User Manual

Data Acquisition Studio

BrainChild

UMDAQC
Rev 3.0, 02/2011

TABLE OF CONTENTS

 Information to user

NOTE:

 Do not open IO Studio and Real time viewer at same time in your PC. First complete IO module configuration by using IO studio software, close IO studio, then, open Real time viewer

 It requires to buy USB hardware lock (Keypro) from supplier to run RealTime viewer in PC. One single license is required to run Real Time Viewer in single PC. It is not required to purchase Hardware lock to view historical data in other computers via LAN. With out hardware lock, Real Time Viewer in Data acquisition software will run for 1 hr. in demo mode

 Original equipment manufacturer reserves right to modify the document with out notice

1. Introduction

1.1 Introduction

Data Acquisition Studio (DAQ) software is PC based data logging and Acquisition software. It acquires data from Modbus RTU/ Modbus TCP slave devices like IO Modules, Recorders, Controllers etc., and shows Real time data in PC in form of Trends, Bar graphs, Digital values etc. and store data in PC for later archival.

DAQ support till 2048 tags (from V1.2 or later). One tag means one channel and it can be either Analog input or Analog output or digital input or digital output or Math channel

1.2 System requirements

Data acquisition Software

PC with Minimum 1 GHz processor, 512 MB RAM
1 GB MB free space in the hard disk
RS 232 serial port/ Ethernet Network adopter RJ 45 female

Operating system: Windows XP, Windows Vista, Windows 2000, Windows 2003 & Windows 7

Note: For IO studio software, it requires to install dot net frame work 2.0. It is not supported for Windows ME, Windows NT and Windows 2000

1.3 DAQ features

1.3.1 Real Time Viewer

- ✓ 2048 tags including AI, AO, DI, DO & Math
- ✓ 1 to 24 configurable tags display per page, maximum 200 display pages
- ✓ Math channels
- ✓ 100 Timers, 50 Counters and 50 Totalizer's
- ✓ 100 comments for Alarms
- ✓ Real time trends, Bar graphs, Digital value display
- ✓ Real Time Alarms
- ✓ Log Speed: 1, 2, 5 10, 30, 60 & 120 Sec, Log Methods: Instant, Average, Minimum & Maximum, Log trigger type: By time, By value change
- ✓ Alarms by Email

- ✓ Display languages: English, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Thai and Czech, Chinese (Traditional) and Chinese (Simplified)

- ✓ Connection to IO Modules, Paperless Recorder, Controllers and any third party devices via Modbus RTU or Modbus TCP protocol

- ✓ Five different types of Events can be configured for each channel and each event support 2 jobs. So, total 10 different jobs can be set per each channel

- ✓ Event Type available for Trigger: H, HH, L, LL, Rate of increase, Rate of decrease and Error.

- ✓ Jobs Available to link with events: Log Alarm, Log Event, Log Alarm (Auto ack.), send email, Sound buzzer, DO Latch ON, DO Latch OFF, DO Process, Enable Timer, Disable Timer, Preset Totalizer, Reset Totalizer, Enable Totalizer, Disable Totalizer, Preset Counter, Reset Counter, Increase Counter, Decrease Counter, Log Report, Reset Min/Max/Avg and Log Message

- ✓ Project Auto configure option available (Generate tag data base automatically once IO modules are connected to the network and create a new project)

- ✓ Supported Math functions: SIN, COS, EXP, SQRT, LN, LOG, ABS, POW, ROUND, HI, LO, INV, TG, CTG, ASIN, ACOS and ATG

- ✓ Source of Math channel: Analog inputs, Math channels, Counters and Totalizers

- ✓ Data Types: 2 byte, 4 byte and 8 byte, Decimal: 0 to 4

- ✓ Real time + Historical combined by changing different display page properies

1.3.2 Historical Viewer

- ✓ Historical trend

- ✓ Historical Alarms/Events

- ✓ Reports (Daily, Weekly & Monthly)

- ✓ Display Historical values in tabular column

- ✓ Mark Remarks on data (Comments)

- ✓ Search data by Time, Timer Period, Event/Alarm, tag wise and Remark

- ✓ View trends both Horizontally and Vertically

- ✓ Zoom out & Zoom In

- ✓ Display view options available at 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 2 min/dot, 5 min/dot, 10 min/dot, 30 min/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hr/page, 4 hr/page, 8 hrs/page, day/page, week/page and Month/page

- ✓ Display white back ground/black background
- ✓ Export data and alarms/events to CSV files. (Specify time or time period or all)
- ✓ Print trend view, Event/Alarm list, Reports & Tag Values

1.3.3 Sample Applications

Data Acquisition Studio Software in PC will act as Modbus Master and Acquire data from IO modules acting as Modbus Slaves in RS485 network. The **serial port** of the PC is connected to an **RS232/RS485 Converter like SNA10A** which in turn is connected to the Network.

