ARC Plus Version 3

Instruction Manual

- ***ARC Plus***
- ***ARC Plus SL***
- ***AutoLoad Plus Software***

BURK TECHNOLOGY

Rev B

ARC Plus firmware version 3.0.3.4

AutoLoad Plus software version 3.1.130

New In Version 3

Version 3 of the ARC Plus firmware adds exciting new features, including:

All-new **web interface** offering platform independence, better speed and more flexible navigation *83*

Redesigned **smartphone interface** to carry over the updated look and new features of the web interface *88*

Easy-to-set **automatic actions** when channels cross limits or change state *54, 63*

Ability to **set meter and status values directly from a macro** without using a virtual channel *71*

Ability to **run two different macros using a single channel's raise/lower buttons** *71*

New macro features, including email templates for **even greater flexibility in formatting email alerts** *75*

Built-in SNMP agent *28*

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Introduction

The ARC Plus remote monitoring and control system takes advantage of the scalability of TCP/IP to provide site-to-site control, central monitoring and/or distributed access to more than 1,000 sites. Users can manage the system via front panel, web browser, and optional telephone and software interfaces, in any combination. Multi-site ARC Plus networks allow site-to-site control from the front panel of any ARC Plus, or automatic coordination of multiple facilities via onboard macros.

ARC Plus Model

The core of the ARC Plus system is the main unit, which provides front panel access to all connected ARC Plus sites, all onboard processing power, and the built-in web server for access via web browser (PC or mobile device). The ESI Plus (Enhanced Speech Interface) is installed in the ARC Plus unit (optional). This allows dial-in monitoring/control and dialout alarm notification via telephone.

ARC Plus SL Model

The ARC Plus SL model provides the full monitoring and control functionality of the ARC Plus in a slim footprint by trading the front panel, onboard ESI Plus capability, and RS-232 serial

connectivity. Installation and operation are nearly identical to the ARC Plus system, with relevant differences noted in this manual.

Front Panel

Note: See **ARC Plus SL** for a description of the ARC Plus SL front panel features.

ARC Plus front panel

Status LEDs

Bicolor status LEDs provide visual indicators for status conditions, alarm activity, maintenance mode state, and link status for any site in the system.

Vacuum Fluorescent Display (VFD)

Shows meter conditions, alarm and event messages, and displays menu functions. The bottom row of the VFD shows the available menu options.

Jog Wheel

Facilitates front panel navigation. Rotate the jog wheel to sites, channels or menu options. Press the jog wheel to accept the selection highlighted on-screen. To exit the menus and return to the channel display, press and hold the jog wheel.

Command Buttons

Backlit command buttons are used for issuing commands and running or stopping macros. Each raise command, lower command, macro start and macro stop function may be assigned a user-defined label and backlight color (green, red, amber or no color) for ease of operation.

Remote LED

Maintenance mode indicator. Illuminates green when the unit is remote mode (the unit will issue commands). Illuminates red when the unit is in maintenance mode (commands are disabled).

Alarm LED

Indicates alarm activity. Illuminates red when there is an alarm at the local site (default). May also be configured to indicate an alarm at any site in the ARC Plus network.

ARC Plus SL

ARC Plus SL front panel

Remote Button and LED

The maintenance mode LED illuminates green when the unit is in remote mode (the unit will issue commands). It illuminates red when the unit is in maintenance mode (commands are disabled). Pressing the remote button toggles the unit in and out of maintenance mode. This affects all Plus-X units connected to the ARC Plus.

Alarm LED

The Alarm LED indicates alarm activity. By default, the LED illuminates red when there is an alarm at the local site. It may instead be configured to illuminate when there is an alarm at any site in the ARC Plus network (see page 34).

ARC Plus Rear Panel

The rear panel of the ARC Plus facilitates connections to the LAN/WAN, integrated input and integrated command relay units, a telephone line (if an ESI is installed), an ARC-16 (if applicable), an optional dial-up modem, and 100 to 240VAC power.

ARC Plus rear panel.

Modem (DB-9M)

Provides external dial-up modem connectivity for optional AutoPilot® 2010 monitoring and control software. A modem may be used instead of or in addition to TCP/IP connectivity. AutoLoad Plus setup and configuration software requires TCP/IP connection.

ARC-16 (DB-9M)

Provides null modem cable connection to the ESI or CI port on an ARC-16 for backwards compatibility. Uses DB-9F to DB-9F cable (for ESI port) or DB-9F to DB-25F cable (CI port).

Ethernet (RJ-45)

Provides Ethernet connection to LAN/WAN.

PLUSBUS (RJ-45)

Provides connection between the ARC Plus and PlusBus accessories using CAT5 cable. The maximum end-to-end distance for any of the four RS-485 PLUSBUS circuits is fifty (50) feet.

Note: The PlusBus is obsolete, and only required for older PlusBus Integrated Input Units and Integrated Command Relay Units with existing installations. New systems use Plus-X Ethernet I/O.

Alarm

The Form C alarm relay can be used to operate external equipment when an alarm condition exists. The relay may be configured to latch closed when there is an alarm at the local site or when there is an alarm at any site in the ARC Plus network. A 3-pin Phoenix connector block is included with the ARC Plus.

Failsafe

Form C relay for interrupting external equipment upon loss of the ARC Plus network link. The relay is latched closed when the network link is present.

Audio

RCA input accepts audio source for remote monitoring via optional ESI Plus (Enhanced Speech Interface) over phone line.

ESI Status

Provides diagnostic information during ESI Plus operation.

Set/Line (RJ-11)

Allows connection of a telephone for local ESI Plus operation (use the **set** jack), and connection of a telephone line cord for dial-in monitoring/control and dialout alarm notifications (use the **line** jack).

Plus-X Ethernet I/O

The Plus-X line of Ethernet I/O devices for the ARC Plus allow up to 256 channels each of metering, status and command. For a complete list of Plus-X devices, visit www.burk.com. Plus-X devices include:

- Plus-X Integrated Input Unit
- Plus-X Integrated Command Relay Unit
- Plus-X 300
- Plus-X AC-8
- Plus-X IP-8 Adapter
- Plus-X GSC Adapter

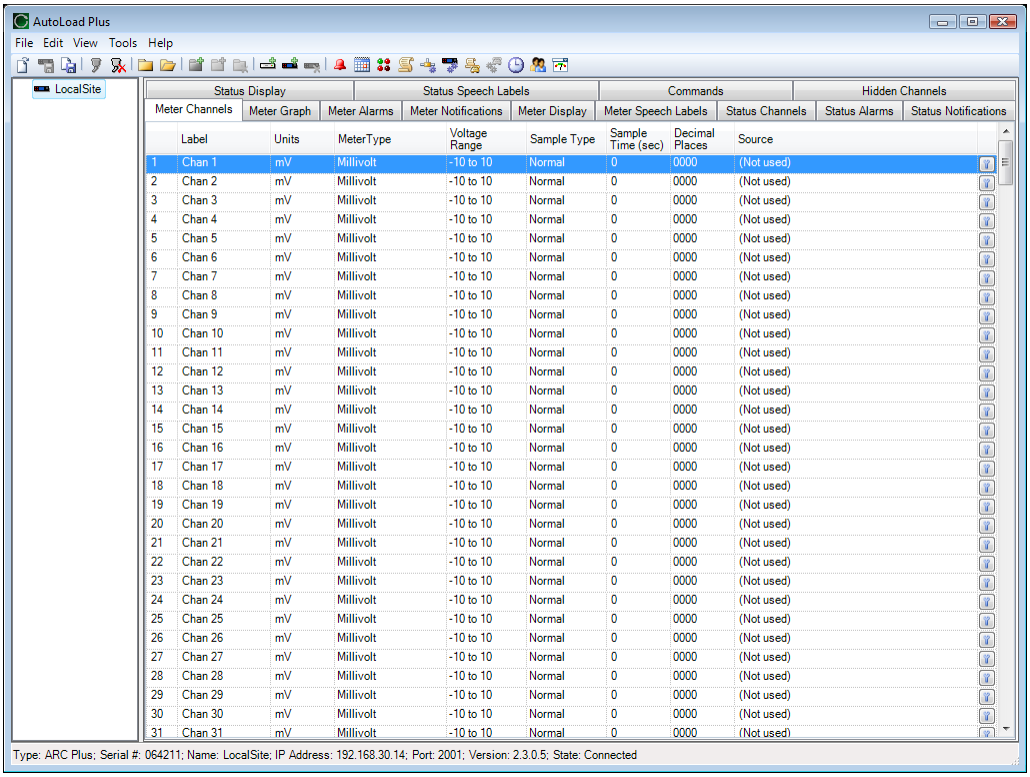
For specific information on installing and configuring your Plus-X accessories, refer to the manual for your product. Manuals are available online at www.burk.com.

PlusConnect™ Direct Transmitter Interfaces

The PlusConnect series of direct transmitter interfaces allow a direct, digital connection to various transmitters without parallel wiring. PlusConnect models are available for many popular models. For a complete list of supported transmitters, visit www.burk.com.

To install your PlusConnect, follow the instructions in your product's manual. The installation procedure is similar to installing any Plus-X Ethernet I/O device.

AutoLoad Plus Software



	Label	Units	MeterType	Voltage Range	Sample Type	Sample Time (sec)	Decimal Places	Source
1	Chan 1	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
2	Chan 2	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
3	Chan 3	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
4	Chan 4	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
5	Chan 5	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
6	Chan 6	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
7	Chan 7	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
8	Chan 8	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
9	Chan 9	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
10	Chan 10	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
11	Chan 11	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
12	Chan 12	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
13	Chan 13	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
14	Chan 14	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
15	Chan 15	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
16	Chan 16	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
17	Chan 17	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
18	Chan 18	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
19	Chan 19	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
20	Chan 20	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
21	Chan 21	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
22	Chan 22	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
23	Chan 23	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
24	Chan 24	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
25	Chan 25	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
26	Chan 26	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
27	Chan 27	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
28	Chan 28	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
29	Chan 29	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
30	Chan 30	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
31	Chan 31	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)

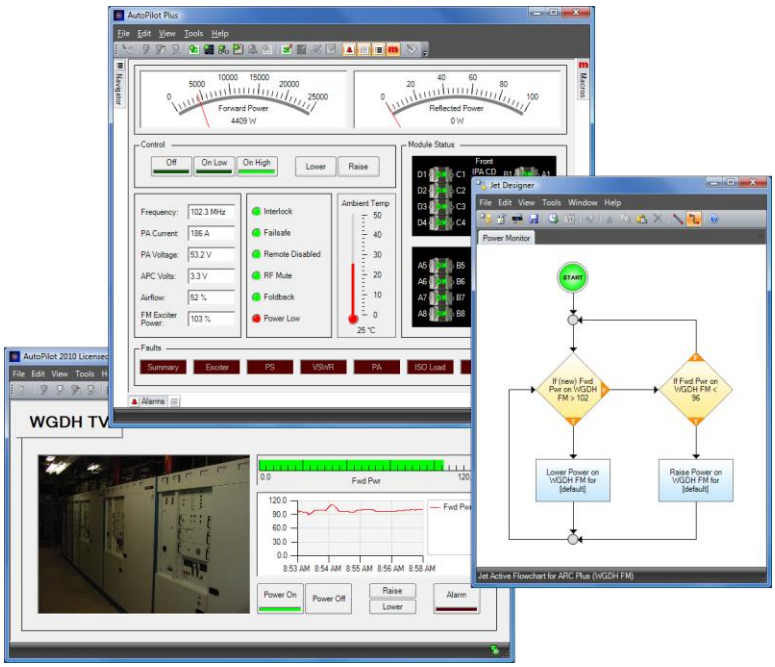
AutoLoad Plus software provides PC-based configuration of the ARC Plus system, from network settings, site names, channel configuration, and network settings to ESI Plus dialout behavior, vocabulary, and more. With the exception of the initial IP address, all ARC Plus setup is accomplished via AutoLoad Plus, locally or remotely. (An IP connection is required.)

Enhanced Speech Interface (ESI Plus)

The Enhanced Speech Interface (ESI Plus) is standard on ARC Plus Stand Alone systems and optional on all other ARC Plus systems. It provides dial-in monitoring and control and dialout alarm notifications via a phone line and DTMF tones. All site, channel and macro labels are user-specified using a large selection of pre-recorded vocabulary.

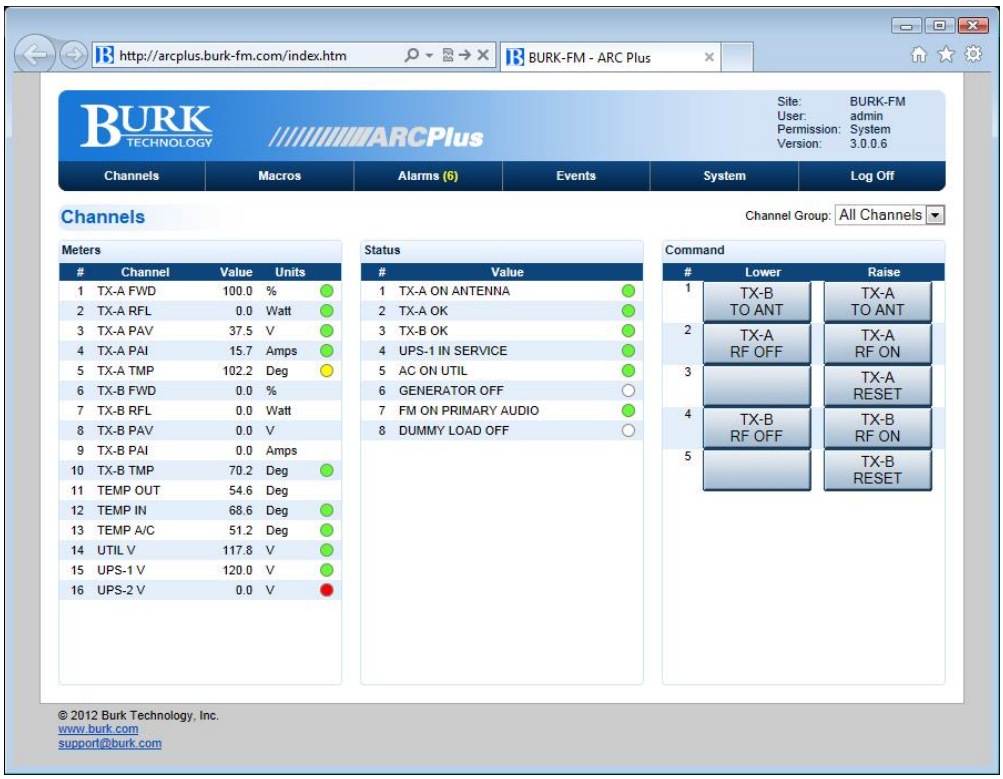
Although an ESI Plus cannot be installed directly onboard the ARC Plus SL, alarms on the ARC Plus SL can trigger dial-out alarm notifications if the ARC Plus SL is on the same network as an ARC Plus that contains an ESI Plus. Likewise, dialing in to an ARC Plus containing an ESI Plus will permit telephone-based monitoring of conditions at the ARC Plus SL site if the ARC Plus SL is on the same network as the ARC Plus.

AutoPilot 2010 Software



AutoPilot 2010 provides PC-based monitoring and control for the ARC Plus network. IP connectivity allows simultaneous control of multiple sites, while optional dial-up modem connectivity provides a means to access single sites from outside the LAN. AutoPilot 2010 provides a customizable GUI, logging and automatic report generation, network and SNMP monitoring, and integration of remote security cameras. Details are included in the AutoPilot 2010 instructions.

Web-based monitoring and control



ARC Plus Web Interface

The ARC Plus includes a built-in web server for managing remote sites via web browser. The web interface is accessible by entering the IP address or host name of the ARC Plus in your web browser.

The web server also provides connectivity to compatible mobile devices. To access the mobile web display from your mobile device, enter the IP address or host name followed by /mobile/.

For more on the web interface, see page Error! Bookmark not defined..

Software and Firmware Updates

Periodic updates to ARC Plus software and firmware, along with release notes, are made available at www.burk.com. To be notified when new versions are available, sign up for email updates by clicking the **Email Updates** link on the Burk Technology web site.

System Security

The ARC Plus protocol contains an encrypted digital signature, preventing unauthorized access without requiring SSL. To avoid exposure to excessive network traffic, installation behind a router or firewall is required. The web server can operate on any HTTP port, allowing the firewall to block Port 80 if desired.

Hardware Setup

Installing the ARC Plus Unit

Install the ARC Plus in a location with access to your LAN/WAN. If you intend to operate the ARC Plus in a stand-alone configuration (dial-up modem and telephone access, but no TCP/IP connection), a network connection must still be available for on-the-bench configuration. A crossover cable may also be used to connect a computer directly to the ARC Plus for configuration.

Configuring ARC Plus Network Settings

After installing the ARC Plus in the equipment rack, connect the ARC Plus port marked Ethernet to your LAN/WAN using CAT5e cable. After obtaining a static IP address, follow these instructions to configure network settings:

Important! The default IP address on the ARC Plus is the same as the default IP address of Plus-X devices. If you are installing an ARC Plus and a Plus-X device on the same network, avoid IP address conflicts by configuring network settings for one unit before connecting the other unit to your network.

ARC Plus

To establish network settings for the ARC Plus Unit:

1. Power up the ARC Plus. The unit will briefly show the firmware version before loading the main display.
2. Rotate the jog wheel until **Config** is selected and press the jog wheel to enter the configuration menu. Select the System submenu and then select Network.
3. Enter the private IP, public IP and port values that will identify the ARC Plus as a unique device on the network. The private IP is the IP address you will use to access the ARC Plus on your company LAN/WAN. The public IP address is used when connecting to the ARC Plus from outside the LAN/WAN, provided your network allows connections from outside. If the ARC Plus will not be accessible from outside the network, enter the private IP address in the public IP field.
4. When you are done with the IP address and port settings, the ARC Plus will prompt you for the subnet and gateway settings. Once you have entered those, you will return to the configuration menu. Your ARC Plus can now be accessed by AutoPilot 2010 and AutoLoad Plus.

Note: If you make a mistake while entering your settings, press and hold the jog wheel button until the network configuration closes and returns you to the top of the menu tree. Navigate to the network configuration menu again, and enter the new settings.

ARC Plus SL

Network settings on the ARC Plus SL are established using AutoLoad Plus software, which requires a TCP/IP connection. The default IP address of the ARC Plus SL is 192.168.0.100. In

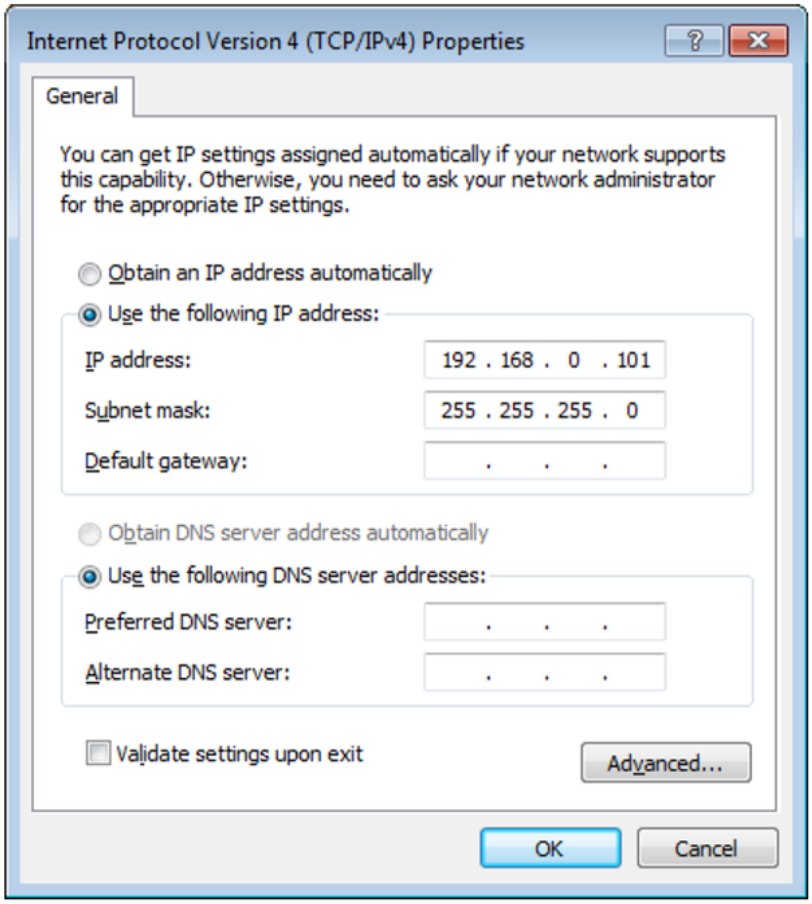
order to connect AutoLoad software to the ARC Plus SL for the first time, you will need to configure the IP address of your computer to an address in the 192.168.0.x range.

One way to do this is to connect only the ARC Plus SL and your PC directly to an Ethernet switch. Then (for Windows 7 PCs):

1. Open the Control Panel on your PC. In the Control Panel search bar, search for Adapter. Click the View network connections link when it appears.

2. Right-click and select Properties for the network connection you will use to connect to the ARC Plus SL.

3. Locate and select TCP/IPv4. Click Properties. Select Use the following IP address and enter an IP address in the range of 192.168.0.x (other than 192.168.0.100). Press OK.



The ARC Plus SL default IP address is 192.168.0.100. For initial configuration, access your network adapter's local area connection properties to set your PC's IP address to the 192.168.0.x range.

After you have configured your IP address to communicate with the ARC Plus SL, you are ready to launch the AutoLoad Plus software to configure the ARC Plus SL's permanent network

settings. See page 27 for instructions on setting the IP address, port number, subnet mask, gateway, DNS server and HTTP port.

Installing Plus-X I/O Devices

The Plus-X line of Ethernet I/O devices allows connecting various combinations of metering, status and command channels to the ARC Plus over a LAN, WAN or the Internet. Popular Plus-X models include the Plus-X Integrated Input Unit, Plus-X Integrated Command Relay Unit, Plus-X 300, PlusConnect™, etc.

The installation procedure for most Plus-X devices is similar. For instructions specific to your Plus-X accessories, please refer to the manual for your model, available online at www.burk.com.

Note: If you are installing an older "PlusBus" model Integrated Input Unit or Integrated Command Relay Unit, see Appendix F.

Configure Network Settings

Begin by configuring your Plus-X device for use on your network. Most Plus-X products are configured via an onboard web page. Open your web browser and navigate to the default IP address of the Plus-X device: **192.168.0.100**. Access the **Network Settings** page and assign the IP address, subnet mask and gateway as appropriate to your network. Enter the IP address of your ARC Plus where prompted.

Note: Some PlusConnect models are configured via telnet or a serial connection. See your PlusConnect manual for more information.

Add your Device to the ARC Plus

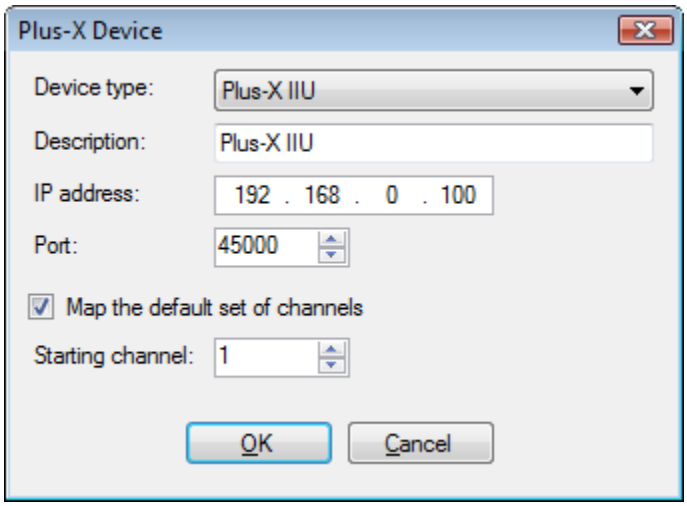
Once the Plus-X device is configured for your network, you will need to add it to the ARC Plus using AutoLoad Plus. If you have not already installed AutoLoad Plus, please do so now. The current version of AutoLoad Plus is available online at www.burk.com.

Using AutoLoad Plus, connect to your ARC Plus using its IP address. From the Edit menu, select **Plus-X Devices**. Click the **Add…** button in the Plus-X Devices toolbar. Using the Device type dropdown list, select the model Plus-X device you are adding, and enter the IP address you assigned it earlier.

Note: If your Plus-X device model does not appear in the dropdown list, you may need to download its XML definition file. Plus-X XML definition files and installation instructions are available online at www.burk.com.

Once you have added the Plus-X device to the ARC Plus, Plus-X device channels must be assigned to channels on the ARC Plus. Plus-X channels may be assigned manually or automatically. Automatic assignment is recommended in most cases. Select the channel number where you want to start assigning channels. For your first Plus-X device, starting at channel 1 is typical. Leave the "Map the default set of channels" checkbox checked and press OK.If installing

additional Plus-X devices, assign them to start *after* the last used channel. For example, if you are installing two 16-channel Plus-X devices, have the first device start at channel 1 and the second device start at channel 17.



Add/edit Plus-X Device dialog in AutoLoad Plus

For information on manually assigning channels, see **Setting the Meter Channel Source**.

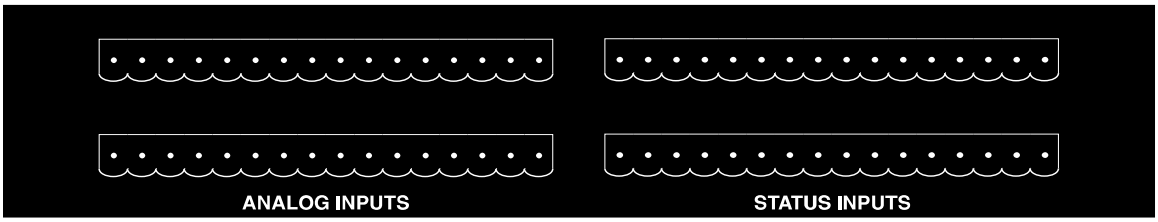
After installing your Plus-X devices, click OK to close the Plus-X Devices dialog. You will see your new channels in the AutoLoad Plus channel tabs for your ARC Plus.

Note: Be sure to save your AutoLoad Plus settings after assigning Plus-X channels.

Connecting Analog and Status Inputs on the Plus-X Integrated Input Unit

Input Channel Pinouts

Each Plus-X Integrated Input Unit (IIU) connects up to 16 metering inputs (±10VDC) and 16 status inputs (0-28VDC or switch closure). Metering channels 1-8 are the top left bank of pins and 9-16 are the bottom left bank of pins. Status channels 1-8 are the top right bank and 9-16 are the bottom right bank:



Each channel has a pin for common ground (left) and a pin for the signal voltage (right), as shown in the table below.

CH 1	CH 2	CH 3	CH 4	CH 4	CH 6	CH 7	CH 8
- +	- +	- +	- +	- +	- +	- +	- +
- +	- +	- +	- +	- +	- +	- +	- +
CH 9	CH 10	CH 11	CH 12	CH 13	CH 14	CH 15	CH 16

IIU Rear Panel Connector Pinouts. Analog and status pinouts are identical. Channels 17-32, 33-48, etc. are connected on subsequent IIUs in the same fashion.

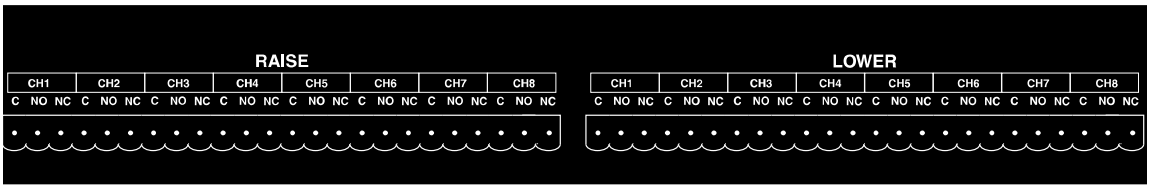
Four 16-pin connector blocks are included to facilitate equipment wiring, two blocks for analog channels, and two for status channels. Analog channels are connected on the left side of the IIU rear panel, and status channels are connected on the right, as shown above.

Secure equipment wiring to the connector blocks using the built-in set screws before attaching the connector block to the appropriate rear panel connectors.

Connecting Command Channels on the Plus-X Integrated Command Relay Unit

Command Channel Connector Pinouts

The Plus-X Integrated Command Relay Unit (ICRU) connects 8 raise and 8 lower channels using two identical 24-pin connector blocks. Raise channels connect to the left set of 24 pins on the rear panel, and lower channels connect to the right set of 24 pins, so shown below:



Close-up of Form C contacts on the ICRU rear panel.

Each channel has three pins: a pin for common (left), and pins for the normally open or normally closed contact. Pinouts for raise channels 1-8 and lower channels 1-8 are identified on the chart below. Channels 9-16, 17-24, etc. connect in the same fashion on subsequent ICRUs.

1	2	3	4	5	6	7	8
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC

ICRU rear panel pinouts. Pinouts for raise channels (left side of ICRU rear panel) are identical to the pinouts for lower channels (right side of ICRU rear panel).

Secure equipment wiring to the connector blocks using the built-in set screws before attaching the connector block to the appropriate rear panel connectors.

Connecting an ARC-16 to the ARC Plus

Note: If you have purchased a Plus-X Dual IP-8 Adapter, refer to the manual for the adapter for information on connecting your IP-8(s) directly to the ARC Plus. For information on the Plus-X Dual IP-8 Adapter, visit www.burk.com.

The ARC Plus is backwards compatible with the ARC-16 broadcast remote control, allowing operators to manage ARC-16 sites via the ARC Plus front panel, web server, AutoPilot 2010 or ESI Plus. Add up to four interconnected ARC-16 units to the ARC Plus by connecting a DB-9F to DB-9F null modem cable from the ARC Plus rear panel port marked **ARC-16** to the ESI COM port on one ARC-16. If a CI is installed on the ARC-16, us a DB-9F to DB-25F cable. Up to three additional ARC-16s can communicate with the ARC Plus using this connection.

Protecting Against Transients and Power Surges

All units in the ARC Plus system are equipped with onboard surge protection designed to prevent damage due to power surges. However, onboard protection is not effective without proper grounding. Use the rear panel grounding lugs to connect the equipment chassis to an appropriate grounding mechanism.

For units connected to a telephone line, either via an ESI (for dial-up telephone control) or via an external dialup modem, external surge protection on the phone line is strongly recommended. The Burk Technology TS-1 is designed specifically for this purpose. External protection for the Ethernet connection is also recommended.

Important Safety Information

Maintenance Mode

Prior to performing any maintenance on connected site equipment, operators MUST engage maintenance mode via the front panel of the ARC Plus system. This disables all commands, whether originating from the local ARC Plus, a remote ARC Plus, AutoPilot 2010 software, web browser, or ESI Plus. This behavior is different from the ARC-16 maintenance mode, which does not prevent local commands.

To turn maintenance mode on, start at the top level of the front panel menus and select MAINT. When prompted to set the maintenance mode condition, rotate the jog wheel to ON and press to accept. The REMOTE LED on the front panel of the unit turns red. When the local site is selected for viewing on the front panel, the MAINT flag appears on the display. If a remote unit is used to view a site that is in maintenance mode, that unit will also show the MAINT flag while the site is selected.

When it is safe to restore command functionality to the system, turn maintenance mode off by rotating the jog wheel to OFF and pressing the jog wheel to accept. The REMOTE LED on the front panel of the unit turns green, and the MAINT flag disappears. For safety reasons, it is not

possible to enable or disable maintenance mode by any means other than the front panel of the ARC Plus at the local site.

Important! For safety reasons, it is not possible to enable or disable maintenance mode by any means other than the front panel of the ARC Plus at the local site.

ARC Plus

On the ARC Plus system, turn maintenance mode on by starting at the top level of the front panel menus and selecting MAINT. When prompted to set the maintenance mode condition, rotate the jog wheel to ON and press to accept. The REMOTE LED on the front panel of the unit turns red. When the local site is selected for viewing on the front panel, the MAINT flag appears on the display. If a remote unit is used to view a site that is in maintenance mode, that unit will also show the MAINT flag while the site is selected.

When it is safe to restore command functionality to the system, turn maintenance mode off by rotating the jog wheel to OFF and pressing the jog wheel to accept. The REMOTE LED on the front panel of the unit turns green, and the MAINT flag disappears.

ARC Plus SL

On the ARC Plus SL, toggle maintenance mode by pressing the front panel REMOTE button. A green REMOTE LED indicates the unit is in remote mode (the unit will issue commands), and a red REMOTE LED indicates the unit is in maintenance mode (the unit will not issue commands).

Power Recovery Behavior

It is recommended to connect the ARC Plus system to a suitable UPS to prevent unexpected power loss.

Plus-X ICRU Models

If power is removed from the ARC Plus system, the position of the raise and lower relays on Plus-X devices will be restored upon power recovery.

PlusBus ICRU Models

For legacy PlusBus ICRU models, AutoLoad Plus software allows users to determine whether the ARC Plus restores the relay state on power recovery, or whether the system comes back online with all relays open. For more information, see page 33.

If the ARC Plus is configured to restore the relay state on power recovery, do not begin maintenance on any site equipment during a power interruption without first unplugging the ICRUs.

