OSSI
YOUR WORLD SECURED

Documentation

MAC-4R RTU Guide

Version 3.x

OSSI
W228 N727 Westmound Dr
Waukesha WI 53186 USA
TEL: 262-522-1870
FAX: 262-522-1872
Ossi-usa.com

Intelli-Site

Security Management Software

MAC-4R RTU Guide

PC Software RTU Interface Guide
For Windows 7 SP1, 2008 R2 SP1, XP SP3 & 2003 SP2

Version 3.x
Copyright © 1999 – 2012 OSSI, LLC.

Copyright

Copyright © 1999-2012 OSSI, LLC. All rights reserved.

Information in this document is subject to change without notice. The software described in this document is furnished under a license agreement or nondisclosure agreement. The software may be used or copied only in accordance with the terms of those agreements. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or any means electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's use without the written permission of OSSI

OSSI
W228 N727 Westmound Dr
Waukesha WI 53186
TEL: 262-522-1870
FAX: 262-522-1872

Trademarks

Intelli-Site® is a registered trademark of OSSI LLC. **Intelli-Site**® is registered in U.S. Patent & Trademark Office.

All other registered and unregistered trademarks are the sole property of their respective owners.

Table of Contents

Copyright **3**

Trademarks **3**

Table of Contents **4**

Section 1 – Introduction **5**
Overview 5
Technical Support Assistance 6
OSSI Headquarters ..... **Error! Bookmark not defined.**
Technical Support ..... **Error! Bookmark not defined.**

Section 2 – MAC-4R RTU Introduction **7**
Adding a MAC-4R to the MASC Tree 7
Add an RTU – Procedure 7
Import an RTU – Procedure 8

Section 3 – RTU Basic Set-up and Communications **20**
Adding a Communications Driver (MAC-4R) 20
Programming the Basics 33
Programming the RTU's Point Settings 41
Programming the RTU's Ladder Logic 47
Programming the RTU's RTU Settings 58

 Copyright © 1999 – 2012 OSSI, LLC.

Section 1 – Introduction

This section describes the following:

- Overview
- Technical Support Assistance

Overview

The MAC-4R RTU (Remote Terminal Unit) is the MASC software representation of a MAC-4R access control panel. For purposes of this document, the term RTU is synonymous with access control panel.

The MAC-4R RTU provides for user configuration of all aspects of the access control panel network including:

- Access control panel general configuration
- Ladder Logic programming
- Communications Settings (in conjunction with Driver Services)
- Doors (Readers) configuration
- Input configuration
- Output Controls

Copyright © 1999- 2012 OSSI, LLC.

Technical Support Assistance

OSSI Headquarters

W228 N727 Westmound Dr.
Waukesha WI 53186 USA
Tel: 262-522-1870 Fax: 262-522-1872

Technical Support

Technical support is available via Telephone, Fax or Email. Contact OSSI Technical Support 8:00 AM to 5:00 PM Central Standard time. If calling after hours, please leave a detailed voice mail message, and someone will return your call as soon as possible.

E-Mail: support@ossi-usa.com
Fax: 262-522-1872 (Attention Technical Support)
Local: 262-522-1870

When calling, please be at the computer prepared to provide the following information:

- Product version number, found by selecting the **About** button from the Intelli-Site Menu Application Bar.
- Product serial number used for registration.
- The type of computer being used including, operating system, processor type, speed, amount of memory, type of display, etc.
- Exact wording of any messages that appear on the screen.
- What was occurring when the problem was detected?
- What steps have been taken to reproduce the problem?

Copyright © 1999 – 2012 OSSI, LLC.

Section 2 – MAC-4R RTU Introduction

This section describes the following Design Mode RTU activities in MASC.

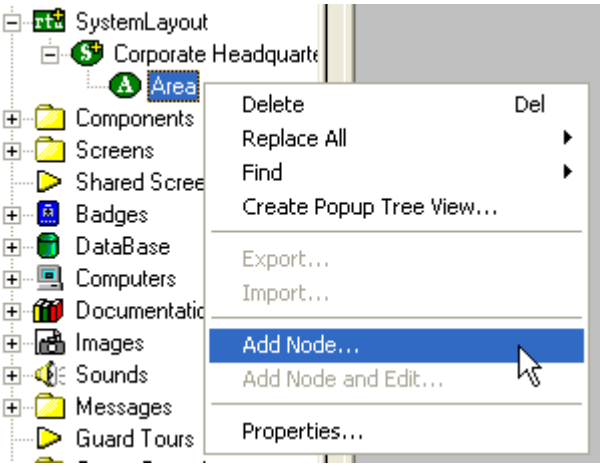
- Setting up a new MAC-4R

Adding a MAC-4R to the MASC Tree

The following section will describe how to add one or more MAC-4R RTU nodes to the tree. All procedures described in this section are accomplished in Design Mode.

Add an RTU – Procedure

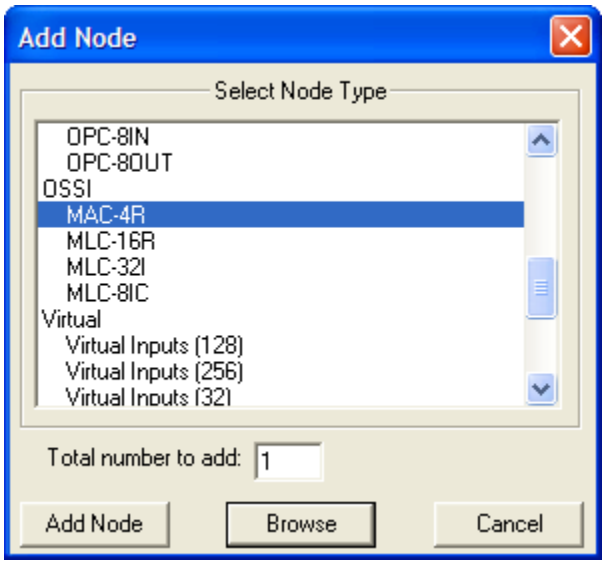
1. Expand the System Layout Node and Right-Click on an Area. Select **Add Node...** from the Shortcut Menu as shown below:



2. Four basic MASC RTU types can be selected from the **Add Node** dialog: **MLC-16R, MLC-32I, MAC-4R and MLC-8IC.** Select the RTU type then enter the number of panels you wish to add to the tree in the **Total number to add:** edit box. You may add multiple panels to an area.

Copyright © 1999- 2012 OSSI, LLC.

Note: The total number of RTUs that may be added must not exceed 255 for a given domain.

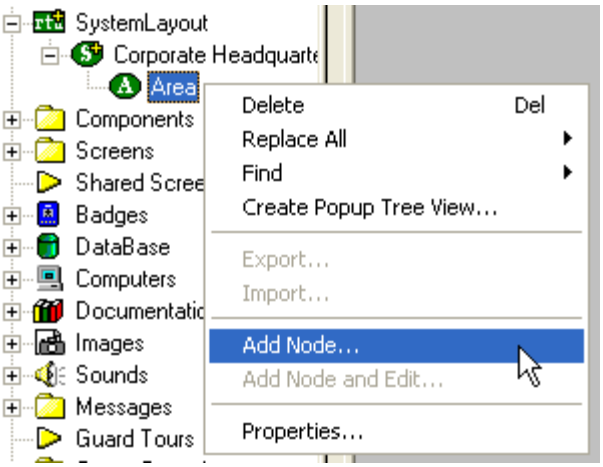


3. The RTU(s) will be added to the tree and the system level Text-To-Speech message **"Node Added"** will sound.

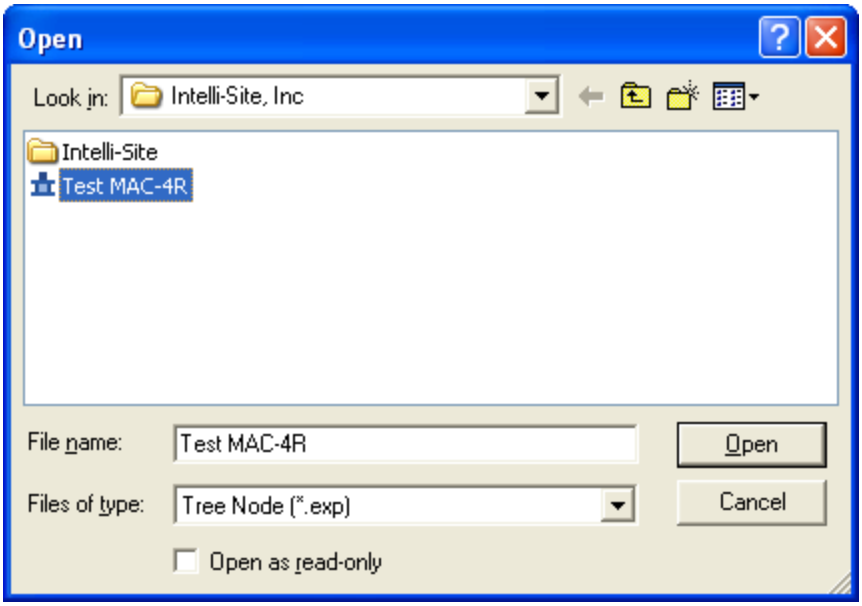
Import an RTU – Procedure

1. If you have a pre-defined custom MAC-4R controller to add, expand the System Layout Node and Right-Click on an Area. Select **Add Node…** from the Shortcut Menu as shown below:

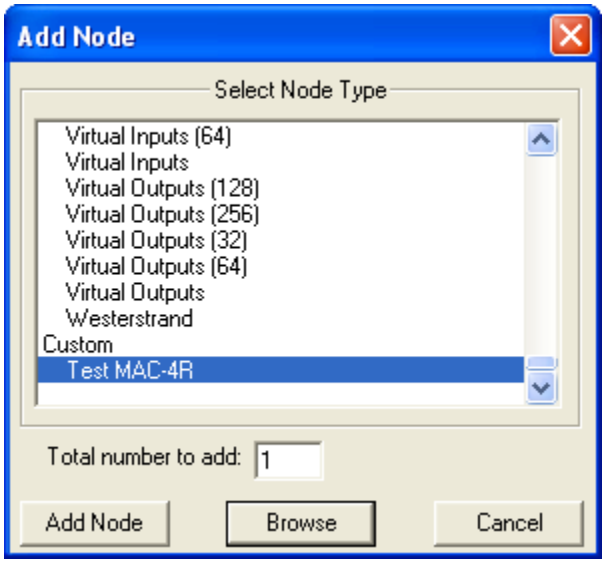
Copyright © 1999 – 2012 OSSI, LLC.



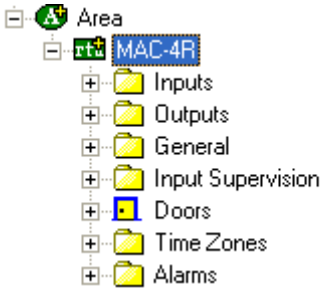
2. Select the **Browse** button on the **Add Node** dialog: A browse window will open. Browse to the appropriate location then select the RTU .exp file you wish to import and select the **Open** button. A new type (**Custom**) will be automatically added to the **Add Node** dialog and the imported .exp will be listed below the **Custom** type.



Copyright © 1999- 2012 OSSI, LLC.



3. Select the imported RTU then enter the number of panels you wish to add to the tree in the **Total number to add:** edit box. You may add multiple panels to an area.
4. The RTU(s) will be added to the tree and the system level Text-To-Speech message **"Node Added"** will sound.
5. The characteristics of the MAC-4R Control panel are divided into 7 leaves with settings that apply to all of the I/O and main panel address under the name of the panel.



Copyright © 1999 – 2012 OSSI, LLC.

a. **MAC-4R Node** - The main panel node allows the operator to set the control panel address, Program Ladder instructions that may include any point on this controller as well as target points from other controllers, and Set the card database structure for card holder data in the controller.

b. **Inputs Node -** There are 16 Inputs per RTU. The input tree is normally used to set the hardware configuration of the physical points. Every change of status can be reported to the Host PC and is normally used to update the graphic screens. An input's change of state is not necessarily an alarm. The ladder programming creates the conditions on which an alarm will be created. Because of this, the change of state is not normally stored into the history file but can be changed by the user at any time.

c. **Outputs Node -** There are a total of 24 addressable outputs on the MAC-4R. The first 8 are physical relays mounted on the RTU. The remaining 16 are solid state output drivers that can be used to control LED's or drive other outputs.

d. **General Node -** There are 32 general software points in the RTU that can be used for setting flags high or low, or perhaps programmed as another alarm point.

Copyright © 1999- 2012 OSSI, LLC.

e. **Input Supervision Node -** When the inputs on the RTU have been programmed to supervise the contacts, these inputs come into play. This allows the user to have complete control of the alarm routing because an input supervision alarm can be treated differently and may cause other things to happen.

