	DB1.DBW	102	"APPL0_DB".CMDBUF[2].Length		DEC	0
38	DB1.DBD	104	"APPL0_DB".CMDBUF[2].StartAddress		DEC	L#0
39	DB1.DBB	108	"APPL0_DB".CMDBUF[2].Attributes		HEX	B#16#00 B#16#00

Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Most likely the control value "APPL0_DB".CMDSEL of the vartable_pib0 still has the value "1" because you have executed Initialization with "Command 1" as the final step.

Now enter "2" for this control value to select the command 2.

Figure 52: Control Field of vartable_pib0



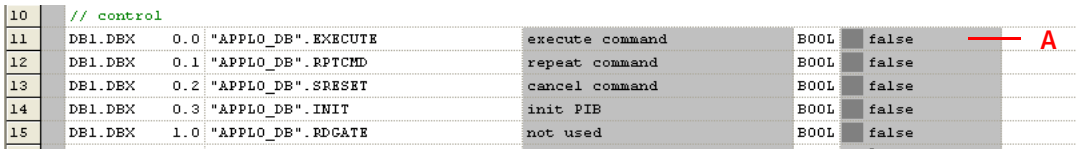
10		// control						
11		DB1.DBX	0.0	"APPL0_DB".EXECUTE	execute command	BOOL	false	
12		DB1.DBX	0.1	"APPL0_DB".RPTCMD	repeat command	BOOL	false	
13		DB1.DBX	0.2	"APPL0_DB".SRESET	cancel command	BOOL	false	
14		DB1.DBX	0.3	"APPL0_DB".INIT	init PIB	BOOL	false	
15		DB1.DBX	1.0	"APPL0_DB".RDGATE	not used	BOOL	false	
16		DB1.DBW	4	"APPL0_DB".CMDSEL	selection of command	DEC	2	2

Note

Load **all** values to your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Initialization" is displayed with a "positive edge" of the control variable "APPL0_DB".EXECUTE. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 53: Control field of vartable_pib0



10		// control						
11		DB1.DBX	0.0	"APPL0_DB".EXECUTE	execute command	BOOL	false	A
12		DB1.DBX	0.1	"APPL0_DB".RPTCMD	repeat command	BOOL	false	
13		DB1.DBX	0.2	"APPL0_DB".SRESET	cancel command	BOOL	false	
14		DB1.DBX	0.3	"APPL0_DB".INIT	init PIB	BOOL	false	
15		DB1.DBX	1.0	"APPL0_DB".RDGATE	not used	BOOL	false	

A *"Inventory" takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Inventory" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

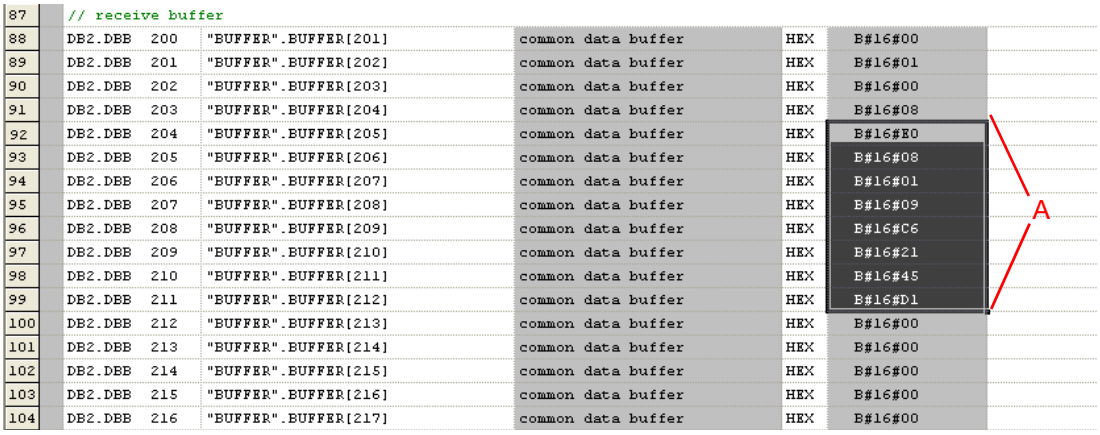
For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

At "Inventory" 8 UID data byte are received. Here the transferred data is "APPL0_DB".TRLEN = "12" long.

You may find a full description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

Now you may read the "Unique Identifier / UID" in the received data field of the vartable_pib0.

Figure 54: The UID in the received data field



87		// receive buffer					
88		DB2.DBB	200	"BUFFER".BUFFER[201]	common data buffer	HEX	B#16#00
89		DB2.DBB	201	"BUFFER".BUFFER[202]	common data buffer	HEX	B#16#01
90		DB2.DBB	202	"BUFFER".BUFFER[203]	common data buffer	HEX	B#16#00
91		DB2.DBB	203	"BUFFER".BUFFER[204]	common data buffer	HEX	B#16#08
92		DB2.DBB	204	"BUFFER".BUFFER[205]	common data buffer	HEX	B#16#E0
93		DB2.DBB	205	"BUFFER".BUFFER[206]	common data buffer	HEX	B#16#08
94		DB2.DBB	206	"BUFFER".BUFFER[207]	common data buffer	HEX	B#16#01
95		DB2.DBB	207	"BUFFER".BUFFER[208]	common data buffer	HEX	B#16#09
96		DB2.DBB	208	"BUFFER".BUFFER[209]	common data buffer	HEX	B#16#C6
97		DB2.DBB	209	"BUFFER".BUFFER[210]	common data buffer	HEX	B#16#21
98		DB2.DBB	210	"BUFFER".BUFFER[211]	common data buffer	HEX	B#16#45
99		DB2.DBB	211	"BUFFER".BUFFER[212]	common data buffer	HEX	B#16#D1
100		DB2.DBB	212	"BUFFER".BUFFER[213]	common data buffer	HEX	B#16#00
101		DB2.DBB	213	"BUFFER".BUFFER[214]	common data buffer	HEX	B#16#00
102		DB2.DBB	214	"BUFFER".BUFFER[215]	common data buffer	HEX	B#16#00
103		DB2.DBB	215	"BUFFER".BUFFER[216]	common data buffer	HEX	B#16#00
104		DB2.DBB	216	"BUFFER".BUFFER[217]	common data buffer	HEX	B#16#00

A *The 8 byte comprising UID is stored in the received data buffer starting with byte 5. Byte 5 repeats the MSB and byte 12 the LSB of the UID. Byte 1 and 2 always display 0×0001for BL ident®. "Bulk reading" systems will indicate here which of the data carriers has been actively read from the "Bulk". Together byte 3 and 4 display the length of the UID (here: 0×0008).*

Reset the variable "APPL0_DB".EXECUTE to "false" after the successful reading of the UID.

With:
Variable > Modify or

"false" again becomes status value.

Write to the data carrier / Channel 1

This chapter explains the writing of 32 byte data with discretionary content to your RFID data carrier.

Writing to the data carrier of the first channel is possible after "Initialization of the first channel" page 3-12 has been completed.

In this example we have selected data which can be easily recognized during the following "Read from data carrier / Channel 1" page 3-17.

Writing of data is executed with the command "Physical_Write" (dt.: physical writing). Enter the command code 0x71 for Physical_Write into the field "Command 3" of the vartable_pib0. A full description of this command code is at "Physical_Write" page 4-25.

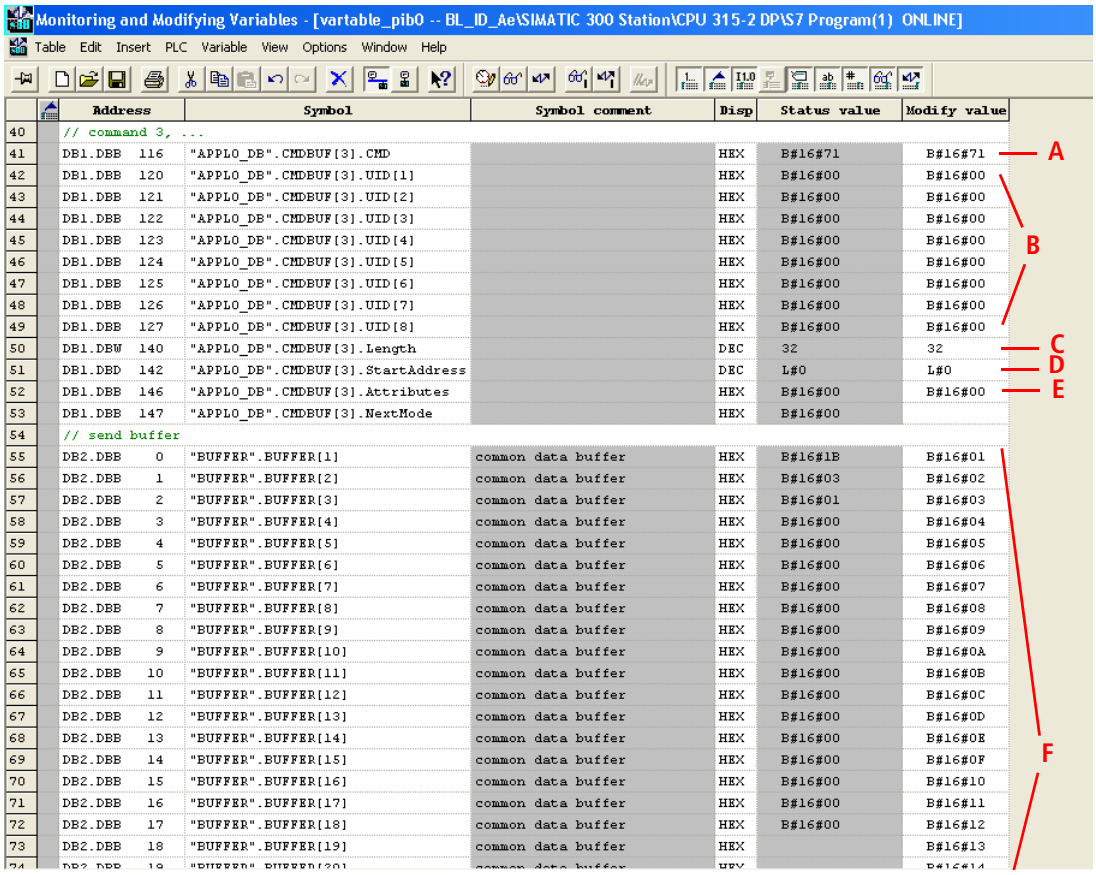
Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Now enter "3" for the control value "APPL0_DB".CMDSEL of the vartable_pib0 to select the command 3.

In the send data field enter 32 byte as hexadecimal numbers. Following writing we will explain reading. We enter the number series: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B... 20 which will be easily recognizable for us.

You may enter the hexadecimal digits as single-digits or double digits and without additional format instructions (B#16#..). The SIMATIC Manager adapts to the suitable format.

Figure 55: Preparing the vartable_pib0 for writing



A *Here the code is entered for the command which is to be executed next with command 3. You may find an overview of all possible commands at "3.1.4 Commands" page 4-23.*
The command code 0×71 is used for the command to write to a physically present TAG "Physical_Write".

B *This data field has 8 byte and may contain an UID. This UID is always compared to the UID of the TAG when values ≠ 00 have been entered here.*
Ensure that here all 8 byte have the value "00" if you do not wish to execute the UID comparison function.

C *Here you may enter the number of byte which are to be transferred from the send data field. The number of possible byte depends on the size of the send data field (page 3-10) and the memory capacity of the used TAGs. In this TURCK example 32 byte are written to the TAG (112 byte). The size of the send data field is 200 byte.*

D *With the help of this address, each byte on the TAG may be explicitly accessed as start address. The start address L#0 is selected in this example. If you use a different data carrier than the one in this project example, please follow Chapter "User data ranges of the data carrier versions" page 3-75.*

E *With these "Attributes" some commands may be specified more closely. This value is not considered with the Write and Read command.*
In "3.1.4 Commands" page 4-23 you will find an overview for all possible commands and the possibilities to more closely specify them via "Attributes". In any case, please also pay attention to "Definitions within the command and diagnostics levels" page 3-40.

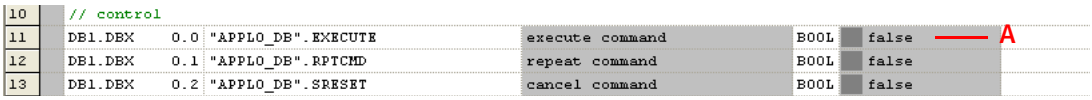
F *Into this send data field, enter the data which you would like to use to write to your TAG with.*

Note

Load all the field values "Control", "Command 3" and "Send Data Field" into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Physical Write" is realized with a "positive edge" of the control variable "APPL0_DB".EXECUTE. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 56: Control field of vartable_pib0



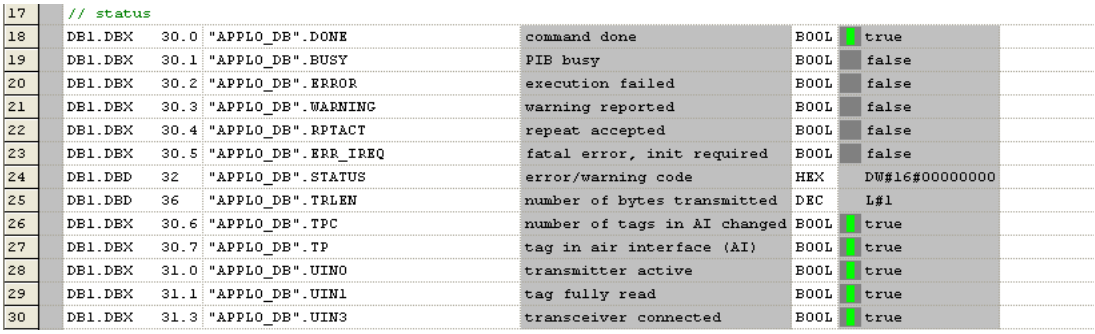
A *"Physical_Write" takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Physical_Write" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 57: Status Field of vartable_pib0



For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

32 data are sent during "Physical_Write"; this is why the length of the transferred data is "APPL0_DB".TRLEN = "32".

You may find a full description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

Reset the variable..."APPL0_DB".EXECUTE to "false" after the write operation was successful.

With:
Variable > Modify or

"false" again becomes status value.

Read from the data carrier / Channel 1

This chapter explains the reading of 32 byte data with discretionary content from your RFID data carrier.

Reading from the data carrier of the first channel is possible after "Initialization of the first channel" page 3-12 has been completed.

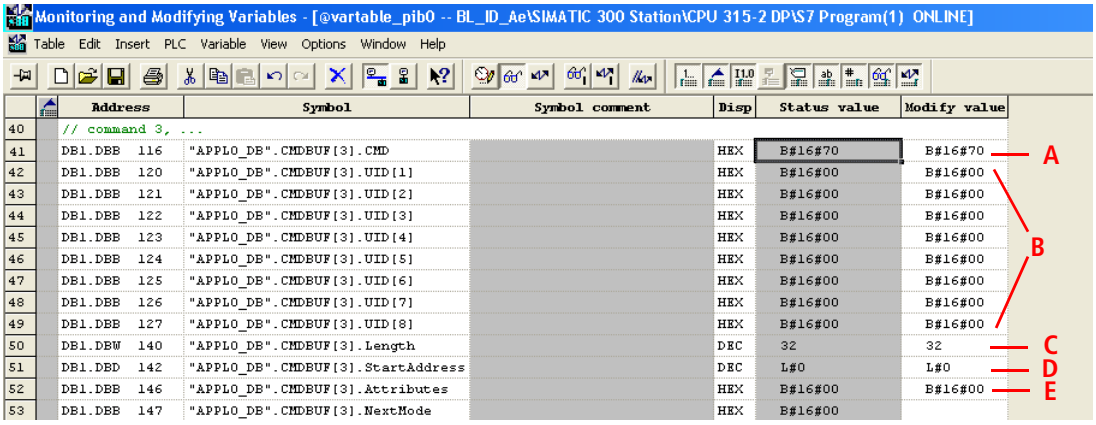
In the prior chapter you wrote data (arbitrary) to the data carrier with the command "Physical_Write". In this chapter you will read the same data with the "Physical_Read"-command from the data carrier.

Enter the command code 0x70 for Physical_Read into the field "Command 3" of the vartable_pib0. A full description of this command code is at "Physical_Read" page 4-24.

Please note that the online connection to your control must be active. The Mode "RUN" is displayed green at the bottom right of the window.

Now enter "3" for the control value "APPL0_DB".CMDSEL of the vartable_pib0 to select the command 3.

Figure 58: Preparing the vartable_pib0 for reading



A *Here the code is entered for the command which is to be executed next with command 3. You may find an overview of all possible commands at "3.1.4 Commands" page 4-23.*
The command code 0×70 is used for the command to read from a physically present TAG "Physical_Read".

B *This data field has 8 byte and may contain an UID. This UID is always compared to the UID of the TAG when values ≠ 00 have been entered here.*
Ensure that here all 8 byte have the value "00" if you do not wish to execute the UID comparison function.

C *Here you may enter the number of byte which are to be transferred into the send data field. The number of possible byte depends on the size of the received data field (page 3-10) and the memory capacity of the used TAGs. In this TURCK example 32 byte are written to the TAG (112 byte). The size of the received data field is 200 byte.*

D *With the help of this address, each byte on the TAG may be explicitly accessed as start address. The start address L#0 is selected in this example. If you use a different data carrier than the one in this project example, please follow Chapter "User data ranges of the data carrier versions" page 3-75.*

E *With these "Attributes" some commands may be specified more closely. This value is not considered with the Write and Read command.*
In "3.1.4 Commands" page 4-23 you will find an overview for all possible commands and the possibilities to more closely specify them via "Attributes". In any case, please also pay attention to "Definitions within the command and diagnostics levels" page 3-40.

Note

Load all the field values "Control" and "Command 3" into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the values!

The command "Physical Read" is realized with a "positive edge" of the control variable "APPL0_DB".EXECUTE. You will create the positive edge by setting the variable from "false" to "true". Enter "1" or "true" as control value.

Figure 59: Control field of vartable_pib0

0		// control					
1		DB1.DBX	0.0	"APPL0_DB".EXECUTE	execute command	BOOL	false
2		DB1.DBX	0.1	"APPL0_DB".RPTCMD	repeat command	BOOL	false
3		DB1.DBX	0.2	"APPL0_DB".SRESET	cancel command	BOOL	false
4		DB1.DBX	0.3	"APPL0_DB".INIT	init PIB	BOOL	false
5		DB1.DBX	1.0	"APPL0_DB".RDGATE	not used	BOOL	false

A

A *"Physical_Read" takes place with the positive edge (switch from false-> true or 0->1)*

With:
Variable > Modify or

the command "Physical_Read" is executed.

You may observe the command execution in the Status Field of the vartable_pib0.

Figure 60: Status Field of vartable_pib0

17		// status					
18		DB1.DBX	30.0	"APPL0_DB".DONE	command done	BOOL	true
19		DB1.DBX	30.1	"APPL0_DB".BUSY	PIB busy	BOOL	false
20		DB1.DBX	30.2	"APPL0_DB".ERROR	execution failed	BOOL	false
21		DB1.DBX	30.3	"APPL0_DB".WARNING	warning reported	BOOL	false
22		DB1.DBX	30.4	"APPL0_DB".RPTACT	repeat accepted	BOOL	false
23		DB1.DBX	30.5	"APPL0_DB".ERR_IREQ	fatal error, init required	BOOL	false
24		DB1.DBD	32	"APPL0_DB".STATUS	error/warning code	HEX	DW#16#00000000
25		DB1.DBD	36	"APPL0_DB".TRLEN	number of bytes transmitted	DEC	L#1
26		DB1.DBX	30.6	"APPL0_DB".TPC	number of tags in AI changed	BOOL	true
27		DB1.DBX	30.7	"APPL0_DB".TP	tag in air interface (AI)	BOOL	true
28		DB1.DBX	31.0	"APPL0_DB".UIN0	transmitter active	BOOL	true
29		DB1.DBX	31.1	"APPL0_DB".UIN1	tag fully read	BOOL	true
30		DB1.DBX	31.3	"APPL0_DB".UIN3	transceiver connected	BOOL	true

For a short period of time, the status variable "APPL0_DB".DONE switches to the status "Busy" and then continues to display "Command Executed"="true". Error-free execution is acknowledged with "APPL0_DB".ERROR = false.

Here the received data is "APPL0_DB".TRLEN = "32" long.

You may find a full description of the status data in "Warnings and error messages" page 3-68 and "3.1.3 Error and Warning Concept" page 4-13.

In the received data field of the vartable_pib0 you may find the data read by the TAG:

Figure 61: Received data field of the vartable_pib0 after successful reading.

87		// receive buffer				
88		DB2.DBB 200	"BUFFER".BUFFER[201]	common data buffer	HEX	B#16#01
89		DB2.DBB 201	"BUFFER".BUFFER[202]	common data buffer	HEX	B#16#02
90		DB2.DBB 202	"BUFFER".BUFFER[203]	common data buffer	HEX	B#16#03
91		DB2.DBB 203	"BUFFER".BUFFER[204]	common data buffer	HEX	B#16#04
92		DB2.DBB 204	"BUFFER".BUFFER[205]	common data buffer	HEX	B#16#05
93		DB2.DBB 205	"BUFFER".BUFFER[206]	common data buffer	HEX	B#16#06
94		DB2.DBB 206	"BUFFER".BUFFER[207]	common data buffer	HEX	B#16#07
95		DB2.DBB 207	"BUFFER".BUFFER[208]	common data buffer	HEX	B#16#08
96		DB2.DBB 208	"BUFFER".BUFFER[209]	common data buffer	HEX	B#16#09
97		DB2.DBB 209	"BUFFER".BUFFER[210]	common data buffer	HEX	B#16#0A
98		DB2.DBB 210	"BUFFER".BUFFER[211]	common data buffer	HEX	B#16#0B
99		DB2.DBB 211	"BUFFER".BUFFER[212]	common data buffer	HEX	B#16#0C
100		DB2.DBB 212	"BUFFER".BUFFER[213]	common data buffer	HEX	B#16#0D
101		DB2.DBB 213	"BUFFER".BUFFER[214]	common data buffer	HEX	B#16#0E
102		DB2.DBB 214	"BUFFER".BUFFER[215]	common data buffer	HEX	B#16#0F
103		DB2.DBB 215	"BUFFER".BUFFER[216]	common data buffer	HEX	B#16#10
104		DB2.DBB 216	"BUFFER".BUFFER[217]	common data buffer	HEX	B#16#11
105		DB2.DBB 217	"BUFFER".BUFFER[218]	common data buffer	HEX	B#16#12
106		DB2.DBB 218	"BUFFER".BUFFER[219]	common data buffer	HEX	B#16#13
107		DB2.DBB 219	"BUFFER".BUFFER[220]	common data buffer	HEX	B#16#14
108		DB2.DBB 220	"BUFFER".BUFFER[221]	common data buffer	HEX	B#16#15
109		DB2.DBB 221	"BUFFER".BUFFER[222]	common data buffer	HEX	B#16#16
110		DB2.DBB 222	"BUFFER".BUFFER[223]	common data buffer	HEX	B#16#17
111		DB2.DBB 223	"BUFFER".BUFFER[224]	common data buffer	HEX	B#16#18
112		DB2.DBB 224	"BUFFER".BUFFER[225]	common data buffer	HEX	B#16#19
113		DB2.DBB 225	"BUFFER".BUFFER[226]	common data buffer	HEX	B#16#1A
114		DB2.DBB 226	"BUFFER".BUFFER[227]	common data buffer	HEX	B#16#1B
115		DB2.DBB 227	"BUFFER".BUFFER[228]	common data buffer	HEX	B#16#1C

Reset the variable..."APPL0_DB".EXECUTE to "false" after the read operation was successful.