Configuring System Settings

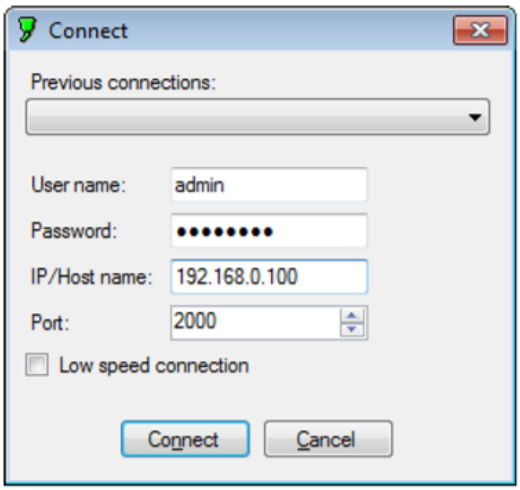
To get started with configuration, you will need to download and install AutoLoad Plus software if you have not done so already. The latest version of AutoLoad Plus is available from Burk Technology's website at www.burk.com. AutoLoad Plus allows you to easily set up and administer your ARC Plus system using a PC. With AutoLoad Plus, you have access to every system parameter such as metering (including calibration), status, and command channel settings, user security, front-panel display options, time and date settings, alarm notifications, ESI Plus settings, macros, and more.

Once connected, the configuration is read and edited directly from the ARC Plus. When you save changes, the changes are loaded directly to the unit.

Note: Only System level users can access AutoLoad Plus. The site administrator(s) will be able to define access levels for each individual user. Software Installation

Connecting to the ARC Plus

To modify ARC Plus settings using AutoLoad Plus, start by launching AutoLoad Plus. AutoLoad Plus will prompt for connection settings. Enter the IP address and your user name and password. Then click **Connect.** (The default user name is **admin**, and the default password is **password**.)



The Connect dialog automatically appears on startup.

*Note: Select the **Low speed connection** option to optimize the AutoLoad Plus connection if you are not connecting over broadband.*

Once connected, AutoLoad shows the site you connected to on the left hand side of the window, along with any other sites in the ARC Plus' network. Click on a site to access its settings. Saving and Archiving ARC Plus Configurations

Saving Configuration Changes to the ARC Plus

Any changes you make must be saved to the ARC Plus before they become active. After making a configuration edit, click the **save** icon in the toolbar or go to the **File** menu and choose **Save**. If you make unsaved configuration changes in AutoLoad Plus and wish to undo them, go to the **File** menu and choose **Revert**. You must revert any changes before saving them to the ARC Plus.

Archiving ARC Plus Settings to the PC

To save a copy of the ARC Plus configuration to your PC, select **Save to File...** from the **File** menu. Give the configuration a file name and press **Save**.

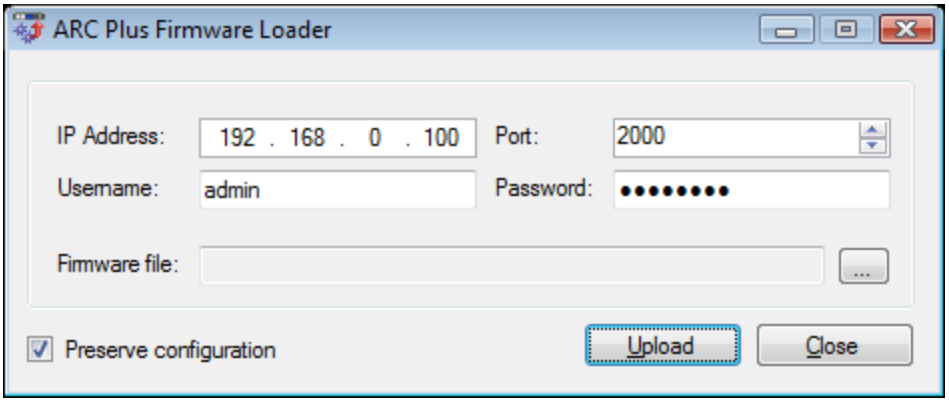
Loading Archived Settings

To load archived settings to an ARC Plus, connect to the desired ARC Plus site and click the **Open from File...** toolbar icon. Select the desired file, click **Open**, and the settings will populate in AutoLoad Plus. Press the **Save** toolbar icon to save the configuration to the ARC Plus.

Uploading Firmware

Important! Uploading firmware causes any latching relays to release when the ARC Plus unit restarts. The relay state will be restored after the process is complete.

To load firmware to the ARC Plus, use the ARC Plus Firmware Loader. The firmware loader is installed with AutoLoad Plus, and appears on the Start Menu under **Programs > Burk Technology > AutoLoad Plus**.



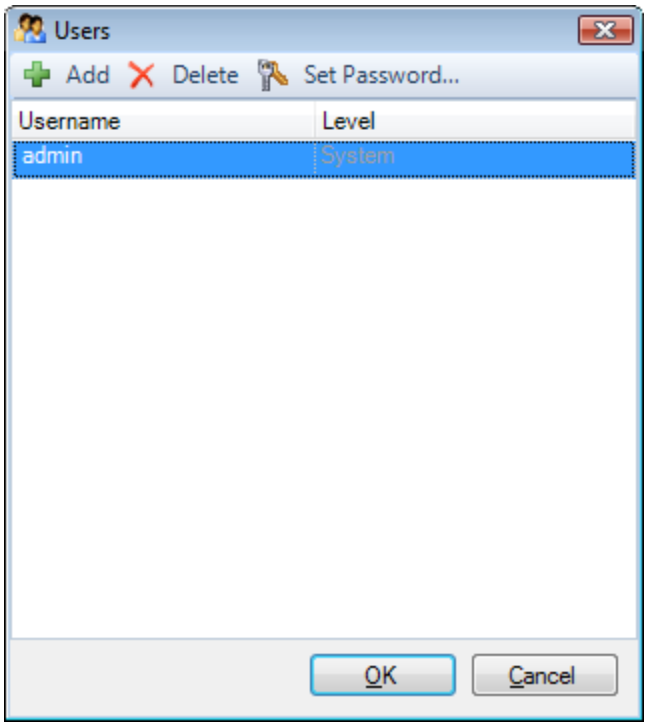
ARC Plus Firmware Loader

1. Enter the IP address and port number (normally 2000) of the ARC Plus.
2. Enter the username and password for any System level user.
3. Use the *browse* button (…) next to the firmware file to select the firmware file you want to load.
4. If you do *not* want to retain the configuration settings on the ARC Plus, *uncheck* the **Preserve configuration** checkbox. Leaving this checkbox checked is recommended.
5. Click **Upload** to upload firmware.
6. The ARC Plus will reboot at the end of the process. It may take several minutes for the entire process to complete.

Changing the Site Name

To change the name of the ARC Plus site, highlight the ARC Plus icon in the site list, right click and select **Rename**. Rename the site as desired (up to 12 characters).

Managing Users



Edit > Settings > Users

The ARC Plus manages users and privileges for up to 128 users, with up to 10 simultaneous connections via any combination of AutoLoad Plus, AutoPilot 2010 or web interface. The same set of usernames and passwords is used for each application. Usernames may contain up to 32 characters.

Administrators can manage users and privileges by selecting **Users** from the Edit > Settings menu.

To add a new user, click the **Add** button. You will be prompted to assign the new user a name and password. Once the new user appears on the user list, assign privileges by selecting an option from the **Level** column:

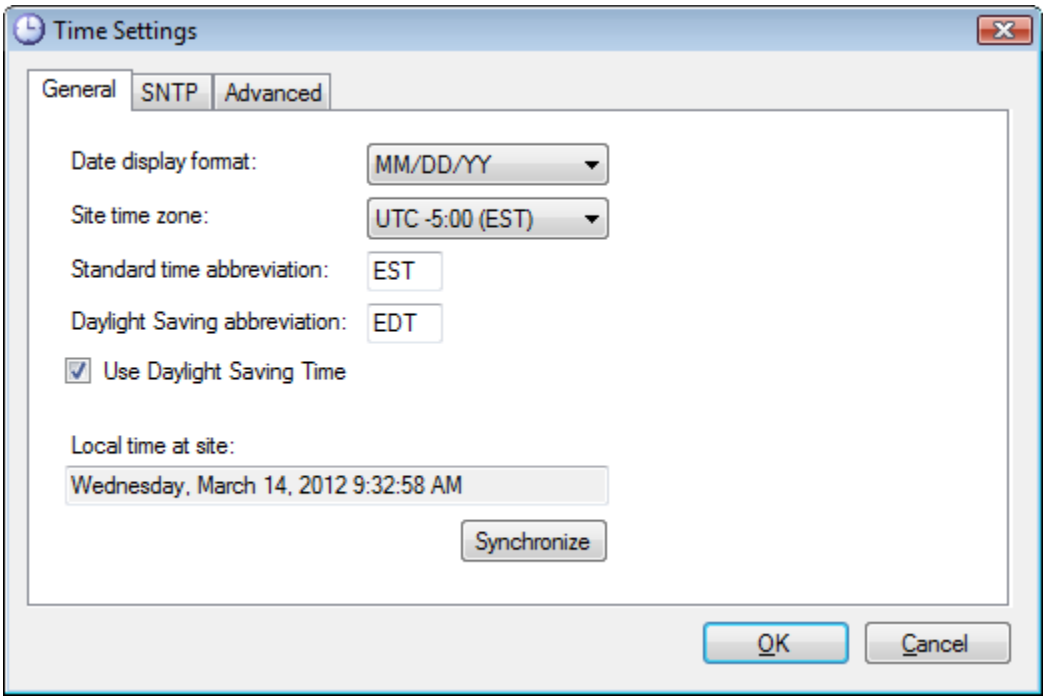
- **System** level users have full access to the ARC Plus system. This privilege level is required to make configuration changes using AutoLoad Plus.
- **Operators** can issue commands, run and stop macros, clear alarms, and calibrate channels.
- **Observers** have read-only access.

You can rename an existing user by simply editing the **Username** field. To change the password, select the user and click the **Set Password…** button in the toolbar. Use the **Delete** button to remove a user entirely.

*Note: While it is possible to rename the default **admin** user, you cannot delete this user or change its access level. Changing the password for the admin user is strongly recommended.*

Note: Passwords are case sensitive; usernames are not.

Time Settings



Time Settings

To change the date and time settings for the ARC Plus, choose **Time Settings** from the **Edit > Settings** menu. This opens the Time Settings dialog.

The General tab allows you to adjust the date display format, time zone, and the abbreviations used for the time zone. If the ARC Plus location observes Daylight Saving Time, check the box for DST.

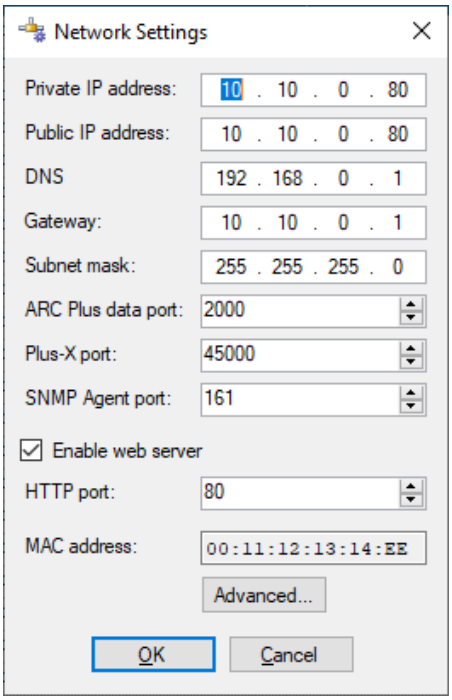
To synchronize the time with your local PC, press the **Synchronize** button. AutoLoad Plus will set the ARC Plus site to the time shown on your Windows clock, adjusting for any time zone difference.

To configure the ARC Plus to synchronize with an SNTP time server, use the **SNTP** tab. Enter the time server IP address, port, and rate (in minutes) at which the ARC Plus should synchronize.

Note: Using an SNTP server is recommended to ensure accurate timestamps and scheduled operations on the ARC Plus.

The **Advanced** tab allows you to change the rules for Daylight Saving Time. The ARC Plus uses United States rules for DST by default. Changing these rules is only necessary for locations that follow different rules.

Network Settings



Network Settings

To change the IP address and other network settings for the ARC Plus, choose **Network Settings** from the **Edit > Settings** menu. This will open the Network Settings dialog. If you are unsure of the settings to use, contact your network administrator.

Important! After clicking the OK button in the Network Settings dialog, AutoLoad will immediately commit your changes and reconnect to the ARC Plus.

Note: In order to reference a mail server by host name instead of IP address, a DNS Server is required.

If your firewall is configured to block access to port 80, the HTTP Port setting can be used to change the port on which the embedded web server communicates.

If, for security reasons, you wish to turn off the embedded web server, uncheck the box marked **Enable web server**. You will not be able to log in to the web interface if this box is checked.

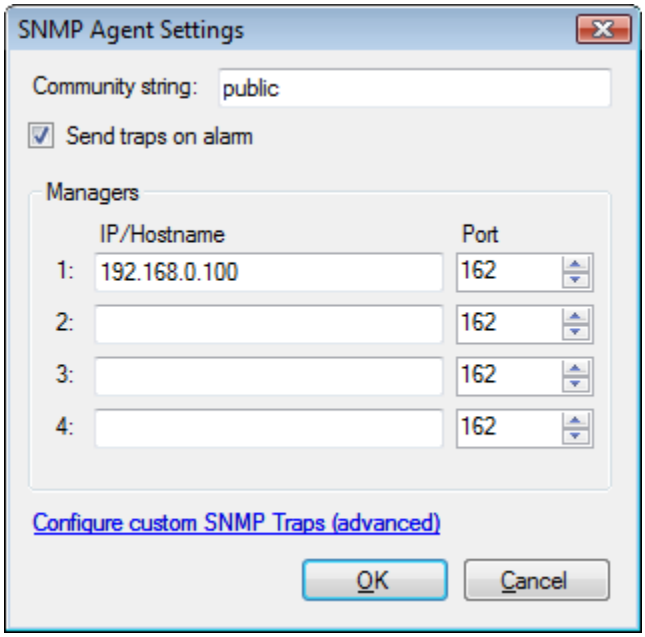
To allow the ARC Plus Touch to communicate over TCP/IP networks with longer than typical network delays, click the **Advanced** button and click the **Enable Longer TCP Timeouts** checkbox.

SNMP

The ARC Plus includes an SNMP agent that can send SNMP traps to up to four SNMP managers in the following circumstances:

- A new alarm occurs
- An alarm becomes inactive (the underlying condition returns to normal)
- An alarm is cleared
- A new event is logged

To configure SNMP settings, click **SNMP Agent Settings…** from the **Edit > Settings** menu. You can enable or disable traps, and configure the IP address (or hostname) and port for up to four SNMP managers.



SNMP Agent Settings

Custom SNMP Traps

The ARC Plus can send user-defined SNMP traps for use with certain third party applications. This functionality is not required for normal operation.

Email and Dialout Notifications

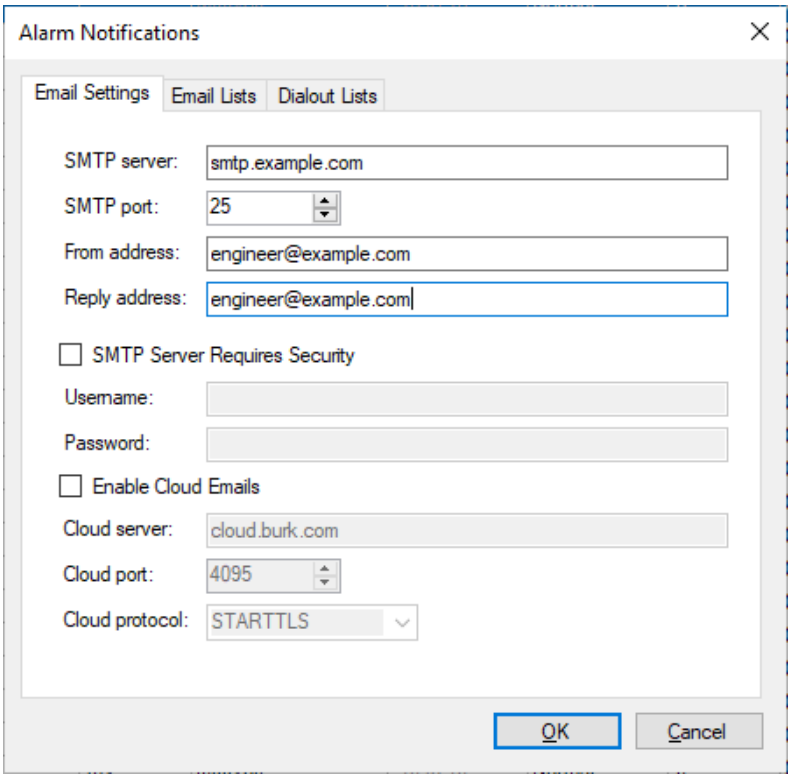
Each alarm can be linked to an email notification list and/or a dialout list to alert personnel to out-of-tolerance conditions or system alarms (such as an offline ICRU). In order for email alarm

notifications to be sent, the ARC Plus must have access to an SMTP server. For dialout notification, the optional ESI Plus must be installed.

Configuring notifications is a two-step process: first, the notification lists must be created in the Alarm Notifications window; then the alarm conditions must be configured to use the appropriate lists. This is accomplished in the Status Notifications and Meter Notifications tabs of the channel configuration area, after you have configured status and metering channels.

Configuring Email Alarm Notifications

Email Settings



Email Settings

To set up email notification and dialout notification lists, choose **Alarm Notifications** from the **Edit > Settings** menu. This opens the Alarm Notifications dialog.

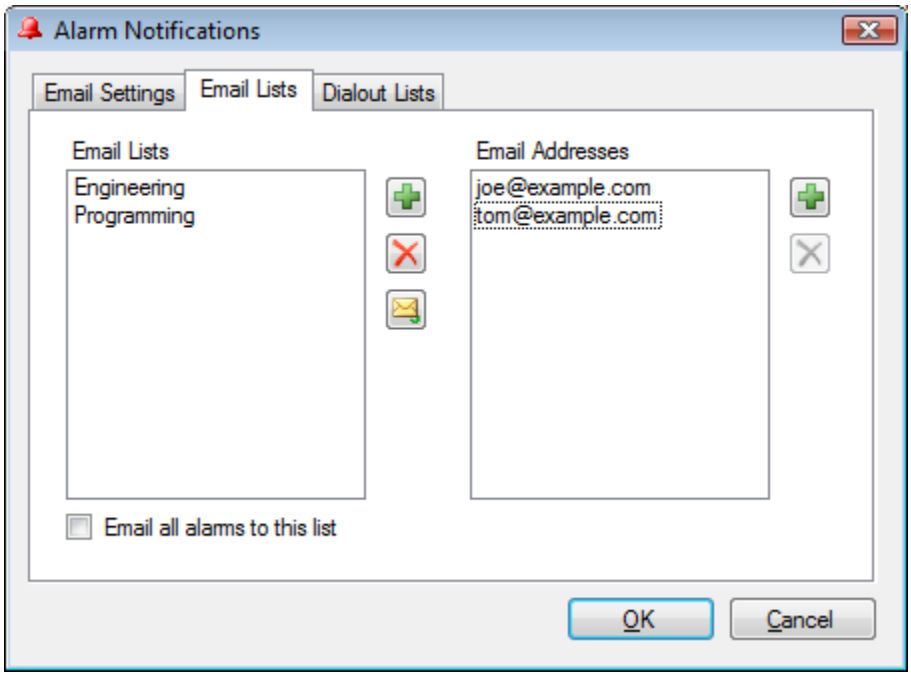
Before setting up list members, enter the hostname or IP address of the mail server and the server port (usually 25). If referencing the mail server by name, a DNS must be entered in the Network Settings configuration (see page 27).

Emails originating from the ARC Plus must have a From address and a Reply address. Any undeliverable notifications will be sent to the reply to address. Most administrators simply enter their own email address for both of these settings.

If your server requires authentication, enter the User name and User password where prompted.

If your email server requires TLS encryption for emails passing through its server, you must also enable cloud emails with a cloud server of **cloud.burk.com**, cloud port of **4095** and cloud protocol set to **STARTTLS.** This allows the ARC Plus to send TLS encrypted emails by first passing though the cloud server to do the encryption which then gets forwarded to you email server.

Email Lists



Email Lists

Each status alarm and each metering alarm threshold can be linked to one of up to 32 email lists, allowing alarm notifications to be directed to the appropriate personnel.

To create an email list, click the **Email Lists** tab. Click the Add button (plus sign icon) to the right of the Email Lists column and enter the name of your first list where prompted. Then click the Add (plus sign) button to the right of the Email Addresses column and add email addresses to the list until complete. When you are done, you can click the Test Email button (envelope icon) to test your email settings. A test email will be sent to all addresses in the selected list.

Now that you have created at least one email list, this list will be available for selection in the Meter Notifications and Status Notifications tabs when you configure ARC Plus channels.

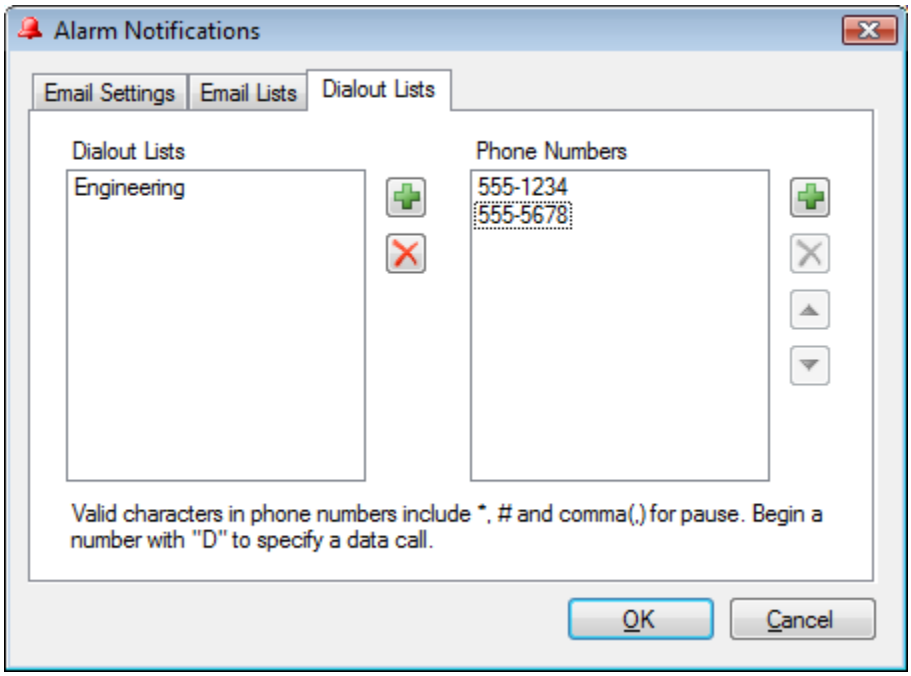
Configuring Dialout Alarm Notifications

If an ESI Plus is installed in any ARC Plus in the network, metering and status alarms can trigger dialout notifications to telephone numbers on your dialout lists. Each status alarm and each

metering threshold can be linked to one of up to 32 dialout lists, and each list can contain up to 12 telephone numbers.

The ESI Plus allows administrators to program a master dialout list, which will be called prior to any alarm-specific dialout lists. If you wish to use this master dialout list in lieu of alarm-specific lists, you do not need to complete the steps below. See **Editing Master Phone Numbers** for information on programming the master dialout list.

Dialout Lists



Dialout Lists

To set up your dialout lists, navigate to the Dialout Lists tab.

Click the Add button (plus sign icon) to the right of the Dialout Lists column and enter the name of your first list where prompted. Then click the Add button (plus sign icon) to the right of the Phone Numbers column and assign telephone numbers to this list.

If you wish for an alarm notification to dial a modem-equipped PC running AutoPilot 2010, precede the telephone number with D (for data). This is a useful way to log an alarm to the PC if there is no IP connectivity to the remote site.

Mapping the Front Panel LEDs

Front Panel LEDs

LED Number	Site	Condition	Channel	On Color	Off Color
1	LocalSite	Status	1	Red	No back color
2	LocalSite	Status	2	Red	No back color
3	LocalSite	Status	3	Red	No back color
4	LocalSite	Status	4	Red	No back color
5	LocalSite	Status	5	Red	No back color
6	LocalSite	Status	6	Red	No back color
7	LocalSite	Status	7	Red	No back color
8	LocalSite	Status	8	Red	No back color
9	LocalSite	Status	9	Red	No back color
10	LocalSite	Status	10	Red	No back color
11	LocalSite	Status	11	Red	No back color
12	LocalSite	Status	12	Red	No back color
13	LocalSite	Status	13	Red	No back color
14	LocalSite	Status	14	Red	No back color
15	LocalSite	Status	15	Red	No back color
16	LocalSite	Status	16	Red	No back color

Mapping Mode Compatibility Mode OK Cancel

Front Panel LEDs

The 16 bicolor LEDs on front panel of the ARC Plus can be used in one of two modes:

Mapping mode allows each LED to be tied to a user-defined condition at any site or channel. This includes status high/low, maintenance mode state, link status, active alarms, and out-of-tolerance conditions (even if not alarmed). The color of the LED is configurable as red, green or off.

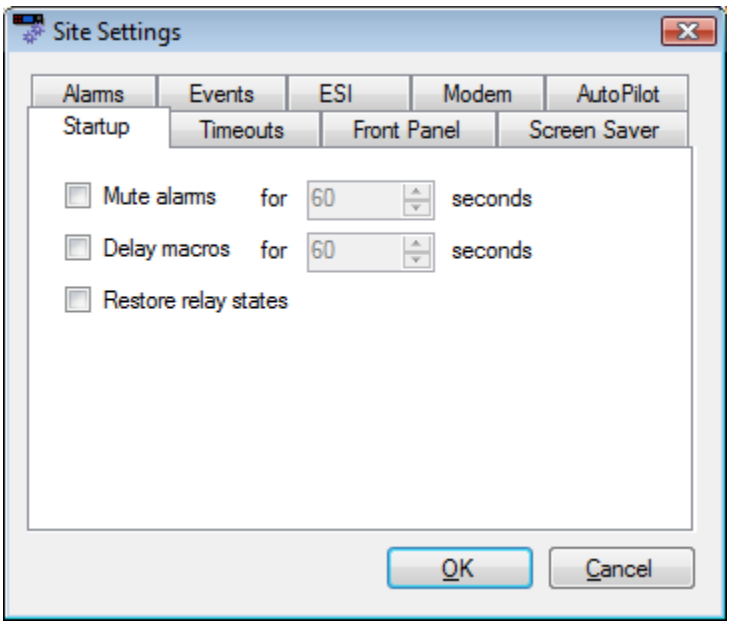
Compatibility mode shows the first 16 status channels of the ARC Plus, where an illuminated red LED indicates a status high condition.

To configure the operation mode of the LEDs and set up colors and condition assignments (in mapping mode), choose **Front Panel LEDs** from the **Edit > Settings** menu. Select **Mapping Mode** at the bottom of the screen and define the behavior for each LED in the space provided. If you do not wish to map LEDs, choose Compatibility Mode at the bottom of the screen.

Site Settings

Many system settings are user-definable and can be configured by accessing the **Site Settings** dialog from the **Edit > Settings** menu.

Startup Behavior



Startup

The Startup tab allows you to configure ARC Plus behavior on initial power up.

Mute Alarms

Check the **Mute alarms** box to suppress all alarm notifications for a specified duration after startup. This provides an opportunity for equipment to recover from a power loss after startup without causing out of tolerance conditions.

Delay Macros

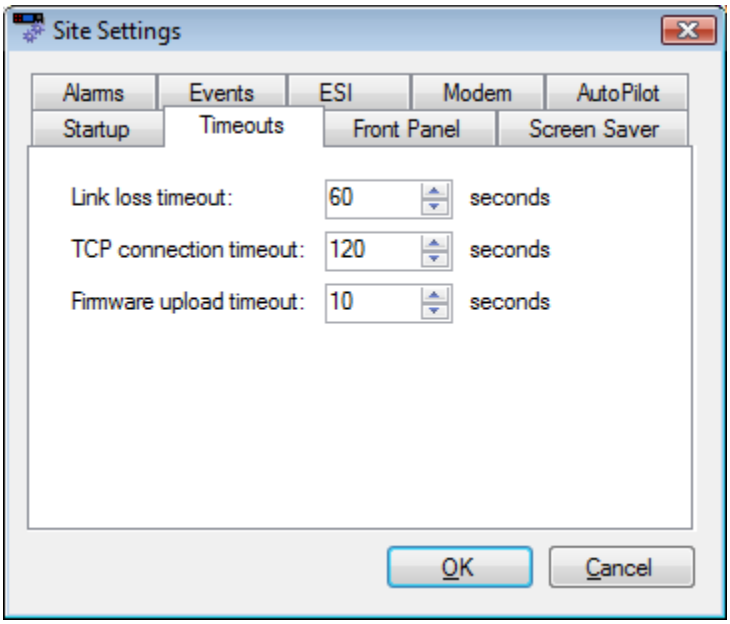
Check the **Delay macros** box to prevent any macros from running during the specified duration after startup. This feature can be used to prevent macros from using readings from equipment that has not yet stabilized or sending commands to equipment that has not yet come back online.

Restore Relay States

For older systems installed with legacy PlusBus ICRU units, the Restore relay states box allows you to configure the behavior of the ICRU relays upon recovery from a loss of power. Check the Restore relay states box if you want the ARC Plus to return all command relays to the state that was saved upon loss of power. Leave the box unchecked if you want the relays to remain open when power is restored.

Note: For Plus-X IIU and ICRU systems, the relay state will be automatically restored upon power recovery. Leaving the Restore relay states box unchecked will not disable this feature.

Timeout Settings

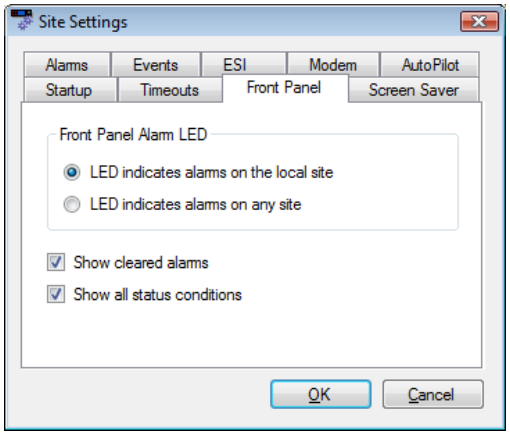


Timeouts

After certain connection errors, AutoLoad Plus, AutoPilot 2010 and the ARC Plus will log events and/or display error messages. Timeout durations are user-configurable in the Timeouts tab.

Note: In a multi-site ARC Plus network, be sure that the Link Loss Timeout setting is the same value for each site in the network. This will prevent false "Remote unit missing" alarms.

Front Panel Behavior



Front Panel

The front panel behavior of the alarm LED, alarm list, and status report display is user configurable.

ARC Plus and ARC Plus SL

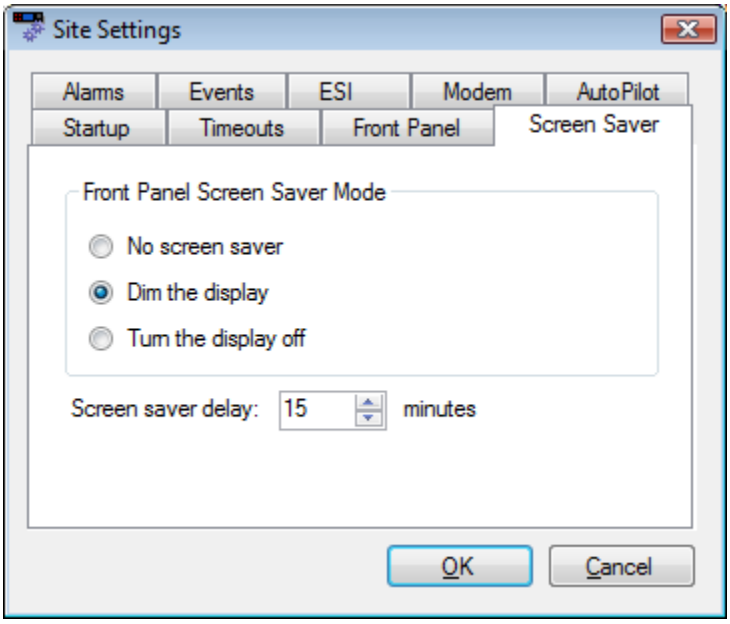
Under Front Panel Alarm LED, the **LED indicates alarm on local site** option causes the front panel LED to illuminate when there is an alarm condition on any of the equipment physically connected to the unit. The **LED indicates alarm on any site** option causes the LED to illuminate when any site in the ARC Plus network has an alarm.

ARC Plus Only

If you want cleared alarms to appear in the front panel alarm list, check the box marked **Show cleared alarms**. Cleared alarms appear beneath uncleared alarms and show the date and time they were cleared.

If you want the status report to show status off and status on messages for every channel, check the box marked **Show all status conditions**. Otherwise, the front panel status report will only include status on messages.

