



INDUSTRIAL CONTROL COMMUNICATIONS, INC.

Instruction
Manual

NetLink





NetLink User's Manual

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1. Introduction

NetLink is an Android-based communications client that enables data access to a variety of remote server devices. Using NetLink, technicians and maintenance personnel have the ability to conveniently interact with building automation systems and factory controls from on-site or around the globe with any Android smartphone or tablet.

Individual network drivers are installed as plugins to the NetLink Application, thereby allowing expandable access to a variety of popular networking protocols, such as Modbus and BACnet. This commonality provides a uniform interface, configuration and application experience, thereby reducing the user's learning curve and commissioning time.

NetLink is a free download and comes packaged with a demo mode plugin that generates random data values for evaluation purposes.

2. Features

NetLink Features

- Multiprotocol support via independently-installed plugins
- Select desired protocol and configure data access definitions
- Monitor and command data values
- Add data access definitions from discovered objects on the network
- Import and Export configuration settings
- Supports three types of user-configurable graphs for data visualization:
 - o Bar graph
 - o Line graph
 - o Step graph
- Supports organizing data items into commandable groups
- Allows a variety of data item sorting options
- Supports configuration of an unlimited number of data items
- Both portrait and landscape view modes are fully supported
- Compatible with phones and tablets running Android 2.2 and higher
- Supports data value scaling, units text, and decimal or hexadecimal values
- Real-time connection status feedback for all objects
- Free download, includes demo mode plugin

Modbus/TCP Plugin Features

- Access Modbus server devices over local networks or the internet
- Supports access to holding register, input register, coil and discrete input elements
- Configurable destination port, scan rate and timeout
- Supports Modbus RTU over TCP
- Discover Modbus devices on the local network or over the internet
- Configurable device and object discovery ranges
- Select between different write functions for registers and coils
- Supports data value scaling, units text, signed and unsigned data types, and decimal or hexadecimal values
- 32-bit registers are fully supported, including floating point values
- The communication to each target device is handled independently, resulting in increased performance

BACnet/IP Plugin Features

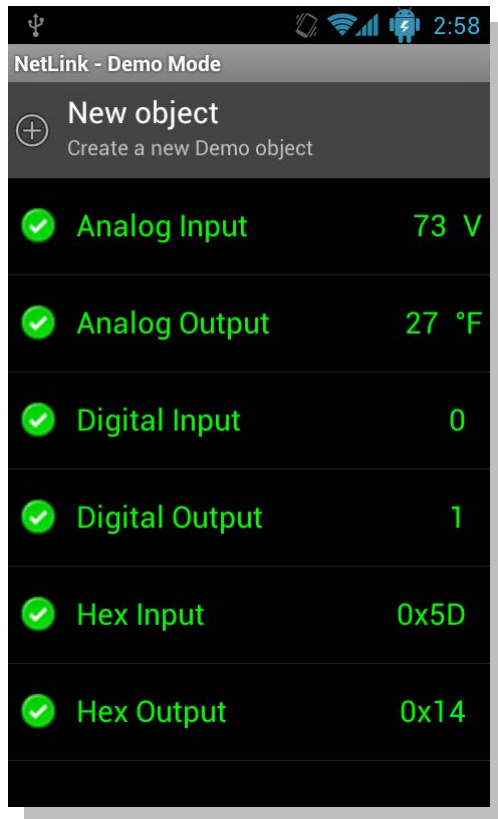
- Access BACnet server devices over local networks or the internet
- Supports access to analog input, analog output, analog value, binary input, binary output, binary value, multi-state input, multi-state output, and multi-state value object types
- Configurable destination port, scan rate and timeout
- Write priority can be selected for each object
- Discover BACnet devices on the local network or over the internet
- Supports data value scaling, units text, and decimal or hexadecimal values
- Supports BBMD and foreign device registration functionality for accessing BACnet devices across subnet boundaries and throughout the internet
- Configurable device name and device instance

OEM Customer Features

- 3rd-party project-specific licensing options available
- Ability to embed any of the NetLink Application and plugin screens as components of other Android applications
- Access plugin services independent of the NetLink application via standard Android APIs

3. Using NetLink

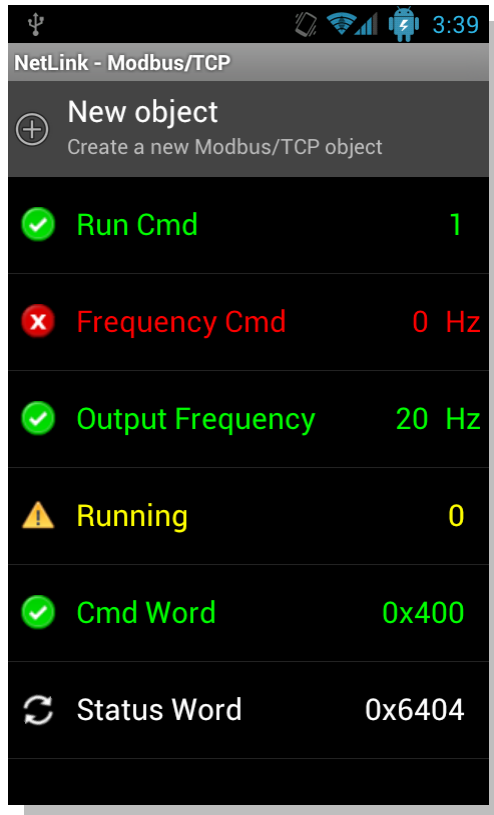
3.1 Object List



The object list displays all created objects and their values for the selected protocol. The object values are updated in real time. Each object is displayed with a connection status icon and corresponding color which indicates the current connection status of the object (refer to section 3.1.1 for more details). To create a new object, tap the button at the top of the list (refer to section 3.1.3). To access the options menu, tap the menu button on your device (refer to section 3.1.1). To view individual object options, tap and hold on an item in the list (refer to section 3.1.5).

3.1.1 Connection Status

The connection status of an object is reflected by the icon shown and the coloring of the text. The different connection states are detailed below.



3.1.1.1 Disconnected



This icon is displayed with the text colored white to indicate that a connection is not established for the object. An object will be in this state initially before establishing a connection. An object will also be in this state if a request times out, or the application cannot establish a connection with the target device.

3.1.1.2 Connected



This icon is displayed with the text colored green to indicate that a connection is established for an object. An object will always be in this state during error-free communication. While an object is connected, its value can be regarded as valid and up-to-date.

3.1.1.3 Warning



This icon is displayed with the text colored yellow to indicate that a connection is established for an object, but the value cannot be read due to an error. An object will be in this state if it receives an exception or error response from the target device. For example, an object will be in this state if the object does not exist on the target device.

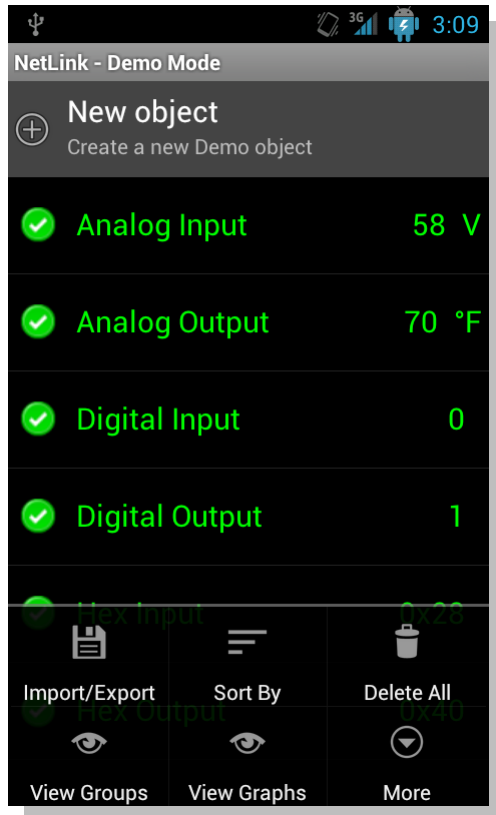
3.1.1.4 Error



This icon is displayed with the text colored red to indicate that a connection error has occurred for an object. A connection error occurs if a connection cannot be established with the target device, or an internal connection error has occurred such as the port being in use.

3.1.2 Options Menu

To access the options menu, tap the menu button on your device. Depending on the device, some menu options may reside under a “More” selection in the menu.



3.1.2.1 Import/Export

This allows a user to either import or export an entire configuration, which includes all objects, graphs, and settings for all available protocols, from or to a file located on the SD card. When exporting a file, the user may enter a name to save the file as, or simply use the default name. The location on the SD card where the files are stored is the directory entitled “NetLink”. Note that when a configuration is imported, this clears all the currently-configured objects, graphs, and settings for all protocols.

3.1.2.2 Sort By

This allows the user to sort the object list. The available options are created, connection status, description, type, value, and units. To toggle between ascending and descending ordering simply select the currently selected sorting option again.

3.1.2.3 Delete All

This deletes all the objects in the object list. Use caution when executing this, as this operation cannot be undone.

3.1.2.4 View Groups

Select this to view the group screen. The group screen displays all configured groups for the selected protocol. For more information on the group screen, refer to section 3.2.

3.1.2.5 View Graphs

Select this to view the graph screen. The graph screen displays all configured graphs for the selected protocol. For more information on the graph screen, refer to section 3.3.

3.1.2.6 Browse Network

Select this to view the object discovery screen. The object discovery screen allows a user to browse for objects on the currently connected network. Discovered objects can then be added to the object list.

3.1.2.7 Settings

Select this to view the settings for the application and installed protocol plugins.

3.1.2.8 Online Help

Select this to go to the online support page where this manual may be downloaded.

