



APPLICATION NOTE

THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Product Family: C-more

Number: AN-EA-015

Subject: C-more to AB Micro 800

Date Issued: 2-19-2014

Revision:

This document illustrates how an Allen Bradley Micro 800 PLC can be configured to communicate with a C-more panel over Modbus RTU and Modbus TCP/IP.

At the time of this writing, C-more version 2.78 was used and Connected Components Workbench Standard Edition version 4.00.00 was used. To determine exactly which AB Micro 800 models support Modbus TCP/IP and Modbus RTU, please contact Allen Bradley. For the purposes of this document, an AB Micro 850 model 2080-LC50-48QVB was used.

The information for connecting these devices together will be broken into multiple sections:

- Cabling
- Port configuration
- Modbus mapping/addressing
- Special communications considerations

Cabling:

- For serial communications, the EA-MLOGIX-CBL cable is compatible with this PLC. Consult the EA-USER-M for specifics of this cable pin out.
- For Ethernet communications, standard Cat5e or Cat6 cables with Ethernet switches (managed or unmanaged) are required. It is possible to connect C-more directly to the AB Micro 800 without an Ethernet switch if a crossover cable is used. For panel to switch and PLC to switch connections, use a standard patch cable.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

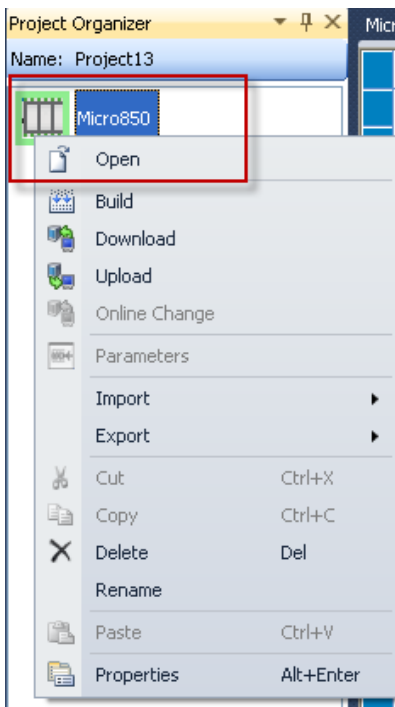
These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Port Configuration:

For Serial:

Configure the PLC serial port for Modbus RTU and match the settings to C-more's Panel Manager Settings:

In the Project Organizer, right click on the controller and choose the "Open" option:

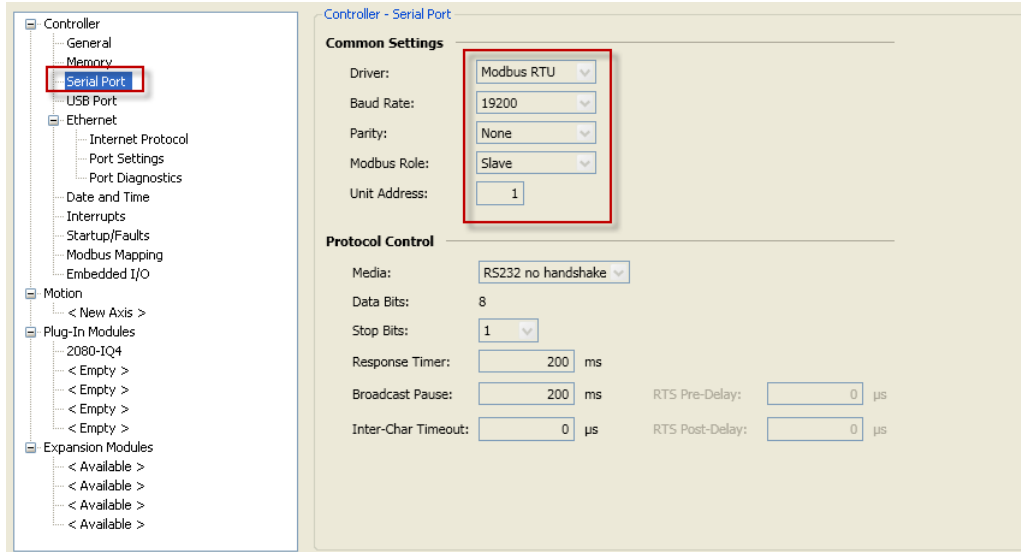




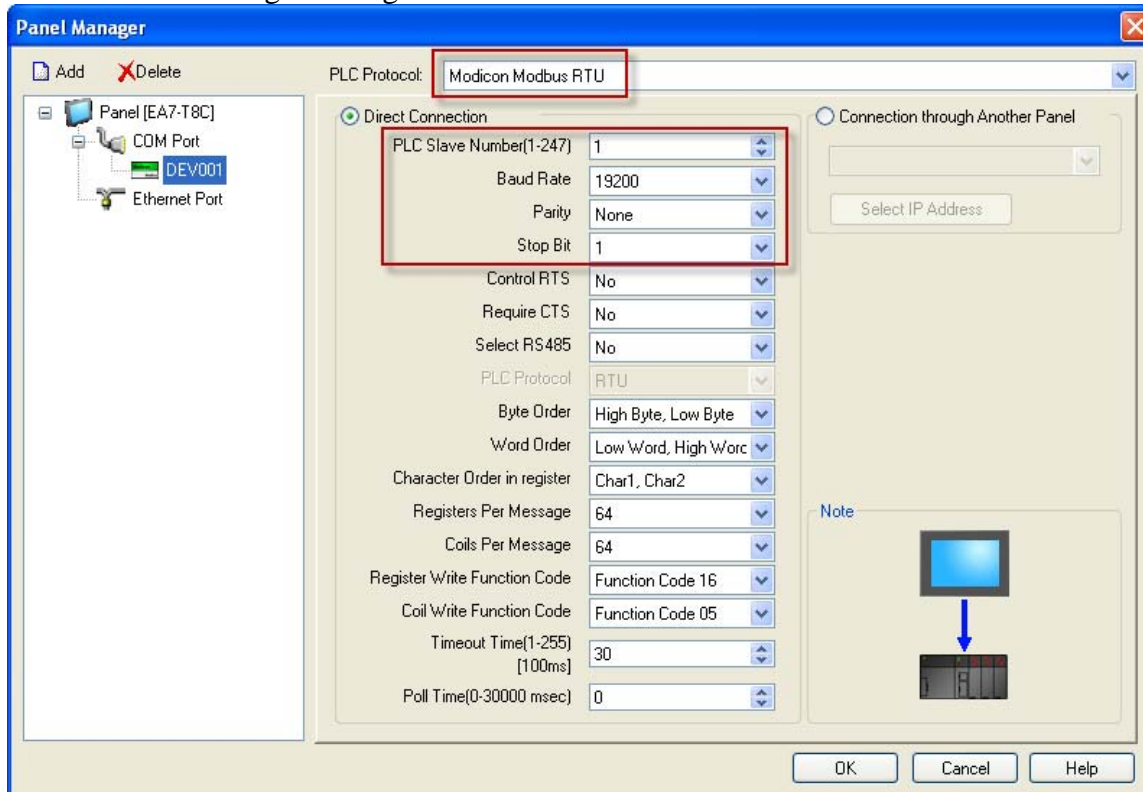
THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Click on the “Serial Port” option on the left and configure the port Driver: Modbus RTU and Modbus Role: Slave. The Baud Rate, Parity and Unit Address (PLC Slave Number in C-more) need to match the C-more panel settings.



C-more Panel Manager setting:



After configuring both sides to match, be sure to download the projects to the C-more Panel and the PLC.