With:
Variable > Modify or

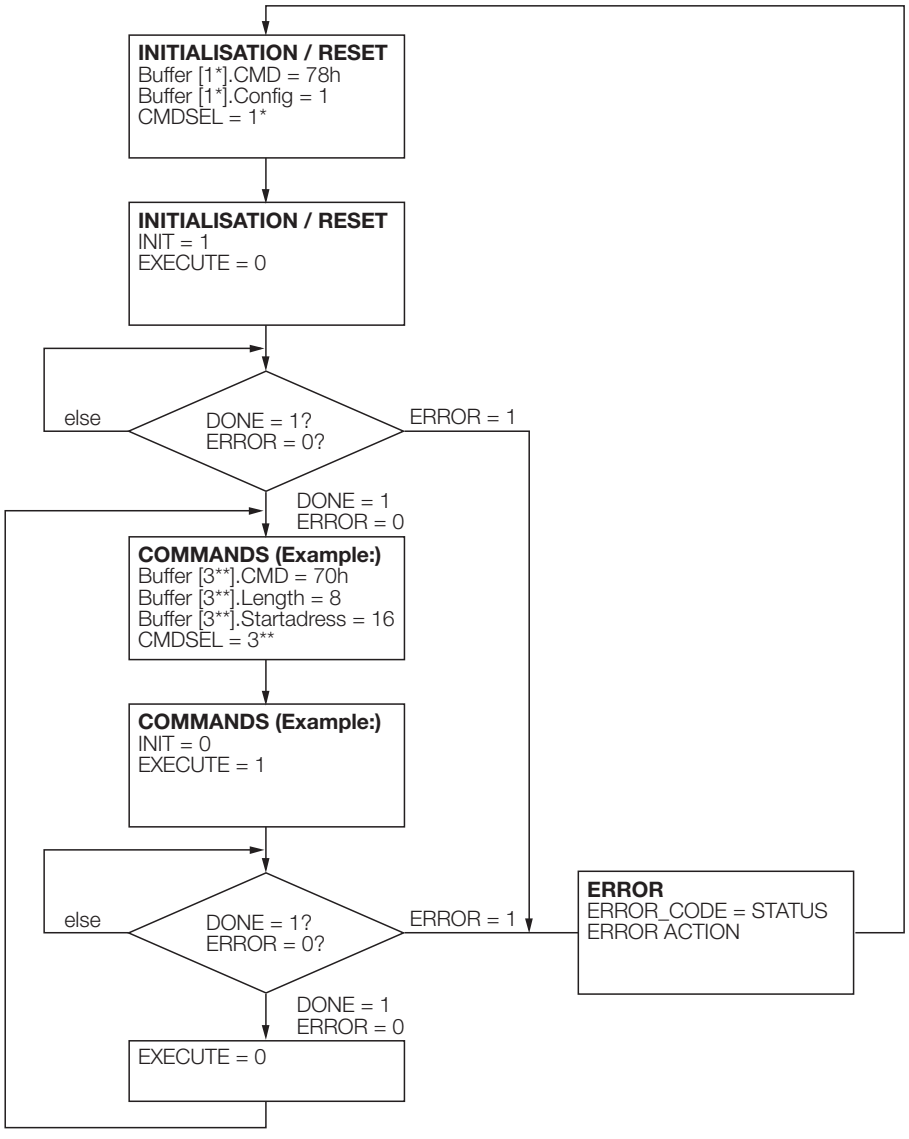
"false" again becomes status value.

Flow diagram of PIB functionality

The following flowchart shows the functionality of the PIB at a glance

Additional support for an appropriate programming is provided by the "Excerpt from the specifications" page 4-1 and the following chapters.

Figure 62: Flow diagram PIB



* must be 0
** can be 3

Note

Please note that query of parameters DONE, ERROR, TP etc. always relates to a signal change (edge).

Definitions within the command and diagnostics levels

The startup of the TURCK *BL ident*®-system with the "Proxy Ident Function Block" involves some discrepancies from "Excerpt from the specifications" page 4-1 (PROFIBUS-specifications). The discrepancies involve the command and diagnostics levels.

The following conformity table shows the commands and status or rather diagnostic messages of the complete specifications of *BL ident*® that are not supported:

Table 26: Conformity table

Name	Type	Additional information concerning the TURCK specific design	conform? (Y/N)
In regards to Point 3.1.4 of the PROFIBUS-specifications			
Read	Command		N
Get	Command		Y
Physical_Read	Command		Y
Write	Command		N
Put	Command		N
Physical_Write	Command		Y
Format	Command		N
Create	Command		N
Delete	Command		N
Clear	Command		N
Update	Command		N
Next	Command		Y
Get-Directory	Command		N
Set-Attribute	Command		N
Get-Attribute	Command		N
Write-Config	Command		Y
Read-Config	Command		Y
Mem-Status	Command		Y
Dev-Status	Command		Y
Inventory	Command		Y
Read-Bar-Code	Command		N
In regards to Point 4.2.1 of the PROFIBUS-specifications			
Reading-Gate	Control-Bit		N
Repeat-Command	Control-Bit		N
Soft-Reset	Control-Bit		Y

Table 26: (Forts.) Conformity table

Name	Type	Additional information concerning the TURCK specific design	conform? (Y/N)
In regards to Point 4.2.2 of the PROFIBUS-specifications			
Target_Presence_Changed	Status Bit		Y
Target_Present	Status Bit		Y
Soft_Reset_Active	Status Bit		Y
Repeat_ Command_Active	Status Bit		N
Busy	Status Bit		Y
Error	Status Bit		Y
UIN3	Status Bit	Read/write head connected	Y
UIN2	Status Bit		N
UIN1	Status Bit	Data of Tag complete read to read/write head	Y
UIN0	Status Bit	Read/write head is activated (also see WriteConfig)	Y

The following commands show discrepancies from the PROFIBUS-specifications:

Write-Config

This command is initiated in PIB via INIT and supports Config = 1 (only Reset) and Config = 3 (write data and Reset). 3 byte of Config-data can be written. With the Config-data there is the possibility to switch the transmitter of the read/write head on and off. The on and off switching of the transmitter can be used to prevent a mutual interference of closely positioned read/write heads.

Table 27: Configuration data

Byte	Bit	Significance
0	0..7	Reserved, must be 0
1	0..7	Reserved, must be 0
2	0	1 = Transmitter On / 0 = Transmitter Off, (default = 1)
	1..7	Reserved, must be 0

Example for configuration data

"0×00, 0×00, 0×01"

Read-Config

The command reads the Config-data described under Write-Config.

Possible command-specific STATUS-values after erroneous execution:

Table 28: STATUS-value

STATUS	Error description
DW#16#E**4**FE**82**xx	No read/write head is connected.

Inventory

Only the parameter Attributes =0 is supported. ("Inventory" page 4-29)

Physical_Read

The parameters StartAddress and Length (+StartAddress) must be within the address range of the Tag. ("Physical_Read" page 4-24)

Physical_Write

The parameters StartAddress and Length (+StartAddress) must be within the address range of the Tag. ("Physical_Write" page 4-25)

Mem-Status

With the command Mem-Status the Attribute 0×0×40 (physical status information) is supported.
The response of the Tag is transferred as data to a GET_SYSTEM_INFORMATION-Command per ISO/IEC15693-3:

- Byte 0 = Series No. (UID), LSB
- .
- .
- Byte 7 = Series No. (UID), MSB
- Byte 8 = Data Carrier Format (DSFID)
- Byte 9 = Application ID. (AFI)
- Byte 10 = Memory Size: Block No.-1
- Byte 11 = Memory Size: Byte/Block-1
- Byte 12 = IC-identification

Dev-Status

Only the parameter Attributes = 0×04 is supported. A data-record per I&M-specifications I&M0 is returned. The connected read/write head is being written to. ("Dev-Status" page 4-28)

Example:

Table 29: Example for Dev-Status

From byte	to byte	Field	Content
0	9	Manufacturer specific header	0, 0, 0, 0, 0,0,0,0,0,0
10	11	MANUFACTURER_ID	0×0B12 (299 = TURCK)
12	31	ORDER_ID	‚TN-CK40-H1147', 0×00, 0×20, 0×20, 0×20, 0×20, 0×20, 0×20
32	47	SERIAL_NUMBER	(not supported)
48	49	HARDWARE_REVISION	0×0003
50	53	SOFTWARE_REVISION	‚V' (0×56), 0×01, 0×03, 0×00 (= V1.3.0)
54	55	REVISION_COUNTER	(not supported)
56	57	PROFILE_ID	0×5B00 (identification system, PIB profile)
58	59	PROFILE_SPECIFIC_TYPE	0×0000
60	61	IM_VERSION	0×01, 0×01 (= I&M V1.1)
62	63	IM_SUPPORTED	0×01, I&M0 supported

Next

Only the parameter NextMode = 0 or 1 is supported. ("Next" page 4-25)

Get

This command is used to set the write protection of a block of a Tag.

In order to set write protection it is necessary to know the organization of the memory of the used tag (number and size of the blocks). The organization of the memory is shown in chapter: "Access to the data ranges of the data carriers" page 3-75.

Attention

Setting of write protection for a block can not be reversed!

Table 30: Send data field for command "Get"

Byte in send data field	Content
0	0×02
1	UID of tag, UID = 0 -> arbitrary
2	UID of tag
3	UID of tag
4	UID of tag
5	UID of tag
6	UID of tag
7	UID of tag
8	UID of tag
9	0×67
10	Block No. of the block to be switched to write-protected (0×00 = 1. Block, 0×FF = 256. Block)

When successful, the following data is returned:

Table 31: Received data

Byte in received data field	Content
0	0×02
1	0×67
2	Command index

If an error occurs, there will be a respective display in STATUS.

Other commands

An overview of additional commands can be found in "3.1.4 Commands" page 4-23. To execute the commands follow the same process as with Write and Read.

Hardware description of the project example

These hardware components were used for the following startup example:

- S7-control "CPU 315-2DP" (DPV1-capable CPU)
- *BL ident*®-Interface-module "TI-BL67-DP1-S-2"
- *BL ident*®-read/write head "TN-CK40-H1147"
- Data carrier "TW-R50-B128" (user data = 112 byte)
- Suitable connection lines

Please download D101583 which you may find in the download area of the TURCK website if you have questions or if you desire clarification concerning the read/write heads and the data carriers.

Download of the active GSD-file

You will need the active GSD-file to realize the configuration of the *BL ident*®-interface module. Please locate the active GSD-file at:

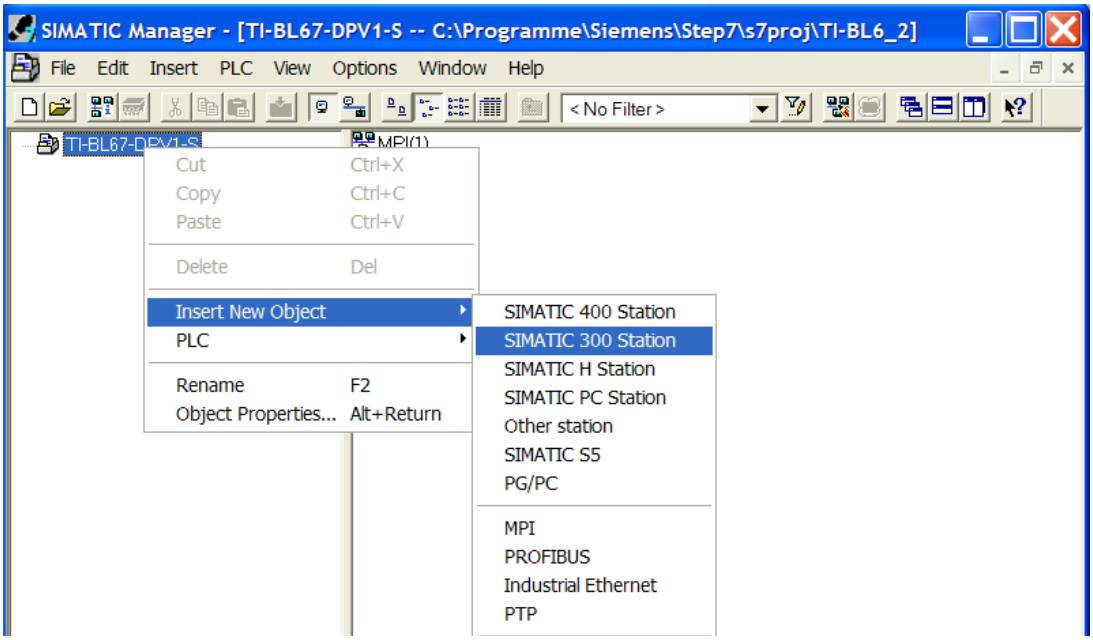
http://www.turck.com....

(Download > Direct search: "BL67-GW-DPV1"...)

Start of the STEP7-software and creating a new project

If need be, please actualize the GSD-file (prior or after start). Start the "SIMATIC basic software Step 7". After the start, the window of the "SIMATIC Manager" will become active. Use file > New to open a new project and assign the project name, here "TI-BL67-DPV1-S-2", for example. Right-click on the project name and then "Insert New Project" to select the control.

Figure 63: Add control to the project

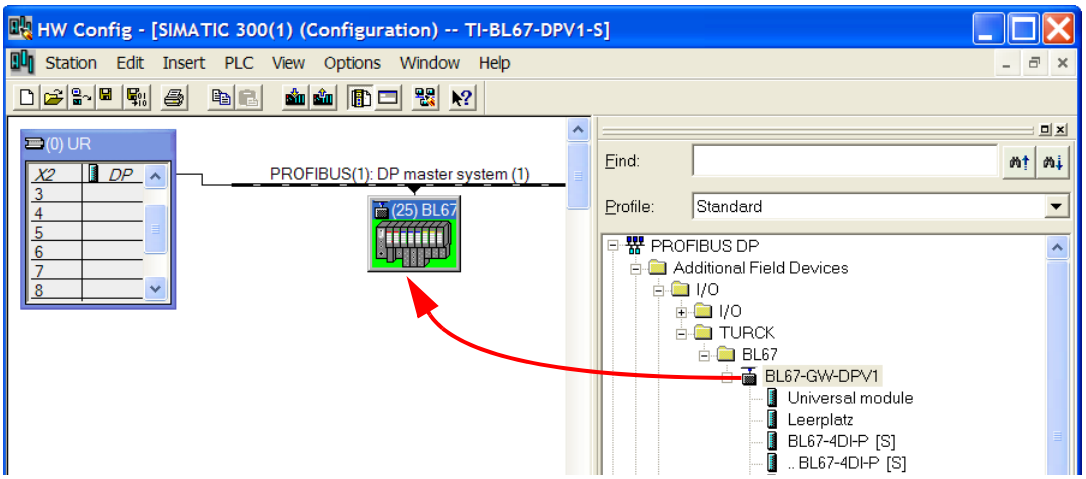


Hardware configuration

To configure the hardware open the hardware-configurator by double-clicking. Hardware . In the hardware-configurator in the upper window area double-click on "Insert Object" and then SIMATIC 300 > RACK-300 > profile track. In the right window area select from the catalog the CPU type (here: GES7 315-2AF02-0AB0) for your control and insert it with drag-and-drop. In the window "Parameter" that is opening to the interface select "new" for "Subnet" and acknowledge the suggested name (for example, PROFIBUS (1)).

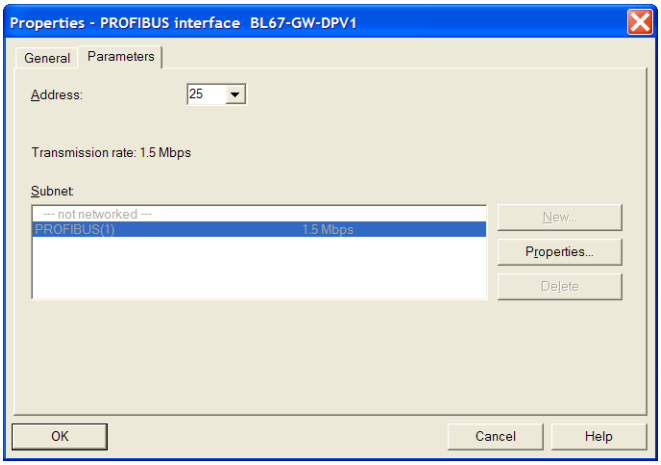
Configure the interface module by first dragging the gateway and dropping it into the window with the graphic diagram in order to move it to the system. The gateway can be found in the device overview at the right side of the window under PROFIBUS-DP > Additional field devices > IO > TURCK > BL67 > BL67-GW-DPV1.

Figure 64: Gateway configuration



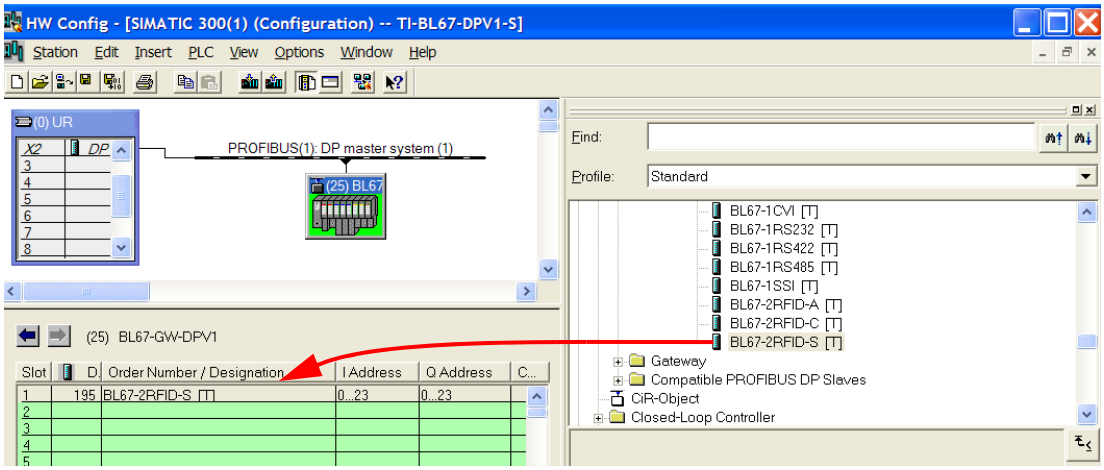
Enter as gateway parameter the address that you had set on the gateway housing with the address switch.

Figure 65: Gateway-Address



The module "BL67-2RFID-S" is in the same file as the gateway. Move the module with drag-and-drop to the BL67-GW-DPV1 table.

Figure 66: BL67-2RFID-S-Module configuration



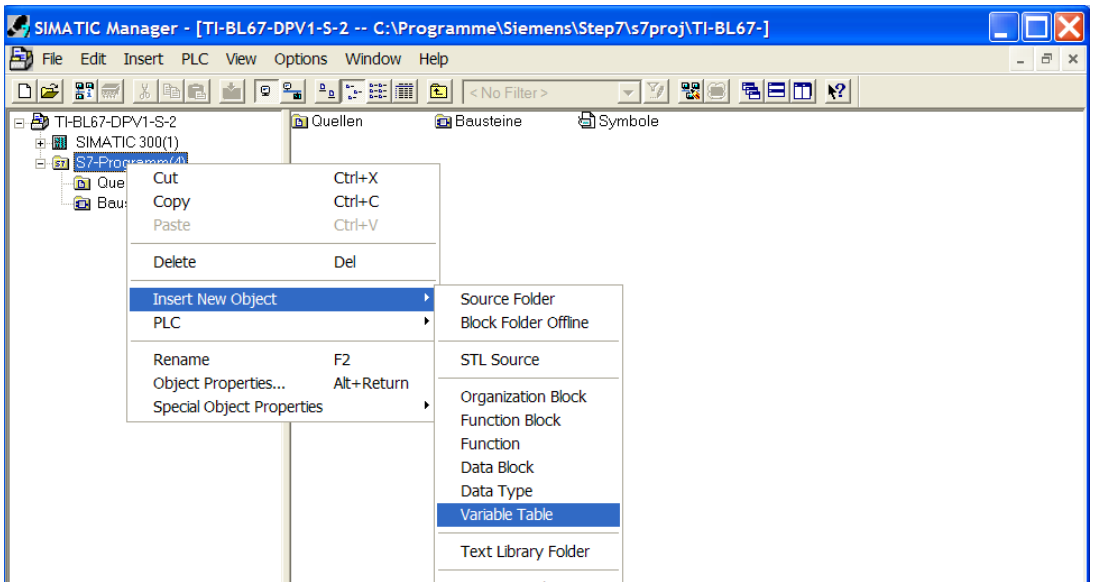
Transfer the configuration data to the automation system (PLC > Download).

Confirm the request for the module to be restarted..

Compiling the variable tables for the process data

Switch the "SIMATIC Manager" range to compile a variable table for the process data. Mark "S7-Program" and select "Insert New Object" > "Variable Table".

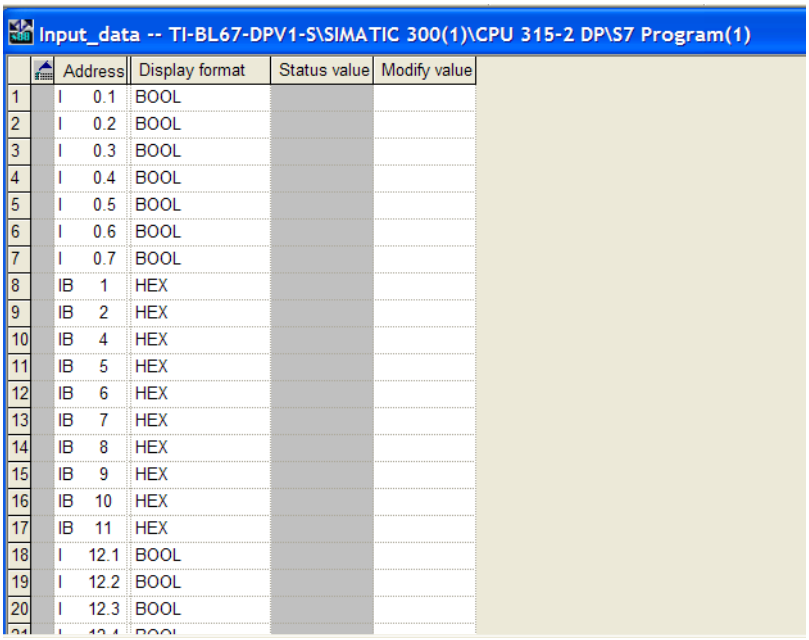
Figure 67: Insert variable table



Assign symbolic names for the variable tables (for example, input- and output data).