Screen Saver Settings

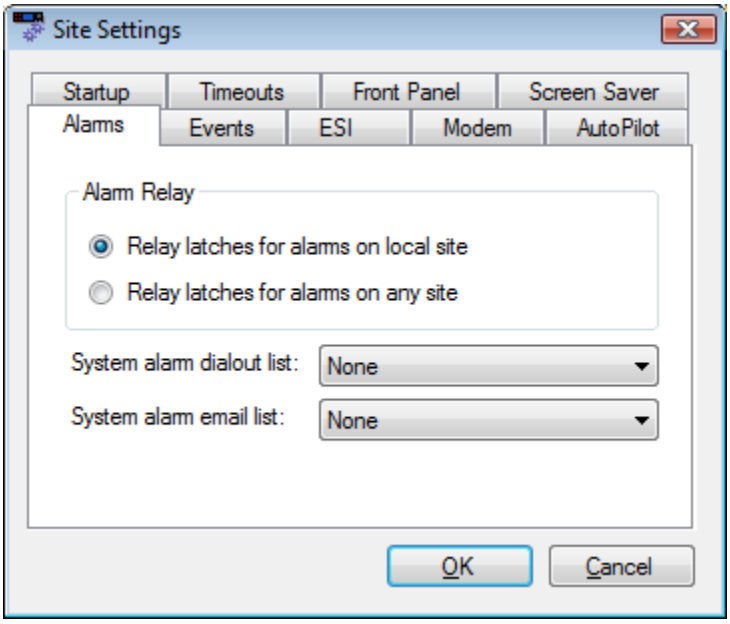


Screen Saver

On ARC Plus systems, the front panel vacuum fluorescent display (VFD) may be configured to dim or turn off after the front panel controls have been inactive for a specified duration. This feature is designed to prevent screen “burn-in” over the service life of the ARC Plus.

If the ARC Plus VFD is already in screen saver mode when you make a change to these settings, the screen saver will not update until the next time the front panel enters screen saver mode.

Alarms



Alarms

ARC Plus

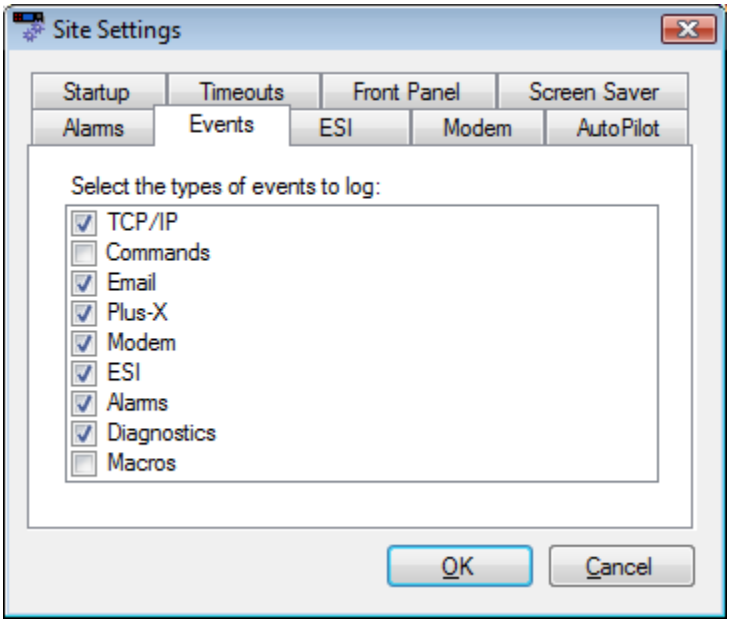
The behavior of the front panel alarm relay may be configured to latch closed when there is an alarm at the local site, or when there is an alarm at any site in the ARC Plus network. Under the **Alarms** tab, select your preference under the **Alarm Relay** heading.

The System alarm dialout list and System alarm email list determine which notification lists the ARC Plus will use when there is a system alarm on the ARC Plus (such as Plus-X device becoming disconnected). To configure email notifications of system alarms, email server settings and at least one email notification list must be configured (see **Configuring Email Alarm Notifications**). In order to select a dialout list, an ESI Plus must be installed and there must be at least one dialout notification list created (see **Configuring Dialout Alarm Notifications**).

ARC Plus SL

The System email list determines which notification lists the ARC Plus will use when there is a system alarm on the ARC Plus (such as Plus-X device becoming disconnected). To configure email notifications of system alarms, email server settings and at least one email notification list must be configured (see **Configuring Email Alarm Notifications**).

Events

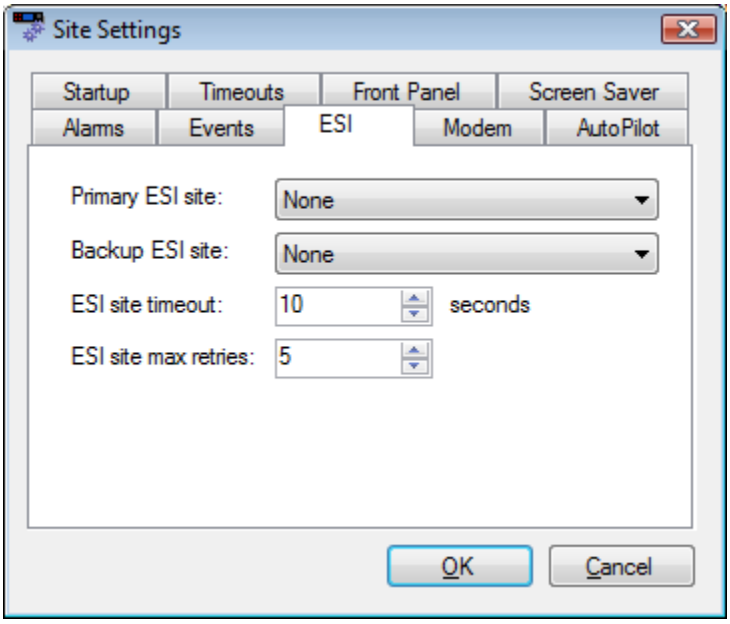


Events

The ARC Plus has an onboard events list to record various types of activities as they take place on the system. You can control what types of events are recorded by checking or unchecking the items in the list on the Events tab.

Note: Depending on how you configure your ARC Plus, some activities may generate a high volume of events. For example, running macros frequently will generate many macro events. Configure the ARC Plus events accordingly to best suit your needs.

Primary/Backup ESI Configuration

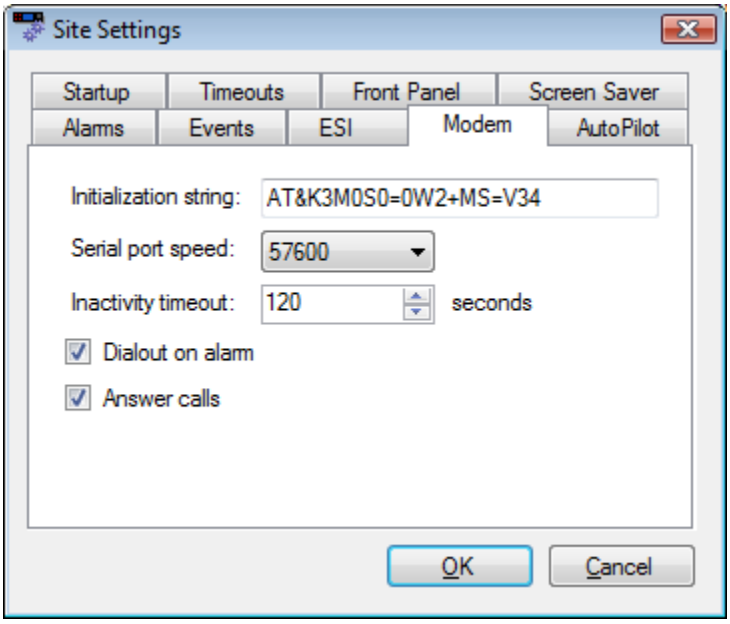


ESI

When an alarm occurs, an ARC Plus SL or an ARC Plus without an ESI Plus installed can connect to an ARC Plus unit with an ESI Plus installed in order to provide dial out notification of the alarm condition. Because more than one ESI Plus may be installed in a network of ARC Plus systems, the ESI tab allows you to configure primary and backup sites.

When an alarm occurs on the local ARC Plus and dialout notification is enabled for that alarm, the ARC Plus will initiate dialout using the ESI Plus installed at the site designated as **Primary ESI site**. The **ESI site timeout** setting determines how long the ARC Plus will wait for a response from the primary ESI Plus. The **ESI site max retries** setting determines how many times it will retry the primary site before attempting to connect to the **Backup ESI site**.

Modem Settings



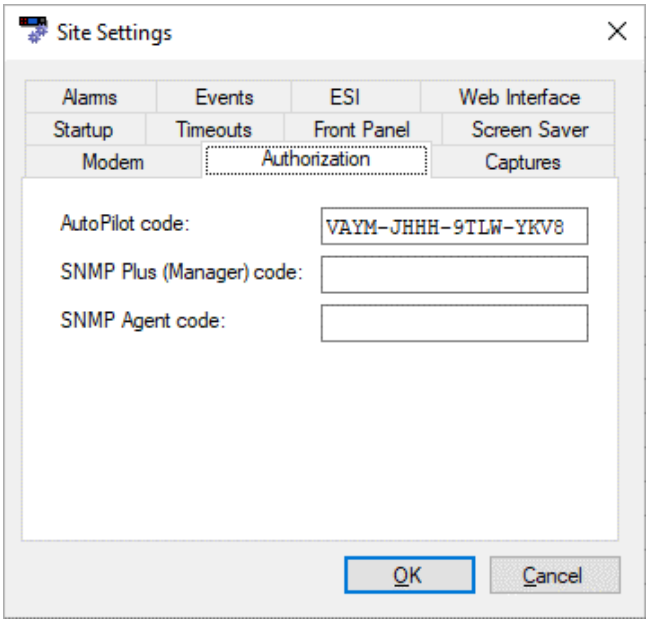
Modem

Note: Modem settings are not applicable to the ARC Plus SL because the ARC Plus SL is not equipped for serial data connectivity.

If you are connecting a dial-up modem to the ARC Plus, enter the modem's initialization string and connection speed where prompted. The **Inactivity timeout** determines how long the ARC Plus will wait after the last data exchange before disconnecting a modem connection.

To allow the modem to be used for dialout notifications and incoming calls, leave the **Dialout on alarm** and **Answer calls** boxes checked. Disabling these options is a means to turn off the modem functionality for this site.

AutoPilot 2010 Authorization Code

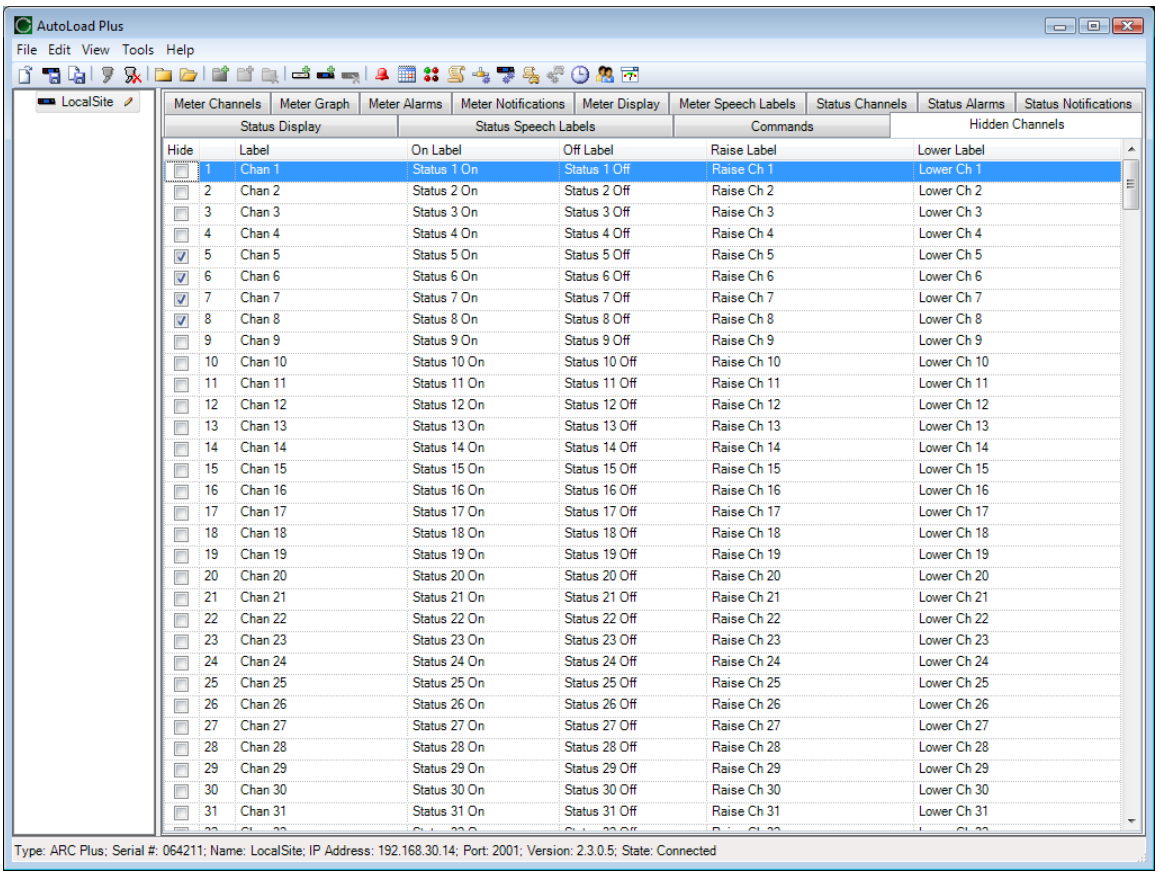


AutoPilot

When you purchase a license for AutoPilot 2010, an authorization code is provided for one (1) ARC Plus unit. Enter the authorization code where prompted in order to begin using AutoPilot 2010 with this ARC Plus.

Note: The ARC Plus will retain the authorization code after upgrading firmware, resetting factory settings or cycling power. However, keeping a record of your authorization code is strongly recommended.

Hiding Unused Channels



Hide		Label	On Label	Off Label	Raise Label	Lower Label
☐	1	Chan 1	Status 1 On	Status 1 Off	Raise Ch 1	Lower Ch 1
☐	2	Chan 2	Status 2 On	Status 2 Off	Raise Ch 2	Lower Ch 2
☐	3	Chan 3	Status 3 On	Status 3 Off	Raise Ch 3	Lower Ch 3
☐	4	Chan 4	Status 4 On	Status 4 Off	Raise Ch 4	Lower Ch 4
☑	5	Chan 5	Status 5 On	Status 5 Off	Raise Ch 5	Lower Ch 5
☑	6	Chan 6	Status 6 On	Status 6 Off	Raise Ch 6	Lower Ch 6
☑	7	Chan 7	Status 7 On	Status 7 Off	Raise Ch 7	Lower Ch 7
☑	8	Chan 8	Status 8 On	Status 8 Off	Raise Ch 8	Lower Ch 8
☐	9	Chan 9	Status 9 On	Status 9 Off	Raise Ch 9	Lower Ch 9
☐	10	Chan 10	Status 10 On	Status 10 Off	Raise Ch 10	Lower Ch 10
☐	11	Chan 11	Status 11 On	Status 11 Off	Raise Ch 11	Lower Ch 11
☐	12	Chan 12	Status 12 On	Status 12 Off	Raise Ch 12	Lower Ch 12
☐	13	Chan 13	Status 13 On	Status 13 Off	Raise Ch 13	Lower Ch 13
☐	14	Chan 14	Status 14 On	Status 14 Off	Raise Ch 14	Lower Ch 14
☐	15	Chan 15	Status 15 On	Status 15 Off	Raise Ch 15	Lower Ch 15
☐	16	Chan 16	Status 16 On	Status 16 Off	Raise Ch 16	Lower Ch 16
☐	17	Chan 17	Status 17 On	Status 17 Off	Raise Ch 17	Lower Ch 17
☐	18	Chan 18	Status 18 On	Status 18 Off	Raise Ch 18	Lower Ch 18
☐	19	Chan 19	Status 19 On	Status 19 Off	Raise Ch 19	Lower Ch 19
☐	20	Chan 20	Status 20 On	Status 20 Off	Raise Ch 20	Lower Ch 20
☐	21	Chan 21	Status 21 On	Status 21 Off	Raise Ch 21	Lower Ch 21
☐	22	Chan 22	Status 22 On	Status 22 Off	Raise Ch 22	Lower Ch 22
☐	23	Chan 23	Status 23 On	Status 23 Off	Raise Ch 23	Lower Ch 23
☐	24	Chan 24	Status 24 On	Status 24 Off	Raise Ch 24	Lower Ch 24
☐	25	Chan 25	Status 25 On	Status 25 Off	Raise Ch 25	Lower Ch 25
☐	26	Chan 26	Status 26 On	Status 26 Off	Raise Ch 26	Lower Ch 26
☐	27	Chan 27	Status 27 On	Status 27 Off	Raise Ch 27	Lower Ch 27
☐	28	Chan 28	Status 28 On	Status 28 Off	Raise Ch 28	Lower Ch 28
☐	29	Chan 29	Status 29 On	Status 29 Off	Raise Ch 29	Lower Ch 29
☐	30	Chan 30	Status 30 On	Status 30 Off	Raise Ch 30	Lower Ch 30
☐	31	Chan 31	Status 31 On	Status 31 Off	Raise Ch 31	Lower Ch 31

The ARC Plus front panel, AutoPilot 2010 and web interface will show all 256 metering, status and command channels (real or virtual). If fewer channels are used, you can remove unused channels from display by clicking the **Hidden Channels** tab and checking off boxes under the **Hide** heading. This will remove the metering, status and command channels from view.

If you have a block of channels to hide or unhide, choose **Hide/Unhide Channels…** from the **Tools** menu to select channels in blocks.

Configuring an ARC Plus Network (Multi-Site Installations)

When more than one ARC Plus unit is installed within an organization, grouping the units together in a single ARC Plus network offers the advantage of site-to-site control, where commands and macros issued by one unit can control equipment connected to another unit. It also allows alarms from one site to appear on the front panel of any other site, and front panel LEDs can be mapped to conditions on any other site.

Adding Sites to the Network

Once your ARC Plus sites are connected to the LAN/WAN, grouping them is easy. Start by connecting to one site in AutoLoad Plus. After the first site is connected, choose **Add Site…** from the **Edit > Site List** menu. You will be prompted for the IP address, port, username and password

of the site you are about to add. Click **OK.** AutoLoad Plus will connect to the second site and the two sites will now be part of the same ARC Plus network.

Categorizing Sites

Adding category names to a large ARC Plus network can make it easier to navigate the front panel site menu. To add a category name, choose **Add Base Category** from the **Edit > Site List** menu and add as many root level categories as desired. You can then create subcategories by choosing **Add Category** from the **Edit > Site List** menu.

Adding ARC-16 Sites to the Network

The ARC Plus can connect to an ARC-16 system using a direct connection or full-time serial link between the ARC-16 CI or ESI serial port and the port marked **ARC-16** on the rear panel of the ARC Plus. See page 10 for cable types.

Connecting one ARC-16 to the ARC Plus allows the ARC Plus to see any other ARC-16s that are connected to the first. For example, in a four-site ARC-16 system, connecting the ARC-16 site D will allow the ARC Plus to also show sites A through C.

After the ARC-16 is connected to the rear panel of the ARC Plus, add the ARC-16 site to the ARC Plus network by choosing **Add ARC-16…** from the **Edit > Site List** menu. The ARC Plus will detect all connected ARC-16 sites and allow you to choose which ones you would like to add to the ARC Plus network.

Once the ARC-16s are added to the network, you can click any ARC-16 site in the AutoLoad Plus site list and navigate the configuration tabs to complete setup.

Setting the Network Password

Change the network password by going to Tools > Set Network Password...

Each ARC Plus site has a network password that is used when connecting to other sites on the network. This prevents unauthorized ARC Plus sites from connecting to your network. Units shipping from the factory have a default network password of **password.** It is strongly

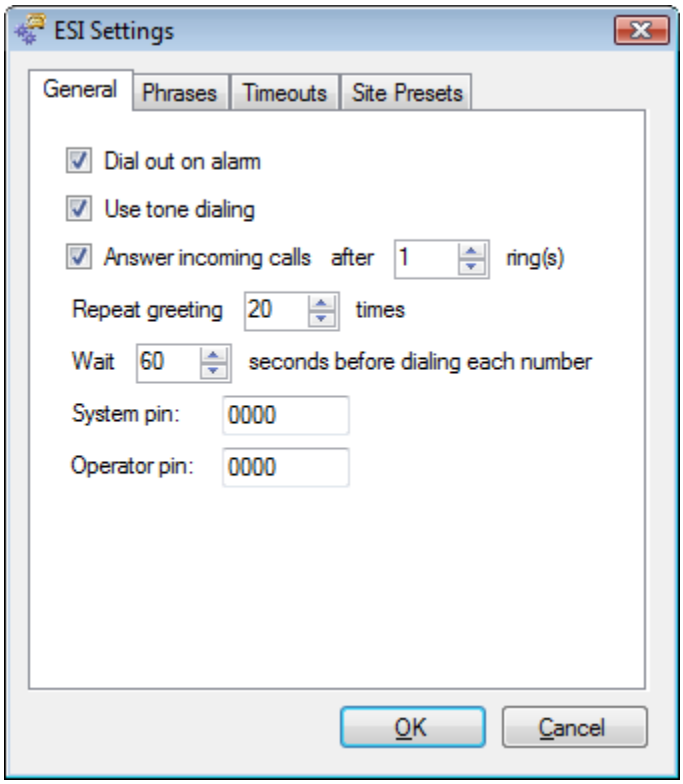
recommended that you change this password by choosing **Set network password…** from the **Tools** menu. AutoLoad Plus will change the network password for all units connected. When adding a new unit to an existing network, the network password must be set on the new unit before it can be added to the network.

Important! All ARC Plus units in the network must have the same network password.

Speech Settings

If an ESI Plus is installed, ESI Plus properties are configurable using the Speech Settings dialog. Access the dialog by choosing **Speech Settings** from the **Edit > Settings** menu.

General ESI Plus Settings



General

Basic ESI Plus properties are set up on the **General** tab.

In order to enable dialout notifications, check the box marked **Dial out on alarm**. The ESI Plus will dial out when there is an alarm condition under the following circumstances:

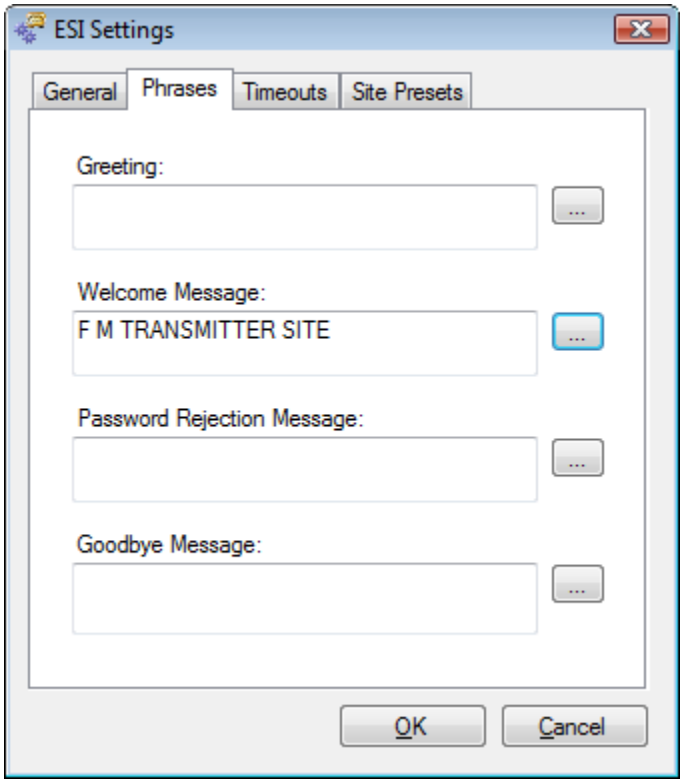
- The alarm condition is configured to dialout to a notification list
- The site with the alarm has designated this ESI as a primary or backup ESI.
- The dial out on alarm box is checked.

If you want this ESI Plus to answer incoming calls, check the box marked **Answer incoming calls** and specify the number of rings the ESI should wait before picking up the line. After answering the call, the ESI Plus speaks the configured greeting and will continuously repeat the greeting to allow time for the user to enter a valid PIN. To increase the amount of time for PIN entry, increase the number of times the greeting is repeated.

When the ESI Plus dials out with alarm notifications, the phone line will not allow inbound calls. Adding a delay between dialout attempts allows users the opportunity to dial in. Configure the duration of this delay in the **Wait ___ seconds before dialing…** field.

Finally, enter System and Operator PINs that will be used for ESI Plus login purposes. The system PIN provides full access to the ARC Plus system (including editing master phone numbers, disabling alarm reporting, and muting channels), while the operator PIN allows readings, commands and macros. PINs may contain up to eight digits.

ESI Phrases

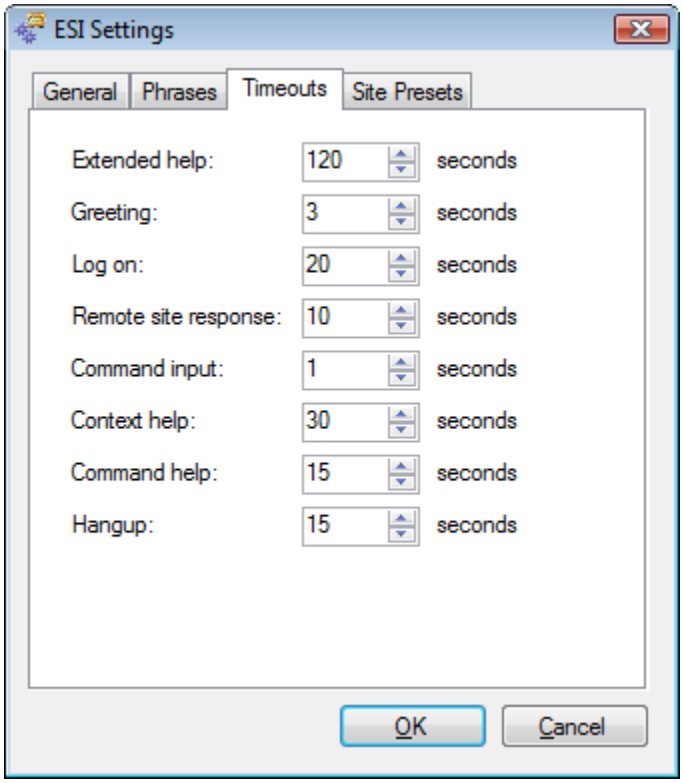


Phrases

The ESI Phrases tab allows configuration of the phrases used to greet the caller, say goodbye, and accept or reject passwords.

Greeting	Spoken as soon as the ESI picks up the line. The word “Hello” is always spoken prior to the greeting.
Welcome Message	Spoken after the user enters a valid PIN.
Rejection Message	Spoken if an incorrect PIN is entered.
Goodbye Message	Spoken when the caller disconnects. The word “Goodbye” is always spoken after the message.

ESI Plus Timeouts



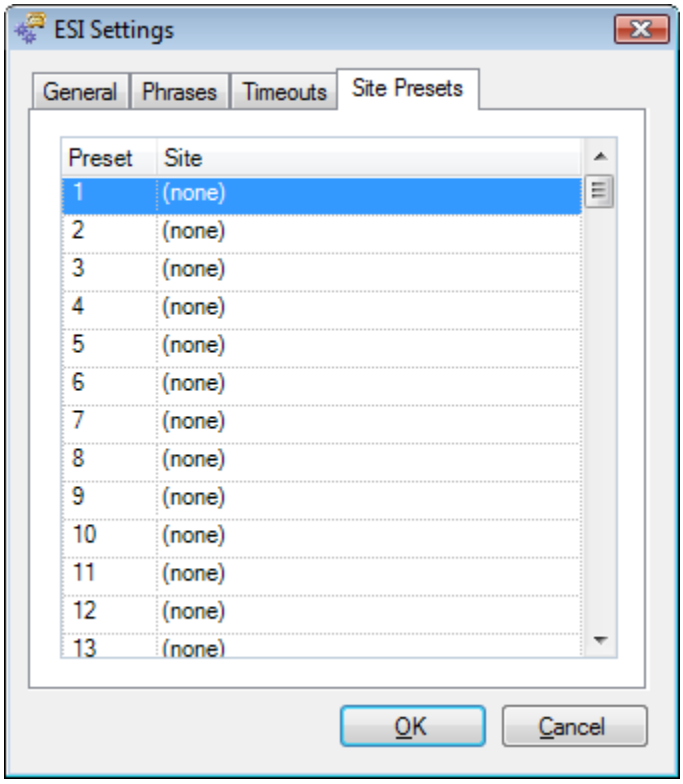
Timeouts

The **Timeouts** tab allows you to adjust default timeouts and timed responses from the ESI Plus.

Extended help	The amount of time the ESI Plus waits before providing a context-sensitive help prompt.
Greeting	The amount of time the ESI Plus pauses between repeated greetings during the login process.
Login	The amount of time allowed to complete PIN entry. After the user begins entering a PIN, the ESI Plus allows the configured amount of time to complete entry.
Remote site response	The amount of time the ESI Plus allows for another ARC Plus site to supply data that this ESI Plus requested. After this duration has elapsed, the ESI Plus will speak, “Error” and you may enter more commands or disconnect.

Command input	The amount of time the ESI Plus allows after the last DTMF tone before accepting the DTMF sequence as a single command.
Context help	The amount of time the ESI Plus allows after a brief help prompt before speaking an extended help prompt.
Command help	The amount of time the ESI Plus allows after an extended help prompt before speaking a list of available commands.
Hang up	The amount of time the ESI Plus allows after speaking the command list before hanging up due to no activity.

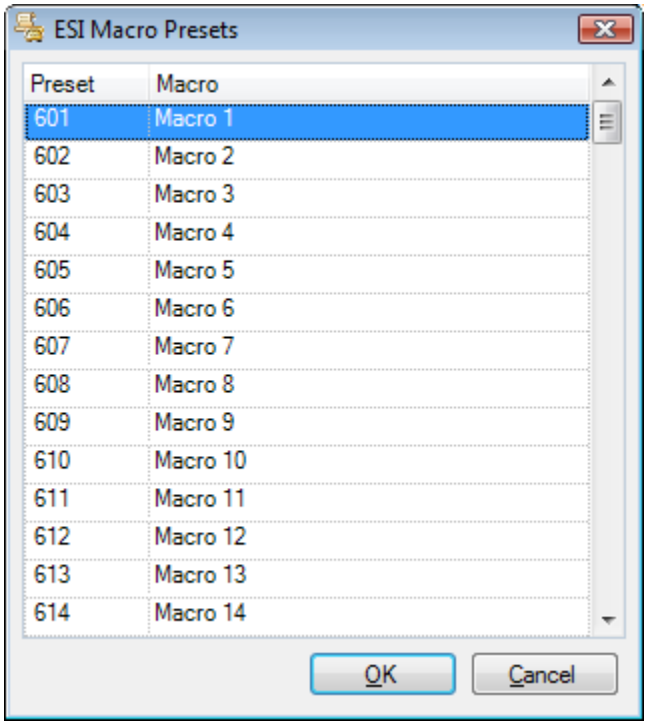
Site Presets



Site Presets

In multi-site systems, it may be easier to select new sites using a preset list, in lieu of spelling the site name with the telephone keypad. To set up presets for up to 98 remote sites, click under the **Site** heading to choose a site name for as many preset numbers as desired. Once presets are established, entering 401-498 during an ESI Plus session will make the new site active for the session.

Macro Presets



Macro Presets

To set up the preset numbers used to identify macros during an ESI Plus session, open the **ESI Macro Presets** dialog from **Edit > Settings > ESI Macro Presets…** and select a macro name to be associated with as many presets as desired.

