

Huron Net Works

DeviceNet DN-1600-IO

Device Profile

Publication # 22000xx
Date 7/9/98
Revision # 1.1

Board Revision A.1
Firmware Revision 1.1

Rev	Date	Note(s)
1.1	7/9/98	Original

1. Object Model

The DN-1600 product line consists of series of I/O products each containing a primary circuit module which controls one of a variety of input, output, and I/O circuit modules. Each I/O module can be identified by the firmware of the primary module which will then apply the correct attribute values to implement the desired product's Object Model.

This Device Profile is derived from the Generic Device Profile (Device Type 0).

1.1 Objects Present in Device

Object	Class Id	Optional/ Required	# of Instances
Identity	0x01	Required	1
Message Router	0x02	Optional*	1
DeviceNet	0x03	Required	1
Assembly	0x04	Required	1 or 2 See Appendix A
Connection	0x05	Required	1 Explicit Messaging 1 Polled I/O 1 COS/Cyclic
Discrete Input Point	0x08	Required	Appendix A
Discrete Output Point	0x09	Required	Appendix A
Input Fault	0x64	Optional	Appendix A
Auxiliary Power	0x66	Optional	Appendix A
Output Fault	0x65	Optional	Appendix A

* Attributes and services are optional; behavior is required.

1.2 Objects That Effect Behavior

Object	Class Id	Effect on Behavior
Identity	0x01	Supports the Reset Service
Message Router	0x02	No Effect
DeviceNet	0x03	Configures Port Attributes
Assembly #1	0x04	Defines input data format
Assembly #2	0x04	Defines output data format
Connection	0x05	Establishes the number of connections
Discrete Input	0x08	Reports Input States
Discrete Output	0x09	Reports Output States& Fault/Idle Action
Input Fault	0x64	Reports Input faults
Output Fault	0x65	Reports Output faults
Auxiliary Power	0x66	Reports presence of Auxiliary Power

1.3 Object Interfaces

Object	Class Id	Interface
Identity	0x01	Message Router
Message Router	0x02	Explicit Message Connection Instance
DeviceNet	0x03	Message Router
Assembly #1	0x04	I/O Connection or Message Router
Assembly #2	0x04	I/O Connection or Message Router
Connection	0x05	Message Router
Discrete Input	0x08	I/O Connection or Message Router
Discrete Output	0x09	I/O Connection or Message Router
Input Fault	0x64	I/O Connection or Message Router
Output Fault	0x65	I/O Connection or Message Router
Auxiliary Power	0x66	I/O Connection or Message Router

1.4 Identification of I/O Assembly Instances

Number	Type	Name
1	Input	Device Inputs
2	Output	Device Outputs

1.5 Format of I/O Assembly Data Attribute

1.5.1 Assembly #1 -- Device Inputs

See Appendix A for the table detailing the format of Assembly Instance #1 for each catalog number.

1.5.2 Assembly #2 -- Device Outputs

See Appendix A for the table detailing the format of Assembly Instance #2 for each catalog number

2. Standard Objects

2.1 Identity Object (0x01)

There is a single instance of the identity object for the device.

2.1.1 Class Attributes

No class attributes are supported.

2.1.2 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Vendor	UINT	0x0014
2	Get	Device Type	UINT	0x0000
3	Get	Product Code	UINT	See Appendix A
4	Get	Revision	STRUCT	01.01
5	Get	Status	WORD	0x0000
6	Get	Serial #	UDINT	See Appendix A
7	Get	Product Name	STRUCT	See Appendix A
8	Get	State	USINT	[0..5]

2.1.3 Instance Services

Service Code	Service Name	Description of Service
05	Reset	Reset the device to power up configuration
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Sets the value of the specified attribute

2.2 Message Router Object (0x02)

There is no externally visible interface to the Message Router Object.

2.3 DeviceNet Object (0x03)

There is a single instance of the DeviceNet Object for the device

2.3.1 Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	0x0002

2.3.2 Class Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Sets the value of the specified attribute

2.3.3 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	MACID Value	USINT	Range 0-63
2	Get/Set	Baud Rate Value	USINT	Range 0-63
3	Get/Set	BOI	BOOL	0x00 Fault
4	Get/Set	Bus-Off Counter	USINT	0x00
5	Get	Allocation Information	STRUCT	Allocate Service
6	Get	MAC ID Switch Changed	BOOL	0=No Change 1=Changed
7	Get	Baudrate Switch Changed	BOOL	0=No change 1=Changed
8	Get	MAC ID Switch Setting	USINT	Range 0-63
9	Get	Baudrate Switch Setting	USINT	Range 0-3

2.3.4 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Sets the value of the specified attribute

2.4 Connection Object (0x05)

2.4.1 Class Attributes

No class Attributes are supported

2.4.2 Instance Attributes

There are three instances of the Connection Object in the device. Instance #1 is assigned to the explicit messaging connection. Instance #2 is assigned to the Polled I/O connection. Instance #4 is assigned to the COS/Cyclic connection. The tables below show the attributes and the predefined values where applicable.