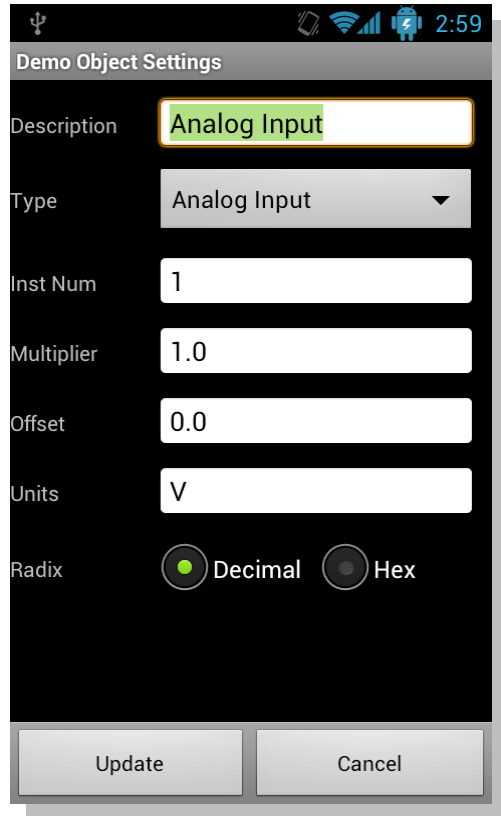
3.1.2.9 About

Select this to view information about the application such as the application version.

3.1.3 Creating/Editing an Object (Object Settings)

The object settings screen allows a user to edit an existing object or create a new one. The options available depend on the selected protocol.

3.1.3.1 Demo Object Settings



3.1.3.1.1 Description

This is the name displayed in the object list.

3.1.3.1.2 Type

Select a type for the object. The available types are described below:

- Analog Input
This object simulates an integer value from 0 to 100 that is read-only.
- Analog Output
This object simulates an integer value from 0 to 100 that is both readable and writeable.
- Digital Input
This object simulates a binary, on-off, value from 0 to 1 that is read-only.
- Digital Output
This object simulates a binary, on-off, value from 0 to 1 that is both readable and writeable.

3.1.3.1.3 Inst Num

This is the instance number for the object. This is used to reference the specific simulated object to read and (if the object type allows) write values.

3.1.3.1.4 Multiplier and Offset

These fields are used for scaling the value of the object. The scaling equation used is $y = mx + b$, where y is the value displayed in the object list, m is the multiplier, x is the network value of the object, and b is the offset.

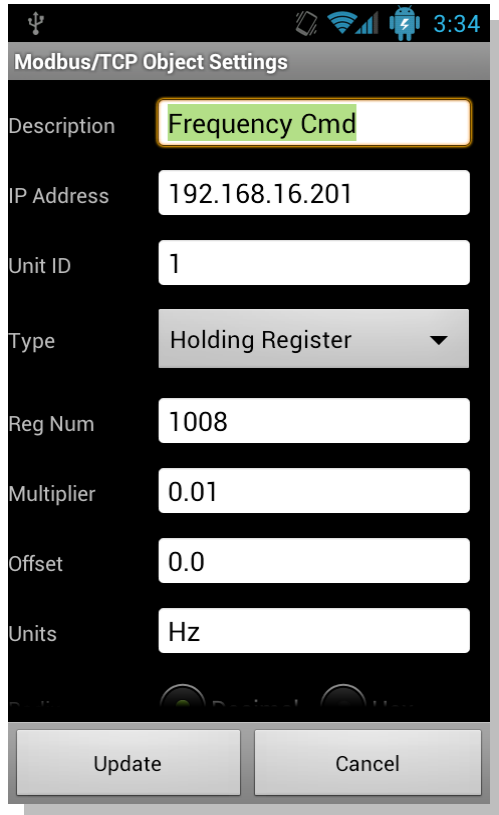
3.1.3.1.5 Units

This is the units displayed beside the value in the object list.

3.1.3.1.6 Radix

Select whether this object's value should be displayed and modified in decimal or hexadecimal.

3.1.3.2 Modbus/TCP Object Settings



Modbus/TCP Object Settings

Description: Frequency Cmd

IP Address: 192.168.16.201

Unit ID: 1

Type: Holding Register

Reg Num: 1008

Multiplier: 0.01

Offset: 0.0

Units: Hz

Update Cancel

3.1.3.2.1 Description

This is the name displayed in the object list.

3.1.3.2.2 IP Address

This is the IP Address to target for the Modbus/TCP server. Enter an IP Address or hostname in this field.

3.1.3.2.3 Unit ID

The implementation of the unit ID is defined by the Modbus/TCP server. Typically, it is used as the device ID field for addressing multiple devices with the same IP address.

3.1.3.2.4 Type

Select a type for the object. The available types are described below:

- Holding Register
This object is a Modbus holding register which has an integer value from 0 to 65535 and is both readable and writeable.
- Input Register
This object is a Modbus input register which has an integer value from 0 to 65535 and is read-only.
- Coil
This object is a Modbus coil which has a binary (on/off) value of 0 or 1 that is both readable and writeable.
- Discrete Input
This object is a Modbus discrete input which has a binary (on/off) value of 0 or 1 that is read-only.

3.1.3.2.5 Reg Num / Coil Num / Input Num

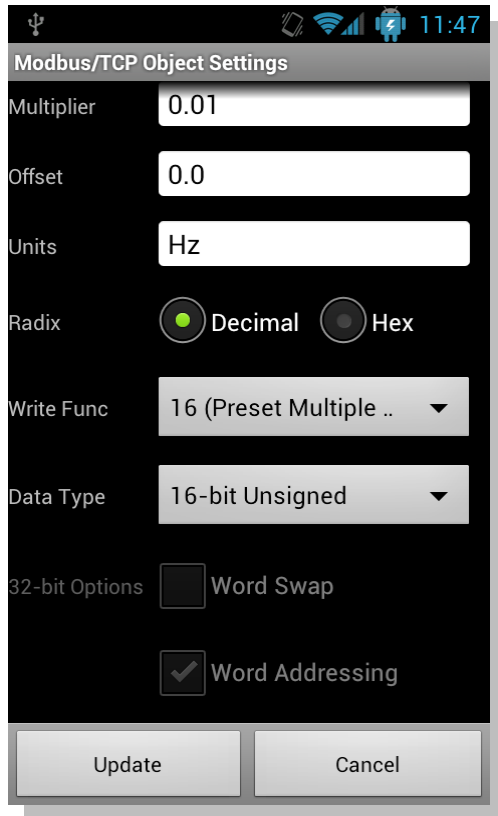
This is the register number for holding or input registers, the coil number for coils, or the input number for discrete inputs. This is used to target the specific object to read and (if the object type allows) write values.

3.1.3.2.6 Multiplier and Offset

See section 3.1.3.1.4.

3.1.3.2.7 Units

See section 3.1.3.1.5.



The image shows a screenshot of a mobile application interface titled "Modbus/TCP Object Settings". The interface is dark-themed. At the top, there is a status bar with icons for USB, Wi-Fi, cellular signal, and the time 11:47. The settings are as follows:

- Multiplier:** A text input field containing "0.01".
- Offset:** A text input field containing "0.0".
- Units:** A text input field containing "Hz".
- Radix:** Two radio buttons, "Decimal" (selected) and "Hex".
- Write Func:** A dropdown menu showing "16 (Preset Multiple ..)".
- Data Type:** A dropdown menu showing "16-bit Unsigned".
- 32-bit Options:** Two checkboxes. "Word Swap" is unchecked. "Word Addressing" is checked.

At the bottom, there are two buttons: "Update" and "Cancel".

3.1.3.2.8 Radix

See section 3.1.3.1.6.

3.1.3.2.9 Write Func

Select the write function code to use. Note that this option is only available for Holding Register and Coil Status types.

3.1.3.2.10 Data Type

Select a data type for the object. This selection will affect how the value for this object is interpreted when displayed in the object list and when written to the target device. Note that the data type selection is only available for Holding Register and Input Register types. The available types are listed below:

- 16-bit Unsigned
- 16-bit Signed
- 32-bit Unsigned
- 32-bit Signed
- 32-bit Floating Point

3.1.3.2.11 32-bit Options

The 32-bit options allows advanced configuration of 32-bit data types.

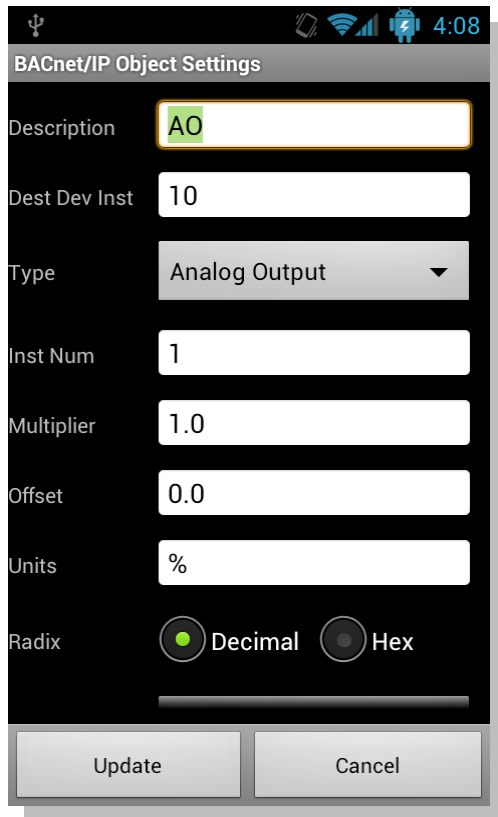
3.1.3.2.11.1 Word Swap

Check this to swap the 16-bit words which comprise the 32-bit register.

3.1.3.2.11.2 Word Addressing

Check this if a 32-bit register is composed of two Modbus register addresses (two 16-bit Modbus registers) on the target device.

3.1.3.3 BACnet/IP Object Settings



3.1.3.3.1 Description

This is the name displayed in the object list.

