Mitsubishi A, AnA, Q and FX Serial
Programmable PLC
Device Driver Guide

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1. Mitsubishi A, Ana, Q & FX Serial Device Communications

1.1 Summary

The WebAccess SCADA Node provides a serial interface to the Mitsubishi Serial Communications Module (for example, the AJ71C24 and AJ71QC24) (Please refer to Manufacturers Documentation for list of Serial Communications Modules), module. The Mitsubishi AJ71C24-S6 computer link module is an interface to connect a MELSEC-A-Series PLC CPU to a computer. The WebAccess driver supports the system configurations in the 1:1 and 1:n computer to PLC ratios.

The driver can communicate with PLCs on a MELSECNET. Up to 32 master stations, and 64 local stations per MELSECNET data.

A MELSECNET local station is one that does not have an AJ71C24 module and communicates with the SCADA Node computer through a master station.

There are separate device drivers for A, AnA, Q and FX CPU type PLCs because the CPU types have different address ranges.

The driver supports only the dedicated protocol, **Format 4**. *For more information about setting protocol mode, please refer to the Manufacturer's Documentation.*

1.1.1   Wiring and Cabling

There are two physical types of connections to the Mitsubishi JW10:

1. **MMI Port** (this is the method tested for this manual).

2. **2-wire RS-422 Communication Terminals**. This method was not tested for this manual.

Please refer to the Manufacturer's Documentation for a description of wiring and cabling.

1.1.1.1   MMI Port

The **MMI Port** is a 9-pin port of the front of the PLC. This is the method tested for this manual.

This is a one-to-one Link (one PLC per com port).

1.1.1.2 2-wire Communications Port

The Computer Link can also be via the **Communication Port**. This is a two wire, RS-422A connection on the Lower terminals of the Model JW-1642K PLC. This is a multiple drop link (up to 63 PLCs per comport). This method was not tested for this manual.

The Lower Terminals of the JW-1624K used for 2-wire RS-422 are labeled **L1**, **L2** and **SHLD**. Shielded twisted pair is required.

1.1.2   PLC Settings

1.1.2.1 MMI Port

The **default settings** (memory #226 = 00000000) are:
Data Length = 7 bits
Stop Bits = 1
Parity = None
Transfer Rate = 19200
PLC Address = 01

When using the computer link mode of the MMI Port, the following system memory settings are used to set Data Length, Stop Bit, Parity and Transfer Rate.

System Memory Number: #226
Description: Transfer specifications
Format: D7,0,D5,D4,D3,D2,D1,D0

D7=Data Length:
D7=0= 7 bits;
D7=1= 8 Bits

D5=Stop Bits:
D5=0=1 bit;
D5=1=2 bits

D4,D3= Parity:
0,0 = None
0,1 = Odd
1,0 = Even
1,1 = Disabled

D2, D1, D0 = Transfer Rate (Bits / sec):
1,1,1 = 38400
0,0,0 = 19200
0,0,1 = 9600
0,1,0 = 4800
0,1,1 = 2400

1,0,0 = 1200
1,0,1 = 600
1,1,0 = 300

Since only one-to-one communications via the MMI port, the **PLC address** is **01**.

The settings tested for this Device Driver Guide where the default:
Data Length = 7 bits
Stop Bits = 1
Parity = None
Transfer Rate = 19200
PLC Address = 01

1.1.2.2 2-wire Communications Port

The JW10 has a two-wire Communications port for using the computer link, data link or remote IO. This function is determined by system memory #234:
#234 = 0 = Computer Link Mode (required by WebAccess)
#234 = 1 = Data Link
#234 = 2 = Remote I/O Link.

System Memory #236 sets the Transfer specification for the 2-wire Communications Port.

The default settings (memory #236 = 00000000) are:
Data Length = 7 bits
Stop Bits = 1
Parity = None
Transfer Rate = 19200
PLC Address = 01

System Memory Number: #236
Description: Transfer specifications
Format: D7,0,D5,D4,D3,D2,D1,D0

D7=Data Length:
D7=0= 7 bits;
D7=1= 8 Bits

D5=Stop Bits:
D5=0=1 bit;
D5=1=2 bits

D4,D3= Parity:
0,0 = None
0,1 = Odd
1,0 = Even
1,1 = Disabled

D2, D1, D0 = Transfer Rate (Bits / sec):
1,1,1 = 38400
0,0,0 = 19200
0,0,1 = 9600
0,1,0 = 4800
0,1,1 = 2400
1,0,0 = 1200
1,0,1 = 600
1,1,0 = 300

System Memory #237 sets the **PLC Address**: 001 to 077 (octal).
WebAccess would use decimal addresses: 1 to 63 (decimal).

