MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6SE6400-1PB00-0AA0

PROFIBUS COMMUNICATION OPTION BOARD

Used with the applicable MICROMASTER 4 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens 6SE6400-1PB00-0AA0 technical data and applicable product instructions

The PROFIBUS optional board supports baud rates of 9.6 kbaud to 12 Mbaud. Fiber optics can be connected using Optical Link Plugs (OLPs) or Optical Link Modules (OLMs).

Functionality

- Cyclical process data exchange (PZD) in accordance with PROFIDrive Profile, version 2.0 or version 3.0
- Parameter accessing:
  Cyclical accessing of parameters (PKW) in accordance with PROFIDrive Profile version 2.0
  or
  acyclical accessing of parameters (data block 47) in accordance with PROFIDrive Profile version 3.0
- Acyclical accessing of parameters (data block 100/data block 47) for the purpose of exchanging parameter values with a SIMATIC S7 CPU (Drive ES SIMATIC function block package)
- Acyclical accessing of parameters for SIMATIC HMI or SIEMENS Drive STARTER tool.
- Support of PROFIBUS control commands SYNC and FREEZE for synchronized data transfer between the master and several slaves
- Internode communication for direct exchange of process data between PROFIBUS slaves (only in conjunction with SIMATIC S7 at the present time).

2 General Definition of PROFIBUS-DP

Definition

PROFIBUS is an international, open field bus standard which is used widely in the fields of production and process automation. The bus is guaranteed brand-neutral and open by virtue of its compliance with international standards EN 50170 and IEC 61158.

PROFIBUS-DP is a PROFIBUS communication profile optimized for high-speed, time-critical data transmission at field level using low-cost connections. PROFIBUS-DP is a suitable substitute for conventional, parallel 24 V signal transmission systems in manufacturing, as well as for analog 4..20 mA signal transmission systems in process automation.

PROFIBUS is a multi-master system, in other words, it is a bus on which several automation, engineering or visualization systems can operate together with the associated distributed field devices. In the context of PROFIBUS, master and slave devices are defined as follows:

- Master devices control data traffic on the bus; they are also referred to as "active" nodes. A master may transmit messages without prior receipt of an external request provided that it has bus access authorization (token). There are two classes of master:
  - Class 1 master:
    These are central automation stations (e.g. SIMATIC S5, S7 and SIMADYN D) which exchange information with slaves in predefined message cycles.
  - Class 2 master:
    These are programming, configuring or operator control and monitoring systems that are used to configure or start up or monitor the plant in operation.
- Slave devices are field devices such as drives (MICROMASTER4) , I/O devices and valves. They never receive bus access authorization, i.e. they may only acknowledge received messages or return information to a master on request. Slave devices are also referred to as "passive" nodes.

Table 3-5 Fault numbers for "Cannot process request" response

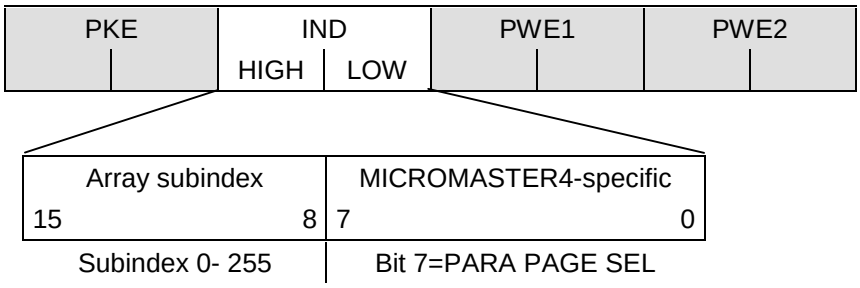
No.	Meaning	
0	Illegal parameter number (PNU)	Parameter does not exist
1	Parameter value cannot be modified	Parameter is a read-only parameter
2	Minimum/maximum not reached/exceeded	-
3	Faulty subindex	-
4	No array	Single parameter has been accessed with array request and subindex > 0
5	Incorrect data type	Mix-up between word and double word
6	Setting not allowed (resetting only)	-
7	Descriptive element cannot be modified	Description can never be modified with MICROMASTER4
11	No status as master control	Modification request without status as master control (see P0927)
12	Key word missing	-
17	Request cannot be processed due to operating state	Current converter status is not compatible with the received request
101	Parameter number currently deactivated	Dependent on converter status
102	Channel not wide enough	Communication channel too small for response
104	Illegal parameter value	Parameter permits only certain values
106	Request not implemented	After request identifier 5, 10, 15
200/ 201	Modified minimum/maximum not reached/exceeded	Minimum/maximum can be further limited in operation
204	Available access authorization does not cover modification of parameters	-