Explicit Message Connection (Instance #1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	state	USINT	0x03
2	Get	instance_type	USINT	0x00
3	Get	Xport Class trigger	USINT	0x83
4	Get	produced connection ID	UINT	0x5FB for MAC ID 63
5	Get	consumed connection ID	UINT	0x5FC for MAC ID 63
6	Get	initial comm characteristics	USINT	0x21
7	Get	produced connection size	UINT	0x000F
8	Get	consumed connection size	UINT	0x000F
9	Get/Set	expected packet rate	UINT	Application Dependent
10	N/A	N/A	N/A	Not Used
11	N/A	N/A	N/A	Not Used
12	Get	watchdog timeout action	USINT	0x01 Auto Delete
13	Get	produced path length	UINT	0x0000
14	Get	produced path	Array of USINT	<NULL>
15	Get	consumed path length	UINT	0x0000
16	Get	consumed path	Array of USINT	<NULL>
17	Get	production inhibit timer	UINT	0x0000*

* Server devices do not use this timer

Poll I/O Message Connection (Instance #2)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	state	USINT	0x03
2	Get	instance_type	USINT	0x01
3	Get	Xport Class trigger	USINT	0x82 Poll/COS/Cyc (0x80 COS/Cyc, no ACK)
4	Get	produced connection ID	UINT	0x3FF for MAC ID 63 (0xFFFF no ACK)
5	Get	consumed connection ID	UINT	0x5FD for MAC ID 63
6	Get	initial comm characteristics	USINT	0x01 (0xF1 no Poll, no Ack)
7	Get	produced connection size	UINT	See Appendix A
8	Get	consumed connection size	UINT	See Appendix A
9	Get/Set	expected packet rate	UINT	Application Dependent
10	N/A	N/A	N/A	Not Used
11	N/A	N/A	N/A	Not Used
12	Get	watchdog timeout action	USINT	0x00 Time Out
13	Get	produced path length	UINT	See Appendix A
14	Get	produced path	Array of USINT	See Appendix A
15	Get	consumed path length	UINT	See Appendix A
16	Get	consumed path	Array of USINT	See Appendix A
17	Get	production inhibit timer	UINT	0x0000*

* Server devices do not use this timer

COS/Cyclic I/O Message Connection (Instance #4)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	state	USINT	0x03
2	Get	instance_type	USINT	0x01
3	Get	Xport Class trigger	USINT	0x12 COS 0x02 Cyc 0x10 COS, no ACK 0x00 Cyc, no ACK
4	Get	produced connection ID	UINT	0x37F for MAC ID 63
5	Get	consumed connection ID	UINT	0x5FA for MAC ID 63 0xFFFF no ACK
6	Get	initial comm characteristics	USINT	0x01 0xF1 no Ack
7	Get	produced connection size	UINT	See Appendix A
8	Get	consumed connection size	UINT	See Appendix A
9	Get/Set	expected packet rate	UINT	Application Dependent
10	N/A	N/A	N/A	Not Used
11	N/A	N/A	N/A	Not Used
12	Get	watchdog timeout action	USINT	0x00 Time Out
13	Get	produced path length	UINT	See Appendix A
14	Get	produced path	Array of USINT	See Appendix A
15	Get	consumed path length	UINT	See Appendix A
16	Get	consumed path	Array of USINT	See Appendix A
17	Get	production inhibit timer	UINT	0x0000*

* Server devices do not use this timer

2.5 Discrete Input(0x08)

2.5.1 Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
1	Get	Revision	UINT	Revision of this object	2

2.5.2 Class Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

2.5.3 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	BOOL	Input Point Value	0=off 1=on

2.5.4 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

2.5.5 Discrete Input Signal Mapping

See Appendix A for Discrete Input Signal Mapping by catalog number.

2.6 Discrete Output (0x09)

2.6.1 Class Attributes

No class attributes are supported for this class.

2.6.2 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get/Set	Value	BOOL	Output Point Value	0=off 1=on
5	Get	Fault State	BOOL	0 = Do not hold state of output after fault	0
6	Get	Fault Value	BOOL	0 = State of output after fault	0
7	Get	Idle State	BOOL	0 = Do not hold state of output during Idle	0
8	Get	Idle Value	BOOL	0 = State of output during idle	0

2.6.3 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Modifies an attribute value

2.6.4 Discrete Output Signal Mapping

See Appendix A for Discrete Output Signal Mapping by catalog number

APPENDIX A.1

CATALOG #: DN-1600-IO2

16IN/16OUT

Format of I/O Assembly Instance #1 -- Device Inputs

Byte	7	6	5	4	3	2	1	0
0	DI.8	DI.7	DI.6	DI.5	DI.4	DI.3	DI.2	DI.1
1	DI.16	DI.15	DI.14	DI.13	DI.12	DI.11	DI.10	DI.9
2	IF.8	IF.7	IF.6	IF.5	IF.4	IF.3	IF.2	IF.1
3	OF.8	OF.7	OF.6	OF.5	OF.4	OF.3	OF.2	OF.1
4	OF.16	OF.15	OF.14	OF.13	OF.12	OF.11	OF.10	OF.9
5	0	0	0	0	0	0	0	AUXOK