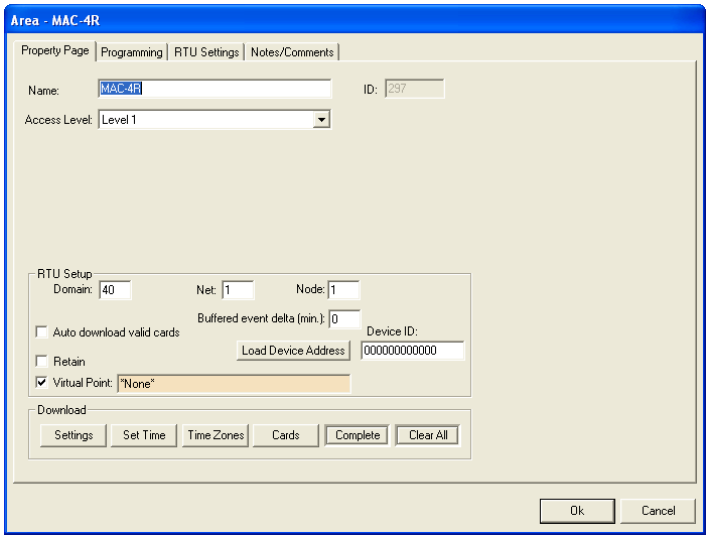
f. **Doors (Readers) Node -** There are 4 readers per RTU, all of which are independently programmed. The reader setting screen controls the basic operational mode of the reader and is also used to set the bit structure.

g. **Time Zones Node -** There are a total of 64 time zones in the MAC-4R RTU. The MASC software divides these time zones into 64 groups of 4. When a time zone is added under Access Control, Time Zones, the same master set of time zones is downloaded to all RTU's This tree provides custom operation for the time zones in this panel. For example, if you wanted to time zone control a door you would drag a time zone from this leaf to the ladder programming screen of the RTU.

Copyright © 1999 – 2012 OSSI, LLC.

h. **Alarms Node -** There are 32 Alarm points in the RTU. Points 1-13 are predefined and reflect different types of hardware-related alarms. The first 13 are used by the firmware and should not be used for any thing else. Points 14-32 are user definable and should be renamed to reflect the true nature of the alarm. The Alarm points are not physical points on the RTU. The ladder programming of the RTU ties the inputs together with the alarm points to create alarms when all the conditions creating the alarm have been met.

6. **Setting the RTU Address -** To associate the new database entry to the physical RTU, right click on the name of the new RTU. The folder's edit menu will open. Select Properties from the menu list. The RTU Properties Dialog window will open as shown below:



Copyright © 1999- 2012 OSSI, LLC.

a. When the new RTU was added to the database, MASC automatically assigned the next available RTU Address. The address consists of 3 parts, a **Domain**, **Net**, and **Node** address. The Domain controls which Computer Port MASC will use when communicating with the RTU. This could be a Serial Port, USB Port, or an IP address through the local Ethernet port. The Net and Node address are unique identifiers for the device on that domain. This address needs to be downloaded to the RTU to start proper communication.

   To set the address of the RTU, the property screen must be opened. A technician would then hit the service pin on the RTU causing the RTU to send it's unique identifying number. Every RTU shipped will have a unique 16 digit number. The service PIN is located in the upper left hand corner of the RTU. There are 2 micro switches, Sw1 and Sw2. Sw1 is the service pin and Sw2 is the reset button.

   After hitting the service pin on the MAC-4R control panel, if all of the communication lines are working properly, you will receive a message "New Neural ID has been received. Do you wish to set the address?" Select Yes. This action will take the Neural ID and place it in the Device ID field on the screen. Hit Apply to save the new address to the Database.

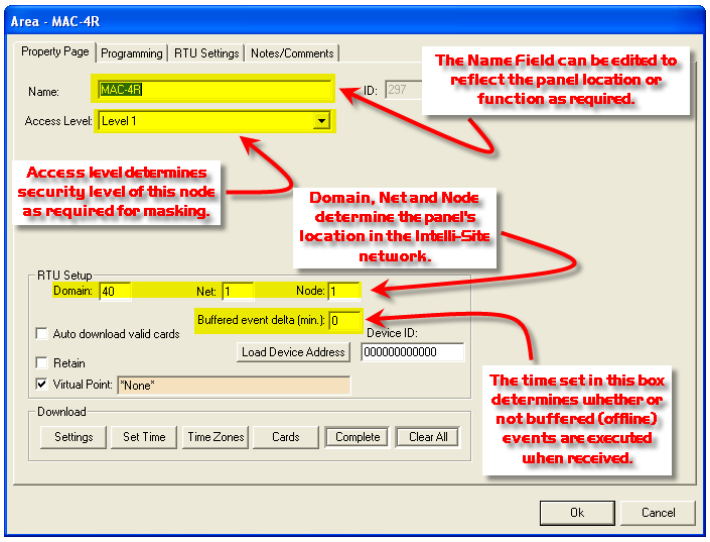
Copyright © 1999 – 2012 OSSI, LLC.

Another method for getting the Neural ID is to manually enter the number from the supplied MAC-4R Test sheet. The installer can enter the Neuron ID of each node into the twelve-digit field on the node file's Property Page tab. Save the information by hitting the Apply or Save button.

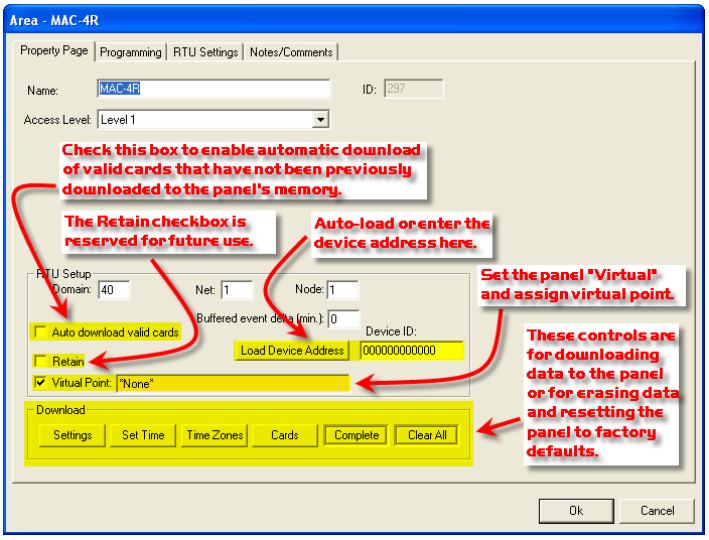
b. Hit **Load Device Address**. This function sets the address of the control panel to the Domain.Net.Node address specified on this screen. From now on this panel will receive all commands sent to this Domain.Net.Node address.

c. Before any inputs start transmitting to the host computer you must download **Settings** to the controller.

7. **Property Page Fields –** The following paragraphs describe each of the remaining Property Page Fields in detail (See Figures Below):



Copyright © 1999- 2012 OSSI, LLC.



a. **Name -** A name should have a close association with the location or function of the actual RTU. The name of the panel shows up in the alarm queue and is stored in history. A good name would be the building name of where the controller is installed.

b. **ID -** System generated

c. **Domain, Net, Node: -** All RTU Address's must be unique within the system. MASC will automatically assign the next available number when adding panels (RTUs). There are three fields for entering the node address. These fields must be matched to the appropriate Driver settings in the MASC Driver Services program. See Example network topology diagram below.

   i. **Domain:** This field determines which port to use on a computer. This could be the MASC server or another workstation on the network. Range 1-65,530

   ii. **Net:** Lon-Works Network subnet - a numerical range 1-254

   iii. **Node:** Lon-Works Network node - a node number between 1-127.

Copyright © 1999 – 2012 OSSI, LLC.

d. **Buffered event delta (min): -** When unbuffering old data from a controller it would be inaccurate to change the screen icons or provide a host interlock on an events. Any event older than the buffered Delta value will only be stored to the history file. Enter a number (in minutes) that will determine if an event is outside of the buffered delta range for host actions.

e. **Auto Download valid cards: -** Cards are automatically added to the RTU when added to the database. If the RTU was off-line at the time there is a change that a card would not make it to the controller. When a card is presented to a reader on this panel the host will evaluate the event and check to see if the card should be valid for this controller. If the card is valid the host will download the card record to the panel immediately.

f. **Virtual Point: -** Check this box to place the panel in Service or "virtualize" the panel. When an RTU has been virtualized all server-to-driver services communications stop and will not be reinitiated until the RTU has been un-virtualized. Drag-and-drop a virtual I/O point into the drop field. This I/O point will be set high whenever the panel is virtualized.

Copyright © 1999- 2012 OSSI, LLC.

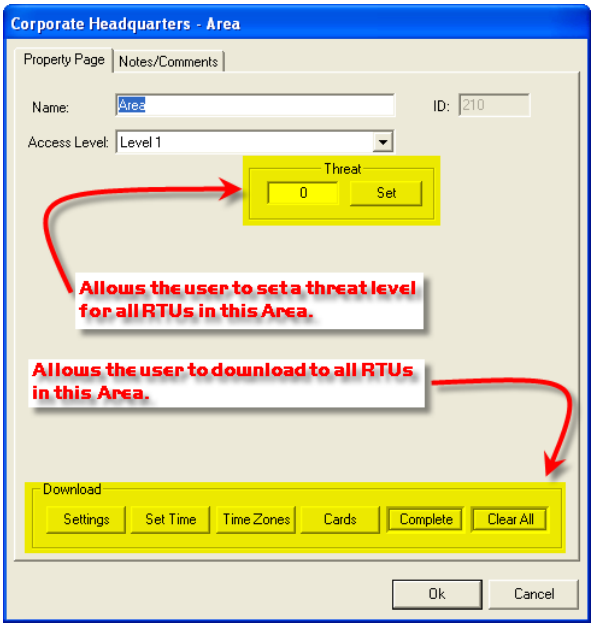
g. **Download –** Allows the user to download data to the panel. The user may download **Settings**, **Set Time**, **Time Zones**, **Cards**, or **Complete** (**Time Zones**, **Cards and Settings**). The **Settings** download includes all the I/O point configuration data including Timezones and Ladder logic. Whenever you change the hardware configuration of Inputs, Outputs, or Readers you must come back to this screen and download Settings to send those changes to the controller. Cards on the other hand are automatically downloaded when ever you make a change. A Settings and Card download would be the same as sending a Complete Download.

h. The user may also **Set Time** (date and time), or reset all panel memory settings to the factory defaults (**Clear All**).

i. **Cards:** Whenever you add a new controller to the database it will need an initial Card download to get started. This download removes all the cards from the controller before it starts a fresh download. This would remove any cards not currently in the MASC database so only authorized cards are loaded.

j. Downloads to multiple panels, as well as Threat Level Settings can also be accomplished from the **Area** property page as shown in the following graphic. Threat Settings can be matched to card holders in Card Management Mode:

Copyright © 1999 – 2012 OSSI, LLC.



Copyright © 1999- 2012 OSSI, LLC.

Section 3 – RTU Basic Set-up and Communications

This section describes the following Design Mode RTU activities in MASC.

- Setting up a new MAC-4R
- Programming the RTU's Point Settings

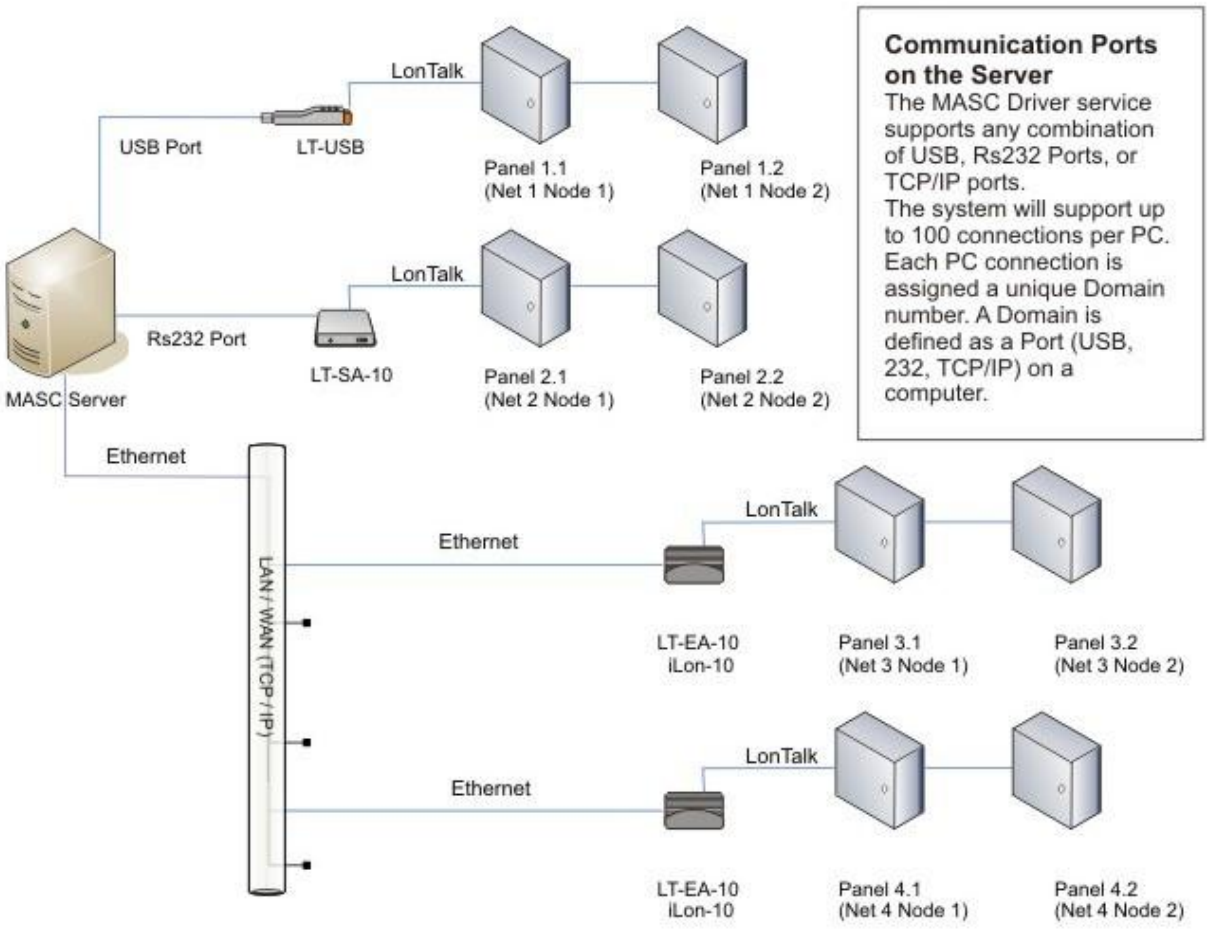
This section is used to establish initial communications with the controller and program initial functionality.