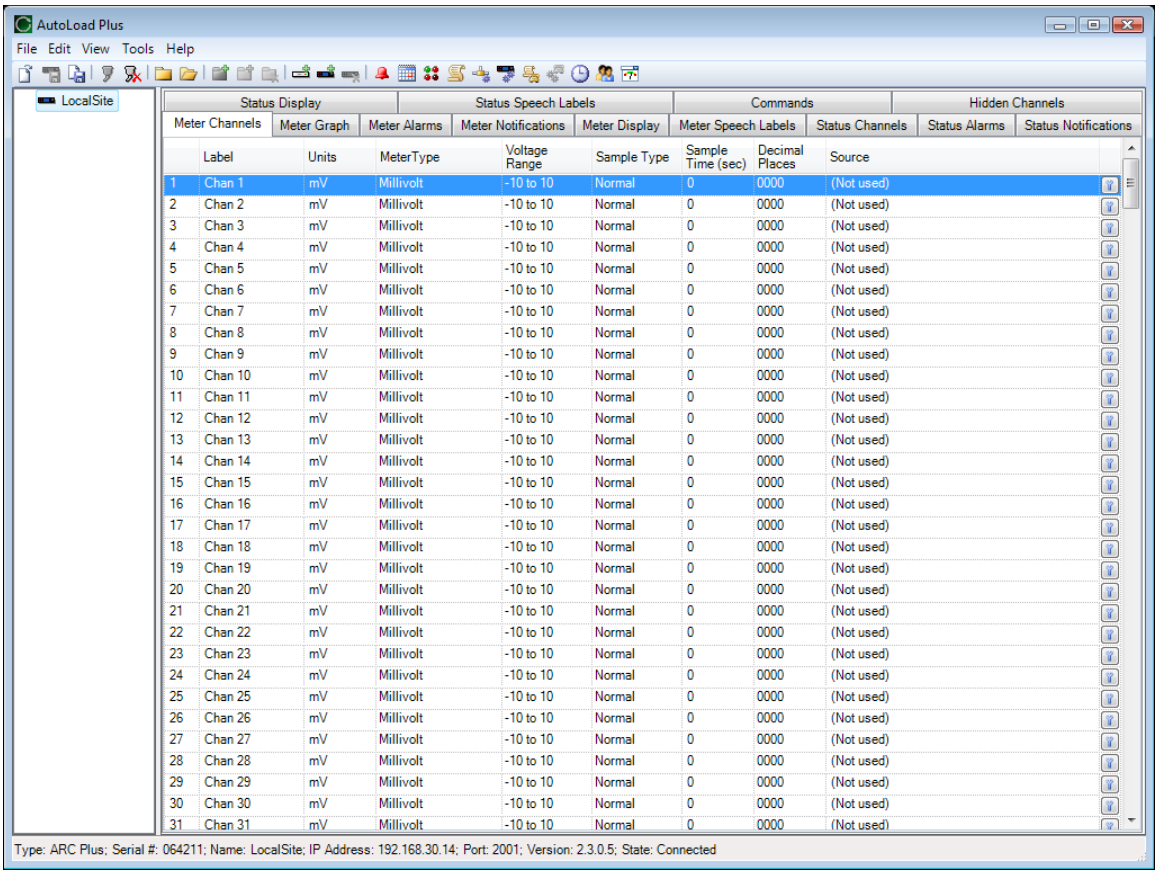
Site Speech Label

To assign the ARC Plus a speech label for site identification during an ESI Plus session, choose **Set Site Name Speech Labels…** from the **Tools** menu. Even if an ESI Plus is not installed on a particular ARC Plus unit, assigning a speech label allows other ESI Plus units to identify the unit during an ESI Plus session.

Configuring Analog Inputs

Configuration for the ARC Plus metering channels is broken out into several tabs in the main display area of AutoLoad Plus. Complete the configuration fields on each tab to set up your analog metering inputs.

Meter Channels Tab



	Label	Units	MeterType	Voltage Range	Sample Type	Sample Time (sec)	Decimal Places	Source
1	Chan 1	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
2	Chan 2	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
3	Chan 3	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
4	Chan 4	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
5	Chan 5	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
6	Chan 6	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
7	Chan 7	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
8	Chan 8	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
9	Chan 9	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
10	Chan 10	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
11	Chan 11	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
12	Chan 12	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
13	Chan 13	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
14	Chan 14	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
15	Chan 15	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
16	Chan 16	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
17	Chan 17	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
18	Chan 18	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
19	Chan 19	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
20	Chan 20	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
21	Chan 21	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
22	Chan 22	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
23	Chan 23	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
24	Chan 24	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
25	Chan 25	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
26	Chan 26	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
27	Chan 27	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
28	Chan 28	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
29	Chan 29	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
30	Chan 30	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)
31	Chan 31	mV	Millivolt	-10 to 10	Normal	0	0000	(Not used)

The Meter Channels tab is where you configure the channel label, units label, calibration type, input characteristics, and decimal place behavior.

Channel and Units Labels

Under the Label and Units Label headings, enter names for the metering channel and the unit of measurement. These labels appear on the front panel, web interface, and in AutoPilot 2010.

Meter Type

Your selection for calibration type determines how the ARC Plus scales the raw input value:

Millivolt	Does not scale the raw input voltage; it applies a calibration constant of 1. A 300mV sample will be displayed as 300 on the ARC Plus, and the channel cannot be manually calibrated.
Linear	Multiplies the raw input voltage by a calibration constant that is determined by comparing the sample voltage to the value entered during manual calibration. The Linear (Absolute) input type displays the absolute value of a linear input, and the Linear (Negative) input type is used for values with a negative voltage input; positive values are clipped to 0.
Degree	Divides the raw input voltage by a 0.1 to show temperature readings from the Burk Technology BTU-4 temperature unit, which provides a 10mV / degree output. The decimal setting for channels configured for degree is locked at 1 (000.0).
Indirect	Multiplies the raw input voltage by the scaled value of the previous channel and multiples the product by a calibration constant.
Squared	Squares the raw input voltage and then multiples the product by a calibration constant.

Setting the Voltage Range

Note: The Voltage Range is only configurable when using legacy PlusBus units.

Under the **Voltage Range** heading, select the input range that most closely matches the expected range of sample values. Supported input ranges are (-5 to 5), (0 to 5), (-10 to 10), and (0 to 10).

Sample Type and Timing

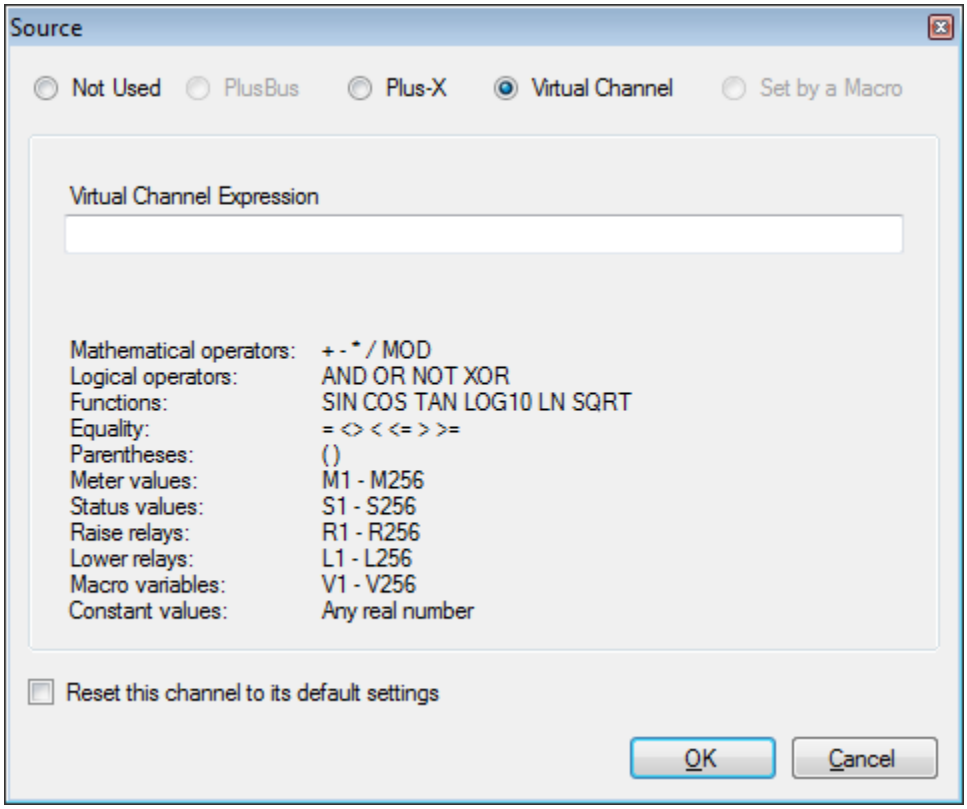
The ARC Plus can optionally take an average, minimum or maximum of a meter channel. To select this behavior, use the **Sample Type** column. Set the timing (in seconds) from the **Sample Time (sec)** column.

For example, to use the average value of a channel over a one-minute period, select *Average* for the Sample Type, and enter *60* in the Sample Time column.

Decimal Places

Use the **Decimal Places** column to select the location of the decimal place when the ARC Plus reports the channel reading. For example, a scaled value of 1200 can also be displayed as 1.200, 12.00 or 120.0.

Setting the Meter Channel Source

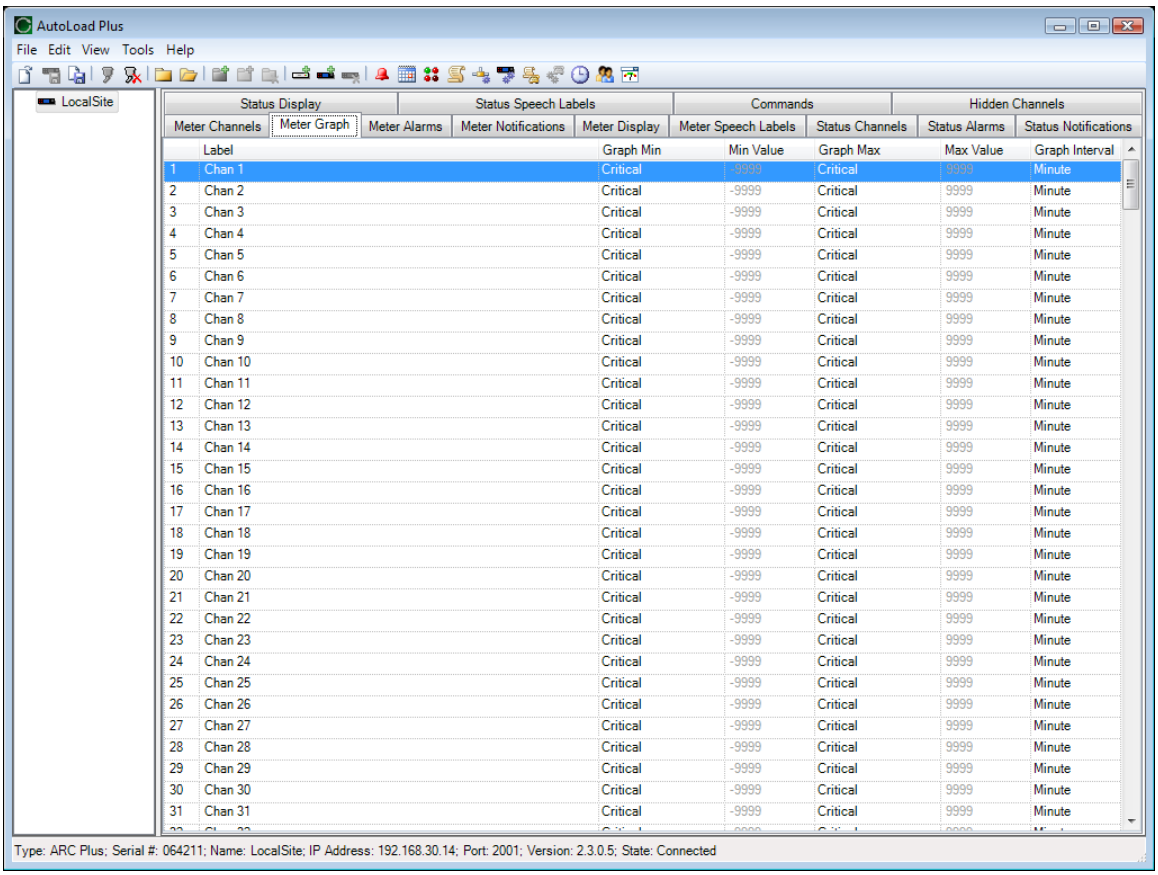


Source dialog

On the **Meter Channels** tab, click the [...] icon under the **Source** heading to configure the source for this channel. There are five options:

Not used	Selected by default. Indicates that a meter channel is not in use.
PlusBus	Only available if a PlusBus channel is assigned to this channel number.
Plus-X	This option allows you to map a Plus-X channel. This is the most common selection.
Virtual Channel	Allows you to calculate a value for this channel. Use the onscreen text for syntax help.
Set by a macro	This option allows a macro to set this channel's value. To assign the value, use the **Set** command in a macro (see page 71) or in Jet™ Active Flowcharts in AutoPilot® 2010.

Meter Graph Tab



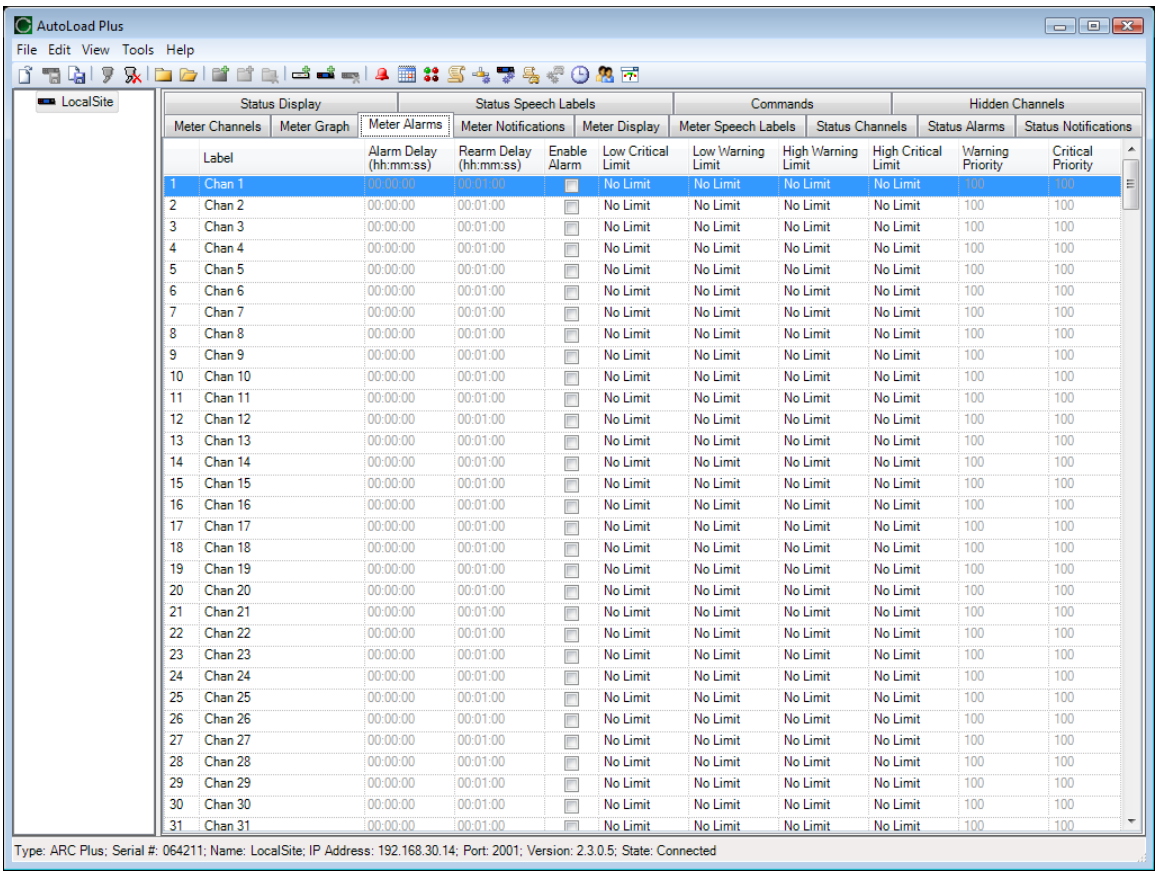
	Label	Graph Min	Min Value	Graph Max	Max Value	Graph Interval
1	Chan 1	Critical	-9999	Critical	9999	Minute
2	Chan 2	Critical	-9999	Critical	9999	Minute
3	Chan 3	Critical	-9999	Critical	9999	Minute
4	Chan 4	Critical	-9999	Critical	9999	Minute
5	Chan 5	Critical	-9999	Critical	9999	Minute
6	Chan 6	Critical	-9999	Critical	9999	Minute
7	Chan 7	Critical	-9999	Critical	9999	Minute
8	Chan 8	Critical	-9999	Critical	9999	Minute
9	Chan 9	Critical	-9999	Critical	9999	Minute
10	Chan 10	Critical	-9999	Critical	9999	Minute
11	Chan 11	Critical	-9999	Critical	9999	Minute
12	Chan 12	Critical	-9999	Critical	9999	Minute
13	Chan 13	Critical	-9999	Critical	9999	Minute
14	Chan 14	Critical	-9999	Critical	9999	Minute
15	Chan 15	Critical	-9999	Critical	9999	Minute
16	Chan 16	Critical	-9999	Critical	9999	Minute
17	Chan 17	Critical	-9999	Critical	9999	Minute
18	Chan 18	Critical	-9999	Critical	9999	Minute
19	Chan 19	Critical	-9999	Critical	9999	Minute
20	Chan 20	Critical	-9999	Critical	9999	Minute
21	Chan 21	Critical	-9999	Critical	9999	Minute
22	Chan 22	Critical	-9999	Critical	9999	Minute
23	Chan 23	Critical	-9999	Critical	9999	Minute
24	Chan 24	Critical	-9999	Critical	9999	Minute
25	Chan 25	Critical	-9999	Critical	9999	Minute
26	Chan 26	Critical	-9999	Critical	9999	Minute
27	Chan 27	Critical	-9999	Critical	9999	Minute
28	Chan 28	Critical	-9999	Critical	9999	Minute
29	Chan 29	Critical	-9999	Critical	9999	Minute
30	Chan 30	Critical	-9999	Critical	9999	Minute
31	Chan 31	Critical	-9999	Critical	9999	Minute

The front panel of the ARC Plus can display up to 7 hours of meter history. To configure the graph settings, advance to the **Meter Graph** tab.

Enter the min and max Y values under the **Graph Min** and **Graph Max** headings. You can use meter limits to establish the graph range by selecting **Warning** or **Critical** as the Graph Min or Graph Max. Otherwise, manually enter the min and max values.

Choose whether to show history in minutes or hours by using the selection box under the **Interval** heading. When set to minutes, the graph will show up to 7 minutes of history. When set to hours, the graph will show up to 7 hours of history.

Meter Alarms Tab



	Label	Alarm Delay (hh:mm:ss)	Rearm Delay (hh:mm:ss)	Enable Alarm	Low Critical Limit	Low Warning Limit	High Warning Limit	High Critical Limit	Warning Priority	Critical Priority
1	Chan 1	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
2	Chan 2	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
3	Chan 3	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
4	Chan 4	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
5	Chan 5	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
6	Chan 6	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
7	Chan 7	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
8	Chan 8	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
9	Chan 9	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
10	Chan 10	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
11	Chan 11	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
12	Chan 12	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
13	Chan 13	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
14	Chan 14	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
15	Chan 15	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
16	Chan 16	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
17	Chan 17	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
18	Chan 18	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
19	Chan 19	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
20	Chan 20	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
21	Chan 21	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
22	Chan 22	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
23	Chan 23	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
24	Chan 24	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
25	Chan 25	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
26	Chan 26	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
27	Chan 27	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
28	Chan 28	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
29	Chan 29	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
30	Chan 30	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100
31	Chan 31	00:00:00	00:01:00		No Limit	No Limit	No Limit	No Limit	100	100

Set up alarm characteristics for each metering channel on the **Meter Alarms Tab**.

Delayed Alarm Reporting

Any metering channel can be configured to delay alarm reporting for a preconfigured duration, as specified under the Alarm Delay heading. When a delay is configured, the channel must be continuously out of tolerance for the duration of the delay before the alarm will be logged or reported.

Rearm Delay

The ARC Plus has a built-in mechanism to reduce multiple alarm reports due to a single alarm event. An out-of-tolerance metering channel that returns to tolerance must remain within normal limits for a period of time before a new alarm is issued on that channel. Use the Rearm Delay column to specify this period.

For example, a channel configured to cause a high temperature alarm immediately upon reaching 90 degrees will report the alarm as soon as the temperature reads 90. However, if the temperature decreases to 89.9 and returns to 90 after less than the rearm period, a second alarm is not issued.

Enabling/Disabling Alarms

In order for a metering channel to report an alarm condition, the box under the Enable Alarm heading must be checked.

Note: To receive email or dialout notifications for an alarm, the channel must also be configured with an email or dialout list in the Meter Notifications tab and the channel and site must not be muted.

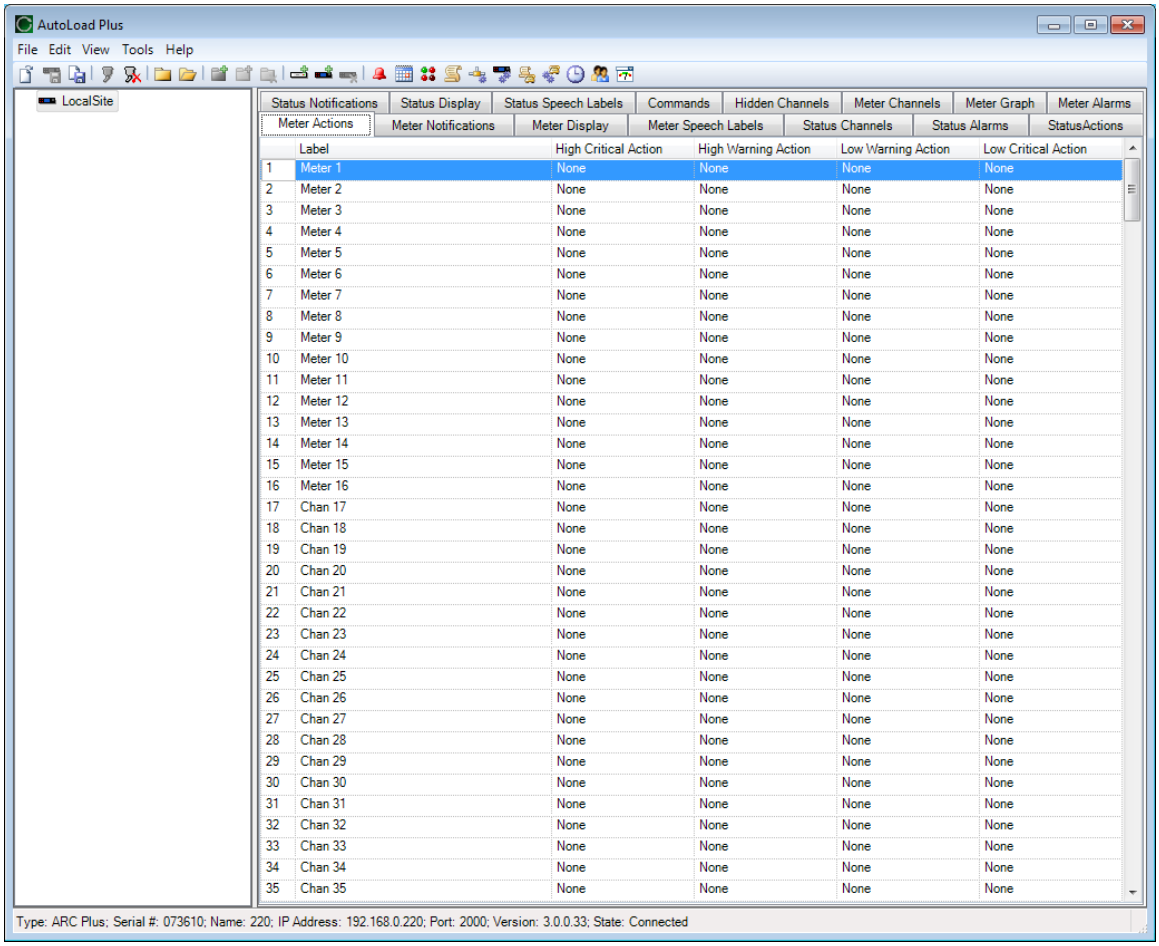
Setting Limits

The critical and warning limits define the alarm thresholds for each metering channel. In addition, the AutoPilot 2010 and the web interface use limits to determine certain display characteristics.

To configure limits for each channel, enter values for the low critical, low warning, high warning and high critical thresholds. If alarms are enabled, a channel that crosses one of these thresholds will cause the alarm to be reported on the front panel of the ARC Plus, in AutoPilot 2010 software, and on the web interface. If email alarm reporting and/or dialout notifications are enabled (dialout requires optional ESI Plus), outbound notifications will also be sent. When entering your limits, keep in mind the lowest limit value should be the critical low and the highest should be the critical high. AutoLoad Plus will automatically adjust limits if they are entered in an order other than least-to-greatest.

Because each critical alarm and each warning alarm can have its own email and dialout notification assignments, the only difference between a warning alarm and critical alarm is how each is logged on the front panel and in AutoPilot 2010 software.

Meter Actions Tab

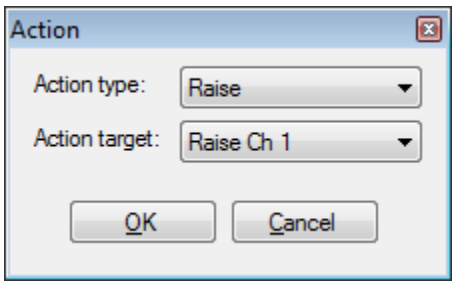


	Label	High Critical Action	High Warning Action	Low Warning Action	Low Critical Action
1	Meter 1	None	None	None	None
2	Meter 2	None	None	None	None
3	Meter 3	None	None	None	None
4	Meter 4	None	None	None	None
5	Meter 5	None	None	None	None
6	Meter 6	None	None	None	None
7	Meter 7	None	None	None	None
8	Meter 8	None	None	None	None
9	Meter 9	None	None	None	None
10	Meter 10	None	None	None	None
11	Meter 11	None	None	None	None
12	Meter 12	None	None	None	None
13	Meter 13	None	None	None	None
14	Meter 14	None	None	None	None
15	Meter 15	None	None	None	None
16	Meter 16	None	None	None	None
17	Chan 17	None	None	None	None
18	Chan 18	None	None	None	None
19	Chan 19	None	None	None	None
20	Chan 20	None	None	None	None
21	Chan 21	None	None	None	None
22	Chan 22	None	None	None	None
23	Chan 23	None	None	None	None
24	Chan 24	None	None	None	None
25	Chan 25	None	None	None	None
26	Chan 26	None	None	None	None
27	Chan 27	None	None	None	None
28	Chan 28	None	None	None	None
29	Chan 29	None	None	None	None
30	Chan 30	None	None	None	None
31	Chan 31	None	None	None	None
32	Chan 32	None	None	None	None
33	Chan 33	None	None	None	None
34	Chan 34	None	None	None	None
35	Chan 35	None	None	None	None

Meter Actions Tab

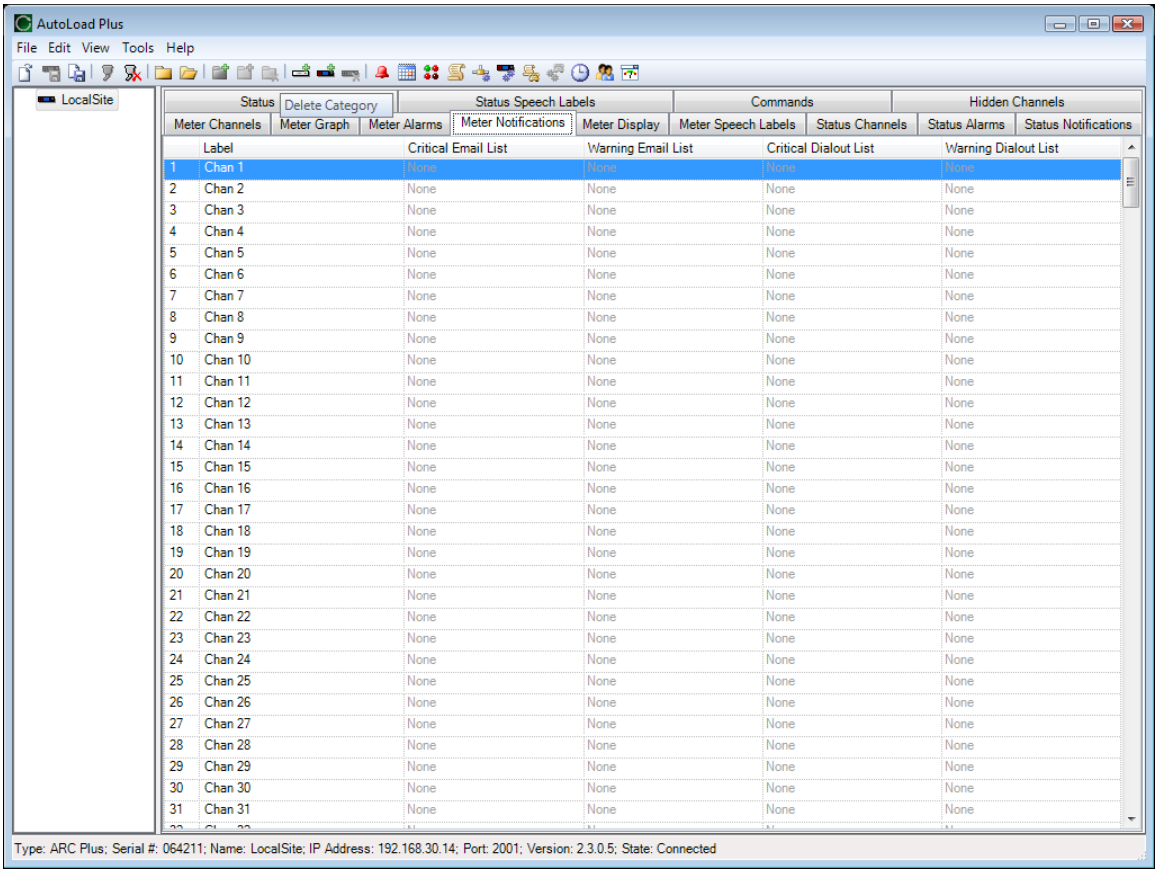
Meter Actions instruct the ARC Plus to automatically issue a command or run/stop a macro when a meter channel crosses a limit. Each limit is individually configurable.

To configure an action, navigate to the **Meter Actions** tab and click the [...] button in the appropriate field for the channel and limit that you want to set. Select the type of action (raise, lower, run macro or stop macro), and the target channel/macro.



Action Dialog

Meter Notifications Tab

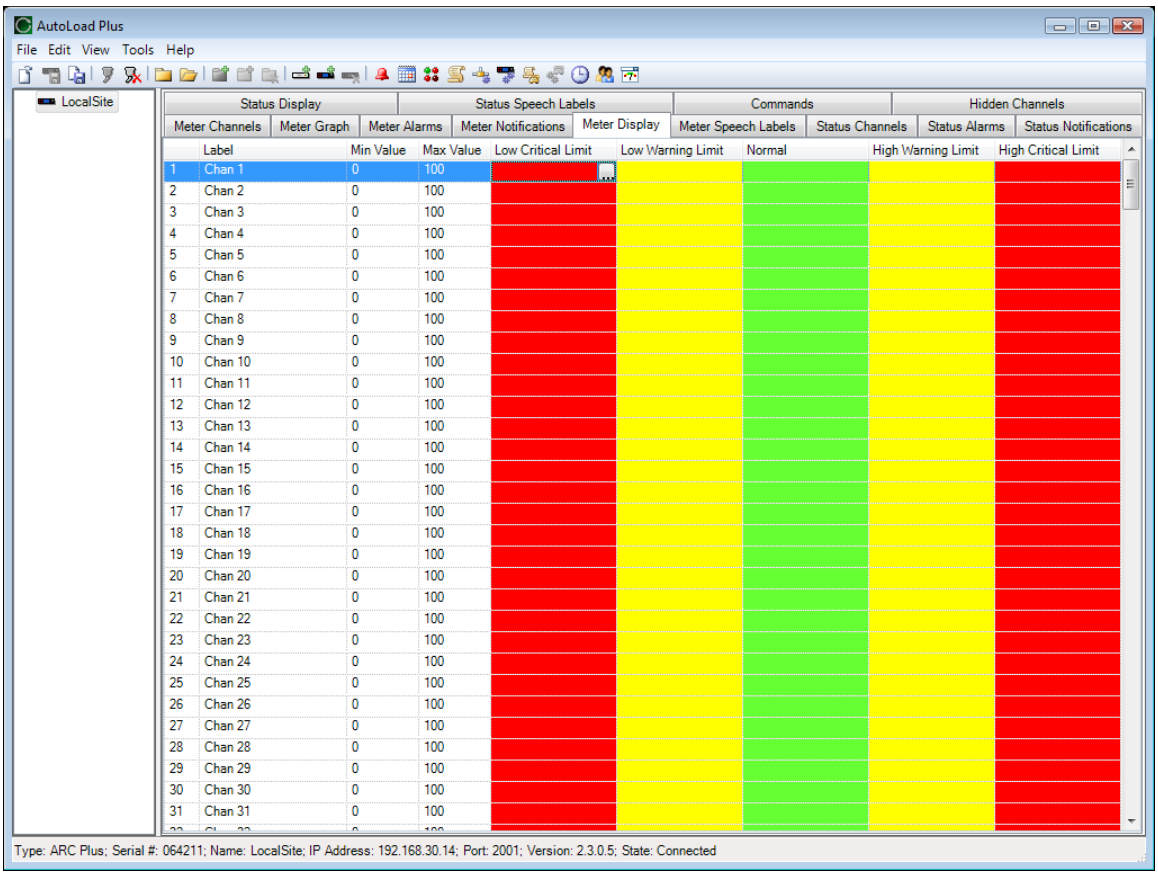


	Label	Critical Email List	Warning Email List	Critical Dialout List	Warning Dialout List
1	Chan 1	None	None	None	None
2	Chan 2	None	None	None	None
3	Chan 3	None	None	None	None
4	Chan 4	None	None	None	None
5	Chan 5	None	None	None	None
6	Chan 6	None	None	None	None
7	Chan 7	None	None	None	None
8	Chan 8	None	None	None	None
9	Chan 9	None	None	None	None
10	Chan 10	None	None	None	None
11	Chan 11	None	None	None	None
12	Chan 12	None	None	None	None
13	Chan 13	None	None	None	None
14	Chan 14	None	None	None	None
15	Chan 15	None	None	None	None
16	Chan 16	None	None	None	None
17	Chan 17	None	None	None	None
18	Chan 18	None	None	None	None
19	Chan 19	None	None	None	None
20	Chan 20	None	None	None	None
21	Chan 21	None	None	None	None
22	Chan 22	None	None	None	None
23	Chan 23	None	None	None	None
24	Chan 24	None	None	None	None
25	Chan 25	None	None	None	None
26	Chan 26	None	None	None	None
27	Chan 27	None	None	None	None
28	Chan 28	None	None	None	None
29	Chan 29	None	None	None	None
30	Chan 30	None	None	None	None
31	Chan 31	None	None	None	None

Each channel can be configured to send email and/or dialout notifications when an alarm condition exists and the channel's alarm is enabled (and not muted). The critical thresholds and warning thresholds can each initiate phone calls and emails to separate lists.