Create the table. As orientation, use the structure of the "Process input data" page 3-59 and the "Process output data" page 3-62.

Figure 68: Structure of the variable table "Input_data"

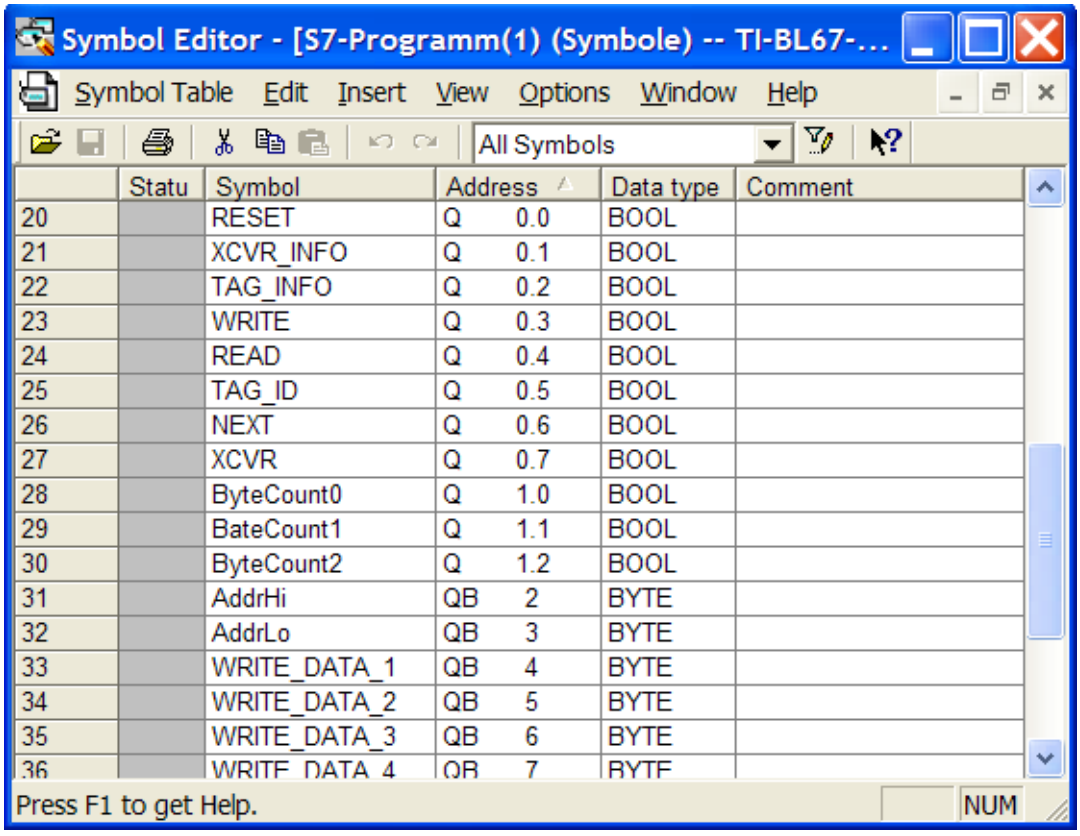


Input_data -- TI-BL67-DPV1-S\SIMATIC 300(1)\CPU 315-2 DP\S7 Program(1)

	Address	Display format	Status value	Modify value
1	I 0.1	BOOL		
2	I 0.2	BOOL		
3	I 0.3	BOOL		
4	I 0.4	BOOL		
5	I 0.5	BOOL		
6	I 0.6	BOOL		
7	I 0.7	BOOL		
8	IB 1	HEX		
9	IB 2	HEX		
10	IB 4	HEX		
11	IB 5	HEX		
12	IB 6	HEX		
13	IB 7	HEX		
14	IB 8	HEX		
15	IB 9	HEX		
16	IB 10	HEX		
17	IB 11	HEX		
18	I 12.1	BOOL		
19	I 12.2	BOOL		
20	I 12.3	BOOL		

To make orientation easier, you may assign names (here: symbols) for the individual variables. Open "OB1" and select "Extras" > "Symbol Table". For this example the descriptions from tables "Process input data" page 3-59 and "Process output data" page 3-62 were adopted.

Figure 69: Symbols (descriptions) for the output data



Symbol Editor - [S7-Programm(1) (Symbole) -- TI-BL67-...

Symbol Table Edit Insert View Options Window Help

All Symbols

	Statu	Symbol	Address	Data type	Comment
20		RESET	Q 0.0	BOOL	
21		XCVR_INFO	Q 0.1	BOOL	
22		TAG_INFO	Q 0.2	BOOL	
23		WRITE	Q 0.3	BOOL	
24		READ	Q 0.4	BOOL	
25		TAG_ID	Q 0.5	BOOL	
26		NEXT	Q 0.6	BOOL	
27		XCVR	Q 0.7	BOOL	
28		ByteCount0	Q 1.0	BOOL	
29		BateCount1	Q 1.1	BOOL	
30		ByteCount2	Q 1.2	BOOL	
31		AddrHi	QB 2	BYTE	
32		AddrLo	QB 3	BYTE	
33		WRITE_DATA_1	QB 4	BYTE	
34		WRITE_DATA_2	QB 5	BYTE	
35		WRITE_DATA_3	QB 6	BYTE	
36		WRITE_DATA_4	QB 7	BYTE	

Press F1 to get Help. NUM

Activating the read/write head

You may access the process data and their functions via both variable tables.

Open the variable table "Output_data" to activate the read/write head. An active read/write head creates an electromagnetic field (the signal is transferred with 13.56 MHz, for example).

In order to read the status values and to download the control values, activate the online connection to your control (PLC > Connect to > Direct CPU). The Mode "RUN" is displayed with a green mark at the bottom right of the window.

You will receive the active values of the process output data via (Monitor Variable) .

In the column "Modify value" set the variable "XCVR" to 1 (true).

Figure 70: The read/write head variable "XCVR"

Var - Output_data

Table Edit Insert PLC Variable View Options Window Help

Output_data -- @TI-BL67-DPV1-S-2_STEP7\SIMATIC 300(1)\CPU 315-2 DP\S7-Programm(1) ...

	Address	Symbol	Display format	Status valu	Modify value
1	Q 0.0	"RESET"	BOOL	false	
2	Q 0.1	"XCVR_INFO"	BOOL	false	
3	Q 0.2	"TAG_INFO"	BOOL	false	
4	Q 0.3	"WRITE"	BOOL	false	false
5	Q 0.4	"READ"	BOOL	false	false
6	Q 0.5	"TAG_ID"	BOOL	false	
7	Q 0.6	"NEXT"	BOOL	false	
8	Q 0.7	"XCVR"	BOOL	false	true
9	Q 1.0	"ByteCount0"	BOOL	false	
10	Q 1.1	"BateCount1"	BOOL	false	
11	Q 1.2	"ByteCount2"	BOOL	false	
12	QB 2	"AddrHi"	HEX	B#16#00	
13	QB 3	"AddrLo"	HEX	B#16#00	
14	QB 4	"WRITE_DATA_1"	HEX	B#16#00	B#16#02
15	QB 5	"WRITE_DATA_2"	HEX	B#16#00	B#16#02
16	QB 6	"WRITE_DATA_3"	HEX	B#16#00	B#16#03
17	QB 7	"WRITE_DATA_4"	HEX	B#16#00	B#16#04
18	QB 8	"WRITE_DATA_5"	HEX	B#16#00	B#16#05
19	QB 9	"WRITE_DATA_6"	HEX	B#16#00	B#16#06
20	QB 10	"WRITE_DATA_7"	HEX	B#16#00	B#16#07
21	QB 11	"WRITE_DATA_8"	HEX	B#16#00	B#16#08
22	Q 12.0		BOOL	false	
23	Q 12.1		BOOL	false	
24	Q 12.2		BOOL	false	
25	Q 12.3		BOOL	false	
26	Q 12.4		BOOL	false	
27	Q 12.5		BOOL	false	

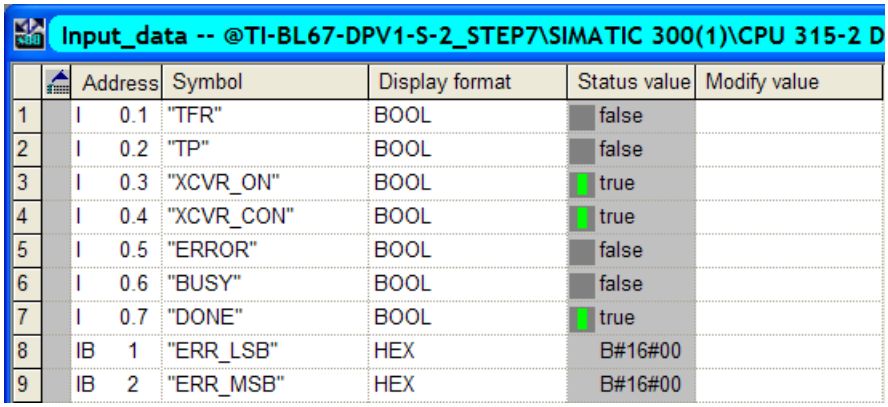
Note

Download the changed value into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the value!

Note

Ensure that the read/write head is connected and activated before setting additional control- and command bits via the process output data.

Figure 71: read/write head is connected and activated.



Input_data -- @TI-BL67-DPV1-S-2_STEP7\SIMATIC 300(1)\CPU 315-2 D

	Address	Symbol	Display format	Status value	Modify value
1	I 0.1	"TFR"	BOOL	false	
2	I 0.2	"TP"	BOOL	false	
3	I 0.3	"XCVR_ON"	BOOL	true	
4	I 0.4	"XCVR_CON"	BOOL	true	
5	I 0.5	"ERROR"	BOOL	false	
6	I 0.6	"BUSY"	BOOL	false	
7	I 0.7	"DONE"	BOOL	true	
8	IB 1	"ERR_LSB"	HEX	B#16#00	
9	IB 2	"ERR_MSB"	HEX	B#16#00	

Initialization/RESET Channel 1

Initialization should be executed after it has been ensured that the read/write head is connected and switched on.

The command to execute initialization is initiated by changing the respective command value from 0 to > 1. Ensure with the help of (Variable monitor) that the variable "RESET" and all other variables have the active output value "false" (0) starting with Bit 0.0 to 0.6. In the column "Modify value" set the variable "RESET" to 1 (true).

Note

Download the changed value into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the value!

The variable "RESET" may be reset to "false" now or after execution. The chapter "Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module" page 3-58 shows how the process flow effects the status messages.

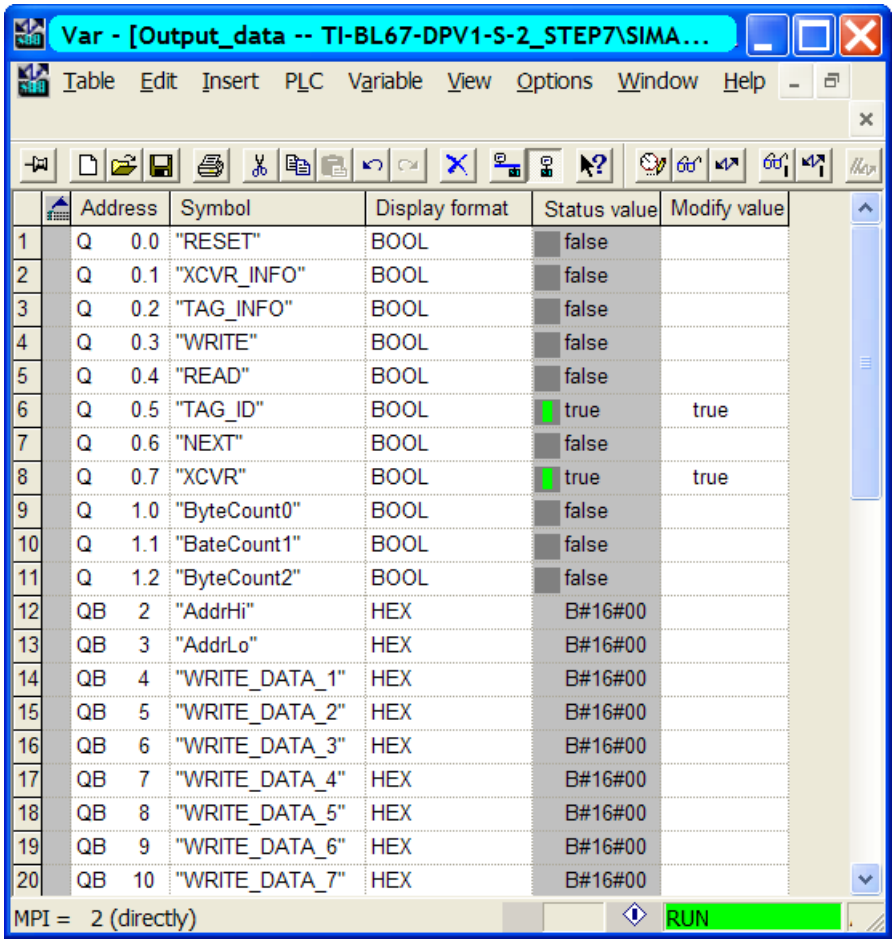
With:
Variable > Modify or

"false" again becomes status value.

Reading of UID from the data carrier / Channel 1

The command to read the UID from a data carrier is executed by changing the respective command value from 0 to > 1. Ensure with the help of (Variable monitor) that the variable "TAG_ID" and all other variables have the active output value "false" (0) starting with Bit 0.0 to 0.6. In the column "Modify value" set the variable "TAG_ID" to 1 (true).

Figure 72: Command to read the UID via the variable "TAG_ID"



	Address	Symbol	Display format	Status value	Modify value
1	Q 0.0	"RESET"	BOOL	false	
2	Q 0.1	"XCVR_INFO"	BOOL	false	
3	Q 0.2	"TAG_INFO"	BOOL	false	
4	Q 0.3	"WRITE"	BOOL	false	
5	Q 0.4	"READ"	BOOL	false	
6	Q 0.5	"TAG_ID"	BOOL	true	true
7	Q 0.6	"NEXT"	BOOL	false	
8	Q 0.7	"XCVR"	BOOL	true	true
9	Q 1.0	"ByteCount0"	BOOL	false	
10	Q 1.1	"BateCount1"	BOOL	false	
11	Q 1.2	"ByteCount2"	BOOL	false	
12	QB 2	"AddrHi"	HEX	B#16#00	
13	QB 3	"AddrLo"	HEX	B#16#00	
14	QB 4	"WRITE_DATA_1"	HEX	B#16#00	
15	QB 5	"WRITE_DATA_2"	HEX	B#16#00	
16	QB 6	"WRITE_DATA_3"	HEX	B#16#00	
17	QB 7	"WRITE_DATA_4"	HEX	B#16#00	
18	QB 8	"WRITE_DATA_5"	HEX	B#16#00	
19	QB 9	"WRITE_DATA_6"	HEX	B#16#00	
20	QB 10	"WRITE_DATA_7"	HEX	B#16#00	

Note

Download the changed value into your control (Variable modify) and ensure with the help of the column Status value (Variable monitor) that the control has accepted the value!

The variable "TAG_ID" may be reset to "false" now or after execution. The chapter "Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module" page 3-58 shows how the process flow effects the status messages.

With:
Variable > Modify or

"false" again becomes status value.

After the "Unique Identifier / UID" has been read, it will be indicated via the variables READ_DATE_1 to READ_DATA_8 of the variable table "Input_data".

Figure 73: UID in the variable table "Input_data"

10	IB	4	"READ_DATA_1"	HEX	B#16#E0
11	IB	5	"READ_DATA_2"	HEX	B#16#04
12	IB	6	"READ_DATA_3"	HEX	B#16#01
13	IB	7	"READ_DATA_4"	HEX	B#16#00
14	IB	8	"READ_DATA_5"	HEX	B#16#0B
15	IB	9	"READ_DATA_6"	HEX	B#16#AE
16	IB	10	"READ_DATA_7"	HEX	B#16#1B
17	IB	11	"READ_DATA_8"	HEX	B#16#D0

Write to data carrier / Channel 1

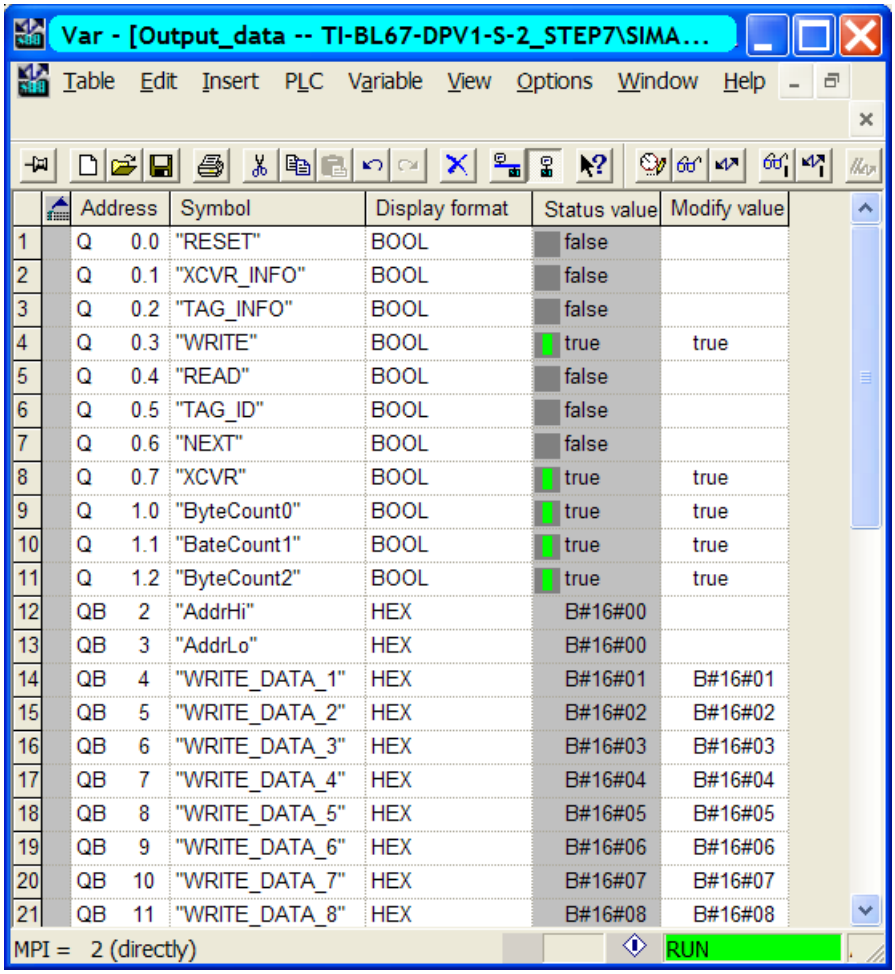
The command to write to a data carrier can be executed after changing the respective command value "WRITE" from 0 to > 1. Ensure with the help of (Variable monitor) that the variable "WRITE" and all other variables have the active output value "false" (0) starting with Bit 0.0 to 0.6. The Bit "XCVR" must remain "true". In the column "Modify value" set the variable "WRITE" to 1 (true).

As an example 8 byte should be transmitted here. With ByteCount0 to ByteCount2 the value 8-1= 7=111_{binary} must be displayed. Set the Bits to "1" (true).

With the data carrier TW-R30-B128 the user data range starts at "0"; other data carriers may have differing user data ranges. Please observe chapter "Overview of the Turck data carriers" page 3-75. With the variables "AddrHi" and "AddrLo" the range on the data carrier is accessed.

In this example, the variables WRITE_DATA_1 to WRITE_DATA_8 will receive the values: 1,2,3,4,5,6,7,8.

Figure 74: Values in the variable table "Output Data" to write to a data carrier



	Address	Symbol	Display format	Status value	Modify value
1	Q 0.0	"RESET"	BOOL	false	
2	Q 0.1	"XCVR_INFO"	BOOL	false	
3	Q 0.2	"TAG_INFO"	BOOL	false	
4	Q 0.3	"WRITE"	BOOL	true	true
5	Q 0.4	"READ"	BOOL	false	
6	Q 0.5	"TAG_ID"	BOOL	false	
7	Q 0.6	"NEXT"	BOOL	false	
8	Q 0.7	"XCVR"	BOOL	true	true
9	Q 1.0	"ByteCount0"	BOOL	true	true
10	Q 1.1	"BateCount1"	BOOL	true	true
11	Q 1.2	"ByteCount2"	BOOL	true	true
12	QB 2	"AddrHi"	HEX	B#16#00	
13	QB 3	"AddrLo"	HEX	B#16#00	
14	QB 4	"WRITE_DATA_1"	HEX	B#16#01	B#16#01
15	QB 5	"WRITE_DATA_2"	HEX	B#16#02	B#16#02
16	QB 6	"WRITE_DATA_3"	HEX	B#16#03	B#16#03
17	QB 7	"WRITE_DATA_4"	HEX	B#16#04	B#16#04
18	QB 8	"WRITE_DATA_5"	HEX	B#16#05	B#16#05
19	QB 9	"WRITE_DATA_6"	HEX	B#16#06	B#16#06
20	QB 10	"WRITE_DATA_7"	HEX	B#16#07	B#16#07
21	QB 11	"WRITE_DATA_8"	HEX	B#16#08	B#16#08

The variable "WRITE" may be reset to "false" now or after execution. The chapter "Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module" page 3-58 shows how the process flow effects the status messages.

Note

Download the changed value into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the value!

Read from the data carrier / Channel 1

The command to read from a data carrier can be executed after changing the respective command value "READ" from 0 to > 1. Ensure with the help of (Variable monitor) that the variable "READ" and all other variables have the active output value "false" (0) starting with Bit 0.0 to 0.6. In the column "Modify value" set the variable "READ" to 1 (true).

As an example 8 byte should be read here. With ByteCount0 to ByteCount2 the value 8-1= 7=111_{binary}must be displayed. Set the Bits to "1" (true).

