Appendix A: PowerNet Software and NetPower DDE

Overview

If you wish to directly program DDE with a NetPower Integrator application, you use device objects to either obtain device data or control devices. A device object is data that is associated with a device, whether it is a device attribute or a control tag. Device objects are used transparently through shared Windows applications.

This chapter describes how you can directly program DDE using device objects. Device objects are listed by device in *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.

DDE command syntax for PowerNet Software has been modified from DDE syntax for IMPACC Series III. For more information, see *DDE Command Syntax: IMPACC Series III vs. PowerNet Software*.

DDE Command Syntax

Format of DDE

The generic format for DDE code is:

D[device number]**TAG**

> **Note**
> When coding with DDE, you do not use the brackets "[" and "]".

You use this format to:

♦ Retrieve device attributes from specific devices (such as Phase A current).

♦ Control certain devices (such as turning on a relay).

♦ Log on to NetPower DDE Server from a NetPower Integrator program.

♦ Dial-up specific devices.

Format of DDE Code: Obtaining Device Attributes

The format for determining a device attribute is:

IMPACC|[DeviceServer name]**!D**[device number]**TAG**

> **Note**
> When coding with DDE, you do not use the brackets "[" and "]".

where:

♦ IMPACC is the application.

♦ NetPower DeviceServer name is the particular NetPower DeviceServer.

♦ Device number is the number of the device to be controlled.

♦ Tag is the attribute requested from the device.

The availability of an attribute varies with the capabilities of each device. For more details on the availability of attributes for particular devices, see *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.

For example, to obtain the device attribute Phase A Current from device number 6 of the NetPower DeviceServer named DeviceServer2, you would enter the following DDE code:

IMPACC|DeviceServer2!D6IA

where:

♦ IMPACC is the application.

♦ DeviceServer2 is the particular NetPower DeviceServer.

♦ D6 is the number of the device to be controlled.

♦ IA is the device attribute to be returned.

Format of DDE Code: Device Control

You may use DDE to control a device. The format for this control action is:

D[device number]**TAG**=Value

> **Note**
> When coding with DDE, you do not use the brackets "[" and "]".

where:

♦ Device number is the number of the device to be controlled.

♦ Tag is the command sent to the device.

♦ Value is an integer representing the command that is sent to the device, and is always set to 1.

The following table lists a subset of valid tags. The availability of a tag varies with the capabilities of each device. For more details on the availability of tags for particular devices, see *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.

TAG
Open, Trip, or Stop
Close, Start, or Start Forward
Reset Peak Demand
Reset Unit or Reset Trip
Reset Demand Window
Reset Run Time
Start Fast
Start Reverse
Start Slow
Start Slow Reverse
Start Forward Direction
Start Reverse Direction
Reset Demand current
Reset Energy

For example, to reset the Peak Demand of device number 1 of DeviceServer2, you would enter the following DDE code:

IMPACC|DeviceServer2!D1ResetPeakDemand=1

where:

♦   IMPACC is the application.

♦   DeviceServer2 is the particular NetPower DeviceServer.

♦   D1 is the number of the device to be controlled.

♦   ResetPeakDemand is the device control.

Format of Dial-Up Commands

You may use DDE to dial-up a specific device. The format for this control action is:

N[network number]**TAG**=Value

where:

♦ Network number is the number of the network to be accessed.

♦ Tag is the command sent to the network.

The following table describes the available tags associated with dial-up commands.

TAG	DDE Type	Description
HANGUP	Long	Terminate a connection with a network.
DIAL	Long	Dial up a network.

For example, to dial-up network number 4 on a NetPower DeviceServer named DeviceServer2, you would enter the following DDE code:

IMPACC|DeviceServer2!N4DIAL=1

Format of other DDE Commands

You may wish to use special DDE commands, such as obtaining the product identification of a device. The format for this control action is:

D[device number]**TAG**

where:

♦ Device number is the number of the device to be controlled.

♦ Tag is a special DDE tag, which is sent to the device.

The following table describes the available special DDE tags.

TAG	DDE Type	Description
TYPEN	Long	Device type from the NetPower Configurator.
PRODUCT_ID	Long	Device product identification.
DIV_CODE	Long	Division code.
COM_VERSION	Long	Communications software version.
USERID	String	User ID that is logged on. (No device number is needed with this device tag.)

TAG	DDE Type	Description
PASSWORD	String	Password for the logged on User ID. (No device number is needed with this device tag.)
MODE	String	Device settings.
MOTION	String	Device settings.
DESC	String	Device description.
RAW STATUS	DWORD	Copy of the INCOM status buffer.
STATN	Double	Device status in code format.
STATT	String	Device status in text format.
RSONN	Double	Device status reason in code format.
RSONT	String	Device status reason in code format.