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DI.1	Discrete Input	8	1	Value	3
DI.2	Discrete Input	8	2	Value	3
DI.3	Discrete Input	8	3	Value	3
DI.4	Discrete Input	8	4	Value	3
DI.5	Discrete Input	8	5	Value	3
DI.6	Discrete Input	8	6	Value	3
DI.7	Discrete Input	8	7	Value	3
DI.8	Discrete Input	8	8	Value	3
DI.9	Discrete Input	8	9	Value	3
DI.10	Discrete Input	8	10	Value	3
DI.11	Discrete Input	8	11	Value	3
DI.12	Discrete Input	8	12	Value	3
DI.13	Discrete Input	8	13	Value	3
DI.14	Discrete Input	8	14	Value	3
DI.15	Discrete Input	8	15	Value	3
DI.16	Discrete Input	8	16	Value	3

APPENDIX A.1

CATALOG #: DN-1600-IO2

16IN/16OUT

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
IF.1	Input Fault	0x64	1	Value	3
IF.2	Input Fault	0x64	2	Value	3
IF.3	Input Fault	0x64	3	Value	3
IF.4	Input Fault	0x64	4	Value	3
IF.5	Input Fault	0x64	5	Value	3
IF.6	Input Fault	0x64	6	Value	3
IF.7	Input Fault	0x64	7	Value	3
IF.8	Input Fault	0x64	8	Value	3
OF.1	Output Fault	0x65	1	Value	3
OF.2	Output Fault	0x65	2	Value	3
OF.3	Output Fault	0x65	3	Value	3
OF.4	Output Fault	0x65	4	Value	3
OF.5	Output Fault	0x65	5	Value	3
OF.6	Output Fault	0x65	6	Value	3
OF.7	Output Fault	0x65	7	Value	3
OF.8	Output Fault	0x65	8	Value	3
OF.9	Output Fault	0x65	9	Value	3
OF.10	Output Fault	0x65	10	Value	3
OF.11	Output Fault	0x65	11	Value	3
OF.12	Output Fault	0x65	12	Value	3
OF.13	Output Fault	0x65	13	Value	3
OF.14	Output Fault	0x65	14	Value	3
OF.15	Output Fault	0x65	15	Value	3
OF.16	Output Fault	0x65	16	Value	3
AUX	Aux Power	0x66	1	Value	3

APPENDIX A.1
CATALOG #: DN-1600-IO2
16IN/16OUT

Discrete Input Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DI.1	IN1	J4.2	Data Input
DI.2	IN2	J4.3	Data Input
DI.3	IN3	J4.4	Data Input
DI.4	IN4	J4.5	Data Input
DI.5	IN5	J4.6	Data Input
DI.6	IN6	J4.7	Data Input
DI.7	IN7	J4.8	Data Input
DI.8	IN8	J4.9	Data Input
DI.9	IN9	J5.2	Data Input
DI.10	IN10	J5.3	Data Input
DI.11	IN11	J5.4	Data Input
DI.12	IN12	J5.5	Data Input
DI.13	IN13	J5.6	Data Input
DI.14	IN14	J5.7	Data Input
DI.15	IN15	J5.8	Data Input
DI.16	IN16	J5.9	Data Input
IF.1	FLT1	J4.2&3	Input Fault
IF.2	FLT1	J4.4&5	Input Fault
IF.3	FLT1	J4.6&7	Input Fault
IF.4	FLT1	J4.8&9	Input Fault
IF.5	FLT1	J5.2&3	Input Fault
IF.6	FLT1	J5.4&5	Input Fault
IF.7	FLT1	J5.6&7	Input Fault
IF.8	FLT1	J5.8&9	Input Fault

APPENDIX A.1
CATALOG #: DN-1600-IO2
16IN/16OUT

Continued:

Bit Name	Signal Name	Connector.Pin	Description
OF.1	OFLT1	J2.2	Output Fault
OF.2	OFLT2	J2.3	Output Fault
OF.3	OFLT3	J2.4	Output Fault
OF.4	OFLT4	J2.5	Output Fault
OF.5	OFLT5	J2.6	Output Fault
OF.6	OFLT6	J2.7	Output Fault
OF.7	OFLT7	J2.8	Output Fault
OF.8	OFLT8	J2.9	Output Fault
OF.9	OFLT9	J3.2	Output Fault
OF.10	OFLT10	J3.3	Output Fault
OF.11	OFLT11	J3.4	Output Fault
OF.12	OFLT12	J3.5	Output Fault
OF.13	OFLT13	J3.6	Output Fault
OF.14	OFLT14	J3.7	Output Fault
OF.15	OFLT15	J3.8	Output Fault
OF.16	OFLT16	J3.9	Output Fault
AUX	AUX_OK	Aux Power	Aux Power OK