Adding a Communications Driver (MAC-4R)

There are 3 different types of communication to a MAC-4R series controller; Ethernet, USB, or RS232. The Ethernet and USB adapters use low level Windows drivers called OpenLDV while the RS-232 port does not require the loading of OpenLDV. The drivers are multi-threaded so every loop of controllers is independent from the other. Each use of an Ethernet, USB, or RS-232 port requires a unique Domain address. A Domain can be defined as a port on a Computer within the system. An remote IP address through OpenLDV also requires a unique Domain address as each IP address it technically a different port.

The illustration below will require 4 unique domain address.

Copyright © 1999 – 2012 OSSI, LLC.



Every connection on a Domain could be addressed starting with RTU Net 1, Node 1 but to make it more supportable we advise the changing of Net's for every Domain connection. This also comes in handy when routing events between sites through the use of Echelon based routers as events can be routed by Net.

Copyright © 1999- 2012 OSSI, LLC.

Since MASC supports over 50 different drivers we have default domains for each Manufacturer. The MAC-4R drivers normally start at address 40 and move up from there. So this example we are going to use domains 41, 42, 43, and 44. Domain 41 will be assigned to the controllers on Net 1. Domain 42 will be assigned to the controllers on Net 2, etc… When as add a controller, it has a default Domain address of 40, therefore it is not assigned to any Domain network until we change it.

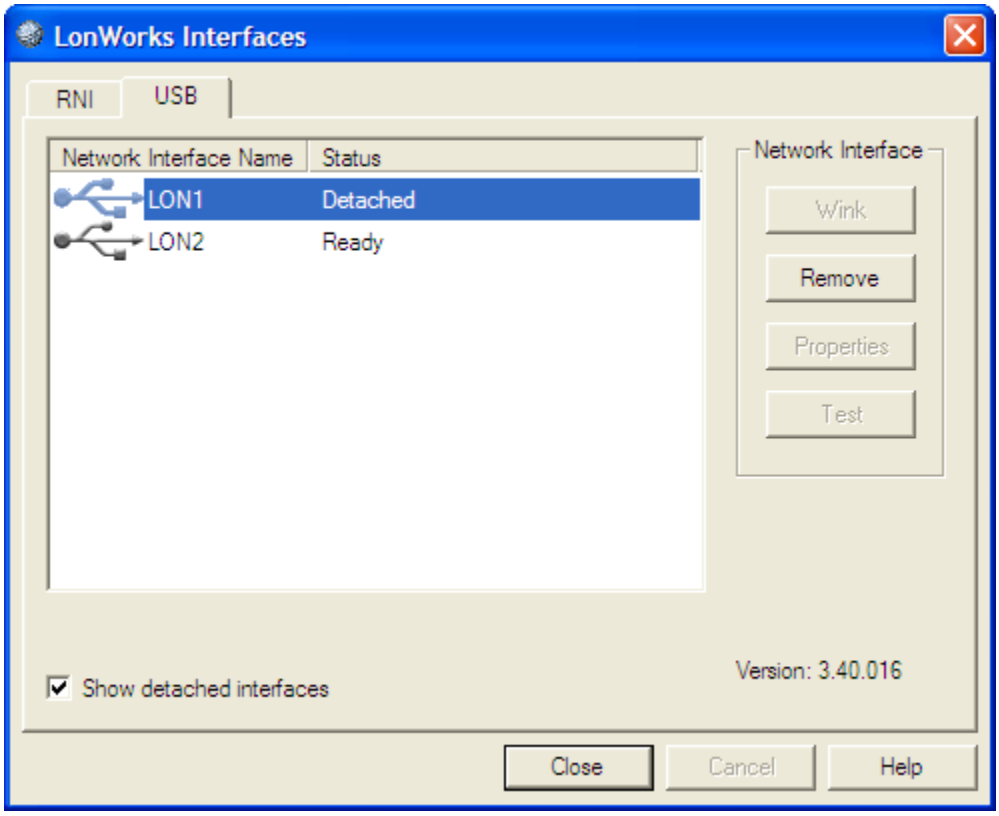
Step 1A, Adding USB Device

Exit MASC and load the Windows OpenLDV Drivers. You'll find these driver on the MASC System CD in a directory called OpenLDV.

After you load the drivers, plug in the USB adapter. Since this is the first USB adapter loaded on the system it should be recognized as LON1, The second adapter will be LON2 etc..

To verify this you can go to Start, Control Panel, Lonworks Interfaces and view the USB tab.

Copyright © 1999 – 2012 OSSI, LLC.



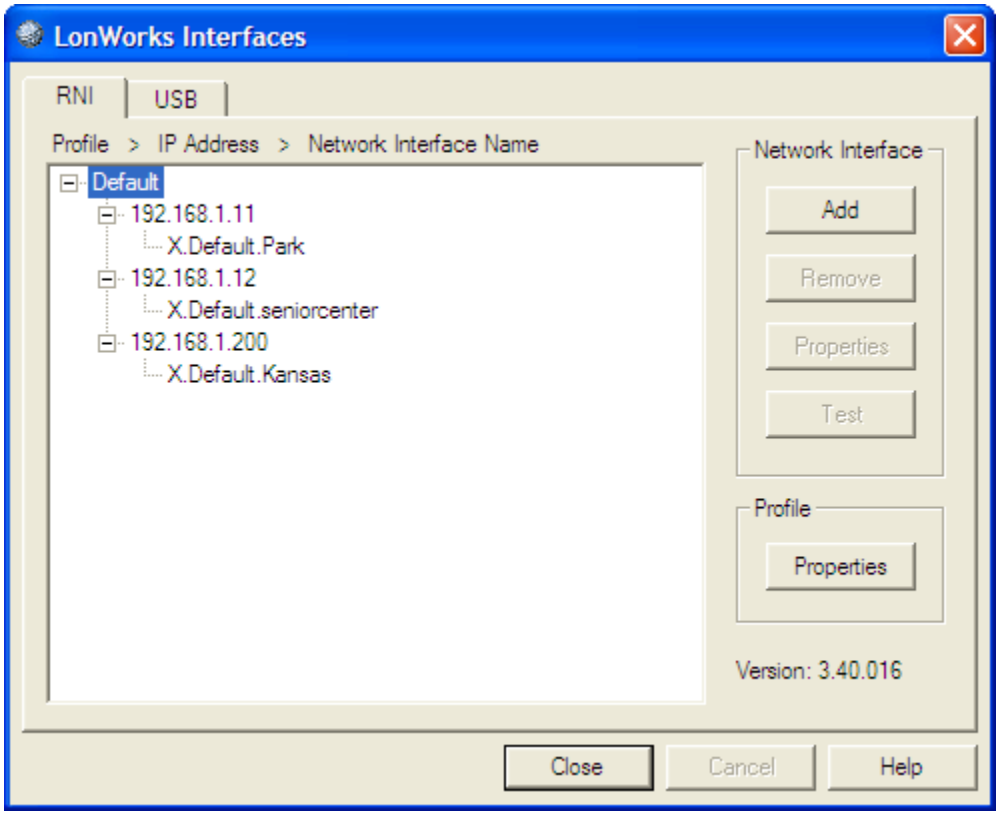
Step 1B, Adding Ethernet IP Device

Exit MASC and load the Windows OpenLDV Drivers (Same as Above). You'll find these drivers on the MASC System CD in a directory called OpenLDV.

Use Windows Explorer to change the IP address of the iLon-10. The Default address is 192.168.1.222 so your computer will have to be set to a compatible address to change it. Enter the IP, Subnet and Gateway for the install and Hit Submit.

After you load the drivers, goto Start, Control Panel, Lonworks Interfaces and view the Remote Network Interface (RNI) tab. Highlight the root branch called Default and select Add.

Copyright © 1999- 2012 OSSI, LLC.



You will be asked for a name. We suggest using the building name. All names have the default x.Default. prefix which you can not change.

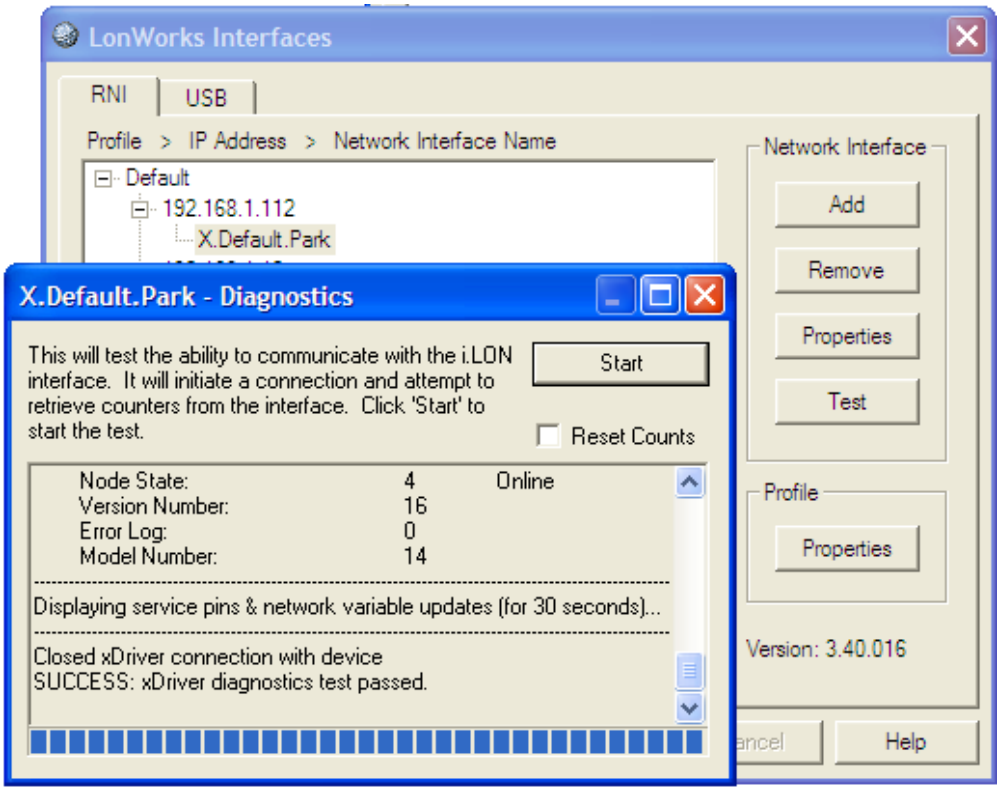
The Next screen, Select "Other".

The Next Screen assign an IP address.

Test your new device.

Highlight the name of the device and hit **TEST**. This will test basic communications and make sure all the low level Windows drivers have been loaded properly.

Copyright © 1999 – 2012 OSSI, LLC.



