Lab 1 1100 Email Support

About this Lab – MicroLogix

MicroLogix 1100 Series B controller now supports email natively. In RSLogix 500 v7.20, SMTP (email protocol) configuration is added and email can be initiated by an Ethernet MSG instruction. This bypasses the additional hardware, 1761-NET-ENIW, previously needed for email. An ASCII string email message can be sent to any computer, cell phone or pager capable of receiving email to alert the appropriate personnel with alarm information and/or production status.

The following sections explain what you'll be doing in this lab session, and what you will need to do to complete the hands-on exercises.

This lab takes approximately 20 minutes to complete.

What You Will Accomplish In This Lab

As you complete the exercises in this hands-on session, you will:

- Learn how to send an email message from a MicroLogix 1100 Series B controller

Who Should Complete This Lab

This hands-on lab is intended for individuals who:

- Would like to demonstrate email capability in MicroLogix 1100 Series B controller

Tools and Prerequisites

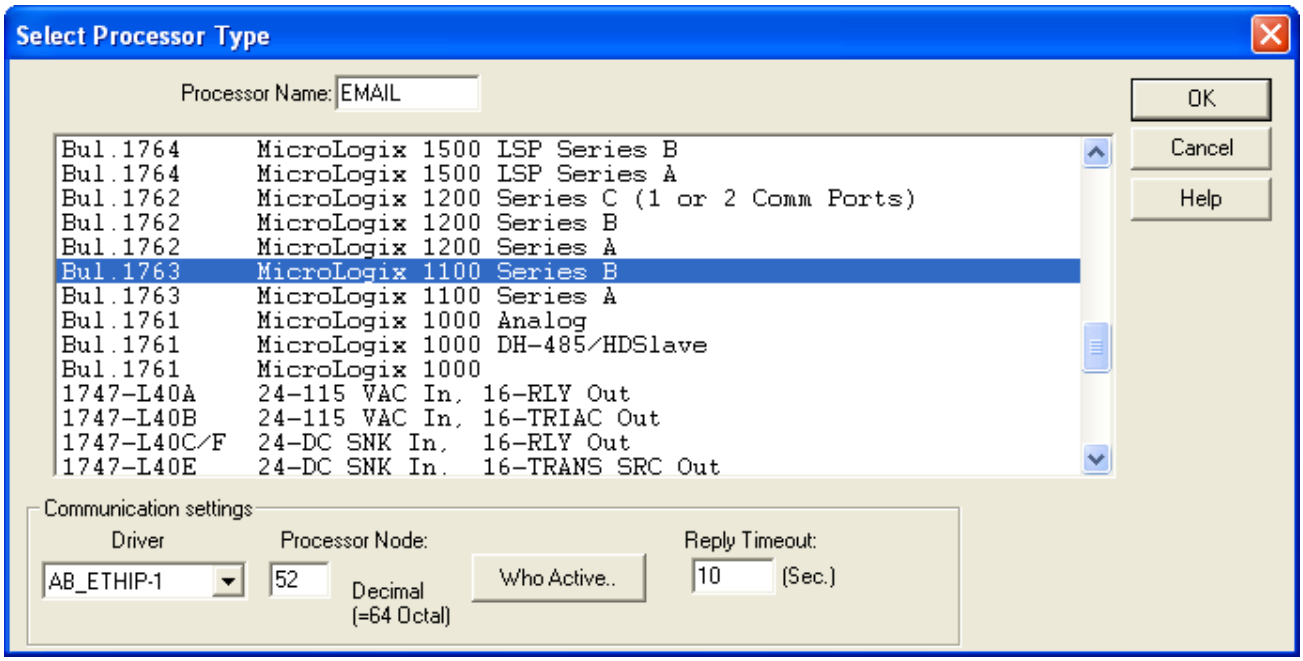
- RSLogix™ 500 (version 7.30)
- MicroLogix 1100 Series B (firmware v.4)
- ArGoSoft Mail Server
- Microsoft Outlook Express

Start the software and open a project

At the Desktop, double click on the ***RSLogix 500*** icon to open.

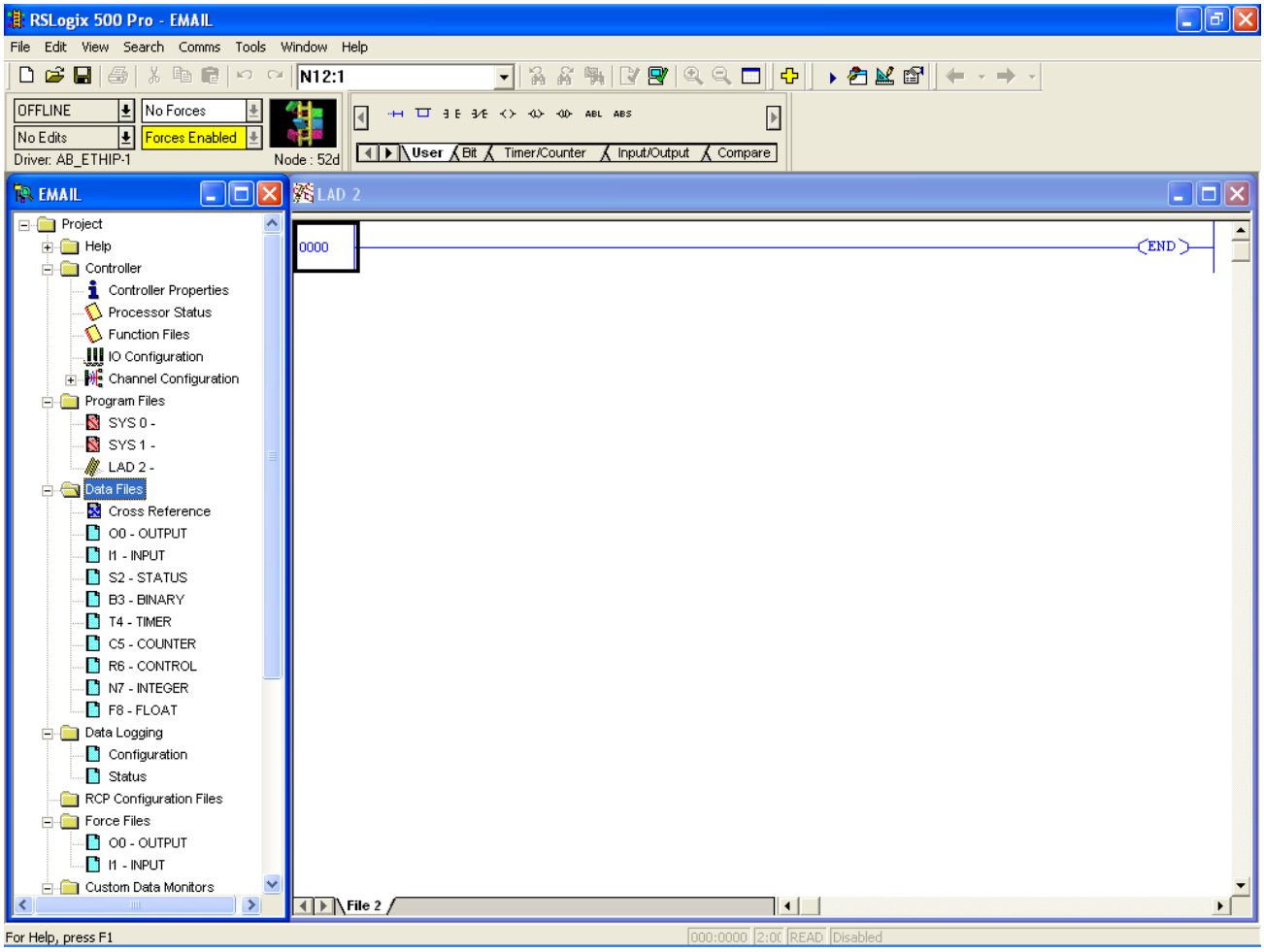
In the tool bar icons, click on ***New*** to create a new project:

Enter Processor Name ***'EMAIL'*** and scroll down the list to select ***Bul. 1763 MicroLogix 1100 Series B*** controller as shown:



Click ***OK***.

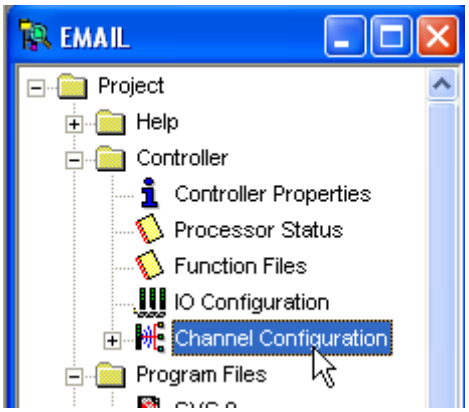
RSLogix 500 project should look like this:



This is a good time to introduce a key shortcut added to RSLogix 500 to take your windows arrangement back to the default settings. To do this, you normally had to go through the menu sequence: ***Window -> Arrange… -> Default Project -> OK***. You can now accomplish the same task by just using the key combination ***Ctrl+K.***

Configure Communication channels

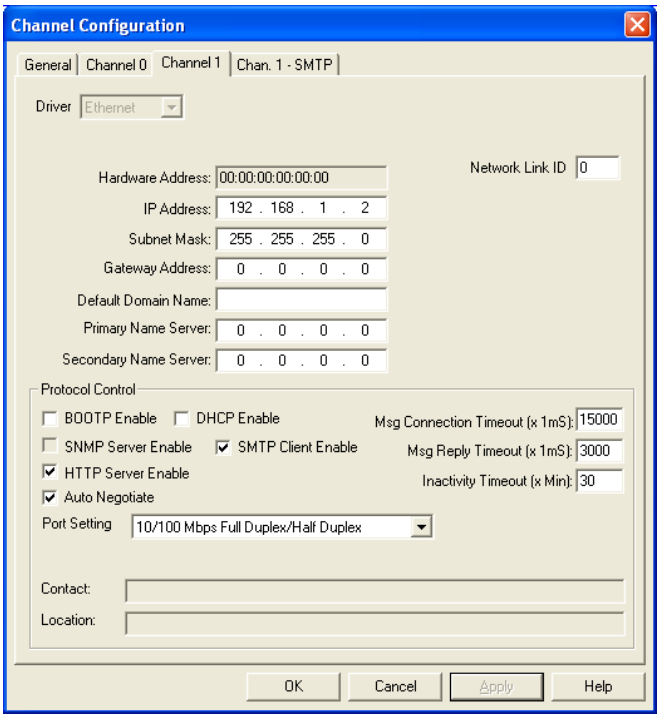
To configure SMTP support, double click on ***Channel Configuration***:



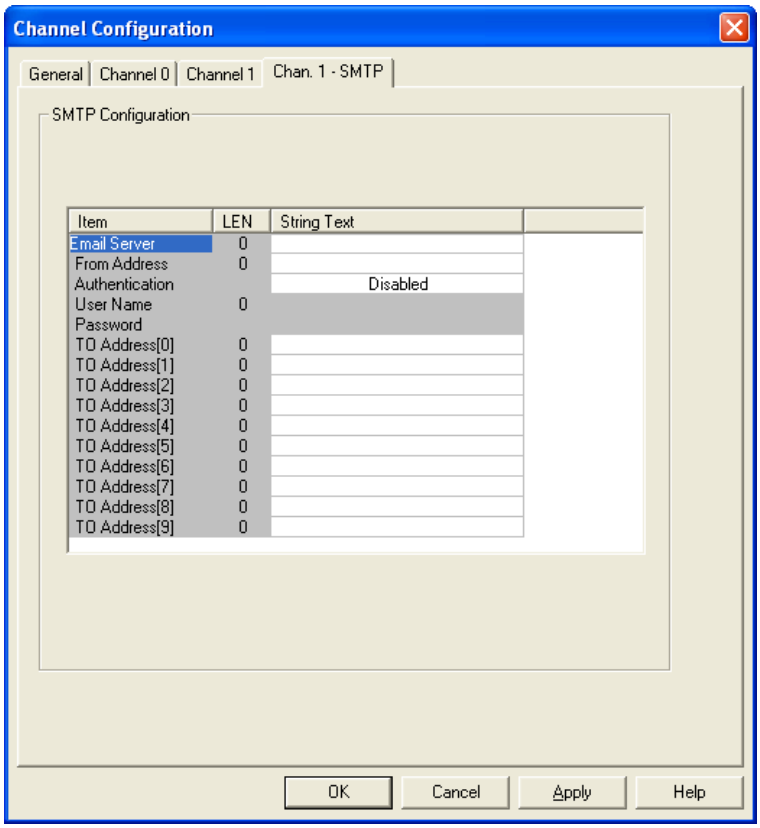
Go to ***Channel 1*** tab.