With the data carrier TW-R30-B128 the user data range starts at "0"; other data carriers may have differing user data ranges. Please observe chapter "Overview of the Turck data carriers" page 3-75. With the variables "AddrHi" and "AddrLo" the range on the data carrier is accessed.

The variable "READ" may be reset to "false" now or after execution. The chapter "Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module" page 3-58 shows how the process flow effects the status messages.

Note

Download the changed value into your control (Variable modify) and ensure with the help of the column Status Values (Variable monitor) that the control has accepted the value!

The following diagram displays the status data after the command Bit has been reset again prior to command execution.

Figure 75: Input data prior to command execution

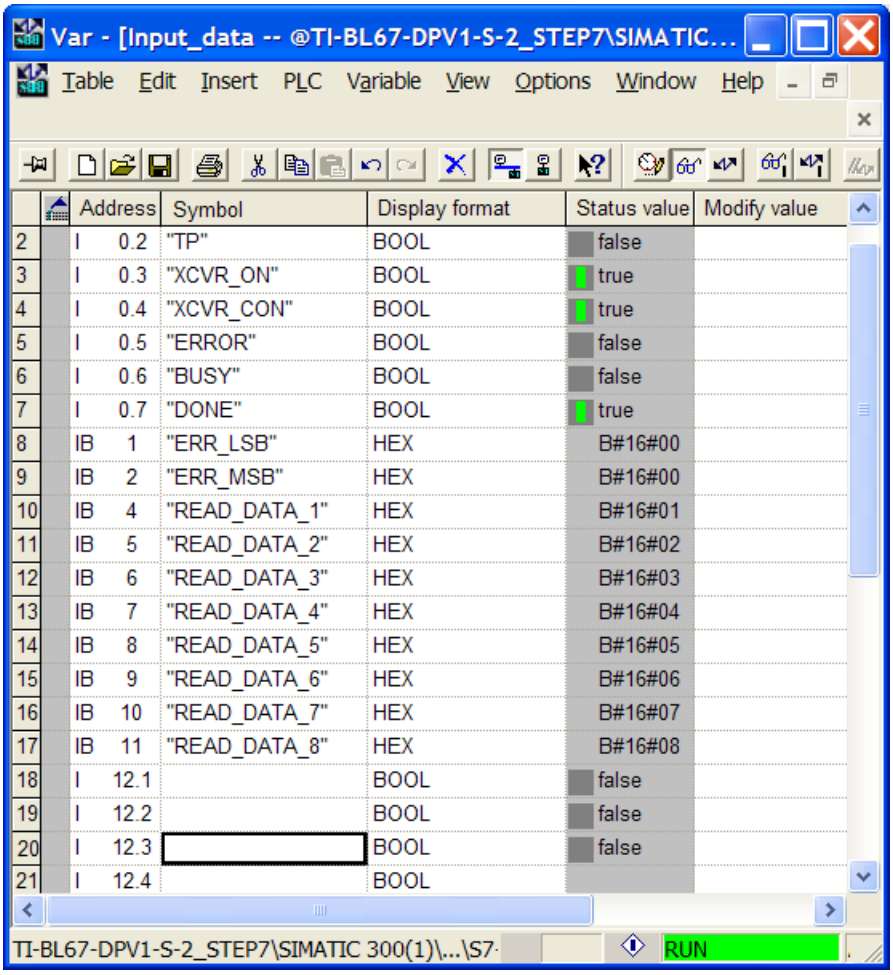
Input_data -- @TI-BL67-DPV1-S-2_STEP7\SIMATIC 300(1)\CPU 315-2 D

	Address	Symbol	Display format	Status value	Modify value
1	I 0.1	"TFR"	BOOL	false	
2	I 0.2	"TP"	BOOL	false	
3	I 0.3	"XCVR_ON"	BOOL	true	
4	I 0.4	"XCVR_CON"	BOOL	true	
5	I 0.5	"ERROR"	BOOL	false	
6	I 0.6	"BUSY"	BOOL	false	
7	I 0.7	"DONE"	BOOL	true	
8	IB 1	"ERR_LSB"	HEX	B#16#00	
9	IB 2	"ERR_MSB"	HEX	B#16#00	

If a data carrier is in the detection range of the read/write head, the user range of the data carrier is automatically and fully read. During this process, TFR=0 and changes to TFR=1 after the read operation is fully completed. Only after the detection range has been evacuated, TFR again becomes "0". This automatic read operation is interrupted by all user commands; the TFR-Bit keeps its active value. The process is restarted when no other commands exist and when TP=1. Read commands can directly access already stored data via TFR=1.

After command execution, the read data are in READ_DATA_1 to READ_DATA_8.

Figure 76: Input data after command execution



	Address	Symbol	Display format	Status value	Modify value
2	I 0.2	"TP"	BOOL	false	
3	I 0.3	"XCVR_ON"	BOOL	true	
4	I 0.4	"XCVR_CON"	BOOL	true	
5	I 0.5	"ERROR"	BOOL	false	
6	I 0.6	"BUSY"	BOOL	false	
7	I 0.7	"DONE"	BOOL	true	
8	IB 1	"ERR_LSB"	HEX	B#16#00	
9	IB 2	"ERR_MSB"	HEX	B#16#00	
10	IB 4	"READ_DATA_1"	HEX	B#16#01	
11	IB 5	"READ_DATA_2"	HEX	B#16#02	
12	IB 6	"READ_DATA_3"	HEX	B#16#03	
13	IB 7	"READ_DATA_4"	HEX	B#16#04	
14	IB 8	"READ_DATA_5"	HEX	B#16#05	
15	IB 9	"READ_DATA_6"	HEX	B#16#06	
16	IB 10	"READ_DATA_7"	HEX	B#16#07	
17	IB 11	"READ_DATA_8"	HEX	B#16#08	
18	I 12.1		BOOL	false	
19	I 12.2		BOOL	false	
20	I 12.3		BOOL	false	
21	I 12.4		BOOL		

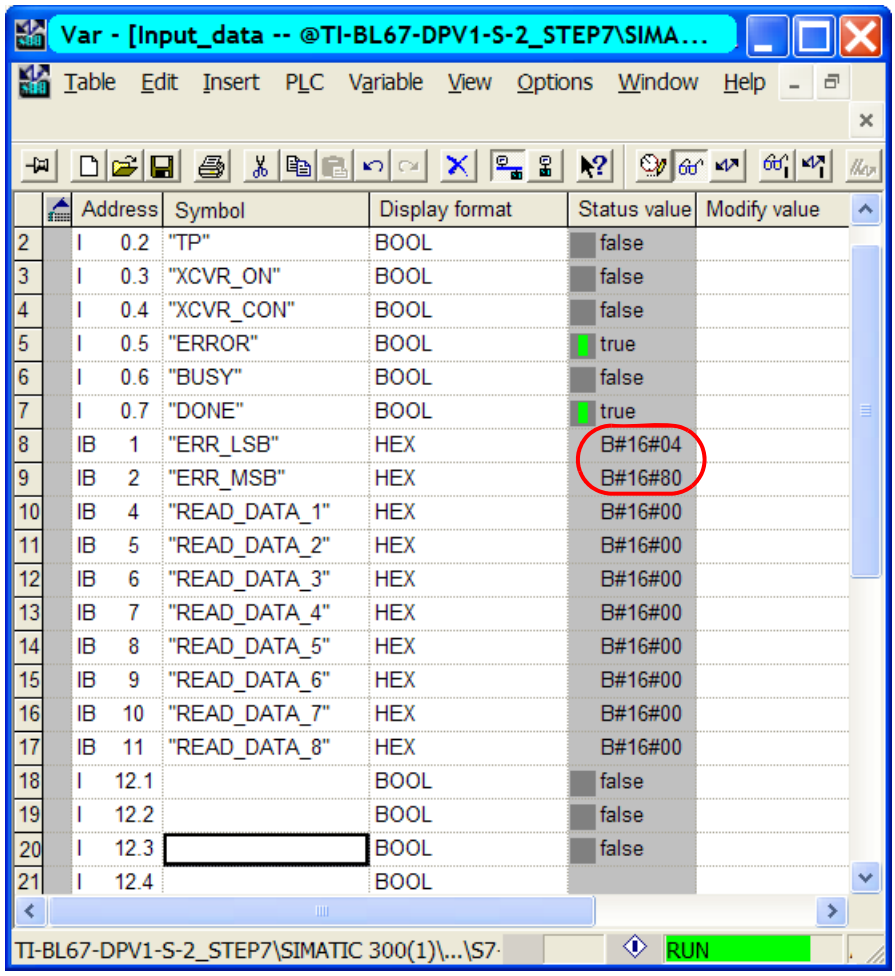
The explanations for the status messages can be found in "Significance of the Status-Bits" page 3-60.

Error messages via the input data

Occurring errors are displayed with the input data via the Accumulative Error Bit "ERROR". More detailed information for cause of error are provided by the two bytes "ERR_LSB" and "ERR-MSB"

In the table "Status values" page 3-68 the two digital values in bold correspond to the first and the second error byte of the input data.

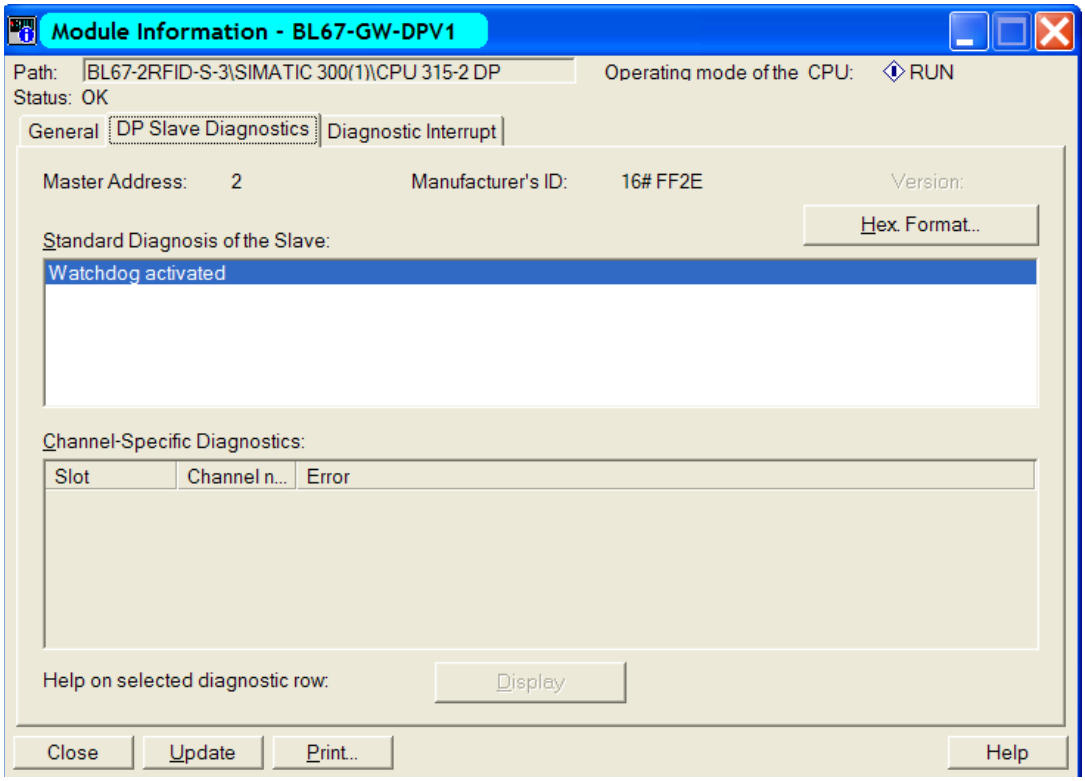
Figure 77: Error display "No read/write head Connection".



DPV1-diagnostic messages

To display "Diagnostics" page 3-67 change to the hardware-configurator. Create the online connection with  . Double-click on the assembly diagram to open the subitem "Assembly Status". The standard diagnostics of the slave are displayed in the top field on the register card "DP-slave Diagnostics" The diagnostic data of the BL67-2RFID-S-module are displayed below in the area "Channel-specific Diagnostics".

Figure 78: DPV1-diagnostic messages



Parameterization

Parameterization of the BL67-2RFID-S-module is only needed when at startup the error ERR_LSB=**1** and ERR_MSB=**02** was sent with the error byte of the input data. In this case the parameter "bypass time Kx [n*4ms]:"" is available per channel.

Parameter setting is done in the "Hardware-configurator" in "Offline Mode". Click on the assembly diagram to open the slot list. Select the subitem "Object Properties" by right clicking on the BL67-2RFID-S-module in this list. The parameter is set with "Device-specific Parameters" on the register card "Parameter assignment". Read the chapters "Parameter" page 3-65 and "Determination of the parameter value "bypass time Kx [n*4ms]:"" page 3-66 if you would like to change the value "bypass time Kx [n*4ms]:".

Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module

The values of the command Bits (TAG-ID, READ, WRITE...) can be reset to the output value "0" prior or after command execution. The two following diagrams show the status messages depending on the procedural sequence:

Figure 79: Resetting of command Bit after execution

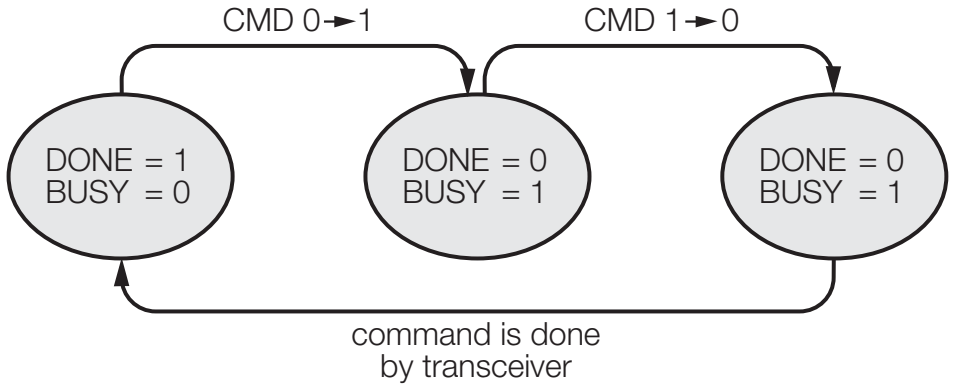
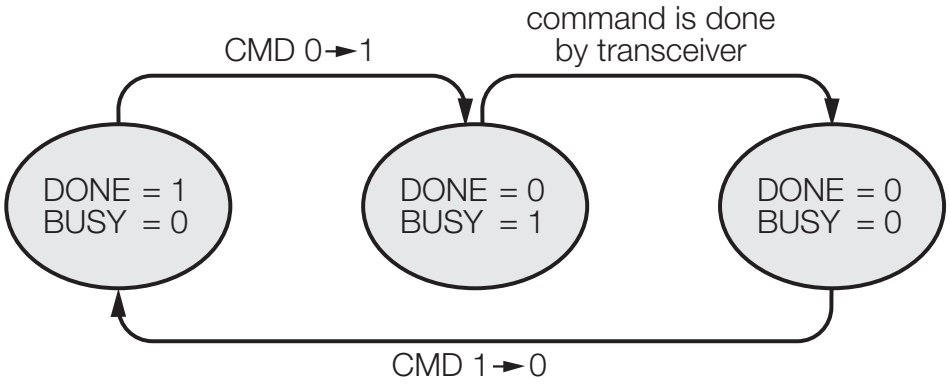


Figure 80: Resetting of command Bit prior to execution



Process input data

Table 32: Input data bytes

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel 1								
0[A)]	DONE	BUSY	ERROR	XCVR_ CON	XCVR_ ON	TP	TFR	res.
1	2 byte error code ("Warnings and error messages" page 3-68)							LSB
2	MSB							
3	res.	res.	res.	res.	res.	res.	res.	res.
4	8 byte read data							
5								
6								
7								
8								
9								
10								
11								
Channel 2								
12	DONE	BUSY	ERROR	XCVR_ CON	XCVR_ ON	TP	TFR	res.
13	2 byte error code ("Warnings and error messages" page 3-68)							LSB
14	MSB							
15	res.	res.	res.	res.	res.	res.	res.	res.

Table 32: Input data bytes

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
16	8 byte read data							
17								
18								
19								
20								
21								
22								
23								

A *Byte-No.*

Significance of the Status-Bits

The following table provides the significance of the status Bits of the process data indicated above:

Table 33: Significance of the Status-Bits

Description	Significance
DONE	**1**: At this time the system is not processing a command and is ready to receive the next command. **0**: All arriving commands are ignored except the RESET-command. DONE only switches to status "1" when all command Bits (READ,WRITE ..) are "0". "Flowchart diagram of command execution BL67-2RFID-S/BL20-2RFID-S-Module" page 3-58
BUSY	**1**: The system is actively executing a command. **0**: Command execution was terminated. BUSY is not the inversion of DONE and possibly can not be used with a handshake-operation. Use the variable DONE to set up a handshake-operation.
ERROR	**1**: An error occurred during command execution. If this flag follows a write command (WRITE), for example, the data of the send-buffer were not written to the data carrier. If this flag follows a read command, no data was read from the data carrier and no new data was stored in the received data buffer. **0**: The last write or read command was successfully executed. The received data buffer contains valid data. Detailed information is provided via the two byte error code. The table "Status values" page 3-68 provides the meaning for the error code.

Table 33: Significance of the Status-Bits

Description	Significance
XCVR_CON	**1**: The read/write head is correctly connected to the BL67-2RFID-S-module. **0**: The read/write head is **not** yet correctly connected to the BL67-2RFID-S-module.
XCVR_ON	**1**: Transfer with 13.56 MHz between read/write head and data carrier is active. **0**: Transfer with 13.56 MHz between read/write head and data carrier is **not** active.
TP (Tag present)	**1**: A data carrier is within the detection range of the read/write head and is recognized by the read/write head. **0**: No data carriers are within the detection range of the read/write head or the read/write head has not recognized the data carrier.
TFR (Tag fully read)	**1**: All data ranges of the data carrier were fully read by the *BL ident*®-system, and the data carrier still is within the detection range (TP=1). Automatic reading always occurs when a data carrier is within the detection range of the read/write head. The time between TP=1 and TFR=1 can not be seen as reference time for a read and write command. If only few bytes are read or written with a Read or write command, the command is being executed significantly faster than the full reading of a 2000 byte data carrier, for example. With TFR=1 read commands can directly access already stored data **0**: The *BL ident*®-system has not fully read all data ranges of the data carrier or the data carrier is within the detection range of the read/write head. This automatic read operation is interrupted by all user commands; the TFR-Bit keeps its active value. The process is restarted if no other commands exist and TP=1.

Note

Depending on the system and in many cases, the status bit "BUSY" can not be used for a handshake operation!

Note

Decoding of the 2-byte error code is described in Chapter "Warnings and error messages" page 3-68.

Process output data

Table 34: Output data bytes

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel 1								
0[A)]	XCVR	NEXT	TAG-ID	READ	WRITE	TAG _INFO	XCVR _INFO	RESET
1	res.	res.	res.	res.	res.	Byte Count2	Byte Count1	Byte Count0
2	MSB	AddrHi						LSB
3	MSB	AddrLo						LSB
4	8 byte write data							
5								
6								
7								
8								
9								
10								
11								
Channel 2								
12	XCVR	NEXT	TAG-ID	READ	WRITE	TAG _INFO	XCVR _INFO	RESET
13	res.	res.	res.	res.	res.	Byte Count2	Byte Count1	Byte Count0
14	MSB	AddrHi						LSB
15	MSB	AddrLo						LSB
16	8 byte write data							
17								
18								
19								
20								
21								
22								
23								

A *Byte-No.*

Significance of the Command-Bits/Control-Bits

Note

If more than one command bit has been set via TAG_ID, READ, WRITE, TRANSCEIVER_INFO or TAG_INFO, the BL67-2RFID-S-module will generate an error message! The Bit "XCVR" must always be set to execute a command so that the read/write head remains active!

The following table provides the significance of the command Bits of the process output data shown above.

Table 35: Significance of the command Bits

Description	Significance
XCVR	**1**: The read/write head is activated (the signal is transferred e. g. with 13.56 MHz). **0**: The read/write head is deactivated (no signal is transferred). First the read/write head must be activated before another command can be initiated with a following process image. If XCVR = 0 is set during the time the *BL ident*®-system is busy with the command execution, the command will be executed first. The read/write head is only switched off when the Status-Bit is "DONE = 1".
NEXT	**1**: Exactly one command can be executed with the same data carrier. If an additional command is initiated with the same data carrier, the Status Bit BUSY = 1 remains. The *BL ident*®-system must be reset (RESET) or the command must be executed with another data carrier. **0**: Function is not used.
TAG_ID	**0 -> 1**: The command to read the UID is initiated with the rising edge. The command is executed when a data carrier is within the detection range of the read/write head. ("UID" page 5-4) **0**: Function is not used.
READ	**0 -> 1**: The read command is initiated with the rising edge. The command is executed when a data carrier is within the detection range of the read/write head. The byte number "ByteCount0..ByteCount2" is read from the data carrier address "AddrLo, AddrHi". **0**: Function is not used.
WRITE	**0 -> 1**: The write command is initiated with the rising edge. The command is executed when a data carrier is within the detection range of the read/write head. The byte number "ByteCount0..ByteCount2" is written to the data carrier address "AddrLo, AddrHi". **0**: Function is not used.

Table 35: Significance of the command Bits

Description	Significance
TAG_INFO	**0 -> 1**: The command TAG_INFO (data carrier information) is initiated with the rising edge. The command is executed when a data carrier is within the detection range of the read/write head. With the process input data, the data carrier information in the area read-data are sent with the following 8 byte: Byte 0: Number of blocks-1 of the data carrier (this means 27 -> 28 blocks) Byte 1: Number of bytes-1 per block (this means 3 -> 4 bytes per block) Byte 2: Is not supported (DSFID-data carrier format) Byte 3: Is not supported (AFI - application recognition) Byte 4: Is not supported (ICID - IC-recognition (is not supported) Byte 5 to byte 7:" "0" **0**: Function is not used.
TRANSCEIVER _INFO	**0 -> 1**: The command TRANSCEIVER_INFO (read/write head information) is initiated and executed with the rising edge. With the process input data, the information is sent to the read/write head in the area read-data with 8 byte: The content of the information is configurable. The content of the information is selected with "AddrHi, AddrLo". **0×00F0**: The first 8 byte of the ORDER_ID (here: product description) are sent, for example "TNER-Q80" = 0×54 4E 45 52 2D 51 38 30(ASCII-table) **0×00F1**: The first 8 byte of the ORDER_ID (here: product description) are sent, for example: "-H1147\0\0" = 0×2D 48 31 31 34 37 5C 00 5C 00 **0×00F2**: The third 8 byte of the ORDER_ID (here: product description) are sent. **0×00F3**: The fourth 8 byte of the ORDER_ID (here: product description) are sent. **0×00F4**: The hardware- and firmware versions of the read/write head are sent. Byte 0: Part x of hardware-version**x**.y. Byte 1: Part y of hardware-version x.**y**. Byte 2: Letter V = 0×56 of the firmware version **V**x.y.z. Byte 3: Part x of the firmware version V**x**.y.z. Byte 4: Part y of the firmware version Vx.**y**.z. Byte 5: Part z of the firmware version Vx.y.**z**. Byte 6 to byte 7: is not used.
RESET	**0 -> 1**: A "Reset" of the *BL ident*®-system is done with the rising edge. When the status bit "BUSY" is set, the execution of the active command is interrupted and the status bit "DONE" is set. The status bit "ERROR" and the two bytes error message (error code) of the process input data are deleted.
ByteCount0..2	Number of byte-1 which still need to be read (READ) or written (WRITE). 111 (0×7) -> 8 byte still must be read/written.