Parameter index (IND) 2nd word

Important NOTE

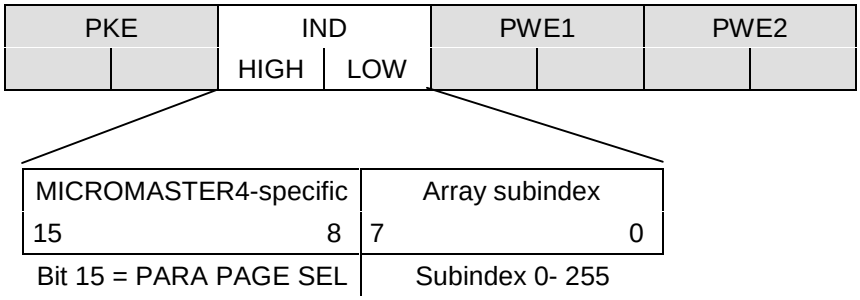
Assignments of index (IND) differ in the PPOs and on the acyclical channel (data block 100):

Structure of IND for cyclical communication via PPOs



The array subindex (referred to simply as "subindex" in the PROFIDrive Profile) is an 8-bit value which is transferred in the high-order byte (bits 8 to 15) of the parameter index (IND) when data are transferred cyclically via PPOs. The low-order byte (bits 0 to 7) is not defined in PROFIDrive Profile version 2.0. The low-order byte of the parameter index is used on MICROMASTER4 to be able to address additional parameters with a number of >1999.

Structure of IND for acyclical communication



The array subindex is an 8-bit value which is always transferred in the low-order byte (bits 0 to 7) of the parameter index (IND) in acyclical data exchange mode. The Parameter Page Selection task for additional parameters is performed in this case by the high-order byte (bits 8 to 15) of the parameter index. This structure conforms to the USS specification.

Function of the subindex in IND

Subindex = 0 .. 254

If the subindex is transferred with values between 0 and 254 in a request, the relevant parameter index is transferred in the case of an indexed parameter. For the meaning of the individual indices of a parameter, please refer to the "Parameter List" in the converter operating instructions.

In the case of a descriptive element, the number of the required element is transferred. The meaning of descriptive elements can be found in the PROFIDrive Profile, version 2.0.

Subindex = 255

A value of 255 for the array subindex is a MICROMASTER4-specific, special function. If the array index is transferred with 255, all the indices of an indexed parameter are transmitted simultaneously in one data block.

The function is meaningful only for acyclical data exchange mode. The structure of the transferred data block complies with the USS specification. The maximum data block size is 206 bytes.

Function of PARA PAGE SEL

The bit for parameter page selection functions as follows:

If it is set to 1, an offset of 2000 is applied in MICROMASTER4 to the parameter number (PNU) transferred in the PKW request before it is passed on.

Parameter name (acc. to Parameter List)	Corresponding mode of parameter addressing via PROFIBUS		
	PNU [decimal]	PNU [Hex.]	Bit 15: PARA PAGE SEL
P0000 - P1999	0 – 1999	0 - 7CF	= 0
P2000 - P3999	0 – 1999	0 - 7CF	= 1

Parameter value (PWE) 3rd and 4th word

The parameter value (PWE) is always transmitted as a double word (32-bit). Only one parameter value at a time can be transferred in a PPO telegram.

