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Replacing the AB 1761-NET-ENI with the MGate EIP3000 to perform an EIP-to-DF1 conversion

1 Application Description

This document illustrates how to replace the AB 1761-NET-ENI with the MGate EIP3000 to perform an EIP-to-DF1 conversion. This application routes DF1 messages to an EtherNet/IP destination or EtherNet/IP messages to a DF1 node.The DF1 device is an Allen-Bradley SLC 5/03 and the EtherNet/IP device is an Allen-Bradley SLC 5/05.We describe how to use an Allen-Bradley 1761-NET-ENI module to route messages and how to use the MGate EIP 3170 to replace it in the following chapters.



A system that has been replaced with an MGate EIP 3170 topology is illustrated below:



2 SLC 5/03 Settings

- 1. Create an SLC 5/03 project on **RSLogix 500**.
- 2. Set the SLC 5/03's **channel 0** setting as below:

Channel Configuration	n	×
General Chan. 1 - Sys	stem Chan. 0 - System Chan. 0 - User	1
Driver DF1 Full Baud 19200 Parity NONE Stop Bits 1	Duplex Source ID 9 (decimal) •	
- Protocol Control	andshaking 💽 ACK Time	out (x20 ms) 50
Error Detection	CRC	
Embeutien Kesponses	Duplicate Packet Detect	NAK Retries 3 ENQ Retries 3

3. Create an **Integer Data File** Name as "**N10**" and set **Elements** as 1. SLC 5/05 will poll this data file that we will discuss later.

Data File Properties	×						
General							
File: 10							
Type: N							
Name: 10505							
Desc:							
Elements: 1 Last: N10:0							
Attributes							
Debug Skip When Deleting Unused Memory							
Global	_						
C Local To File: LAD 2 -							
Protection							
C Constant C Static 💿 None							
C Memory Module							
OK Cancel Apply Hel	>						

We set N10:0's initial value as "1234".

闣 Data File N10) (dec)	TO505								
Offset	0	1	2	3	4	5	6	7	8	9
N10:0	.234									
•) -
N10:0								Radix:	Decimal	•
Symbol:									Columns	10 🔻
Desc:										
N10 •		Propert	ies		<u>U</u> sage			<u>H</u> elp		

4. Create an **Integer Data File** Name as "**N14**" and set **Elements** as 2. The N14:0 will store data responses from SLC 5/05. The N14:1 will store polling counts.

Data File Properties	×
General	
File: 14	
Type: N	
Name: GET	
Desc:	
Elements: 2 Last: N14:1	
Attributes	
🗖 Debug	
Skip When Deleting Unused Memory	
Scope	
Global	
C Local To File: LAD 2 -	
Protection	
C Constant C Static C None	
Memory Module	
OK Cancel Apply He	P

5. Edit the **LAD 2** program as below. This program will send **500CPU Read** commands every 5 seconds.



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The **MSG** settings are as follows:

ł	🗮 MSG - N7:0 : (14 Elements)
	General
	This Controller Communication Command: 500CPU Read Data Table Address: N14:0 Size in Elements: 1 Channel:: 0
	Target Device Message Timeout : Data Table Address: N10:0 Local Node Addr (dec): 1 Local / Remote : Local

This message will use **500CPU Read** commands to read **Target Node 1** and **Data Address** as **N10:0**; size is **1**. **Target Node 1** will be routed by 1761-NET-ENI or the MGate EIP 3170 to SLC 5/05.

6. When the settings have been completed, download this program to SLC 5/03.

3 SLC 5/05 Settings

- 1. Create an SLC 5/05 project on RSLogix 500.
- 2. Create an Integer Data File Name as "N10" and set Elements as 1. SLC 5/03 will poll this data file.

)ata File Properties	×						
General							
File: 10							
Type: N							
Name: 10503							
Desc: Output							
Elements: 1 Last: N10:0							
Attributes							
Scope							
 Global 							
C Local To File: LAD 2 -							
Protection							
C Constant C Static © None							
☐ Memory Module ☐ Web View Disable							
OK Cancel Apply Help	,						

Set N10:0's initial value as "5678".