Table 35: Significance of the command Bits

Description	Significance
AddrHi, AddrLo	Array of the length 2 byte. Repeats the start address of the memory range in the data carrier which is to be accessed via the Write or Read command. The writable and readable start addresses of the data carrier can be ≠ 0. The Chapter "Overview of the Turck data carriers" page 3-75 provides information in regards to the writable/readable start address of the data carrier versions.
WRITE_DATA	Write-data array of the length 8 byte.

Parameter

At this time only the parameter "bypass time K1 [n*4ms]:" and "bypass time K2 [n*4ms]:" are transferred with the 8 byte parameter data image.

Table 36: Parameter data bytes

	Bit							
	7	6	5	4	3	2	1	0
0[A)]	reserved							
1								
2								
3								
4								
5	"bypass time K1 [n*4ms]:"							
6	reserved							
7	"bypass time K2 [n*4ms]:"							

A *Byte-No.*

Keep the default setting "=0" of this parameter when a startup has occurred without the error message "Dwell period of the tag in the detection range was not sufficient for successful command processing." page 3-68.

If the error message "Dwell period of the tag in the detection range was not sufficient for successful command processing." page 3-68 is indicated, check whether your application supports the "Adherence to Recommended Distances" (minimum distances), a decrease in speed or data volume. The specification "recommended" and "maximum distance" can be found in the manual D101583 in the section "Operating Data".

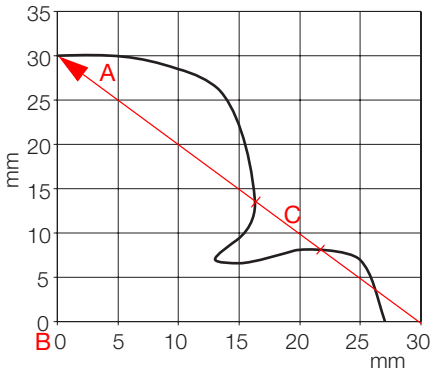
In case the recommended distances can not be adhered to, or in case the error indication concerning the recommended distances continues due to external interferences, the parameter "bypass time Kx [n*4ms]:"" must be set to a suitable value.

Determination of the parameter value "bypass time Kx [n*4ms]:"

The parameter "bypass time Kx [n*4ms]:"" is the result of the used components, the distances, the speed of the data carrier to the read/write head and other external interferences.

Therefore measure all needed bridging times directly on location. The following diagram shows the typical run of the detection range:

Figure 81: Detection range of a read/write head



A *Distance bridged by the data carrier when passing by the read/write head*
B *Center of the read/write head*
C *Section of the distance that needs to be bridged.*

For the section "C" in the above diagram the data carrier must use maximum the "bypass time K1 [n*4ms]:". The data carrier must be within the detection range before the bridging time elapses so that the transfer can continue.

Additional diagrams for the detection ranges of different read/write heads and data carriers are shown in the manual D101583 in the Chapter "Pass Over Paths".

The LEDs of the Write-Read head or rather the status bit "TP" of the process input data indicate if the data carrier is within the detection range or not.

Diagnostics

There are three diagnostics for read/write head with 2 byte for each channel. These diagnostics are also displayed with the ERROR-byte of the process input data.

Table 37: Diagnostic Data byte

	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Channel 1								
0[A)]						Overload		
1					Error			Hardware error
Channel 2								
2						Overload		
3					Error			Hardware error

A *Byte-No.*

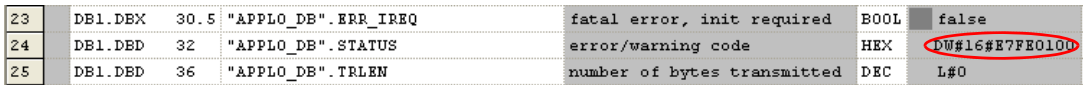
Table 38: Significance of the error Bits

Description	**Significance**
Overload	The voltage supply of the read/write head was switched off because of overcurrent ("DW#16#E4FE01xx" page 3-68).
Hardware error	There is a hardware error of the read/write head ("DW#16#E4FE81xx" page 3-69).
Undervoltage	The voltage supply of the read/write head is not in the required range ("DW#16#E4FE88xx" page 3-69).

Warnings and error messages

At the startup of an interface module type "TI-BLxx-DP1-x" or "TI-BLxx-DP0-x" and the "Proxy Ident Function Block" an error- and warning code is sent with the variables "APPLO_DB.STATUS".

Figure 82: The variable APPLO_DB. STATUS



At the startup of an interface module type "TI-BLxx-DPV1-**S**-x" the error- and warning code is displayed with two byte of the process input data.

Figure 83: Two error byte of the process input data

The following table explains the significance of STATUS values.

Table 39: Status values

Status value of "APPLO_DB.STATUS"	**Significance of error code**
RFID standard profile	
DW#16#E**1**FE**82**xx	Tag memory error (for example, CRC error)
DW#16#E**1**FE**82**xx	Dwell period of the tag in the detection range was not sufficient for successful command processing. Information for the possible cause and correction of this error can be found in "Determination of the parameter value "bypass time Kx [n*4ms]:"" page 3-66 for the BLxx-2RFID-S-Module.
DW#16#E**1**FE**82**xx	The indicated address range or command does not match to the used tag type.
DW#16#E**1**FE**82**xx	Tag is defective and must be replaced.
DW#16#E**1**FE**82**xx	Tag in the detection range does not have the expected UID.
DW#16#E**1**FE**82**xx	Tag does not support the active command.
DW#16#E**1**FE**82**xx	At least one part of the indicated range in the tag is write protected.
DW#16#E**4**FE**01**xx	Supply of read/write head was switched off because of increases current consumption, for example short circuit.
DW#16#E**4**FE**82**xx	Antenna or rather transmitter of the read/write head is switched off. WriteConfig needed ("Write-Config" page 4-26, page 3-10, page 3-41).

Table 39: (Forts.) Status values

Status value of "APPLO_DB.STATUS"	Significance of error code
DW#16#E4FE82xx	The requested data volume exceeds the capacity of the internal memory.
DW#16#E4FE82xx	A parameter of the active command is not supported.
DW#16#E4FE82xx	An error with no details was indicated by the cyclic status word (for example, antenna out of service). The error is independent of the active command.
***BL ident*® specific error codes**	
DW#16#E4FE80×x	No read/write head is connected.
DW#16#E4FE81xx	The read/write head is defective.
DW#16#E4FE84xx	Telegram content is invalid (for tags of type TW-R22-HT-B64). Range is write protected or not present.
DW#16#E4FE88xx	The read/write head is not sufficiently supplied.
DW#16#E4FE89xx	The read/write head sends permanent CRC-errors on the RS485-line. EMV-problem?
DW#16#E4FE8Axx	The Ident-unit indicates permanent CRC-errors on the RS485-line. EMV-problem?
DW#16#E4FE90×x	The read/write head does not recognize a command sent via Get.
RFID standard profile	
DW#16#E5FE82xx	The Ident-unit indicates a wrong sequence No. (SN).
DW#16#E5FE82xx	The PIB-FB indicates a wrong sequence No.
DW#16#E5FE82xx	The Ident-unit indicates an invalid data block No.
DW#16#E5FE82xx	The PIB-FB indicates an invalid data block No.
DW#16#E5FE82xx	The PIB-FB indicates an invalid data block length.
DW#16#E5FE82xx	The Ident unit executes a hardware reset (Init_Active is set to "1"), Init (Bit 15 within the cyclic "Control Word") is expected by the PIB.
DW#16#E5FE0Axx	The command code "CMD" and the respective command acknowledgement do not match. Involved is a software or synchronization error which is not permitted during normal operation.
DW#16#E5FE0Bxx	The sequence of the telegram for receipt acknowledgement is wrong.
DW#16#E5FE0Cxx	Synchronization error (Distance of step of AC_H/AC_L and CC_H/CC_L in the cyclic "Control Word" is wrong). A new initialization must be done.
DW#16#E6FE82xx	Invalid command.

Table 39: (Forts.) Status values

Status value of "APPLO_DB.STATUS"	Significance of error code
DW#16#E**6**FE**82**xx	The Ident-unit indicates an invalid command-index.
DW#16#E**6**FE**82**xx	The Ident-unit indicates that at this time only Write commands (Write-Config) are allowed.
***BL ident*® specific error codes**	
DW#16#E**6**FE**8**0××x	No previous tag was recognized, no UID was stored (at Next).
DW#16#E**6**FE**FF**xx	Unknown error
RFID standard profile	
DW#16#E**7**FE**82**xx	Only command INIT is permitted in this state (indicated by PIB).
DW#16#E**7**FE**82**xx	CMDSEL > CMDDIM or command code "CMD" not permitted.
DW#16#E**7**FE**82**xx	The PIB indicates: Parameter "Length" of command is too long for the global data range which is reserved within TXBUF.
DW#16#E**7**FE**82**xx	RXBUF Overrun (more data was received than can be stored in the memory RXBUF).
DW#16#E**7**FE**82**xx	In any case, the next command must be the "INIT"-command. All other commands are rejected.
DW#16#E**7**FE**06**xx	The index is outside the range 111/112 and therefore wrong.
DW#16#E**7**FE**82**xx	BLxx-2RFID-y does not respond to the INIT-command. Check whether the right ID is set!
DW#16#E**7**FE**82**xx	Timeout during initialization.
DW#16#E**7**FE**82**xx	Repeating the command is not supported by PIB*.
DW#16#E**7**FE**0A**xx	Error during determination of data package size within the PIB.

IEC-conform error messages

The following tables show the design of the IEC-conform error messages. The error messages appear as 6-digit hexadecimal digital values. The error's meaning consists of 4 information pieces which can be retrieved from the following three tables.

Table 40: Digits 1 and 2 of the hex-error code

Digits 1 and 2 of the hexadecimal error code	Significance
0×40	reserved
0×41	Get_Master_Diag
0×42	Start_Seq
0×43	Download
0×44	Upload
0×45	End_Seq
0×46	Act_Para_Brct
0×47	Act_Param
0×48	Idle
0×49 to 0×50	reserved
0×51	Data_Transport
0×52 to 0×55	reserved
0×56	RM
0×57	Initiate
0×58	Abort
0×59	reserved
0×5A	reserved
0×5B	reserved
0×5C	Alarm_Ack
0×5D	reserved
0×5E	Read
0×5F	Write
0×C0	reserved
0×C1	FE
0×C2	NI
0×C3	AD
0×C4	EA

Table 40: Digits 1 and 2 of the hex-error code

Digits 1 and 2 of the hexadecimal error code	Significance
0×C5	LE
0×C6	RE
0×C7	IP
0×C8	SC
0×C9	SE
0×CA	NE
0×CB	DI
0×CC	NC
0×CD	TO
0×CE	CA
0×CF to 0×D0	reserved
0×D1	Error Data_Transport
0×D2 to 0×D6	reserved
0×D7	Error Initiate
0×D8	reserved
0×D9	reserved
0×DA	reserved
0×DB	reserved
0×DC	Error Alarm_Ack
0×DD	reserved
0×DE	Error Read
0×DF	Error Write

Table 41: Digits 3 and 4 of the hex-error code

Digits 3 and 4 of the hexadecimal error code	Significance
0×00 to 0×7F	reserved
0×80	DPV1
0×81 to 0×FD	reserved
0×FE to 0×FF	PROFILE_SPECIFIC

Table 42: Digits 5 and 6 of the hex-error code

Digit 5 of the hexadecimal error code	Significance	Digit 6 of the hexadecimal error code	Significance
0×**A** 10 (decimal) 1010 (binary)	application	0×0 (0000)	read error
		0×1 (0001)	write error
		0×2 (0010)	module failure
		0×3 to 0×6	not specific
		0×7 (0111)	busy
		0×8 (1000)	version conflict
		0×9 (1001)	feature not supported
		0×A to 0×F	User specific
0×**B** 11 (decimal) 1011 (binary)	access	0×0 (0000)	invalid index
		0×1 (0001)	write length error
		0×2 (0010)	invalid slot
		0×3 (0011)	type conflict
		0×4 (0100)	invalid area
		0×5 (0101)	state conflict
		0×6 (0110)	access denied
		0×7 (0111)	invalid range
		0×8 (1000)	invalid parameter
		0×9 (1001)	invalid type
		0×A (1010)	backup
		0×B to 0×F	User specific

Table 42: Digits 5 and 6 of the hex-error code

Digit 5 of the hexadecimal error code	**Significance**	**Digit 6 of the hexadecimal error code**	**Significance**
0×**C** 12 (decimal) 1100 (binary)	resource	0×0 (0000)	read constrain conflict
		0×1 (0001)	write constrain conflict
		0×2 (0010)	resource busy
		0×3 (0011)	resource unavailable
		0×4 to 0×7	not specific
		0×8 to 0×F	user specific
0×**D to** 0×**F** 13 to 15 (decimal) 1101 to 1111 (binary)	User specific	-	-

Access to the data ranges of the data carriers

Use a different data carrier as indicated in "Hardware description of the project example" page 3-3, or if you would like to access certain ranges of the data carrier, you will need to change the values "Start Address" for "Preparations of the vartable_pib0 for writing." page 3-16/Seite 3-34 or for "Preparations of the vartable_pib0 for reading" page 3-18/Seite 3-36. The value "Start Address" is marked there with the legend point D and explained.

Figure 84: Preparations of the vartable_pib0 for writing.

51	DB1.DBD	142	"APPL0_DB".CMDBUF[3].StartAddress		DEC	L#0	L#0
52	DB1.DBB	146	"APPL0_DB".CMDBUF[3].Attributes		HEX	B#16#00	B#16#00
53	DB1.DBB	147	"APPL0_DB".CMDBUF[3].NextMode		HEX	B#16#00	
54	// send buffer						
55	DB2.DBB	0	"BUFFER".BUFFER[1]	common data buffer	HEX	B#16#1B	B#16#01
56	DB2.DBB	1	"BUFFER".BUFFER[2]	common data buffer	HEX	B#16#03	B#16#02
57	DB2.DBB	2	"BUFFER".BUFFER[3]	common data buffer	HEX	B#16#01	B#16#03
58	DB2.DBB	3	"BUFFER".BUFFER[4]	common data buffer	HEX	B#16#00	B#16#04
59	DB2.DBB	4	"BUFFER".BUFFER[5]	common data buffer	HEX	B#16#00	B#16#05
60	DB2.DBB	5	"BUFFER".BUFFER[6]	common data buffer	HEX	B#16#00	B#16#06
61	DB2.DBB	6	"BUFFER".BUFFER[7]	common data buffer	HEX	B#16#00	B#16#07
62	DB2.DBB	7	"BUFFER".BUFFER[8]	common data buffer	HEX	B#16#00	B#16#08
63	DB2.DBB	8	"BUFFER".BUFFER[9]	common data buffer	HEX	B#16#00	B#16#09
64	DB2.DBB	9	"BUFFER".BUFFER[10]	common data buffer	HEX	B#16#00	B#16#0A
65	DB2.DBB	10	"BUFFER".BUFFER[11]	common data buffer	HEX	B#16#00	B#16#0B
66	DB2.DBB	11	"BUFFER".BUFFER[12]	common data buffer	HEX	B#16#00	B#16#0C
67	DB2.DBB	12	"BUFFER".BUFFER[13]	common data buffer	HEX	B#16#00	B#16#0D
68	DB2.DBB	13	"BUFFER".BUFFER[14]	common data buffer	HEX	B#16#00	B#16#0E

Overview of the Turck data carriers

The data carriers type **I-Code SL2** are writable and readable starting with the byte No. 0 to byte No. 111.

The "Start Byte No." is part of the command structure "Physical_Read" page 4-24 and "Physical_Write" page 4-25 and is called "Start Address".

The table explains the data structure of the data carrier.

- TW-I14-B128
- TW-L43-43-F-B128
- TW-L82-49-P-B128
- TW-R16-B128
- TW-R20-B128
- TW-R30-B128
- TW-R50-B128
- TW-R50-90-HT-B128
- ...

Table 43: Data structure of I-Code SL2-data carrier

Byte No. (StartAddress)	Content	Access	Block No. (one block has 4 byte)
-16 to -9	UID	Read only via "Inventory" page 4-29	-4 to -3
-8 to -5	Tag information	Read only via specific commands	-2
-4 to -1	Conditions for Write access		-1
0 to 111	User data range	Read / write via "Physical_Read" page 4-24 and "Physical_Write" page 4-25	0 to 27

The data carriers type **I-Code SL1** are writable and readable starting with the byte No. 18 to byte No. 63.

The "Start Byte No." is part of the command structure "Physical_Read" page 4-24 and "Physical_Write" page 4-25 and is called "Start Address".

The table explains the data structure of the data carrier.

- TW-R16-B64
- TW-R22-HT-B64
- ...

Table 44: Data structure of I-Code SL1-data carrier

Byte No. (StartAddress)	Content	Access	Block No. (one block has 4 byte)
0 to 7	UID	Read only via "Inventory" page 4-29	0 to 1
8 to 11	Conditions for Write access	Read only via specific command	2
12 to 15	Special functions (for example, EAS / QUIET)	Read/Write only via specific commands	3/4
16	family code		
17	application identifier		
18 to 63	User data range	Read / write via "Physical_Read" page 4-24 and "Physical_Write" page 4-25	4/5 to 15

The data carriers type **FRAM** are writable and readable starting with the byte No. 0 to byte No. 1999.

The "Start Byte No." is part of the command structure "Physical_Read" page 4-24 and "Physical_Write" page 4-25 and is called "Start Address".

The table explains the data structure of the data carrier.

- TW-R20-K2
- TW-R30-K2
- TW-R50-K2
- TW-R50-90-HT-K2
- ...

Table 45: Data structure of the FRAM-data carriers

Byte No. (StartAddress)	**Content**	**Access**	**Block No. (one block has 8 byte)**
0 to 1999	User data range	Read / write via "Physical_Read" page 4-24 and "Physical_Write" page 4-25	0 to 249
2000 to 2007	UID	Read only via "Inventory" page 4-29	250
2008 to 2015	AFI, DSFID, EAS	Read/Write (with limitations) via specific command	251
2016 to 2047	Special functions (for example, EAS / QUIET)	Read only via specific command	252 to 255

4 Excerpt from the specifications

1 General information

TURCK publishes this excerpt of the PROFIBUS Specification "Profile for Identification Systems, Proxy Ident Function Block" (Version 1.20, June 2007) by courtesy of the PNO (PROFIBUS Nutzer Organisation).

Please also note "Definitions within the command and diagnostics levels" page 3-40.

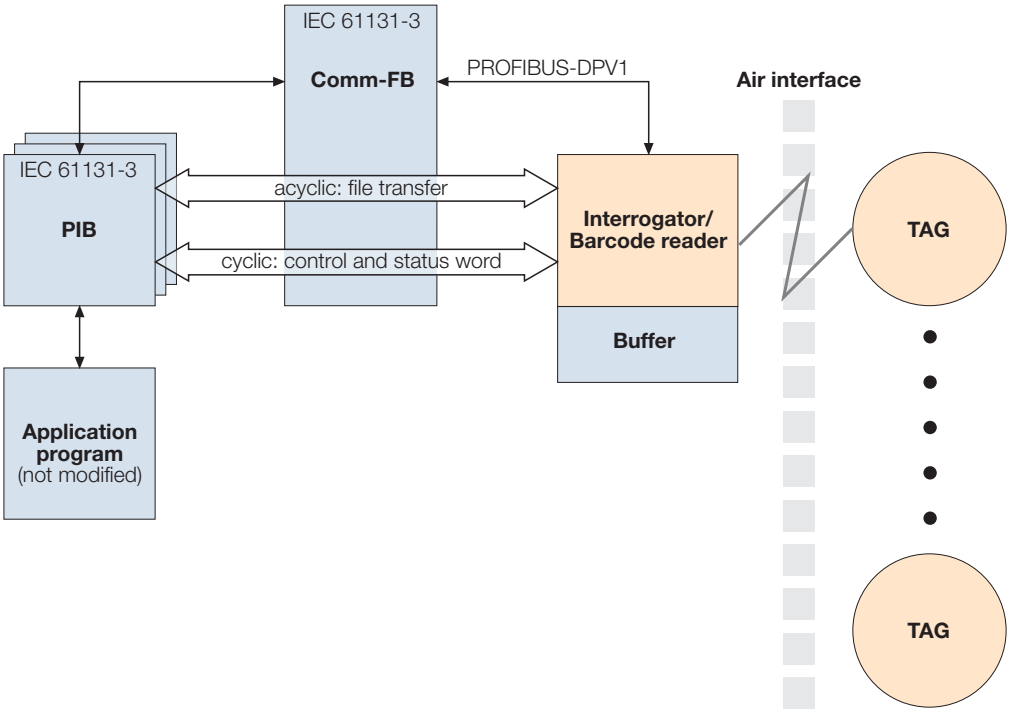
1.6 Functional requirements

This sub clause defines the functional requirements coming from the application of RFID and BR systems. They define the restrictions/limitations for the design of the PIB and the corresponding functions to be realized within the field device. As there are different functions regarding RFID and BR they are described in parallel.

1.6.1 General requirements

The basic idea is to adapt existing RFID and BR systems to PROFIBUS technology enabling integration into existing systems and to ease the use in new systems (refer to figure below).

Figure 85: Basic design



As existing proprietary solutions have to overcome there are certain restrictions to be considered in addition to the conformance to PROFIBUS technology.