For example, to obtain the status of device number 4 for DeviceServer2, you would enter the following DDE code:

IMPACC|DeviceServer2!D4statn

where:

♦ IMPACC is the application.

♦ DeviceServer2 is the particular NetPower DeviceServer.

♦ D4 is the number of the device to be controlled.

♦ Statn is the device attribute to be returned.

Application Notes and General Guidelines

♦ Case Sensitivity. DDE item names and device point formats are case insensitive.

♦ Device Status Formats. A device status can be requested in two formats:

D[device number]**STATT**   Returns the standard IMPACC Status Codes for a device in text format.

D[device number]**STATN**   Returns an integer value as an index equivalent to the standard IMPACC Status Codes.

For information on device status codes and their integer values see *Appendix A: Status/Reason Codes* in the *PowerNet Software User's Guide*.

♦ Reason Code Formats. A device reason can be requested in two formats:

D[device number]**RSONT**   Returns the standard IMPACC status reason code for a device in text format.

D[device number]**RSONN**   Returns an integer value as an index equivalent to the standard IMPACC Reason Codes.

For information on device status codes and their integer values see *Appendix A: Status/Reason Codes* in the *PowerNet Software User's Guide*.

Tag Quality

Tag quality is an option for the NetPower DeviceServer that allows you to verify the quality of returned values. These return codes apply values for requested device attributes.

To return tag quality, do the following:

♦ If you are typing code in a DDE-based application (such as Microsoft Excel), add the code "quality" at the end of the input string. For example:

=IMPACC|nodename1!D1statnquality

The system returns a quality code corresponding to the returned value. These codes are listed in the following table.

Code	Description
x0000	INVALID
x00C0	VALID
x0002	UNDERRANGE
x0008	OVERRANGE
x0044	NOT_SUPPORTED
x001C	SCAN_TIMEOUT
x0104	OUT_OF_SERVICE
x0204	EDS_ERROR
x0118	CONFIG_ERROR
x0218	1^{ST}_RX_TIMEOUT

Code	Description
x0418	RX_TIMEOUT
x0818	BCH_ERROR
x001C	NACK_ERROR
x1018	TX_ERROR
x40C0	IN_ALARM
x0256	BAD_COM
x0512	GATE_DISCONNECT

Example: Determine the Quality of a Returned Attribute

You wish to determine the quality of the attribute Phase A Current from device number 1.

1. In Microsoft Excel, type the following code:

   =IMPACC|nodename1!d1iaquality

   Microsoft Excel updates to display a specific quality code number.

2. In the NetPower DDE Server main window, click the Enable/Disable icon to enable the display.

The NetPower DDE Server main window updates to display the message associated with the quality code.
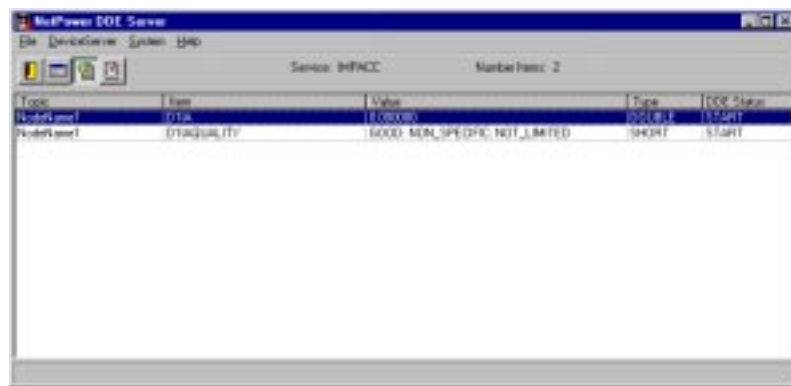
DDE Error Messages

When there are problems specific to the NetPower DeviceServer, the NetPower DeviceServer generates error codes. These error codes display in the gray box at the bottom of the NetPower DDE Server main window.

DDE between IMPACC and NetPower Integrator

This section assumes you are familiar with the NetPower Integrator applications. For more information, see the *NetPower Integrator User's Manual*.

NetPower Integrator is an object-oriented graphics program that enables you to create windows to perform various tasks (such as monitoring industrial controllers or communicating with other Microsoft Windows applications). Using NetPower Integrator applications, you can create custom windows, system drawings, animated graphics, and much more. You write specific DDE codes to link graphic objects to DDE functions, and using NetPower Integrator software, you display these graphic objects in your custom windows.

Thus, through DDE, NetPower Integrator can receive data and send commands to devices, using graphic windows to control those devices. For example, you could create a drawing of your system that displays actual readings from devices and allows you to issue device control commands (Open, Close, Trip, etc.).

