Appendix A
DeviceNet Explicit Messages

DeviceNet explicit messages sent from the Master Unit to a GRT1 Series DeviceNet Communications Unit can be used to read or write any parameter of a specified GRT1 Series DeviceNet Communications Unit.

The DeviceNet Communications Units process the commands sent from the Master and then return responses.

Basic Format of Explicit Messages

The basic format of each command and response is shown below.

Command Block

Destination node address	Service code	Class ID	Instance ID	Attribute ID	Data

Destination Node Address

The node address of the Unit that is sending the explicit messages (commands) is specified as a single-byte hexadecimal.

Service Code, Class ID, Instance ID, Attribute ID

The parameters used for specifying the command, processing object, and processing content.

Note The number of bytes designated for Class ID, Instance ID, and Attribute ID depend on the Master Unit. When sent from an OMRON DeviceNet Master, the Class ID and Instance ID are 2 bytes (4 digits), and Attribute ID is 1 byte (2 digits).

Data

Data is not required when the read command is used.

Response Block

Normal Response Block

Number of bytes received	Source node address	Service code	Data

Error Response Block

Number of bytes received: 0004 Hex (fixed)	Source node address	Service code	Error code

Number of Bytes Received

The number of bytes received from the source node address is returned in hexadecimal. When an error response is returned for an explicit message, the number of bytes is always 0004 Hex.

Source Node Address

The node address of the node from which the command was sent is returned in hexadecimal.

Service Code

For normal completion, the value when the leftmost bit of the service code specified in the command turns ON is stored as shown in the following table.

Function	Command service code	Response service code
Write data	10 Hex	90 Hex
Read data	0E Hex	8E Hex
Reset	05 Hex	85 Hex
Save	16 Hex	96 Hex

When an error response is returned for an explicit message, the value is always 94 Hex.

Data

Read data is included only when a read command is executed.

Error Codes

The explicit message error code. For details, refer to the list of error codes in the following table.

List of Error Codes

Response code	Error name	Cause
08FF	Service not supported	The Service code is incorrect.
09FF	Invalid Attribute value	The specified Attribute value is not supported. The data written was outside valid range.
16FF	Object does not exist	The specified Instance ID is not supported.
15FF	Too much data	The data is larger than the specified size.
13FF	Not enough data	The data is smaller than the specified size.
0CFF	Object state conflict	The specified command cannot be executed due to an internal error.
20FF	Invalid parameter	The specified operation command data is not supported.
0EFF	Attribute not settable	An Attribute ID supported only for reading has been executed for a write service code.
10FF	Device state conflict	The specified command cannot be executed due to an internal error.
14FF	Attribute not supported	The specified Attribute is not supported.
19FF	Store operation failure	The data cannot be stored in memory.
2AFF	Group 2 only server general failure	The specified command or Attribute is not supported or the Attribute was not set.

Explicit Messages Common to All Slaves

Reading General Status

Explicit message	Read/write	Function	Command					Response
			Service code	Class ID	Instance ID	Attribute ID	Data size	
General Status Read	Read	Reads the specified Communications Unit's status flags (8 bits).	0E Hex	95 Hex	01 Hex	65 Hex	---	1 byte

Note Refer to *2-2-3 I/O Allocation to the Slice I/O Terminal's Master Unit* for information on the Generic Status Flags

Setting and Monitoring the Unit Conduction Time

Explicit message	Read/ write	Function	Command					Response
			Service code	Class ID	Instance ID	Attribute ID	Data size	
Unit Maintenance Set Value	Read	Reads the set value for the Communications Unit's Unit Conduction Time (Power ON time, unit: 0.1 hr)	0E Hex	95 Hex	01 Hex	73 Hex	---	4 bytes 00000000 to FFFFFFFF Hex (0 to 4294967295)
	Write	Writes the set value for the Communications Unit's Unit Conduction Time (Power ON time, unit: 0.1 hr)	10 Hex	95 Hex	01 Hex	73 Hex	4 bytes 00000000 to FFFFFFFF Hex (0 to 4294967295)	---
Unit Maintenance Present Value	Read	Reads the present value for the Communications Unit's Unit Conduction Time (Power ON time, unit: 0.1 hr)	0E Hex	95 Hex	01 Hex	71 Hex	---	4 bytes 00000000 to FFFFFFFF Hex (0 to 4294967295)
Unit Maintenance Flag	Read	Reads the monitor status of the Communications Unit's Unit Conduction Time (Power ON time)	0E Hex	95 Hex	01 Hex	72 Hex	---	1 byte 00: Within range 01: Out of range (over the monitor value)

Alarm Information Read

Explicit message	Read/write	Function	Command					Response
			Service code	Class ID	Instance ID	Attribute ID	Data size	
Alarm Information Read	Read	Reads the Slice I/O Terminal's alarm data.	0E Hex	9C Hex	01 Hex	73 Hex	---	32 bytes (See note.)

Note The following tables show the alarm data details.