To set up notification list assignments, navigate to the **Meter Notifications** tab and use the drop-down lists to select the email lists and dialout lists each alarm will use. Before a list is available for selection, it must be created using the Alarm Notifications window (see **Email and Dialout Notifications**). A metering channel can be configured with critical alarms and warning alarms (low and high thresholds for each), and notifications for critical alarms may be directed to different lists from the notifications for warning alarms.

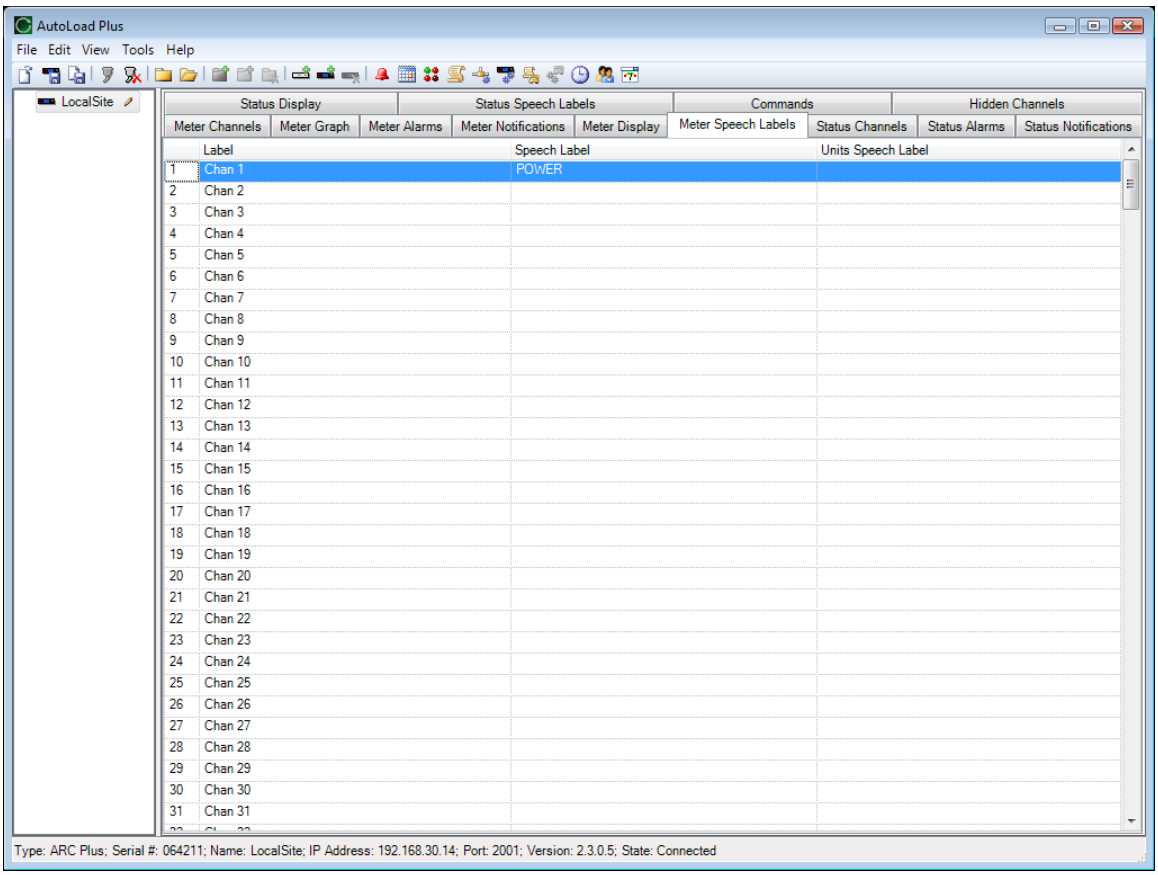
Meter Display Tab



The meter display tab is where you configure how each metering channel is displayed in AutoPilot 2010 and the web interface. Color and meter range selections are stored onboard the unit so channels will appear the same on every PC used to access the site.

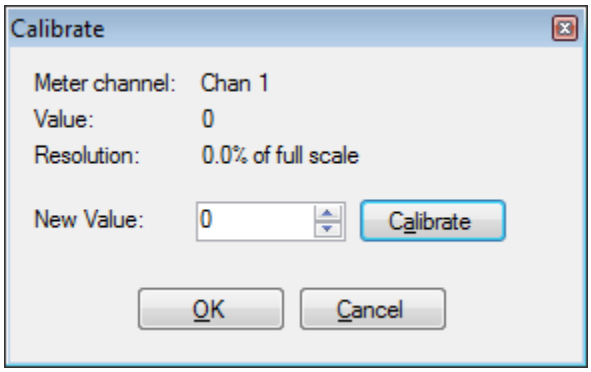
Under the Min Value and Max Value headings, choose the lower and upper bounds for the meter display in AutoPilot 2010 and the web interface. Then click the […] icon to modify the color selections for each segment of the meter. By default, meters show red for the ranges outside of critical limits, yellow for the ranges that encompass warning limits, and green for the normal range.

Meter Speech Labels Tab



The settings on the **Meter Speech Labels** tab assign pre-recorded vocabulary to each channel and unit label. This vocabulary is used when an ESI Plus is reporting conditions via a telephone connection. Click the [...] icons to assign ESI Plus vocabulary.

Calibrating Analog Inputs



Metering values are scaled according to the input type specified on the Meter Channels tab (see **Meter Type**), and a calibration constant is applied to all input types except Millivolt and Degree. The calibration constant converts the scaled value to a calibrated value, corresponding to the

actual reading on the parameter being monitored. The calibration process sets that calibration constant.

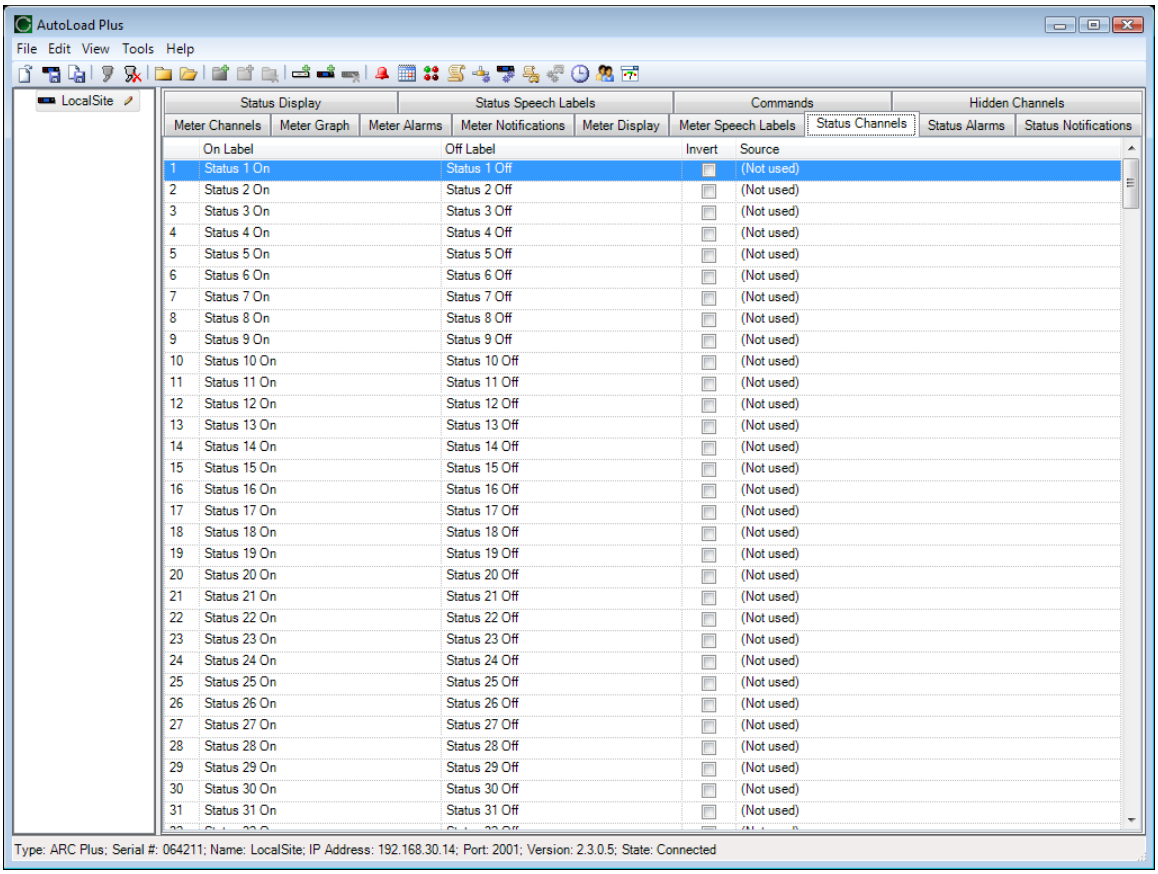
To calibrate a metering channel:

1. Choose the channel you want to calibrate by selecting the corresponding row in the **Meter Channels** tab.
2. Click the “wrench ” icon on the far-right side of the grid.
3. The calibration window will display the current channel, scaled value and resolution.
4. To change the value of the metering channel, enter the actual channel reading in the box for **New Value** and press the **Calibrate** button. AutoLoad Plus will automatically calculate a new calibration constant.

Configuring Status Inputs

Configuration for the ARC Plus status channels is broken out into several tabs in the main display area of AutoLoad Plus. Complete the configuration fields on each tab to set up your status inputs.

Status Channels Tab



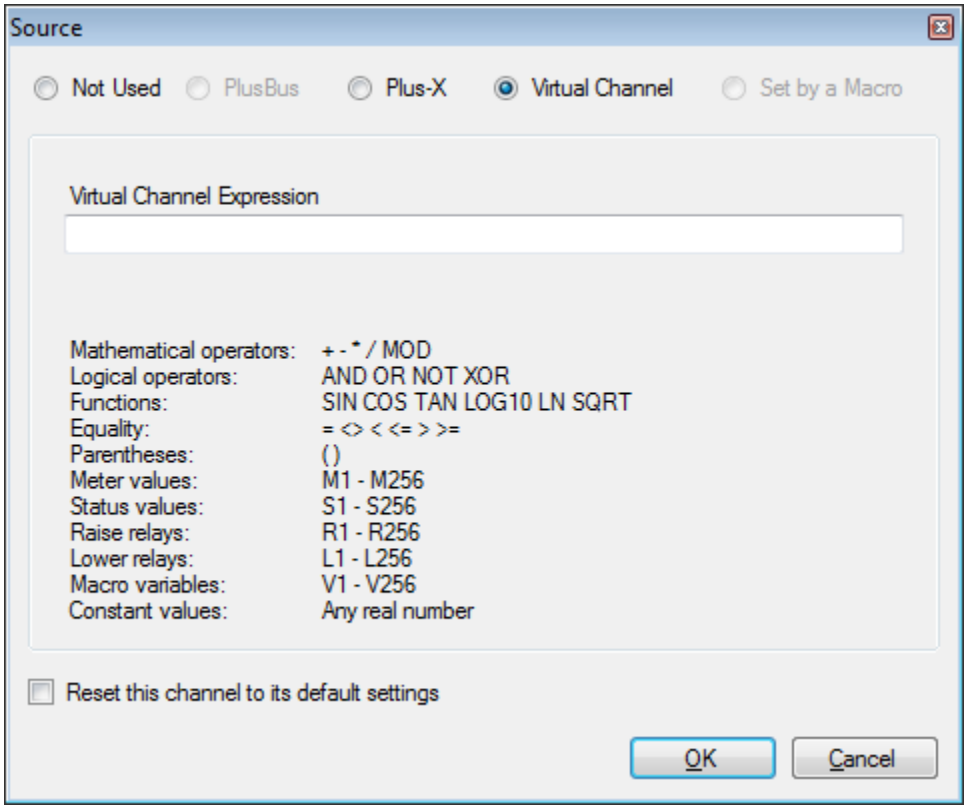
	On Label	Off Label	Invert	Source
1	Status 1 On	Status 1 Off		(Not used)
2	Status 2 On	Status 2 Off		(Not used)
3	Status 3 On	Status 3 Off		(Not used)
4	Status 4 On	Status 4 Off		(Not used)
5	Status 5 On	Status 5 Off		(Not used)
6	Status 6 On	Status 6 Off		(Not used)
7	Status 7 On	Status 7 Off		(Not used)
8	Status 8 On	Status 8 Off		(Not used)
9	Status 9 On	Status 9 Off		(Not used)
10	Status 10 On	Status 10 Off		(Not used)
11	Status 11 On	Status 11 Off		(Not used)
12	Status 12 On	Status 12 Off		(Not used)
13	Status 13 On	Status 13 Off		(Not used)
14	Status 14 On	Status 14 Off		(Not used)
15	Status 15 On	Status 15 Off		(Not used)
16	Status 16 On	Status 16 Off		(Not used)
17	Status 17 On	Status 17 Off		(Not used)
18	Status 18 On	Status 18 Off		(Not used)
19	Status 19 On	Status 19 Off		(Not used)
20	Status 20 On	Status 20 Off		(Not used)
21	Status 21 On	Status 21 Off		(Not used)
22	Status 22 On	Status 22 Off		(Not used)
23	Status 23 On	Status 23 Off		(Not used)
24	Status 24 On	Status 24 Off		(Not used)
25	Status 25 On	Status 25 Off		(Not used)
26	Status 26 On	Status 26 Off		(Not used)
27	Status 27 On	Status 27 Off		(Not used)
28	Status 28 On	Status 28 Off		(Not used)
29	Status 29 On	Status 29 Off		(Not used)
30	Status 30 On	Status 30 Off		(Not used)
31	Status 31 On	Status 31 Off		(Not used)

Under the **On Label** and **Off Label** headings, enter names for the status on and status off conditions, respectively. Labels can be up to twenty (20) characters.

Inverting a Status Channel

Normally a status “low” input results in the ARC Plus showing a status “on” condition. If you want a status “high” input to result in the “on” condition, check the box under the **Invert** heading.

Setting the Status channel Source

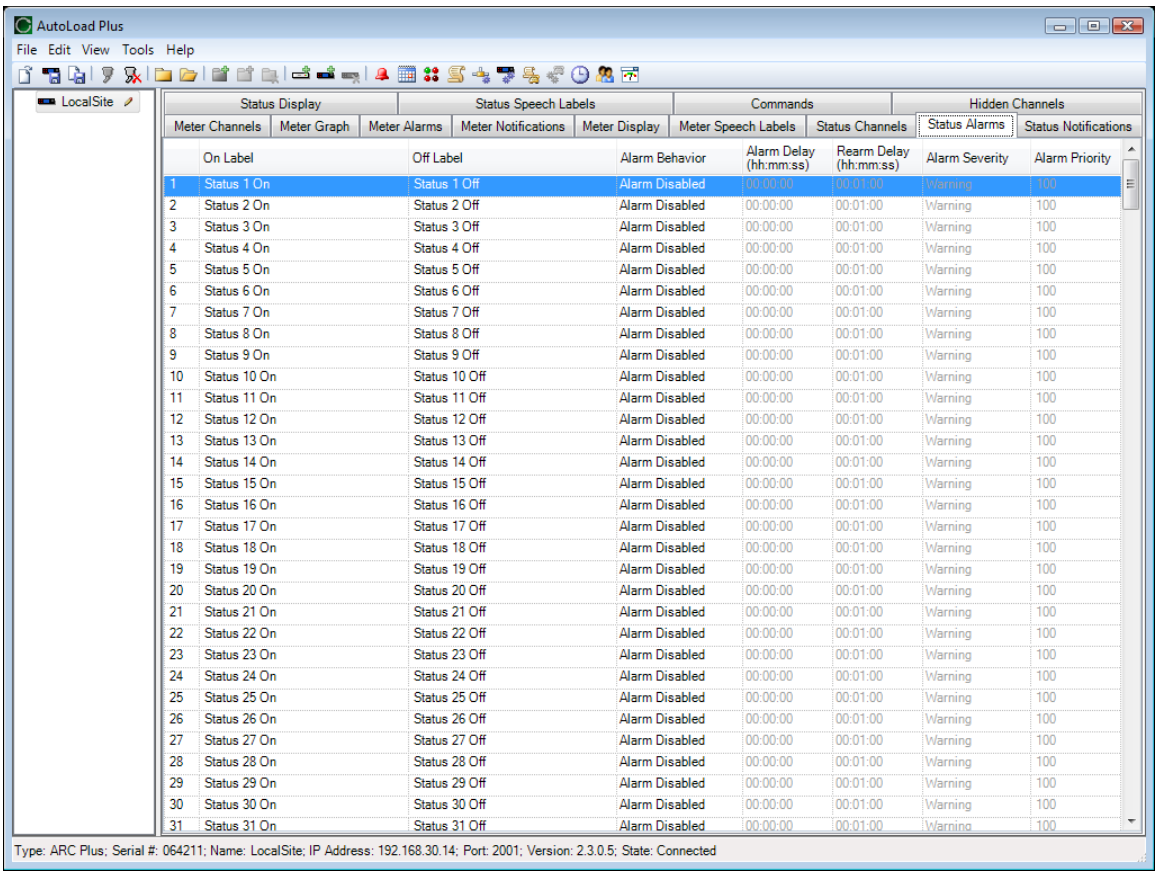


Source dialog

On the **Status Channels** tab, click the […] icon under the **Source** heading to configure the source for this channel. There are five options:

Not used	Selected by default. Indicates that a status channel is not in use.
PlusBus	Only available if a PlusBus channel is assigned to this channel number.
Plus-X	This option allows you to map a Plus-X channel. This is the most common selection.
Virtual Channel	Allows you to calculate a value for this channel. Use the onscreen text for syntax help.
Set by a macro	This option allows a macro to set this channel's state. To assign the state, use the **Set** command in a macro (see **General Macro Expressions**) or in Jet™ Active Flowcharts in AutoPilot® 2010.

Status Alarms Tab



	On Label	Off Label	Alarm Behavior	Alarm Delay (hh:mm:ss)	Rearm Delay (hh:mm:ss)	Alarm Severity	Alarm Priority
1	Status 1 On	Status 1 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
2	Status 2 On	Status 2 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
3	Status 3 On	Status 3 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
4	Status 4 On	Status 4 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
5	Status 5 On	Status 5 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
6	Status 6 On	Status 6 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
7	Status 7 On	Status 7 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
8	Status 8 On	Status 8 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
9	Status 9 On	Status 9 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
10	Status 10 On	Status 10 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
11	Status 11 On	Status 11 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
12	Status 12 On	Status 12 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
13	Status 13 On	Status 13 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
14	Status 14 On	Status 14 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
15	Status 15 On	Status 15 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
16	Status 16 On	Status 16 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
17	Status 17 On	Status 17 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
18	Status 18 On	Status 18 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
19	Status 19 On	Status 19 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
20	Status 20 On	Status 20 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
21	Status 21 On	Status 21 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
22	Status 22 On	Status 22 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
23	Status 23 On	Status 23 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
24	Status 24 On	Status 24 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
25	Status 25 On	Status 25 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
26	Status 26 On	Status 26 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
27	Status 27 On	Status 27 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
28	Status 28 On	Status 28 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
29	Status 29 On	Status 29 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
30	Status 30 On	Status 30 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100
31	Status 31 On	Status 31 Off	Alarm Disabled	00:00:00	00:01:00	Warning	100

Set up alarm characteristics for each status channel on the **Status Alarms** tab.

Enabling/Disabling Alarms

To configure status alarms, select the desired alarm behavior under the **Alarm Behavior** heading. A status channel can cause an alarm when the status channel is on, or when it is off. If you do not want status alarms for a particular channel, choose **Alarm disabled** for the alarm behavior.

Delayed Alarm Reporting

Any status channel can be configured to delay alarm reporting for a preconfigured duration, as specified under the **Alarm Delay** heading. When a delay is configured, the status channel must be continuously in the alarm state for the duration of the delay before the alarm will be logged or reported by the ARC Plus.

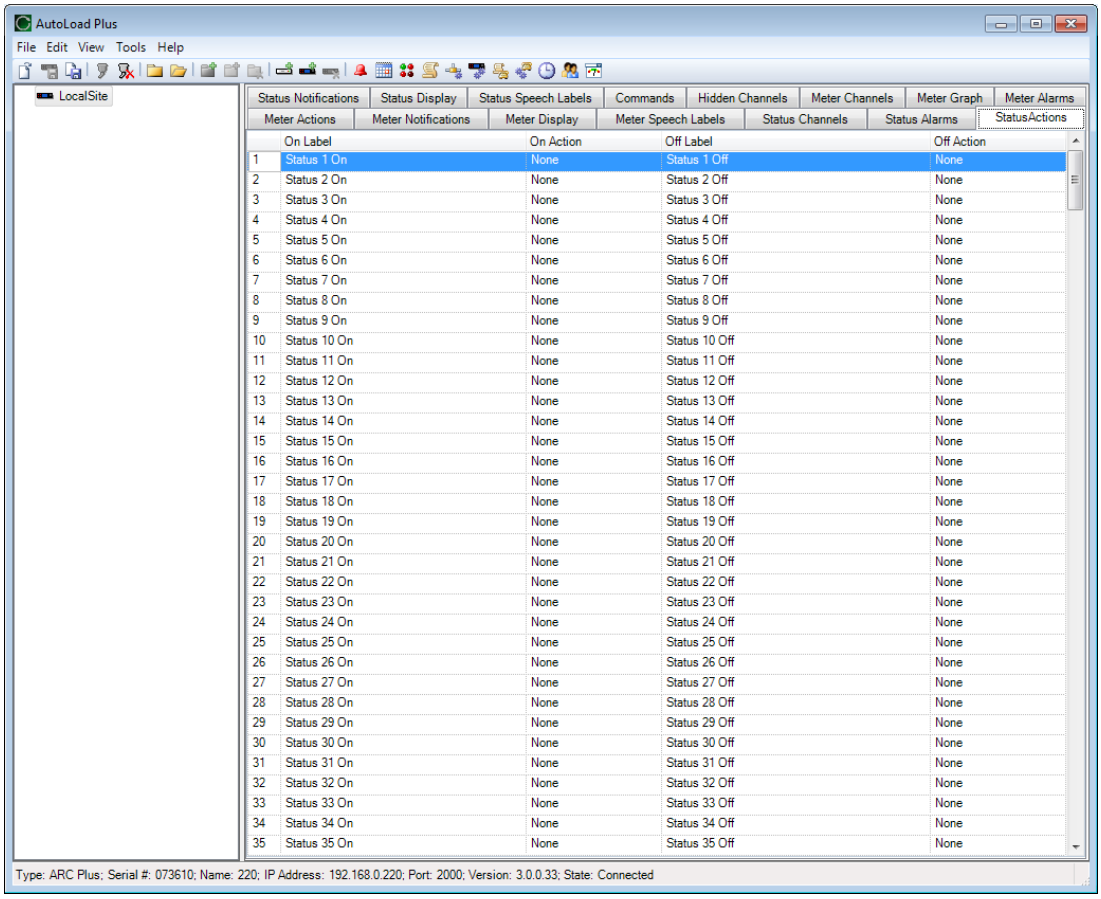
Rearm Delay

The ARC Plus has a built-in mechanism to reduce multiple alarm reports due to a single alarm event. A status channel in alarm must remain in its normal state for a period of time before a new alarm is issued on that channel. Use the Rearm Delay column to specify this period.

Setting the Alarm Severity

Status alarms may be configured as warning alarms or critical alarms. Both types of alarms are reported in the same ways (front panel, email notifications, dial out behavior, etc.). The designation as warning or critical simply aids in prioritizing alarm response or reviewing past alarm activity.

Status Actions Tab

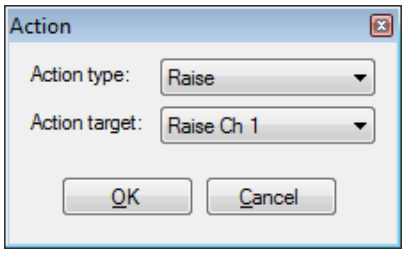


	On Label	On Action	Off Label	Off Action
1	Status 1 On	None	Status 1 Off	None
2	Status 2 On	None	Status 2 Off	None
3	Status 3 On	None	Status 3 Off	None
4	Status 4 On	None	Status 4 Off	None
5	Status 5 On	None	Status 5 Off	None
6	Status 6 On	None	Status 6 Off	None
7	Status 7 On	None	Status 7 Off	None
8	Status 8 On	None	Status 8 Off	None
9	Status 9 On	None	Status 9 Off	None
10	Status 10 On	None	Status 10 Off	None
11	Status 11 On	None	Status 11 Off	None
12	Status 12 On	None	Status 12 Off	None
13	Status 13 On	None	Status 13 Off	None
14	Status 14 On	None	Status 14 Off	None
15	Status 15 On	None	Status 15 Off	None
16	Status 16 On	None	Status 16 Off	None
17	Status 17 On	None	Status 17 Off	None
18	Status 18 On	None	Status 18 Off	None
19	Status 19 On	None	Status 19 Off	None
20	Status 20 On	None	Status 20 Off	None
21	Status 21 On	None	Status 21 Off	None
22	Status 22 On	None	Status 22 Off	None
23	Status 23 On	None	Status 23 Off	None
24	Status 24 On	None	Status 24 Off	None
25	Status 25 On	None	Status 25 Off	None
26	Status 26 On	None	Status 26 Off	None
27	Status 27 On	None	Status 27 Off	None
28	Status 28 On	None	Status 28 Off	None
29	Status 29 On	None	Status 29 Off	None
30	Status 30 On	None	Status 30 Off	None
31	Status 31 On	None	Status 31 Off	None
32	Status 32 On	None	Status 32 Off	None
33	Status 33 On	None	Status 33 Off	None
34	Status 34 On	None	Status 34 Off	None
35	Status 35 On	None	Status 35 Off	None

Status Actions Tab

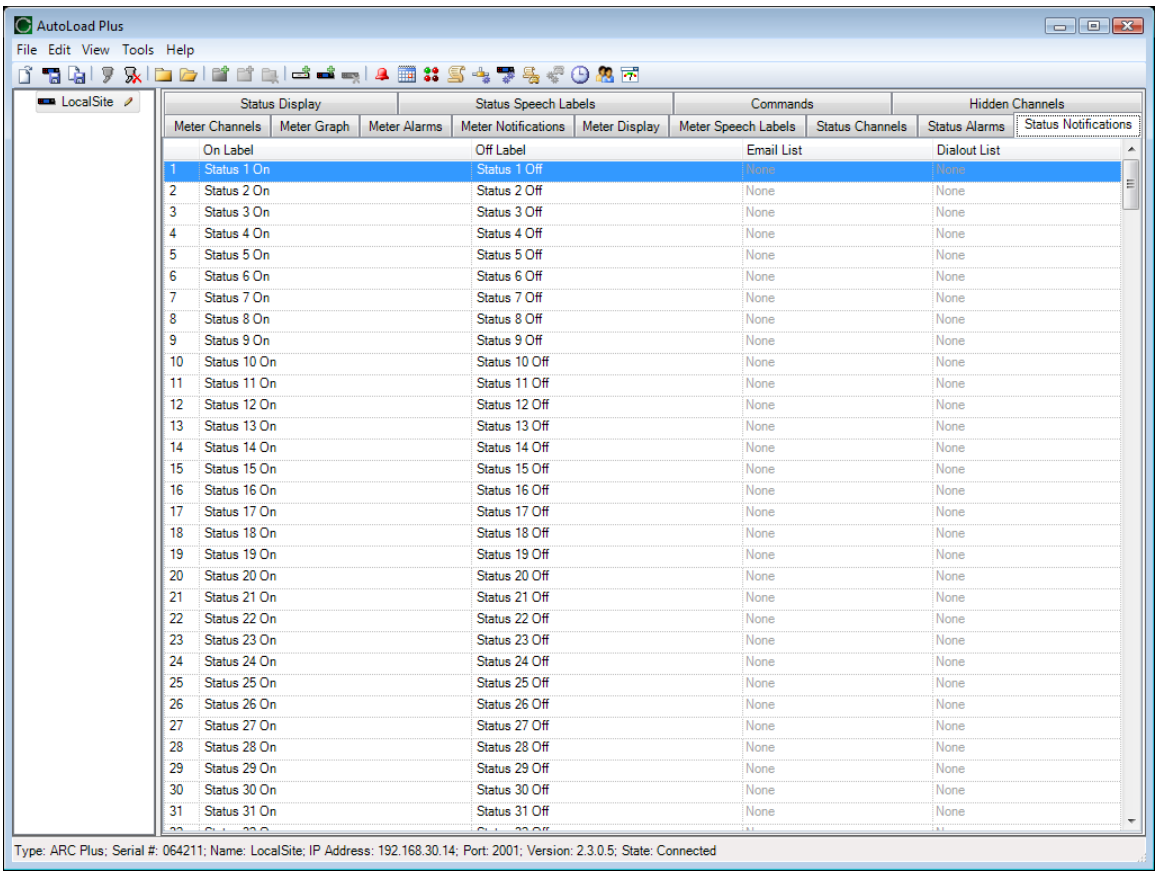
Status Actions instruct the ARC Plus to automatically issue a command or run/stop a macro when a status channel changes state. **On** and **off** states are individually configurable.

To configure an action, navigate to the **Status Actions** tab and click the [...] button in the appropriate field for the channel and state that you want to set. Select the type of action (raise, lower, run macro or stop macro), and the target channel/macro.



Action Dialog

Status Notifications Tab

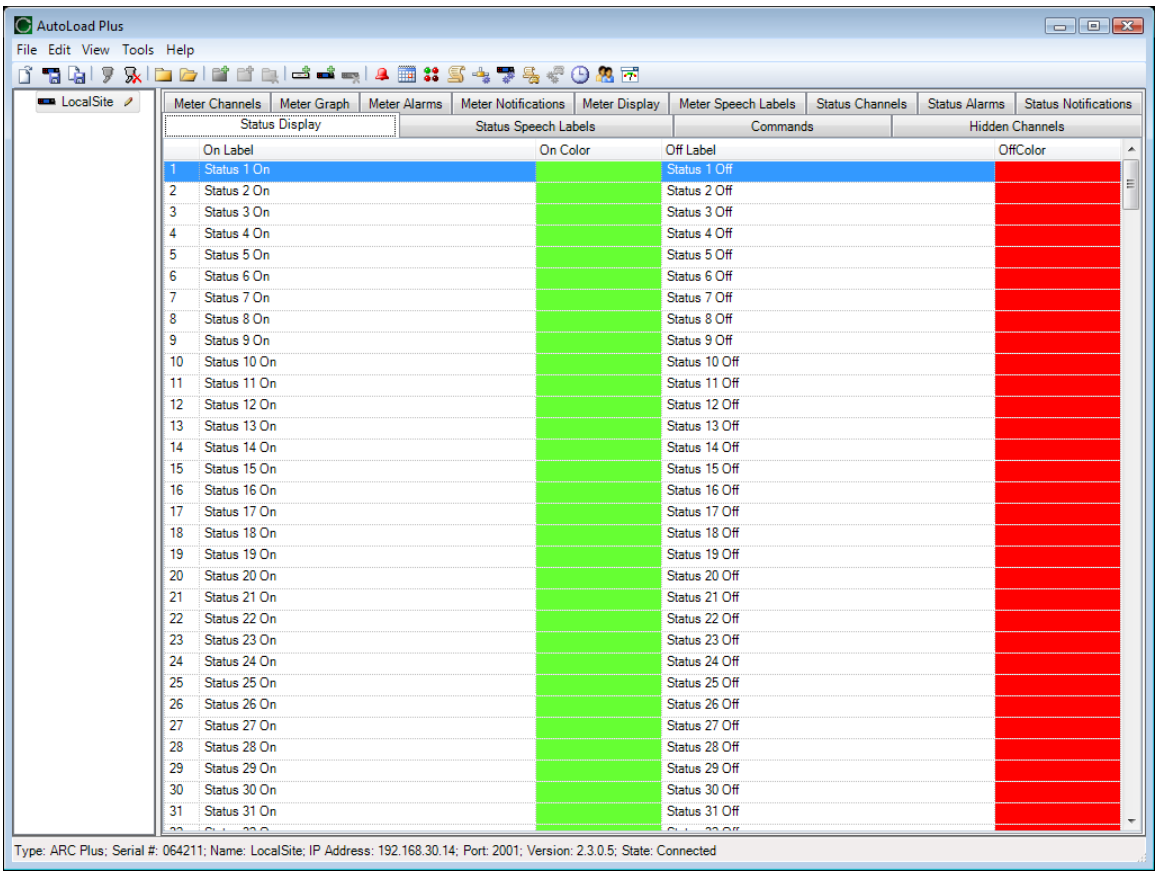


	On Label	Off Label	Email List	Dialout List
1	Status 1 On	Status 1 Off	None	None
2	Status 2 On	Status 2 Off	None	None
3	Status 3 On	Status 3 Off	None	None
4	Status 4 On	Status 4 Off	None	None
5	Status 5 On	Status 5 Off	None	None
6	Status 6 On	Status 6 Off	None	None
7	Status 7 On	Status 7 Off	None	None
8	Status 8 On	Status 8 Off	None	None
9	Status 9 On	Status 9 Off	None	None
10	Status 10 On	Status 10 Off	None	None
11	Status 11 On	Status 11 Off	None	None
12	Status 12 On	Status 12 Off	None	None
13	Status 13 On	Status 13 Off	None	None
14	Status 14 On	Status 14 Off	None	None
15	Status 15 On	Status 15 Off	None	None
16	Status 16 On	Status 16 Off	None	None
17	Status 17 On	Status 17 Off	None	None
18	Status 18 On	Status 18 Off	None	None
19	Status 19 On	Status 19 Off	None	None
20	Status 20 On	Status 20 Off	None	None
21	Status 21 On	Status 21 Off	None	None
22	Status 22 On	Status 22 Off	None	None
23	Status 23 On	Status 23 Off	None	None
24	Status 24 On	Status 24 Off	None	None
25	Status 25 On	Status 25 Off	None	None
26	Status 26 On	Status 26 Off	None	None
27	Status 27 On	Status 27 Off	None	None
28	Status 28 On	Status 28 Off	None	None
29	Status 29 On	Status 29 Off	None	None
30	Status 30 On	Status 30 Off	None	None
31	Status 31 On	Status 31 Off	None	None

Use the Status Notifications Tab to determine which email lists and/or dialout lists are used to notify operators of status alarms.