It is required that:

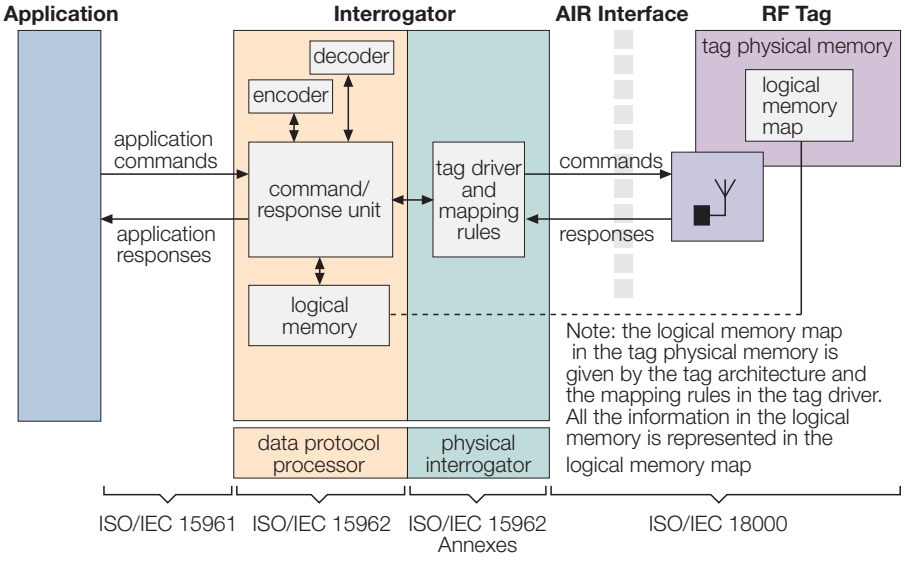
- Integration of RFID and BR systems do interfere with existing Profibus systems to a minimum extend.
  - Control flow is done with cyclic communication
  - Data transfer is done with acyclic communication
  - Application programs are kept independent from introducing PIB
  - Fragmentation, Defragmentation of data packages is kept inside the PIB

1.6.2 Requirements coming from the use of Radio Frequency Identification Systems

Regarding RFID systems actually standardization activities are under progress. These activities are targeted on defining the air interface (ISO/IEC 18000) as well as the file format and handling of files (ISO/IEC 15962) as illustrated below.

This profile specification explicitly focuses on data transfer via industrial networks based on PROFIBUS as well as on the integration into programmable controller systems.

Figure 86: Relevant standardization activities

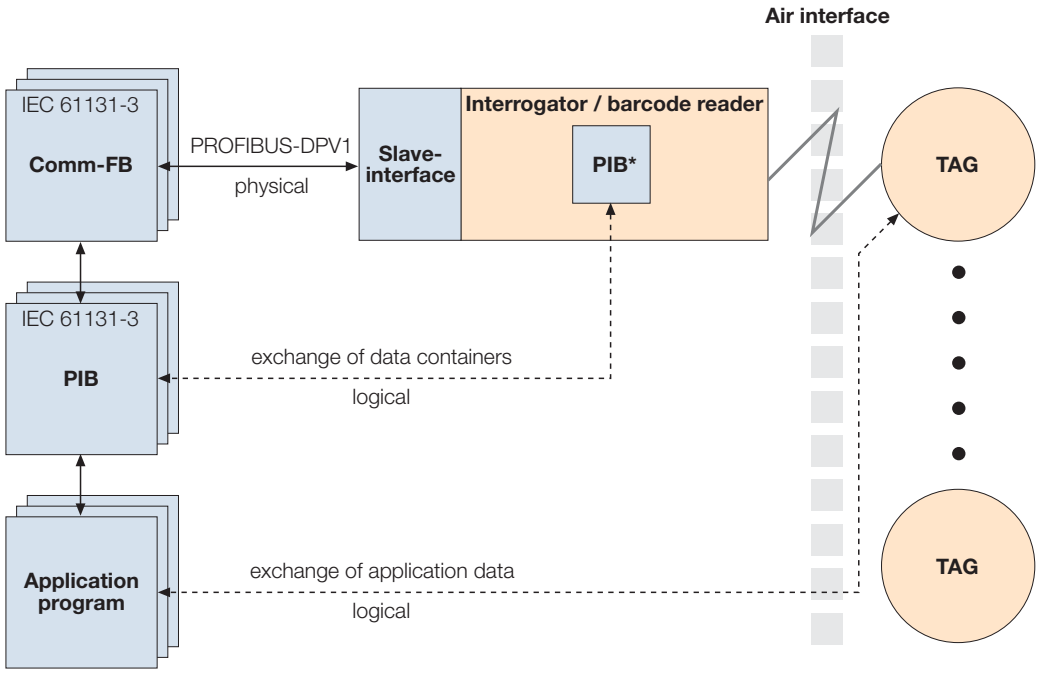


Because of these ongoing processes it seems not to be needed to consider these subjects within this document. Later on, if the standardization within IEC is finished the related documents can be referenced. Consequently this document will not consider:

- Air interface,
- File format,
- File handler,
- User data coding.

Currently it is usual to consider data as a packet that is interpreted by both applications the one in the Ident Unit and the one within the PLC using the PIB (see figure below).

Figure 87:
Data transfer



2.1 Principles of modelling

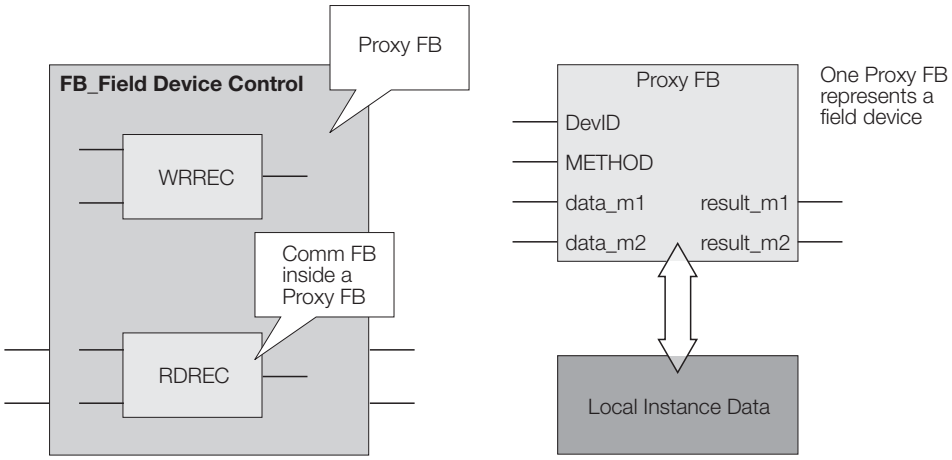
The following principles of modelling for the Proxy Ident Block (PIB) have to be met:

- To fit into the existing PLC systems, e.g. using the existent addressing concept.
- To be efficient and without overhead; that means the model shall be performance oriented.
- To enable an easy application program portation between different PLC systems.
- To use directly the existing Comm FBs.
- To apply good programming style is to avoid dependencies of the hardware configuration data such as addressing in the application program.

2.2 General PIB-model

The PIB is modeled as a Proxy FB representing a complete Ident Unit. It follows the basic concepts of Proxy FB modeling as described in [4].

Figure 88: Using Comm-FB and Proxy-FB for PIB-modelling PLC: DP-Master Class1 IEC 61131-3 Program



2.3 Representation

The representation of the interface of function block types is given in graphical and textual form according IEC 61131-3. The behavior of the function blocks is presented as a graphical state diagram with tables for the transitions and the actions.

3 Definition of Proxy-Ident-Blocks (PIB)

This chapter provides the specification of the Proxy Ident Block following the guidelines as stated within [4].

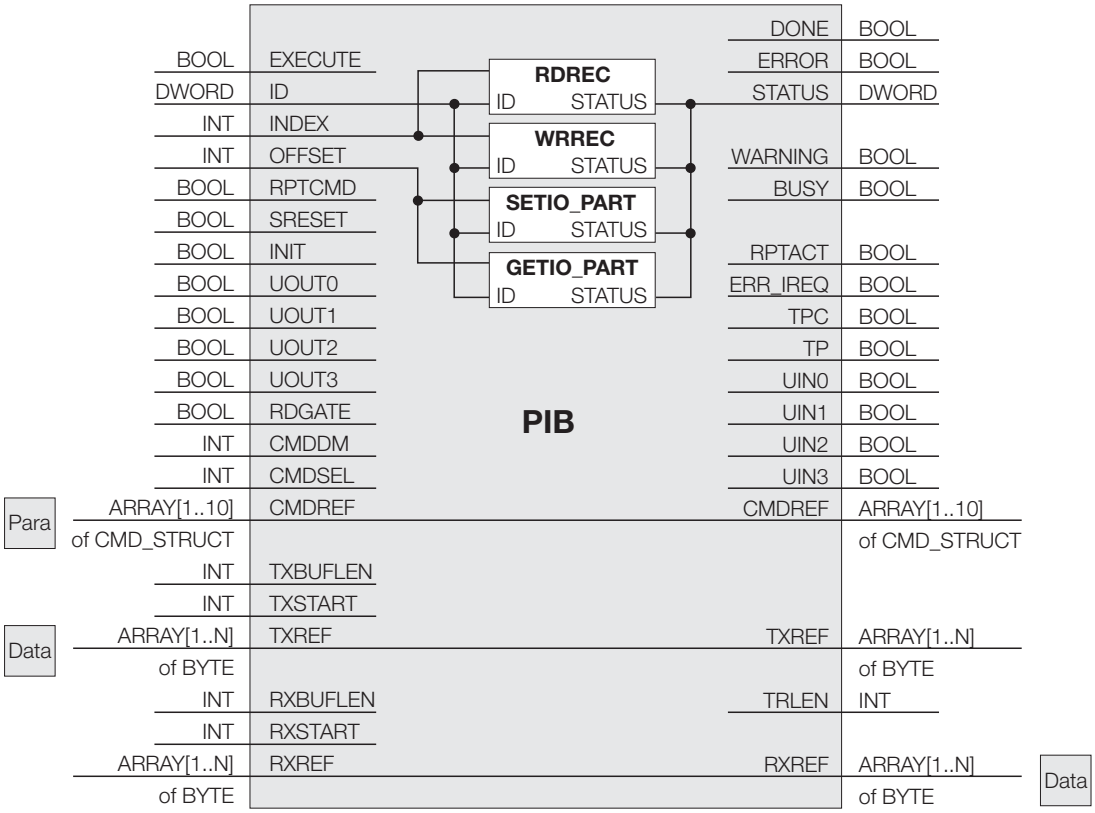
Note

In case several PIB instances are operated by an application program in parallel it must be guarantied that individual instances do not block each other.

3.1.1 Block Definition

The following figure provides a graphical presentation for the interface of the PIB.

Figure 89: Graphical Presentation of the PIB Interface



3.1.2 Parameters

Table 46: PIB-Parameter description

Name	Description
EXECUTE	The user (application program) can start the operation of a block instance by setting this input parameter of type BOOL to TRUE. Before starting the block operation the command and its associated parameters have to be put to the memory associated to the CMDREF parameter. Also the CMDSEL parameter has to be set properly. This parameter is activated with the rising edge.
ID*	The value of this input parameter is used as a unique identifier for addressing a single device or a slot within a device. The detailed description is given in [4]. In combination with the parameter "INDEX" it addresses an individual Ident Unit.
INDEX*	The value of this input parameter is used to identify a single ident channel within a slot of a device. The use of the parameter corresponds to the definition of the address parameter "Index" within [1] and [2].
OFFSET*	The value of this input parameter is used to identify the channel related I/O data as transferred cyclically as subpart of the data associated to a slot (module).
RPTCMD*	This parameter forces the Ident Unit to repeat the command currently executed or next to be executed as long as the parameter is set to "1". The parameter is mapped to the "Repeat_Command" bit of the cyclic control word (see chapter 4.2.1)
SRESET*	If this input parameter is set to "1" the command currently processed within the Ident Unit will become cancelled. The parameter is mapped to the "Soft_Reset" bit of the cyclic control word (see chapter 4.2.1). This parameter is activated with the rising edge.
INIT*	This input parameter forces, if set from "0" to "1", the Ident Unit to restart its operation except the communication interface. Local Ident Unit operations done within this procedure are manufacturer specific. The parameter is mapped to the "Init" bit of the cyclic control word (see chapter 4.2.1). After the sequence "Init_Active=0 Init_Active=1 Init_Active=0" (cyclic status word) has been completed the PIB has to send automatically a Write-Config command to the Ident Unit. This parameter is activated with the rising edge.
UOUT0*	This parameter of type BOOL represents the user specific bit 0 as defined to be transferred within the cyclic control word (see chapter 4.2.1). The parameter is mapped to bit 0 of the cyclic control word.
UOUT1*	This parameter of type BOOL represents the user specific bit 1 as defined to be transferred within the cyclic control word (see chapter 4.2.1). The parameter is mapped to bit 1 of the cyclic control word.
*The user program has the task to reset and change all input parameters.	

Table 46: (cont.) PIB-Parameter description

Name	Description
UOUT2*	This parameter of type BOOL represents the user specific bit 2 as defined to be transferred within the cyclic control word (see chapter 4.2.1). The parameter is mapped to bit 2 of the cyclic control word.
UOUT3*	This parameter of type BOOL represents the user specific bit 3 as defined to be transferred within the cyclic control word (see chapter 4.2.1). The parameter is mapped to bit 3 of the cyclic control word.
RDGATE*	This parameter of type BOOL represents the optional bit 8 as defined to be transferred within the cyclic control word (see chapter 4.2.1). If set to "1" means start operation.
CMDDIM*	In order to write a more efficient user application several Commands can be stored within the memory. The number of commands stored influences the range of memory to be instantiated for this PIB instance. The input parameter CMDDIM defines the number of command parameter structures "CMD_STRUCT".
CMDSEL*	As there may be a certain number of commands stored in parallel there must be a selector for a single command to be executed. The input parameter CMDSEL is used for this purpose. It references one of the predefined commands. The first CMD_STRUCT is reserved for parameters associated to the command "Write_Config".
CMDREF*	This In_Out parameter references a global memory range. This memory range is used to store commands and their associated parameters. The max. number of commands stored in association with a single PIB instance shall not exceed 10. Chapter 3.1.4 defines the commands supported by the profile version.
	supported by the profile-version.
TXBUFLEN*	This input parameter specifies the number of bytes used by this instance of the PIB for storing data to be send. The number is calculated starting from the relative position within the memory range defined by the TXSTART parameter. For consistency reasons it is recommended not to modify this parameter after the PIB is instantiated.
TXSTART*	The input parameter TXSTART indicates the relative position of the "TXBUF" within the global memory area referenced by the parameter "TXREF". This is the starting point of memory assigned to the PIB instance. For consistency reasons it is recommended not to modify this parameter after the PIB is instantiated.
TXREF*	This In_Out parameter is a reference to a global memory area used by several blocks. The PIB instance may share the memory with several other blocks.

*The user program has the task to reset and change all input parameters.

Table 46: (cont.) PIB-Parameter description

Name	Description
RXBUFLEN*	This input parameter specifies the number of bytes used by this instance of the PIB for storing data received. The number is calculated starting from the relative position within the memory range defined by the RXSTART parameter. For consistency reasons it is recommended not to modify this parameter after the PIB is instantiated.
RXSTART*	The input parameter RXSTART indicates the relative position of the "RXBUF" within the global memory area referenced by the parameter "RXREF". This is the starting point of memory assigned to the PIB instance. For consistency reasons it is recommended not to modify this parameter after the PIB is instantiated.
RXREF*	This In_Out parameter is a reference to a global memory area used by several blocks. The PIB instance may share the memory with several other blocks.
TRLEN	This output parameter indicates the number of user bytes transmitted (sent or received – depending on the command executed) after the command succeeded. It counts the number of data transferred starting at the position referenced by (TXSTART + OffsetBuffer) or (RXSTART + OffsetBuffer).
DONE	This output parameter indicates, if set to "TRUE", that a command has been executed with a positive result. The application program should check this flag before calculating the data transferred while executing the command.
ERROR	This output parameter is used to indicate, if set to "TRUE" that an error has been recognized. The error may be recognized local (within the host) or re-mote (within the Ident Unit). Detailed error information is provided by the "STATUS" parameter. The flag is set by the PIB internally depending on the Error bit within the acknowledgement frame (Bit 0 of CI). The flag is reset to "FALSE" by the PIB instance after a new call of a command.
WARNING	This output parameter is used to indicate, if set to "TRUE" that a warning has been recognized. The warning may be recognized local (within the host) or remote (within the Ident Unit). Detailed warning information is provided by the "STATUS" parameter. The flag is set by the PIB internally depending on the warning bits within the acknowledgement frame (Bit 1..7 of CI - one or more bits are set to 1). The flag is reset to "FALSE" by the PIB instance after a new call of a command. Note: In case of WARNING all user data associated to a command may be transferred correctly (if ERROR is not set). In this case the data buffer contains valid values.

*The user program has the task to reset and change all input parameters.

Table 46: (cont.) PIB-Parameter description

Name	Description
STATUS	The output parameter "STATUS" provides detailed error information or/ and warning information for the last command that has been executed with a negative result or warning indication. The value changes not before the next appearance of a warning or error. Coding depends on the source of the warning or error which may be reported from the embedded CommFBs, functions to access cyclic data, the Ident Unit, tag or from the PIB internal functions.
BUSY	This output parameter indicates, if set to "TRUE", that the PIB is "busy" and a command will no be accepted to become started (except "INIT" and "SRESET"). The parameter is intended to indicate the user that the PIB is still operating.
RPTACT	This output parameter indicates, if set to "TRUE", that the PIB* accepted the request for repeating the current command. It is mapped from the "Repeat_Command_Active" bit of the cyclic input data. The output parameter remains active as long as the bit within the cyclic telegram is set. The PIB* provides data following a command execution as long as this output parameter is set – the user shall read command result.
ERR_REQ	This output parameter indicates, if set to "TRUE", that the PIB* noticed a fatal error. It is mapped from the Error_Flag of the cyclic input data. The output parameter remains active as long as the bit within the cyclic telegram is set. The PIB remains in the current state (state machine). After noticing that this parameter is "TRUE" the user has to set the INIT input parameter of the PIB or send a Dev-Status command (if possible).
UIN0	This output parameter of type BOOL represents the user specific bit 0 as defined to be transferred within the cyclic status word (see chapter 4.2.2).
UIN1	This output parameter of type BOOL represents the user specific bit 1 as defined to be transferred within the cyclic status word (see chapter 4.2.2).
UIN2	This output parameter of type BOOL represents the user specific bit 2 as defined to be transferred within the cyclic status word (see chapter 4.2.2).
UIN3	This output parameter of type BOOL represents the user specific bit 3 as defined to be transferred within the cyclic status word (see chapter 4.2.2).
TP	This output parameter indicates, if set to "1", that a target is in the range of the Ident Unit. The parameter corresponds to the "Target_Present" bit of the cyclic status word (see chapter 4.2.2). It becomes reset in case there is no target in the range of the Ident Unit. In case an Ident Unit does not support this feature the parameter is set to "0". This parameter is not used for bar-code reader.
TPC	This output parameter indicates, if set to "1", that a new target is in the range of the Ident Unit. The parameter corresponds to the "Target_Presence_Changed" bit of the cyclic status word (see chapter 4.2.2). The parameter is reset to "0" after the next "Inventory" command succeeded. In case an Ident Unit does not support this feature the parameter is set to "0". This parameter is not used for barcode reader.

*The user program has the task to reset and change all input parameters.

Table 47: Features of PIB-parameters

Name	Data type	Range	User conditions m = mandatory, o = optional
EXECUTE	BOOL	When DONE≠O or ERROR≠O, a change from "0" to "1" of the parameter EXECUTE forces the function block to execute a command. (if DONE=0 and ERROR=0 the PIB has not been initialized or a command is in process)	m
ID*	DWORD	0×00000000 .... 0×FFFFFFFF (please see [4])	m
INDEX	INT	101...108, 111...118,201...254	m
OFFSET	INT	0...244	m
RPTCMD	BOOL	0 = No Repeat_Command 1 = Repeat_Command	o
SRESET	BOOL	Change from "0" to "1" forces the function block to execute the SRESET command (termination of the last actual command).	m
INIT	BOOL	Change from "0" to "1" forces the function block to execute the initialization procedure.	m
UOUT0	BOOL	Bit 0 = 0/1	o
UOUT1	BOOL	Bit 0 = 0/1	o
UOUT2	BOOL	Bit 0 = 0/1	o
UOUT3	BOOL	Bit 0 = 0/1	o
RDGATE	BOOL	0 = reading gate is not active 1 = reading gate is active	o
CMDDIM	INT	2 ... 10	m
CMDSEL	INT	1 ...10	m
CMDREF	ARRAY[2.. CMDDIM] from CMD_STRUCT	CMDDIM x 42	m
TXBUFLEN	INT	0 ... 32768	m
TXSTART	INT	0 ... 32768	m
RXBUFLEN	INT	0 ... 32768	m

*The user program has the task to reset and change all input parameters.

Table 47: (cont.) Features of PIB-parameters

Name	Data type	Range	User conditions m = mandatory, o = optional
RXSTART	INT	0 ... 32768	m
RXREF	ARRAY [1..N]of BYTE	N	m
TRLEN	INT	0 ... 32768	m
DONE	BOOL	0 = command not completed or last command finished with error 1 = command completed	m
ERROR	BOOL	0 = last command not completed or finished without error 1 = last command finished with error	m
WARNING	BOOL	0 = no warning information available 1 = warning information available	m
STATUS	DWORD	Refer to chapter 3.1.3	m
BUSY	BOOL	0 = PIB currently does not execute a command 1 = command currently executed by the PIB	m
RPTACT	BOOL	0 = no repeat command function active at the PIB* 1 = repeat command function active at the PIB*	o
ERR_REQ	BOOL	0 = no error indicated from the PIB* 1 = error indicated by the PIB*	m
UINO	BOOL	Bit 0 = 0/1	o
UIN1	BOOL	Bit 0 = 0/1	o
UIN2	BOOL	Bit 0 = 0/1	o
UIN3	BOOL	Bit 0 = 0/1	o
TP	BOOL	0 = no target present 1 = target present	o (not used for barcode reader)

Table 47: (cont.) Features of PIB-parameters

Name	Data type	Range	User conditions m = mandatory, o = optional
TPC	BOOL	0 = no target changed 1 = target changed	o (not used for barcode reader)

*The user program has the task to reset and change all input parameters.

To ease the access to individual elements of the command structure a common structure has been defined to be used for every command independent of the use of single parameters. The use of a parameter depends on the definition of the command itself.

The parameters are defined in chapter 3.1.4.