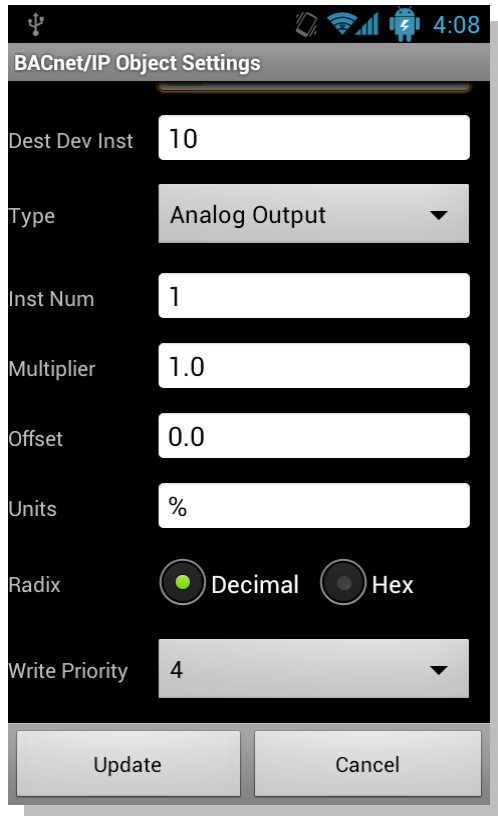
3.1.3.3.2 Dest Dev Inst

This is the destination device instance to target for this object. Each device on the BACnet/IP network will have a unique device instance associated with it.

3.1.3.3.3 Type

Select a type for the object. The available types are described below:

- Analog Input
This object represents a physical analog real (32-bit floating point) value that is read-only.
- Analog Output
This object represents a physical analog real (32-bit floating point) value that is both readable and writeable.
- Analog Value
This object represents a virtual analog real (32-bit floating point) value that is both readable and writeable.
- Binary Input
This object represents a physical digital (on/off) value of 0 or 1 that is read-only.
- Binary Output
This object represents a physical digital (on/off) value of 0 or 1 that is both readable and writeable.
- Binary Value
This object represents a virtual digital (on/off) value of 0 or 1 that is both readable and writeable.
- Multi-state Input
This object represents a physical state (32-bit unsigned integer) that is read-only.
- Multi-state Output
This object represents a physical state (32-bit unsigned integer) that is both readable and writeable.
- Multi-state Value
This object represents a virtual state (32-bit unsigned integer) that is both readable and writeable.



BACnet/IP Object Settings

Dest Dev Inst: 10

Type: Analog Output

Inst Num: 1

Multiplier: 1.0

Offset: 0.0

Units: %

Radix: ☒ Decimal ☐ Hex

Write Priority: 4

Update Cancel

3.1.3.3.4 *Inst Num*

This is the instance number for the object. This is used to reference the specific object on the target device to read and (if the object type allows) write values.

3.1.3.3.5 *Multiplier and Offset*

See section 3.1.3.1.4.

3.1.3.3.6 *Units*

See section 3.1.3.1.5.

3.1.3.3.7 *Radix*

See section 3.1.3.1.6.

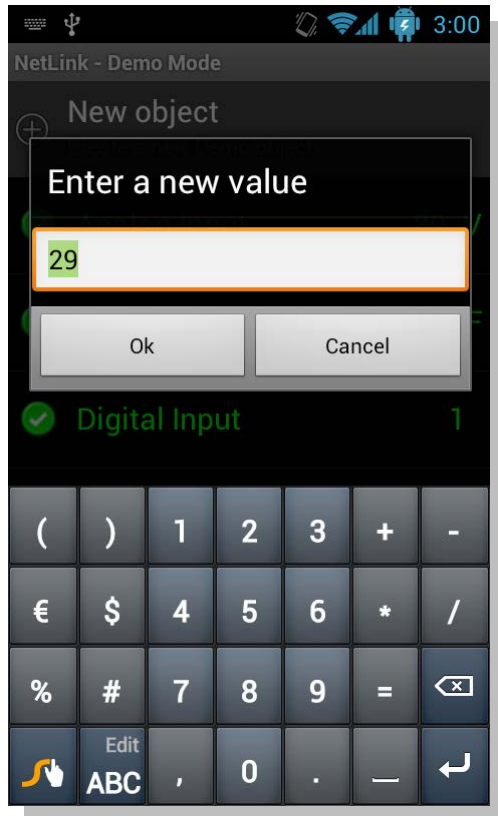
3.1.3.3.8 *Write Priority*

Select the priority to assign to writes for this object. BACnet write priorities may have a value from 1 to 16, where 16 is the lowest priority. Selecting “None” will use a write priority of 16, but will not allow the ability to relinquish values. Note that the write priority setting is only available for writeable objects (Output and Value objects).

3.1.4 Commanding an Object's Value

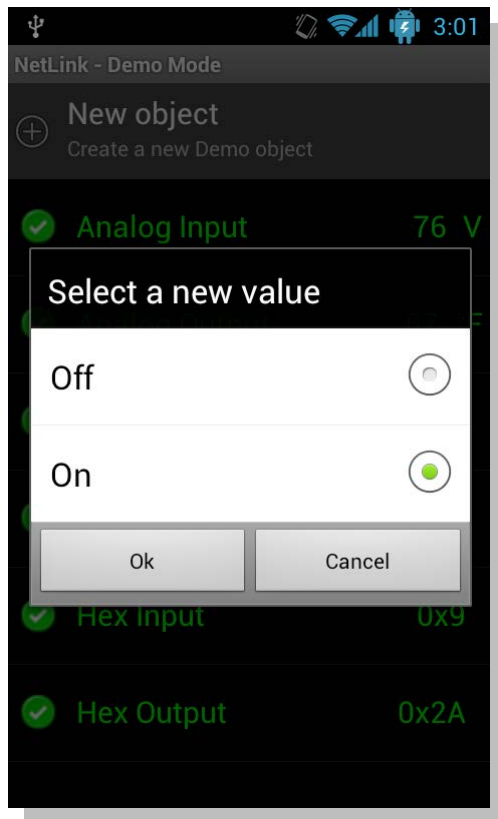
Writable objects can be command from the object list by tapping on the list item.

3.1.4.1 Entering a New Value



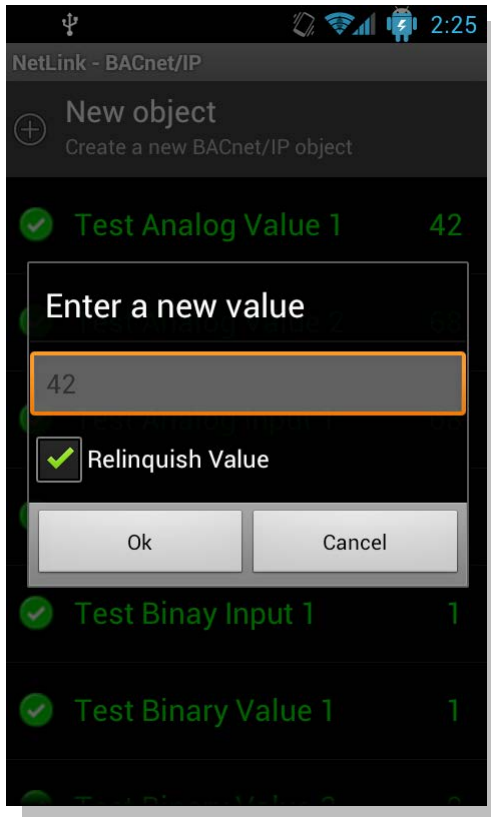
For object types that have an adjustment range larger than 0 to 1, any decimal or hexadecimal value (depending on the radix selected for the object) within the allowable range of the object may be entered into the edit box. Note that because some protocols use integer values instead of real (floating point) values, digits after the decimal place may be dropped.

3.1.4.2 Selecting a New Value

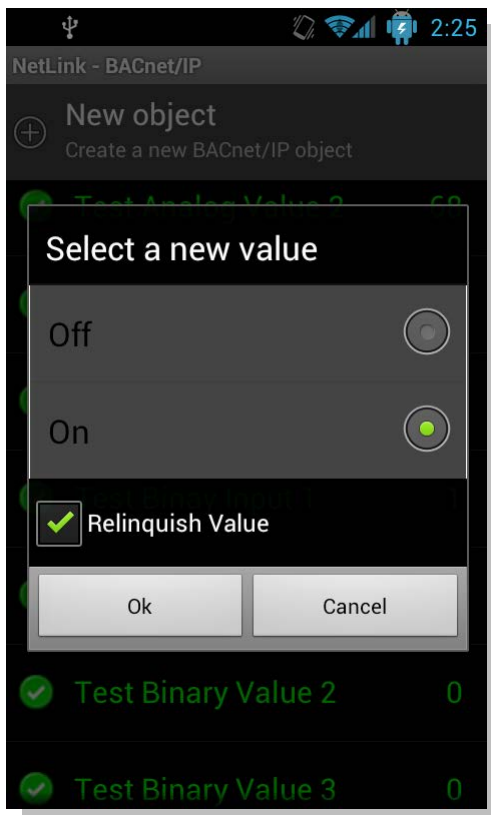


For binary (on/off) object types that have a range of 0 to 1, either a value of Off (corresponding to 0) or On may be selected.

3.1.4.3 Relinquishing a Value (BACnet only)

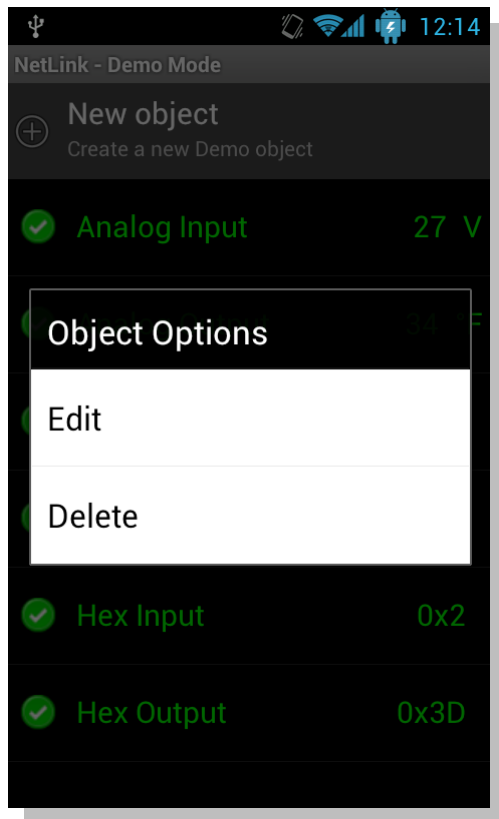


For BACnet object types configured with a write priority other than “None”, the value written at the configured priority may be relinquished by checking the “Relinquish Value” check box. Relinquishing a value writes a NULL to the object’s value at the assigned priority. This option is available regardless of whether a new value is being entered or selected.