🔀 Data F	ile N10 (dec) -	TO503 ·	Outpu	t						
Offset	0	1	2	3	4	5	6	7	8	9
N10:0	5678									
•										• -
	N10:0							Radix:	Decimal	-
Symbol:									Columns:	10 💌
Desc:										
N10 :	J	<u>P</u> roperti	ies		<u>U</u> sag	•		<u>H</u> elp		

3. Create an **Integer Data File** Name as "**N14**" and set **Elements** as 2. The N14:0 will store data responses from SLC 5/03. The N14:1 will store polling counts.

ata i ne i topere	ies		×
General			
File: 1-	4		
Type: N			
Name: [ET		
Desc:			
Elements:	Last: N14:1		
Attributes			
Debug Skip When I Scope	Deleting Unused Memory		
 Global 			
C Local	To File: LAD 2 -	v	
Protection			
Protection C Constant	C Static © None		
Protection C Constant	⊂ Static		

4. Edit the **LAD 2** program as below. This program will send **500CPU Read** commands every 5 seconds.



The MSG settings are as below. Enable **MultiHop**:

🔀 MSG - N7:0 : (51 Elements)	
General MultiHop	
This Controller Communication Command: Data Table Address: Size in Elements: Channel:	500CPU Read N14:0 1 1
Target Device	
Message Timeout :	23
Data Table Address:	N10:0
Local / Remote :	Local MultiHop: Yes

In the **MultiHop** tab, add **Hop** as below:

🔀 MSG - N7:0 : (51 Elements)			
General (MultiHop)		1761-NET-E	ENI's IP
Ins = Add Hop		Del = Remove Hop	†
From Device	From Port	To Address Type	To Address
This SLC 5/05	Channel 1	EtherNet/IP Device (str):	192.168.32.58

This message will be send to the 1761-NET-ENI module, command as **500CPU Read** to read **Data Address** as **N10:0**, and **size** is **1**.

5. When the settings have been completed, download this program to SLC 5/05.

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4 1761-NET-ENI Settings

1. Use ENI/ENIW Utility to configure 1761-NET-ENI. In the **Message Routing** tab, set Destination Node 1 mapping to SLC 5/05's IP.

🔋 ENI / ENIV	V Utility	100	E		— X—
ENI IP Addr	Message	Routing	Email Reset Utility Settings	Web Config	Web Dat 🔸 🕨 Help
	Destn	Config	IP Address	<u> </u>	Load From Save To
	0	100	000.000.000.000		
	1	101	192.168.032.151		SLC 5/05's IP
	2	102	000.000.000.000		Deraturs ENI ROM
	3	103	000.000.000		Text
	4	104	000.000.000.000	T	Modified

2. When the settings have been completed, save to "ENI ROM".

5 1761-NET-ENI Communication Test

If the settings on all devices are done, SLC 5/03 will send **500CPU Read** commands every 5 seconds. If they receive the correct responses, they will store data in Data File N14:0. We can use RSLogix 500's **Go Online** to monitor it. To perform a communication test for the 1761-NET_ENI, do the following:

1. Use RSLogix 500's **Go Online** to monitor SLC 5/03. N14:0's value must be updated as "5678".

闣 Data File	e N14 (dec)	GET								
Offset	0	1	2	3	4	5	6	7	8	9
N14:0	5678	3627								
N1 Symbol:	4:0							Radix	Decimal Columns:	▶ - ▼ 10 ▼
Desc:		Prope	rties		<u>U</u> sag	e		Help)	

 Use RSLogix 500's Go Online to monitor SLC 5/05. N14:0's value must be updated as "1234".

📸 Data File	e N14 (dec)	GET								
Offset	0	1	2	3	4	5	6	7	8	9
N14:0	1234	4015								
•										• -
N1	4:0							Radix:	Decimal	-
Symbol:									Columns:	10 🔻
Desc:										
N14 -		Proper	ties		<u>U</u> sage			Help		

3. The figure below illustrates how data is transmitted:

SLC 5/03	Value	SLC 5/05	Value
N10: 0	1234	N10: 0	5678
N14: 0	5678	N14: 0	1234

6 MGate EIP 3000 Settings

We remove the 1761-NET-ENI module and then add the MGate EIP 3170 into the topology.