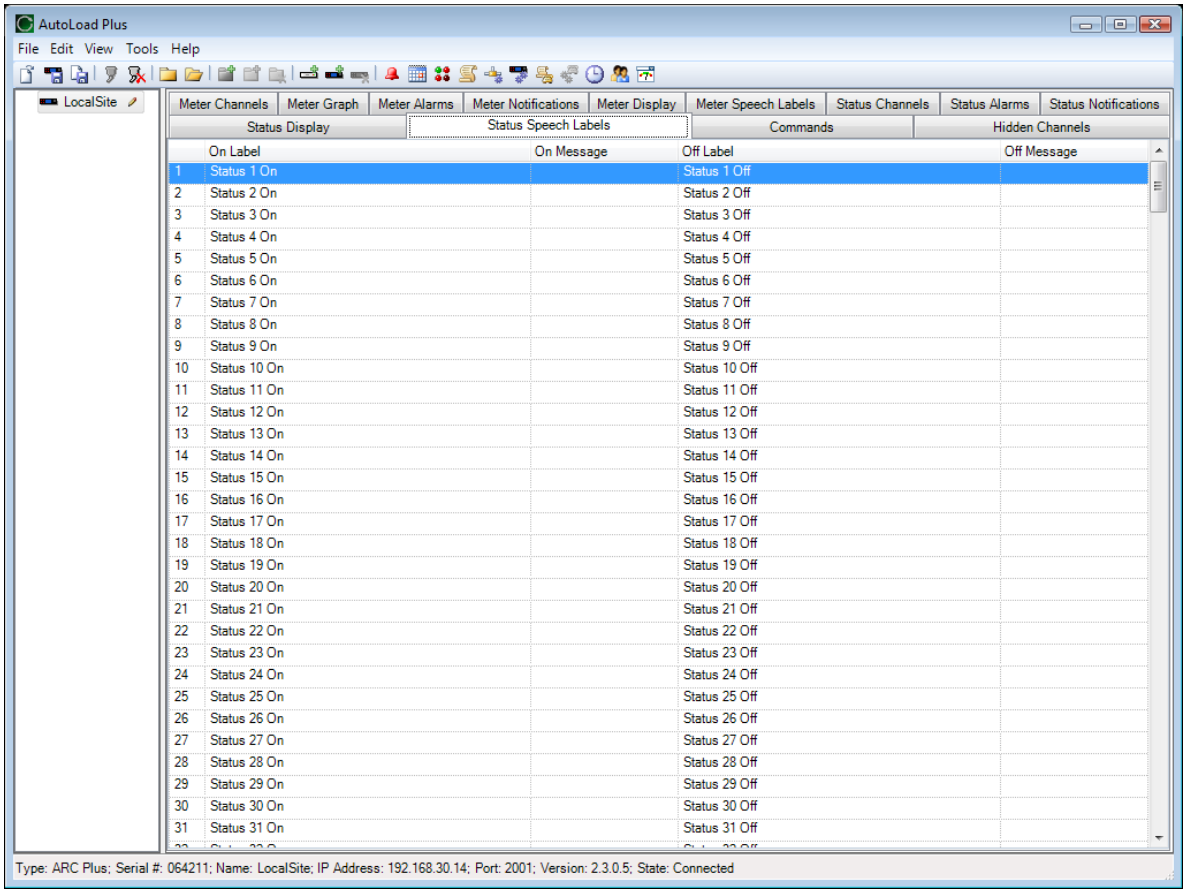
Before a list is available for selection, it must be created using the **Alarm Notifications** window (see **Email and Dialout Notifications**).

Status Display Tab



AutoPilot 2010 software and the web interface both show on and off indicators for the status channels. To change which colors are used, navigate to the **Status Display** tab and click the […] icon next to each status on or status off message. The process is the same as for metering channels (see **Meter Display Tab**).

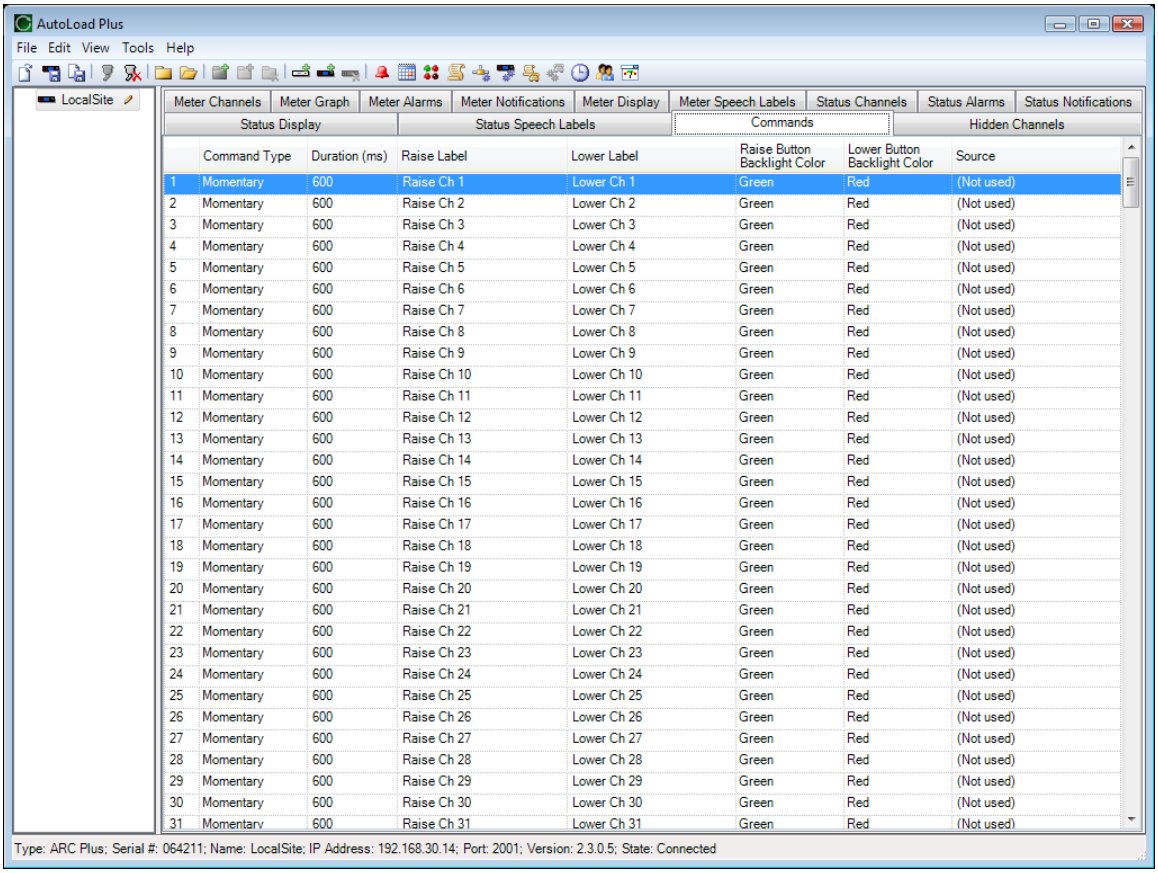
Status Speech Labels Tab



	On Label	On Message	Off Label	Off Message
1	Status 1 On		Status 1 Off	
2	Status 2 On		Status 2 Off	
3	Status 3 On		Status 3 Off	
4	Status 4 On		Status 4 Off	
5	Status 5 On		Status 5 Off	
6	Status 6 On		Status 6 Off	
7	Status 7 On		Status 7 Off	
8	Status 8 On		Status 8 Off	
9	Status 9 On		Status 9 Off	
10	Status 10 On		Status 10 Off	
11	Status 11 On		Status 11 Off	
12	Status 12 On		Status 12 Off	
13	Status 13 On		Status 13 Off	
14	Status 14 On		Status 14 Off	
15	Status 15 On		Status 15 Off	
16	Status 16 On		Status 16 Off	
17	Status 17 On		Status 17 Off	
18	Status 18 On		Status 18 Off	
19	Status 19 On		Status 19 Off	
20	Status 20 On		Status 20 Off	
21	Status 21 On		Status 21 Off	
22	Status 22 On		Status 22 Off	
23	Status 23 On		Status 23 Off	
24	Status 24 On		Status 24 Off	
25	Status 25 On		Status 25 Off	
26	Status 26 On		Status 26 Off	
27	Status 27 On		Status 27 Off	
28	Status 28 On		Status 28 Off	
29	Status 29 On		Status 29 Off	
30	Status 30 On		Status 30 Off	
31	Status 31 On		Status 31 Off	

When an ESI Plus is installed, the settings on the **Status Speech Labels** tab assign pre-recorded vocabulary to each channel and unit label. The process for configuring status speech labels is the same as for metering channels (see **Meter Speech Labels Tab**).

Configuring Command Channels



	Command Type	Duration (ms)	Raise Label	Lower Label	Raise Button Backlight Color	Lower Button Backlight Color	Source
1	Momentary	600	Raise Ch 1	Lower Ch 1	Green	Red	(Not used)
2	Momentary	600	Raise Ch 2	Lower Ch 2	Green	Red	(Not used)
3	Momentary	600	Raise Ch 3	Lower Ch 3	Green	Red	(Not used)
4	Momentary	600	Raise Ch 4	Lower Ch 4	Green	Red	(Not used)
5	Momentary	600	Raise Ch 5	Lower Ch 5	Green	Red	(Not used)
6	Momentary	600	Raise Ch 6	Lower Ch 6	Green	Red	(Not used)
7	Momentary	600	Raise Ch 7	Lower Ch 7	Green	Red	(Not used)
8	Momentary	600	Raise Ch 8	Lower Ch 8	Green	Red	(Not used)
9	Momentary	600	Raise Ch 9	Lower Ch 9	Green	Red	(Not used)
10	Momentary	600	Raise Ch 10	Lower Ch 10	Green	Red	(Not used)
11	Momentary	600	Raise Ch 11	Lower Ch 11	Green	Red	(Not used)
12	Momentary	600	Raise Ch 12	Lower Ch 12	Green	Red	(Not used)
13	Momentary	600	Raise Ch 13	Lower Ch 13	Green	Red	(Not used)
14	Momentary	600	Raise Ch 14	Lower Ch 14	Green	Red	(Not used)
15	Momentary	600	Raise Ch 15	Lower Ch 15	Green	Red	(Not used)
16	Momentary	600	Raise Ch 16	Lower Ch 16	Green	Red	(Not used)
17	Momentary	600	Raise Ch 17	Lower Ch 17	Green	Red	(Not used)
18	Momentary	600	Raise Ch 18	Lower Ch 18	Green	Red	(Not used)
19	Momentary	600	Raise Ch 19	Lower Ch 19	Green	Red	(Not used)
20	Momentary	600	Raise Ch 20	Lower Ch 20	Green	Red	(Not used)
21	Momentary	600	Raise Ch 21	Lower Ch 21	Green	Red	(Not used)
22	Momentary	600	Raise Ch 22	Lower Ch 22	Green	Red	(Not used)
23	Momentary	600	Raise Ch 23	Lower Ch 23	Green	Red	(Not used)
24	Momentary	600	Raise Ch 24	Lower Ch 24	Green	Red	(Not used)
25	Momentary	600	Raise Ch 25	Lower Ch 25	Green	Red	(Not used)
26	Momentary	600	Raise Ch 26	Lower Ch 26	Green	Red	(Not used)
27	Momentary	600	Raise Ch 27	Lower Ch 27	Green	Red	(Not used)
28	Momentary	600	Raise Ch 28	Lower Ch 28	Green	Red	(Not used)
29	Momentary	600	Raise Ch 29	Lower Ch 29	Green	Red	(Not used)
30	Momentary	600	Raise Ch 30	Lower Ch 30	Green	Red	(Not used)
31	Momentary	600	Raise Ch 31	Lower Ch 31	Green	Red	(Not used)

To configure command channels, navigate to the **Commands** tab.

Command Configuration

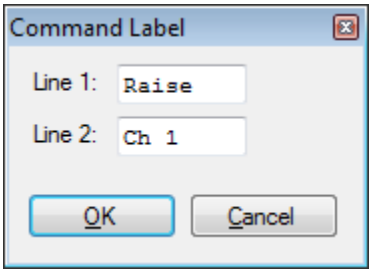
Momentary or Latching Relays

All ARC Plus relays can be configured as either momentary or latching. Make this selection under the **Command Type** heading. Momentary relays are energized for the duration configured under the **Command Duration** heading. Latching channels are energized until the opposing relay is activated (i.e. when a channel is latched in the “raise” state, the raise relay is energized until the lower relay is activated).

Command Duration

The **command duration** setting determines the pulse duration for a momentary command.

Command Labels

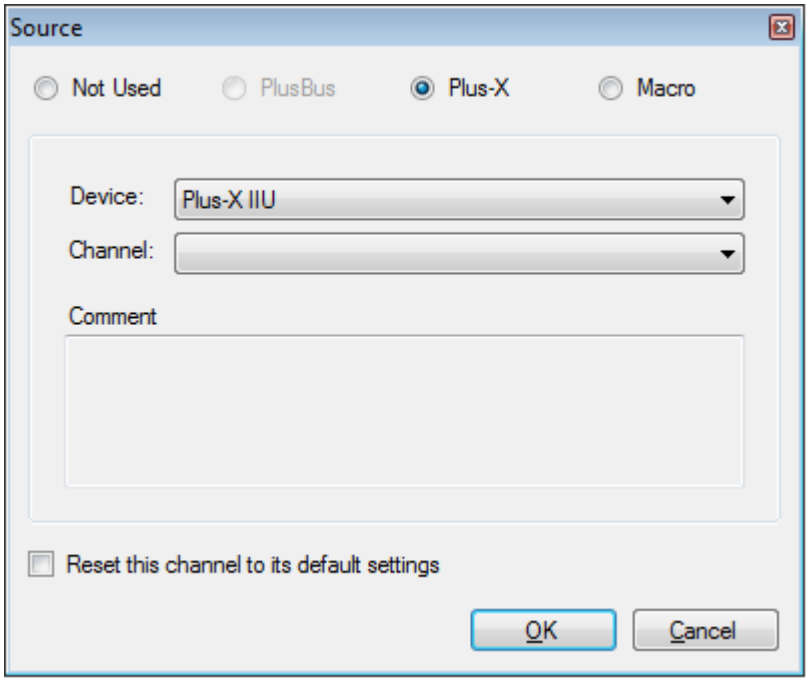


Command labels appear on the front panel, on the web interface, and in AutoPilot 2010 software. The front panel LCD buttons provide 12 characters for the command label (2 rows of 6 characters each), which allows operators to see the label before issuing a raise or lower command. To configure raise and lower labels, click inside **Raise label** or **Lower label** field and then click the square button next to the label text. This window shown above, with two separate lines for the label. Enter the channel label and click **OK.**

LCD Colors

The backlight colors for the front panel raise and lower labels can be configured to be red, green or amber. Use the dropdown lists under the **Raise Button Backlight Color** and **Lower Button Backlight Color** headings to configure these colors.

Setting the Command Source



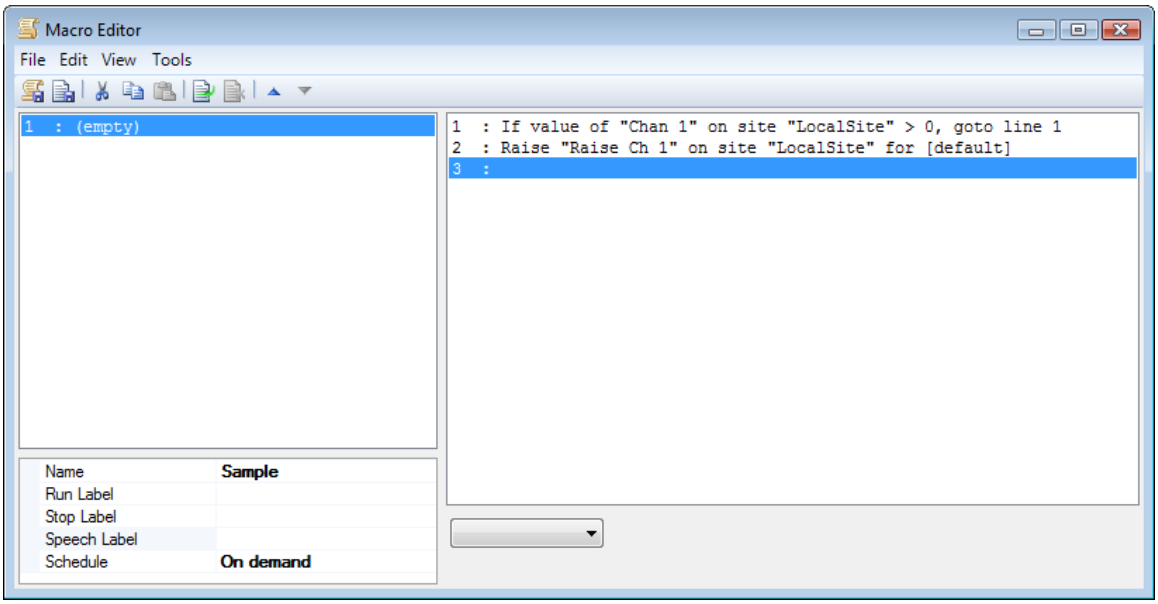
To set the source of a command channel, click the [...] button in the Source column. There are four options:

Not used	Selected by default. Indicates that a command channel is not in use.
PlusBus	Only available if a PlusBus channel is assigned to this channel number.
Plus-X	This option allows you to map a Plus-X channel. This is the most common selection.
Macro	This option allows you to run a macro by issuing a raise or lower command to the channel. Two different macros may be assigned to a channel's respective raise and lower commands. *Note: You can always run/stop macros from the macro list.*

Macros

The ARC Plus features on-board macros for automatic responses to conditions at the remote site, scheduled activities based on time-of-day, or calendar-based routines that reference pre-configured calendar times.

Creating Macros



Use the Macro Editor to create and edit macros.

Macros are edited in AutoLoad Plus by selecting **Macros…** from the **Edit > Settings** menu. This opens the **Macro Editor**.

Macros execute instructions line by line. To generate a line of macro code, use the drop-down list at the bottom of the screen. As you build your line of code, new drop-down menus appear, allowing you to complete each expression.

As you create your macro, use the icons in the toolbar to cut/copy and paste lines of code, delete lines, insert new lines, or reorder lines. When you insert new lines inside of your macro, you will be prompted to update Go To references automatically.

Note: If statements always end in a Go To instruction, allowing you to create condition-based instructions in two steps (the first line would test the condition and direct the macro to the line with the action to take if the If statement evaluates as true).

General Macro Expressions

If	The "If" macro command is a versatile way to compare two values in a macro. The types of values are: meter value, status value, macro variable and constant. To use this command, select the type of value for each side of the equation using the drop down lists, and pick the operator you want to use for comparison (=, <>, <, >).
Set	The "Set" macro command allows you to set a meter channel, status channel or macro variable to any of the following: meter channel, status channel, macro variable or constant. For example, if your antenna monitor readings appear on channel 10, and you want to store the current reading on channel 11, you can set channel 11 to the value of channel 10. *Note: Channels that are configured to be "set by a macro" are only updated when the macro assigns their new value.*

Macro Expressions for Channel Values and Site Conditions

Use these functions for expressions that read channel values and site conditions from the ARC Plus:

If Value **If Status**	These statements test the expression against the most recently obtained meter/status value for the specified site and channel.
If New Value **If New Status**	This statement waits until the ARC Plus updates the meter/status reading before testing the expression against the value. Use this macro function to test the result of a raise/lower command.
If Relay State	Tests if the state of a relay is latched or unlatched.
If Alarm	Tests the expression against the alarm count at the specified site. Can be used with an inequality to trigger an action if the alarm count is greater than 0.
If Maint Mode	Tests the expression against the maintenance mode on/off state at the specified site.
Raise/Lower	Issues a command to the specified site and channel. Note that the command duration entered in the macro editor will override the command duration otherwise programmed for the channel.
Alarm	Generates an alarm on the ARC Plus with the specified message. Can also be used at the end of a macro to initiate notification that the macro is complete.
Set Mute	Mutes alarm reporting on the specified channel.
Set Limit	Sets a meter channel limit value. This is typically used to change power limits on AM stations that run with different day/night power.

Macro Expressions for Date and Time Functions

Date/time and day-of-week statements all reference the date/time or day-of-week as reported by the local ARC Plus unit. For example, if you are programming a macro to execute a command at noon eastern time, but the ARC Plus is configured to display Pacific time, set the **If Time** statement to use 9:00AM.

If Date **If Time** **If Day** **If Calendar Time**	Tests the expression based on the date and time at the site, or on the day of the week.

Macro Expressions for Reading and Manipulating Variables

Macros can manipulate up to 256 variables to perform a variety of functions. For example, a macro can increment or decrement a variable, providing an event counter that can be read by a virtual channel. Note that a remote ARC Plus cannot act upon a macro that resides on a different unit.

If Memory	Tests the expression based on the value of the specified variable. The ARC Plus stores up to 256 variables, all of which can be acted on by any macro onboard the local ARC Plus.
Set Memory	Sets the variable to a specific value.
Increment **Decrement**	Increases or decreases the specified variable by one (1). Multiple increment or decrement expressions can be combined to increase or decrease the variable by amounts greater than 1.

Macro Expressions for Running/Stopping Other Macros

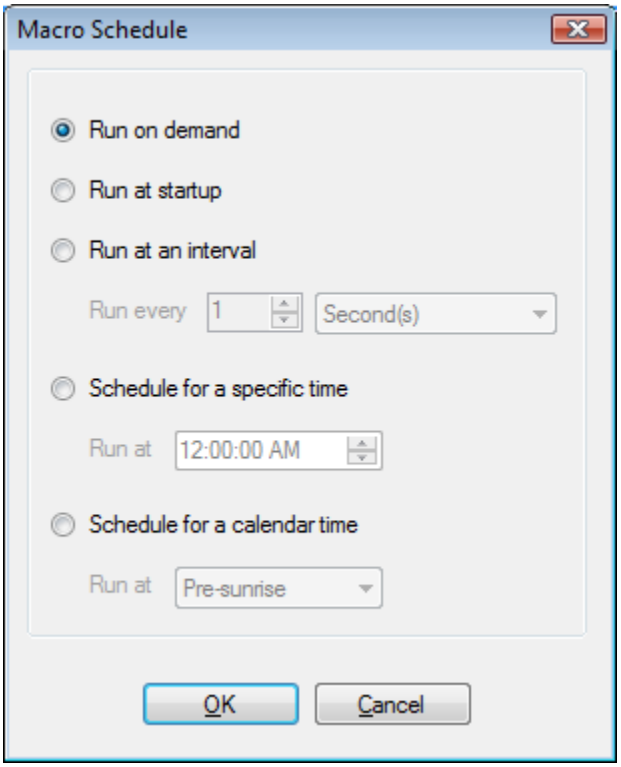
Macros can be used to run and stop other macros, as well as use a particular macro's running/stopped status in an "if" statement.

If Macro	Tests the expression based on whether a macro is running (on) or stopped (off). A macro that is scheduled to run, but is not currently executing instructions, is considered to be stopped.
Set Macro	Runs or stops the specified macro.

Other Macro Expressions

Wait	Programs the macro to pause for the specified duration before executing the next line of code.
Message	Generates a new entry in the ARC Plus event log with the specified message text. Note that messages do not initiate any email notification, but they can be logged and shown in reports.
Send Email	Sends an email to the selected email list with the selected message.
Email Report	Sends an email to the selected email list using a preconfigured email template. See **Configuring Macro Email Templates** for configuring the email template.
Email Log	Sends an email to the selected email list with a text log of all current values on the system.
Speak Phrase	Used only when an ESI board has been modified to output sound through its audio jack. Instructs the ESI to speak the selected phrase.
Goto Line	Directs the macro to a specific line of code.
End	Stops the macro. The macro will run again when next scheduled, when called upon by another macro, or when issued manually via the front panel, ESI Plus, AutoPilot 2010 or web interface.

Scheduling the Macro



Once you program the macro, the next step is to schedule when it will run. Click the [...] button in the **Schedule** field in the list of macro properties below the macro list.

Run on demand means the macro will run when executed manually via the front panel, AutoPilot 2010, web interface, or ESI Plus session. It will also run when executed from another macro that is already running.

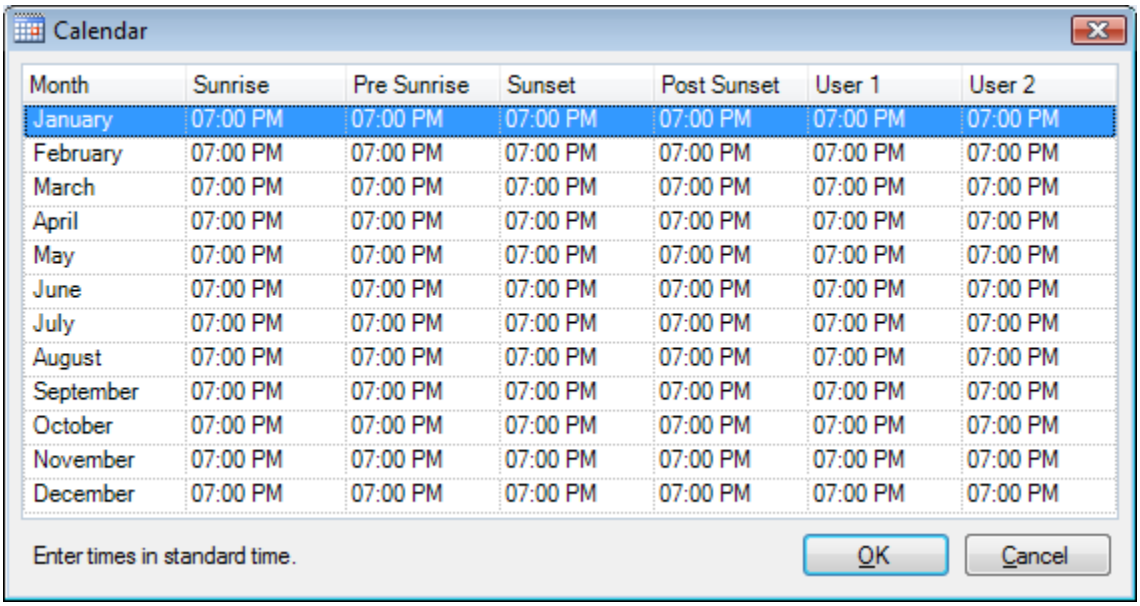
Run at startup means that the macro will run (once) when the ARC Plus first powers on.

Run at an interval schedules the macro to repeat after a specified amount of time.

Schedule for a specific time means the macro will run when the ARC Plus real-time clock matches the time configured in the **Run at** field.

Schedule for a calendar time runs the macro according to a user-defined time of day based on the current month (see below).

Programming Calendar Times


Calendar

Month	Sunrise	Pre Sunrise	Sunset	Post Sunset	User 1	User 2
January	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
February	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
March	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
April	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
May	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
June	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
July	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
August	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
September	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
October	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
November	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM
December	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM	07:00 PM

Enter times in standard time.

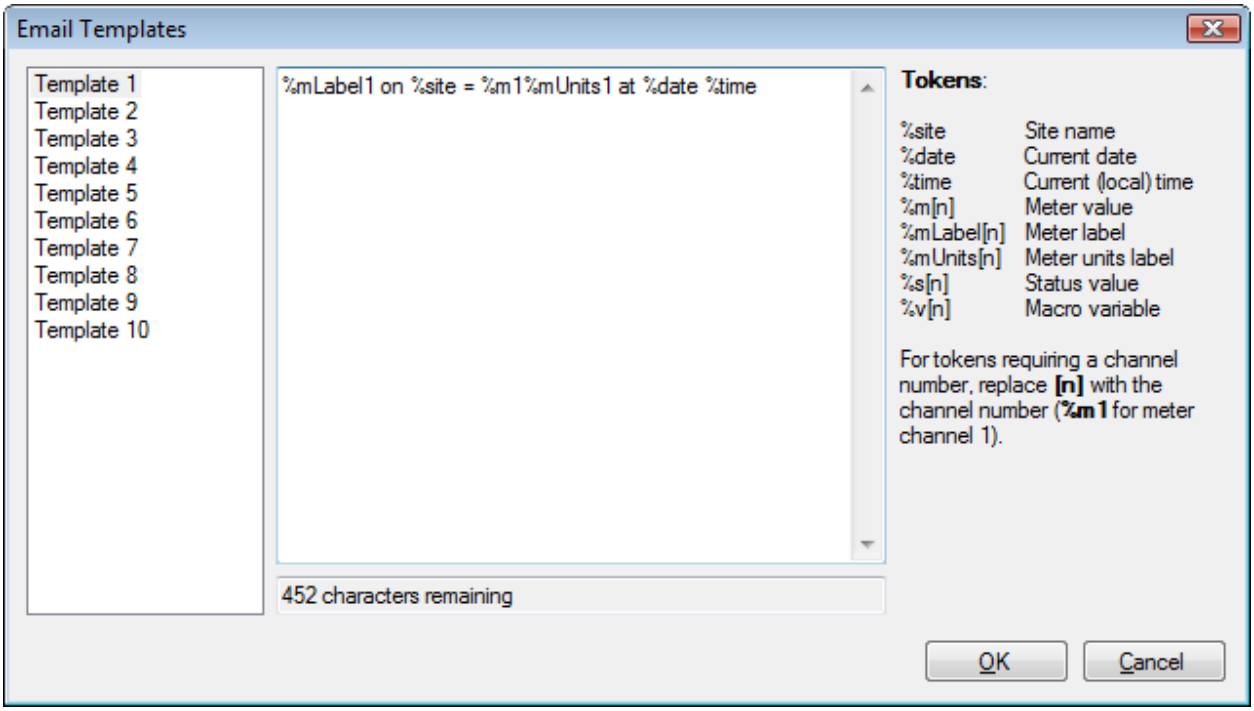
OK Cancel

Macros scheduled to run according to a calendar time reference the ARC Plus calendar, which is configured by selecting **Calendar** from the **Tools** menu in the Macro Editor.

The **Calendar** allows six preset times of day, per month (Pre Sunrise, Sunrise, Sunset, Post Sunset, User 1 and User 2). Set up the schedule by clicking under the appropriate heading and using the arrows to set the desired time. When a macro references one of these presets times, it will use the time-of-day configured here. Use standard time when programming the calendar; the ARC Plus will automatically adjust for Daylight Saving Time if configured to do so (see **Time Settings).**

Configuring Macro Email Templates

Macro email templates allow you to send customized email messages containing site and channel data. To create or edit an email template, use the **Tools > Email Templates…** menu item from the Macro Editor.



Email Templates

The email template editor always shows all ten templates. To rename a template, select it in the list and then click on its label to edit.

Use the text editor to enter the text for this template. The available tokens are displayed onscreen. For example, to send an email stating the value of channel 1 and the site name, use the following syntax:

```
%mLabel1 on %site = %m1%mUnits1 at %date %time
```

Assuming channel 1 is “Forward Pwr”, the email message will be similar to the following:

```
Forward Pwr on WXYZ = 2950W at 1/1/2012 9:15:00 AM
```

To send an email using a template, use the **Email Report** macro command. When that macro command is triggered, the ARC Plus will use the selected template to send an email to the list specified in the macro command.

Saving and Naming the Macro

Macro Name

Set a name for your macro by entering in the **Name** field in the macro properties list.