Follow the configuration as shown in the screenshot:

- ***Uncheck*** BOOTP Enable
- Leave DHCP ***Unchecked***: We will be using a Fixed IP address. The local PC has a stand-alone email server that will be able to receive the email sent from the MicroLogix 1100 controller.
- (NEW!) ***Check*** SMTP Client Enable: enable SMTP configuration
- Configure the IP Address and Subnet Mask fields with the information shown below:
  - ***IP Address:*** `'192.168.1.2'`
  - ***Subnet Mask:*** `'255.255.255.0'`

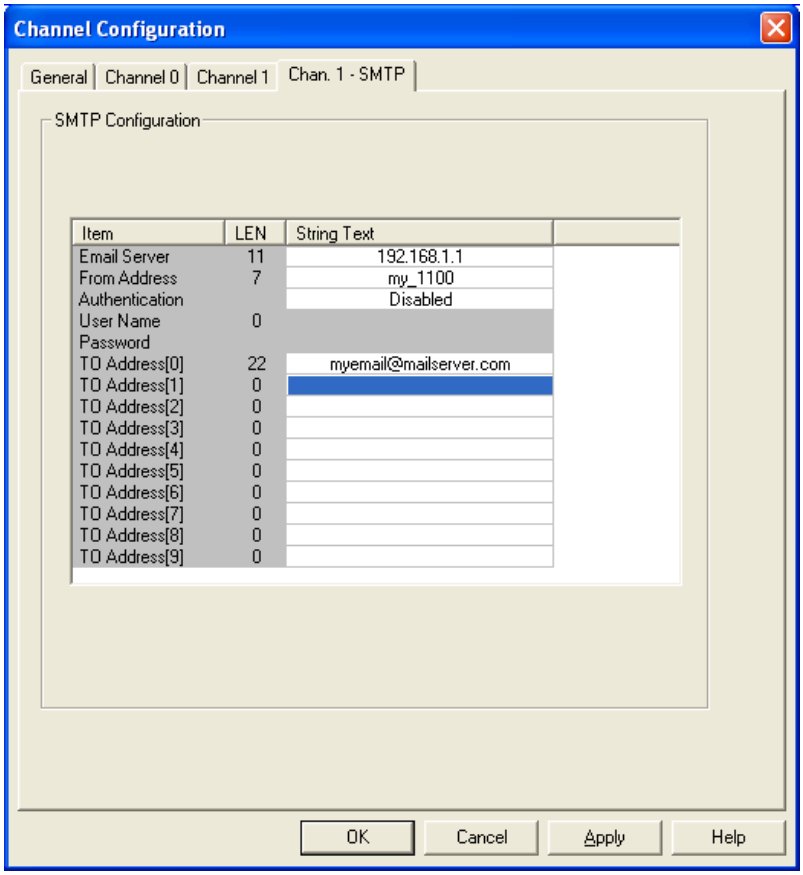


When SMTP client is enabled, a new tab, Chan.1 – SMTP, appears in the window. Click on ***Chan.1-SMTP*** to open.



In this lab, we will use a standalone email server installed on the local PC (ArGoSoft Mail Server Freeware). This service starts automatically and is preconfigured to receive email messages from the MicroLogix 1100. In your specific application, your ***Email Server*** will be provided by your ISP (Internet Service Provider) as a domain name for the email server (i.e. "Hotmail.com). For this lab, you should configure this screen as follows:

- ***Email Server***: enter the email server name (the default domain name in Channel 1 tab will be appended to the end of the email server name) or its IP address, which is ***'192.168.1.1'*** and then ***Enter***
- ***From Address***: enter any string without space to identify this controller. Type in ***'my_1100'*** and then ***Enter***
- ***Authentication***: if enabled, you must have a valid login to access the email server. We will leave it ***disabled***.
- ***TO Address[0]-[9]***: Enter up to 10 destination email addresses. For this lab, we are using a local email server. The email server has an account for one email. You must use the name of that account in TO Address[0] typing: '**myemail@mailserver.com**' and then ***Enter***

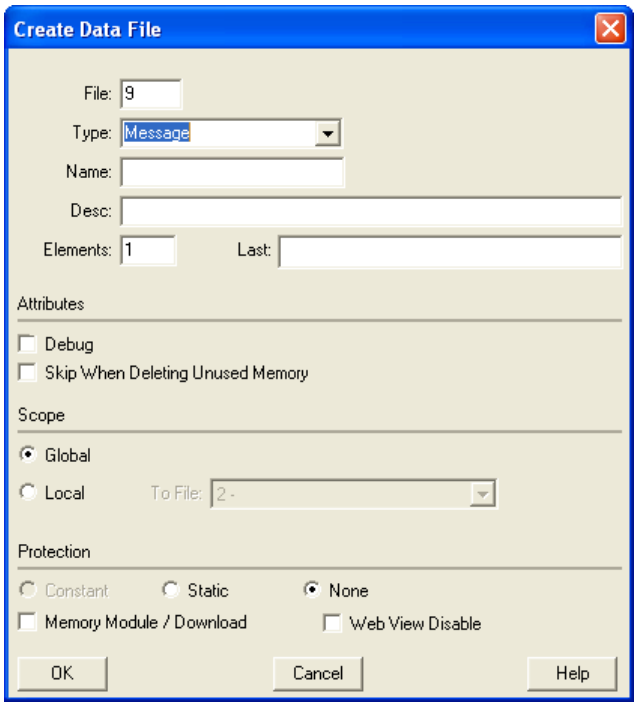


Click ***Apply*** and then ***OK***. You are done with configuring communications and email support for this controller.