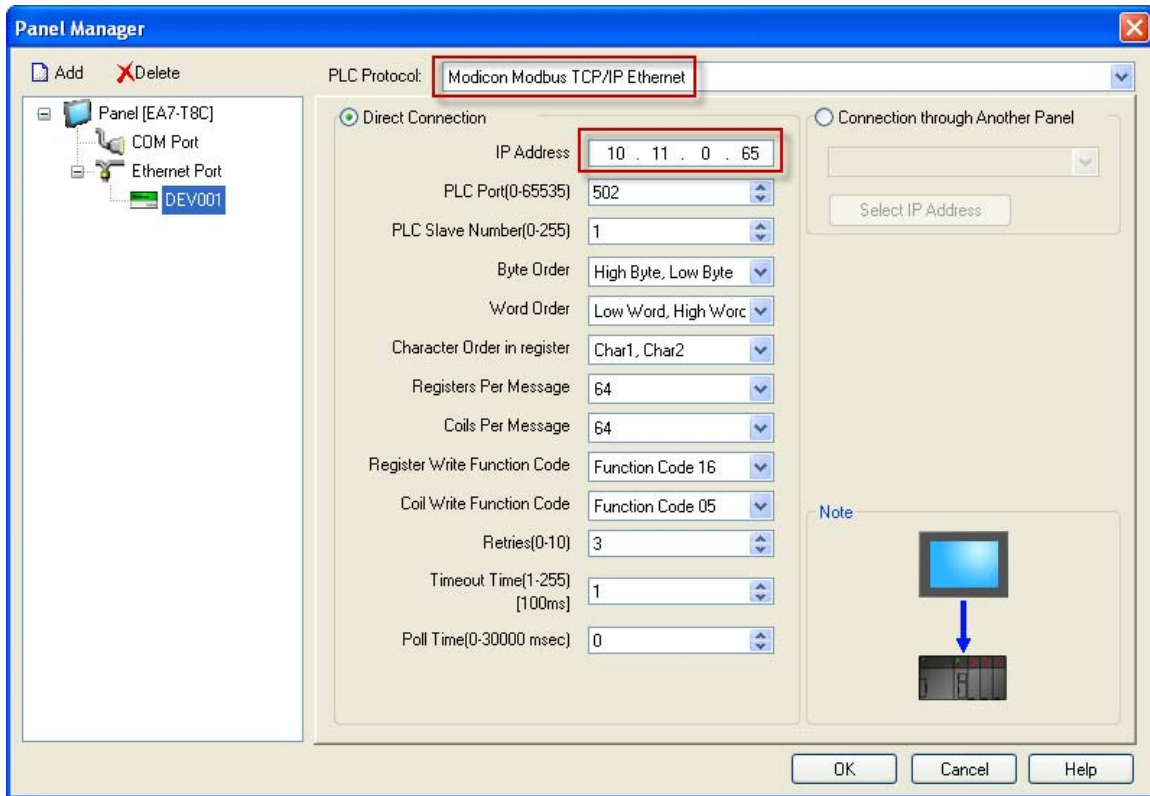


THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

For Ethernet:

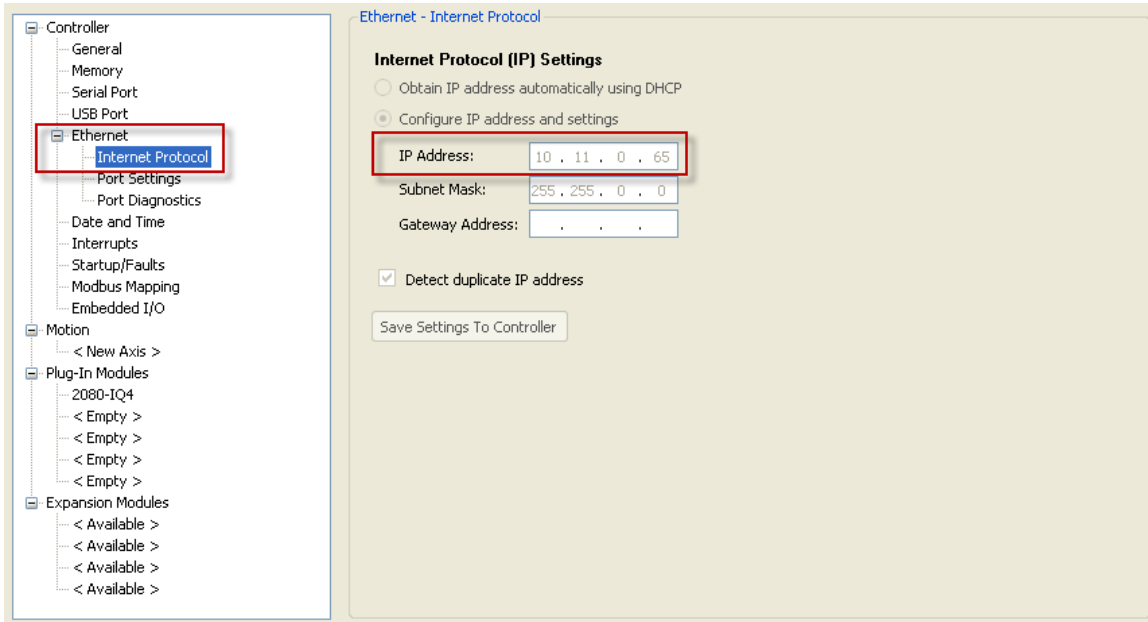
In C-more Panel Manager, choose the “Modicon Modbus TCP/IP Ethernet” option. Enter in the IP address of the AB Micro 800 PLC that can be found in the same area as the Modbus RTU serial port setup:





THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



Once these settings have been transferred to the PLC and the C-more panel, they should be able to communicate successfully.