NetPower Integrator and DDE Requests

In order for a NetPower Integrator application to access device information, tag name variables must be created. Each device data to be accessed (e.g., Phase A Current, Max Real Power, etc.) must be assigned a DDE tag name within NetPower Integrator. The following table lists information that must be specified when creating a tag name for IMPACC.

Option	Description
Tag name	User specified.
Type	"DDE Integer," "DDE Real," or "DDE Message" depending on the IMPACC data item. To view a complete list of data items, see *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.
Read Only or Read/Write	For data items, select Read Only.
Initial Value	User specified.
Min EU	User specified.
Max EU	User specified.
Deadband	User specified.
Min Raw	User specified.
Max Raw	User specified.

Option	Description
DDE Access Name	User specified, but must be configured as follows: DDE Application Name: IMPACC DDE Topic Name: NetPower DeviceServer name Handling of initial data values: Wait for change When to advise server: Advise only active items

For step-by-step instructions on defining DDE tag names, see the *NetPower Integrator User's Manual*.

The actual code to be sent to IMPACC is entered in the following format:

D[device number][data type]

where:

♦ Device number is the number of the device to be controlled.

♦ Data type is the particular item being requested.

Issuing IMPACC Commands from NetPower Integrator Windows

In order for a NetPower Integrator program to control devices, tag name variables must be created. Each IMPACC control (e.g., open a breaker, reset an alarm, etc.) must be assigned a DDE tag name within NetPower Integrator. The following table lists information that must be specified when creating a tag name for IMPACC.

Option	Description
Tag name	User specified.
Type	"DDE Integer" depending on the IMPACC data item. To view a complete list of data items, see *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.
Read Only or Read/Write	For commands, select Read/Write.
Initial Value	User specified.
Min EU	User specified.
Max EU	User specified.
Deadband	User specified.
Min Raw	User specified.
Max Raw	User specified.

Option	Description
DDE Access Name	User specified, but must be configured as follows: DDE Application Name: IMPACC DDE Topic Name: NetPower DeviceServer name Handling of initial data values: Wait for change When to advise server: Advise only active items

For step-by-step instructions on defining DDE tag names, see the *NetPower Integrator User's Manual*.

Device commands are created by defining an action object in a window. For example, one such object that can be used for DDE commands is the "Touch Pushbutton – Action." The actual code to be sent to IMPACC (known as Action Script) is entered in the following format:

D[device number]**Tag**=1

where:

♦ Device number is the number of the device to be controlled.

♦ Tag is a particular device control. Valid device controls are listed in *Appendix B: Device Objects* in the *PowerNet Software User's Guide*.

DDE Command Syntax: IMPACC Series III vs. PowerNet Software

To obtain device attributes, the DDE syntax for PowerNet Software is the same as for IMPACC Series III. This command syntax is as follows:

D[device number][data type]

where:

♦ Device number is the number of the device to be controlled.

♦ Data type is the particular device attribute.

For example, the DDE code for Phase A Current for device number 2 is as follows:

D2IA

To control specific devices, the DDE syntax for PowerNet Software is the not the same as for IMPACC Series III. For IMPACC Series III, the DDE device control syntax is as follows:

D[device number]**CONTROL**=Value

where:

♦ Device number is the number of the device to be controlled.

♦ Control is a DDE tag representing the device control.

♦ Value is an integer representing the command that is sent to the device.

Thus, with IMPACC Series III, to open a breaker on device number 4, the DDE code is as follows:

D4CONTROL=2

where (2) is an integer representing the action to close the breaker. To enter these codes, you need to refer to a specific table that lists these integers and corresponding functions.

For PowerNet Software, the DDE syntax has been modified, such that individual device controls are not associated with particular integers. Rather, the device control is used directly with the control tag, and Value may only be 0 or 1. If Value is 1, the device control is communicated to the device, and once the command is executed, Value is reset to 0.

For example, to open a breaker on device number 4, the DDE code is as follows:

D4OPEN=1

The full DDE syntax is as follows:

IMPACC|DeviceServer2!D4OPEN=1

where:

♦ IMPACC is the application.

♦ DeviceServer2 is the particular NetPower DeviceServer.

♦ D4 is the number of the device to be controlled.

♦ Open is the desired device control.

♦ The integer 1 is the Value (or switch) to signal that the control must be performed.

NetPower DDE Server reads the code and the Value of 1, indicating that the device control must be performed. It then relays this code to the NetPower DeviceServer, and once the return code indicating that the action was completed is sent from the NetPower DeviceServer, the NetPower DDE Server resets the value of 1 to 0.