Create Message and String Data Files

Now we will add a couple data files to support email using MSG instruction. Create a Message file (MG9) by right click on ***Data Files*** folder and select ***New***:

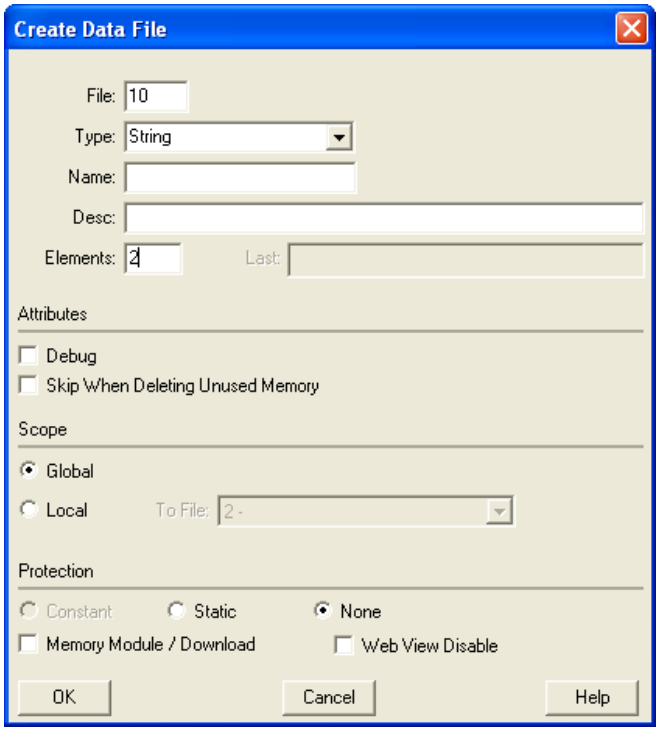
For file 9, change Type to ***Message***:



Click ***OK***. File MG9 should appear in the Data Files folder in the Controller Organizer.

Create a String file to store the actual email message: subject line and body text. Right click on ***Data Files*** and select ***New***.

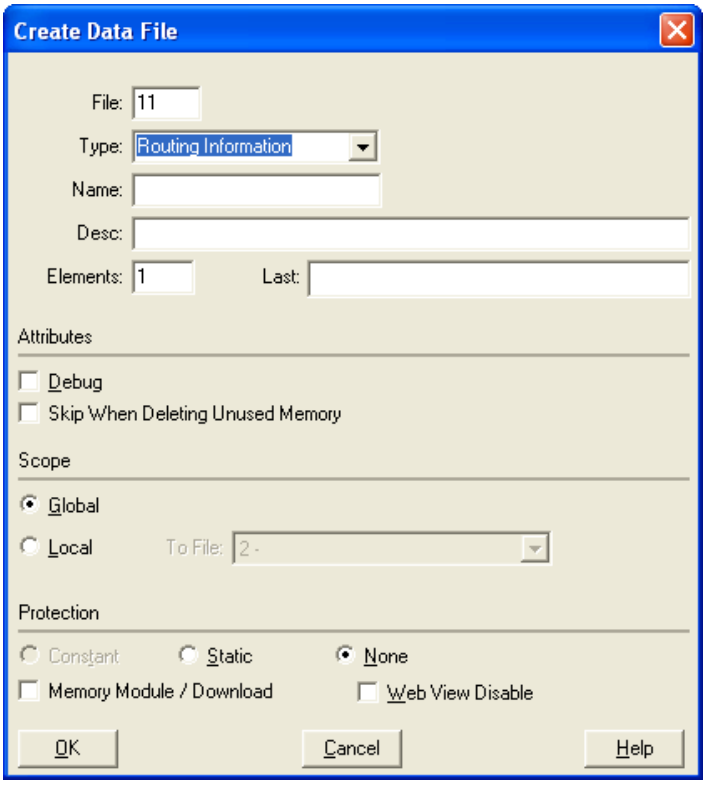
For file 10, configure type to ***String*** and Elements ***2*** (email subject line and email body text).



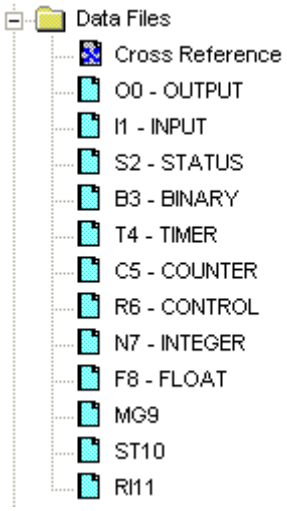
Click ***OK***. File ST10 should appear in the Data Files folder in the Controller Organizer.

Lastly, create a data file to store routing information. Right click on ***Data Files*** and select ***New***.

For File 11, select type ***Routing Information***:

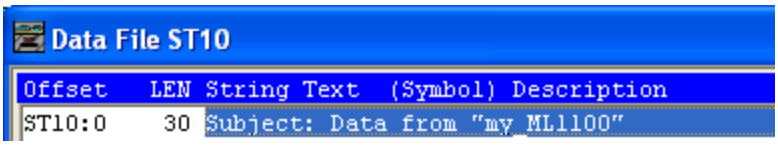


Click ***OK***. Your Data Files folder should look like this in the Controller Organizer:

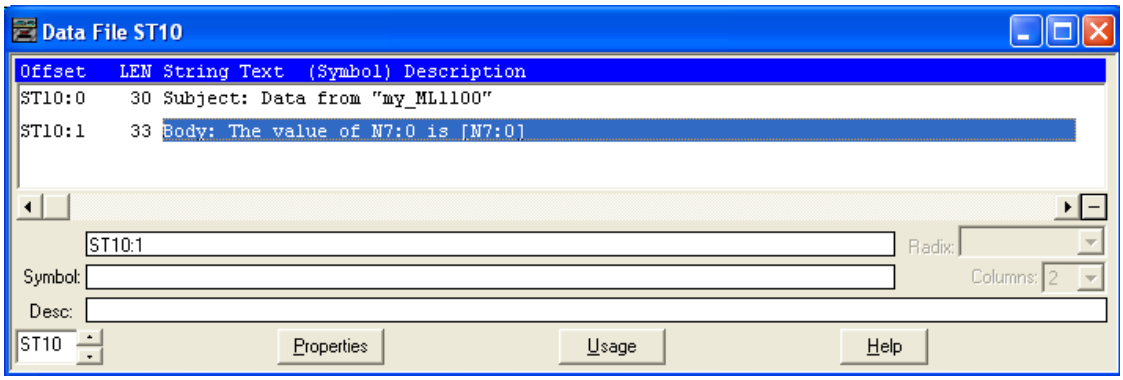


Double click on ***ST10*** to create our email message. The 1st string element is the email subject and the 2nd string element is the email body text. Both strings are limited to 82 characters max. Both strings also support embedded variables inline indirection for **integer** and **long** file elements.

For ST10:0, double click on the ***String Text field*** to enter the email subject line ***'Subject: Data from "my_ML1100"'*** and press ***Tab.***



For ST10:1, we will create the email body text. Let's monitor the element 0 value in Integer file N7. Type a line similar to the one below. To include the value of the Integer field, it must be enclosed by brackets (example **`[N7:0]`**). Press ***Enter*** to accept the line

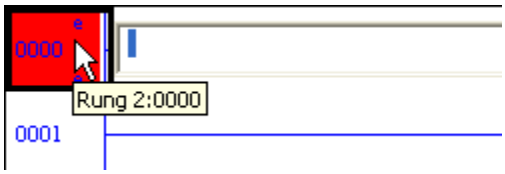


Close ST10 when done.

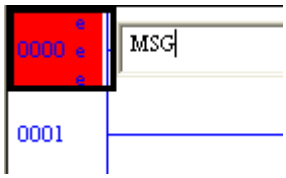
Double click on the ***N7 – Integer*** file and place a number into ***N7:0***. This is the data that will be sent in the email, then press ***Tab*** and close ***N7***.

Create Message instruction for Email

In the opened ladder program, LAD 2, configure a standard MSG instruction to send email. Double click on rung ***0000*** so it becomes edit enabled:

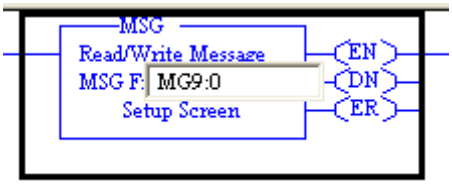


Type ***'MSG'*** in the field:

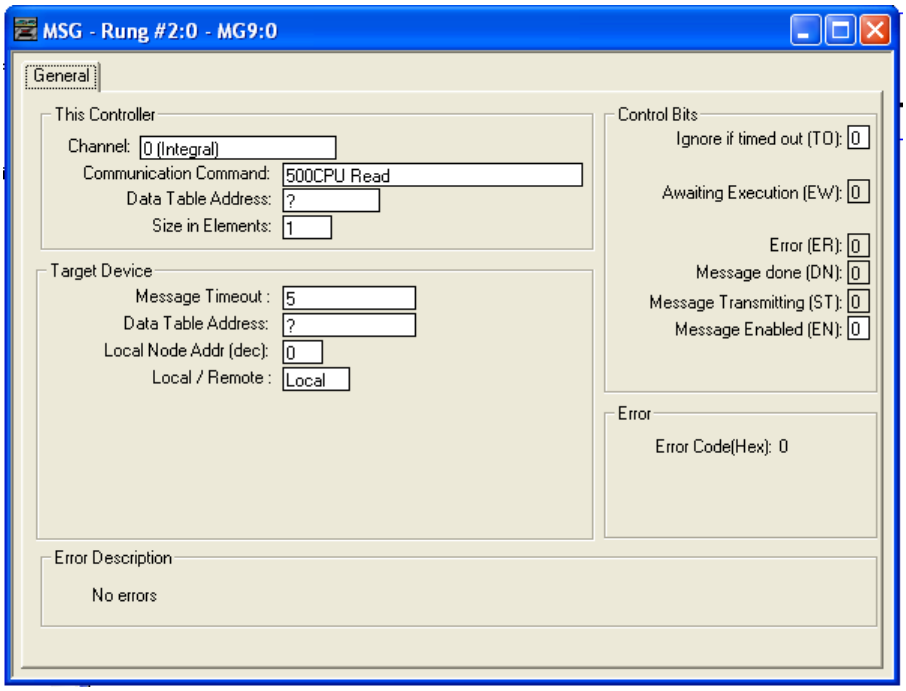


Press ***Enter***.

In the MSG File field, type ***'MG9:0'*** and press ***Enter***. Press ***OK*** at the pop-up window.

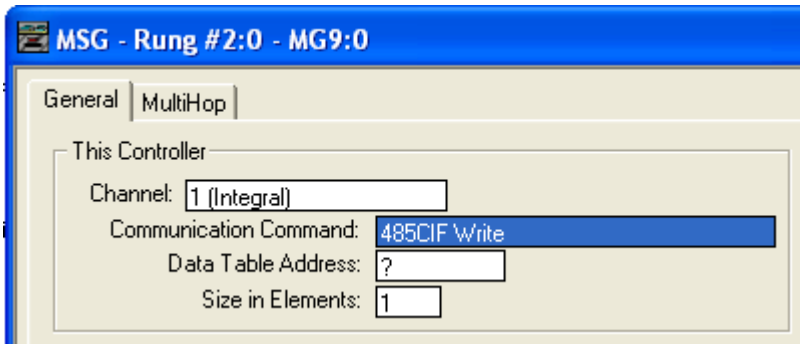


The MSG Setup Screen pops up as shown:

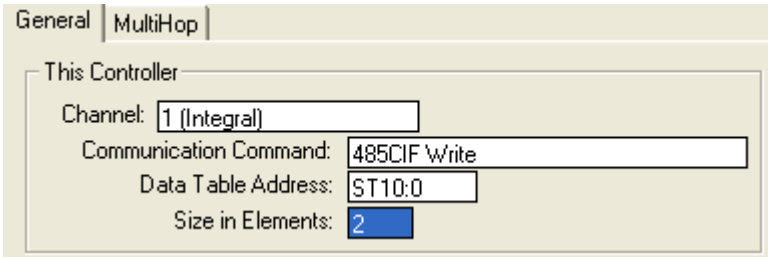


Double click on Channel 0 (Integral) and Change Channel to ***1 (Integral)***. Channel 1 is the Ethernet port.