Run Label and Stop Label

While the front panel macro menu displays the name of the macro, the LCD buttons used to run and stop the macro can be programmed to display specific run and stop labels. By default, these labels are **Run Macro** and **Stop Macro**. If desired, you can change these labels by entering text in the **Run Label** and **Stop Label** fields in the macro properties list.

Speech Label

In order for an ESI Plus speech interface to report the name of the macro, a label must be assigned in the **Speech Label** field.

Front Panel Operation

The front panel controls on the ARC Plus allow operators to monitor and control any site in the network (allowing control of studio equipment from a transmitter site, for example), as well as configure some of the settings that are also accessible in AutoLoad Plus software. It is generally easier to configure the system using AutoLoad Plus; front panel configuration provides convenient on-the-fly changes.

Commands and configuration changes are effective for the unit that is selected for display on the front panel of the ARC Plus. The currently selected site is always displayed in the upper left corner of the screen. If you select a remote site for display, commands and configuration changes will be sent to the remote unit. Other units may need to reselect the site or channel to see configuration updates, such as a change to a channel label.

Menu navigation

Front panel menus are operated by rotating the jog wheel to the desired item and pressing the jog wheel to activate the selection. The ARC Plus has a user-configurable screen saver option (see page 35). If the front panel is dim or blank, rotate the jog wheel to restore the screen to its normal state. To cancel a menu selection and return to the top level, press and hold the jog wheel for a few seconds.

The instructions below use the **>** symbol to separate menu levels. For example, metering channel calibration is accomplished by accessing the **Config** menu, selecting **Channel,** followed by **Metering** and finally **Calib**. This would appear in the instructions as **Config > Channel > Metering > Calib.** For a quick reference of the entire front panel menu structure, see **Appendix E: Menu Diagram**).

Selecting Sites and Channels for Display

Selecting Sites

The top-level **Site** menu allows site selection for site-to-site monitoring and control. Select this menu to display a list of sites in the system. If you have grouped sites and added category names, your site hierarchy structure will appear in the site list. Select the desired site for display. Once selected, the site name appears at the top left of the screen and commands and readings are valid for the selected site.

Changing Channels

After selecting a site, rotate the jog wheel to change which channel is displayed. Hidden channels are not available for selection.

Toggling Between Text and Graph Mode

Metering channels can be displayed in two different ways: text mode and graph mode. Text mode provides a real-time text readout of the channel reading. In graph mode, the ARC Plus tracks readings over time (for as long as the channel is selected) and displays them in graph format. To toggle between text and graph mode, navigate to **View > Graph** or **View > Text** as appropriate.

Note: You can edit the graph display settings in AutoLoad Plus (see **Meter Graph Tab***).*

Viewing Status Conditions

The ARC Plus displays status conditions using the front panel LED indicators, as well as in the on-screen status report. The 16 LED indicators can be mapped to any site or channel and can also indicate other site conditions (see **Mapping the Front Panel LEDs**).

To view the status report on the front panel, navigate to **View > Status**. The status report shows Status ON conditions by default, but can be configured to show Status OFF conditions as well (see **Front Panel Behavior**).

Issuing Commands

The command buttons on the right side of the front panel allow you to issue raise and lower commands to the associated channel. As you select each channel using the jog wheel, the labels for the command buttons are updated. These labels and the background color for the command buttons are configured using the AutoLoad Plus software (see **Command Labels**).

Pushing a command button executes the raise or lower command. For momentary commands, reissuing a command while the command output is still active restarts the command duration timer (in other words, the ARC Plus does not wait for the first command to finish before starting the second command).

Note that the command duration is configured in AutoLoad Plus (see **Command Duration**). Pressing and holding the command button does not extend the command duration.

Note: It is possible to override command button functionality so that the command button issues a macro instead of executing a raise/lower command. See **Setting the Command Source** *for more on overriding command channels.*

Running Macros

To run macros, or to see which macros are already running, select **Macros** from the top menu level. The macro list appears, showing which macros are already running. Use the jog wheel to select the desired macro. To run or stop the macro, use the command buttons on the right side of the front panel.

When you are done with macros, push the jog wheel once to return to the main display.

To run macros directly from the channel display (without selecting the **Macros** menu), use AutoLoad Plus to override an unused command channel with the macro functionality.

Viewing Alarms

The front panel alarm LED alerts users to the presence of an alarm, either at the local site, or at any other site in the network. You can define this behavior in AutoLoad Plus (see **Alarms**).

To view and clear alarms, navigate to **View > Alarms**. The ARC Plus displays a list of sites with active alarms, with the local site at the top of the list whether there is an alarm or not. Any sites missing from the list have no active alarms.

Select the desired site to see a list of alarms at that site. Up to 256 alarms are shown. The ARC Plus displays active alarms first, followed by cleared alarms that are stored in memory. Critical alarms are flagged with the (!) icon. Cleared alarms are flagged with the (X) icon. Once 256 alarms are stored in memory, the oldest cleared alarm is deleted to make room for a new active alarm. The only time an active alarm would be removed from memory is if there are already 256 active alarms and a new one occurs.

Select any alarm in the list to view the date/time of the alarm, the type of the alarm, and when the alarm was cleared (if applicable).

To clear an alarm, select it from the alarm list and then select **Clear Alarm.** To clear all alarms at the site, select **Clear All.** When you clear an alarm, it will no longer be reported as an out of tolerance condition from the front panel of any ARC Plus unit, via AutoPilot 2010, or via the ESI Plus.

Reviewing Events

The ARC Plus keeps a record of the 256 most recent events, such as IIU or ICRU connections/interruptions; TCP/IP sessions, etc. To view the event list, navigate to **View > Events**. Once 256 events are stored, the oldest will be deleted to make room for a new one.

Using Maintenance Mode

Maintenance mode disables all ARC Plus commands, regardless of origin, making it possible to perform maintenance on site equipment without the risk of ARC Plus command actuation. Maintenance mode can only be enabled or disabled from the front panel of the local unit; **it cannot be toggled remotely by any means**.

To turn maintenance mode on, select **MAINT** from the top menu level. The display will prompt you to select **ON** or **OFF**. Turn maintenance mode **ON** to disable commands, or **OFF** to enable them. The **MAINT** flag appears on the front panel and the **REMOTE** LED turns red when the site is in maintenance mode. If you select a different site for display, the **MAINT** flag disappears, but the red **REMOTE** LED remains illuminated.

Macros will continue to run while a unit is in maintenance mode. However, any commands driven by macros will not be issued. The **If Maint Mode** macro command can be used to test maintenance mode status (see **General Macro Expressions**).

Channel Configuration

The **Channel Configuration** menu is where you configure settings that affect how the ARC Plus displays and processes channel data, such as which channels have alarms enabled or disabled, metering and status channel limits, command durations, etc.

From the top level of the menus, access the channel menu by navigating to **Config > Channel.**

Enabling/Disabling Alarms

The **Alarms** submenu allows you to determine which channels trigger alarm conditions when they are outside of their prescribed tolerances. The menu allows you to enable/disable alarms on all channels or on specific metering and status channels. If you disable all alarms, enabling them again will only enable alarms that were enabled prior to disabling.

Adjusting Metering Limits

To adjust metering channel limits, navigate to **Config > Channel > Metering > Limits** and select the desired metering channel. Use the jog wheel to enter the desired values for each limit threshold. If you do not want the ARC Plus to report an alarm for one or more thresholds, set the limit to 9999 or -9999 to disable it.

Note: The front panel allows disabling of critical limits only because the ARC Plus requires the limit threshold selections to be entered in descending order (a channel with a critical high limit of 450, for example, may not be configured with a warning high limit of 9999). Use AutoLoad Plus to disable warning limits.

Calibrating Metering Channels

The calibration screen allows you to calibrate the scaled value of the metering channel. To calibrate channels, navigate to **Config > Channel > Metering > Calib.** At least 50mV of sample voltage is required in order to calibrate channels. Note that channels configured for **millivolt** or **degree** input types cannot be calibrated.

Editing Front Panel Graph Settings

The graph settings screen determines how the ARC Plus displays historical metering values when the graph mode is selected for viewing. You can customize the minimum and maximum displayable values of the graph as well as whether the history is shown in minutes or hours.

To edit the graph settings, navigate to **Config > Channel > Metering > Graph.** Select the desired channel, and then enter min and max values for the graph scale. To use the channel's warning or critical limits to determine the graph scale, select **warning** or **critical** in lieu of a numerical entry.

Next, select whether to view 8 hours or 8 minutes of graph history. The channel must be continuously selected for display in order to build history.

Setting Metering Channel Alarm Delays

The metering alarm delay allows you to determine how long the metering channel must remain out of tolerance before the ARC Plus reports an alarm state. Each metering channel can have a different delay duration.

To set metering channel alarm delays, navigate to **Config > Channel > Metering > Delay**. Select the desired channel and then use the jog wheel to set the delay as desired.

Configuring Status Channels

The front panel allows configuration of each status channels' alarm type, alarm delay and inversion.

To adjust these settings, navigate to **Config > Channel > Status.** Select the desired status channel and start by determining whether the ARC Plus should invert the channels' input. Normally a high input results in a status on condition. When inverted, a status low input results in a status on condition.

Next, determine whether the status on condition results in a warning alarm or critical alarm. If you do not want the channel to alarm, select either of the two alarm types and use the alarm enable/disable configuration option to disable the alarm (see **Enabling/Disabling Alarms**).

Finally, enter the alarm delay duration for the status channel.

Configuring Command Channels

The command channel configuration screen allows you to determine for each command channel whether the output is momentary or latching. For momentary channels, you may also select the command duration.

To configure command channels, navigate to **Config > Channel > Command**. Select the desired channel and use the jog wheel to configure the channel to be **momentary** or **latching**. If you select **momentary**, you may also determine the command duration. See **Configuring Command Channels** for more on command channel configuration and behavior.

Hiding Channels from Display

If you have unused ARC Plus channels, you can hide them so that they are not displayed on the front panel. This avoids scrolling through empty channels when scrolling from one channel to the next.

To hide channels, navigate to **Config > Channel > Hidden**. Use the jog wheel to select the channel to hide or unhide and push the jog wheel to toggle its display status.

ESI Configuration

ESI channel labels, greetings, timeout preferences, PINs are all configured using the AutoLoad Plus software. The front panel configuration menus allows you to enable or disable alarm

dialout and call answering . Also use the ESI configuration menu to operate the ESI Plus in **local mode**.

Configuring Call and Answer Settings

Configuring the call and answer settings determines whether the ESI Plus dials out on alarm and/or answers incoming calls. Configuring these settings allows operators with more than one ESI Plus to designate one for incoming calls and other for outgoing calls, or to temporarily suspend alarm dialout.

To configure call and answer settings, navigate to **Config > ESI > Call/Answer**. Use the jog wheel to enable/disable dialout and/or call answering.

Using the ESI Plus in Local Mode

Local mode allows you to connect a telephone directly to the ARC Plus and access the unit via the ESI Plus without dialing in through the phone line. This may be helpful for troubleshooting purposes. To operate in local mode, navigate to **Config > ESI > Local** and follow the instructions on the screen.

Adjusting System Settings

The system settings menu provides access to the date and time setup, the unit's network settings and the firmware version, alias ID and MAC address.

Adjusting the Date and Time

To set the date, time and time zone information for the ARC Plus, navigate to **Config > System > Clock**. Use the jog wheel to enter the date and local time. Then select the standard time zone. For example, choose **-05:00 EST** if the site observes eastern time, even if Daylight Saving Time is in effect. Finally, choose **yes** or **no** to indicate whether the site observes DST.

Changing the Network Configuration

Navigate to **Config > System > Network** to adjust the ARC Plus unit's network settings. Use the jog wheel to set the unit's public and private IP addresses, subnet and gateway. If you are not sure of the settings to use, contact your network administrator.

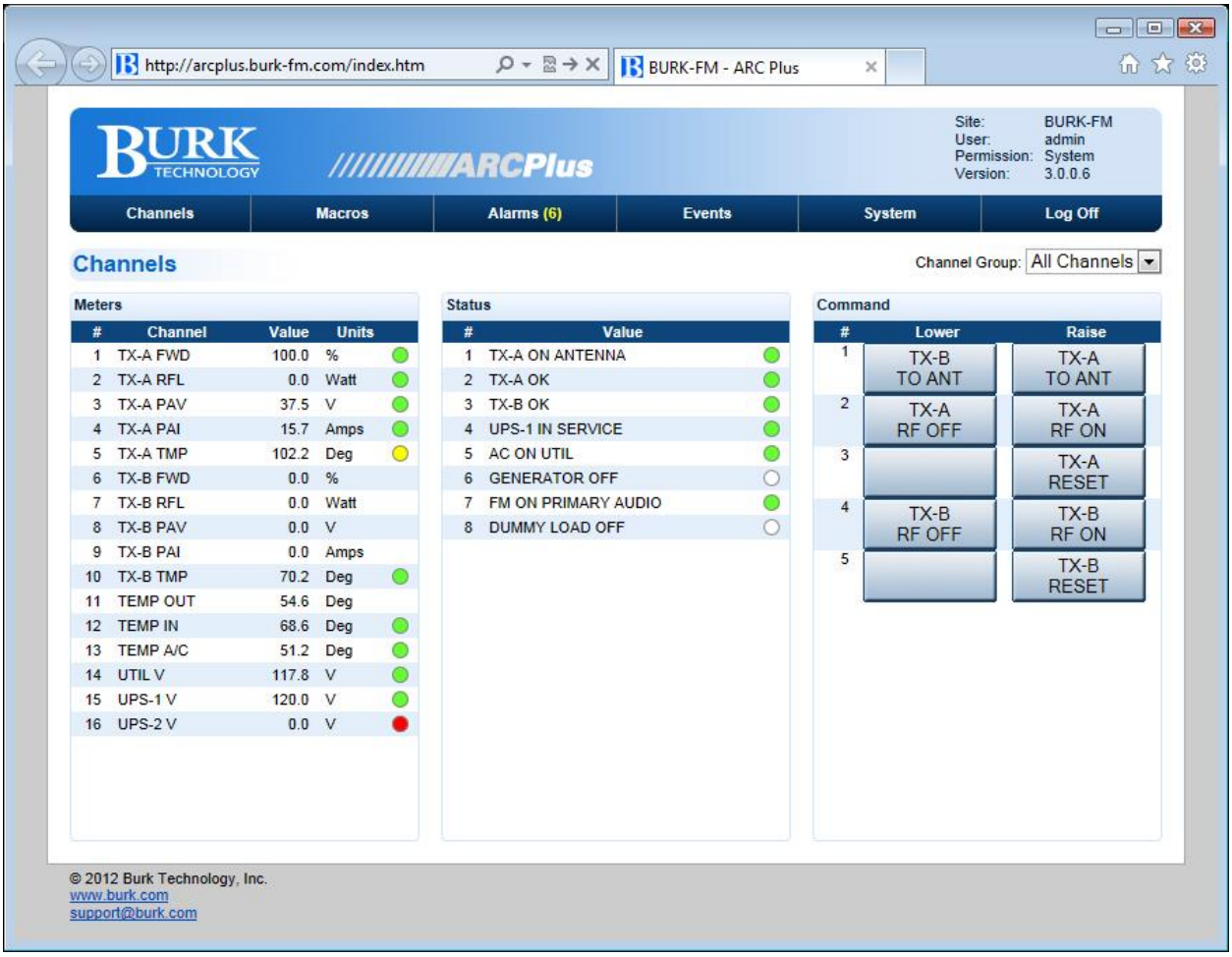
Viewing Firmware Version, MAC address and more

Navigate to **Config > System > Info** to view the unit's firmware version, serial number, MAC address and unit alias.

Restoring Default Settings

If you ever need to erase the unit's configuration and restore factory settings, unplug the ARC Plus unit and restore power while pressing both command buttons and the jog wheel button. Keep these buttons pressed until the ARC Plus displays the firmware version and the message, "Config Cleared." The only user settings retained when restoring factory configuration are the network settings. You would need to re-enter your AutoPilot 2010 authorization code if you previously used the ARC Plus with AutoPilot 2010 software.

Using the Web Interface



Version 3 Web Interface

System Requirements

The web interface works with any modern web browser. Supported browsers include:

- Microsoft Internet Explorer 7 or newer (version 9 is recommended)
- Firefox 3 or newer
- Google Chrome
- Apple Safari or newer
- Mobile Safari (including iPad)

The web interface requires that JavaScript and cookies are enabled in your browser.

Security

The web interface *never* transmits your password unencrypted. When you log in, client-side code creates a one-way hash of your password to send to the ARC Plus.

Logging In and Out

To log in, enter the IP address or domain name of the ARC Plus in your web browser. When the login screen appears, enter your username and password and click the **login** button. Usernames, passwords and privileges are set up in AutoLoad Plus software. If none have been established, the default username is **admin** and the default password is **password**.

Use the **Log Off** link to end your session.

Navigating the Web Interface

Channels

When you first log on, the web interface will display the **Channels** page. This page displays your meter, status and command channels. Only unhidden channels with a source assignment and name will appear in the lists.

Use the **Channel Group** drop down to select a predefined channel bank, configured in AutoLoad Plus (see **Customizing Channel Banks for Display**), or to display all the channels on your site. Groups will also appear for any ARC-16 systems that are connected to your ARC Plus.

*Note: Raise and Lower commands will present a confirmation prompt before sending a command. To disable this feature, navigate to the **System** page and uncheck **Prompt for confirmation when issuing a command**.*

Macros

The **Macros** page displays a list of the macros on your ARC Plus, along with their status. Use the **Run** and **Stop** buttons to run/stop a macro (you will see a confirmation prompt).

Alarms

The **Alarm** page displays the alarms on this ARC Plus, with the following fields:

Date/Time	The date/time when the alarm occurred
Duration	The duration of the alarm, if it has been resolved
Severity	The severity (warning or critical) of the alarm
Priority	The user-defined priority (a numeric value between 0 and 255)
Type	The type of alarm (such as status alarm or system alarm)
Message	A message describing the alarm description
Time Cleared	The time the alarm was cleared, or blank if uncleared

Use the **Clear** link to clear an alarm or **Clear all alarms** to clear all. Use the **Show more** or **Show all** links at the bottom of the page to display more alarms. When all alarms are displayed, “All alarms shown” will appear at the bottom of the page.

Note: The Alarms link in the page header will display a number next to the link to indicate how many uncleared alarms are on the system.

Events

The **Events** page displays the ARC Plus event list.

Use the **Show more** or **Show all** links at the bottom of the page to display more events. When all events are displayed, “All events shown” will appear at the bottom of the page.

System

The **System** page allows you to perform several system related actions, described below:

Networking

Use the **Networking** page to set the networking parameters on the ARC Plus. Use the onscreen help text for more information.

Rebooting

The **Reboot** link will reboot the ARC Plus. You will see a confirmation prompt before the system reboots.

Resetting the system to Factory Defaults

The **Reset to Factory Defaults** link will reset the ARC Plus to its factory default settings. You will see a confirmation prompt before this takes place.

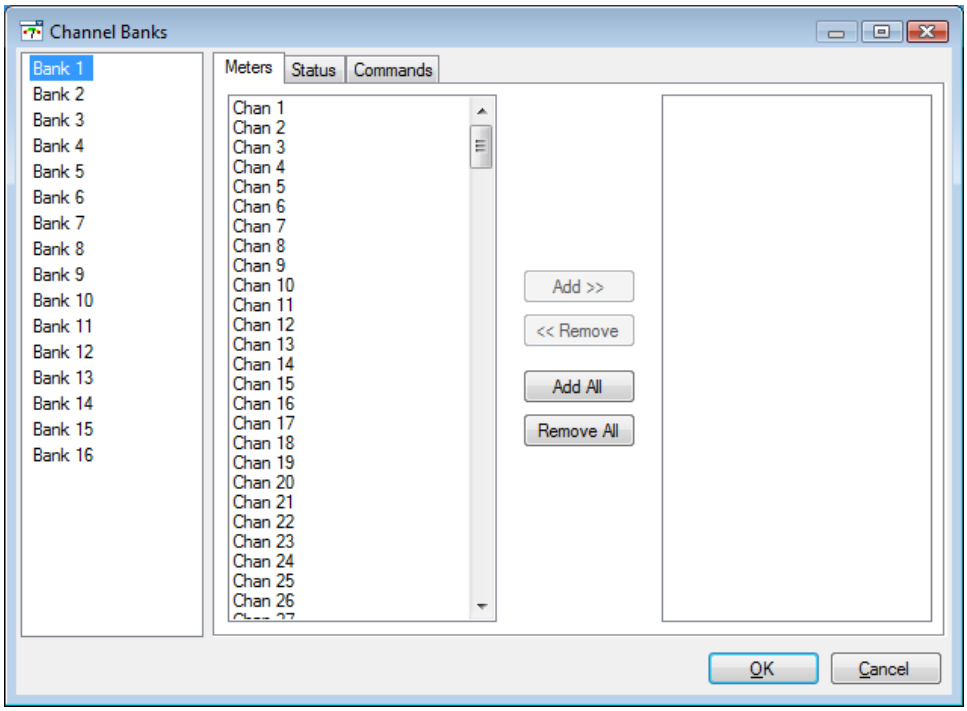
*Note: your network settings will **not** be reset.*

Warning: Resetting the ARC Plus to factory defaults will erase all of your configuration and data from the ARC Plus. It is strongly recommended that you back up your configuration in AutoLoad Plus before doing so. This operation cannot be undone.

Customizing Channel Banks for Display

The groupings of channels displayed in the web and smart phone interfaces can be edited so as to display any combination of ARC Plus and ARC-16 channels. Each customizable grouping is known as a **Channel Bank**, and you may configure up to 16 separate channel banks for display on each ARC Plus web or smart phone interface.

To create or edit a channel bank, use the **Edit > Settings > Channel Banks…** menu.



Channel Bank Editor

The Channel Bank Editor always shows all 16 banks. To name a bank, first select it, and then click on its label in the list and type in a new name.

Each channel bank can contain any number of meter, status and command channels. To add channels to a bank:

1. Select the channel bank
2. Select the Meter, Status or Commands tab
3. Select the channel(s) you want to add from the left-hand list and click the **Add >>** button. (You can add all channels by clicking **Add All**).
4. To remove channels, select the desired channels in the right-hand list and use **<< Remove** or **Remove All.**

The channel banks you configure in AutoLoad Plus will appear in the web interface and smartphone interface.

Accessing the Original Web Interface

If you want to access the original, Java-based web interface, add **/legacy/** to the URL for your ARC Plus. For example, if your ARC Plus' IP address is 192.168.0.100, navigate to:

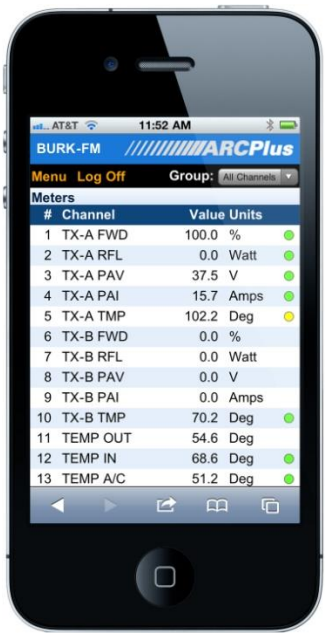
```
http://192.168.0.100/legacy/
```

Note: be sure to include the trailing / character.

The legacy web interface is provided for compatibility purposes only and is not supported. Using the new web interface is strongly recommended.

Using the Smartphone Interface

The ARC Plus smartphone-optimized web page is designed to work with iPhone, Droid and other popular smartphones.



Smartphone interface on the iPhone

To access the smartphone interface, add **/mobile/** to the URL for your ARC Plus. For example, if your ARC Plus' IP address is 192.168.0.100, navigate to:

```
http://192.168.0.100/mobile/
```

Note: be sure to include the trailing / character.

The smartphone interface is designed for use on a smartphone or other small format mobile device. While it is possible to view this page on a desktop, laptop or tablet, the page may not display as expected. However, the standard web interface will work correctly on these devices.

Security

The smartphone interface *never* transmits your password unencrypted. When you log on, client-side code creates a one-way hash of your password to send to the ARC Plus.

Navigating the Smartphone Interface

When you log on to the smartphone interface you will see the **Channels** page. This page displays your meter, status and command channels in a vertical list. If you have more channels than fit on one screen, scroll down to see more channels.

As with the web interface, use the **Group** list to select a channel bank.

Use the **Menu** link to display the additional features available in the smartphone interface:

Channels	Displays meter, status and command channels. This is the starting page.
Macros	Displays the macros on this ARC Plus and their current status. Allows you to run/stop macros.
Alarms	Displays all alarms on this ARC Plus. Alarms are displayed in a vertical list, with each field on its own line.
Events	Displays the event list.
Log Off	Logs off of the smartphone interface.

Accessing the Original Mobile Web Interface

If desired, you can access the original mobile web interface by using the **/legacy/mobile/** URL:

```
http://192.168.0.100/legacy/mobile/
```

Note: the legacy mobile page is available for compatibility purposes only and is not supported. Using the new smartphone interface is strongly recommended.

Using the ESI Plus

The optional ESI Plus provides telephone dial-up control and dialout alarm notification. Installed inside the ARC Plus main unit, the ESI Plus adds a line jack to the rear panel of the ARC Plus for connection to a POTS line. This allows operators to dial the telephone number associated with the phone line, enter a PIN, and then take readings and issue commands for any site linked to the ESI. When configured to do so, the ESI will also dial out to alert operators to alarm conditions.

Configuring the ESI Plus

Before you can use the ESI for monitoring, control and alarm notification, some configuration steps are necessary:

- Assign ARC Plus sites to the ESI Plus
- Configure site, channel and unit labels for the ESI
- Configure greeting and goodbye messages
- Set up selective dialout lists

There are also default settings that you may adjust, such as number of rings before the ESI answers an incoming call, the amount of time the ESI waits between phone numbers on the dial out list, etc. All of these may be edited via AutoLoad Plus.

Calling the ESI

Calling in to the ESI allows you to monitor and control any remote site linked to the ESI. To place a call to the ESI:

1. Dial the phone number for the line connected to ESI. After the specified number of rings, the ESI will pick up the line and speak the programmed greeting.
2. After the ESI picks up, a modem tone is played. Press any key to bypass the tone. Then enter your assigned PIN, followed by the # key. PINs are assigned in AutoLoad Plus under Speech Settings. If you make a mistake, press * to clear the entry and start over. If you enter an incorrect PIN, the ESI will speak, “Error,” and you can try again. Once you begin entering the PIN, you have 20 seconds to finish, or the ESI will disconnect.

   Note: The durations allowed to begin entering the PIN and to complete entry are configurable in the AutoLoad Plus software.

3. Once you enter your PIN, the ESI will speak the user-programmed welcome message, followed by the name of the site in which the ESI is installed and the number of alarms present at that site. After you log in, the ESI waits for a user command. All ESI functions are described later in this chapter, and the ESI command list can be found on **ESI Plus Command List**.

Receiving Dialout Alarm Notifications

In order for the ESI to dial out and report alarm notifications, dialout must be enabled and the site and channel must not be muted. Configure these parameters using the AutoLoad Plus software or the front panel configuration menu.

1. The ESI executes the dialout process as follows:
2. A non-muted channel enters an alarm state, and any specified alarm delay duration expires.
3. The ESI dials the first telephone number on the master dialout list and allows a specified duration for the line to ring, a user to pick up, and a password to be entered. The amount of time allowed to log in can be modified using the AutoLoad Plus software.
4. If no user has supplied a password at the end of the time allowance, the ESI disconnects and remains idle for a user-specified amount of time so that the line is free for incoming calls. The pause duration can be modified using the AutoLoad Plus software.
5. After pausing, the ESI attempts the next phone number in the master dialout list. Once all of the phone numbers have been attempted, and if the alarm remains active, the ESI then attempts each number on the alarm channel's selective dialout list, again pausing after each attempt.
6. If the alarm remains active after the selective dialout list is exhausted, the ESI restarts from the master dialout list and continues the process until the alarm is cleared.
7. Once a user answers a call and enters a password, the ESI announces the name of the site where the alarm is located, the number of alarms at that site, and the alarm conditions that prompted the dialout notifications.
8. The dialout process ends when a user logs in and clears the alarm. If a user disconnects without clearing the alarm, dialout will continue.

ESI Plus operation

Site Selection

In a multi-site system, the ESI can facilitate dial-in access and dialout alarm notification for an unlimited number of ARC Plus sites. However, readings and commands are available for only one site at a time. The site presently reporting conditions, and the site where commands will take effect, is considered the selected site. When you begin an ESI session, a site is already selected by default:

- When you dial in, the selected site is the site where the ESI is physically installed.
- When the ESI dials out, the selected site is the site where the alarm occurred.

In both cases, the ESI will speak the name of the selected site immediately after log-in.

To change the selected site using preset numbers:

1. Enter 401-498 to select a site preset (presets are configured in AutoLoad Plus).
2. The ESI will speak the name of the selected site and report the number of alarms at the site.

You may then enter any ESI command. If you do not know the preset number of a site, or if the site is not stored as a preset:

1. Enter 499. The ESI will prompt you to use the telephone keypad to enter the first four letters of the site name. Use the site name assigned to the ARC Plus unit and displayed on the front panel, even if the site has a different name when spoken by the ESI.
2. If there is one site match, the ESI will announce the name of the selected site and report the number of alarms at the site. If there is more than one match, the ESI will prompt you to choose the site from a list of matches.

You may then enter any ESI command.

Note: You can always find out which site is currently selected by dialing 400.

Channel Selection and Meter Readings

Once the desired site is selected, you can choose a channel for readings and commands by entering the channel number (1-256). The ESI speaks the name of the metering channel, the current value, and the unit label.

To repeat a channel reading at any time, dial 000.

Shortcut: When entering channels 1-99, you can speed up the selection process by entering 001-099.

Issuing Commands

After selecting the desired channel, you can issue a raise or lower command to that channel by pressing # for raise or * for lower. The ESI will confirm your entry by saying, “raise,” or, “lower.” You can then issue another raise or lower command, or enter any other ESI command. For an updated metering reading at any time, enter 000.

Reviewing Status Conditions

To hear a report of all status channels at the site with a status high condition, enter 350. The ESI will speak all Status On messages. If a channel’s status input is inverted, a low input results in a status on message, which will be read in the status report.

The ESI will announce the end of the report when you have heard the last status message. You can interrupt and exit a status report at any time with a new ESI command, including 000 to repeat the selected channel’s meter reading. Entering 350 again will start a new status report.

Reviewing Alarms

When the ESI dials out to report an alarm, it will speak the name of the alarm that prompted dialout as soon as you log in. At any time, you can access a list of all alarms at the site by entering 300. The ESI will report the number of alarms at the site, and then read the first alarm in the list. The ESI waits for your input after each alarm. You have the following choices:

- Press # to clear the alarm and go on to the next one.
- Press * to leave the alarm active (not cleared) and go on to the next one.
- Press # # # to clear all alarms at the site. The ESI will prompt you to confirm before clearing all alarms.

You can temporarily suspend alarm notification on any active alarm by pressing * followed by the desired number of hours (1-9). For example, press *4 to put alarm notification on hold for four hours. After four hours, if the alarm is still active, the ESI will begin dialing out for this alarm once again. This method allows operators to ignore an alarm for a period of time without clearing it.

The ESI will tell you when it has reached the end of the alarm report. You can then enter any command.

Running Macros

You can use the ESI to run or stop macros that are saved to the ARC Plus unit. To run or stop macros:

1. Log in to the ESI.
2. Select the desired site by entering the site preset (401-498) or by spelling the site name (499).
3. Once the desired site is selected, choose a macro by entering a macro preset number 601-698. Macro presets are set up using AutoLoad Plus software. If you wish to select a macro from a menu, dial 699.
4. The ESI announces the name of the macro you selected, and whether the macro is running or stopped.
5. To run the macro, press #. To stop the macro, press *. The ESI will confirm your selection and read the macro status after it runs or stops the macro.
6. When you are done with macros, dial 000 to exit and repeat the current metering channel reading.

Each time the ESI speaks the running or stopped status of the macro, the status is valid only at the time the ESI executes its query. A macro that is running one moment may execute its last line of code in the next moment, and the ESI will not automatically announce a change of status. Entering a new run or stop command, reselecting the macro preset number (601-698) or choosing the macro from the menu (699) will generate a new macro status update.

If a macro executes for a very brief duration, it is possible to issue a run command only to hear the ESI announce the new status as “stopped.” This may happen when the macro completes its last line of code before the ESI queries the new macro status.

Besides running and stopping macros, you can listen to a list of currently running macros by entering 600. The ESI will read the names of macros that are stored on the selected unit and running at the moment you enter your query. Macros that stop during the macro report will be reported as running.

Audio Input Monitoring

Next to the line jack on the ESI, there is an RCA audio jack, which allows the user to dial in to the ESI and monitor the audio fed to that jack. To monitor the audio input:

1. Log in to the ESI.
2. Dial 994 to begin monitoring the audio input. You may issue channel commands while the audio is playing. However, depending on the signal level, it is possible for the audio input to overpower DTMF tones.
3. Dial 995 to turn the audio input off. The audio input automatically turns off after 30 seconds.

Editing Master Phone Numbers

There are two types of ESI dialout lists: the master dialout list, and the selective alarm dialout lists. Both are set up in the AutoLoad Plus software, and the master dialout list can be edited during an ESI session by a user with

system-level privileges. The master dialout list allows users to receive notification of all alarms prior to any other phone numbers being dialed.