3.1.5 Object Options

Tap and hold on an item in the object list to access the object options menu.



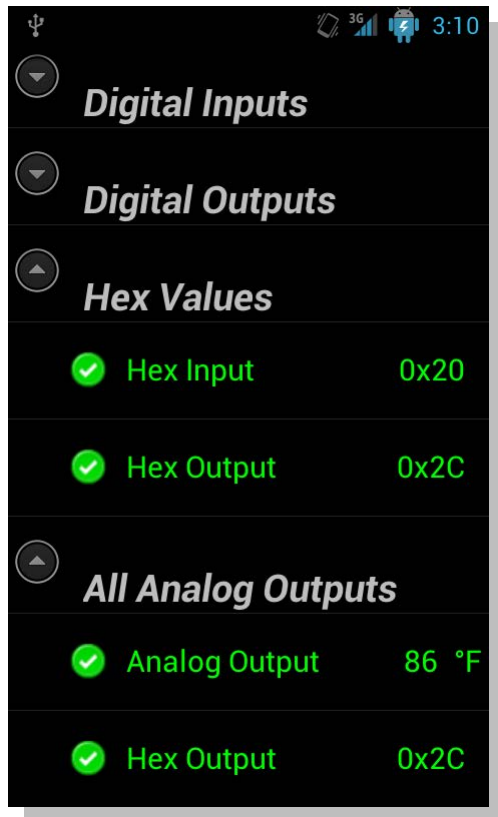
3.1.5.1 Edit

Select this option to edit the object settings. Refer to section 3.1.3 for details.

3.1.5.2 Delete

Select this option to delete the selected object. Note that this action cannot be undone.

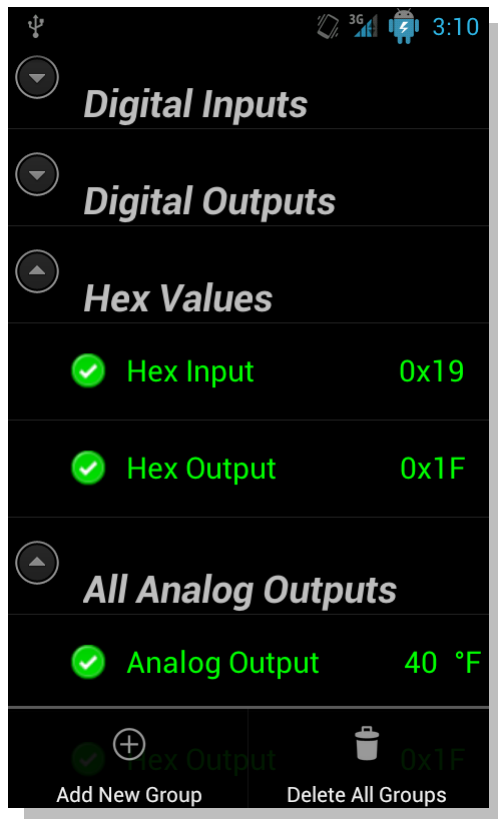
3.2 Groups



The group screen allows selected objects from the Object List to be grouped under a common heading. This can be useful for organizing objects that share common attributes (floors in a building, for example) as well as grouping commandable objects to write a value to all objects simultaneously. To create a new group, tap the “Add New Group” button in the options menu (refer to section 3.2.1). To select data items to be members of a group, tap and hold a group heading to display the group options (refer to section 3.2.2).

3.2.1 Options Menu

To access the options menu, tap the menu button on your device.



3.2.1.1 Add New Group

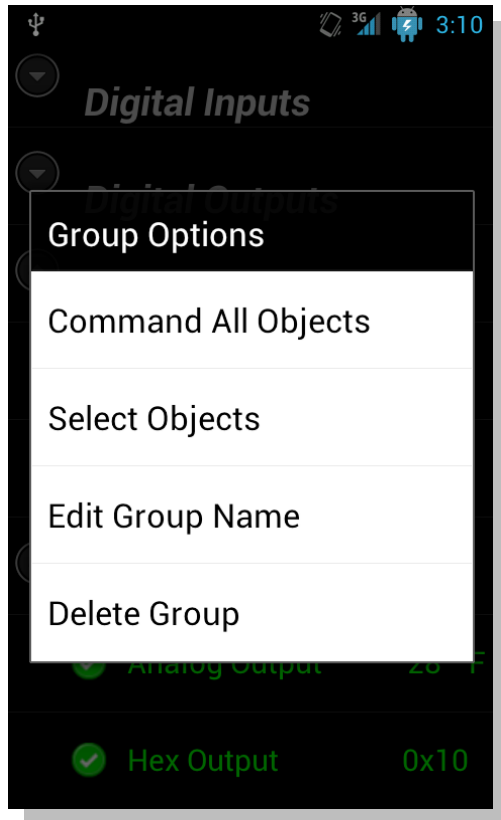
Select this to append a new group to the end of the group screen.

3.2.1.2 Delete All Groups

This deletes all the groups from the group screen. Use caution when performing this operation as it cannot be undone.

3.2.2 Group Options

To access the options menu of a particular group, tap and hold on a group heading to bring up the Group Options menu.



3.2.2.1 *Command All Objects*

Select this option to simultaneously write a value to all of the objects in the selected group. Note that this option is only available for groups composed of writable objects that have the same scaled range for their values. For BACnet objects, the “Relinquish Value” option will be available when entering or selecting a new value if all objects in the group are configured with a write priority other than “None”.

3.2.2.2 *Select Objects*

Select this option to choose which objects are to be members of the selected group. Note that individual objects may be members of more than one group if desired.

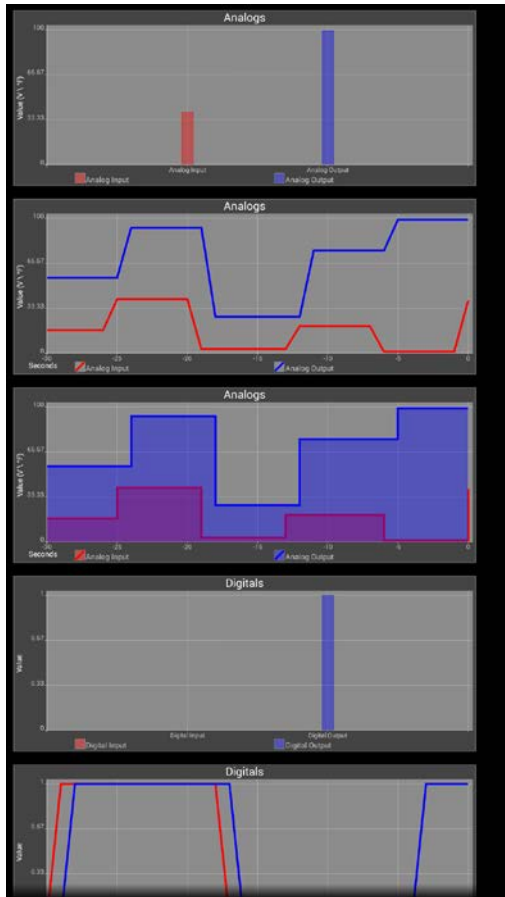
3.2.2.3 *Edit Group Name*

Select this option to edit the name of the group.

3.2.2.4 *Delete Group*

Select this option to delete the selected group. Note that this action cannot be undone.

3.3 Graphs

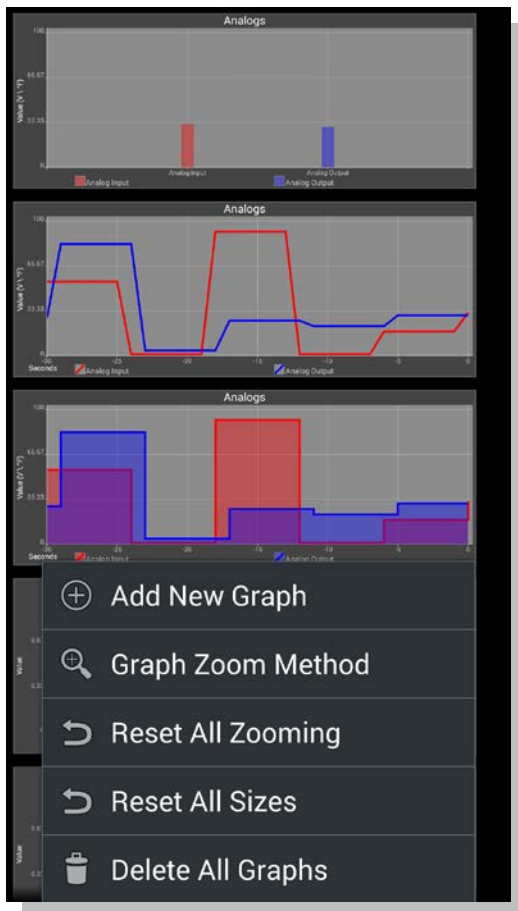


The graph screen displays all created graphs and their associated data for the selected protocol. The object values are updated periodically depending on the sample rate configured (refer to section 3.3.2). To create a new graph, tap the “Add New Graph” button in the options menu (refer to section 3.3.1). To configure the data displayed in the graph, tap and hold a graph to display the graph options (refer to section 3.3.3).

All graphs can be zoomed in and out using pinch-to-zoom, two finger gestures. The graphs can also be scrolled, or panned, when zoomed. Two different zoom methods are supported. These methods are described in section 3.3.1.2.

3.3.1 Options Menu

To access the options menu, tap the menu button on your device.



3.3.1.1 Add New Graph

Select this to append a new graph to the end of the graphs screen. Refer to section 3.3.2 for details on creating graphs.

3.3.1.2 Graph Zoom Method

Select the zoom method to use when using pinch-to-zoom gestures on graphs. Image Zoom allows you to zoom in or out on a particular area of the graph, as if you were scaling an image. Data Zoom allows you to increase or decrease the range shown on each of the graph's axes.