APPENDIX A.1

CATALOG #: DN-1600-IO2

16IN/16OUT

Format of I/O Assembly Instance #2 -- Device Outputs

Byte	7	6	5	4	3	2	1	0
0	DO.8	DO.7	DO.6	DO.5	DO.4	DO.3	DO.2	DO.1
1	DO.16	DO.15	DO.14	DO.13	DO.12	DO.11	DO.10	DO.9

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DO.1	Discrete Out	9	1	Value	3
DO.2	Discrete Out	9	2	Value	3
DO.3	Discrete Out	9	3	Value	3
DO.4	Discrete Out	9	4	Value	3
DO.5	Discrete Out	9	5	Value	3
DO.6	Discrete Out	9	6	Value	3
DO.7	Discrete Out	9	7	Value	3
DO.8	Discrete Out	9	8	Value	3
DO.9	Discrete Out	9	9	Value	3
DO.10	Discrete Out	9	10	Value	3
DO.11	Discrete Out	9	11	Value	3
DO.12	Discrete Out	9	12	Value	3
DO.13	Discrete Out	9	13	Value	3
DO.14	Discrete Out	9	14	Value	3
DO.15	Discrete Out	9	15	Value	3
DO.16	Discrete Out	9	16	Value	3

Discrete Output Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DO.1	ODAT1	J2.2	Data Out
DO.2	ODAT2	J2.3	Data Out
DO.3	ODAT3	J2.4	Data Out
DO.4	ODAT4	J2.5	Data Out
DO.5	ODAT5	J2.6	Data Out
DO.6	ODAT6	J2.7	Data Out
DO.7	ODAT7	J2.8	Data Out
DO.8	ODAT8	J2.9	Data Out
DO.9	ODAT9	J3.2	Data Out
DO.10	ODAT10	J3.3	Data Out
DO.11	ODAT11	J3.4	Data Out
DO.12	ODAT12	J3.5	Data Out
DO.13	ODAT13	J3.6	Data Out
DO.14	ODAT14	J3.7	Data Out
DO.15	ODAT15	J3.8	Data Out
DO.16	ODAT16	J3.9	Data Out

APPENDIX A.1
CATALOG #: DN-1600-IO2
16IN/16OUT

Variable Attributes Table

Attribute Name	Class ID	Instance ID	Attribute ID	Value
Product Code	1	1	3	0x000E
Serial Number	1	1	6	0x00002C00*
Product Name	1	1	7	11,"DN-1600-IO2"
Produced connection size	5	2	7	0x0006
consumed connection size	5	2	8	0x0002
produced path length	5	2	13	0x0006
produced path	5	2	14	20.04.24.01.30.03
consumed path length	5	2	15	0x0006
consumed path	5	2	16	20.04.24.02.30.03

* -- Base Serial Number used when Non-Volatile Memory is not initialized.

APPENDIX A.1

CATALOG #: DN-1600-IO2 16IN/16OUT

Input Fault (0x64)

There are eight instances of the Input Fault Object. The value of each instance indicates the status of a pair of input points sharing the same input connector.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	1=Fault 0=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.1

CATALOG #: DN-1600-IO2 16IN/16OUT

Auxiliary Power (0x66)

There is one instance of the Auxiliary Power Object. The value indicates the status of Vaux power which supplies the output driver circuits.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	0=Fault 1=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

APPENDIX A.1

CATALOG #: DN-1600-IO2

16IN/16OUT

Output Fault(65)

There are 16 instances of the Output Fault Object. The value of each instance shows the presence of a match or mismatch between the intended state of an output point and the actual state.

Command Output	Diagnostic Input	Output Diagnostic Value
0	0	0 = No Fault
0	1	1 = Fault
1	0	1 = Fault
1	1	0 = No Fault

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Output Diagnostic Value	0/1

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

APPENDIX A.2

CATALOG #: DN-1600-IO3

8IN/8OUT

Format of I/O Assembly Instance #1 -- Device Inputs

Byte	7	6	5	4	3	2	1	0
0	DI.8	DI.7	DI.6	DI.5	DI.4	DI.3	DI.2	DI.1
1	0	0	0	0	IF.4	IF.3	IF.2	IF.1
2	OF.8	OF.7	OF.6	OF.5	OF.4	OF.3	OF.2	OF.1
3	0	0	0	0	0	0	0	AUXOK

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DI.1	Discrete Input	8	1	Value	3
DI.2	Discrete Input	8	2	Value	3
DI.3	Discrete Input	8	3	Value	3
DI.4	Discrete Input	8	4	Value	3
DI.5	Discrete Input	8	5	Value	3
DI.6	Discrete Input	8	6	Value	3
DI.7	Discrete Input	8	7	Value	3
DI.8	Discrete Input	8	8	Value	3
IF.1	Input Fault	0x64	1	Value	3
IF.2	Input Fault	0x64	2	Value	3
IF.3	Input Fault	0x64	3	Value	3
IF.4	Input Fault	0x64	4	Value	3
OF.1	Output Fault	0x65	1	Value	3
OF.2	Output Fault	0x65	2	Value	3
OF.3	Output Fault	0x65	3	Value	3
OF.4	Output Fault	0x65	4	Value	3
OF.5	Output Fault	0x65	5	Value	3
OF.6	Output Fault	0x65	6	Value	3
OF.7	Output Fault	0x65	7	Value	3
OF.8	Output Fault	0x65	8	Value	3
AUX	Aux Power	0x66	1	Value	3