2. WebAccess: Parameters

WebAccess drivers provide object-oriented "parameters" to guide novice users with pre-built templates containing typical addresses and provide a productivity tool for experienced users. Users can select a parameter type to start, and then modify the address to the correct register in order to build a tag.

Parameter	Data Type	Description	Address format	Conv. Code	Length	Read / Write
CV	Analog	Counter Value	TC000	BCD	16	Read Write[1]
Reg0	Analog	Register 09xxx	09000	Unsigned Integer	16	Read Write[1]
Reg1	Analog	Register 19xxx	19000	Unsigned Integer	16	Read Write[1]
Reg2	Analog	Register 29xxx	29000	Unsigned Integer	16	Read Write[1]
Reg3	Analog	Register 39xxx	39000	Unsigned Integer	16	Read Write[1]
T0	Analog	Timer 0xx Value	TC000	BCD	16	Read Write[1]
T1	Analog	Timer 1xx Value	TC100	BCD	16	Read Write[1]
T2	Analog	Timer 2xx Value	TC200	BCD	16	Read Write[1]

Parameter	Data Type	Description	Address format	Conv. Code	Length	Read / Write
T3	Analog	Timer 3xx Value	TC300	BCD	16	Read Write[1]
C	Discrete	Counter	C000	Unsigned Integer	1	Read Write[1]
DI	Discrete	DI - Relay	0000	Unsigned Integer	1	Read Only[1]
DO	Discrete	DO - Relay	0040	Unsigned Integer	1	Read Write[1]
Relay	Discrete	Aux. Relay	0100	Unsigned Integer	1	Read Write[1]
T	Discrete	Timer	T000	Unsigned Integer	1	Read Only[1]

Note 1 – WebAccess cannot write reliably to a Register if Ladder Logic is also writing to the same register. Ladder Logic executes more quickly that WebAccess and will overwrite any write from WebAccess.

Note 2 – The PLC must be in RUN mode for physical IO to be scanned by the PLC and written to memory of PLC.

3. Configure a Mitsubishi JW device

3.1   Summary

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **WebAccess Configuration**.
4. Open or Create a **Projec**t.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is a **Serial type Comport**.
7. Configure Baud Rate, Data Bit, Stop Bits and Parity to match those in the PLC. All PLCs on this Comport must use the same settings.
       The default settings (memory #236 or #226 = 00000000) are:
       Data Length = 7 bits
       Stop Bits = 1
       Parity = None
       Transfer Rate = 19200
       PLC Address = 01
8. Configure a **MitsubishiJW Device** (determines the communications Protocol or Device Driver) using **Add Device**
9. Use **Add Tag** to create tags.
10. Select a Parameter to match the type of data to be read (Analog Input, Analog Output, Digital Input, Digital Output). The Address of the data must match the Parameter Type:
11. Modify the Address to match the actual address.
12. Apply a Tag name.
13. Edit Tag to assign Alarms, Scaling, Engineering Units, Description and other features.

