

Expansion cards for Hi-drive



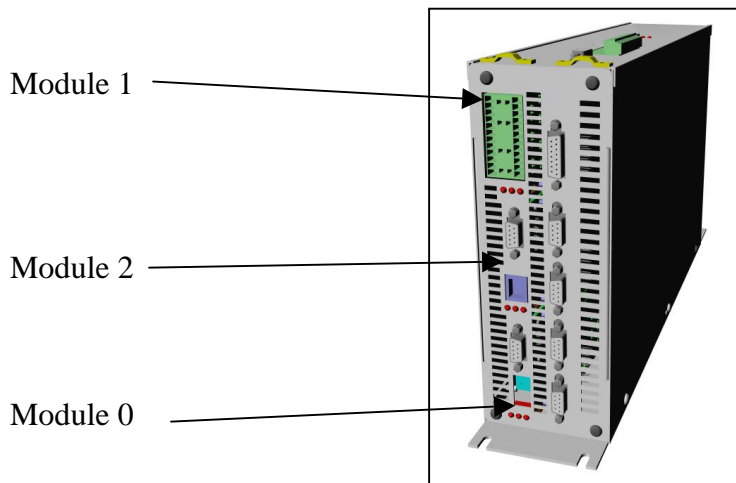
Rev.0.0
October 2005

1.EXPANSION CARDS

The Rev.4 firmware (micro + FPGA_200) is designed to manage the following optional expansion cards:

- input and output card
- Profibus card

The drive can house three modules. The modules chosen determine the drive configuration:



Each module is represented by a fixed parameter:

- module 0 = Pr381
- module 1 = Pr382
- module 2 = Pr383

The values of these three parameters may vary from 310 to 380, and each value takes up 2 words (2 parameters): the first word indicates the parameter displaying the input status (selected from parameters Pr0 to Pr255), while the second shows the output status.

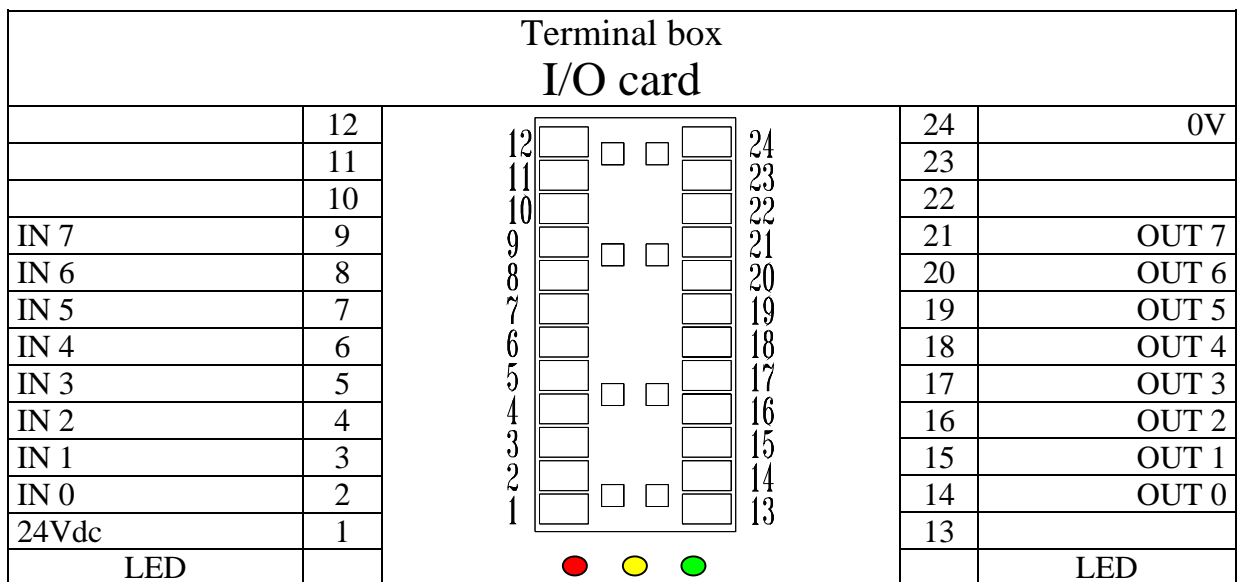
N.B. the “map parameters” indicating the inputs must never be used to indicate the outputs. It is therefore advisable to carefully select the 2 words used.

The data scanning sequence of the modules is as follows:



1.1. INPUT/OUTPUT card

Each I/O module (order code EXPI-8I8O) has 8 inputs and 8 outputs. Inputs and outputs are scanned every 128µs.