APPENDIX A.2
CATALOG #: DN-1600-IO3
8IN/8OUT

Discrete Input Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DI.1	IN1	J4.2	Data Input
DI.2	IN2	J4.3	Data Input
DI.3	IN3	J4.4	Data Input
DI.4	IN4	J4.5	Data Input
DI.5	IN5	J4.6	Data Input
DI.6	IN6	J4.7	Data Input
DI.7	IN7	J4.8	Data Input
DI.8	IN8	J4.9	Data Input
IF.1	FLT1	J4.2&3	Input Fault
IF.2	FLT2	J4.4&5	Input Fault
IF.3	FLT3	J4.6&7	Input Fault
IF.4	FLT4	J4.8&9	Input Fault
OF.1	OFLT1	J2.2	Output Fault
OF.2	OFLT2	J2.3	Output Fault
OF.3	OFLT3	J2.4	Output Fault
OF.4	OFLT3	J2.5	Output Fault
OF.5	OFLT4	J2.6	Output Fault
OF.6	OFLT5	J2.7	Output Fault
OF.7	OFLT6	J2.8	Output Fault
OF.8	OFLT7	J2.9	Output Fault
AUX	AUX_OK	Aux Power	Aux Power OK

APPENDIX A.2

CATALOG #: DN-1600-IO3

8IN/8OUT

Format of I/O Assembly Instance #2 -- Device Outputs

Byte	7	6	5	4	3	2	1	0
0	DO.8	DO.7	DO.6	DO.5	DO.4	DO.3	DO.2	DO.1

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DO.1	Discrete Out	9	1	Value	3
DO.2	Discrete Out	9	2	Value	3
DO.3	Discrete Out	9	3	Value	3
DO.4	Discrete Out	9	4	Value	3
DO.5	Discrete Out	9	5	Value	3
DO.6	Discrete Out	9	6	Value	3
DO.7	Discrete Out	9	7	Value	3
DO.8	Discrete Out	9	8	Value	3

Discrete Output Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DO.1	ODAT1	J2.2	Data Out
DO.2	ODAT2	J2.3	Data Out
DO.3	ODAT3	J2.4	Data Out
DO.4	ODAT4	J2.5	Data Out
DO.5	ODAT5	J2.6	Data Out
DO.6	ODAT6	J2.7	Data Out
DO.7	ODAT7	J2.8	Data Out
DO.8	ODAT8	J2.9	Data Out

APPENDIX A.2
CATALOG #: DN-1600-IO3
8IN/8OUT

Variable Attributes Table

Attribute Name	Class ID	Instance ID	Attribute ID	Value
Product Code	1	1	3	0x000E
Serial Number	1	1	6	0x00002C00*
Product Name	1	1	7	11,"DN-1600-IO3"
Produced connection size	5	2	7	0x0004
consumed connection size	5	2	8	0x0001
produced path length	5	2	13	0x0006
produced path	5	2	14	20.04.24.01.30.03
consumed path length	5	2	15	0x0006
consumed path	5	2	16	20.04.24.02.30.03

* -- Base Serial Number used when Non-Volatile Memory is not initialized.

APPENDIX A.2

CATALOG #: DN-1600-IO3

8IN/8OUT

Input Fault (0x64)

There are four instances of the Input Fault Object. The value of each instance indicates the status of a pair of input points sharing the same input connector.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	1=Fault 0=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.2

CATALOG #: DN-1600-IO3

8IN/8OUT

Auxiliary Power (0x66)

There is one instance of the Auxiliary Power Object. The value indicates the status of Vaux power which supplies the output driver circuits.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	0=Fault 1=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.2

CATALOG #: DN-1600-IO3

8IN/8OUT

Output Fault(65)

There are eight instances of the Output Fault Object. The value of each instance shows the presence of a match or mismatch between the intended state of an output point and the actual state.

Command Output	Diagnostic Input	Output Diagnostic Value
0	0	0 = No Fault
0	1	1 = Fault
1	0	1 = Fault
1	1	0 = No Fault

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Output Diagnostic Value	0/1

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.3

CATALOG #: DN-1600-IO4

16IN

Format of I/O Assembly Instance #1 -- Device Inputs

Byte	7	6	5	4	3	2	1	0
0	DI.8	DI.7	DI.6	DI.5	DI.4	DI.3	DI.2	DI.1
1	DI.16	DI.15	DI.14	DI.13	DI.12	DI.11	DI.10	DI.9
2	IF.8	IF.7	IF.6	IF.5	IF.4	IF.3	IF.2	IF.1

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DI.1	Discrete In	8	1	Value	3
DI.2	Discrete In	8	2	Value	3
DI.3	Discrete In	8	3	Value	3
DI.4	Discrete In	8	4	Value	3
DI.5	Discrete In	8	5	Value	3
DI.6	Discrete In	8	6	Value	3
DI.7	Discrete In	8	7	Value	3
DI.8	Discrete In	8	8	Value	3
DI.9	Discrete In	8	9	Value	3
DI.10	Discrete In	8	10	Value	3
DI.11	Discrete In	8	11	Value	3
DI.12	Discrete In	8	12	Value	3
DI.13	Discrete In	8	13	Value	3
DI.14	Discrete In	8	14	Value	3
DI.15	Discrete In	8	15	Value	3
DI.16	Discrete In	8	16	Value	3
IF.1	Input Fault	0x64	1	Value	3
IF.2	Input Fault	0x64	2	Value	3
IF.3	Input Fault	0x64	3	Value	3
IF.4	Input Fault	0x64	4	Value	3
IF.5	Input	0x64	5	Value	3