Modbus mapping/addressing:

In order to give visibility to the PLC variables (tags) on Modbus serial and Ethernet, Modbus addresses must be mapped to each tag individually in the AB Micro 800.

The directions below illustrate variables that we created arbitrarily for this documentation. The same process should apply for the variables you create in your application.

The AB Micro 800 supports the 4 standard Modbus data types:

- Holding Registers = Read/Write 16 bit registers typically addressed as 4xxxxx where the '4' indicates the data type and the xxxxx is the offset from 1 to 65535.
- Input Registers = Read Only 16 bit registers typically addressed as 3xxxxx where the '3' indicates the data type and the xxxxx is the offset from 1 to 65535.
- Coils = Read/Write bits (Boolean) typically addressed as 0xxxxx where the '0' indicates the data type and the xxxxx is the offset from 1 to 65535.
- Input Bits = Read Only bits (Boolean) typically addressed as 1xxxxx where the '1' indicates the data type and the xxxxx is the offset from 1 to 65535.

The image below shows 4 global variables created to represent an example of the data types listed above.

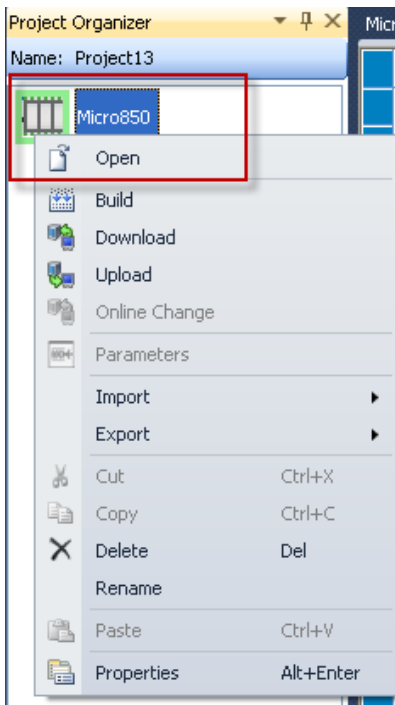


THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

HoldReg1	INT		1234	Read/Write
Coil1	BOOL		TRUE	Read/Write
InputReg1	INT		4321	Read/Write
InputBit1	BOOL		TRUE	Read/Write

To map these variables to Modbus addresses go to the Project Organizer, right click on the controller and choose the “Open” option:



In the bottom left option tree, choose the “Modbus Mapping” selection. In this window, you can assign the Modbus addresses to the variables. In the image below, we show examples of mapping the actual addresses to the corresponding variables.

NOTE: You cannot be connected to the controller when entering in the variables in the Modbus mapping table.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Variable Name	Data Type	Address	Addresses Used
Coil1	Bool	000001	000001
HoldReg1	Int	400001	400001
InputBit1	Bool	100001	100001
InputReg1	Int	300001	300001

In C-more, you can create matching tags (Tag Names do NOT have to match) and addresses (MUST match) to the global variables of the PLC:

Tag Name - Edit

No. 3

Tag Information

Device Name: DEV001

Tag Name: COIL1

Tag Data Type: Discrete

Characters: 40 Retentive

PLC Address

Memory Type: 0 Address: 1

Apply Close Help



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

The screenshot shows the 'Tag Name - Edit' dialog box for tag number 1. The 'Tag Information' section includes: Device Name: DEV001, Tag Name: HOLDREG1, Tag Data Type: Signed int 16, Characters: 40, and a 'Retentive' checkbox which is unchecked. The 'PLC Address' section includes: Memory Type: 4, and Address: 1. Buttons for 'Apply', 'Close', and 'Help' are at the bottom.

The screenshot shows the 'Tag Name - Edit' dialog box for tag number 4. The 'Tag Information' section includes: Device Name: DEV001, Tag Name: INPUTBIT1, Tag Data Type: Discrete, Characters: 40, and a 'Retentive' checkbox which is unchecked. The 'PLC Address' section includes: Memory Type: 1, and Address: 1. Buttons for 'Apply', 'Close', and 'Help' are at the bottom.

The screenshot shows the 'Tag Name - Edit' dialog box for tag number 2. The 'Tag Information' section includes: Device Name: DEV001, Tag Name: INPUTREG1, Tag Data Type: Signed int 16, Characters: 40, and a 'Retentive' checkbox which is unchecked. The 'PLC Address' section includes: Memory Type: 3, and Address: 1. Buttons for 'Apply', 'Close', and 'Help' are at the bottom.