3.3.1.3 Reset All Zooming

This resets all graphs to their default zooms.

3.3.1.4 Reset All Sizes

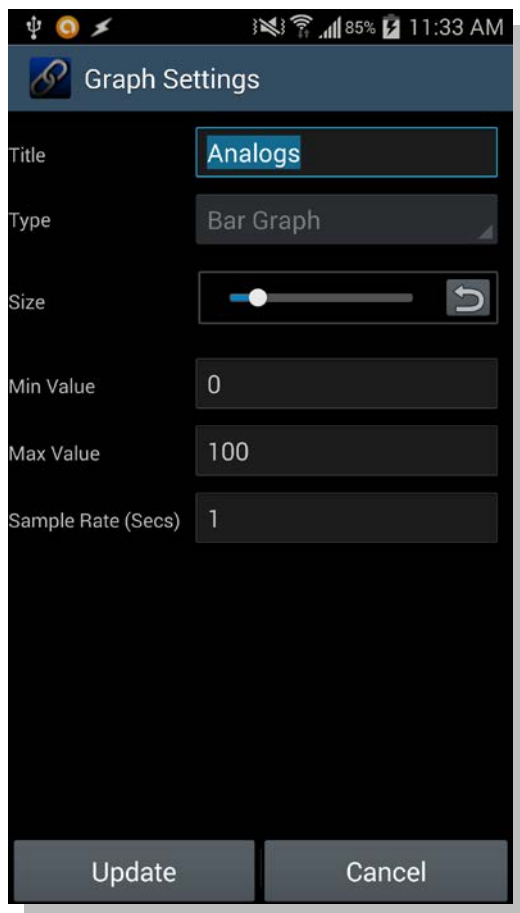
This resets all graphs to their default sizes.

3.3.1.5 Delete All Graphs

This deletes all the graphs from the graph screen. Use caution when executing this, as this operation cannot be undone.

3.3.2 Creating/Editing a Graph (Graph Settings)

The graph settings screen allows a user to edit an existing graph or create a new one.



3.3.2.1 Title

Enter the title to display at the top of the graph.

3.3.2.2 Type

Select a type for the object. Note that the type cannot be modified when editing graph settings of an existing graph. The available types are described below:

- Bar Graph
This graph displays bars which grow and shrink vertically to indicate the current value of the data displayed. A new bar is drawn for each data item selected.
- Line Graph
This graph displays a moving line with 30 history samples. A new line is drawn for each data item selected.
- Step Graph
This graph displays a block which moves with a 30-sample history as well as grows and shrinks vertically to indicate the sampled value of the data displayed.

3.3.2.3 Size

Move this slider to configure the percentage of the screen this graph will occupy. To reset the size of this graph to the default size, click on the reset button on the right of the slider.

3.3.2.4 Min Value

Enter the minimum value to display on the Y axis of the graph.

3.3.2.5 Max Value

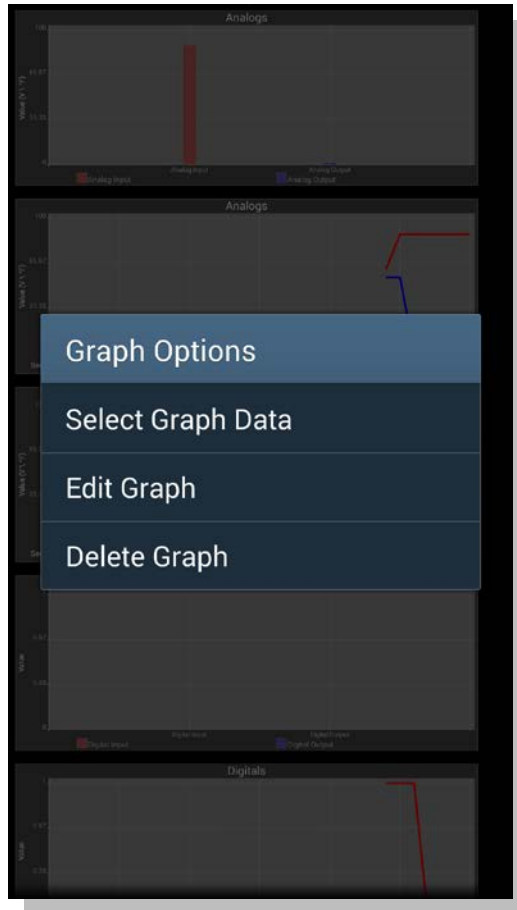
Enter the maximum value to display on the Y axis of the graph.

3.3.2.6 Sample Rate (Secs)

This is the rate at which data points are drawn on the graph, in seconds. For line and step graphs, the X axis will be scaled by this value. For example, a line graph with a sample rate of 10 seconds will display values from now until 300 seconds ago, while one with a sample rate of 2 seconds will display values from now until 60 seconds ago (30 history samples total in each case).

3.3.3 Graph Options

To access the options menu of a particular graph, tap and hold on a graph to bring up the Graph Options menu.



3.3.3.1 Select Graph Data

Select this option to choose which data items to display in the selected graph.

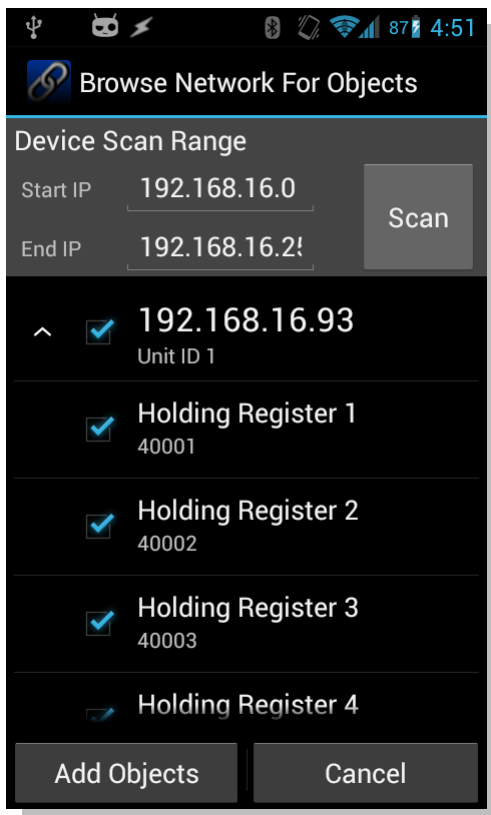
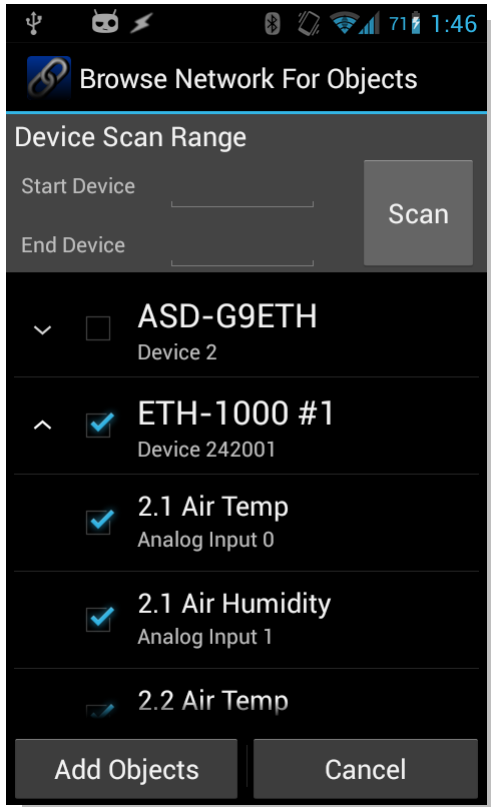
3.3.3.2 Edit Graph

Select this option to edit the graph settings. Refer to section 3.3.2 for details.

3.3.3.3 Delete Graph

Select this option to delete the selected graph. Note that this action cannot be undone.

3.4 Object Discovery



The object discovery screen enables browsing for objects on the currently connected network or over the internet. To search for devices in a specific range, enter the desired start and end device instance or IP address limits and click the scan button. Once a device is discovered, tap on the device entry to discover its objects. To add objects to the object list, check the checkbox next to an object, or check the checkbox next to a device itself to select all objects on that device. Then click the “Add Objects button” to add the objects to the Object List (refer to section 3.1).

3.4.1 Device Scan Range

By default, the object discovery will scan for all devices on the network. To restrict either the start device, end device, or both, enter limits in these fields. Depending on the protocol, the start device and end device are specified by either an instance number or an IP address.

3.4.1.1 Start Device

Enter the lowest device instance to scan for. This field may be left blank.

3.4.1.2 End Device

Enter the highest device instance to scan for. This field may be left blank.

3.4.1.3 Start IP

Enter the lowest IP address or hostname to scan for. This field must contain a valid IP address or hostname.

3.4.1.4 End IP

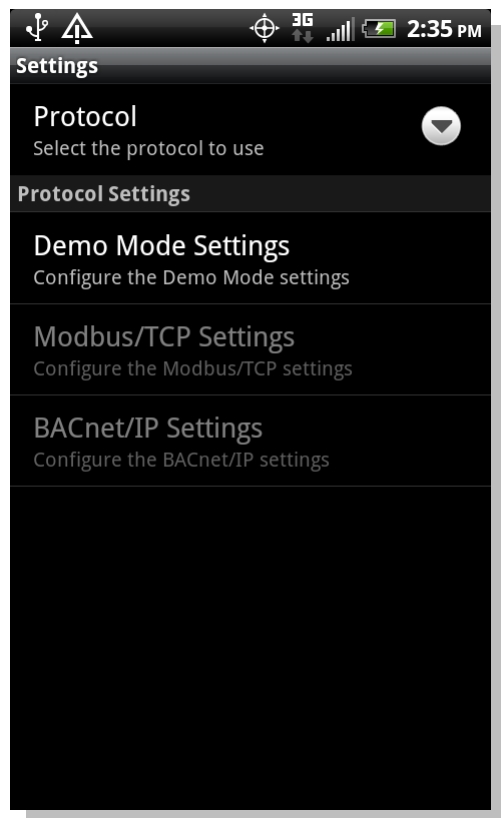
Enter the highest IP address or hostname to scan for. This field must contain a valid IP address or hostname.