Use the **MGate Manager** to config the MGate EIP 3170 as follows:

1. In the **Network** tab, set IP1 Address as 1761-NET-ENI's IP Address, as below:

Network	Serial	Routing	Protocol	SNMP	Miscellaneous
Nam	-		10.57		505
- North	-		MG-EI	P31/0_/	585
Netv	work Con	figure	Static		•
IP1/	Address		192	. 168 .	32 . 58
	P2 Addre	SS	254	. 7 .	0.0
Netn	nask		255	. 255 . 2	255 . 0
Gate	eway		255	. 255 . 2	255 . 255

2. In the **Serial** tab, set Port 1's serial port setting as below:

Network	Serial	Routing	Protocol	SNM	P Miscellar	neous	1
Port 1			Port 2				1
Baudrate	e Flov	v Control	Baudrate	Э	Flow Contro	d I	B
19200 Parity	▼ No	ne 🔻	Parity	-	FIFO	-	[P.
None Stop bit	Eni Inte	able 🔻	Stop bit	-	Interface	-	5
1 Data bits	▼ RS	232 🔻	Data bits	.		T	D
8	•			-			C

3. In the Routing tab, add **"Target Node DST**" 1 as SLC 5/05's IP. In Routing Information, Req. From PORT1, which DST is 001, will route to SLC 5/05. All EIP Nodes Req. will route to PORT1.

Rule	Req. From	DST of Req.		To		Fourse Type	
01	PORT1	001		192.168.32.151:44818		Source Type	-
02	PORT2 (ProCOM)	ANY		PORT1		Serial Port	
03	PORT3 (ProCOM)	ANY		PORT1		Target Node N	lo.
04	PORT4 (ProCOM)	ANY		PORT1		By DST 3	ה
05	PORT5 (ProCOM)	ANY		PORT1		by 001	
06	All EIP Nodes (via IP1)	ANY		PORT1		Modify	
rget Noo	de Information						
Target I	Node IP	No.	Type	Node Location	Node DST	Slot No.	
192	. 168 . 32 . 151	03	DF1	PORT3 (ProCOM)	003		
TOP P	A AND DOT CLANK	04	DF1	PORT4 (ProCOM)	004		
TCP Port Node DST Slot No.		05	DF1	PORT5 (ProCOM)	005		
	-1	0.0	CTD	100 160 00 161,44010	001		

Set Port1 Node DST as "09".

Network Se	erial Routing	Protocol S	SNMP	Miscellane	eous				
-Routing Inf	ormation								
Rule	Req. From		DST o	f Req.	То		Co		
01	PORT1		001		192.168.32.151:4481	8	Source Type		
02	2 PORT2 (ProCOM)		ANY		PORT1		Serial Port		
03	PORT3 (ProC	COM)	ANY		PORT1		Target Node No.		
04	PORT4 (ProC	COM)	ANY		PORT1				
05	PORT5 (ProC	COM)	ANY		PORT1		by DST +		
06	All EIP Nodes	s (via IP1)	ANY		PORT1		Modify		
Target Not	le Information								
Target N	lode IP		No.	Type	Node Location	Node DST	Slot No.		
0	. 0 . 0	. 0	01	DF1	PORT1	009			
700.0	u l por	el	02	DF1	PORT2 (ProCOM)	002	=		
TCP Por	t Node DST	Slot No.	03	DF1	PORT3 (ProCOM)	003			
44818	0	-1	04	DF1	PORT4 (ProCOM)	004			
	_		05	DF1	PORT5 (ProCOM)	005	- *		
Add	Modify	Remove	•				•		

4. In the **Protocol** tab, set the Port1's **DF1** setting as follows:

Network Serial Routing	Protocol s	NMP Miscellaneous
Response Time-out		
Node Location	Port 1	Port 2 Ethernet
Response Time-out	3000	(200 - 120000 ms) (Default: 3000 ms)
DF1 Settings		
ACK Timeout	500	(50 - 30000 ms) (Default: 500 ms) (Recommended value: Response Timeout / 4)
Frame Errorr Detection	CRC 16	© BCC
EIP Settings		
CIP Communications	Onnecte	ed (Class 3) 💿 Unconnected (UCMM)

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7 MGate EIP 3000 Communication Test

To perform a communication test with the MGate EIP 3000, do the following:

1. Use RSLogix 500's Go Online to monitor SLC 5/03. Edit N10:0's value as "1111".

🔀 Data File	N10 (dec) -	- TO505								• ×
Offset	0	1	2	3	4	5	6	7	8	9
N10:0	1111									
•										• -
N1	0:0							🗌 Radix	Decimal	•
Symbol:									Columns	: 10 💌
Desc:										
N10 ·		Propert	ies		<u>U</u> sage			<u>H</u> elp		