	Fault				
IF.6	Input Fault	0x64	6	Value	3
IF.7	Input Fault	0x64	7	Value	3
IF.8	Input Fault	0x64	8	Value	3

APPENDIX A.3

CATALOG #: DN-1600-IO4

16IN

Discrete Input Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DI.1	IN1	J4.2	Data Input
DI.2	IN2	J4.3	Data Input
DI.3	IN3	J4.4	Data Input
DI.4	IN4	J4.5	Data Input
DI.5	IN5	J4.6	Data Input
DI.6	IN6	J4.7	Data Input
DI.7	IN7	J4.8	Data Input
DI.8	IN8	J4.9	Data Input
DI.9	IN9	J5.2	Data Input
DI.10	IN10	J5.3	Data Input
DI.11	IN11	J5.4	Data Input
DI.12	IN12	J5.5	Data Input
DI.13	IN13	J5.6	Data Input
DI.14	IN14	J5.7	Data Input
DI.15	IN15	J5.8	Data Input
DI.16	IN16	J5.9	Data Input
IF.1	FLT1	J4.2&3	Input Fault
IF.2	FLT2	J4.4&5	Input Fault
IF.3	FLT3	J4.6&7	Input Fault
IF.4	FLT4	J4.8&9	Input Fault
IF.5	FLT5	J5.2&3	Input Fault
IF.6	FLT6	J5.4&5	Input Fault
IF.7	FLT7	J5.6&7	Input Fault
IF.8	FLT8	J5.8&9	Input Fault

Format of I/O Assembly Instance #2 -- Device Outputs

This device has no outputs and thus no output assembly.

APPENDIX A.3
CATALOG #: DN-1600-IO4
16IN

Variable Attributes Table

Attribute Name	Class ID	Instance ID	Attribute ID	Value
Product Code	1	1	3	0x000E
Serial Number	1	1	6	0x00002C00*
Product Name	1	1	7	11,"DN-1600-IO4"
produced connection size	5	2	7	0x0003
consumed connection size	5	2	8	0x0000
produced path length	5	2	13	0x0006
produced path	5	2	14	20.04.24.01.30.03
consumed path length	5	2	15	0x0000
consumed path	5	2	16	<NULL>

* -- Base Serial Number used when Non-Volatile Memory is not initialized.

APPENDIX A.3

CATALOG #: DN-1600-IO4

16IN

Input Fault (0x64)

There are eight instances of the Input Fault Object. The value of each instance indicates the status of a pair of input points sharing the same input connector.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	1=Fault 0=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.4

CATALOG #: DN-1600-IO5

8OUT

Format of I/O Assembly Instance #1 -- Output Faults

Byte	7	6	5	4	3	2	1	0
0	OF.8	OF.7	OF.6	OF.5	OF.4	OF.3	OF.2	OF.1
1	0	0	0	0	0	0	0	AUXOK

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
OF.1	Output Fault	0x65	1	Value	3
OF.2	Output Fault	0x65	2	Value	3
OF.3	Output Fault	0x65	3	Value	3
OF.4	Output Fault	0x65	4	Value	3
OF.5	Output Fault	0x65	5	Value	3
OF.6	Output Fault	0x65	6	Value	3
OF.7	Output Fault	0x65	7	Value	3
OF.8	Output Fault	0x65	8	Value	3
AUX	AUX Power	0x66	1	Value	3

Output Fault Signal Mapping

Bit Name	Signal Name	Connector.Pin	
OF.1	OFLT1	J2.2	Output Fault
OF.2	OFLT2	J2.3	Output Fault
OF.3	OFLT3	J2.4	Output Fault
OF.4	OFLT3	J2.5	Output Fault
OF.5	OFLT4	J2.6	Output Fault
OF.6	OFLT5	J2.7	Output Fault
OF.7	OFLT6	J2.8	Output Fault
OF.8	OFLT7	J2.9	Output Fault
AUX	AUX OK	Aux Power	Aux Power OK

APPENDIX A.4

CATALOG #: DN-1600-IO5

8OUT

Format of I/O Assembly Instance #2 -- Device Outputs

Byte	7	6	5	4	3	2	1	0
0	DO.8	DO.7	DO.6	DO.5	DO.4	DO.3	DO.2	DO.1

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DO.1	Discrete Out	9	1	Value	3
DO.2	Discrete Out	9	2	Value	3
DO.3	Discrete Out	9	3	Value	3
DO.4	Discrete Out	9	4	Value	3
DO.5	Discrete Out	9	5	Value	3
DO.6	Discrete Out	9	6	Value	3
DO.7	Discrete Out	9	7	Value	3
DO.8	Discrete Out	9	8	Value	3