Figure 90: Data type definition of the PIB-command:

```
TYPE
    CMD STRUCT
        STRUCT
            CMD : BYTE;
            Config : BYTE ;
            OffsetBuffer : INT;
            UID : ARRAY[1..8] OF BYTE;
            FileName : ARRAY[1..8] OF BYTE;
            Offset : DINT;
            Length : INT;
            StartAddress : DINT;
            Attributes : BYTE;
            NextMode : BYTE;
            Timeout : INT;
            ObjectNumber : INT;
            FileType : WORD;
      END STRUCT;
END TYPE
```

3.1.3 Error and Warning Concept

The PIB indicates if the requested command was performed successfully or not. The error indication is typically used for two purposes:

1. To change the reaction to the process i.e. to implement a substitute reaction e.g. to repeat the request at another time or another place or to abort the process task.
2. To issue an alarm message to a HMI system by the application program or by the PLC system automatically.

Note

In case 1, only very few different reactions dependent on the indicated error are typical. Detailed error information is hardly used.

As the PIB encapsulates other FB's (Communication FB's) and functions, the STATUS parameter represents status information generated by several sources.

Also the parameter STATUS can be used to provide warning information.

Optionally to the use of the STATUS parameter it is possible to transmit error and warning information within diagnostic data (refer to chapter 4.4).

The STATUS output has the data type DWORD which is interpreted as a packed array of four bytes as described in the following table.

Table 48: Structure of STATUS-output

Byte	Name	Definition	Data type
0	Function_Num	Please see Table 49:	Byte
1	Error_Decode	Please see Table 50:	Byte
2	Error_Code_1	Please see Table 51:	Byte
3	Error_Code_2	Warnings of manufacturer-specific errors	Byte

The Function_Num byte definition is based on /2/ and extends the additions made in [4]. It is used for grouping of failures and warnings.

Table 49: Values of byte Function_ Num

Frame Select or (Bit 7), decimal	PDU - Indicator (Bit 5 to 6), decimal	Error_Code_2 is used for warnings (Bit 4)*	Function_ Code / Error_Code (Bit 0 to 3) decimal	Description per this profile
0	0 . . . 3	0/1	0 ... 15	No error
1	0, 1	0/1	0 . . . 15	Error not related to DP protocol and not defined for this profile
1	2	0/1	0 . . . 15	Error message regarding DP protocol, refer to /2/ and [4]
1	3	0/1	0	vendor specific coding of Error_Code_1 and Error_Code_2
1	3	0/1	1	Error_Code_1 provides error information related to Tag/Transponder/ Barcode vendor specific coding of Error_Code_2
1	3	0/1	2	Error_Code_1 sends error information to air-interface manufacturer-specific coding of Error_Code_2

Table 49: (cont.) Values of byte Function_ Num

Frame Select or (Bit 7), decimal	PDU - Indicator (Bit 5 to 6), decimal	Error_Code_2 is used for warnings (Bit 4)*	Function_ Code / Error_Code (Bit 0 to 3) decimal	Description per this profile
1	3	0/1	3	Error_ Code _1 provides error information related to file system vendor specific coding of Error_Code_2
1	3	0/1	4	Error_Code_1 provides error information related to Ident Unit (Interrogator/Barcode Reader) vendor specific coding of Error_ Code _2
1	3	0/1	5	Error_Code_1 provides error information regarding communication between PIB and Ident Unit (except DP error) vendor specific coding of Error_Code_2
1	3	0/1	6	Error_ Code _1 provides command specific error information vendor specific coding of Error_Code_2
1	3	0/1	7	Error_Code_1 provides error information generated internally by PIB vendor specific coding of Error_Code_2
1	3	0/1	8 ... 15	Not defined here

* Bit 4 = 0: Error_Code_2 contains vendor specific information, Bit 4 = 1: Error_Code_2 contains warning information (Byte 5 (CI) of acknowledge frame)

The Error_Decode-Byte is used to define the meaning of Function_Num, Error Code 1 and Error Code 2.

Table 50: Values from Byte Error Decode

Error_Decode	Source	Meaning
0×00	PLC	No error, no warnings
0×01 .. 0×7F	PLC	Warning (not used for this profile)
0×80	DP V1	Error reported according to IEC 61158-6 /2/
0×81 .. 0×8F	PLC	0x8x reports an error according the x-th parameter of the call of the Comm FB as defined
0×90 .. 0×FD		reserved
0×FE	Profile (PIB, Ident-device)	Profile-specific error
0×FF	Profile (PIB, Ident-device)	Reserved for future use

The Error_Code_1 provides a number detailing the error or warning. Within the following table Error_Decode is fixed to 0xFE.

Table 51: Values from Byte Error Code 1

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
1	1	IG	Tag memory error (e.g. CRC error).	o
1	2	IG	Presence error (indicated by Ident Unit), tag has left the transmission window.	o
1	3	IG	Address or command does not fit the tag characteristics (memory size) (indicated by Ident Unit).	o
1	4	IG	Tag is defective. (replace tag or battery)	o
1	5	IG	Tag memory overflow.	o
1	6	IG	Unformatted tag.	o
1	7	IG	Inconsistent tag data structure. Reformat tag.	o

Table 51: (cont.) Values from Byte Error

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
1	8	IG	Tag within the transmission window does not have the expected UID (indicated by Ident Unit).	o
1	9	IG	Command not supported by the Tag.	o
1	10	IG	Access violation (e.g. block locked) refer to ISO18000-x.	o
1	11..127	IG	Reserved for future profile use.	o
1	128..255	IG	Vendor specific.	o
2	1	IG	Communication time-out at air interface (indicated by Ident Unit)	o
2	2	IG	More tags/barcodes within transmission window than allowed. (indicated by Ident Unit)	o
2	3..127	IG	Reserved for future profile use.	o
2	128..255	IG	Vendor specific	o
3	1	IG	Incorrect file name (indicated by Ident Unit)	o
3	2	IG	File does not exist (indicated by Ident Unit)	o
3	3	IG	The Tag type is incorrect or unsuitable for the selected mode of operation. No file system available on tag. (indicated by Ident Unit)	o
3	4	IG	Create command; no more directory entries available. (indicated by Ident Unit)	o

Table 51: (cont.) Values from Byte Error

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
3	5	IG	Create command; file already exists in directory. (indicated by Ident Unit)	o
3	6	IG	Access right violation. (indicated by Ident Unit)	o
3	7	IG	File length overflow (indicated by Ident Unit)	o
3	8	IG	File not accessible (corrupted) (indicated by Ident Unit)	o
3	9..127	IG	Reserved for future profile use	o
3	128..255	IG	Vendor specific	o
4	1	IG	Power supply failure (indicated by Ident Unit)	o
4	2	IG	Hardware failure within Ident Unit (indicated by Ident Unit)	o
4	3	IG	Antenna not operating (indicated by Ident Unit); e.g. switched off or disconnected	o
4	4	IG	Command buffer overflow within Ident Unit (indicated by Ident Unit)	o
4	5	IG	Data buffer overflow within Ident Unit (indicated by Ident Unit)	o
4	6	IG	Command in this mode not supported by Ident Unit. (indicated by Ident Unit)	o

Table 51: (cont.) Values from Byte Error

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
4	7	IG	Ident Unit reports an unspecific error indicated by the cyclic Status Word (e.g. antenna does not work, …) This error is not related to a specific command.	o
4	8..127	IG	Reserved for future profile use.	o
4	128..255	IG	Vendor specific	o
5	1	IG	Wrong sequence number (SN) indicated by Ident Unit.	m
5	2	PIB	Wrong sequence number (SN) indicated by PIB.	m
5	4	IG	Invalid data block number DBN indicated by Ident Unit.	m
5	5	PIB	Invalid data block number DBN indicated by PIB.	m
5	6	IG	Invalid data block length DBL indicated by Ident Unit.	o
5	7	PIB	Invalid data block length DBL indicated by PIB.	m
5	8	IG	Command from another user being processed (indicated by Ident Unit).	o
5	9	PIB	The Ident Unit proceeds a hardware reset (Init_Active set to "1"), Init (Bit 15 within the cyclic control word) is expected from the PIB.	m

Table 51: (cont.) Values from Byte Error

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
5	10	PIB	The command code "CMD" and the respective acknowledgement do not correspond. This is a software or synchronization error that cannot occur in normal operation.	m
5	11	PIB	Wrong sequence of acknowledge telegrams (TDB/DBN).	m
5	12	PIB	Synchronization error (increment of AC_H/ AC_L and CC_H/CC_L in cyclic control word is wrong), INIT needed to be performed.	m
5	13..127	IG	Reserved for future profile use (must not be used).	o
5	128..255	IG	Vendor specific	o
6	1	IG	Invalid CMD	m
6	2	IG	Invalid command index CI indicated by Ident Unit.	m
6	3	IG	Invalid command parameter (e.g. data range) indicated by Ident Unit.	o
6	4	IG	Wrong synchronization between application program and Tag. A command expected is missing. (Object detect error).	o
6	5	IG	Only Write-Config command permissible in this state. (indicated by Ident Unit)	m
6	6..127	IG	Reserved for future profile use	o
6	128..255	IG	Vendor specific	o

Table 51: (cont.) Values from Byte Error

Function _Code/ Error_Code*	Error_Code_1 (decimal)	Sent by	Meaning	mandatory / optional
7	1	PIB	Only INIT command permissible in this state. (indicated by PIB)	m
7	2	PIB	Command code "CMD" not permissible.	m
7	3	PIB	Parameter "Length" of the command too long, does not fit the global data reserved within the TXBUF. (indicated by PIB).	m
7	4	PIB	RXBUF overflow (more data received than memory in RXBUF available).	m
7	5	PIB	This indication tells the user that only a "INIT" is permitted as the next command. All other commands will be rejected.	m
7	6	PIB	Wrong Index (out of range: 101 .. 108)	m
7	7	PIB	Ident Unit does not respond to INIT (Init_Active expected in cyclic status message).	m
7	8	PIB	Time-out during Init (60 seconds as defined by TC3WG9)	m
7	9	PIB	Command repetition not supported by the PIB*	o
7	10	PIB	Error during packet size adoption within PIB.	
7	11..127	PIB	Reserved for future profile use.	o
7	128..255	PIB	Vendor specific	o

*) Bit 0 to 3 (decimal coded) of Function_Num IU … Ident Unit

The Error_Code_2 provides either warning information (if Bit 4 of Function_Num is set "1") or optional vendor specific number detailing the error (if Bit 4 of Function_Num is reset "0"). The warnings are mapped from the acyclic acknowledge telegram Byte 5 (CI).

Table 52: Coding of warnings

Error_Decode	Error_Code_2 (Bit position)	Source	Meaning
0×FE	0	Ident Unit	Bit is fixed to "0".
0×FE	1	Ident Unit	Vendor specific
0×FE	2	Ident Unit	Vendor specific in case of Ident Unit being a Barcode Reader. Low Battery in case of Ident Unit being a RFID.
0×FE	3	Ident Unit	Vendor specific
0×FE	4	Ident Unit	Vendor specific
0×FE	5	Ident Unit	Vendor specific
0×FE	6	Ident Unit	Vendor specific
0×FE	7	Ident Unit	Vendor specific

3.1.4 Commands

This chapter describes the commands supported by the PIB and their associated parameters. The following restrictions apply to the use of commands:

- Cyclic control flow is of higher priority in relation to acyclic transmitted commands.
- "INIT" and "SRESET" are aborting the execution of a command within the Ident Unit.
- After sending a cyclic control message (INIT, SRESET) the consecutive change of parameter "DONE" is related to the cyclic control message and not to the command interrupted by INIT or SRESET.
- "INIT" resets communication (cyclic control and status flow, acyclic commands) between PIB and Ident Unit. For this procedure first "Init" is sent within cyclic control word. After the "Init_Active" bit within the status word is reset a "Write-Config" command is generated and sent to the Ident Unit. This requires that the user is providing "Write-Config" parameters within the command area before requesting "INIT". (see chapter 4.2.3)
- "Write-Config" resets all functions within the Ident Unit except communication.
- "SRESET" terminates the last command.

Table 53: Description of the PIB-command

Name	**Description**	
Get	This is the command to read manufacturer specific data located at the Ident Unit. The TXBUF is used as manufacturer specific area for parameter data (optional send data). Received data are stored within the RXBUF starting at the beginning of the RXBUF. The parameter TRLEN of the PIB indicates the number of bytes received.	
	VAR CMD : BYTE := 0×62; (* b *) END_VAR	
	Parameter	Description
	OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data received has to be stored. All following bytes have to be stored at incremented addresses.
	Length	This parameter specifies the number of bytes to be sent to the Ident Unit starting at the address indicated by the parameter Offset Buffer. The range is: 0 … 226.
Physical_ Read	This is the command to read data from a transponder using a physical start address and the length of data to be read. The parameter TRLEN of the PIB indicates the number of bytes received.	
	VAR CMD : BYTE := 0×70; (* p *) END_VAR	
	Parameter	Description
	OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data received has to be stored. All following bytes have to be stored at incremented addresses.
	UID	This parameter identifies a single transponder. UID = 0: Any (no specific) The tag currently present is read.
	Length	This parameter specifies the number of bytes to be read from transponder starting at the address indicated by the parameter StartAddress.
	Start Address	This parameter specifies a physical address within the trans-ponder memory.

Table 53: (cont.) Description of the PIB-command

Name	Description	
Physical_ Write	This command permits writing to a data carrier of data that is defined via a physical start address and the length of the data to be written.	
	VAR CMD : BYTE := 0×71; (* q *) END VAR	
	Parameter	Description
	OffsetBuffer	This parameter determines the relative Offset in the TXBUF. With it the first address in the memory range is set in which the first byte of the parameter data to be sent will be stored.
	UID	This parameter identifies a single data carrier. UID = 0: Arbitrary (no specific data carrier) The active, present tag is read.
	Length	This parameter specifies the number of bytes to be send to the transponder starting at the address indicated by the parameter StartAddress.
	Start Address	This parameter specifies a physical address within the trans-ponder memory.
Next	This is the command to finish operations regarding one transponder. The next command will be executed when the next transponder is recognized/ indicated.	
	VAR CMD : BYTE := 0×6E; (* n *) END VAR	
	Parameter	Description
	UID	This parameter identifies a single transponder. UID = 0: Any (no specific) The tag currently present is read.
	NextMode	valid values: NextMode = 0 (The next command can be applied to each (another or the same) tag) NextMode = 1 (only a different tag will become handled)

Table 53: (cont.) Description of the PIB-command

Name	Description	
Write-Config	This service is used to modify operation of the Ident Unit except interruption of the communication. It is possible to send new parameters to the Ident Unit (ConfigData). Also a reset can be initiated requesting the Ident Unit to restart operation. The TXBUF is used as manufacturer specific area for config data. Config data are manufacturer specific. Normally Write-Config is executed automatically by the PIB during INIT. Optionally Write-Config may be started with EXECUTE. Mandatory operation to be supported: Config = 1 Optional to be supported: Config = 2 or Config = 3	
	VAR CMD : BYTE := 0×78; (* x *) END VAR	
	Parameter	Description
	OffsetBuffer	This parameter specifies the relative offset within the TXBUF. It specifies the first address within the memory area where the first byte of data to be sent is to be stored.
	Length	This parameter specifies the number of config data byte to be written to the Ident Unit.
	Config	Config = 0...not allowed Config = 1...Reset, no ConfigData Config = 2...no Reset, ConfigData to be send Config = 3 ... Reset, ConfigData to be send Config > 3 ... reserved
	Definition of sub-parameters delivered within the response:	
	MaxPacketSize	This parameter is transmitted from the PIB* to the PIB and provides information about the max. length of the Ident PDU (Ident header + data) the slave device is able to receive or send. The PIB checks the PDU length supported by the PIB* dynamically within the initialization phase (INIT). PIB adapts the internal algorithm for packaging data and align the PDU size. 00 = Default (corresponds to 240 Byte) 64…240 = max. permitted PDU size of within the PIB* 01…63 = reserved 241…255 = reserved

Table 53: (cont.) Description of the PIB-command

Name	Description	
Read-Config	This service is used to read config data out of the Ident Unit. The RXBUF is used as manufacturer specific area for config data. Config data are manufacturer specific. The parameter TRLEN of the PIB indicates the number of bytes received.	
	VAR CMD : BYTE := 0×61; (* a *) END VAR	
	Parameter	Description
	OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data read is to be stored.
Mem-Status	This service is used to read the status of a tag (battery condition, memory size, type of tag, available capacity, …). The RXBUF is used as manufacturer specific area for status data. Status data are manufacturer specific. The parameter TRLEN of the PIB indicates the number of bytes received.	
	VAR CMD : BYTE := 0×73; (* s *) END VAR	
	Parameter	Description
	UID	This parameter identifies a single transponder. UID = 0: Any (no specific) The tag currently present is read.
	Attributes	This parameter is used to specify the class of information to be read. Valid values are: 0×00...reserved 0×01...warning detail 0×02...reserved 0×03...reserved 0×04...physical status information (man. Spec. details) 0×05...file system related status information (man. Spec. details) 0×06 - 0×7F reserved 0×80 - 0×FF manufacturer specific.
	OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data read is to be stored.

Table 53: (cont.) Description of the PIB-command

Name	**Description**	
Dev-Status	This service is used to read the status of an Ident Unit. The RXBUF is used as manufacturer specific area for status data. Status data are manufacturer specific. The parameter TRLEN of the PIB indicates the number of bytes received.	
	VAR CMD : BYTE := 0×74; (* t *) END VAR	
	Parameter	Description
	Attributes	This parameter is used to specify the class of information to be read. Valid values are: 0x00… reserved 0x01… warning detail (man. Spec. details) 0x02… error history (man. Spec. details) 0x03… command history (man. Spec. details) 0x04… channel related I&M information (data record I&M0) 0x05… channel related I&M information (data record I&M1) 0x06… channel related I&M information (data record I&M2) 0x07… channel related I&M information (data record I&M3) 0x08… channel related I&M information (data record I&M4) 0x09 – 0x7F reserved 0x80 – 0xFF manufacturer specific
	OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data read is to be stored.

Table 53: (cont.) Description of the PIB-command

Name	Description
Inventory	This command is used to request a list of all UID's currently accessible within the antenna lobe. Vendor specific it is possible to deliver additional information. The RXBUF is structured as follows. Following an example is given to illustrate the construction of the data transferred. It is not intended to be used as Structured Text code within the PLC program. The example represents the transmission of 5 objects (ObjectNumber = 5) and ObjectLength = 16 VAR CONSTANT ObjectNo. : INT := 5; ObjectLength : INT := 16; END_VAR TYPE UID_STRUCT STRUCT UID : ARRAY[1..8] OF BYTE; Data : ARRAY[1.. (ObjectLength-8)] OF BYTE; END STRUCT; END_TYPE TYPE UidList: ARRAY[1..ObjectNo.] OF UID _STRUCT; END_TYPE
	VAR CMD : BYTE := 0×69; (* i *) END VAR

Parameter	Description
Attributes	This parameter is used to specify the information to be read. Valid values are: 0x00…all UID's are read (without additional information) 0x01 – 0x7F reserved 0x80 – 0xFF manufacturer specific
OffsetBuffer	This parameter specifies the relative offset within the RXBUF. It specifies the first address within the memory area where the first byte of data read is to be stored.

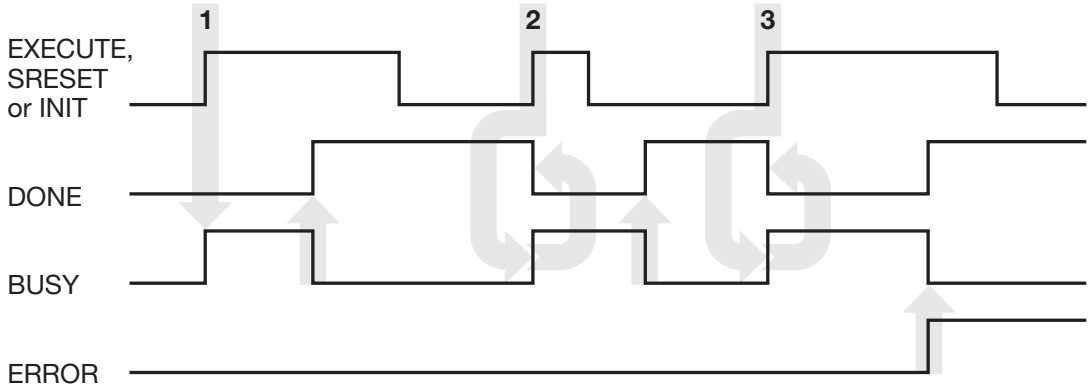
Table 53: (cont.) Description of the PIB-command

Name	Description	
	Definition of sub-parameters delivered within the response:	
	Parameter	Description
	Object No.	This parameter specifies the number of UID‘s delivered within the acknowledge.
	Object Length	This parameter specifies the number of bytes associated to a single UID (length of UID + additional data). In case of Attributes =0x00 the following applies: ObjectLength = 8.
	UidList	This optional parameter contains a list of manufacturer specific information associated to the UID’s currently accessible within the antenna lobe.

3.1.6. PIB Timing

The following diagram represents the general timing of the PIB.

Figure 91: General timely control of PIB



1 The EXECUTE/INIT/SRESET input remains 1 until the function block invocation has completed, it is reset by the user after DONE gets 1.

2 The user pulses the EXECUTE/INIT/SRESET input only for one invocation. The request is not aborted.

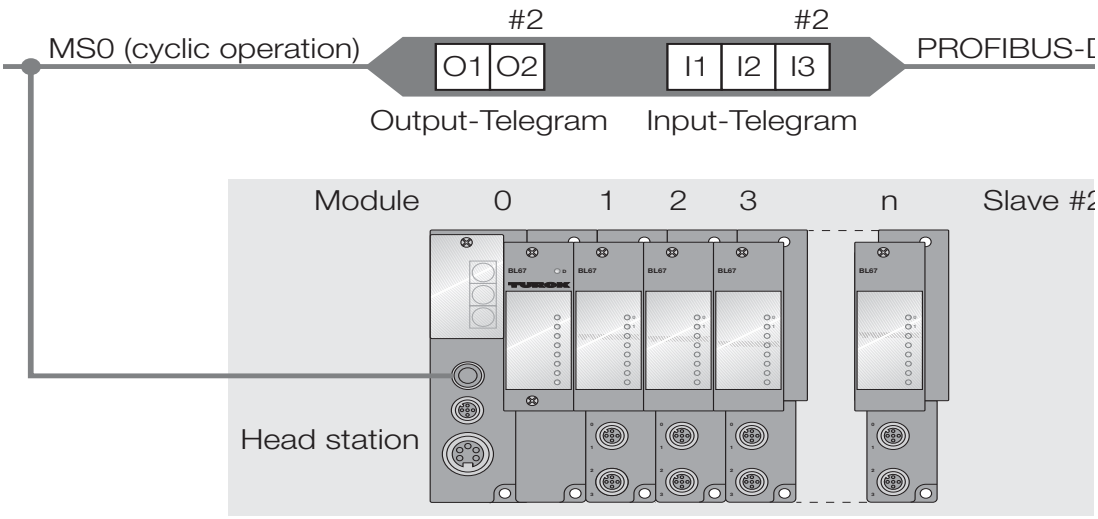
3 Like case 1, but an error occurred.