Step 2

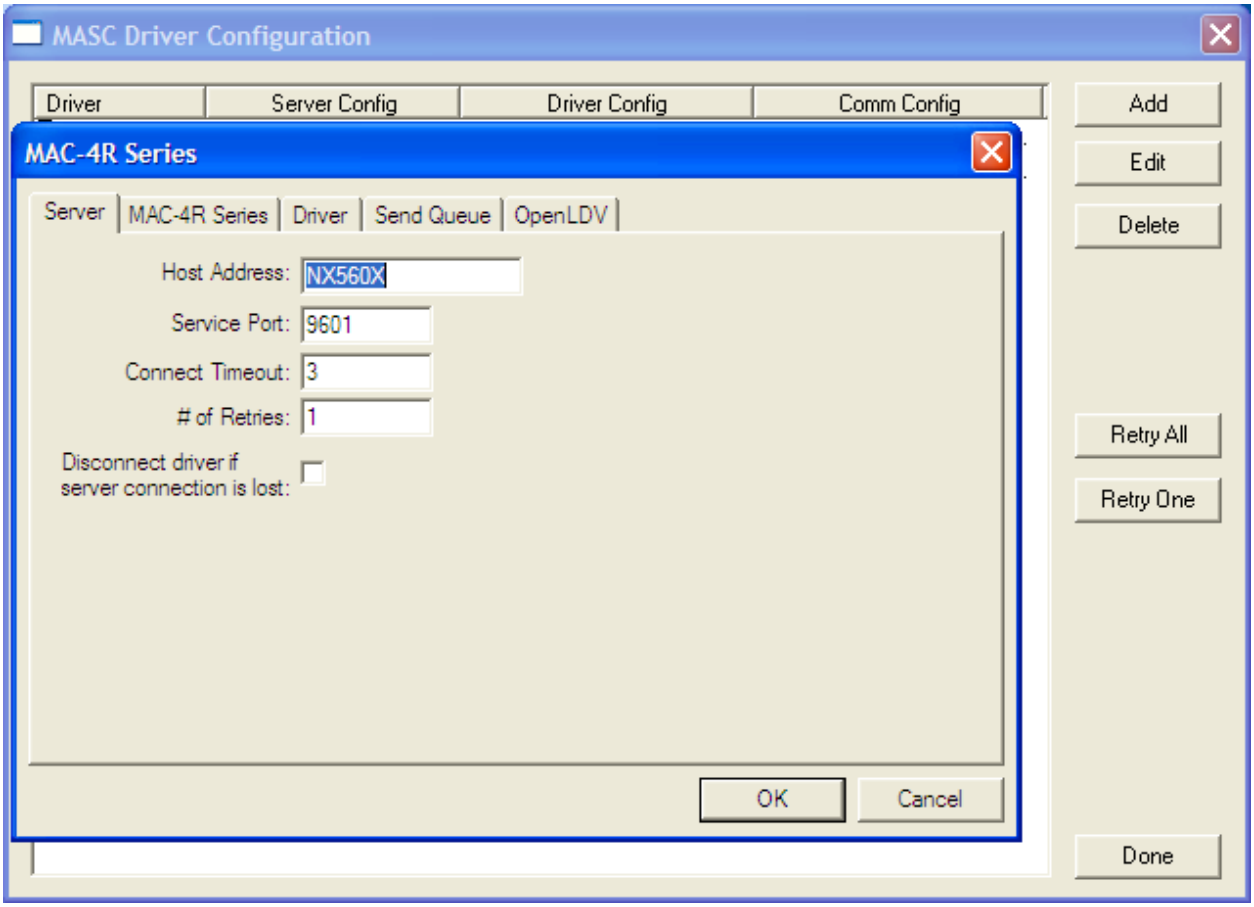
Load MASC Server and Workstation and change the Domain for the MAC-4R controller Net 1, Node 1 to Domain 41.

Step 3

Load MASC Driver Application, Right click on the double Green box in the system tray and Select Open. An empty Driver window will appear.

- Select "Add" to add a driver.
- Select MAC-4R Driver
- Select OpenLDV. If Open LDV did not show up you will have to reboot your computer so the OpenLDV drivers are registered before MASC starts.

Copyright © 1999- 2012 OSSI, LLC.



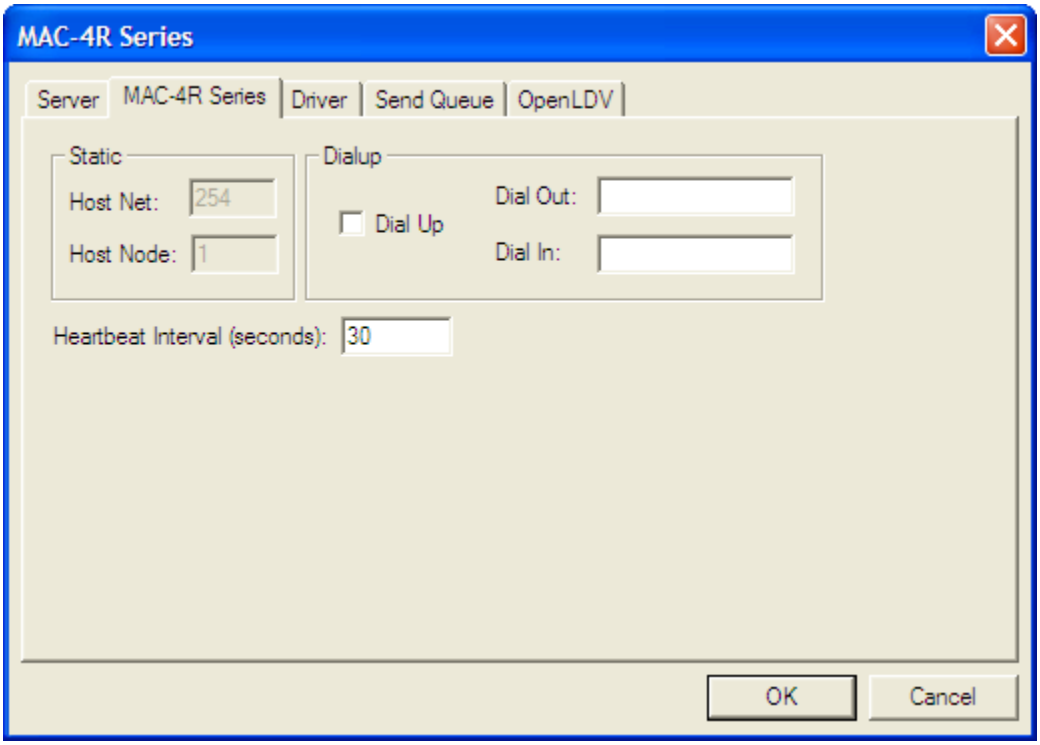
Server Tab

Host Address: Enter the name of the Computer running MASC Server program.

Service Port: Base port address plus the last number in the project subdirectory name. If the base address for communications is 9600 and the project name is Project_001, the Service port should be 9601. This service port is the same for all instances of the driver so even though we need 4 Domains every driver will be assigned the same service port of 9601.

Don't change any thing else on this tab.

Copyright © 1999 – 2012 OSSI, LLC.



Host Net and **Host Node**, describe the USB, iLon-10, or SLTA's address. The controller sends all events to this address on the way back to the server. Since each network drop line has an Echelon network device it's best not to change this setting. By default all control panels are setup to talk to a network device at Net: 254, Node:1.

Dialup: Dialup settings for panels connected via modem. (This option is no longer supported).

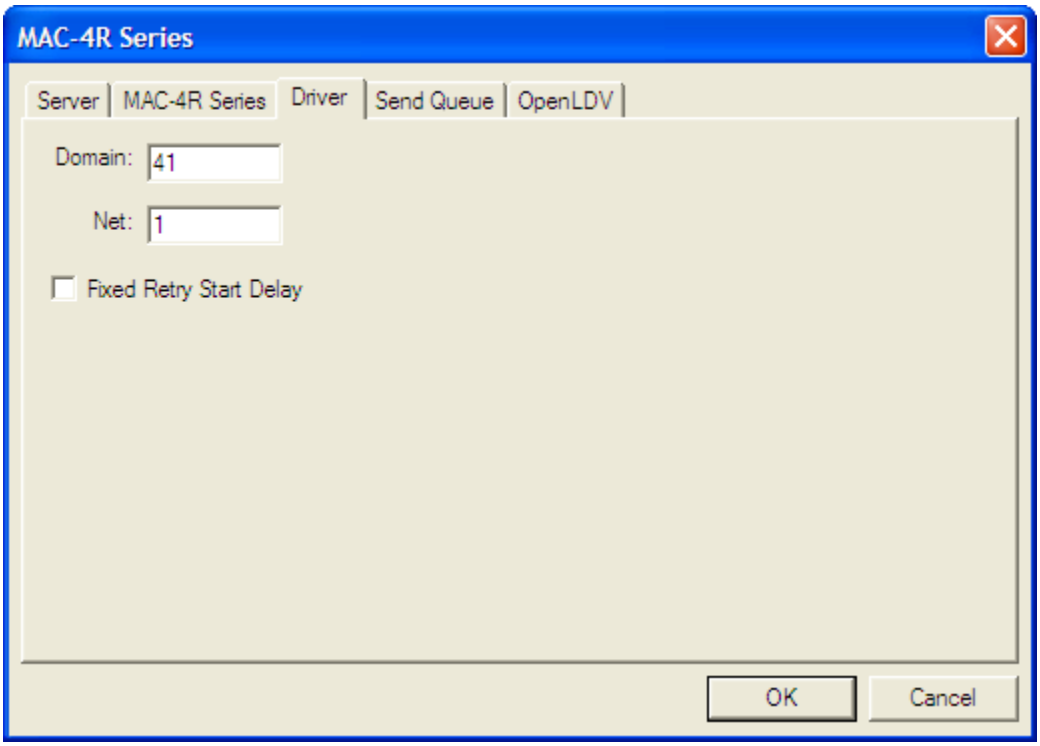
Dialup Check box – Should be checked in order to enable modem operations.

Dial Out: The telephone number for dial-out reporting.

Dial In: The telephone number for dial-in operations to the panel.

Copyright © 1999- 2012 OSSI, LLC.

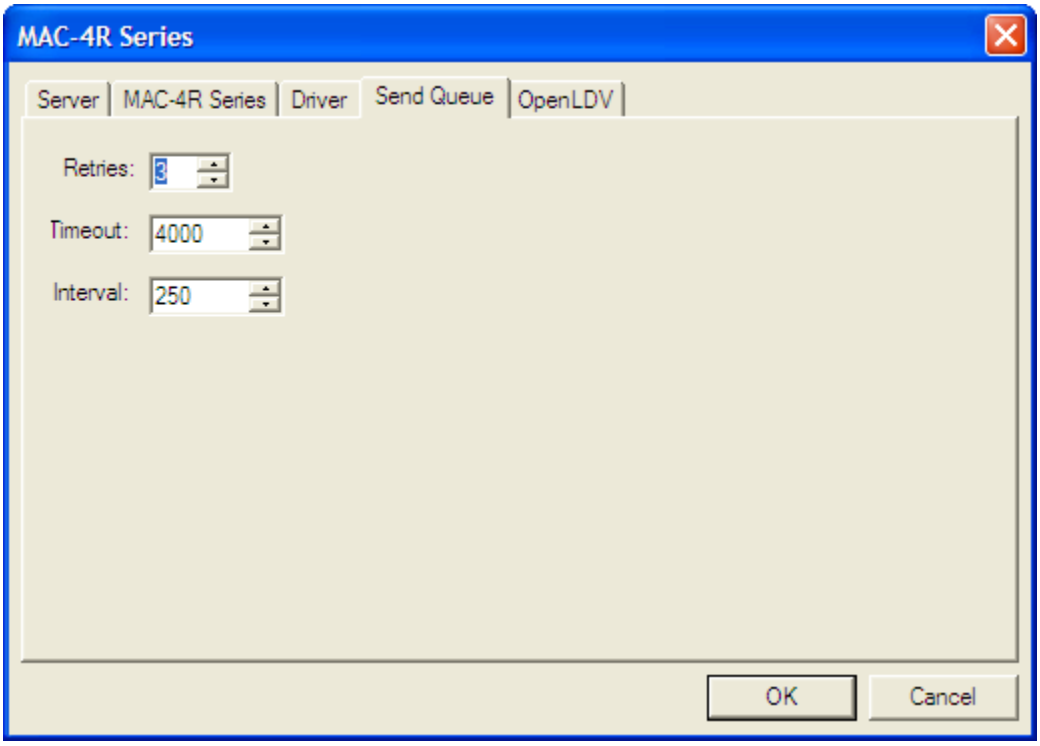
Heartbeat Interval (seconds) – This determines the frequency of poll commands to a given loop of controllers. Since the RTU's do not need a poll to transmit, the only reason for the poll is to supervise the communications line. The total interval time between heartbeats from the first panel to the last panel on that com line. For best throughput, take the total number of controllers on the com line and multiply it by 20 or 30. For example if you have 20 controllers, 20 x 20 = 400. The system will poll all 20 controllers within 400 seconds. This provides 20 seconds in between polls for activity and commands.



Copyright © 1999 – 2012 OSSI, LLC.

Domain – In this example we will enter a unique domain of 41. When the driver first loads it will look at the project file and must find at least one RTU with the current Domain and Net numbers listed. If the Driver can not find a RTU with Domain 41, Net 1 it will turn the top icon to Red indicating no connection has been made. Valid Domain numbers range from 1-65,530

Net – Valid Net numbers range from 1-254.