Because the master phone number list can be edited via an ESI session, it provides a convenient way for a user to add a temporary phone number to the dialout list. For example, if an operator will be away from their phone or does not have access to their pager, they can call in to the ESI, add their alternate phone number to the master dialout list, and the ESI will dial that phone number any time an alarm is received (dialout must be enabled).

The master dialout list also makes it possible for users to skip setting up selective dialout lists if all operators wish to be notified of all alarms in the system.

To edit the master dialout list during an ESI session:

1. Log in to the ESI with system-level privileges.
2. Enter 801-809 to select a master dialout entry 1 to 9. The ESI will respond by speaking the phone number stored in that entry.
3. Press # to edit the phone number. The ESI will prompt you to enter the new phone number. Use digits 0-9 only. If you make a mistake, press # and the ESI will revert to the previously saved phone number. Press * when you are done entering the new phone number. To delete an entry, press # followed by *.
4. The ESI will announce the new phone number entry.
5. Enter a new ESI command, or 999 to disconnect.

*Note: The master dialout list does not support the * or # characters, or pauses in the dialing string. For these functions, set up one or more selective dialout lists using the AutoLoad Plus software, and link the list to the desired alarm conditions.*

Muting Alarms

In order for the ESI to dial out when an alarm occurs, the channel presenting the alarm must not be muted. If the channel is muted, the ARC Plus will not record alarms at all, and the ESI will not dialout when conditions are out of tolerance. Alarm monitoring may be enabled/disabled using the front panel configuration menu, AutoLoad Plus software, or during an ESI session, as described below. You can toggle alarm monitoring for all channels at a site, or for specific metering and status channels.

To enable or disable alarm monitoring for all channels at a site:

1. Log in to the ESI with system-level privileges.
2. Dial 500. The ESI will report whether alarm monitoring is enabled or disabled for the current site.
3. Press # to enable alarm monitoring, or * to disable it. The ESI will report the new alarm monitoring condition.
4. You may then enter any ESI command.

To enable or disable alarm monitoring for a single status channel:

1. Log in to the ESI with system-level privileges.
2. Enter the channel number for the desired status channel. The ESI will read the meter value and label for the channel. However, the status channel with the same channel number is still selected.
3. Dial 510. The ESI will report whether alarm monitoring is enabled or disabled for the status channel.
4. Press # to enable alarm monitoring, or * to disable it. The ESI will report the new alarm monitoring condition.
5. You may then enter any ESI command.

To enable or disable alarm monitoring for a single metering channel:

1. Log in to the ESI with system-level privileges.
2. Enter the channel number for the desired metering channel. The ESI will read the meter value and label for the channel.
3. Dial 520. The ESI will report whether alarm monitoring is enabled or disabled for the metering channel.
4. Press # to enable alarm monitoring, or * to disable it. The ESI will report the new alarm monitoring condition.
5. You may then enter any ESI command.

Onboard Help

Built-in voice guidance on the ESI operates in either of two modes, terse or verbose. Verbose mode is designed to help novice users navigate the various functions. The ESI confirms each

command, speaks a context-sensitive help prompt after each command, and prompts the user for a new command after a period of inactivity. Terse mode is for advanced users who need minimal prompting. The ESI will confirm each command, and will only prompt for a new command just prior to disconnecting.

The ESI operates in verbose mode by default. To switch to terse mode, dial 997. The ESI will remain in terse mode for this and subsequent sessions, until a user dials 996 to switch back. In addition to the context-sensitive prompts in verbose mode, any user can summon a complete list of available commands by entering 998. The ESI will read a list of commands. You can interrupt the list with a new command at any time. The ESI will finish reading the current phrase before executing the new command.

Command Timeouts

When the ESI expects input from the user, it will wait for a user-specified amount of time before disconnecting. The default duration is 60 seconds. If you need more time to enter a command, enter 993. The amount of the time extension is configurable using the AutoLoad Plus software.

Disconnecting

When you are done using the ESI, enter 999. This makes the line immediately available for new calls. If you hang up without disconnecting, it may take 60 seconds or more for the ESI to release the phone line on its own, depending on the duration of the command timeout setting.

Using the ESI in Local Mode

It is possible to connect a telephone directly to the ARC Plus and use the ESI while it is not connected to an outside phone line. This is useful for troubleshooting purposes.

To use the ESI in local mode:

1. Plug a telephone set into the RJ-11 connector of the ESI.
2. On the front panel of the unit, enter the configuration menu, select the ESI option, and select “local.” Once the set is off-hook, accept the “local mode” selection.
3. The ESI will prompt you to log in, just as you would if you were dialing in remotely.

ESI Plus Command List

Login	*Once the ESI Plus starts speaking, enter the system or user PIN. Then press #.*	
Channel Selection	1-256	Select Channel
	#	Raise
	*	Lower
Alarm Report	300	Begin alarm report
	#	Clear last alarm spoken
	# # #	Clear all alarms on this site
	*	Advance to next alarm without clearing
	*1 - *9	Mute current alarm for 1-9 hours
Status Report	350	Begin status report
	*	Advance to next status message
Site Selection	400	Report currently selected site
	401-498	Select site by preset
	499	Select site by spelling site name
Toggle Alarm Monitoring	500	Report alarm monitoring for selected site
	510	Report status alarm monitoring for selected channel
	520	Report metering alarm monitoring for selected channel
Macros	600	Report currently running macros
	601-698	Select macro by preset number
	699	Select macro by using voice menu
	#	Run selected macro
	*	Stop selected macro
Edit Master Phone Numbers	801-809	Report the programmed phone number
	#	Enter new phone number
	*	Save entry
Special Functions	993	Extend command entry timeout
	994	Enable audio input monitoring
	995	Disable audio input monitoring
	996	Verbose mode (extensive guidance)
	997	Terse mode (limited guidance)
	998	Summon help prompt
	999	Disconnect

Appendix A: Specifications

All Units

Operating Environment

0 to 40˚C; 5 to 85% RH

Power Requirements

100 to 240VAC, 47-63 Hz, 1A

ARC Plus

Dimensions (WxHxD)

2RU: 19” x 3.5” x 12” (48.26 cm x 8.89 cm x 30.48cm)

Memory

Nonvolatile FLASH memory and battery-backed real-time clock store data for 20 years without power.

Front Panel Interface

4x20-character Vacuum Fluorescent Display with jog wheel navigation

16 bi-color LEDs show status signals and are mappable to a variety of status data on any site or channel

Dynamically updated command buttons show user-defined command text with tricolor backlight

Alarm LED alerts users to local or global alarm conditions (user-definable)

Remote LED indicates maintenance mode status

Communication Ports

RJ-45 Ethernet port for 10/100BaseT network connection

4 PLUSBUS ports support connections for up to 16 IIUs and 32 ICRUs

COM ports for optional dial-up modem and ARC-16 connection

Integrated Input Unit

Dimensions (WxHxD)

1RU: 19” x 1.75” x 12” (48.26 cm x 4.45 cm x 30.48cm)

Metering Input Ranges & Accuracy

(-5 to 5), (0 to 5), (-10 to 10), (0 to 10VDC)

>99.75% accuracy, full-scale

Status Input Ranges

0 to 28VDC or switch closure

Integrated Command Relay Unit

Dimensions (WxHxD)

1RU: 19” x 1.75” x 12” (48.26 cm x 4.45 cm x 30.48cm)

Output Types

Form C relay output (C, NO, NC); each is user configurable for momentary or latching output.

Appendix B: FCC Part 68 Statement

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the rear panel of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company. The jack USOC for this equipment is RJ11C. The Facility Interface Code is 02LS2. The Service Order Code is 9.0Y.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The Ringer Equivalency Number is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

If the ARC Plus causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

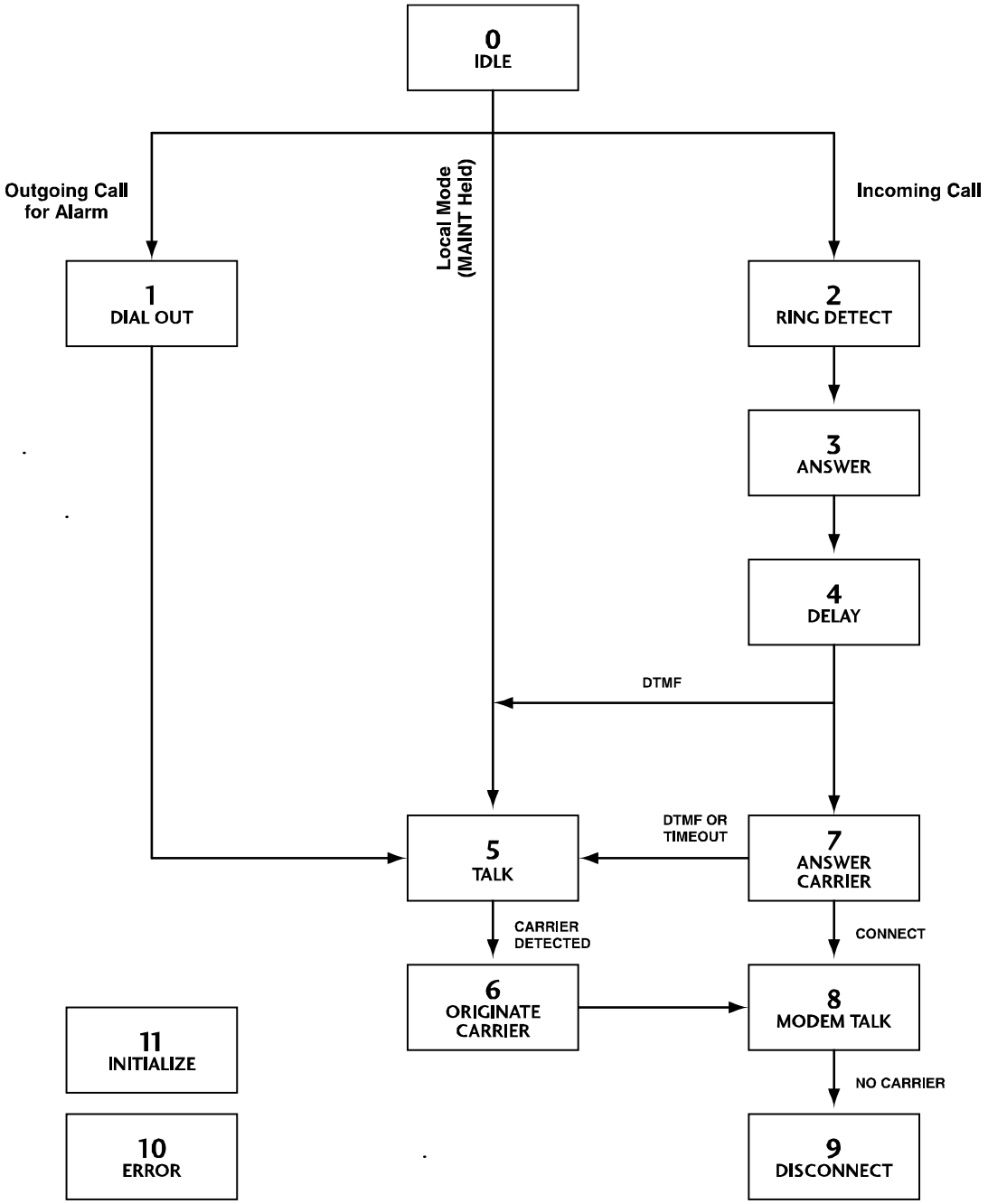
If trouble is experienced with the ARC Plus, for repair or warranty information, please contact Burk Technology at 978-486-3711 or email support@burk.com. There are no user-serviceable parts. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your facility has specially wired alarm equipment connected to the telephone line, ensure the installation of the ARC Plus does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Appendix C: ESI Plus Diagnostics

The rear LED on the ESI Plus shows through the ARC Plus rear panel to indicate ESI Plus state according to the blinking pattern.



Appendix D: ESI Plus Vocabulary

A
ABOVE
ACRODYNE
ADJUST
AEQ
AIR
AIR TOOLS
ALARM
ALARMS
ALL
ALTRONIC
AM
AMPS
ANALOG
ANTENNA
ARE
ARMSTRONG
ARRAKIS
ATLANTA
AUDEMAT-AZTEC
AUDIO
AUDIO TECHNICA
AUDIOLAB
AURAL
AUTO
AUTOMATIC
AUTOMATION
AUXILIARY
AVAILABLE
AXCERA
B
BACKUP
BAD
BALTIMORE
BASE
BASE CURRENT
BATTERY
BE
B E
BEACON
BEAM
BELAR
BELOW
BETABRITE
BEXT
BIRD
BOOT
BOSE
BOSTON
BROADCAST TOOLS
BUILDING
BURK
BURST
C
CARRIER
CELSIUS
CHANGE
CHANNEL
CHARLOTTE
CHICAGO
CHOOSE
CLEAR
CLEARED
CLEVELAND
CLOCK
COAX
COMBINER
COMMAND
COMPOSITE
COMPUTER
CONDITION
CONDITIONING
CONFIGURATION
CONTACT
CONTINENTAL
CONTROL
CONVERTER
CRASH
CRITICAL
CROWN
CURRENT
D
DALLAS
DANAGGAR
DAY
DAYPART
DAYTIME
DEAD
DECREASE
DEGREE
DEGREES
DEICER
DELAY
DELTA
DENON
DENVER
DETECTOR
DETROIT
DIAL
DIELECTRIC
DIGITAL
DIGITAL AUDIO LABS
DOLBY
DOOR
DOWN
DOWNLINK
DRIVE
DTV
DUMMY
E
EAS
EAST
EIGHT
EIGHTEEN
EIGHTY
ELECTRIC
ELEVEN
EMERGENCY
ENCO
ENERGY-ONIX

ENTER
EQUALS
EQUIPMENT
ERI
ERROR
EVENTIDE
EXCITER
EXIT
EXTERNAL
EXTREME
F
FADE
FAHRENHEIT
FAIL
FAN
FAULT
FIBER
FIFTEEN
FIFTY
FILAMENT
FINAL
FIRE
FIVE
FLASHER
FLOOR
FLOW
FM
FM SCA
FOR
FORTY
FORWARD
FOURTEEN
FREEZING
FREQUENCY
FRONT
FUEL
FURNACE
G
GAS
GE
GENERATOR
GEPCO
GOOD
GOODBYE
GORMAN REDLICH
GPS
GROUND
H
HARRIS
HARTFORD
HD
HEATER
HELLO
HELP
HERTZ
HI
HIGH
HOLLYANNE
HOT
HOURS
HOUSTON
HUNDRED
I
IBOC
IN
INCREASE
INDIANAPOLIS
INOVONICS
INPUT
INTERFACE
INTERLOCK
INTRAPLEX
INTRUSION
IP
IS
ISN’T
J
JVC
K
KILO
KILOVOLTS
KILOWATTS
KINTRONIC
L
LAN
LANLINK
LARCAN
LEFT
LEVEL
LIGHT
LIGHTWAVE
LIMIT
LINE
LINK
LINKS
LOAD
LOCAL
LOGITEK
LOOP
LOS ANGELES
LOW
LOWER
LUCID
LYNX
M
MACKIE
MACRO
MAGNET
MAIN
MANUAL
MARTI
MASTERCLOCK
MEGA
MEGAWATTS
METER
MIAMI
MICRO
MICROWAVE
MIDDLE
MILLI
MILLIAMPS
MILLIVOLTS
MINNEAPOLIS
MINOLTA
MINUS
MINUTES

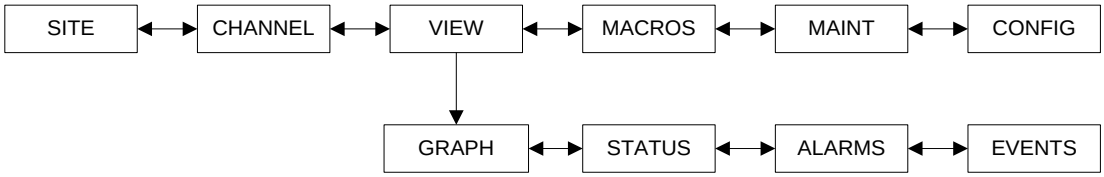
MIRANDA
MODE
MODULATION
MODULE
MONITOR
MONO
MOSELEY
MOTOR
MOTOROLA
MULTIMEDIA
MUTE
MUTED
N
NASHVILLE
NAUTEL
NEC
NETWORK
NEUMANN
NEW YORK
NIGHT
NINE
NINETEEN
NINETY
NITROGEN
NO
NOISE
NORMAL
NORTH
NOT
NOW
NTSC
NUMBER
O
OFF
OFF AIR
OFFLINE
OMNIA
ON
AIR
ONE
ONLINE
ONLY
OPEN
ORBAN
ORLANDO
OUT
OUTDOOR
OUTPUT
OVER
OVERLOAD
P
PATTERN
PEAK
PELICAN
PERCENT
PHASE
PHILADELPHIA
PHOENIX
PHONE
PILOT
PITTSBURGH
PLATE
PLEASE
PORTLAND
POSTSUNSET
POTOMAC
POUND
POWER
PRESET
PRESSURE
PRESUNRISE
PRINTER
PROCESSOR
PROGRAM
PUMP
PUT
Q
QEI
R
RADIO
RAISE
RALEIGH
RATIO
RCA
READY
RECEIVER
RECORD
RECOVERY
REFLECTED
REJECT
RELATIVE
RELAY
REMOTE
REPEATER
RESET
RETURN
REVERSE
RF
RHODE AND SCHWARTZ
RIGHT
ROLAND
ROOM
RPU
RUN
RUNNING
S
SACRAMENTO
SAFE
SAN DIEGO
SAN FRANCISCO
SATELLITE
SBS
SCREEN
SEATTLE
SECURITY
SEE
SENSOR
SET
SEVEN
SEVENTEEN
SEVENTY
SHACK
SHUT
SHUTDOWN
SIDE
SIDELIGHTS

SIGHT
SIGNAL
SILENCE
SITE
SIX
SIXTEEN
SIXTY
SMOKE
SOUTH
SPEED
ST. LOUIS
STACK
STANDBY
STAR
STARLINK
START
STARTUP
STATION
STATUS
STEREO
STL
STOP
STOPPED
STROBE
STUDIO
SUB
SUBCARRIER
SUPPLY
SWITCH
SYNC
SYSTEM
T
T1
TAMPA
TAPE
TELEMETRY
TELOS
TEMP
TEMPERATURE
TEN
TERSE
TEST
TFT
THALES
THANK YOU
THERMAL
THIRTEEN
THIRTY
THIS
THOUSAND
THREE
TIME
TO
TOO
TOTAL
TOWER
TOWER LIGHTS
TRANSFER
TRANSLATOR
TRANSMITTER
TRIM
TRL
TSL
TV
TWELVE
TWENTY
TWO
TWO-WAY
U
UNDER
UNIT
UP
UPLINK
UPS
UTILITY
V
VERBOSE
VIDEO
VIRTUAL
VISUAL
VOICE
VOLTS
VSWR
W
WAIT
WAN
WARNING
WASHINGTON
WATER
WATTS
WEIGHT
WEST
WHY
X
Y
YOU
Z
ZERO
ZONE

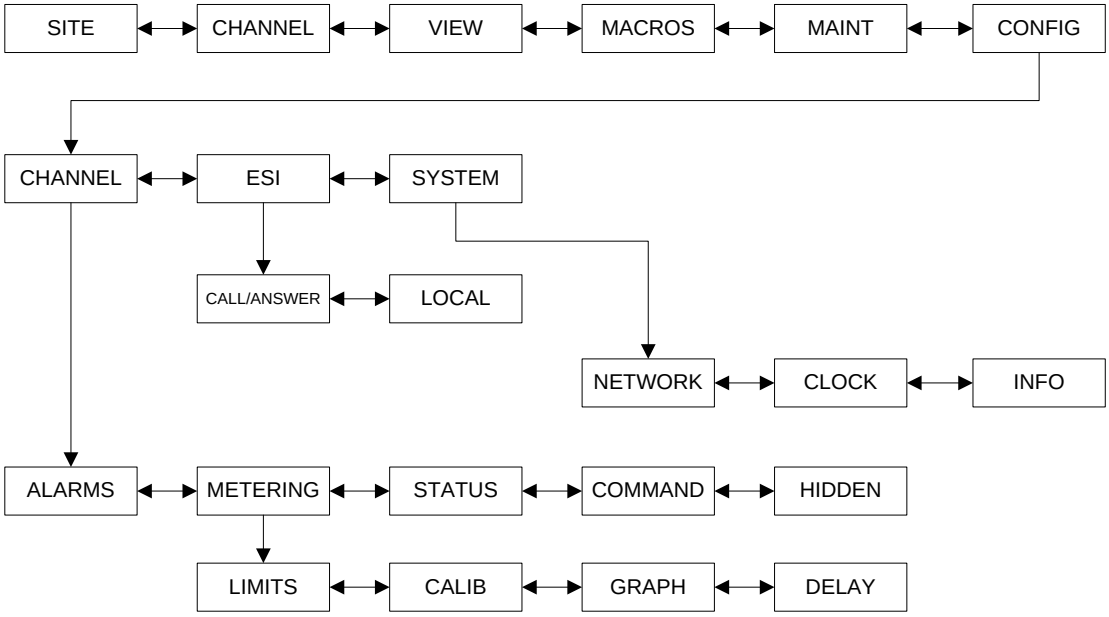
Appendix E: Menu Diagram

The **SITE**, **CHANNEL**, **MACROS**, and **MAINT** menus all provide functionality from the top menu level (there are no submenus). The following diagrams show the submenus under the **VIEW** and **CONFIG** menus.

View Menu



Config Menu

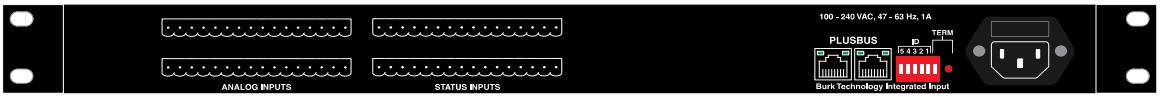


Appendix F: PlusBus Installation

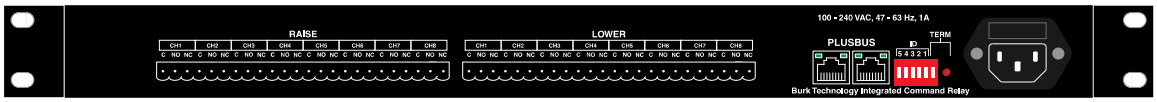
Note: The PlusBus is obsolete, and only required for older PlusBus Integrated Input Units and Integrated Command Relay Units with existing installations. New systems use Plus-X Ethernet I/O.

Installing the IIU & ICRU

The Integrated Input Unit (IIU) and Integrated Command Relay (ICRU) are used to connect site equipment to the ARC Plus. Each IIU connects up to 16 metering and 16 status channels, and each ICRU connects 8 pairs of raise/lower relay outputs. Units are connected to the ARC Plus in daisy-chain fashion and communicate over a digital bus using CAT5 cable. Each of four PLUSBUS ports on the ARC Plus can connect to up 32 IIU/ICRUs, as long as there are no more than 16 IIUs or 32 ICRUs in use among all four PLUSBUS ports. Burk Technology recommends distributing the IIUs and ICRUs across all four ports. The maximum cable run is 50’ per port.



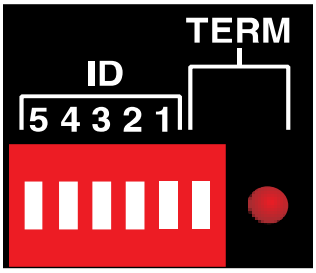
The IIU accepts 16 metering channels (left side of panel) and 16 status channels (right side of panel).



The ICRU accepts 8 raise and 8 lower channels.

Unit Identification

Prior to operation, each IIU and ICRU must be assigned a binary unit identifier using the rear panel dip switches, shown below. The dip switch settings determine the assigned channel range to each IIU and ICRU. Refer to page 109 for the settings used for each channel range. No two IIUs can have the same identifier, and no two ICRUs can have the same identifier.



Rear panel dip switches are used to assign a binary identifier to each IIU and ICRU.

After configuring the unit identifiers, set the TERM dip switch to ON for the final unit in each PLUSBUS chain. (If all four PLUSBUS ports are used, the TERM switch on four units will be set). It makes no difference whether the final unit is an IIU or an ICRU. When the units are powered, the TERM LED will illuminate for each unit identified as a terminator.

IIU and ICRU Dip Switch Settings

Unit ID	IIU Metering & Status Range	ICRU Command Range	DIP Switch Setting				
			5	4	3	2	1
0	1-16	1-8					
1	17-32	9-16					UP
2	33-48	17-24				UP	
3	49-64	25-32				UP	UP
4	65-80	33-40			UP		
5	81-96	41-48			UP		UP
6	97-112	49-56			UP	UP	
7	113-128	57-64			UP	UP	UP
8	129-144	65-72		UP			
9	145-160	73-80		UP			UP
10	161-176	81-88		UP		UP	
11	177-192	89-96		UP		UP	UP
12	193-208	97-104		UP	UP		
13	209-224	105-112		UP	UP		UP
14	225-240	113-120		UP	UP	UP	
15	241-256	121-128		UP	UP	UP	UP
16		129-136	UP				
17		137-144	UP				UP
18		145-152	UP			UP	
19		153-160	UP			UP	UP
20		161-168	UP		UP		
21		169-176	UP		UP		UP
22		177-184	UP		UP	UP	
23		185-192	UP		UP	UP	UP
24		193-200	UP	UP			
25		201-208	UP	UP			UP
26		209-216	UP	UP		UP	
27		217-224	UP	UP		UP	UP
28		225-232	UP	UP	UP		
29		233-240	UP	UP	UP		UP
30		241-248	UP	UP	UP	UP	
31		249-256	UP	UP	UP	UP	UP

Connecting IIUs and ICRUs to the ARC Plus

If you have not already done so, install the units in the equipment rack. If you wish, you may distribute the units in multiple racks. Next, use CAT5e cable to link a PLUSBUS port on the rear panel of the ARC Plus to a PLUSBUS port on the rear panel of the first IIU or ICRU in the daisy chain. Use another CAT5e cable to link the second PLUSBUS port of the IIU or ICRU to the next unit in the daisy-chain. Continue until all units are connected. The unit(s) identified as terminators (the TERM switch is set to ON) should be the final unit in each daisy chain.

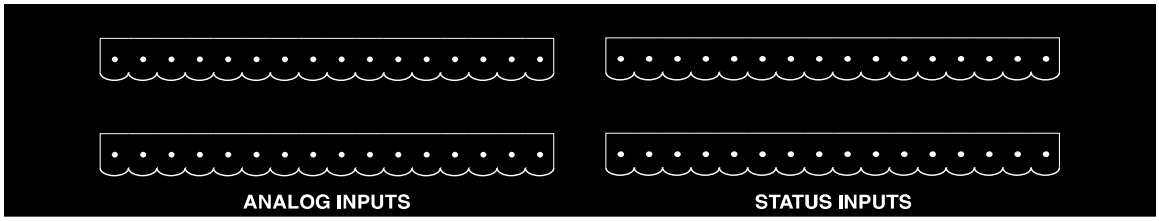
When powered and connected to the ARC Plus, the LINK indicator illuminates on the front panel of the IIU and ICRU. If a unit is disconnected during operation, the ARC Plus logs a system alarm to provide remote notification.

Note: A 12" CAT5e cable is supplied with each IIU and ICRU for interconnecting units in the same rack. A longer cable length may be used, up to 50' total run per PLUSBUS port, to distribute the units among multiple racks. PLUSBUS ports accept standard RJ-45 connectors and all pins are used.

Connecting Analog and Status Inputs

Input Channel Pinouts

Each IIU connects up to 16 metering inputs (±10VDC) and 16 status inputs (0-28VDC or switch closure). Metering channels 1-8 are the top left bank of pins and 9-16 are the bottom left bank of pins. Status channels 1-8 are the top right bank and 9-16 are the bottom right bank:



Each channel has a pin for common ground (left) and a pin for the signal voltage (right), as shown in the table below.

CH 1	CH 2	CH 3	CH 4	CH 4	CH 6	CH 7	CH 8
- +	- +	- +	- +	- +	- +	- +	- +
- +	- +	- +	- +	- +	- +	- +	- +
CH 9	CH 10	CH 11	CH 12	CH 13	CH 14	CH 15	CH 16

IIU Rear Panel Connector Pinouts. Analog and status pinouts are identical. Channels 17-32, 33-48, etc. are connected on subsequent IIUs in the same fashion.

Four 16-pin connector blocks are included to facilitate equipment wiring, two blocks for analog channels, and two for status channels. Analog channels are connected on the left side of the IIU rear panel, and status channels are connected on the right, as shown above.

Labeling Analog and Status Inputs

The accessory kit supplied with the IIU includes labels to identify the ground pin and supply voltage pin for each channel. To align and affix the labels:

1. Start by designating one of the 16-pin connector blocks for metering channels 1-8.
2. Orient the connector block with the set screws facing toward you and below the wiring terminals.
3. Peel off the label identifying ground and supply voltage for channels 1-8 and align the label on top of the connector block with the ground symbol above the left-most input and the CH 1 designator above the second input from the left. When the label is aligned correctly, the designator for CH 8 will be positioned above the right-most wiring input and there will be a small amount of overhang on each side of the label.
4. Wrap the overhang around the side of the connector.
5. Next, label a new connector block for metering channels 9-16, followed by the two connector blocks for status channels. On subsequent IIUs, apply labels for channels 17-32, 33-48, etc. in the same way.

Note: If you wish, you can apply the label directly on the rear panel of the IIU instead of on the connector block.

Wiring the Input Channels

Once you have labeled the connector blocks for your input channels, attach wiring for each remote control channel to the connector block using the connector labels as a guide. Secure the wiring using the built-in set screws before attaching the connector block to the appropriate rear panel connector.

Metering Input Gain Adjustment

The IIU has 16 pairs of 3-pin headers (one pair for each metering channel, identified on the board by channel number). These headers allow jumper-selectable gain adjustment for each metering channel. By default, units ship with the jumpers configured for 1x gain (the IIU uses the voltage inputs as supplied by the external equipment). This setting is appropriate for typical applications.

If the external equipment supplies a weak voltage sample, resetting the jumpers according to the silk-screened diagram results in 4x gain (the IIU multiplies the voltage by 4 before scaling the value). Both jumpers must be moved in unison.

Note: If both jumpers are missing, the associated metering channel will have 4x gain.

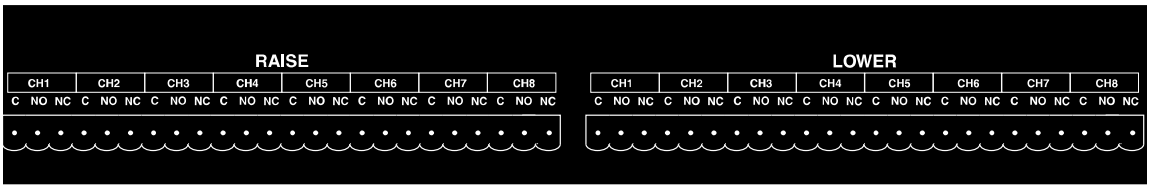
Toggling Between Switch Closure and Voltage-Controlled Status Inputs

The jumpers on headers JP1-JP16 on the IIU determine whether the respective status input is driven by a switch closure or is voltage controlled. By default, units ship with the jumper engaged, enabling switch closure (the status on condition occurs when the voltage sample is closed to ground). To configure one or more channels to be voltage controlled, simply remove the jumper.

Connecting Command Channels

Command Channel Connector Pinouts

The ICRU connects 8 raise and 8 lower channels using two identical 24-pin connector blocks. Raise channels connect to the left set of 24 pins on the rear panel, and lower channels connect to the right set of 24 pins, so shown below:



Close-up of Form C contacts on the ICRU rear panel.

Each channel has three pins: a pin for common (left), and pins for the normally open or normally closed contact. Pinouts for raise channels 1-8 and lower channels 1-8 are identified on the chart below. Channels 9-16, 17-24, etc. connect in the same fashion on subsequent ICRUs.

1	2	3	4	5	6	7	8
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC

ICRU rear panel pinouts. Pinouts for raise channels (left side of ICRU rear panel) are identical to the pinouts for lower channels (right side of ICRU rear panel).

Labeling Command Channels

The accessory kit supplied with the ICRU includes labels to identify each command channel. To align and affix the labels:

1. Start by designating one of the 24-pin connector blocks for raise channels 1-8.
2. Orient the connector block with the set screws facing toward you and below the wiring terminals.
3. Peel off the label identifying channels 1-8 and align the label on top of the connector block so that the “CH 1” segment of the label corresponds with the first three pins on the left side of the connector block. “CH 2” corresponds with the next set of three pins, and so on. When the label is aligned correctly, the three pins on the far right of the connector block are identified as “CH 8” and there will be a small amount of overhang on each side of the label.
4. Wrap the overhang around the side of the connector.
5. Next, label the second connector block for lower channels 1-8. On subsequent ICRUs, apply labels for channels 9-16, 17-24, etc. in the same way.

Note: If you wish, you can apply the label directly on the rear panel of the ICRU instead of on the connector block.

Wiring Command Channels

Once you have labeled the connector blocks for your command channels, attach wiring for each channel to the connector block using the connector labels as a guide. Secure the wiring using the built-in set screws before attaching the connector block to the appropriate rear panel connector.