4.5 Data access within field device

4.5.1 General device model

A PROFIBUS device is whether a compact or a modular device (see figure below). In case it is a modular device it is constructed of a head station and a number of modules. It may optionally have binary inputs and outputs. The granularity of devices and modules may vary.

Figure 92: General Device Model



Head station

The head station contains the interface to PROFIBUS and the according parameters. The head station can be redundant. In this case, the redundant head station may occupy a backplane slot different from 0.

Module

A module usually contains a logical or physical combination of channels. The modules are inserted into the slots, or are otherwise stacked. A module may contain several channels. Modules are counted continuously, starting with the module next to the head station. Modules can exist, which do not contain channels (e.g. power supply). A module is logically identified by a slot number as shown in the figure above. The slot number is used for addressing purpose.

Channel

A channel contains all hard- and software components used to produce a measurement value (input channel) or to create a physical output signal (output channel). Thus, the ident channels represent the Ident Unit. Channels are counted separately for each module, starting with first channel 1. A module may contain up to 8 ident channels.

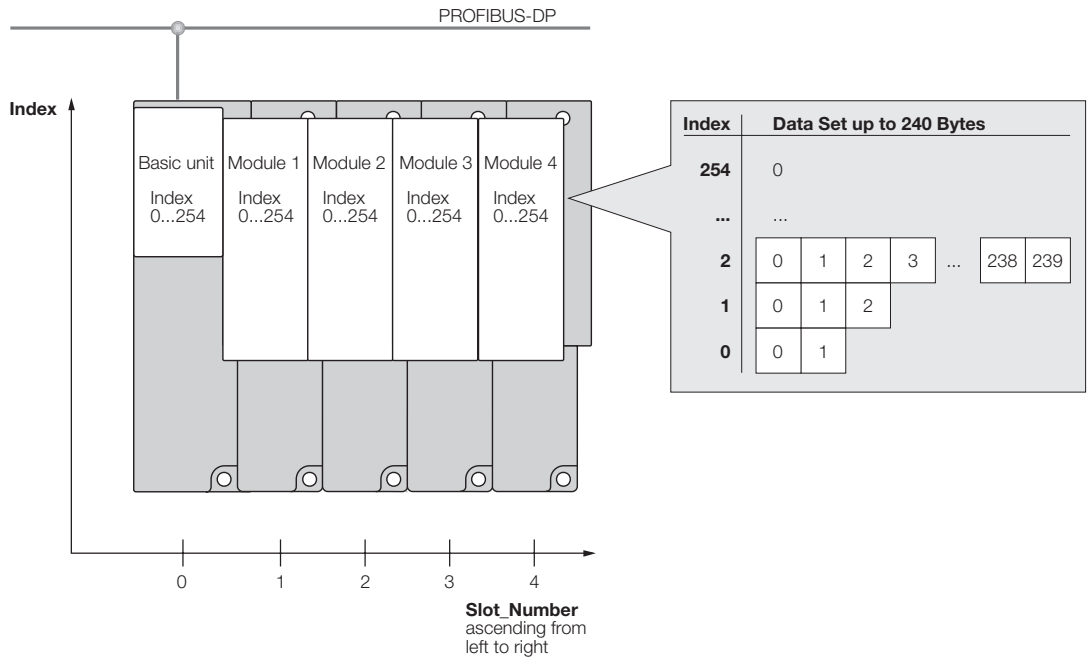
4.5.2 Block mapping for cyclic PROFIBUS-DP data transfer

The output values from master to the slave and the input values from the connected sensors are transferred as cyclic data. Cyclic data will be transferred via the Data_Exchange service ("...cyclic exchange of the I/O data with the DP-Master (Class 1)..."). The input and output values are mapped into the cyclic data stream. This mapping is device-global. The principle is shown in figure 30. The mapping relies on the modular structure of the GSD [7]. The modules in a device are defined using the Module/EndModule keywords. The assignment to a slot is controlled by the values inside the SlotDefinition/EndSlotDefinition keywords. The assignment of modules to physical slots is done by the configuration device.

4.5.3 Block Mapping for Acyclic PROFIBUS-DP Data Transfer

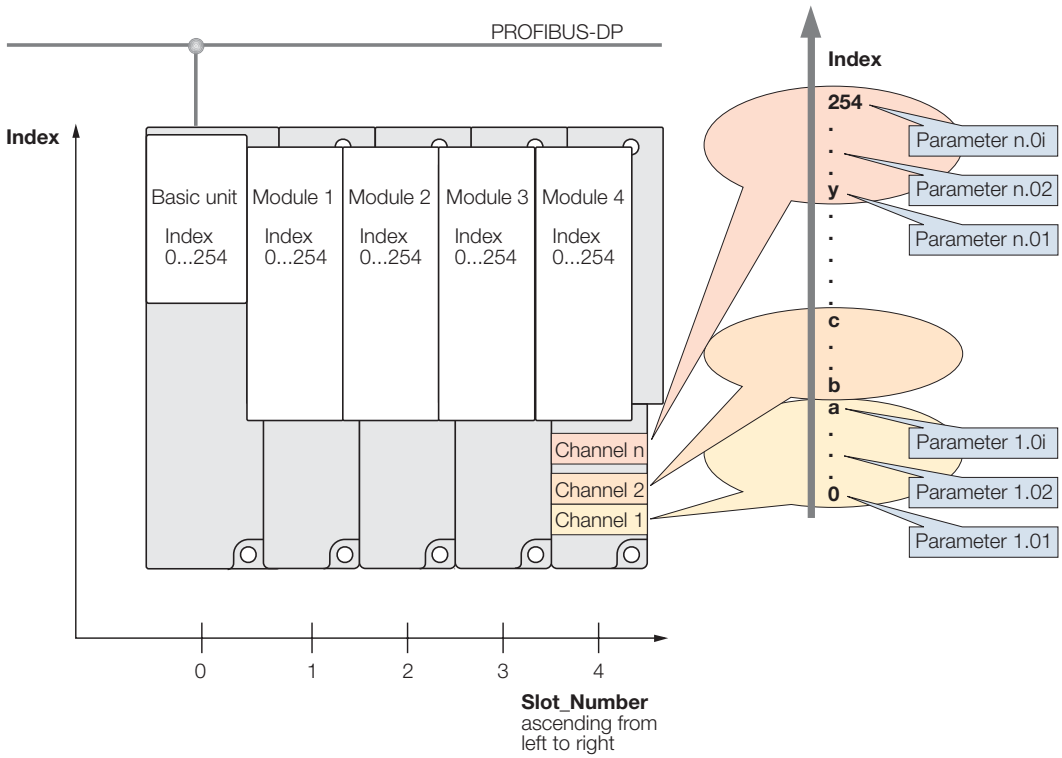
The acyclic PROFIBUS read and write services are based on slot – index address combinations. Within this profile a mapping is defined between the device structure and the slots. The device block is always assigned to slot number 0 (zero). Every module of a device is mapped to one slot. Each parameter of a module has to be mapped to an index in order to be accessible by MS1/MS2 services.

Figure 93: Mapping of input and output values to cyclic communication



In case several channels are assigned to one module, they will share the addressing space of the related slot. All parameters, independent from the channel they are assigned to, have to become addressed by an individual index as illustrated below.

Figure 94: Assignment of parameters and addresses



4.5.4 Ident channel definition

This chapter describes the mapping of ident channels to modules. Basically it is possible that up to 8 ident channels may be assigned to an individual module. Module 0 is not used to support an ident channel. For each of the ident channels two indices are used for acyclic communication:

- Index 10x ("x" representing the channel number)
  Indices 101 to 108 are used to parameterize one ident channel. Only the Write_Config command is allowed to be transferred through these indices. After the module starts up, a Write-Config must be sent to each ident channel. The channel is not ready for operation until this is done. A Write-Config is also accepted during normal operation. Write-Config interrupts a running command. The user receives no further acknowledgment for the interrupted command.
- Index 11x ("x" representing the channel number)
  Indices 111 to 118 are used for sending the actual commands and related acknowledgments (all commands except Write_Config).

Note

BL ident®-Modules have 2 channels per module. This only allows the use of Indices 111 to 112!
Other indices only carry error messages"DW#16#E7FE06xx" page 3-70!

The indices of a module are used as follows:

Table 54: Indices of a module

Index	Use
0 ... 100	reserved
101	Parameterization Channel 1 (CHL = 1)
102	Parameterization Channel 2 (CHL = 2)
103	Parameterization Channel 3 (CHL = 3)
104	Parameterization Channel 4 (CHL = 4)
105	Parameterization Channel 5 (CHL = 5)
106	Parameterization Channel 6 (CHL = 6)
107	Parameterization Channel 7 (CHL = 7)
108	Parameterization Channel 8 (CHL = 8)
109, 110	reserved
111	Data transfer Channel 1 (CHL = 1)
112	Data transfer Channel 2 (CHL = 2)
113	Data transfer Channel 3 (CHL = 3)
114	Data transfer Channel 4 (CHL = 4)
115	Data transfer Channel 5 (CHL = 5)
116	Data transfer Channel 6 (CHL = 6)

Table 54: Indices of a module

Index	Use
117	Data transfer Channel 7 (CHL = 7)
118	Data transfer Channel 8 (CHL = 8)
119 ... 200	reserved
201 ... 254	Manufacturer specific
255	I&M-functions

The main purpose of the I&M functions is to support the end user during various scenarios of a device's life cycle be it configuration, commissioning, parameterization, diagnostics, repair, firmware update, asset management, audit trailing, and alike. Well-defined uniform parameters and rules should enable the manufacturers to offer devices that behave in a uniform manner and that should enable the end user to act quick and straight. Information provided by the I&M function may be related to the complete device, to an individual module within a device ar a channel associated to a module. Data structures and access mechanisms for device and module related I&M functions are defined in "PROFIBUS Profile Guideline, Part 1, Identification and Maintenance Functions" [5]. Addressing of channel related I&M functions is currently under discussion within TC3 of PNO. The next version of the "PROFIBUS Profile Guideline, Part 1, Identification and Maintenance Functions" will define how to access these information. As it is the intention of TC3 WG9 not to define a proprietary version of channel related I&M functions this new version of "PROFIBUS Profile Guideline, Part 1, Identification and Maintenance Functions" shall become applicable here.

5.1 PROFILE_ID

The Profile ID’s used for the profile "PROFIBUS Proxy Ident Function Blocks acc. to IEC 61131-3" are:

- 5B00H for RFID systems and
- 5B10H for barcode readers.

Assignment of Profile ID’s is managed by PNO.

5.2 Channel related Information

For each channel it is possible to provide channel related I&M functions. Thus, a device may contain as many channel related information, as channels may be implemented in the individual modules. The scope of this information is restricted to an individual channel. The semantic meaning of the channel related I&M information is the same as of those related to a complete device or module. They are represented by the data types described in [5].

Appendix A - Compliance table

The following table lists the permitted "Implementation dependant features" of the PIB. A manufacturer which claims to be compliant with this PNO specification shall provide a list in the format of this table and shall identify all compliant features of the PIB supported.

Table 55: Implementation dependant features for the PIB

Clause	Feature	Implementation chosen
3	Maximum memory size supported for the TXBUF	
3	Maximum memory size supported for the RXBUF	
3	Maximum number of commands to be stored within the CMDREF	

The following table lists the communication related features of the Ident Unit relevant to this profile specification. A manufacturer of an Ident Unit which claims to be able to communicate with an instance of a PIB shall provide a list in the format of this table and shall identify all compliant features of the Ident Unit supported.

Table 56: Conformance table for Ident-devices

Clause	Feature	Explanation	Implementation specific additional information	compliant? (Y/N)
3.1.3	Read	Command		
3.1.3	Get	Command		
3.1.3	Physical_Read	Command		
3.1.3	Write	Command		
3.1.3	Put	Command		
3.1.3	Physical_Write	Command		
3.1.3	Format	Command		
3.1.3	Create	Command		
3.1.3	Delete	Command		
3.1.3	Clear	Command		
3.1.3	Update	Command		
3.1.3	Next	Command		
3.1.3	Get-Directory	Command		

Table 56: (cont.) Conformance table for Ident-devices

Clause	Feature	Explanation	Implementation specific additional information	compliant? (Y/N)
3.1.3	Set-Attribute	Command		
3.1.3	Get-Attribute	Command		
3.1.3	Write-Config	Command		
3.1.3	Read-Config	Command		
3.1.3	Mem-Status	Command		
3.1.3	Dev-Status	Command		
3.1.3	Inventory	Command		
3.1.3	Read-BarCode	Command		
4.2.1	Reading_Gate	Control Bit		
4.2.1	Command repetition	Control Bit		
4.2.2	Target_Presence_ Changed	Status Bit		
4.2.2	Target_Present	Status Bit		
	MaxPacketSize	Max. Ident PDU size supported		

Appendix B - Elementary data types used within this specification

This informative annex provides the data type definitions used for this specific profile specification.

Table 57: Data types

Name	Definition	Source
BOOL	Boolean (The possible values of variables of this data type shall be 0 and 1, corresponding to the keywords FALSE and TRUE, respectively.)	IEC 61131-3
DWORD	Bit string of length 32	IEC 61131-3
WORD	Bit string of length 16	IEC 61131-3
INT	Integer (The range of values for variables of this data type is from – (2^{16-1}) to (2^{16-1})-1.)	IEC 61131-3
ANY		IEC 61131-3
DINT	Double integer (The range of values for variables of this data type is from – (2^{32-1}) to ((2^{32-1})-1).	IEC 61131-3
BYTE	Bit string of length 8	IEC 61131-3
ARRAY[1..x] of Data Type		IEC 61131-3
CMD_ STRUCT	TYPE CMD STRUCT STRUCT CMD : BYTE; Config BYTE;. OffsetBuffer : INT; UID : ARRAY[1..8] OF BYTE; FileName : ARRAY[1..8] OF BYTE; Offset : DINT; Length : INT; StartAddress : DINT; Attributes : BYTE;. NextMode : BYTE;. Timeout : INT; ObjectNumber : INT; FileType : Word; END STRUCT; END TYPE	

Table 57: (cont.) Data types

Name	Definition	Source
DIRELEMENTS_ STRUCT	TYPE DIRELEMENTS_STRUCT STRUCT FileName : ARRAY[1..8] OF BYTE; UsedLength : DINT; Attributes : BYTE; FileLength : DINT; FileType : WORD; END STRUCT; END_TYPE	
DIRLIST_ STRUCT	Whereas this structure is defined in ST notation it is not intended to become copied into a ST program as it contains an array of dynamic length, which is not conform to IEC 61131-3 (ST). ST has only been chosen for consistency reason within the document. TYPE DIRLIST_ STRUCT STRUCT UID1 : ARRAY[1..8] OF BYTE; TagName : ARRAY[1..8] OF BYTE; FreeUserMem : DINT; Checksum : WORD; FileCount : INT; FileList : ARRAY[1..FileCount] of DIRELEMENTS_STRUCT; END STRUCT; END TYPE	
UID_STRUCT	Whereas this structure is defined in ST notation it is not intended to become copied into a ST program as it contains an array of dynamic length, which is not conform to IEC 61131-3 (ST). ST has only been chosen for consistency reason within the document. TYPE ObjectLength : INT; END_TYPE TYPE UID STRUCT STRUCT UID : ARRAY[1..8] OF BYTE; Data : ARRAY[1..(ObjectLength-8)] OF BYTE; END_STRUCT; END_TYPE	

Table 57: (cont.) Data types

Name	Definition	Source
UidList	Despite the fact that this structure is defined in the ST-language it must not be copied into a ST-program because it contains an array (field) with a dynamic length that does not meet IEC 61131-3 (ST) ST was only selected in the document based on reasons of consistency. TYPE ObjectNumber : INT; END TYPE TYPE UIdList: ARRAY[1..ObjectNumber] OF UID_STRUCT; END TYPE	

The encoding of UID is defined within Technical Report ISO/IEC /TR 15963, Automatic identification – Radio Frequency Identification for item management – Unique identification for RF tags, Annex A as follows:

Table 58: Encoding of UID

AC (Allocation Class)	UID issuer Registration Number	Serial number
8 Bit	Size defined by AC value	Size defined by AC value
MSB		LSB

Table 59: AC-values

AC-value	Class	UID issuer identifier size	Serial Number size	Registration authority (of "UID issuer Registration Number"
'11100000'	7816-6	8 Bit	48 Bit	APACS (ISO/IEC 7816-6 registration authority)
'11100001'	14816	perNEN	perNEN	NEN (ISO 14816 registration authority)
'11100010'	EAN.UCC	per EAN.UCC	per EAN.UCC	EAN.UCC
000×xxxx	INCITS 256	per ANS INCITS 256	per ANS INCITS 256	ANSI ASC INCITS T6
'11100011' to '11101111'	RFU	N/A	N/A	Reserved for future use by ISO

5 Glossary

A

Automation device

Control device with inputs and outputs that is connected to a technical process. Programmable controllers (SPC) are a special group of automation devices.

B

Bulk capture

Simultaneous, unequivocal recognition of multiple RFID data carriers which are directed around a read/write head (transceiver).

Bus

Bus system for the data transfer between hardware components (for example, CPU, memory, I/O-level). A bus may consist of multiple parallel cables for the transfer of data (addressing, control and power supply).

Bus system

The total of all devices that communicate with each other via a bus.

C

Configuration

Systematic mapping of a station's I/O-modules.

CPU

English abbr. for "Central Processing Unit". Central device for data processing, the core of the processor.

D

Distribution

Distribution involves all activities concerning the transfer of goods between economic entities.

DIN

Abbr. for "German Institute for Standardization Membership Corporation".

DP-Master Class 1

The automation system (SPC) which mainly executes cyclic data processing. The DPV1-functions may be used in addition/or as an option. (also DPM1/DPC1).

DP-Master Class 2

Only acyclic demand data are transferred. This data transfer may be executed with the help of an engineering tool (PC user program), for example.

DPV1

Expansion of functions for PROFIBUS-DP. In addition to the cyclic process data, demand data may be transferred via acyclic communication functions. The acyclic services are chronologically processed in parallel, and in addition to the cyclic process data transfer, they are completed with low priority.

E

Earth

In electrical engineering the term for conductive earth of which its electrical potential is zero at each point. Within the vicinity of grounding equipment the electrical potential of the earth may differ from zero; in this case the term "common ground reference potential" is used.

Earth electrode

One or more components which have direct and good contact with the earth.

EEPROM - Electrically Erasable Programmable Read-Only Memory

EEPROM describes a non-volatile, electronic memory component. An EEPROM consists of a field effect transistor matrix with insulated floating gate in which each transistor represents a bit.

EMC

Electromagnetic compatibility (EMC) identifies the generally desirable state in which technical devices are not interfering with each other based on unintentional electric or electromagnetic effects.

F

Fieldbus

Data network at sensor-/actuator level. A fieldbus connects the devices in the field with a control device. High transfer safety and real time behavior are characteristic for the fieldbus.

FRAM - Ferroelectric Random Access Memory

FRAM describes a non-volatile electronic memory type based on crystals with ferroelectric features.

G

Grounding

Connecting an electrically conductive part to the earth electrode via a piece of grounding equipment.

GSD - General Station Description

(Formerly master file) The GSD file describes the device features which are used in PROFIBUS-DP. The GSD file is a readable text file and is provided in different languages. Project planning tools require the device information for configuration and start-up. The content of the GSD file typically consists of general information (for example, manufacturer name and version), and for modular devices it consists of communication characteristics (for example module names, texts for diagnostic messages, parameterization possibilities and parameter names) of the individual modules.

H

Hexadecimal

Number system with the basis 16. The count starts at 0 to 9 and continues with the letters A, B, C, D, E and F.

I

IEC 61131

IEC 61131 is an international standard which covers the basics for programmable controllers.

Initialization

At initialization the required memory (for example, variables, code, buffer) is reserved and filled with start values.

IP - International Protection

The protection class (IP) identifies the suitability of electrical operating devices (for example, devices, installation material) in regards to different ambient conditions, also the protection of people against potential dangers when the electric operating devices are being used.

L

Logistics

Logistics involves the teachings of comprehensive planning, control, execution, allocation, optimization and control of processes for the movement from one location to another of goods, data, energy and persons as well as the needed means of transport.

LSB

English abbr. for "Least Significant Bit". Bit with the least significance.

M

Master

The Master controls access of a master-slave operation in the fieldbus range.

MSB

Abbr. for "Most Significant Bit". Bit with the most significance.

P

Parameterization

Setting of parameters of the individual bus participants or rather their modules in the configuration software of the DP-Master.

PIB

Abbr. for "Proxy Ident Function Block". This function block represents an Ident system in the control. This is why there exists a uniform program interface for the actual application.

PLC

Abbr. for Programmable Logic Controller.

R

Read/write head

The read/write head (also read/write device) creates an electromagnetic high-frequency field. This is how data is transferred and the data carrier (transponder) is supplied with power. The data is displayed with the help of modulation of the electromagnetic field.

Repeater

In the field of digital communication technology, the repeater is a signal regenerator which receives a signal in the bit physical layer then regenerates it and resends it. Noise as well as jitter of the run time and the pulse format are removed from the received signal during this type of regeneration.

RFID

Radio Frequency Indentification

RFID-Technology

This technology supports a contact free transfer of data with the help of an electromagnetic alternating field. This type of transfer is also called radio frequency technology. A Tag is used as data carrier.

S

Station

Function block of the assembly, consisting of multiple components.

STEP 7

STEP 7 is the current programming software of the Simatic-S7-SPS-family of the company Siemens AG and is the sequence to STEP 5.

T

Tag

RFID-tags are small transponders in an application suitable enclosure, for example, sticker, chip card, tag.

Transceiver

Sender and receiver combination

The RFID technology uses transceivers in form of so-called "Readers". These devices send a signal first which the transponder (for example, RFID-tag) acknowledges by sending a response which in turn is received by the transceiver and sent to a (computer) system for further processing.

Transponder

(**Trans**mitter + Res**ponder**)
Response-sending device. A transponder consists of a microchip (with an unique identification No.), a send-/receive-antenna and an enclosure. Data is transferred between a read-device and a transponder via electromagnetic waves.

Transponder-Technology

(also „RFID-Technology“)

U

UHF - Ultra High Frequency

This frequency range belongs to the microwave range. RIFD functions in Europe with 865..868 MHz / USA 902..928 MHz / Japan 955MHz / China 840..845 MHz and 920..925 MHz.

UID

English abbr. for "Unique Identifier". The UID is an unique serial No. for transponders. As address it refers to the data belonging to the transponder rather the tagged product. This data may be stored in a data base, for example.

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