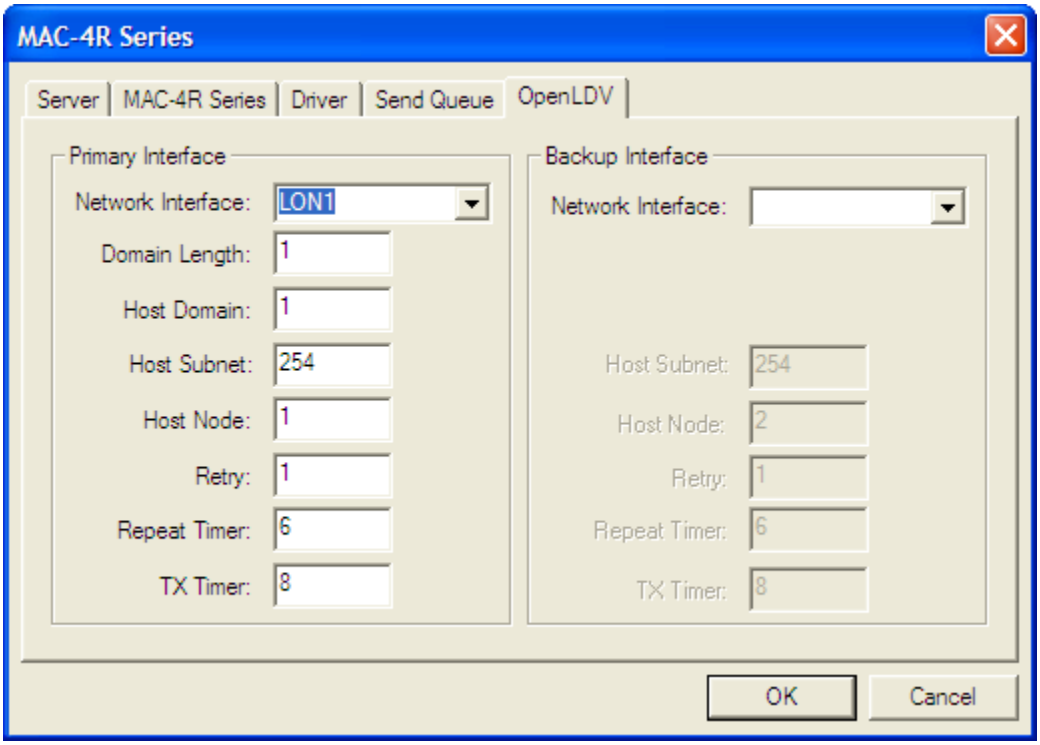
Send Queue – The values here control the number of RTU commands sent before a Panel Off-Line event is created.

Since the Echelon Network Interface always knows if a RTU is communicating, many time the Network Interface will inform the driver service that this RTU is not there by sending a x15 o NAK back to the driver service. When the Driver service receives a NAK it will not retry the command because it won't do any good to to so.

Copyright © 1999- 2012 OSSI, LLC.

If on the other hand no response is received from the Echelon Network Interface the retries will go out as programmed here.

We do not recommend changing any values here.



Network Interface – This picklist will display all Open LDV ports created using the Lonworks Interfaces program. The list will display all USB and IP ports available.

Backup Interface – Echelon offers the feature of redundant Network interfaces. If the primary interface fails the backup interface will take it's place. This is the same list of devices displayed under Network Interface. You can not have the same device operating under both rolls. If you do not have (2) network interfaces on a single loop just leave this one blank.

No other changes are needed beyond this point.

Copyright © 1999 – 2012 OSSI, LLC.

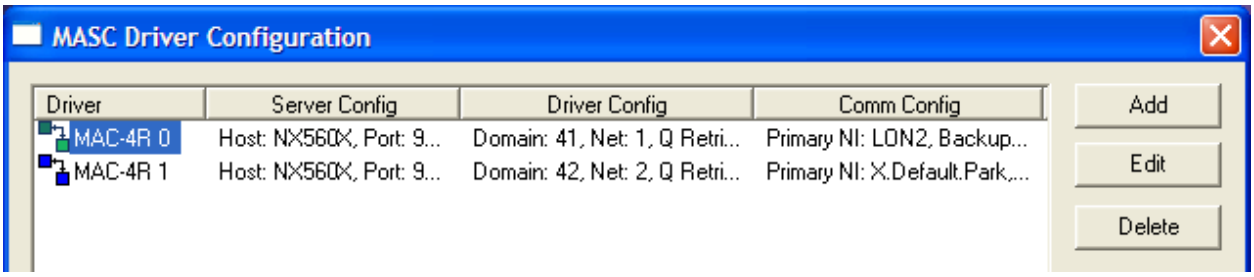
Domain Length – This is the length in bytes of the Hardware Domain number of the MAC-4R equipment.

Host Domain - This is the Hardware domain of the MAC-4R equipment. By default all equipment is shipped to operate on Domain 1.

Host Subnet, Host Node – This will be the Echelon address of the USB or IP device installed on this port. By default all control panels are programmed to communicate through a network interface at Subnet 254, Node 1. If you change this parameter you will also have to change the settings of each MAC-4R on the network.

Step 4

When you first add a driver the icon will be Blue indicating an Off-Line Status. To turn the new Driver On-Line, right click on the name of the driver and select On-Line.



If the controller is working properly the Icon should turn Green (Top) and Green (Bottom). The Top Icon indicates the Driver service is talking to the MASC Server Program. The Bottom Icon indicates communications with the Lon-Talk Network interface.

Step 5

Set the Address of the MAC-4R RTU

Go to Section 6 above for a detailed explanation of the procedure.

Copyright © 1999- 2012 OSSI, LLC.

- Open the Main Properly Screen MAC-4R controller you want to Set.
- Hit the Service Pin, A window appears, Asking if you want to use this Neural ID. Answer Yes.
- Hit Apply to Save changes
- Hit Load Device Address, The Off-Line alarm from the MAC-4R controller in the Alarm que should automatically Clear.
- Download Settings
- **You now have an operational MAC-4R RTU**

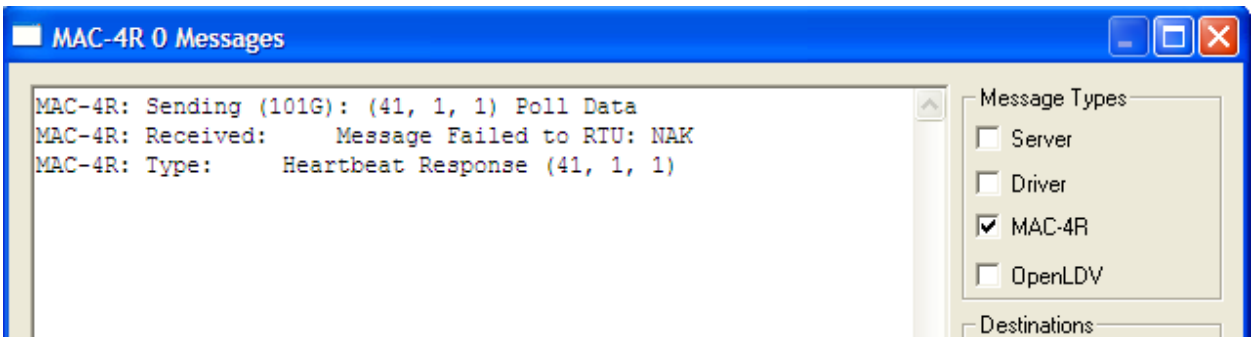
Clear any Events from the Alarm Que from Unknown Panel. If you are still getting unknown Panel Events the MAC-4R never received it correct panel address.

Valid Communications is always reported through the Panel On-Line Off-line status. If for any reason the Host computer is unable to talk to a MAC-4R controller you will receive an MAC-4R Panel Status Off-Line Alarm.

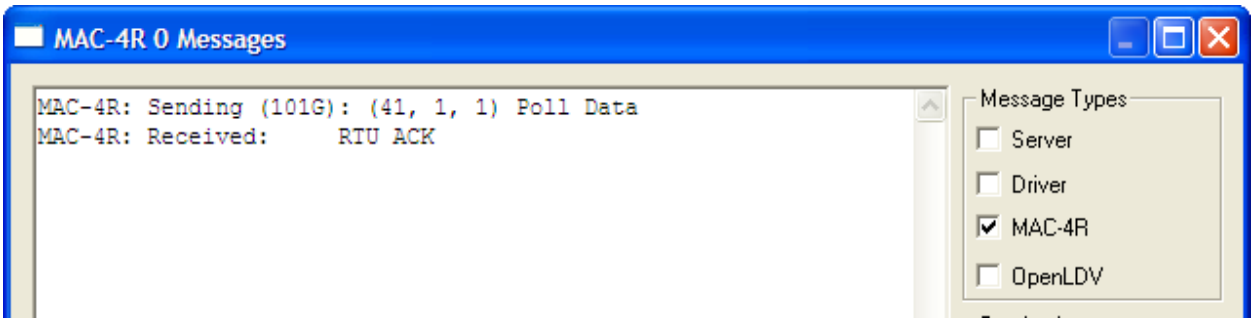
If for some reason the MAC-4R is no communicating MASC offers a data scope of the Communications Line.

- Open the Driver Server
- Right Click on the name of the Driver and Select Messages.
- Right click on the Banner and select Always on Top
- Make sure Message types of "MAC-4R" is checked. This is from a com loop where the controller is not connected properly to the USB adapter

Copyright © 1999 – 2012 OSSI, LLC.



- This is a screen from a MAC-4R controller communicating properly. Notice you get an RTU ACK after every command.



Programming the Basics

Here's a quick guide to programming a MAC-4R control panel so it's fully operational.

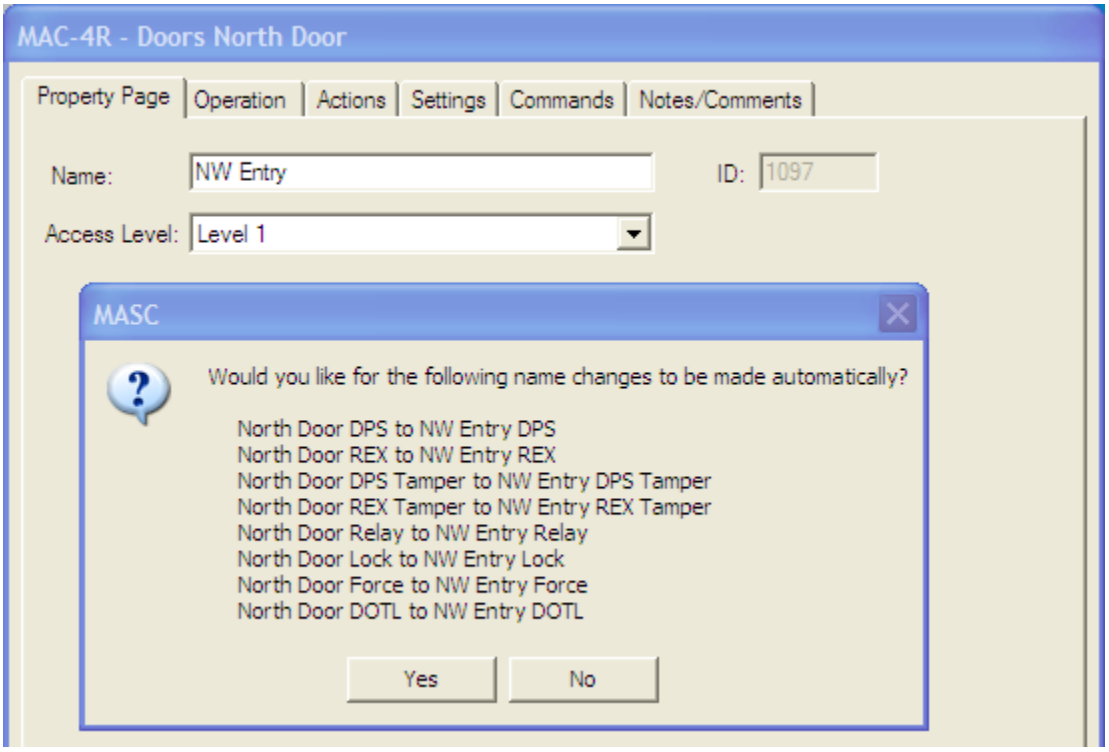
Step 1

Expand the Control Panel in the tree, expand the Door (Reader) Branch, Right click on a Reader and Select Properties.

Go to the Settings Tab and ***set the Bit count on the Reader***. This is the maximum number of bits you would expect to get for the cards in use.

Copyright © 1999- 2012 OSSI, LLC.

Go to the Property Tab and ***Name your door***. When you Save the change the system will ask if you want to automatically rename all the associated devices. Answer Yes.