3.4.2 Additional Discovery Settings

Some protocols (such as Modbus/TCP) may require additional discovery settings. These settings can be found in the protocol settings for each plugin. Refer to section 3.5.4 for details on the discovery settings for the Modbus/TCP plugin.

3.5 Settings

To access the application's settings, select Settings from the options menu on the object list screen.



3.5.1 Protocol

Select the desired protocol that the application will use. This will change the objects displayed in the object list and the graphs that are displayed. When changing protocols, no configuration data is lost. For example, objects and graphs for the Modbus/TCP protocol can be created, then BACnet/IP may be selected and objects and graphs for the BACnet/IP protocol can be created. Switching between these two configurations can then be accomplished by selecting the corresponding protocol from this menu.

3.5.2 Protocol Settings

These settings are specific to each individual plugin. Note that some installed plugins may not require these settings, and therefore will not appear in this list.

Only the settings for the currently-selected protocol are enabled: all other available (but not selected) Protocol Setting selections are greyed out. Refer to section 3.5.1 for information on changing the currently-selected protocol.

3.5.2.1 Demo Mode Settings

Select this to access the settings for the Demo Mode plugin included with NetLink. Refer to section 3.5.3 for details.

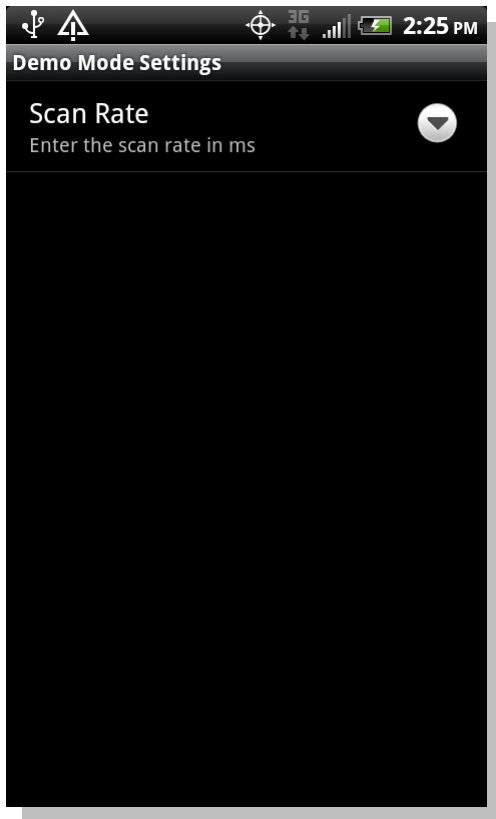
3.5.2.2 Modbus/TCP Settings

Select this to access the settings for the Modbus/TCP plugin. Refer to section 3.5.4 for details.

3.5.2.3 BACnet/IP Settings

Select this to access the settings for the BACnet/IP plugin. Refer to section 3.5.5 for details.

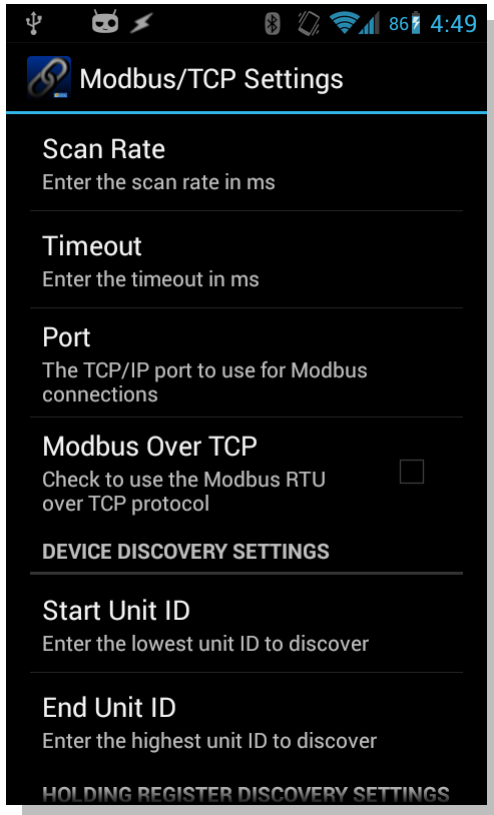
3.5.3 Demo Mode Settings



3.5.3.1 Scan Rate

Enter the time in milliseconds that the Demo Mode plugin should delay between generating values for consecutive objects. The default value is 1000 (1 second).

3.5.4 Modbus/TCP Settings



Modbus/TCP Settings

Scan Rate
Enter the scan rate in ms

Timeout
Enter the timeout in ms

Port
The TCP/IP port to use for Modbus connections

Modbus Over TCP
Check to use the Modbus RTU over TCP protocol ☐

DEVICE DISCOVERY SETTINGS

Start Unit ID
Enter the lowest unit ID to discover

End Unit ID
Enter the highest unit ID to discover

HOLDING REGISTER DISCOVERY SETTINGS

3.5.4.1 Scan Rate

Enter the time in milliseconds that the Modbus plugin should delay between network requests. The default value is 1000 (1 second).

3.5.4.2 Timeout

Enter the time in milliseconds that the Modbus plugin will wait for a response after sending a network request. The default value is 10000 (10 seconds).

3.5.4.3 Port

Enter the desired TCP/IP port to use for Modbus/TCP communications. The default value is 502.

3.5.4.4 Modbus Over TCP

When checked, Modbus communications will use the Modbus RTU over TCP protocol instead of the standard Modbus/TCP protocol.

3.5.4.5 Device Discovery Settings

This section specifies the settings used when discovering devices on a Modbus/TCP network (refer to section 3.4 for further details regarding device discovery). Independent settings exist for discovery of holding registers, input registers, coils and discrete inputs. This flexibility enhances discovery optimization by allowing the ability to target only the elements and ranges that are applicable for the devices on a given network.

3.5.4.5.1 Start Unit ID

Enter the lowest unit ID to discover on the network. The default value is 1.

3.5.4.5.2 End Unit ID

Enter the highest unit ID to discover on the network. The default value is 1.



Modbus/TCP Settings

HOLDING REGISTER DISCOVERY SETTINGS

Discover Holding Register..
Check to enable the discovery of holding registers ☒

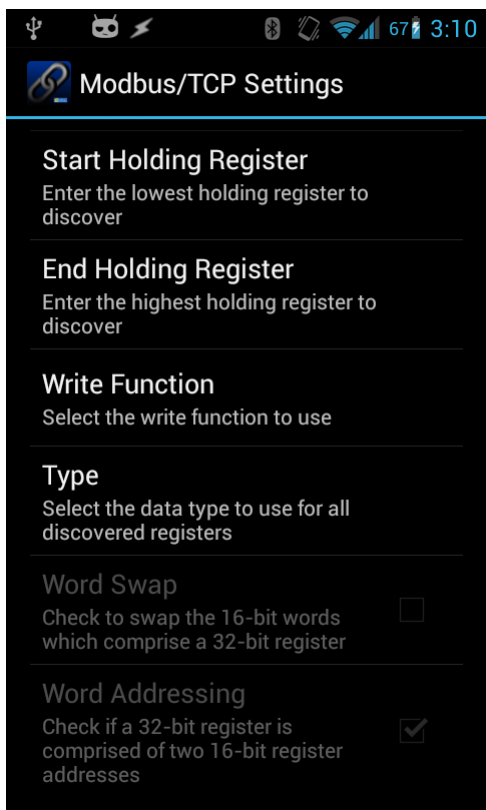
Start Holding Register
Enter the lowest holding register to discover

End Holding Register
Enter the highest holding register to discover

Write Function
Select the write function to use

Type
Select the data type to use for all discovered registers

Word Swap
Check to swap the 16-bit words which comprise a 32-bit register ☐



Modbus/TCP Settings

Start Holding Register
Enter the lowest holding register to discover

End Holding Register
Enter the highest holding register to discover

Write Function
Select the write function to use

Type
Select the data type to use for all discovered registers

Word Swap
Check to swap the 16-bit words which comprise a 32-bit register ☐

Word Addressing
Check if a 32-bit register is comprised of two 16-bit register addresses ☒

3.5.4.6 Holding Register Discovery Settings

This section specifies the settings used when discovering holding register object types on a Modbus/TCP device.

3.5.4.6.1 Discover Holding Registers

Check this box to enable the discovery of holding registers. This is enabled by default.

3.5.4.6.2 Start Holding Register

Enter the lowest holding register index to discover on a device. The default value is 1.

3.5.4.6.3 End Holding Register

Enter the highest holding register index to discover on a device. The default value is 100.

3.5.4.6.4 Write Function

Select the write function to use for all discovered holding registers that are added to the object list.

3.5.4.6.5 Type

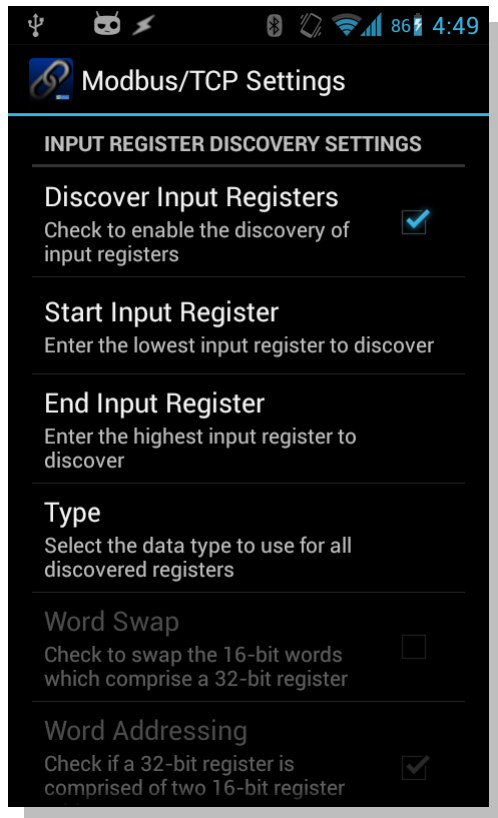
Select the data type to use for all discovered holding registers that are added to the object list.