3.2   Serial Comport Properties

The Serial Comport is associated with an RS232C or RS422A port on the SCADA Node PC (usually an RS232C port). This number must match the actual COM1, COM2, etc on the SCADA node.
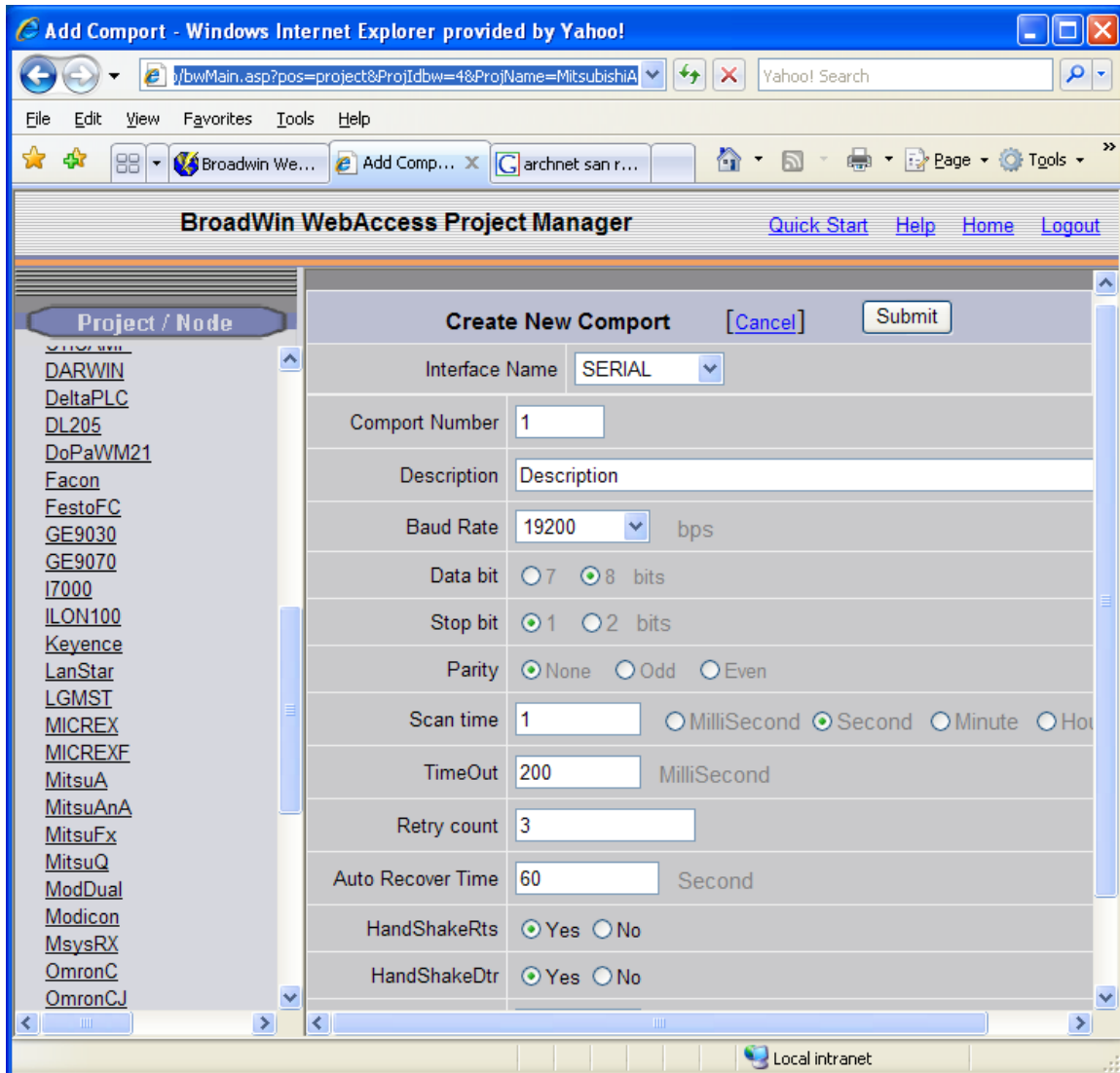
Figure 3.1 Serial Comport properties

The Serial Comport requires the comport number to match that of the physical interface (e.g. COM1, COM2, COM3, etc) on the SCADA Node.

3.2.1 Description

This is an optional field used for user reference.

3.2.2 Baud Rate

For the Mitsubishi JW10, values are from 300 to 38400 baud. **The default setting is 19200**.

This must match the baud rate configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual baud rate set in the PLC.*

All PLCs connected to this comport must use the same Baud Rate.

3.2.3   Data Bits

For the Mitsubishi JW 10, the values are 7 or 8 Data Bits. **The default setting is 7 bits.**

This must match the number of data bits configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Data Bits set in the PLC.*

All PLCs connected to this comport must use the same number of data bits. A typical value is 8 bits.

3.2.4   Stop Bits

For the Mitsubishi JW 10 there can be 1 or 2 Stop Bits. **The default setting is 1 stop bit.**

This must match the number of stop bits configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Stop Bits set in the PLC.*

 All PLCs connected to this comport must use the same number of stop bits.

3.2.5   Parity

For the Mitsubishi JW 10 the Parity can be None, Odd, Even or Disabled.

The default setting is None.

