

5.6 DF1 IO Server

5.6.1 Introduction

The eWON serial link can be configured as a DF1 INTERFACE. When the Baud Rate in the DF1 IO Server is set to a value different than "Disabled", the DF1 module in the eWON will be enabled.

This DF1 module provides 3 features:

- Poll items in SLC50x and PLC5 controllers using PCCC requests.
- Forward PCCC requests from EIP (TCP/IP) to DF1 bus and thus, act as an adapter between EIP and DF1.

Using that feature, it is for example possible to access a PLC connected to the eWON's DF1 link by connecting RSLogix 500 using RSLinx TCP driver started with the eWON IP address as destination.

- Poll DH+ device using ControlLogix gateway

The DF1 IO Server must be configured in **Full Duplex mode** (eWON serial link must be configured in RS232 mode, with dipswitch).

note: Please check in the "Rockwell compatibility matrix" on page 192 if your device is supported.

5.6.2 Setup

5.6.2.1 Communication Setup

COM Setup		
COM Port:	SER1 Port (COM:1)	
Baud Rate:	9600	Default: 9600
Parity:	None	Default: NO
Stop Bit(s):	1	Default: 1
Frame Error Detection:	CRC	Default: CRC
HW Mode:	Half Duplex	Default: Full Duplex
Master response timeout:	MS	20..60000, default: 1000
Rx message timeout:	MS	1000..60000, default: 3000
Tx message timeout:	MS	1000..60000, default: 3000
eWON DF1 Address		Device address of eWON on DF1 link (0..254, default: 4)
Destination DF1 Address		Device address of destination on DF1 link when EIP is used (0..254, default: 1)

Figure 76: DF1 communications setup

If more than one Serial port are available, you must choose on which COM the DF1 request will be sent.

The following parameters can be modified:

Baud Rate	Select the Baudrate from 1200 to 38400 Bauds
Parity	The parity to apply: none / odd / even
Stop Bit(s)	Number of stop bits
Frame Error Detection	Cyclic Redundancy Check (CRC) or Block Check Character (BCC)
HW mode	Full Duplex no handshaking or Half duplex
Master Response Timeout	Maximum time the eWON will wait for a valid message from the DF1 master. This value can be critical for a correct operation, depending on the responsiveness of the master. A value of 1000 should be selected to guarantee correct operation
Rx message timeout (MSEC)	Maximum time between a request is posted and the response is received
Tx message timeout (MSEC)	Maximum time for a request to be sent

Table 70: DF1 communication setup controls

eWON DF1 address	Device Address of eWON on DF1 link When eWON will act as a DF1 slave, it will respond to 2 consecutive link addresses; doing this improves the throughput of data across the eWON when acting as a gateway. (eWON DF1 address and eWON DF1 address +1)
Destination DF1 address	Device Address of Destination on DF1 link when EIP is used

Table 70: DF1 communication setup controls

5.6.2.2 Topic configuration

The screenshot shows a configuration window for DF1 topics. It contains three sections, each for a different topic (A, B, and C). Each section has a header with a topic name and an 'Enabled' checkbox. Below each header are three rows of configuration fields: 'Topic Name', 'Destination Device Type and Address', and 'Poll Rate'. The 'Poll Rate' field includes a numeric input and a unit dropdown (currently set to 'MS'). At the bottom of the window are two buttons: 'Update Config' and 'Cancel'.

Figure 77: DF1 topics configuration

Three topics can be used for the IO Server. These topics are used to give a common property to a group of DF1 Tags like:

- **Enable/Disable**
- **Poll rate**
- **Destination Device Type and Address**

Topic configuration item	Description
Topic enabled	Enables or disables polling of all the Tags in the topic
Destination Device Type and Address	The Destination Device Type and Address is a global parameter for all the Tags of the topic. See below for the Device Address syntax. If an address is specified here, it will replace (overload) the address defined Tag by Tag
Poll rate	Defines the refresh rate of the Tag name. In a complex application, we can imagine that some Tag name must be refreshed every second – typically for digital input - and other every minute – typically: temperature-

Table 71: DF1 topics configuration setup

5.6.2.2.1 DF1 : serial link

The Destination Device Type and address is :

- *SLC500-x* (where x is the address of your SLC500 Device, range 0..254)
- *PLC5-x* (where x is the address of your PLC5 Device, range 0..254)

i.e.: **Topic A Destination = SLC500-1**
Topic B Destination = PLC5-6

5.6.2.2.2 DF1 : Ethernet routing

Thanks to the ABLogix IOServer, eWON is now able to poll data on SLC500/PLC5 devices by its ethernet link. Even SLC500 connected behind your ControlLogix Network became available for polling.

