Getting started with the IP-S7-Link .Net Advanced MATLAB

The IP-S7-Link .Net Advanced MATLAB is a toolbox which uses the software driver framework IP-S7-Link .Net Advanced which does implement the whole internet protocol (IP) stack for Simatic S7 controllers. While the toolbox does provide simple read / write methods it does also target different advanced scenarios. Using this toolbox does not only bring the possibility to bind programmable logic controller (PLC) addresses to your MATLAB application. It does also provide mechanisms to link variables or whole structs to one or more PLC addresses of your PLC device and read / write them at once.

This section of the IP-S7-Link .Net Advanced MATLAB documentation provides information about basic application development tasks.

Operand

Name	Abbreviation (Siemens, DE)	Abbreviation(IEC)
Input	E	I
Output	A	Q
Flag	M	M
Peripherals	P	P
Counter	Z	C
Data Block	DB	DB
Timer	T	16

Data types

Name	Abbreviation	Bit size	Range	Description	Array
BOOL	X	1	0 to 1	single bit representing true (1) or false (0)	x
BYTE	B	8	0 to 255	unsigned 8-bit	x
WORD	W	16	0 to 65.535	unsigned 16-bit (Word)	x
DWORD	D	32	0 to 2^{32} -1	unsigned 32-bit (Double Word)	x
CHAR	B	8	A+00 to A+ff	ASCII-Code unsigned 8-bit character	x
INT	W	16	-32.768 to 32.767	signed 16-bit integer	x
DINT	D	32	-2^{31} to 2^{31}-1	signed 32-bit integer (Double Word)	x
REAL	D	32	+-1.5e-45 to +-3.4e38	IEEE754 32-bit single precision floating point number	x
S5TIME	W	16	00.00:00:00.100 to 00.02:46:30.000	binary coded decimal (BCD) number representing a time span	
TIME	D	32	00.00:00:00.000 to 24.20:31:23.647	signed 16-bit integer representing a time span in milliseconds	
TIME_OF_DAY	D	32	00.00:00:00.000 to 00.23:59:59.999	unsigned 16-bit integer representing a time span in milliseconds	

Name	Abbreviation	Bit size	Range	Description	Array
DATE	W	16	01.01.1990 to 31.12.2168	unsigned 16-bit integer representing a date in days	
DATE_AND_TIME	D	64	00:00:00.000 01.01.1990 to 23:59:59.999 31.12.2089	binary coded decimal (BCD) number representing a date and time	
S7String	B	any	A+00 to A+ff	ASCII-Code, max. 254 Bytes	

The variables are composed of operand and data type. Examples:

Examples	Data type	Example Siemens	Example IEC
Input Byte 1, Bit 0	BOOL	E 1.0	I 1.0
Output Byte 1, Bit 7	BOOL	A 1.7	Q 1.7
Flag Byte 10, Bit 1	BOOL	M 10.1	M 10.1
Data Block 1, Byte 1, Bit 0	BOOL	DB1.DBX 1.0	DB1.DBX 1.0
Input Byte 1	BYTE	EB 1	IB 1
Output Byte 10	BYTE	AB 10	QB 10
Flag Byte 100	BYTE	MB 100	MB 100
Peripherals Input Byte 0	BYTE	PEB 0	PIB 0
Peripherals Output Byte 1	BYTE	PAB 1	PQB 1
Data Block 1, Byte 1	BYTE	DB1.DBB 1	DB1.DBB 1

Data Block 1, Data Block 1 Typ bool, Address 1.0 → DB1.DBX 1.0
Data Block 1, Data Block Typ Byte, Address 1 → DB1.DBB 1
Peripherals Input, Typ DWORD, Address 0 → PED 0

Help:
DB#.DBB # = Data Block#.Data Block Byte #
DB#.DBW # = Data Block#.Data Block Word #
DB#.DBD # = Data Block#.Data Block Doubleword #
= Address

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