Word offset	Bit			
	15 12	11 8	7 4	3 0
+0	Slice I/O Node #4	Slice I/O Node #3	Slice I/O Node #2	Slice I/O Node #1
+1	Slice I/O Node #8	Slice I/O Node #7	Slice I/O Node #6	Slice I/O Node #5
+2	Slice I/O Node #12	Slice I/O Node #11	Slice I/O Node #10	Slice I/O Node #9
:				
+13	Slice I/O Node #56	Slice I/O Node #55	Slice I/O Node #54	Slice I/O Node #53
+14	Slice I/O Node #60	Slice I/O Node #59	Slice I/O Node #58	Slice I/O Node #57
+15	Slice I/O Node #64	Slice I/O Node #63	Slice I/O Node #62	Slice I/O Node #61

The 4 bits allocated to each Slice I/O Node have the following functions:

Bit 0	Warning (Minor error)
Bit 1	Alarm (Major error)
Bit 2	Reserved
Bit 3	Reserved

Note The Warning/Alarm details depend on the Communications Unit. Refer to the Unit's operation manual.

Using Explicit Messages

The following example shows how to use explicit messages with a DeviceNet Communications Unit connected to a CS1W-DRM21 DeviceNet Master Unit.

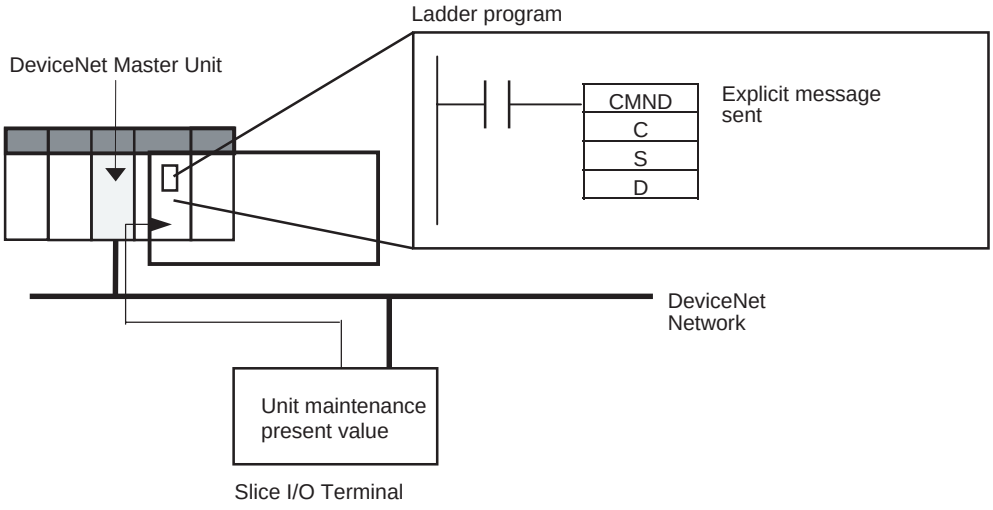
Example: Sending a “Unit Maintenance Present Value Read” command to the DeviceNet Communications Unit.

Example: DeviceNet Master Unit’s node address: 05

Unit number: 0

Unit address: FE Hex (or 10 Hex)

DeviceNet Communication Unit’s node address: 11



Operation

Reads the Unit maintenance PV of the Slice I/O Terminal’s DeviceNet Communications Unit.

The data is read using the EXPLICIT MESSAGE SEND command (2801).

The command data is written in words starting from D01000 in the PLC and the response data is stored in words starting from D02000.

If the command does not end normally, the end code is stored in D00006 and the send command is re-executed.

Command Details

- [CMND S D C]
  S: D01000
  D (first response word): D02000
  C: D00000

Contents of S

Address	Contents (Hex)	Meaning
D01000	28 01	Command code
D01001	0B 0E	DeviceNet Communications Unit's node address: 11 Service code: 0E Hex
D01002	00 95	Class ID: 0095 Hex
D01003	00 01	Instance ID: 0001 Hex
D01004	71 **	Attribute ID: 71 ** Hex (Set any value for the blank boxes.)

Contents of C

Address	Contents (Hex)	Meaning
D00000	00 09	Number of bytes of command data
D00001	00 0C	Number of bytes of response data
D00002	00 00	Destination DeviceNet Master Unit's network address: 0
D00003	05 FE	Destination DeviceNet Master Unit's node address: 5 Destination DeviceNet Master Unit's unit address: FE Hex (or 10 Hex)
D00004	00 00	Response required Communications port number: 0 Number of retries: 0
D00005	00 3C	Response monitoring time: 6 s

Response

Contents of D

Address	Contents (Hex)	Meaning
D02000	28 01	
D02001	00 00	
D02002	00 02	
D02003	0B 8E	Response source node address: 11 (0B Hex) Normal completion: 8E Hex
D02004 to D02005	00 00	Unit Maintenance PV (4 bytes of data)