With these use of DF1 IOServer, the Serial config can be left unconfigured (baudrate=disabled), only one Topic enabled is required. You need to use a similar syntax than in ABLogix IOServer.

- [DeviceType-] IP Address [, Port, Link]**
- **DeviceType** = type of PLC (SLC500 or PLC5)

- **IP Address** = address on your Ethernet network (i.e.: 10.0.0.50)
- **Port** = value from 1 to 3 representing: 1 = Backplane, 2 = Channel A, 3 = Channel B
- **Link** could be:
 - **Slot**: representing the Slot on the Backplane (0=CPU)
 - **Node ID**: value from 0 to 99 (for ControlNet)
 - **IP address**

To reach a SLC500 with Ethernet address 10.0.0.60:
 Topic A Destination = **10.0.0.60 or SLC500-10.0.0.60**

To reach a PLC5 with Ethernet address 10.0.0.65:
 Topic A Destination = **PLC5-10.0.0.65**

To reach a SLC500 connected behind a ControlLogix :
 Topic A Destination = **10.0.0.80,1,3,2,45 or SLC500-10.0.0.80,1,3,2,45**

- **10.0.0.80** = IP address of the ControlLogix
- **1** = BackPlane
- **3** = Slot 3 (COM card in ControlNet)
- **2** = Channel A (of the Card present in Slot 3)
- **45** = NodeID of the SLC500 (in the ControlNet network)

To reach a PLC5 connected behind a ControlLogix :
 Topic A Destination = **PLC5-10.0.0.90,1,3,2,44**

- **10.0.0.90** = IP address of the ControlLogix
- **1** = BackPlane
- **3** = Slot 3 (COM card)
- **2** = Channel A (of the Card present in Slot 3)
- **44** = NodeID of the PLC5 (in the COM network)

5.6.2.2.3 DH+ polling using ControlLogix gateway

This feature allows the eWON to poll PLC tags located on a DH+ network, behind a controllogix equipped with one or more DHRIO cards. Polling is done using eWON EIP protocol. The DF1 IO server is used to access the "SLC500" PLC family. The ABLOGIX IO server is used to access the "LOGIX" PLC family.

The syntax *[Device Type-] IP address [,Port,Link]* is still applicable but in this particular case: the [,Port,Link] part becomes mandatory. The DH+ channel used to reached the "SLC500" PLC must be specified using the "A" or "B" character.

Example: To reach a SLC500 with DH+ node Id 5, using channel A of a DHRIO card at slot 9 of a controllogix at IP address 10.0.30.21.
 Topic A Destination = **SLC500-10.0.30.21,1,9,A,5**

- **10.0.30.21** = IP address of the ControlLogix
- **1** = BackPlane
- **9** = Slot 9 (COM card)
- **A** = Channel A (of the Card present in Slot 9)
- **5** = NodeID of the SLC500 (in the COM network)

5.6.3 Tag name convention

IO Server configuration		
IO Server Name	DF1	
Topic Name	A	
	B	
	C	
Item Name	ValueName, DeviceType-DeviceAddress	Device Type and Address are defined Tag by Tag Only device Type SLC500 is supported Device Address is a number between 0..254
	ValueName	Topic PLC Address is used

Table 72: DF1 IO server configuration

The Item Name can contain the PLC address where the value is polled, or not. If address is also specified at topic level, the address specified at Tag level will be ignored.

5.6.3.1 Value Name

5.6.3.1.1 General Description

The general format of value names for data from SLC-500 controllers matches the naming convention used by the programming software. The format is shown below (The parts of the name shown between square brackets are optional).

General Value Name Format: X: [file] element [.field] [/bit]

X: Identifies the file type. The table below summarizes the valid file types, default file number for each type and the fields allowed.