This must match the parity configured in the PLC. *Please refer to the Manufacturer's Documentation to determine the actual number of Data Bits set in the PLC.*

All PLCs connected to this comport must use the parity.

3.2.6   Scan Time

The Mitsubishi JW 10 was tested with a Scan time = 2 Seconds.

This is the time in milliseconds to scan the PLC. This must match the ability of the PLC to respond.

If the PLC cannot respond as fast as the SCAN Time entered, WebAccess will scan at a slower rate.

3.2.7   Timeout

The Mitsubishi JW 10 was tested with Time Out = 200 Milliseconds.

Timeout is the time waited before re-sending a communications packet that did not have a reply.

Timeout specifies how long the software waits for a response to a data request, specifically to wait for a reply from one packet. A recommended value is 7 to 10 ticks, longer if the communication device is slow. This is protocol dependent: some protocols do not allow changes in time out.

Combined with Retry count, Timeout also determines time to consider a device or port as BAD.   Timeout is the time to wait since last communication packet sent without a reply. Time is in milliseconds. The slow or poor quality communications require longer timeout. The faster the communications network or device, the shorter the timeout required. Shorter timeouts notify operators of communications failure more quickly.

3.2.8   Retry Count

The Mitsubishi JW 10 was tested with Retry count = 3.

Number of times to retry communications if no reply is received from a device. Combined with Timeout, also determines time to consider a device or port as BAD.

In addition, Indicates the number of times after the first attempt has failed that communication should be attempted before indicating a failure. Specifically, how many times to send a single packet after the field device fails to respond to the first packet. After the retry count is exceeded, all the tags in the packet are marked with asterisks and the next packet of requests is sent. A reasonable value is 3 to 5 times. After this number of tries, the tags in this packet are marked as "fail to respond" (i.e. asterisks) and are disabled. In reality, increasing the number of retries hides failures on the part of the field device to respond to a request. Essentially, increasing the retries gives the field device more chances to reply.

3.2.9   Auto Recover Time

The Mitsubishi JW 10 was tested with Auto Recover Time = 60 Seconds.

Auto Recover Time is the time to wait before attempting to re-establish communications with a BAD device or port.

If communications to the PLC is unusually slow due to hardware, communications or network issues, you might consider increasing this value. If communications to the PLC or RTU fails frequently, you may want to decrease this number in order to have WebAccess try to re-establish communications sooner.

If communications to the PLC, RTU or device Fails (i.e. exceeds Timeout) WebAccess will wait the Auto Recover Time before trying to re-establish communications.

3.2.10 Hand Shake RTS

The Mitsubishi JW 10 was tested **HandShakeRts = Yes**.

The RTS (Request To Send) signal is raised and lowered on the Serial Communications Port if this value set to Yes.. RTS is determined by settings in the field device. *Refer to your device interface manual to determine the value for this field and the type of cable used.*