The LEDs on the card indicate the following statuses:

	GREEN	YELLOW	RED
Service mode (boot)	ON	ON	-
Module initialization in course	OFF	ON	-
Module initialized	OFF	OFF	-
Communication between module and drive not initialized	OFF	OFF	-
Communication between module and drive active	ON	OFF	-
No alarm	ON	OFF	OFF
Alarm: module outputs protected due to overcurrent	ON	-	ON

Example: using two I/O modules (module 1 and 2). The card configuration is:

Module	Module management parameter	Mapping parameter	Map para.	Addressed parameter	Description
Module 0	Pr381		310		
			311		
Module 1: I/O	Pr382	Pr312	312	Pr100	Module 1 input status
			313	Pr101	Module 1 output status
Module 2: I/O	Pr383	Pr314	314	Pr102	Module 2 input status
			315	Pr100	Module 2 output status (displays status of inputs to module 1)
			316		
			...		
			378		
			379		
			380		

Module 1 is defined by parameter Pr382, which contains the parameter showing the card mapping. In this case Pr312 is indicated: since it is a two-word parameter, it means that parameter Pr312 indicates the inputs to module 1 and Pr313 is used to show the output status. These two parameters must specify the two parameters to which the inputs and outputs must be associated.

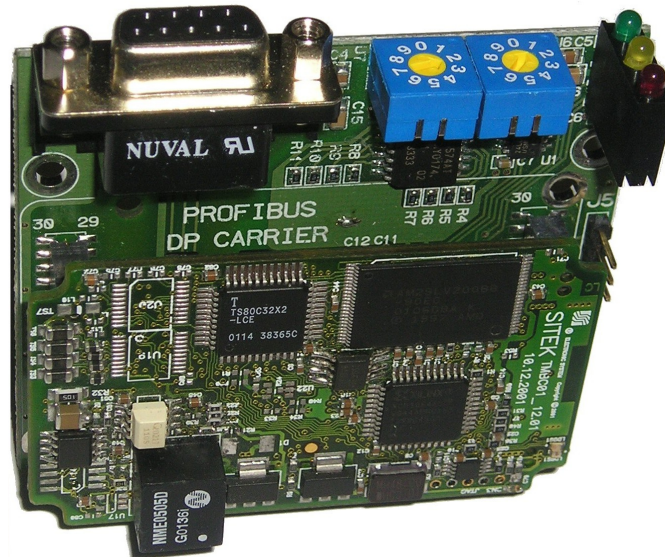
N.B. inputs may be addressed only on parameters Pr0 to Pr255.

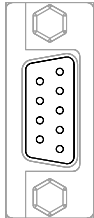



N.B. the same map parameter cannot be used for more than one module.

1.2. PROFIBUS card

The Profibus card comprises a DB9 connector and two selectors which define the address indicated by a decimal number from 0 to 99.

Data exchange between the drive and the card takes place at the beginning of the operating mode layer every 512µs (outputs are updated at the subsequent scan).



Profibus card					
VP	6	 DB9	1	n.c.	
n.c.	7		2	n.c.	
RxD/TxD (-)	8		3	RxD/TxD (+)	
n.c.	9		4	CONTR - P	
			5	DGND	
Profibus address selector: tens	1	 Selector 1			
Profibus address selector: units	2	 Selector 2			
LED				LED	

The LEDs on the card indicate the following statuses:

	GREEN	YELLOW	RED
Service mode (boot)	ON	ON	-
Module initialization in course	OFF	ON	-
Module initialized Communication between module and drive not initialized	OFF	OFF	-
Communication between module and drive active	ON	OFF	-
No alarm	ON	OFF	OFF
Alarm: Profibus communication error	ON	-	ON

Module	Module management parameter	Mapping parameter	Map para.	Addressed parameter	Description
Module 0	Pr381	Pr3xx	Includes 32 continuous parameters (they must be within the range from 310 to 380)	Prxxx	

The Profibus card exchanges 16 words in input (IW[0...15]) and 16 words (OW[0...15]) in output. The outputs are entered in the mapping first, followed by the inputs. From the point of view of the PLC, there are 15 words available for reading and 15 for writing organized according to the following structure:

- a bi-directional block of 4 words for writing and 4 words for reading for the service channel
- 5 blocks of 2 words each for writing
- 5 blocks of 2 words each for reading
- 1 block of 1 word for writing
- 1 block of 1 word for reading

When configuring the network, users must select the blocks that must be sent and/or received through the Profibus network by the PLC.

The parameterization telegram contains information regarding the sequence of the blocks that are exchanged.