2. Use RSLogix 500's "Go Online" to monitor SLC 5/05. Edit N10:0's value as "2222".

🔀 Data File N	10 (dec)	- TO503 -	Outpu	t						
Offset	0	1	2	3	4	5	6	7	8	9
N10:0	2222									
•										• -
N10:0								Radix	Decimal	-
Symbol:									Columns	10 💌
Desc:										
N10 ·		<u>P</u> ropert	ies		<u>U</u> sage			<u>H</u> elp)	

3. Check SLC 5/05; N14:0's value must be updated as "1111".

闣 Data File N	14 (dec)	GET								
Offset	0	1	2	3	4	5	6	7	8	9
N14:0	1111	4437								
•) -
N14:0	0							Radix	Decimal	-
Symbol:									Columns	: 10 💌
Desc:										
N14 ·		Proper	rties		<u>U</u> sage			<u>H</u> elp	>	

4. Check SLC 5/03; N14:0's value must be updated as "2222".

\overline Data File I	V14 (dec)	GET								
Offset	0	1	2	3	4	5	6	7	8	9
N14:0	2222	4523								
) -
N14:	0							Radix:	Decimal	-
Symbol:									Columns:	10 💌
Desc:										
N14 •		Prope	rties		<u>U</u> sage			<u>H</u> elp		

5. The figure below illustrates how data is transmitted:

SLC 5/03	Value	SLC 5/05	Value
N10: 0	1111	N10: 0	2222
N14: 0	2222	N14: 0	1111

- 6. Use MGate Manager to monitor traffic:
 - a. Request from SLC 5/05

Traffic Monitor	MGate	EIP3170	192.168.32.58)	

•	.II	○ Exception only ○ N	lessage On	5/05	Send	Com	nand Route to Node 9	Start
No.	Time	Node & Direction	Protocol	Туре	DST	CMD	Deta	Comment
1	0.000	192.168.32.151>MG	EIP	Command		05	07 01 00 A6 5B 37 BC 0F 00 C0 05 A2 02 0A 89 00 00	
2	0.000	MG Port 1>	DF1	Command	9 🤦	0F	10 02 09 80 0F 00 C0 05 A2 02 0A 89 00 00 10 03 CF ED	
3	0.010	MG Port 1<	DF1	ACK				DF1 Transmission sy
4	0.030	MG Port 1<	DF1	Reply	128	4F	10 02 80 09 4F 00 C0 05 57 04 10 03 EC A4	13 respond value
5	0.035	MG Port 1>	DF1	ACK				-04E7 /b 1111)
6	0.035	192.168.32.151 <mg< td=""><td>EIP</td><td>Reply</td><td></td><td>4F</td><td>07 01 00 A6 5B 37 BC 4F 00 C0 05 57 04 0A 89</td><td>(0457 (Dec. as 1111)</td></mg<>	EIP	Reply		4F	07 01 00 A6 5B 37 BC 4F 00 C0 05 57 04 0A 89	(0457 (Dec. as 1111)

b. Request from SLC 5/03

Traffic I	Monitor	(MGate EIP3170 192.168	3.32.58)						
● All ○ Exception only ↓ Jessage Only						Rou	te to 5/05	Start Stop	
No.	Time	Node & Direction	Protocol	Туре	DST	CMD	Data	Comment	1
7	1.000	MG Port 1<	DF1	Command	1	0F	10 02 01 09 0F 00 C0 27 A2 02 0A 89 00 00 10 03 4D 06		
8	1.000	192.168.32.151 <mg< td=""><td>EIP</td><td>Command</td><td>1</td><td>0F</td><td>01 09 0F 00 C0 27 A2 02 0A 89 00 00</td><td></td><td></td></mg<>	EIP	Command	1	0F	01 09 0F 00 C0 27 A2 02 0A 89 00 00		
9	1.000	MG Port 1>	DF1	ACK				DF1 Transmission sy	
10	1.010	192.168.32.151>MG	EIP	Reply	9	4F	09 01 4F 00 C0 27 AE 08	ond value	
11	1.010	MG Port 1>	DF1	Reply	9	4F	10 02 09 01 4F 00 C0 27 AE 08 10 03 39 DD 0x08AE (Dec. as 2222)	
12	1.020	MG Port 1<	DF1	ACK				DF1 Transmission sy	