Discrete Output Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DO.1	ODAT1	J2.2	Data Out
DO.2	ODAT2	J2.3	Data Out
DO.3	ODAT3	J2.4	Data Out
DO.4	ODAT4	J2.5	Data Out
DO.5	ODAT5	J2.6	Data Out
DO.6	ODAT6	J2.7	Data Out
DO.7	ODAT7	J2.8	Data Out
DO.8	ODAT8	J2.9	Data Out

Variable Attributes Table

Attribute Name	Class ID	Instance ID	Attribute ID	Value
Product Code	1	1	3	0x000E
Serial Number	1	1	6	0x00002C00*
Product Name	1	1	7	11,"DN-1600-IO5"
produced connection size	5	2	7	0x0002
consumed connection size	5	2	8	0x0001
produced path length	5	2	13	0x0006
produced path	5	2	14	20.04.24.01.30.03
consumed path length	5	2	15	0x0006
consumed path	5	2	16	20.04.24.02.30.03

* -- Base Serial Number used when Non-Volatile Memory is not initialized.

APPENDIX A.4

CATALOG #: DN-1600-IO6

8OUT

Output Fault(0x65)

There are eight instances of the Output Fault Object. The value of each instance shows the presence of a match or mismatch between the intended state of an output point and the actual state.

Command Output	Diagnostic Input	Output Diagnostic Value
0	0	0 = No Fault
0	1	1 = Fault
1	0	1 = Fault
1	1	0 = No Fault

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Output Diagnostic Value	0/1

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.4

CATALOG #: DN-1600-IO5

8OUT

Auxiliary Power (0x66)

There is one instance of the Auxiliary Power Object. The value indicates the status of Vaux power which supplies the output driver circuits.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	0=Fault 1=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.5

CATALOG #: DN-1600-IO1

CMH 16IN/16OUT

Format of I/O Assembly Instance #1 -- Device Inputs

Byte	7	6	5	4	3	2	1	0
0	DI.8	DI.7	DI.6	DI.5	DI.4	DI.3	DI.2	DI.1
1	DI.16	DI.15	DI.14	DI.13	DI.12	DI.11	DI.10	DI.9

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DI.1	Discrete Input	8	1	Value	3
DI.2	Discrete Input	8	2	Value	3
DI.3	Discrete Input	8	3	Value	3
DI.4	Discrete Input	8	4	Value	3
DI.5	Discrete Input	8	5	Value	3
DI.6	Discrete Input	8	6	Value	3
DI.7	Discrete Input	8	7	Value	3
DI.8	Discrete Input	8	8	Value	3
DI.9	Discrete Input	8	8	Value	3
DI.10	Discrete Input	8	8	Value	3
DI.11	Discrete Input	8	8	Value	3
DI.12	Discrete Input	8	8	Value	3
DI.13	Discrete Input	8	8	Value	3
DI.14	Discrete Input	8	8	Value	3
DI.15	Discrete Input	8	8	Value	3
DI.16	Discrete Input	8	8	Value	3

APPENDIX A.1
CATALOG #: DN-1600-IO1
CMH 16IN/16OUT

Discrete Input Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DI.1	IN1	J4.2	Data Input
DI.2	IN2	J4.3	Data Input
DI.3	IN3	J4.4	Data Input
DI.4	IN4	J4.5	Data Input
DI.5	IN5	J4.6	Data Input
DI.6	IN6	J4.7	Data Input
DI.7	IN7	J4.8	Data Input
DI.8	IN8	J4.9	Data Input
DI.9	IN9	J5.2	Data Input
DI.10	IN10	J5.3	Data Input
DI.11	IN11	J5.4	Data Input
DI.12	IN12	J5.5	Data Input
DI.13	IN13	J5.6	Data Input
DI.14	IN14	J5.7	Data Input
DI.15	IN15	J5.8	Data Input
DI.16	IN16	J5.9	Data Input

APPENDIX A.1

CATALOG #: DN-1600-IO1

CMH 16IN/16OUT

Format of I/O Assembly Instance #2 -- Device Outputs

Byte	7	6	5	4	3	2	1	0
0	DO.8	DO.7	DO.6	DO.5	DO.4	DO.3	DO.2	DO.1
1	DO.16	DO.15	DO.14	DO.13	DO.12	DO.11	DO.10	DO.9

Map of I/O Assembly Data Attribute Components

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
DO.1	Discrete Out	9	1	Value	3
DO.2	Discrete Out	9	2	Value	3
DO.3	Discrete Out	9	3	Value	3
DO.4	Discrete Out	9	4	Value	3
DO.5	Discrete Out	9	5	Value	3
DO.6	Discrete Out	9	6	Value	3
DO.7	Discrete Out	9	7	Value	3
DO.8	Discrete Out	9	8	Value	3
DO.9	Discrete Out	9	9	Value	3
DO.10	Discrete Out	9	10	Value	3
DO.11	Discrete Out	9	11	Value	3
DO.12	Discrete Out	9	12	Value	3
DO.13	Discrete Out	9	13	Value	3
DO.14	Discrete Out	9	14	Value	3
DO.15	Discrete Out	9	15	Value	3
DO.16	Discrete Out	9	16	Value	3