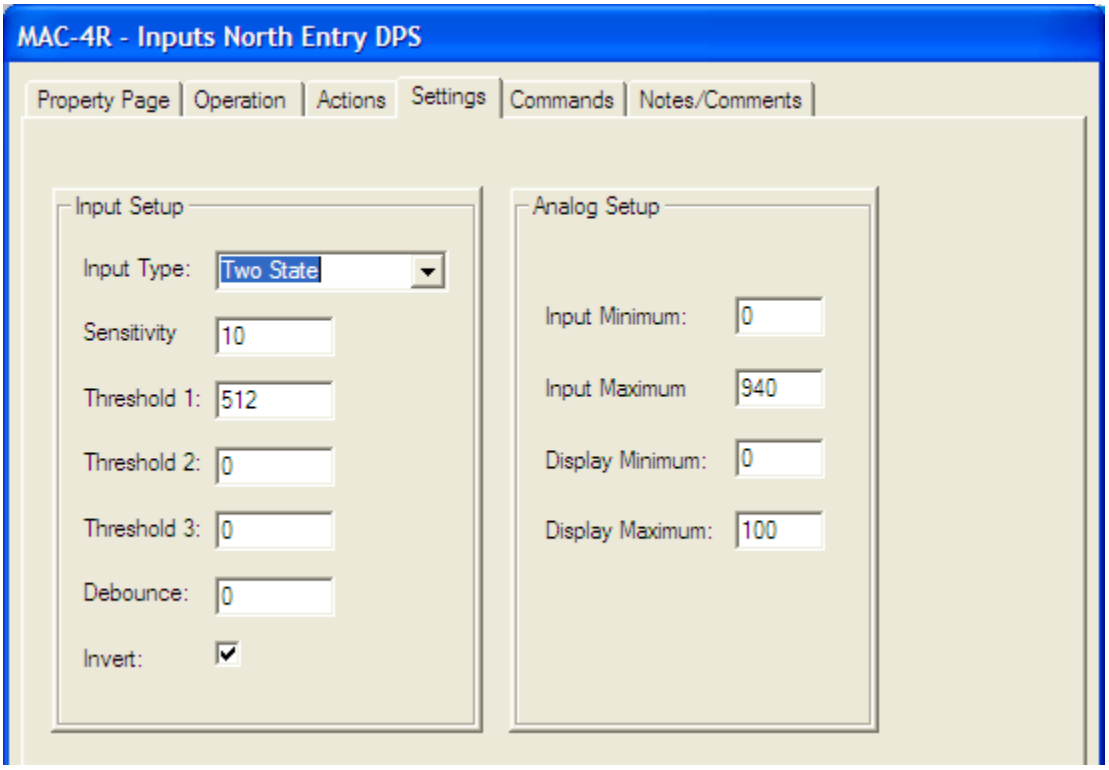


Step 2

Configure Inputs as N/O or N/C.

Expand the branch for the Inputs on the MAC-4R. Right click on the name of the Input selecting the Property page. Go to the Settings tab and select the proper Input Type and configure the Input as N/O or N/C. By default all points are N/O. Here's an example of programming the Door Position Switch (DPS) for Door 1 to Normally Closed (N/C).

Copyright © 1999 – 2012 OSSI, LLC.



Go to all remaining inputs that are N/C and add the check mark in the Invert Field.

For details instructions on changing the point type refer to the Input Section below.

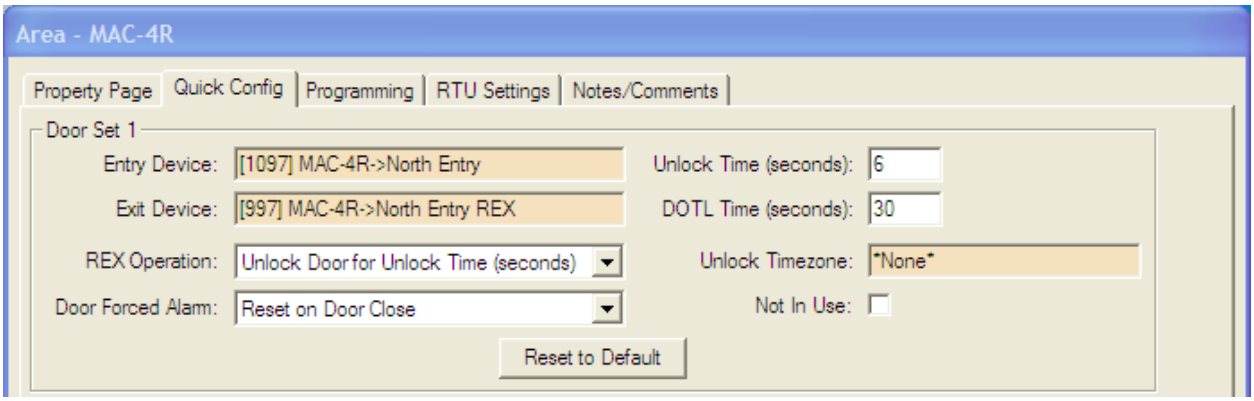
Step 3

Configure Door Operation

By default the MAC-4R has all 4 doors setup for Reader In, Rex Out by pulsing the Relay. If this matches your install you don't need to do anything in this step and can proceed to the next step.

If you want to change this operation we created a Quick Config tab located on the main property screen of a MAC-4R. Highlight the name of the MAC-4R and select Properties. Go to the Quick Config Tab.

Copyright © 1999- 2012 OSSI, LLC.



Any time you see a Golden Brown field know that it operates as a Drag-n-Drop field. Points can be dragged out of the tree and inserted into these fields.

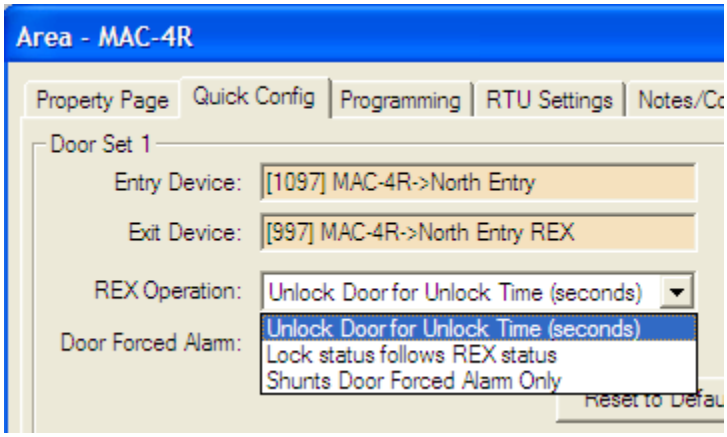
Adjustments made through the Quick Config tab will automatically make all the necessary adjustments on the Programming Ladder screen automatically. The Quick Config Tab provides about 20 different ways to configure a door.

Entry Device – The name of the entry device is normally a Reader. You can drag-n-drop reader names into this field. By default Reader 1 id for Door Set 1 etc.

Exit Device – This could be a Reader or a REX. If you have Reader 1 and an IN Reader, and Reader 2 as an OUT reader, go to Door Set 2 and check the "Not in Use". This will eliminate all the attachments from Reader 2 to it's Door Set.

REX Operation -

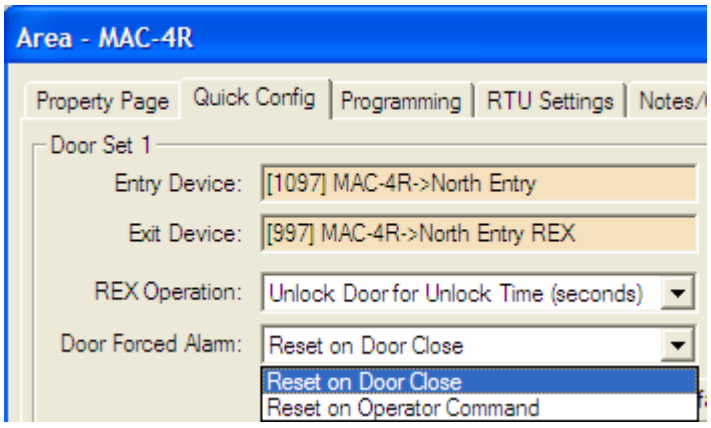
Copyright © 1999 – 2012 OSSI, LLC.



Unlock Doors for Unlock Time (Seconds) This is the default setup. A trip of the Rex device will unlock the door for the Unlock Time specified.

Lock status follows Rex Status – This would probably be used when you have Mag-Locks and motion sensors as Rex devices. If someone is standing in front of the Rex device, the Door will be unlocked for as long as the Rex device can detect them.

Shunts Door Forced Only – If you have Motions for Rex and door strikes that allow free exit your best solution is to shunt the Door Alarm upon exit. This option will not unlock the door so the door remains secure at all times.



Copyright © 1999- 2012 OSSI, LLC.

Reset on Door Close – With no guard staff to monitor alarms you have to ask yourself how to reset the alarm. This choice has the Alarm reset when the door closes.

Reset on Operator Command – If you have someone that will be monitoring the system and you plan on creating graphic maps this choice has the alarm go high and it will remain high indefinitely until someone sets it low. If chosen the best way to set it low is to reconfigure your door Icon Alarm state and have a Set-Off command go out when the operator clicks on the Icon.

Unlock Time – The time used by the relay to unlock the door.

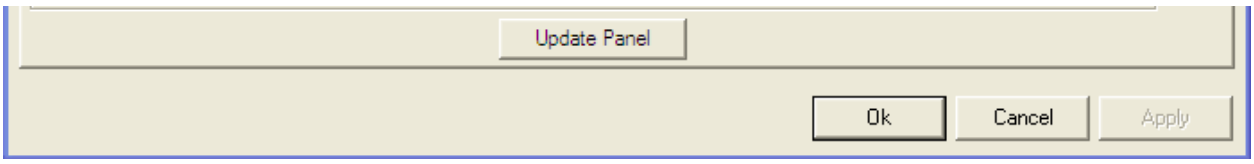
DOTL Time – Door Open Too Long or Held Open. This is the amount of time we allow for holding a door open on a valid read before creating a Door Held Open Alarm.

Unlock Timezone – This is a drag-n-drop field that can only be filled by dragging a Timezone from the same MAC-4R you are editing and dropping it into the field. It will unlock the door and automatically shunt the Held Open and Forced Open alarm points. There is only one master list of Timezones that can be found under the Access Control branch. All the Timezones in this leave get loaded into all the control panels.

Not in Use – This field eliminates any links to RTU points the current door set.

Copyright © 1999 – 2012 OSSI, LLC.

Whenever making any changes you can hit the ***Apply*** button to Save and have the Screen remain Open. The ***Update Panel button*** on the bottom of the screen is used to send the changes down to the control panel.

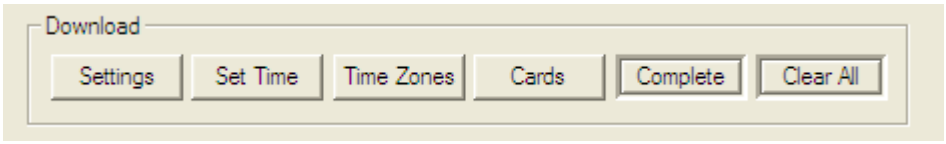


Step 4

Because we've made changes to Inputs, Doors, and the Door Configuration we need to Download ***Setting*** again.

Highlight the MAC-4R RTU Name, Right click and Select Properties to get to the main panel screen.

Select Download ***Settings***.



Step 5

To get your cards working you need to edit the following items under Access Control branch:

- Timezones, (Timezones must be manually download after any change. Go to the Site or Area Screen to download all the panels at one time.)
- Access Groups, or Door Groups, A group of doors assigned to an Access Set.
- Access Set. A group of Door Groups that can be assigned to a cardholder.

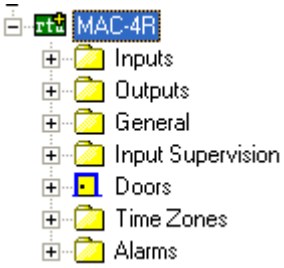
Copyright © 1999- 2012 OSSI, LLC.

- Add your cards and assign them an Access Level which is any combination of multiple Access Sets.

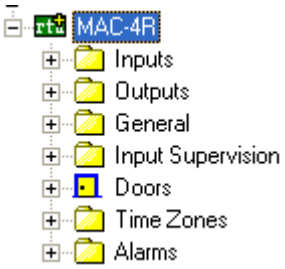
Congratulations your basic programming is done !

Copyright © 1999 – 2012 OSSI, LLC.

Programming the RTU's Point Settings

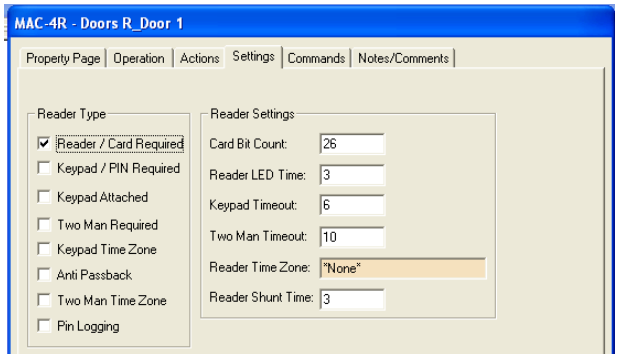


The following section describes configuration of the RTU settings (RTU Settings Tab) of the MAC-4R RTU. Each MAC-4R consists of Inputs, Outputs, General, Input Supervision, Doors, Time Zones and Alarms. Even though these points all have different functions, the programming of these points is basically the same. The only differences come in Inputs and Doors which both have a settings tab. The settings tab defines the operational mode of the device(s). Every point has its own set of screens and can be independently programmed. Left-Click on the name of the RTU and expand the tree so that all of the child-nodes are exposed as shown below:



1. **Doors –** To view the doors, double click on the folder labeled **Doors**. Right click on one of the **Doors** and select **Properties** from the menu, then select the Settings Tab:

Copyright © 1999- 2012 OSSI, LLC.



a. **Reader/Card Required:** Check this box for a card reader that requires a swipe with a valid card to activate the door control.

b. **Keypad/PIN Required:** Check this box for a card reader with a keypad. To activate the door control a valid Personal Identification Number (PIN) must be entered on the keypad. All PINs must be 4 digits in length.

c. **Keypad Attached:** The MAC-4R panel supports PIN only entry. The user can configure up to 16 4 digit PIN numbers for PIN only entry. The 16 PIN numbers correspond to card numbers 1 through 16. Upon entry of the PIN number, the card database is scanned for cards 1 through 16 and a matching PIN entry. If a matching PIN entry is located, the panel will grant or deny access based on the configuration and access assignments of that card number.