3.2.11 Hand Shake DTR

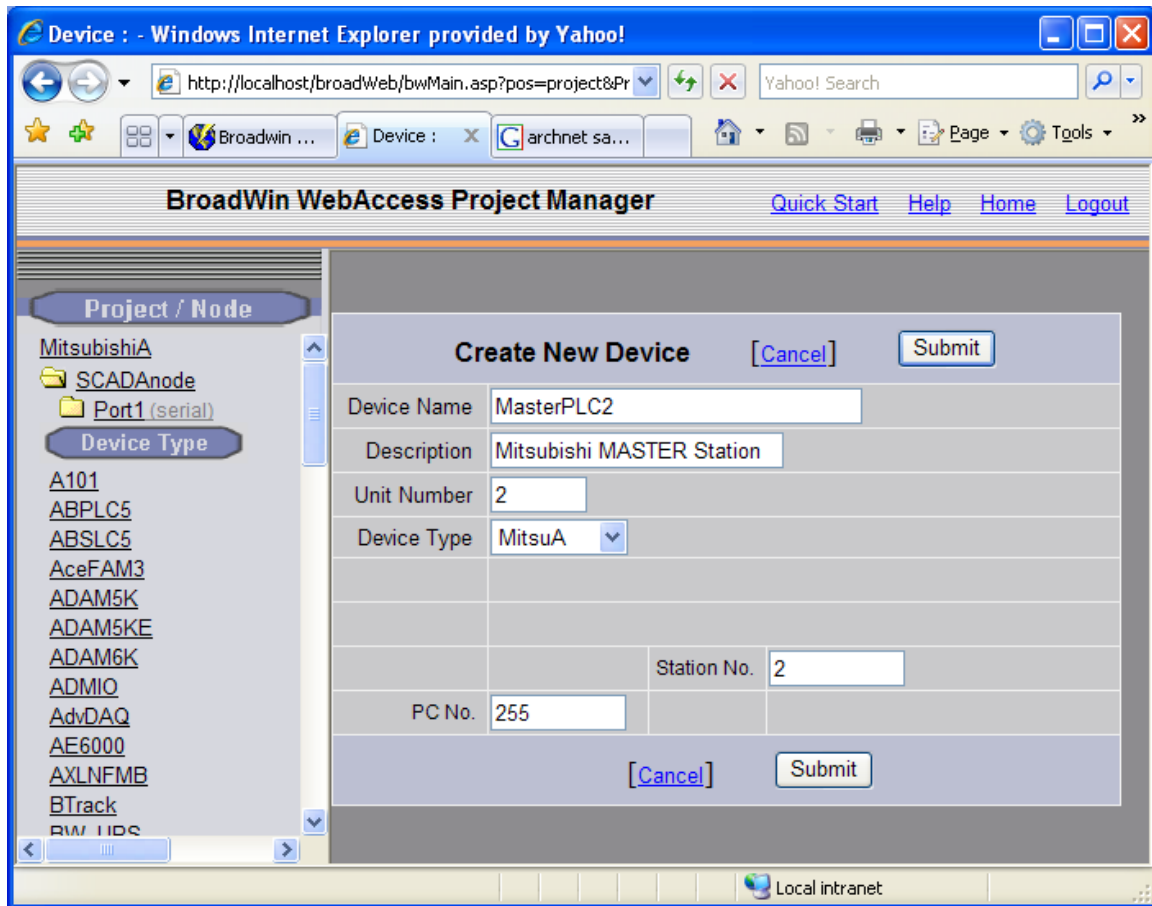The Mitsubishi JW 10 was tested with **HandShakeDtr = Yes**.

The DTR (Data Terminal Ready) signal raised and lowered on the Serial Communications Port if this value is set to Yes. DTR is determined by settings in the field device and the type of cable used. *Please refer to the Manufacturer's Documentation to determine if DTR handshake is set in the PLC.*

3.2.12 Backup Port

The Backup Port has not been tested for the Mitsubishi JW10.

3.3   Device Properties - MitsuA

Add your device to the Serial Port, by selecting the Serial Port you have configured, then select **Add Device**. Or, to modify an existing Device, Select **Device Properties**. The Device Properties Page for a Serial Type Device appears.