The map parameter indicates the parameter which functions as the address of the individual blocks in the map. Care must be taken when using these addresses to avoid “writing” the high word on a low word of another block.

Output (received by the drive via Profibus)			Input (written by the drive with Profibus)		
address	Block	Description	address	Block	Description
OW0		Profibus status	IW0		Reserved
OW1	Service channel	CMD Ser. CH.	IW1	Service channel	STATUS Ser. CH.
OW2		Address Ser. CH.	IW2		address Ser. CH.
OW3		DATA H Ser. CH.	IW3		DATA H Ser. CH.
OW4		DATA L Ser. CH.	IW4		DATA L Ser. CH.
OW5	Output Block0	Data HIGH	IW5	Input Block0	Data HIGH
OW6		Data LOW	IW6		Data LOW
OW7	Output Block 1	Data HIGH	IW7	Input Block 1	Data HIGH
OW8		Data LOW	IW8		Data LOW
OW9	Output Block 2	Data HIGH	IW9	Input Block 2	Data HIGH
OW10		Data LOW	IW10		Data LOW
OW11	Output Block 3	Data HIGH	IW11	Input Block 3	Data HIGH
OW12		Data LOW	IW12		Data LOW
OW13	Output Block 4	Data HIGH	IW13	Input Block 4	Data HIGH
OW14		Data LOW	IW14		Data LOW
OW15	Output Block 5	Data	IW15	Input Block 5	Data

H: high data, most significant word

L: low data, less significant word

The whole map is exchanged in a single scan.

1.2.1. Description of the service channel

Both the input and output words IW[1...4] and OW[1...4] are used for the service channel.

Output service channel

OW[1]: service channel command. The following table contains a description of the functions contained in this word:

Bit	Function	Description
Bit[0...3]	Type of command	1: read 2: write 3: set bits 4: reset bits 5: toggle bits
Bit[4...5]	Length of data	0: 1 byte 1: 2 byte 2: 3 byte 3: 4 byte
Bit[6]	Reserved	
Bit[7]	Toggle bit	At each change the bit triggers execution of the command
Bit[8...12]	Node address	Indicates the node, if necessary connected via SBC CAN, to which the valid value 1...31 is sent (for drives which permit extended acyclic communication, otherwise 1...14)
Bit[13]	External node CAN	Permits service channel commands to be sent to external nodes connected via SBC CAN
Bit[14...15]	Reserved	

OW[2]: parameter address. It contains the address of the parameter to be modified or read.

OW[3]: low data. It contains the first two bytes of data to modify the parameters. When bit operations are performed, it contains the mask of bits on which action must be taken.

OW[4]: high data. It contains the most significant two bytes for writing operations 3 or 4 bytes long.

Input service channel

IW[1]: stato service channel. La tabella seguente contiene la descrizione delle funzioni contenute in questa word:

Bit	Funzione	Descrizione
Bit[0...3]	Type of command	1: read 2: write 3: set bits 4: reset bits 5: toggle bits
Bit[4...5]	Length of data	0: 1 byte 1: 2 byte 2: 3 byte 3: 4 byte
Bit[6]	Reserved	
Bit[7]	Toggle bit	When the bit is equal in value to its correspondent in the command word, it means that the execution is terminated and it is possible to go on to the next one.
Bit[8...12]	Node address	The address of the remote node to which the command is addressed is repeated when the external node mode CAN bit [13] OW[1] is used.
Bit[13...14]	Reserved	
Bit[15]	Fault service channel	To 1 if communication with external node CAN is not successful.

IW[2]: parameter address. The parameter address of the operation that has been performed is returned.

IW[3]: low data. 2 least significant bytes read.

IW[4]: high data. 2 most significant bytes read.

N.B.: The master function on the card with the Profibus expansion must be set by switching bit b78.14 to 1 to enable communication with external nodes via CAN and, if confirmation of the operation is required from the nodes connected via CAN when parameters are changed too, bit b78.15 on the connected slave nodes (function active only for hi-drive) must be switched to 1.

Example: using the Profibus module (module 0). The card configuration is:

Module	Module management parameter	Mapping parameter	Map para.	Addressed parameter	Description
Module 0	Pr381	Pr310	310		Profibus status
			311	Service channel	Service channel
			312		
			313		
			314		
			315	103	Used by the PLC via OW5 [H]
			316	102	Used by the PLC via OW6 [L]
			
			326		Reserved
			327	Service channel	Service channel
			328		
			329		
			330		
			331	105	Used by the PLC via IW5 [H]
			332	104	Used by the PLC via IW6 [L]
			
			341		
			342		
			...		
			378		
			379		
			380		



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