Copyright © 1999 – 2012 OSSI, LLC.

d. **Two Man Required:** Each card reader can be defined as a two man entry reader. This requires that two valid cards must be presented within a programmable time period (two man timeout period) before access is granted. If two cards are not presented within the timeout period a two man timeout event is logged.

e. **Keypad Timezone:** When selected, this will require keypad to look at time zone to see if keypad is in use.

f. **Anti Passback:** This puts the door in anti-passback mode of operation.

g. **Two Man Timezone:** This will require two man rule for the time specified in the time zone field.

h. **Pin Logging:** Will allow the user to specify any PIN.

i. **Card bit count:** The panel currently supports standard 26, 32, 34, 35, 37, 40, and 48 bit card formats.

j. **Reader LED time:** Measured in seconds, allows the user to set how long the LED changes state on valid reads.

k. **Keypad timeout:** Measured in seconds, determines how long the control panel will wait for a PIN code before timing out.

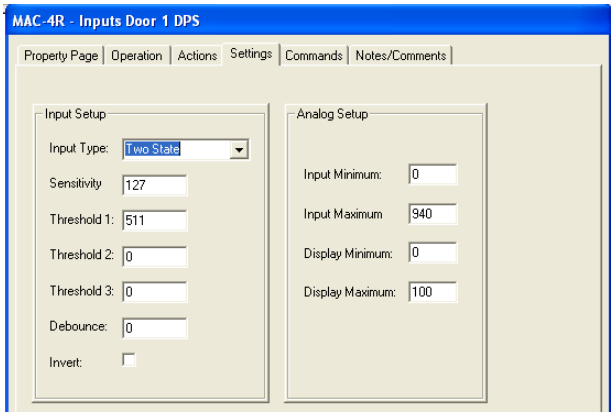
l. **Two Man Timeout:** Measured in seconds, time lapse between the two valid card swipes required to open the door if two man rule was specified.

Copyright © 1999- 2012 OSSI, LLC.

m. **Reader Timezone:** The user can enable time zone override of keypad and two man requirements for each reader. If override is configured and the specified time zone is active or "On" then the function is not required for access.

n. **Reader Shunt Time:** Measured in seconds, time card reader is disabled after valid card swipe.

2. **Inputs –** To view the inputs, double click on the folder labeled **Inputs**. Right click on one of the **Inputs** and select **Properties** from the menu, then select the Settings Tab:



a. **Input Type: -** Click on the down arrow to open the drop down list.

i. **Two State** - No end of line resistors, Contact is normally open or closed.

ii. **Supervised End of Line (EOL)** - One end of line resistor across a normally open contact.

iii. **Supervised Series -** One end of line resistor wired in series with a normally closed contact.

iv. **Supervised Four State -** Requires resistors across the switch and another one in series.

Copyright © 1999 – 2012 OSSI, LLC.

v. **Analog -** Wired to an analog device, whose output is not greater than 12 volts.

k. **Sensitivity:** Sets the measure of incremental change required before re-evaluation. Measured in mv. 12 mv is the minimum amount of change that can be detected. This value is normally increased to decrease the sensitivity of the point.

l. **Threshold 1:** This field determines the boundaries between Active and non-Active. The total value from high to low is 0 to 1024. T1 is used as the mid marker for 2-state inputs. A 2-State input only has two states so we divide 1024 by 2 and find the mid point. When the value of the point moves above 511 the point become Active.

m. **Threshold 2:** 3-State inputs needs the total value divided into 3 pieces while 4-State inputs need the pie divided into 4 pieces. The Threshold determines the boundary for each.

n. **Threshold 3:** Same as above.

	2-State	**3-State**	**4-State**
Sensitivity	50	50	50
Threshold 1	511	350	250
Threshold 2	0	700	500
Threshold 3	0	0	750

o. **Debounce:** Future Feature.

p. **Invert:** Changes to normal status of the contact from normally open to normally closed. If the box is open, the contact is wired normally open. Add the check mark if the contact is normally closed.

Copyright © 1999- 2012 OSSI, LLC.

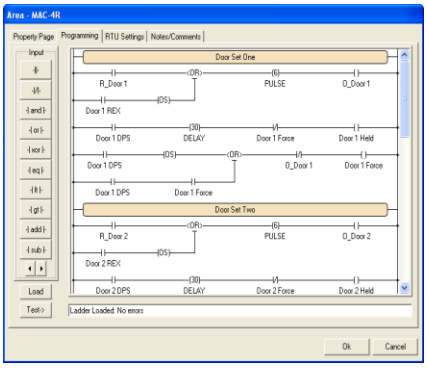
q. **Input Minimum:** Enter the minimum value you expect to receive from the analog device. 0-1024

r. **Input Maximum:** Enter the maximum value you expect to receive from the analog device. 0-1024

s. **Display Minimum:** Enter the lowest value you want presented on the screen.

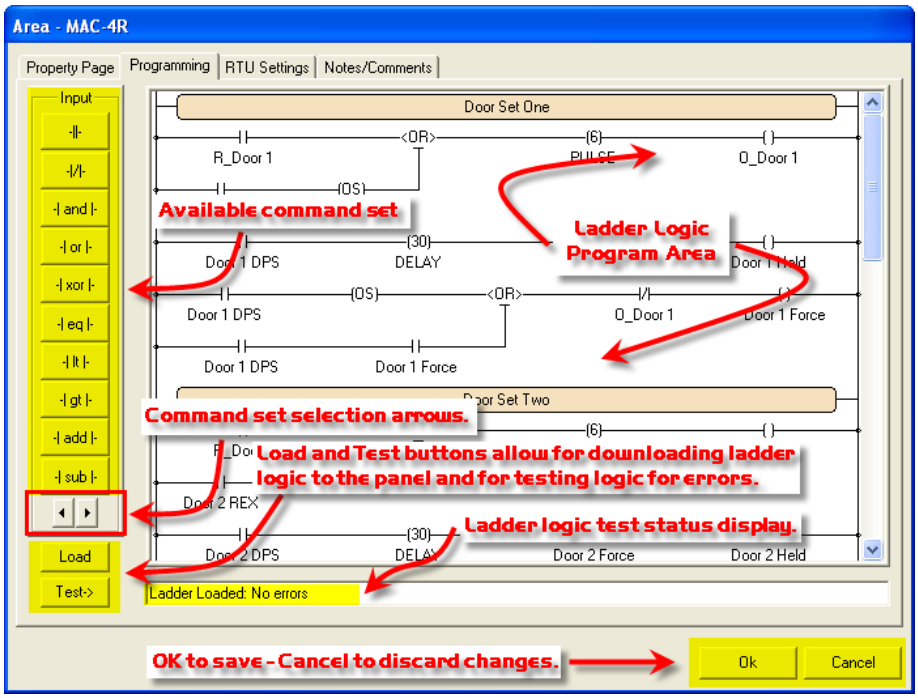
t. **Display Maximum:** Enter the maximum numerical value you want presented on the display screen. If it were a temperature gauge enter 120.

Copyright © 1999 – 2012 OSSI, LLC.



Programming the RTU's Ladder Logic

The following section describes configuration of the ladder logic (Programming Tab) of the MAC-4R RTU. Right-Click on the name of the RTU, select Properties, then go to the **Programming** tab as shown below:



Copyright © 1999- 2012 OSSI, LLC.

1. **Introduction:** The Programming screen provides a graphical representation for interlocking points with conditional statements. The instructions are user-defined by dragging and dropping points and commands on to the screen. The screen is divided into 5 different sections, one for each door and another section for basic I/O. Each door has 3 lines (or rungs) which are totally separate from one another. For example a door has 3 rungs in it because it has 3 different targets or actions that need to occur. The first line (rung) controls the output for the door, the second rung creates a Door held open alarm if the door is held open for over 31 seconds, and the third creates a door forced alarm if the door is opened when the door is still locked. Notice that each line has a different target and is not related to the other.

   There are seven main categories of ladder instructions located to the left of the graphic screen. The type of commands include: Input, Constant, Branch, Analog, General1, General2, and Shunt. To display the ladder logic programming commands in each set: use the Command Set Selection buttons.

   The rungs are read like an electrical drawing. To provide electrical flow or to set a target(s) high, closed connections are needed across the rung. When looking at the drawing, you cannot look at the point as being opened or closed. A point is ether in its normal condition (set off) or active (set on) condition.

Copyright © 1999 – 2012 OSSI, LLC.

The following symbols are used for points used as sources for making decisions. The symbols can be dragged and dropped over the top of another symbol to change it.

⊣/⊢ Has flow when the point is in its normal condition.

⊣⊢ No flow when the point is in its normal condition.

Every rung also has a value between 0 and 255. This allows for control and monitoring of up to 8 points through one rung. If only one point is being monitored the value will be 255 when active and 0 when normal.

2. **Basic Rules:** The following rules apply to ladder logic programming.
    a. The first point coming off the left-hand side of the screen is always considered a **source or decision** field. All source and Decision fields should have a point name and use ether the ⊣⊢ sign or ⊣/⊢ sign.
    b. Targets **points** are on the right side of the rung and should have a command with curved brackets. Available target commands come from **General 1 Set** and **Shunt Set**.
    c. The rung supports **multiple target fields**.
    d. A target point is using a follow command it can only be used on one rung. It can not exist in multiple rungs. If using a SetOn and SetOff command you can have the same target in two different rungs.
    e. All source or decision fields in the rung must be from the controller you are programming.
    f. Target points can be from the same controller or different controllers.

Copyright © 1999- 2012 OSSI, LLC.

Note: When comparing single points: use the Branch command set.

3. **Input Set:** Input set commands are used to control 8 points per command. The set will monitor either the first set of 8 or the second set of 8 points. A point must be provided to the set to determine which set is monitored. If the point provided is one of the first 8, it will monitor the first 8 points. If it's one of the second, it will monitor the second set of points. A value is created and compared with the rung.

Point On	None	1	2	3	4	5	6	7	8
Value	0	1	2	4	8	16	32	64	128

For Example if inputs 1 and 3 are active a value of 5 will be sent, 1 for input 1 and 4 for input 3.

a. -| and |- If any one of the 8 points goes high a value is forwarded.

b. -| or |- Used to ***Or*** one set of 8 points with another set of 8.

c. -| xor |- Sets flow high if one set or the other has a point high, but not both.

d. -| eq |- The value of two sets must equal to create flow.

e. -| lt |- The second set would have to be less than the first set.

f. -| gt |- The second set would have to be greater than the first set.

g. -| add |- Adds value of the second set to the first set.

h. -| sub |- Subtracts the value of the second set from the first set.

4. **Constant Set:** Constant commands allow the user to specify a constant value in place of a second set of points. The constant set should always follow the set it is compared with.

Copyright © 1999 – 2012 OSSI, LLC.

a. **–[and]-** Bit for bit comparison against the value of the constant set. Bit value must be high in both sets for bit to be set high in results.

b. **–[or]-** Bit for bit Or against the value of the constant set. Will result in one, the other, or both.

c. **–[xor]-** Bit for bit XOr against the value of the constant set which will result in one or the other, but not both.

d. **–[eq]-** Bit for Bit compare with value of constant set must be equal.

e. **–[lt]-** Compares the input value to the constant set and if less than turns all bits high or low.

f. **–[gt]-** Compares the input value to the constant set and if greater than turns all bits high or low.

g. **–[add]-** Adds value of the constant set to whatever the input value was.

h. **–[sub]-** Subtracts value of the constant set to whatever the input value was.

5. **Branch Set:** The Branch set splits the rung into multiple paths allowing logic between single points.

a. **-< and >-** Splits rung so both sources must be high before target will be set high.

b. **-< or >-** Splits rung so if either rung goes high the target will be set high.

c. **-< xor >-** Splits rung so if either one but not both source rungs go high target will be set high.

d. **-< eq >-** Branch one needs to equal branch two.

e. **-< lt >-** Branch two needs to be less than branch one.

Copyright © 1999- 2012 OSSI, LLC.

f. **-< gt >-** Branch two needs to be greater than branch one.

g. **-< add >-** Add branch two to branch one.

h. **-< sub>-** Subtract branch two from branch one.

6. **Analog Set:** Analog commands provide a value for one point between 0 and 255. The point being monitored must be setup for analog operation. The MAC-4R provides 10 bit resolution, when monitored the two least significant bits are dropped.

   a. **-< and >-** Used to AND two analog points together.

   b. **-< or >-** Used to OR two analog points together.

   c. **-< xor >-** Used to XOR two analog points together.

   d. **-< eq >-** Brings the analog value as the second value.

   e. **-< lt >-** Compares the value set on LT to input rung.

   f. **-< gt >-** Compares the value set on GT to input rung.

   g. **-< add >-** Adds set value to rung.

   h. **-< sub>-** Subtracts set value from rung.