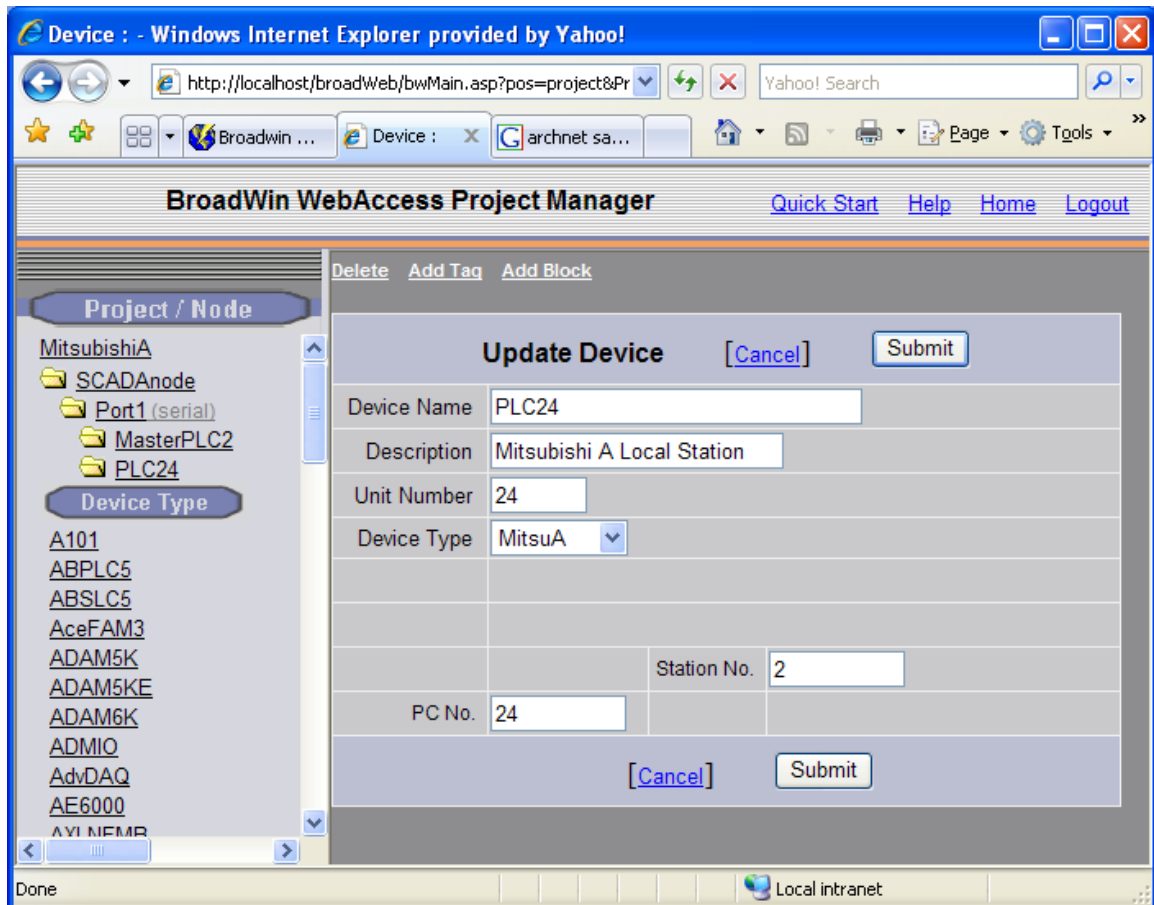Figure 3-12 MitsuA Device – MASTER STATION (PC No. must = 255)

Figure 3-12 MitsuA Device – LOCAL STATION (Stattion No. = Master Station No., PC No.= Local Station Address on MELECNET)

3.3.1   Device Name

A Device is a PLC, Controller, VAV or other automation hardware or software entity. **Device name** is a User-assigned name that will appear in the Project Manager (Configuration Tool) and in runtime VIEW Displays. Choosing a descriptive Name can help technicians identify the location of your device.

Changing only the Device Name will rename the existing device.

Changing both the **Device Name** and the **Unit Number** will make a copy of the device (e.g. create another device).

3.3.2   Description

User assigned description up to 70 characters

3.3.3   Unit Number

Unit Number, for Mitsubishi JW, must correspond to the Unit Number used in the protocol addressing.

> If using the **MMI Port,** since only one-to-one communications is supported via the MMI port, the **PLC address** is **1**.

> If using the 2-wire Communications Port, the System Memory #237 sets the **PLC Address**: 001 to 077 (octal). WebAccess would use decimal addresses: 0 to 63 (decimal). *Reference: Mitsubishi User's Manual, page 13.3*

See section 1.1.4 PLC Settings to determine actual settings in the PLC.

3.3.4   Device Type

The **Device Type** is **MitsubishiJW**.

4. Configure Tags

4.1   Analog Tag

This example is to configure a Tag that reads an Analog Input (Address Register 900)