A 32-bit parameter value comprises PWE1 (high-order word, 3rd word) and PWE2 (low-order word, 4th word).

A 16-bit parameter value is transferred in PWE2 (low-order word, 4th word). PWE1 (high-order word, 3rd word) must be set to 0 on the PROFIBUS-DP master in this case.

Rules for processing requests/responses

- A request or a response can only ever refer to one parameter.
- The master must repeat a request continuously until it has received the appropriate response.
- The master detects the response to a request it has sent by
  - evaluating the response identifier,
  - evaluating the parameter number PNU,
  - evaluating the parameter index IND if necessary, or
  - evaluating the parameter value PWE if necessary.
- The complete request must be sent in one telegram. Request telegrams cannot be split. The same applies to responses.
- In the case of response telegrams which contain parameter values, the drive always returns the momentary parameter value when repeating response telegrams.
- If no information needs to be fetched from the PKW interface in cyclical operation (only PZD data are relevant), then the "No request" request telegram must be issued.

5 Starting up the PROFIBUS Board

NOTE

Before the converter with connected PROFIBUS board is switched on, you should plug either the standard display panel (SDP), a basic operator panel (BOP) or an 'Advanced Operator Panel' (AOP) into the PROFIBUS board.

The PROFIBUS optional board may only be installed when the converter power supply is disconnected.

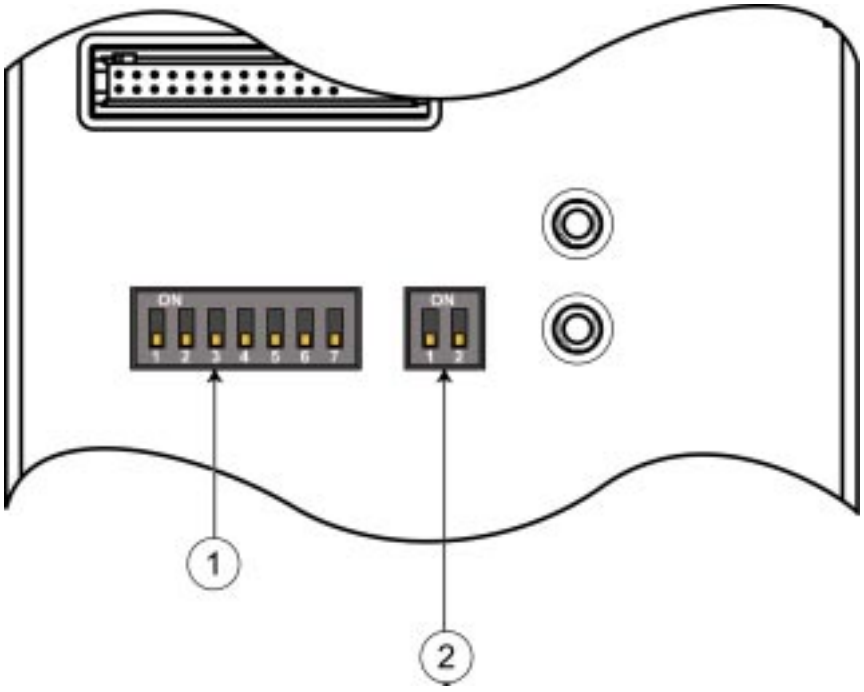
5.1 PROFIBUS address

A minimum requirement for starting up the PROFIBUS optional board is the PROFIBUS address setting.

Two methods of setting the PROFIBUS address:

- Via the seven DIP switches on the communication board or
- via parameter "P0918".

DIP switches



1 PROFIBUS address switch (DIP switch)
2 (for Siemens internal use only)

Fig. 5-1 View of DIP switch

The PROFIBUS address can be set to between 1 and 125, as shown in the following table, on DIP switches 1 to 7.