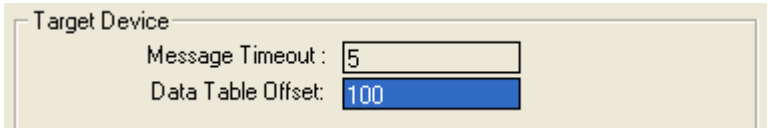
For email, we will use 485CIF Write communication command by double click on the field and select ***485CIF Write*** in the dropdown menu:

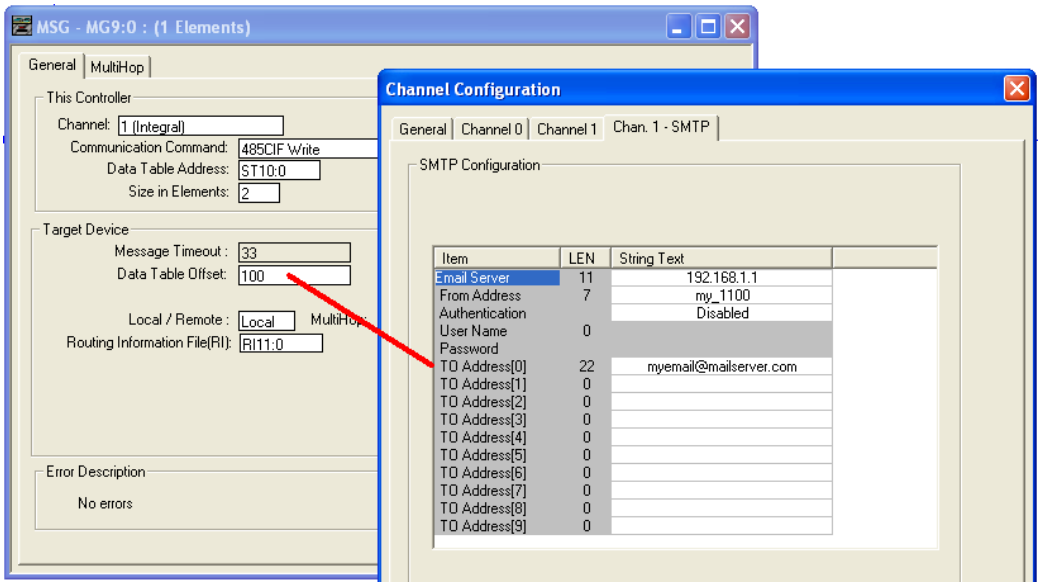


Recall, our email message strings are stored in Data File ST10, with 2 elements in total. So enter the following for **Data Table Address** and **Size in Elements** as shown:

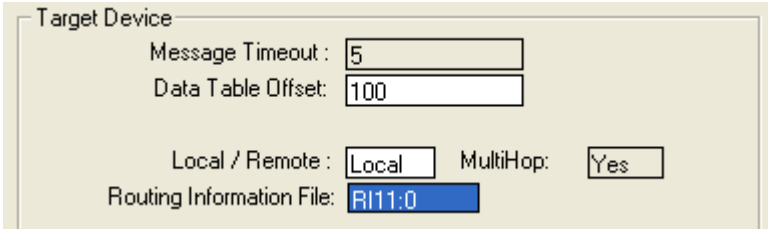


In the Target Device section, the **Data Table Offset** points to *one of the ten* destination email addresses in Chan.1-SMTP configuration. Recall in the Chan. 1-SMTP configuration, you can enter up to 10 destination email addresses (TO Address[0] to TO Address[9]). Here, the Data Table Offset value ranges from 100 to 109 to correspond to each destination address. Enter ***'100'*** so this MSG instruction will send email to "***TO Address[0]"***

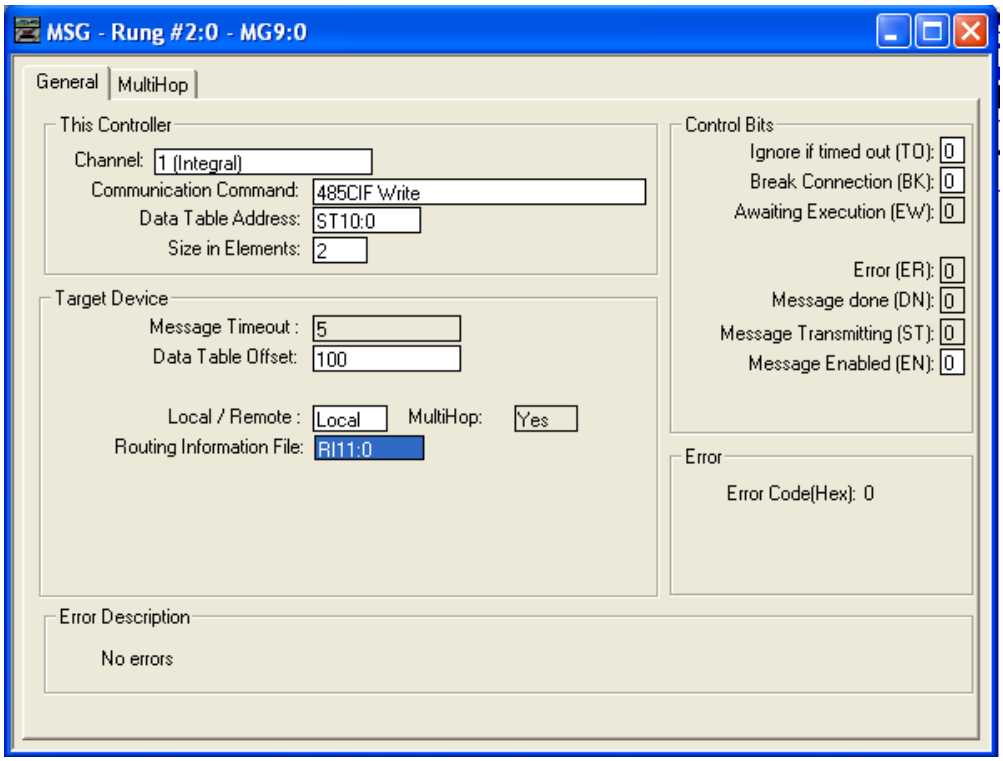




Enter ***'RI11:0'*** for Routing Information File:

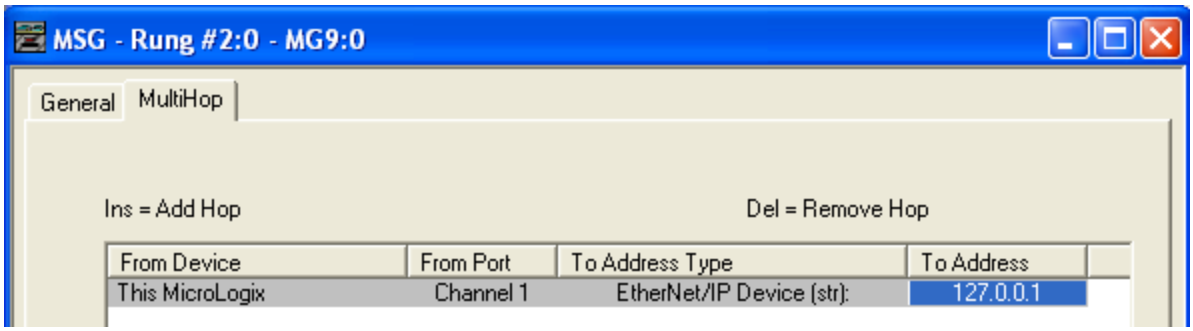


The General tab should look like this when done:



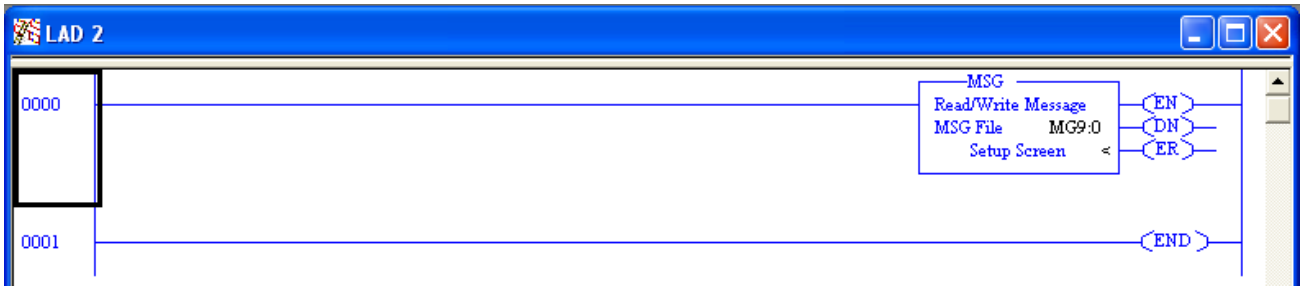
Click on the ***MultiHop*** tab.

The Destination IP address of this MSG instruction is the local controller's IP address. We may use the actual IP address of the controller or the "universal" local IP address of '127.0.0.1'. Type in ***'127.0.0.1'*** in the To Address field:



Close the Setup Screen. This MSG instruction is configured to send out an email to the email address entered in TO Address[0] in Chan.1-SMTP configuration.

Click the ***Verify Program*** button. Your rung should be accepted with no errors:



Click the ***Save*** button. Save the program with file name ***'EMAIL'***.

Download Email application

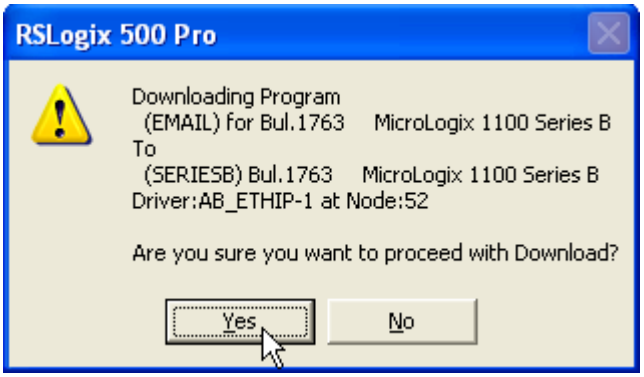
Now we are ready to download our program to the MicroLogix 1100 controller. The current configuration for our lab's MicroLogix 1100 is DHCP-disabled and using static IP address of 10.91.100.81. To download our program, go to ***Comms*** > ***System Comms***:

Browse the ***EtherNet/IP*** driver to select your station's MicroLogix 1100's IP address: ***192.168.1.2***

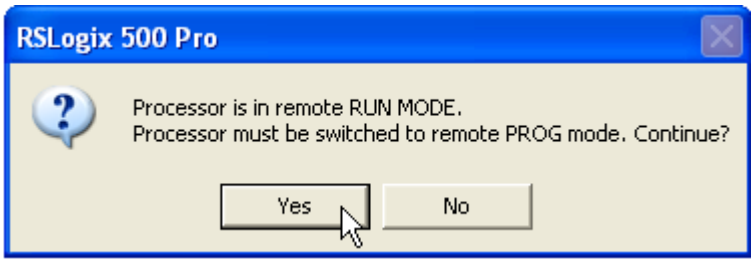
Click ***Download***.

If prompt for Revision Note, just click ***OK***.