1. Open **Internet Explorer**.

2. Connect to **Project Node**.

3. Start **WebAccess Configuration**.

4. Select **Project**.

5. Select **SCADA Node**.

6. Select the Mitsubishi JW10 **Device**.

7. Select **Add Tag**.

8. From **Parameter** Pull Down List Select **Reg0**. This will configure an Analog Input. Wait for the Page to update.

9. Optionally, select **ALARM** from the ALARM pulldown list. Wait for the Page to update with a PINK highlight around alarm (an additional Alarm Fields at bottom of page).
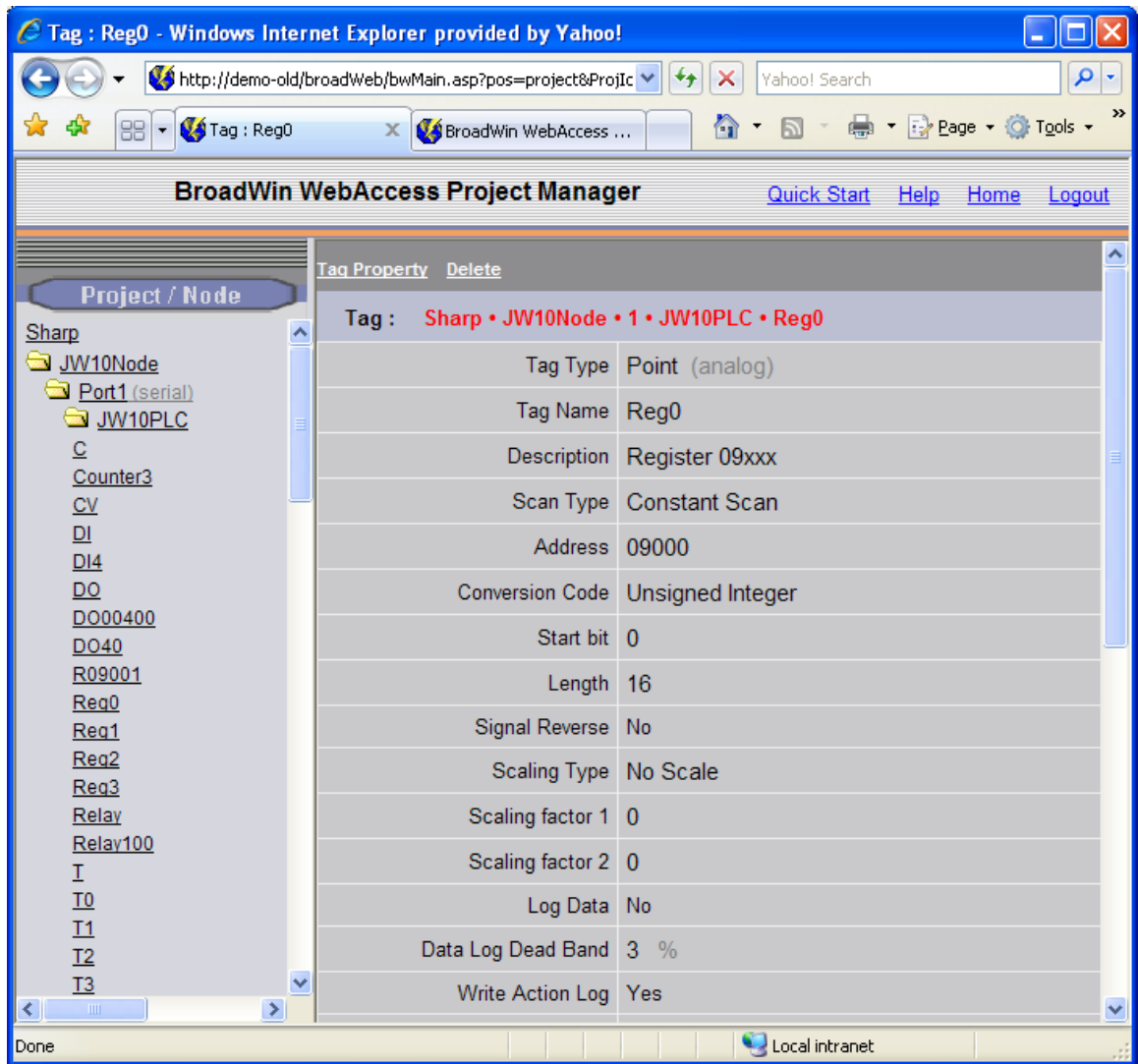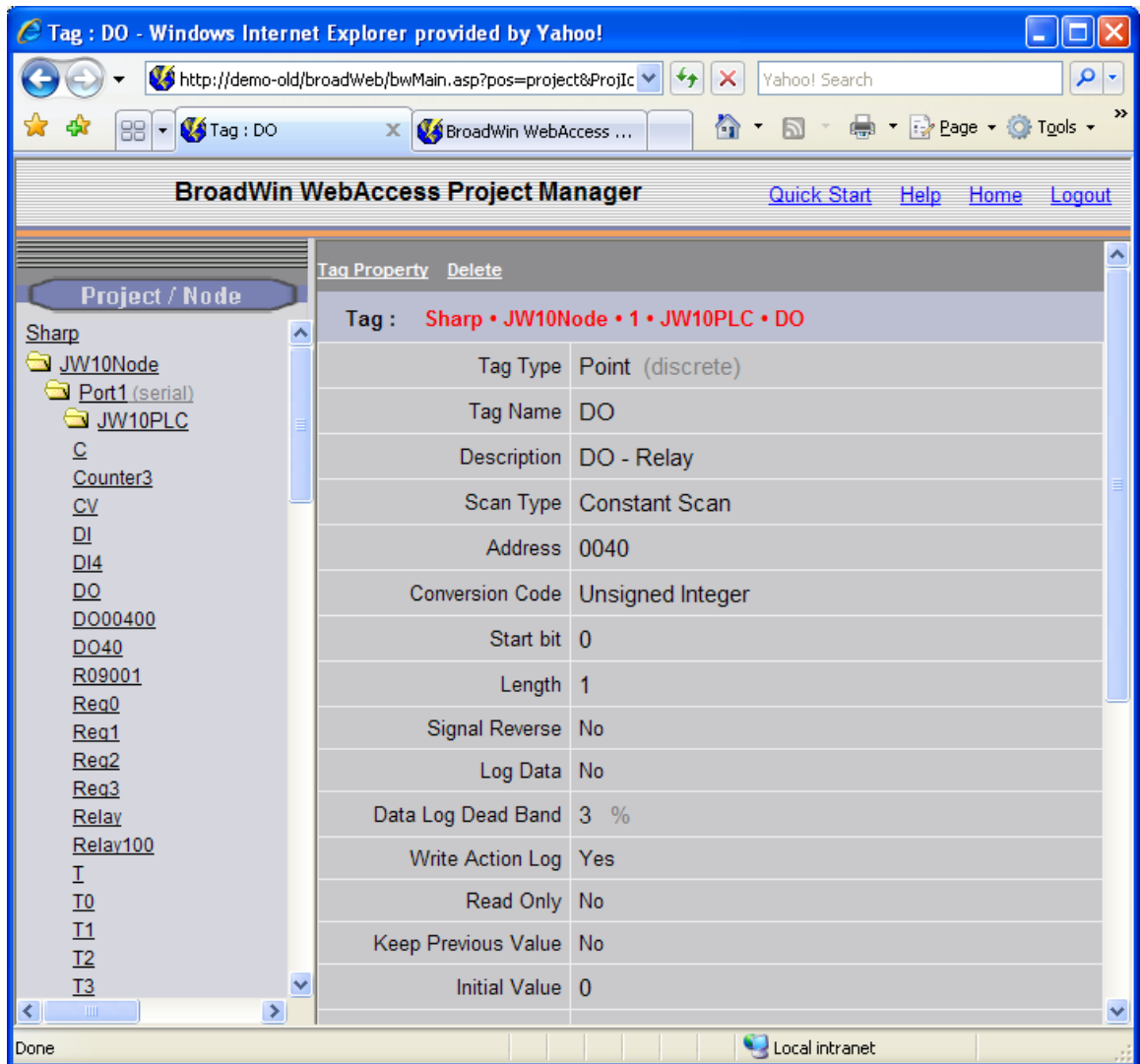
10. Enter a **Tagname** users can use to identify this Analog Input measurement. For example, if this is a Flow measurement, enter **Reg0**.

