Allen-Bradley DF1

Allen-Bradley DF1 Full Duplex communication protocol

Supported device types and versions

The *Allen-Bradley DF1 Full Duplex* protocol supports communication with Allen-Bradley devices of the SLC-500 series. Communication supports (is verified for) for the following devices:

Table 1

Device type	Meaning	Protocol version
Allen-Bradley SLC 5/04	Communication with the SLC 5/04 CPU via RS232 port	-
Allen-Bradley 1770-KF3	DH-485 bus concentrator supports communication with all the devices of the SLC-500 series (description of the setting is mentioned at the end of the chapter).	-

Communication line configuration

- Communication line category: Serial, SerialOverUDP Device Redundant.
- Serial line parameters:
  - Baud rate (for 1770-KF3, 300, 600, 1200, 2400, 4800, 9600 or 19200 Baud can be used - parameter 3 of KF3 settings - *RS-232C Baud Rate*),
  - Parity (for 1770-KF3, None or Even parity can be used - parameter 4 of KF3 setting - *RS-232C Parity*),
  - Handshaking (for 1770-KF3, set the parameter 7 of KF3 setting - *Flow Control,* according to the setting of the RS-232 cable).

Line protocol parameters

Configuration dialog box - tab **Parameters,** select the **Allen-Bradley DF1 Full Duplex** protocol.
They influence some optional parameters of the protocol.

Table 2

Parameter	Meaning	Unit	Default value
BCC/CRC Checksum	Type of checksum for securing of the payload.	CRC BCC	CRC
Full Debug	Activates detailed listings about sending and receiving values and further debug information.	YES/NO	NO

Communication station configuration

Communication protocol: **Allen-Bradley DF1**
Station address: DH-485 Node Address of device in the range of 1 up to 31.

Station protocol parameters

Communication station - configuration dialog box - the **Protocol parameter** input field.
They influence some optional parameters of the protocol.

Table 3

Parameter	Meaning	Unit	Default value
Interface Node	DH-485 Node Address of the communication interface (KF3), the address 0 is commonly used. (Warning, when you use the 1770-KF3 device, its setting is valid for all stations of the line).	-	0
Wait First Timeout	First delay before reading the response after sending a request.	ms	100
Wait Timeout	Delay between response readings until its finalization.	ms	100
Max Wait Retry	The number of response readings till its finalization.	-	40
Max Read Retry	The number of response readings, if the received response is not the response to the expected transaction. All received messages are to confirmed.	-	10
Retry Count	A retry count of the request in case of a communication failure.	-	3
Block Read	Enables block data reading. It is executed by non-documented functions - careful proceeding is asdvised.	YES /NO	NO
Max. Block Length	Maximum block length for block reading (in bytes). The value must be an even number within the range of 2 up to 254.	-	40

I/O tag configuration

Possible I/O tag types: **Ai, Ao, Ci, Co, Di, Dout**.

I/O tag address is a text address in the SLC-500 format. The address format is:

```
[$] X [file] : element [.field] [/bit]
```

in which

$	optional character
X	file type identifier (required - see table No. 4)
file	file number (optional, if not defined, the default file number according to table No. 4 will be used)
element	the number of an element in the file (required),
.field	a sub-element number (optional, used for Output, Input files only),
/bit	a bit number (optional, must be within the range of 0..15).

Table 4

X	File Type	Default file number
O	Output	0
I	Input	1
S	Status	2
B	Binary	3
N	Integer	7
F	Float	8

Output type file

```
[$]O[n]:e[.s][/b]
```

"n" the file number, if it is different from the default number 0,
"e" element number in the file,
"s" sub-element number (0..255),
"b" bit number (0..15).

For example:

```
O:2
$O0:2/0
O:1.0/1
```

Note: You cannot write into Output files, only read data.

Input type file

```
[$]I[n]:e[.s][/b]
```

"n" the file number, if it is different from the default number 1,
"e" element number in the file,
"s" sub-element number (0..255),
"b" bit number (0..15).

For example:

```
I:1
$I1:2/0
I:2.0/15
```

Note: You cannot write into Input files, only read data.

Status type file

```
[$]S[n]:e[/b]
```

"n" the file number, if it is different from the default number 2,
"e" element number in the file,
"b" bit number (0..15).

For example:

```
S:0
$S2:40
S:2/15
```

Note: You cannot write bit-by-bit into Status type files (output I/O tags with the parameter [/b]).

Binary type file

```
[$]B[n]:e[/b]
```

"n" the file number, if it is different from the default number 3,
"e" element number in the file,
"b" bit number (0..15).

For example:

```
B:2
$B3:0
B3:2/1
```

Integer type file

```
[$]N[n]:e[/b]
```

"n" the file number, if it is different from the default number 7,
"e" element number in the file,
"b" bit number (0..15).

For example:

```
N7:2
$N:0
N27:0/1
```

Float type file

```
[$]F[n]:e
```

"n" file number - if there is used other than the default number of 8,
"e" element number in the file.

For example:

```
F:0
$F8:0
F29:1
```

The recommended settings of the 1770-KF3 device

Further recommended parameters for the 1770-KF3 device:

- Set the Parameter *0 DH-485 Node Address* to 0. You can use other address, see „Communication station protocol parameters" - the parameter „IN".
- Set the parameter *5 DF1 Device Category* to *DF1 full-duplex.*
- The parameter *6 Error Detection* - both *BCC* and *CRC16* can be used, see „Communication station protocol parameters" - the BCC/CRC Checksum parameter.
- As for the other parameters, the suitable default settings are described in the document „1770-6.5.18, DH-485 Communication Interface User Manual (Cat. No. 1770-KF3)", Allen-Bradley April 1993.

Literature

- "1770-6.5.18, DH-485 Communication Interface User Manual (Cat. No. 1770-KF3)", Allen-Bradley - April 1993.
- "1770-6.5.16, DF1 Protocol and Command Set, Reference Manual", Allen-Bradley - October 1996.

Changes and modifications

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Document revisions

- Ver. 1.0 - August 22nd, 2000 - document creation.
- Ver. 1.1 - April 27th, 2009 - update of the document.

Related pages:

Communication protocols