3.5.4.6.6 Word Swap

Check this box to swap the 16-bit words which comprise a 32-bit register for all discovered holding registers that are added to the object list. Note that this setting is available only if a 32-bit data type is selected.

3.5.4.6.7 Word Addressing

Check this box if a 32-bit register is comprised of two 16-bit register addresses for all discovered holding registers that are added to the object list. Note that this setting is available only if a 32-bit data type is selected.



3.5.4.7 Input Register Discovery Settings

This section specifies the settings used when discovering input register object types on a Modbus/TCP device.

3.5.4.7.1 Discover Input Registers

Check this box to enable the discovery of input registers. This is enabled by default.

3.5.4.7.2 Start Input Register

Enter the lowest input register index to discover on a device. The default value is 1.

3.5.4.7.3 End Input Register

Enter the highest input register index to discover on a device. The default value is 100.

3.5.4.7.4 Type

Select the data type to use for all discovered input registers that are added to the object list.

3.5.4.7.5 Word Swap

Check this box to swap the 16-bit words which comprise a 32-bit register for all discovered input registers that are added to the object list. Note that this setting is available only if a 32-bit data type is selected.

3.5.4.7.6 Word Addressing

Check this box if a 32-bit register is comprised of two 16-bit register addresses for all discovered input registers that are added to the object list. Note that this setting is available only if a 32-bit data type is selected.



Modbus/TCP Settings

COIL DISCOVERY SETTINGS

Discover Coils
Check to enable the discovery of coils ☒

Start Coil
Enter the lowest coil to discover

End Coil
Enter the highest coil to discover

Write Function
Select the write function to use

DISCRETE INPUT DISCOVERY SETTINGS

Discover Discrete Inputs
Check to enable the discovery of discrete inputs ☒

Start Input
Enter the lowest discrete input to discover

3.5.4.8 Coil Discovery Settings

This section specifies the settings used when discovering coil object types on a Modbus/TCP device.

3.5.4.8.1 Discover Coils

Check this box to enable the discovery of coils. This is enabled by default.

3.5.4.8.2 Start Coil

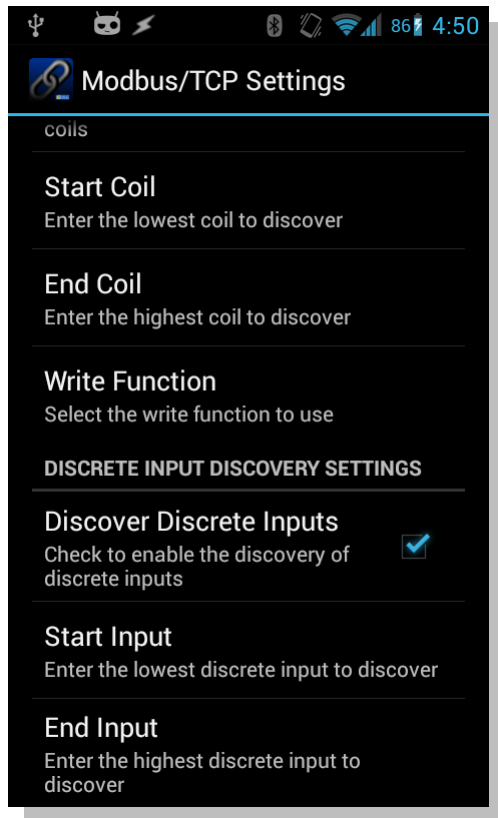
Enter the lowest coil index to discover on a device. The default value is 1.

3.5.4.8.3 End Coil

Enter the highest coil index to discover on a device. The default value is 100.

3.5.4.8.4 Write Function

Select the write function to use for all discovered coils that are added to the object list.



The screenshot shows the 'Modbus/TCP Settings' screen on a mobile device. At the top, there's a status bar with various icons and the time 4:50. Below the title bar, there's a 'coils' section with 'Start Coil' and 'End Coil' fields, each with a placeholder text 'Enter the lowest coil to discover' and 'Enter the highest coil to discover' respectively. Below this is a 'Write Function' section with a placeholder text 'Select the write function to use'. A section titled 'DISCRETE INPUT DISCOVERY SETTINGS' follows, containing a 'Discover Discrete Inputs' checkbox which is checked, with a placeholder text 'Check to enable the discovery of discrete inputs'. Below this are 'Start Input' and 'End Input' fields, each with a placeholder text 'Enter the lowest discrete input to discover' and 'Enter the highest discrete input to discover' respectively.

3.5.4.9 Discrete Input Discovery Settings

This section specifies the settings used when discovering discrete input object types on a Modbus/TCP device.

3.5.4.9.1 Discover Discrete Inputs

Check this box to enable the discovery of discrete inputs. This is enabled by default.

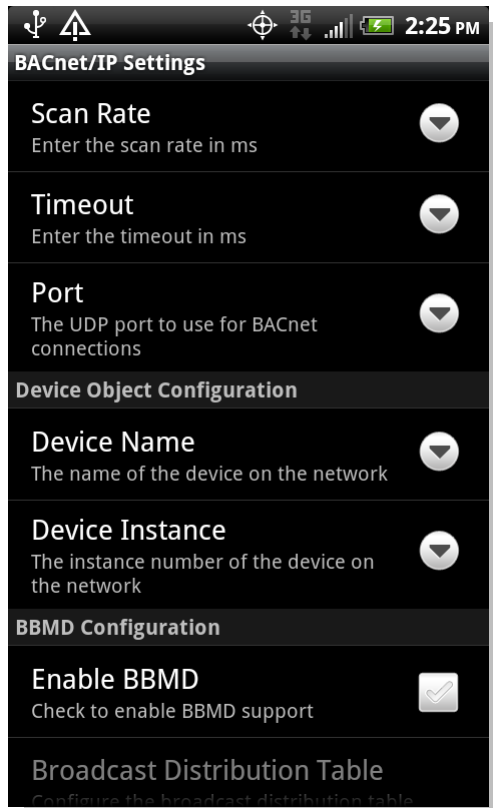
3.5.4.9.2 Start Input

Enter the lowest discrete input index to discover on a device. The default value is 1.

3.5.4.9.3 End Input

Enter the highest discrete input index to discover on a device. The default value is 100.

3.5.5 BACnet/IP Settings



BACnet/IP Settings

Scan Rate
Enter the scan rate in ms

Timeout
Enter the timeout in ms

Port
The UDP port to use for BACnet connections

Device Object Configuration

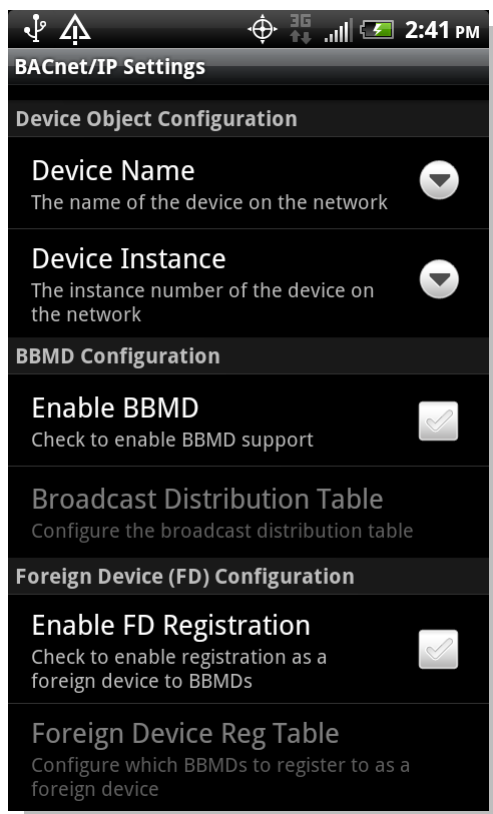
Device Name
The name of the device on the network

Device Instance
The instance number of the device on the network

BBMD Configuration

Enable BBMD
Check to enable BBMD support

Broadcast Distribution Table
Configure the broadcast distribution table



BACnet/IP Settings

Device Object Configuration

Device Name
The name of the device on the network

Device Instance
The instance number of the device on the network

BBMD Configuration

Enable BBMD
Check to enable BBMD support

Broadcast Distribution Table
Configure the broadcast distribution table

Foreign Device (FD) Configuration

Enable FD Registration
Check to enable registration as a foreign device to BBMDs

Foreign Device Reg Table
Configure which BBMDs to register to as a foreign device

3.5.5.1 Scan Rate

Enter the time in milliseconds that the BACnet plugin should delay between network requests. The default value is 1000 (1 second).

3.5.5.2 Timeout

Enter the time in milliseconds that the BACnet plugin will wait for a response after sending a network request. The default value is 10000 (10 seconds).

3.5.5.3 Port

Enter the desired UDP port to use for BACnet/IP communications. The default value is 47808.

3.5.5.4 Device Object Configuration

3.5.5.4.1 Device Name

Enter the name for the NetLink client device that will appear on the BACnet/IP network. This name must be unique on the BACnet/IP network.

3.5.5.4.2 Device Instance

Enter the device instance for the NetLink client device. This device instance must be unique on the BACnet/IP network.

3.5.5.5 BBMD Configuration

These settings are used to configure the NetLink client as a BBMD device (**BACnet Broadcast Management Device**).

3.5.5.5.1 Enable BBMD

Check this box to enable BBMD support and enable configuration of the broadcast distribution table. BBMD support includes the ability to distribute broadcasts to the configured broadcast distribution table, as well as to any foreign devices that have registered with the NetLink client.

3.5.5.5.2 Broadcast Distribution Table

Select this to view and edit the broadcast distribution table. To configure the broadcast distribution table, make sure that "Enable BBMD" is checked. Refer to section 3.5.5.7 for details.

3.5.5.6 Foreign Device (FD) Configuration

These settings are used to allow the NetLink client to register with remote BBMD devices as a foreign device.