11. Edit the **Address** to the actual address. From the example, Enter: **09000**

12. Enter a Description. This will help identify this tag to Users and Operators. For example, enter Boiler #1 Steam Flow.

13. Optionally enter, Scaling, Span Hi, Span Low, Engineering Units, and Alarms; enable data logging, etc.

14. Press **Submit**.

4.2   Digital Tag

This example is to configure a Tag that writes a Digital Output (Address DO 40)

15. Select the Mitsubishi JW10 **Device**.

16. Select **Add Tag**.

17. From **Parameter** Pull Down List Select **DO**. This will configure an Analog Input. Wait for the Page to update.

18. Optionally, select **ALARM** from the ALARM pull down list. Wait for the Page to update with a PINK highlight around alarm (an additional Alarm Fields at bottom of page).

19. Enter a **Tagname** users can use to identify this Analog Input measurement. For example, if this is a Flow measurement, enter **DO**.

20. Edit the **Address** to the actual address. From the example, Enter: **0040**

21. Enter a Description. This will help identify this tag to Users and Operators. For example, enter DO-Relay.

22. Optionally enter, State 0 Description, State 1 Description, Alarms, enable data logging, etc.

23. Press **Submit**.

Congratulations! You have just configured a Measurement and Output Tags to Mitsubishi device.