Select ***Yes*** to proceed with download:



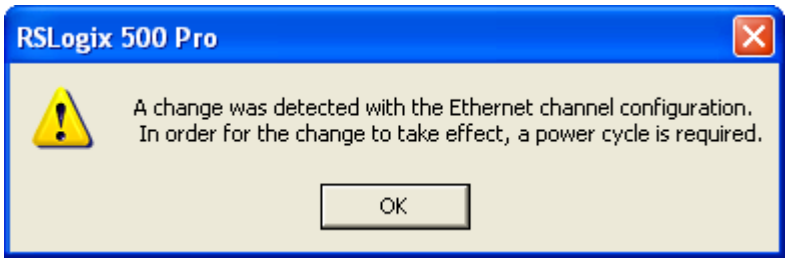
If the following prompt appears, click ***Yes***:



IMPORTANT: Click

to apply communication configurations.

Click ***OK*** at the message on power cycle unit if this message appears. If not, continue with the next step.



If prompted to change controller to Run mode, select ***No***. The Message instruction is only executed once when the controller goes into RUN mode and we want to wait and verify a few more things.

Click ***Yes*** to “Do you want to go Online?”

Now, lets use the LCD display of the MicroLogix 1100 controller to verify our IP address settings. Press the ***ESC*** button to return to the top main menu.

Use the down arrow key to select ***Advance Set*** menu and press the ***OK*** button.

Use the down arrow key to select ***ENET cfg*** and press the ***OK*** button.

Confirm that the ***IP address of your controller***, is set to 192.168.1.2

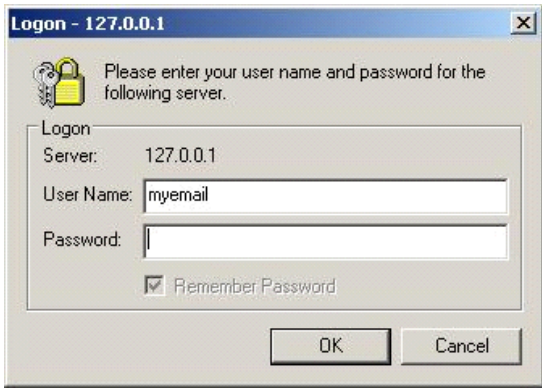
Press the ***ESC*** button again to go back to the main menu.

Run application and verify reception of Email

We will use Microsoft Outlook Express to read emails from our local email server.

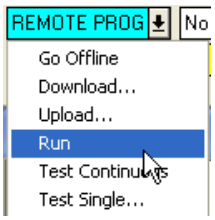
Open Microsoft Outlook Express by selecting ***Start > Programs > Outlook Express***.

If asked for a Password, type '***1234***'

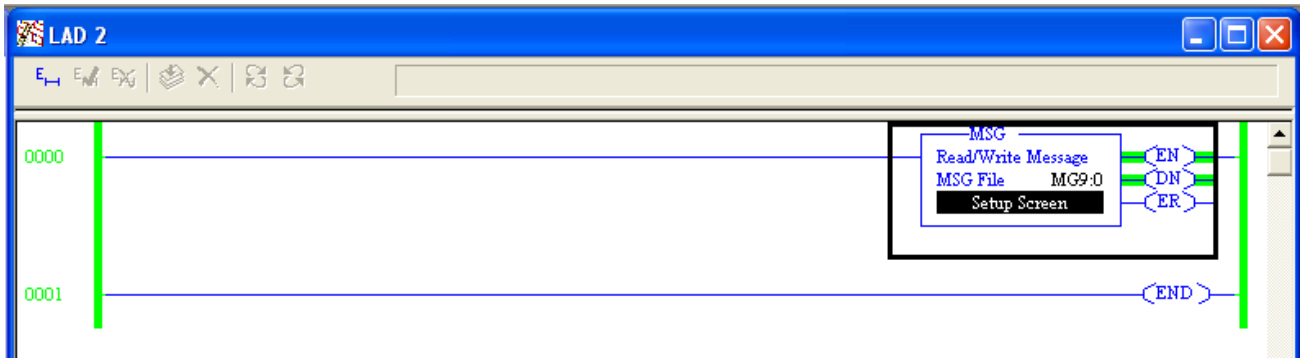


Browse to the ***Inbox*** folder for incoming messages.

Change the controller mode from Remote Program to Remote Run by selecting ***Run***:



The MSG.DN (done bit) should highlight green to indicate that this MSG completed successfully (an email is sent) and the email reached an SMTP server:



The following list shows possible errors that could arise when an email message instruction doesn't complete successfully:

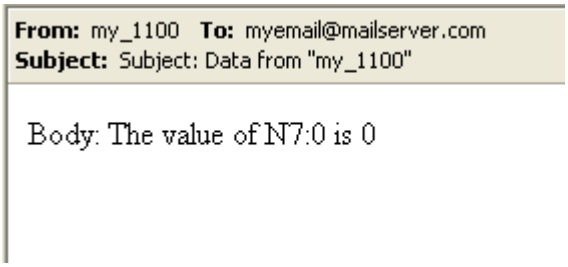
SMTP Error Codes: If MSG.ER is green (MSG.DN is not complete), then an error has occurred for this message. Open up the MSG's Setup Screen to see the error code:

- 00 – No error (successful delivery to the Mail relay Server)
- d4 – Can't communicate with (either) Name Server
- dd – General SMTP error

For specific SMTP error, add a rung: "**MOV MG9:0.22**" to an integer register to evaluate:

- 0x01dd (477) – SMTP mail server IP address not configured
- 0x02dd (733) – To (destination) address not configured or invalid
- 0x03dd (989) – From (reply) address not configured or invalid
- 0x04dd (1245) – Unable to connect to SMTP mail server
- 0x05dd (1501) – Communication error with SMTP mail server
- 0x06dd (1757) – Authentication required
- 0x07dd (2013) – Authentication failed

Now, go back to Outlook Express and click on the ***Send/Recv*** button to update your Inbox. Verify on the list if you did receive a new email message that should be similar to this:



This concludes the Lab. Congratulations! You just sent out an email from a MicroLogix 1100 controller. Think of applications that could benefit from this feature when using Rockwell Automation solutions.