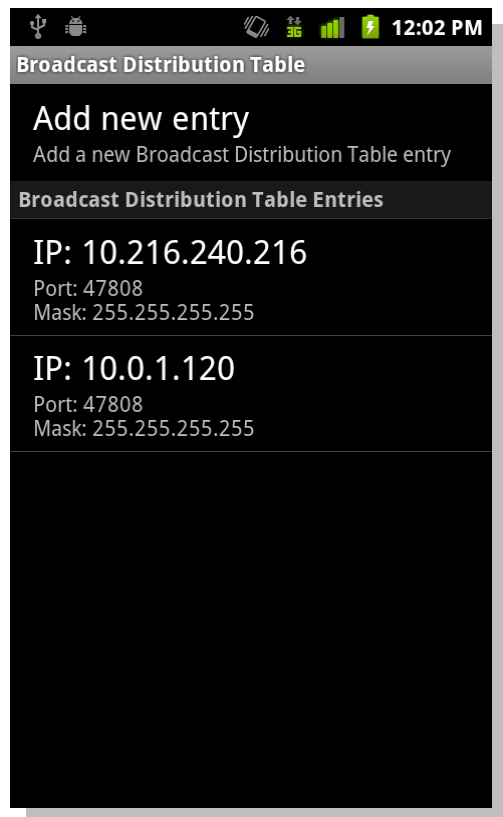
3.5.5.6.1 Enable FD Registration

Check this box to enable registration as a foreign device with remote BBMD devices, and to enable configuration of the foreign device registration table.

3.5.5.6.2 Foreign Device Reg Table

Select this to view and edit the foreign device registration table. To configure this table, ensure that “Enable FD Registration” is checked.

3.5.5.7 Broadcast Distribution Table

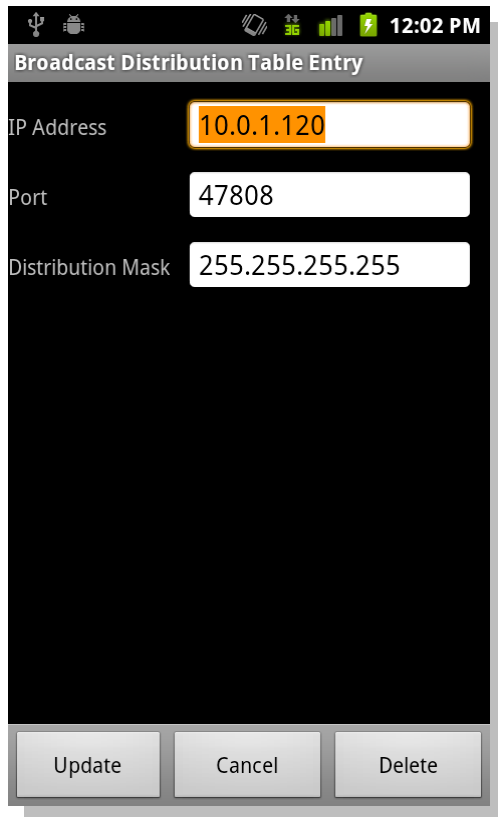


3.5.5.7.1 Overview

The broadcast distribution table displays a list of BBMD devices that will distribute broadcasts with each other. The NetLink client will distribute broadcast packets to each device defined in this table, excluding itself. Note that this table will always contain a non-editable entry for the host device's own IP address. Also note that this table must be identical to that entered into the other BBMD devices.

To create a new entry, tap "Add new entry" at the top of the screen. To edit an existing entry, tap on the entry in the list. Refer to section 3.5.5.7.2 for details.

3.5.5.7.2 Creating/Editing a Broadcast Distribution Table Entry



Broadcast Distribution Table Entry

IP Address: 10.0.1.120

Port: 47808

Distribution Mask: 255.255.255.255

Update Cancel Delete

3.5.5.7.2.1 IP Address

Enter the IP address of the remote BBMD device.

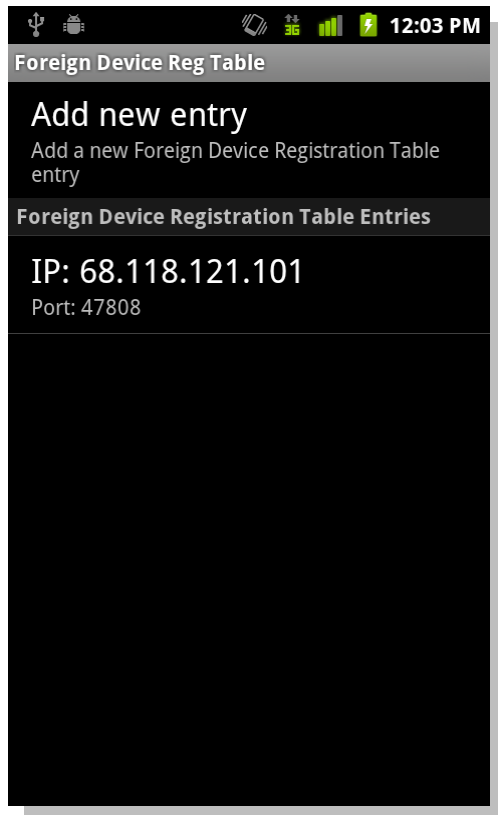
3.5.5.7.2.2 Port

Enter the port to use when communicating with the remote BBMD device. The default value is 47808.

3.5.5.7.2.3 Distribution Mask

Enter the mask to use to distribute broadcasts on the remote BBMD's network. The default value of 255.255.255.255 will result in a point-to-point connection between the NetLink client and remote BBMD device.

3.5.5.8 Foreign Device Registration Table



3.5.5.8.1 Overview

The foreign device registration table displays a list of BBMD devices that the NetLink client will register itself to. The NetLink client will register as a foreign device to each device defined in this table.

To create a new entry, tap “Add new entry” at the top of the screen. To edit an existing entry, tap on the entry in the list. Refer to section 3.5.5.8.2 for details.

3.5.5.8.2 Creating/Editing a Foreign Device Registration Table Entry



Foreign Device Registration Table Entry

IP Address

Port

Update Cancel Delete

3.5.5.8.2.1 IP Address

Enter the IP address of the remote BBMD device.

3.5.5.8.2.2 Port

Enter the port to use when communicating with the remote BBMD device. The default value is 47808.

4. FAQ

Question	Answer
Why are my objects in the “disconnected” state?	Upon starting the application, all objects are in the “disconnected” state and their data values are initialized to 0. The objects may remain in the “disconnected” state for the following reasons: 1. The target device is offline Ensure that the target device is powered, connected to a network, and has IP address settings compatible with the device running the NetLink application. 2. The object settings are incorrect Ensure that the target options of the object settings (such as IP address, Unit ID or Destination Device Instance, etc.) match the address or device instance of the target device. Also ensure that the object to be accessed exists on the target device. 3. The application or protocol settings are incorrect Ensure that the timeout value is not set too low, and that the protocol-specific settings are configured properly. 4. The NetLink client is establishing a connection For some networks (such as BACnet/IP) the NetLink client must first discover the target device(s) prior to being able to transfer data values. This may require up to 30 seconds to fully complete.

Question	Answer
Why are my objects in the “error” state?	Objects are set to the “error” state if a connection cannot be established with the target device because of a communication error. The objects may be in the “error” state for the following reasons: 1. The target device is offline Ensure that the target device is powered, connected to a network, and has IP address settings compatible with the device running the NetLink application. 2. The object settings are incorrect Ensure that the target options of the object settings (such as IP address, Unit ID or Destination Device Instance, etc.) match the address or device instance of the target device. Also ensure that the object to be accessed exists on the target device. 3. A network resource is in use Ensure that the port is not already in use. Sometimes this may occur while old connection threads are still finishing after new ones have been created during events such as a screen rotation. The error should disappear after some time once the old threads have finished.
Why are my objects in the “warning” state?	Objects are set to the “warning” state if a connection has been established with the target device, but there is an error reading or writing the value of the object. The objects may be in the “warning” state for the following reasons: 1. The target device is responding with an error response Ensure that the object to be accessed exists on the target device and the object settings match what is allowed on the target device (for example, write function code or write priority). If the warning occurs on a write, ensure that the value written is within the allowable range of the object on the target device. 2. The target device is responding with an invalid or unexpected response Ensure that the target device is configured properly and that the object settings match what is allowed on the target device. If problems persist, contact the manufacturer of the target device.
How do I get plugins for NetLink?	Plugins are available on the Google Play Market. Please visit the market to download plugins for NetLink.

Question	Answer
I downloaded a NetLink plugin, now what?	NetLink plugins will be installed on your device, but will not appear in the application launcher list. To start using a new plugin, open the NetLink application, tap the “menu” button on your device, go to “Settings...Protocol” and select the protocol supported by the new plugin.
How do I configure the rate that my objects' values update?	This can be configured by changing the “Scan Rate” in the application settings. Refer to section 3.4 for details.
Can I toggle the sort order of my objects in the object list between ascending and descending?	Yes. To toggle the sort order from ascending to descending, tap the device's menu button, select “Sort By”, and tap the currently selected option.
I just exported my configuration. Where is the configuration file saved?	The configuration file will be saved in a folder titled “NetLink” on the device's SD card.
I tapped on “View Graphs”, but all I see is a blank screen. What should I do?	A blank screen will appear if there are no graphs added to the screen. To add a graph, tap the menu button on your device and select “Add New Graph”. Refer to section 3.3.1 for details.
Why isn't my graph displaying anything?	Make sure that data has been selected for the graph to use (refer to section 3.3.3.1) and that the data values of the objects are within the “Min Value” to “Max Value” range specified in the graph settings (refer to sections 3.3.2.4 and 3.3.2.5). If the graph is a line or step graph, make sure that at least two sample rate time periods have elapsed (refer to section 3.3.2.6).
Can I request new features or plugins for NetLink?	Yes, please contact us at sales@iccdesigns.com or by telephone at +1-608-831-1255.
I'm still having problems. What should I do?	Please contact ICC either by email at support@iccdesigns.com or by telephone at +1-608-831-1255.



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