X	File Type	Default file Number	Fields
O	Output	0	
I	Input	1	
S	Status	2	
B	Binary	3	
T	Timer	4	.PRE, .ACC, .EN, .TT, .DN
C	Counter	5	.PRE, .ACC, .CU, .CD, .DN, .OV, .UN, .UA
R	Control	6	.LEN, .POS, .EN, .DN, .ER, .UL, .IN, .FD
N	Integer	7	
F	Floating	8	
A	ASCII	none	

Table 73: value names for DF1 addresses

- **File:** File number must be 0-255 decimal
- **Element:** Element number within the file
- **Field:** Valid only for Counter, Timer and Control files
- **/bit:** Valid for all types except Floating

5.6.3.1.2 Output File Items

Output File Item Format: O[n]:e.s[/b]

- "n" represents the file number and is optional. Value is always zero
- "e" indicates the element number in the file (0..30)
- "s" indicates the sub-element number (0..255)
- "b" specifies the bit (0..15) decimal

5.6.3.1.3 Input File Items

Input File Item Format: I[n]:e.s[/b]

- "n" represents the file number and is optional. Value is always one
- "e" indicates the element number in the file (0..30)
- "s" indicates the sub-element number (0..255)
- "b" specifies the bit (0..15) decimal

5.6.3.1.4 Status File Items

Status File Item Format: S[n]:e[/b]

- "n" represents the file number and is optional. If not specified, it is assumed to be two
- "e" indicates the element number in the file (0..255)
- "b" specifies the bit (0..15) decimal

5.6.3.1.5 Binary File Items

Binary File Item Format: B[n]:e/b

- "n" represents the file number and is optional. If not specified, it is assumed to be three, otherwise must be between 3 and 255 decimal
- "e" indicates the element number in the file (0..255)
- "b" specifies the bit (0..15) decimal

Note:

The format B[n]/b is not supported.

5.6.3.1.6 Timer File Items

- **Timer File Item Format:** T[n]: e [.f] [/b]
- "n" represents the file number and is optional. If not specified, it is assumed to be four, otherwise must be between 4 and 255 decimal
- "e" indicates the element number (3 words per element) in the file (0..255)
- "f" identifies one of the valid values for timer fields specified in the table above. If omitted it is assumed to be the word containing the status bits
- "b" specifies the bit (0..15) decimal

5.6.3.1.7 Counter File Items

Counter File Item Format: C[n]: e [.f] [/b]

- "n" represents the file number and is optional. If not specified, it is assumed to be five, otherwise must be between 5 and 255 decimal
- "e" indicates the element number (3 words per element) in the file (0..255)
- "f" identifies one of the valid values for counter fields specified in the table above. If omitted it is assumed to be the word containing the status bits
- "b" specifies the bit (0..15) decimal

5.6.3.1.8 Control File Items

Counter File Item Format: C[n]: e [.f] [/b]

- "n" represents the file number and is optional. If not specified, it is assumed to be six, otherwise must be between 6 and 255 decimal
- "e" indicates the element number (3 words per element) in the file (0..255)
- "f" identifies one of the valid values for counter fields specified in the table above. If omitted it is assumed to be the word containing the status bits
- "b" specifies the bit (0..15) decimal

5.6.3.1.9 Integer File Items

Integer File Item Format: N[n]:e[/b]

- "n" represents the file number and is optional. If not specified, it is assumed to be seven, otherwise must be between 7 and 255 decimal
- "e" indicates the element number in the file (0..255)
- "b" specifies the bit (0..15) decimal

5.6.3.1.10 Floating File Items

Floating File Item Format: F[n]:e

- "n" represents the file number and is optional. If not specified, it is assumed to be eight, otherwise must be between 8 and 255 decimal
- "e" indicates the element number in the file (0..255)

5.6.3.1.11 ASCII File Items

ASCII File Item Format: An:e[/b]

- "n" represents the file number and is not optional
- "e" indicates the element number in the file (0...255)
- "b" specifies the bit (0..15) decimal

5.6.3.1.12 Status register

The STATUS Tag is a special Tag that returns information about the current state of the communication for a given device. As for other Tags, the status Tag ValueName is composed of:

Status, Global Device Address

- You can define a status Tag for each PLC used.
- If you use the status address, the Tag must be configured as analog.

0	Communication not initialized. Status UNKNOWN. If no Tag is polled on that device address, the communication status is unknown.
1	Communication OK.
2	Communication NOT OK.

Table 74: Tag Status meaning

5.6.3.2 Destination Device Type and Address

The Device Address is used in the topic definition or in the Tag definition. If used in the Tag definition, it will be separated from the value name by a coma (',').

- **Format:**

DeviceType-DeviceAddress

Only device Types SLC500 or PLC5 are supported.

Device Address is a number between 0 and 254.

example : SLC500-1 or PLC5-22

- **Format:**

[DeviceType-] IP address [,Port,Link]

example: 10.0.0.80 to access a SLC500

See "DF1 : Ethernet routing" on page 96