7. **General 1 Set:**

   a. **-/ inv /-** Invert the bit pattern.

   b. **–(nonzero)-** If any bit is on, turn all bits on.

   c. **–(os)-** One Shot, will provide one opportunity to set the target high. It will ignore the return to normal on the source field and provide the next opportunity to set target high the next time source field goes high.

Copyright © 1999 – 2012 OSSI, LLC.

d. **–( )-** Target field: Target Point must be provided. Target will follow state of source field unless otherwise specified with another command.

e. **–(o)-** Send a Set-On command to Target Field. Target point must be provided.

f. **–(f)-** Send a Set-Off command to Target Field. Target point must be provided.

g. **–(out)-** Multiple Target Field, Controls 8 outputs. Targets follow state of Source fields.

h. **–(out-o)-** Multiple Target Field, Controls 8 outputs. Set-on command send to Output(s).

i. **–(out-f)-** Multiple Target Field, Controls 8 outputs. Set-off command send to Output(s)

8. General 2 Set:

a. **–(grp)-** Card Group command is assigned to Activation Group from the Card Holder Screen. Group number must be specified. It requires Reader point and ActivationGroup. Right click on the GRP command after it's in the ladder to set these values.

b. **–(elev)-** Not in use at this time.

c. **–[delay]-** Delays for the number of seconds specified, if source still high create flow for target.

d. **–[pulse]-** Send Pulse command to target. Number of seconds must be specified.

e. **–[count]-** Count number of times point goes high before target gets set high. Count value must be set (0-255).

Copyright © 1999- 2012 OSSI, LLC.

f. –[ct]- If Card Type equals set value follow flow. It requires Reader point and Card type selected. Right click on the CT command after it's in the ladder to set these values.

g. –[cn]- If Card number equals set value follow flow. It requires Reader point and Card number selected. Right click on the CN command after it's in the ladder to set these values.

9. Shunt Set:

a. –(s)- Shunt specified point, Shunt state follows source field.

b. –(so)- Send Shunt-On command to specified point.

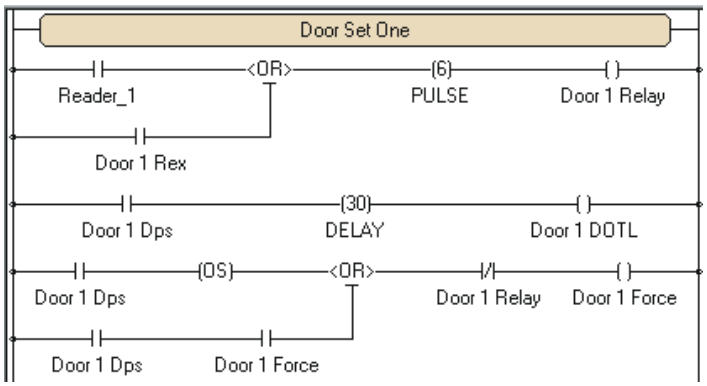
c. –(sf)- Send Shunt-Off command to specified point.

d. –(sout)- Shunt group of points. Shunt state follows source fields.

e. –(sout-o)- Send Shunt-On command to specified group of points.

f. –(sout-f)- Send Shunt-Off command to specified group of points.

10. Sample Standard Door Configuration: The following graphic illustrates a sample configuration for Door Set One:



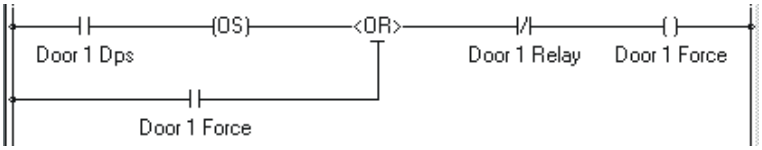
If the reader has a valid card or Door 1 Rex gets tripped a 6 second pulse will be sent to Door 1 Relay.

Copyright © 1999 – 2012 OSSI, LLC.

When DPS (Door Position Switch) goes out of normal, Delay 30 seconds, if still open, Door 1 DOTL (Door Open Too Long) alarm point go high following the DPS status. When DPS returns to normal the DOTL alarm point will return to normal.

When DPS opens, it goes through a OS (One Shot) to create a Door Forced Open Alarm. The OS provides one evaluation cycle to create alarm. If Door 1 Relay is in the normal condition which is off you still have electrical flow and the Door1 Forced alarm can be created. If the Door1 relay is on the electrical flow will be broken and no Door 1 Forced alarm will be created. The OS ignores the return to normal of the DPS, therefore the Door Force will not return to normal. A second Or branch is added that does not go through the OS. Notice the DPS on both lines. When the DPS returns to normal and the Door 1Force alarm is high the door force will return to normal.

11. Keeping Door Force high and setting it low through Graphics:

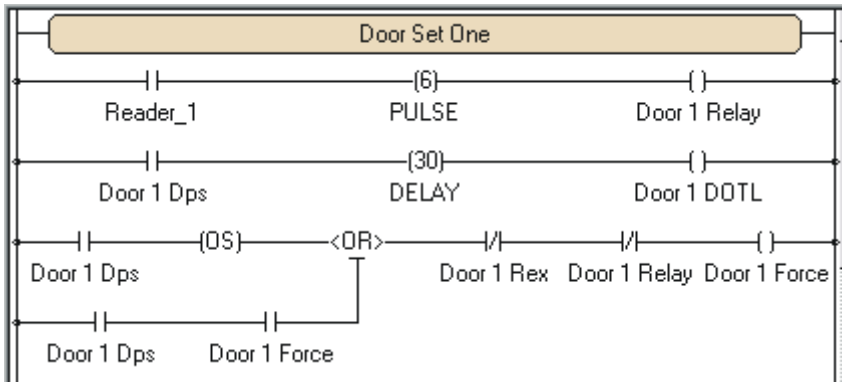


If you are using the graphic capabilities of MASC and want the Door Forced Alarm to go High and remain in alarm until an operator acknowledges the point you can modify the Ladder so the Door 1 Forces alarm will not return to normal. See the illustration above. The DPS was taken off of the second rung. Now because of the OS abilities to ignore the return to normal the point remains high.

In the graphics mode Right Click on the icon controlling the door, on the actions tabs, action set2, use the Resetdig (Reset Dialog

Copyright © 1999- 2012 OSSI, LLC.

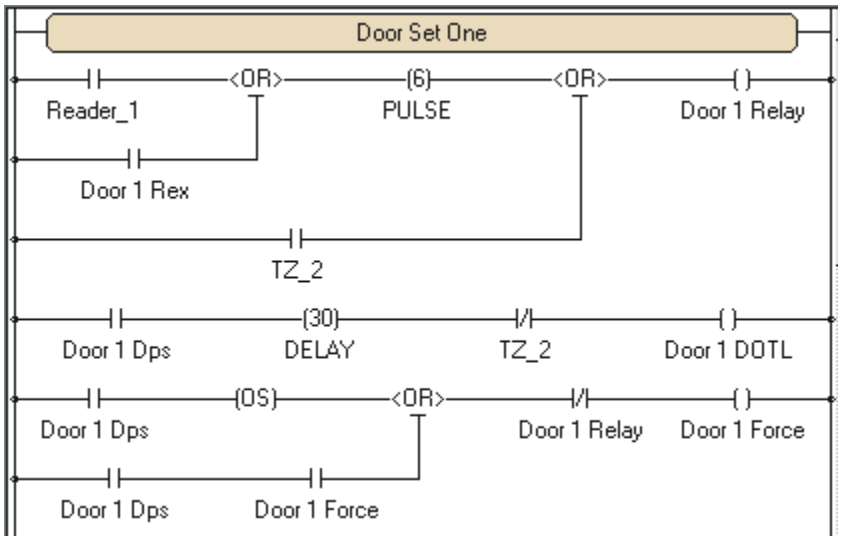
Box) command and drag the Door Forced target in the box. Check Mouse down, on states 3 and 4. This will reset the point only when states 3 or 4 are high.



If you have a Motion sensor working with door strikes and you don't want to unlock the door when someone walks by the motion sensor use this configuration. In this example, the Rex button is shunting the Door Forced alarm and not unlocking the door. The OR branch was taken off of the first branch so the rex will not unlock the door. Door 1 Rex was added in series with the Door Force Open Alarm rung so if someone walks by the motion sensor the electrical flow will be broken thereby not creating the Door 1 Force alarm.

The Motion Sensor's hardware setting caused the motion to go on for 5 second intervals, allowing someone 5 seconds to open the door. Keeping the door open longer than 5 seconds will not create a Door Force because of the OS (One Shot). The one shot creates one opportunity to create the Door Forced alarm at the time the door is initially opened.

Copyright © 1999 – 2012 OSSI, LLC.



Timezone controlling a door to unlock based on time.

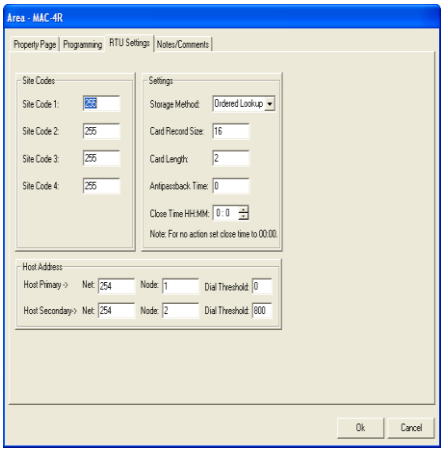
Open the programming tab of the MAC-4R and expand the same controller in the window to the left. Expand the time zone leaf of the panel you're working on.

Drop an Or branch after the pulse time on Door 1 Relay rung. Then add the time zone to the branch. Because the Or is after the Pulse command the relay will be held on for the entire time zone. If the Or branch is before the pulse, a 6 second pulse would be sent to the relay when the time zone first started.

The Time zone should also be added to the Door 1 DOTL alarm to shunt the alarm during the time zone. When the time zone activates it will break the electrical flow and not allow a Door 1 DOTL alarm to be created.

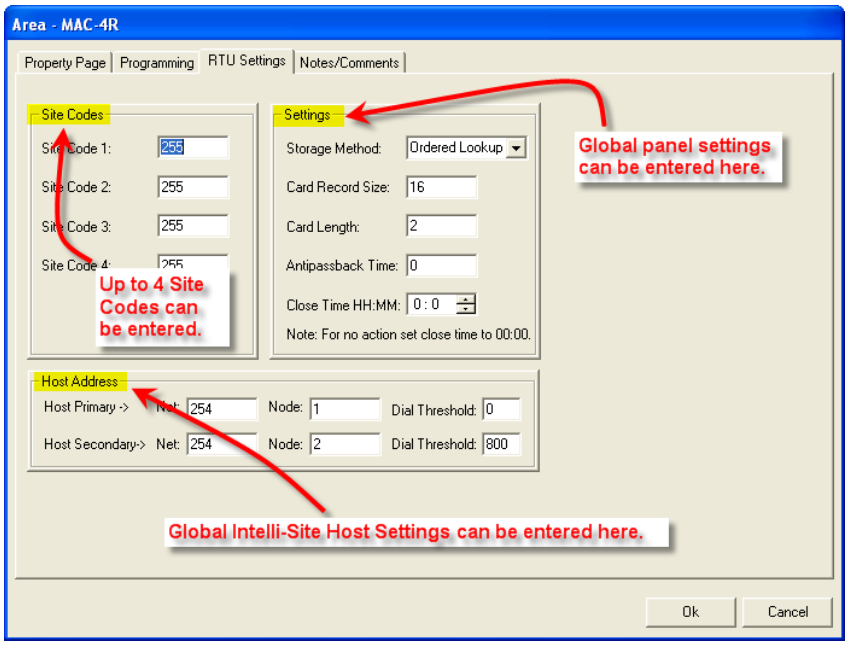
Adding the Time zone to the Door 1 Forced alarm is not necessary because the Door 1 Relay will be on during the Time zone in effect shunting out the Door 1 Forced alarm during the Time zone.

Copyright © 1999- 2012 OSSI, LLC.



Programming the RTU's RTU Settings

The following section describes configuration of the RTU settings (RTU Settings Tab) of the MAC-4R RTU. Right-Click on the name of the RTU, select Properties, then go to the **RTU Settings** tab as shown below:



2. **Site Codes:** The site codes can be entered individually on the card screen or globally on this screen. MASC allows up to four site codes. A value of 255 is a valid site code for any site. If there is only one site code in the facility that site code must be entered in all four slots. If the MAC-4R sees a 255 in any of the slots it will still allow any site code.
3. **Storage Method:** Ordered lookup can support up to 16,000 12 digits cards while the Flat file supports up to 52,000 5 digit cards. Card numbers of 52,001 through 65,000 are not supported using Flat File mode. Ordered Lookup is the default.
4. **Card Record Size –** 16 is the default size for Card Records (Bytes).

Copyright © 1999 – 2012 OSSI, LLC.

5. **Card Length –** 2 is the default size for Card Length (Bytes).
6. **Anti Passback Time –** The panel supports timed anti-passback. Time supported is expressed in minutes ranging from 0 to 255.
7. **Close Time HH:MM -** At the close time the MAC-4R will clear any points that have been forced on. To disable this feature enter a value of 0.
8. **Host Settings –** Host setting defaults should not be changed.

Copyright © 1999- 2012 OSSI, LLC.