Switch number:	1	2	3	4	5	6	7
Add to address:	1	2	4	8	16	32	64
Example 1: Address = 3 = 1 + 2	**on**	**on**	off	off	off	off	off
Example 2: Address = 88 = 8 + 16 + 64	off	off	off	**on**	**on**	off	**on**

Some "addresses" have a special meaning:

Address	**Meaning**
0	PROFIBUS address is determined by P0918
1..125	Valid PROFIBUS address
126, 127	Invalid PROFIBUS address

Important NOTE

The converter power supply must be switched off before the DIP switch settings are changed (if the communication board is already mounted on converter). DIP switch setting changes do not take effect until the PROFIBUS has been restarted cold again. This cold restart must be initiated by switching the power off and then on again, irrespective of whether the board is supplied from the converter mains supply or its own, separate 24 V connection.

5.2 Communication board parameters

The following parameters must be set to start up the PROFIBUS optional board:

Parameter	Content
P0918	PROFIBUS address
P0719	Process data master control
P0700	Fast selection command source
P1000	Fast selection frequency setpoint
r2050	Process data setpoint source (BICO)
P2051	Process data actual values (BICO)
P2041	Communication board functions
P2040	Process data telegram failure time
P0927	Modification source for parameters
r2054	Communication board diagnostics (see Section 7.3)

Parameter "P0918" (PROFIBUS address)

If address 0 is set on the DIP switches of the communication board (setting in delivery state), then the PROFIBUS address can be changed in parameter "P0918". Valid settings are 1 to 125 (default = 3).

Once a valid PROFIBUS address has been set on the switches, parameter "P0918" can no longer be changed. In this case, the parameter displays the PROFIBUS address set on the switches.

The "Reset converter parameters to factory setting" function also resets the PROFIBUS address to 3 if it has been set originally via "P0918“.

Parameter "P0719" (process data master control)

P0719 = 66!

For simple applications, parameter P0719 can be set to 66 to select the setpoint source. Control word 1 and the master setpoint are then accepted by the PROFIBUS optional board.

Status word 1 and the actual main value are output via the PROFIBUS optional board regardless of the setting in P0719.

P0719 has priority over "P0700“ and "P1000“.

Parameters "P0700" and "P1000" (fast selection)

The control word and setpoint sources can be selected quickly in parameters P0700 (select command source) and P1000 (select frequency setpoint) respectively.

P0719 must be set to 0 when BICO technology is used with "P700" and "P1000".

8 Appendix

8.1 Technical data

Table 8-1 Technical data

Order number	6SE6400-1PB00-0AA0
Size (height x width x depth)	 161 mm x 73 mm x 43.5 mm
Pollution severity	Pollution severity 2 according to IEC 664-1 (DIN VDE 0110/T1), No moisture condensation permitted in operation
Mechanical strength In stationary state - Deflection - Acceleration During transportation - Deflection - Acceleration	Acc. to DIN IEC 68-2-6 (with correctly installed board) 0.15 mm in 10 Hz to 58 Hz frequency range 19.6 m/s^2 in > 58 Hz to 500 Hz frequency range 3.5 mm in 5 Hz to 9 Hz frequency range 9.8 m/s^2 in > 9 Hz to 500 Hz frequency range
Climate class	Class 3K3 to DIN IEC 721-3-3 (in operation)
Cooling method	Natural air cooling
Permissible ambient or coolant temperature - In operation - In storage - In transit	 -10° C to +50° C (14° F to 122° F) -25° C to +70° C (-13° F to 158° F) -25° C to +70° C (-13° F to 158° F)
Permissible humidity rating	Relative air humidity <= 95 % in transit and storage <= 85 % in operation (condensation not permissible)
Supply voltage	6.5 V ± 5 %, max. 300 mA, internal from basic converter or 24V ± 10 %, max. 350 mA, from external source
Output voltage	5 V ± 10 %, max. 100 mA, electrically isolated supply - for the bus termination of the serial interface or - for the supply of an OLP (Optical Link Plug)
Data transmission rate	Max. 12 Mbaud

8.2 EMC information

The board complies with the following standards governing radio emissions and interference immunity:

- Radio emissions in accordance with EN55011 1991 Class A
- Interference immunity in accordance with IEC 801-3 and EN61000-4-3