APPENDIX A.1
CATALOG #: DN-1600-IO1
CMH 16IN/16OUT

Discrete Output Signal Mapping

Bit Name	Signal Name	Connector.Pin	Description
DO.1	ODAT1	J2.2	Data Out
DO.2	ODAT2	J2.3	Data Out
DO.3	ODAT3	J2.4	Data Out
DO.4	ODAT4	J2.5	Data Out
DO.5	ODAT5	J2.6	Data Out
DO.6	ODAT6	J2.7	Data Out
DO.7	ODAT7	J2.8	Data Out
DO.8	ODAT8	J2.9	Data Out
DO.9	ODAT9	J3.2	Data Out
DO.10	ODAT10	J3.3	Data Out
DO.11	ODAT11	J3.4	Data Out
DO.12	ODAT12	J3.5	Data Out
DO.13	ODAT13	J3.6	Data Out
DO.14	ODAT14	J3.7	Data Out
DO.15	ODAT15	J3.8	Data Out
DO.16	ODAT16	J3.9	Data Out

APPENDIX A.1
CATALOG #: DN-1600-IO1
CMH 16IN/16OUT

Variable Attributes Table

Attribute Name	Class ID	Instance ID	Attribute ID	Value
Product Code	1	1	3	0x000E
Serial Number	1	1	6	0x00002C00*
Product Name	1	1	7	11,"DN-1600-IO1"
Produced connection size	5	2	7	0x0002
consumed connection size	5	2	8	0x0002
produced path length	5	2	13	0x0006
produced path	5	2	14	20.04.24.01.30.03
consumed path length	5	2	15	0x0006
consumed path	5	2	16	20.04.24.02.30.03

* -- Base Serial Number used when Non-Volatile Memory is not initialized.

APPENDIX A.1

CATALOG #: DN-1600-IO1

CMH 16IN/16OUT

Input Fault (0x64)

There are eight instances of the Input Fault Object. The value of each instance indicates the status of a pair of input points sharing the same input connector.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	1=Fault 0=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

APPENDIX A.1

CATALOG #: DN-1600-IO1

CMH 16IN/16OUT

Auxiliary Power (0x66)

There is one instance of the Auxiliary Power Object. The value indicates the status of Vaux power which supplies the output driver circuits.

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Input Fault Value	0=Fault 1=OK

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

APPENDIX A.1

CATALOG #: DN-1600-IO1

CMH 16IN/16OUT

Output Fault(65)

There are 16 instances of the Output Fault Object. The value of each instance shows the presence of a match or mismatch between the intended state of an output point and the actual state.

Command Output	Diagnostic Input	Output Diagnostic Value
0	0	0 = No Fault
0	1	1 = Fault
1	0	1 = Fault
1	1	0 = No Fault

No class attributes are supported for this class

Instance Attributes are shown in the following table

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Output Diagnostic Value	0/1

The only service is a Get_Attribute_Single

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

APPENDIX B

Factory Test Object (0xC4)

There is one instance of the Factory Test Object: instance #1. This object has no attributes, only services. In the examples the master's MAC ID is one(1), and the server's MAC ID is sixty-three(63), but this is only an example. In practice the Master MAC Id and the Server MAC Id could be any legal values in the range zero(0) to sixty-three(63).

Service Code	Service Name	Description and example of Service
3A	Factory_Unlock	Invalidate Non-Volatile Storage [5FC]<01 3A C4 01>
3B	Factory_Lock	Save Factory Data in Non-Volatile [5FC]<01 3B C4 01>
3C	Set_Vendor_Id	Change the Vendor Id in RAM [5FC]<01 3C C4 01 95 00> New Vendor Id is 0x0095
3D	Set_Product_Code	Change the Product Code in RAM [5FC]<01 3D C4 01 12 03> New Product Code is 0x0312
3E	Set_Serial_Number	Change the Serial Number in RAM [5FC]<01 3E C4 01 80 28 AA BB> New serial number is 0xBBAA2880
3F	Set_Product_Name	Change the Product Name in RAM [5FC]<01 3F C4 01 4F 34 49 34 04> New name is 4, '8I4O'
40	Set_Produce_Size	Change the Produce Size in RAM [5FC]<01 40 C4 01 04> New produce size is 4
41	Set_Consume_Size	Change the Consume Size in RAM [5FC]<01 41 C4 01 01> New consume size is 1
42	Set_Obit_Count	Change the output bit count in RAM [5FC]<01 42 C4 01 04> New output bit count is 4
43	Set_Ofbit_Count	Change output fault bit count in RAM [5FC]<01 43 C4 01 04> New output fault bit count is 4
44	Set_Ibit_Count	Change the input bit count in RAM

		[5FC]<01 44 C4 01 08> New input bit count is 8
45	Set_Ifbit_Count	Change input fault bit count in RAM [5FC]<01 45 C4 01 04> New input fault bit count is 4
46	Set_Override	Set the RAM override bit (RAM overrides the hardwired ID) [5FC]<01 46 C4 01 01> Clear the RAM override bit [5FC]<01 46 C4 01 00>

All services return an “Object Does Not Exist” error message in all cases.