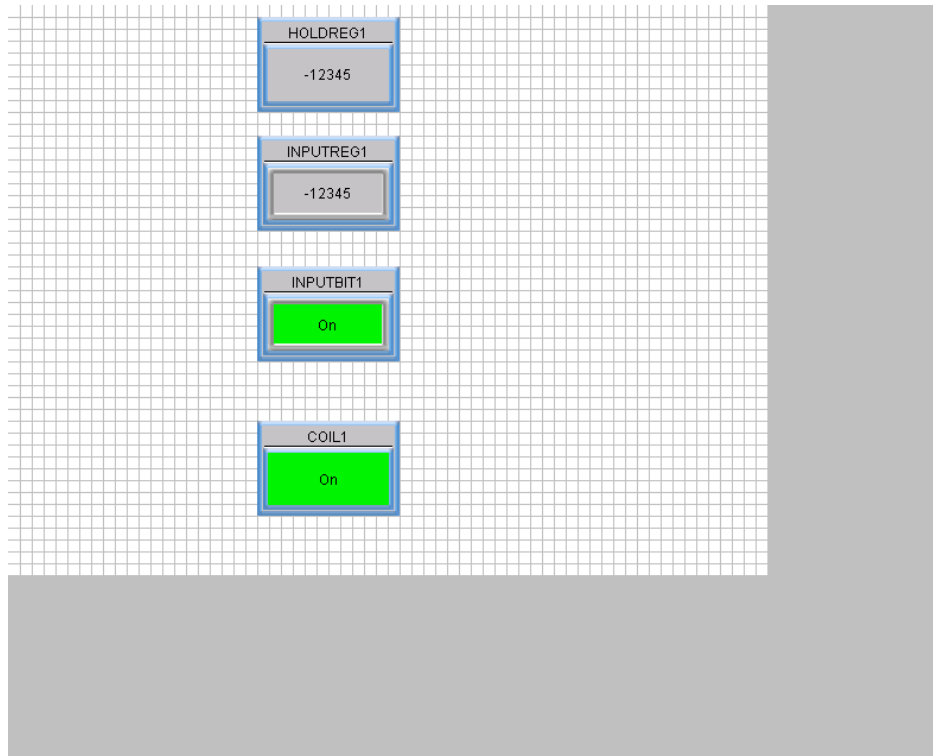
Test your setup:

To read or write data to the variables, assign the HOLDREG1 tag to a Numeric Entry object. Assign the INPUTREG1 tag to a Numeric Display object. Assign the COIL1 tag to a Pushbutton object. Assign the INPUTBIT1 to an Indicator object so that the screen looks something like the one below:



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



Transfer this project to the C-more panel and you should see successful communications.

Special communications considerations:

- **Communications errors:** If you receive any errors on the screen, ensure that all of the serial settings match and are loaded into the PLC and C-more panel. If using Ethernet, ensure that their IP addresses (BOTH C-more and the PLC) are in the same subnet. Consult your network administrator if you are not sure how to configure the correct subnet for these products. Also double check that the Modbus addresses match. As mentioned above both products use the Modicon style Modbus addressing. The addressing in the PLC looks like 400001 and the equivalent address in C-more looks like 40001 when viewed in the Tag Name database. The highest digit is the data type identifier (4 in this case) and the remaining value is the offset from 1 of that data type. So 40001 and 400001 are the same address, the latter address having just one extra 0 placeholder. This is the same for the 3xxxxx, 1xxxxx and 0xxxxx types.
- **Block reads/writes and exception responses:** The PLC will respond successfully to read requests of non-existing Modbus addresses IF the starting address is a valid one. The PLC supports the standard Modbus full block requests (~250 bytes of data). However... If a write is sent to the PLC with non-existing Modbus addresses, it will give



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

an exception response even if the 1st address does exist in the PLC. C-more will always attempt to optimize and read and write blocks of data as large as possible. If errors occur when attempting writes to the PLC from C-more, the “Registers Per Message” and “Coils Per Message” settings in C-more may have to be adjusted.

- **Number of supported Modbus TCP connections:** At the time of this writing and with the AB Micro PLC model specified at the beginning of this document, the PLC supported 16 concurrent Modbus TCP connections meaning that 16 C-more panels could be connected to the PLC at the same time on Ethernet.

NOTE: this specification may be different for other models and could change in subsequent firmware changes of the PLC.

Technical

Assistance: If you have questions regarding this Application Note, please contact us at 770-844-4200 for further assistance.