Alternatively Ethernet port of PC is connected to Protocol converter like PC-E as shown attached

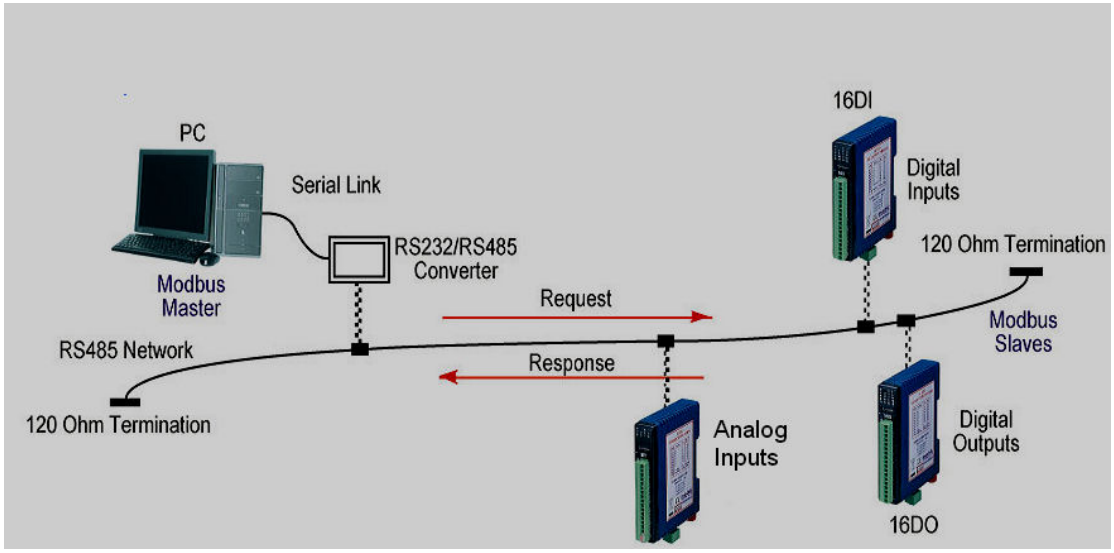


Fig1: Application by serial ports

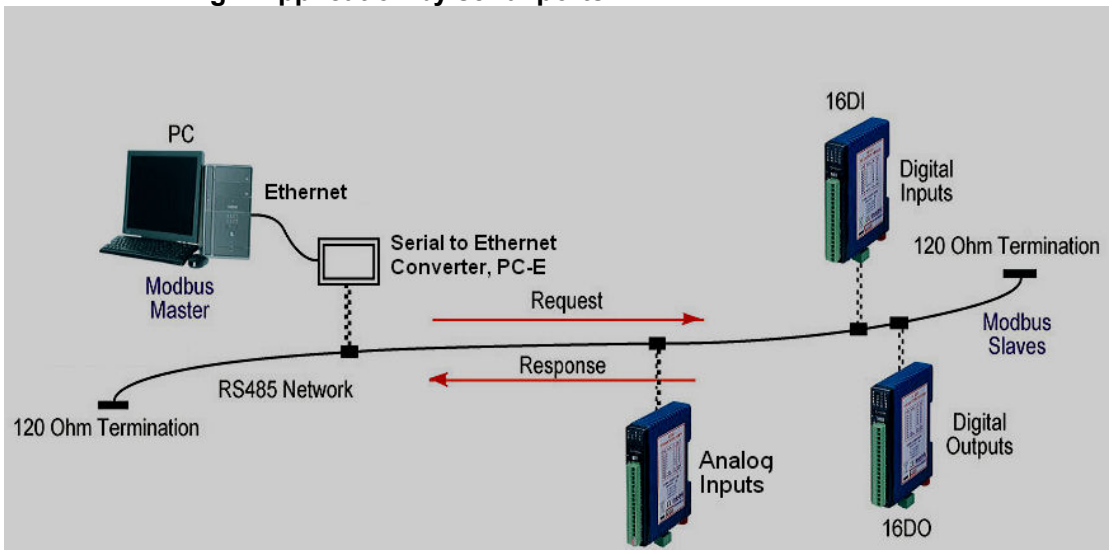


Fig2: Application by Ethernet

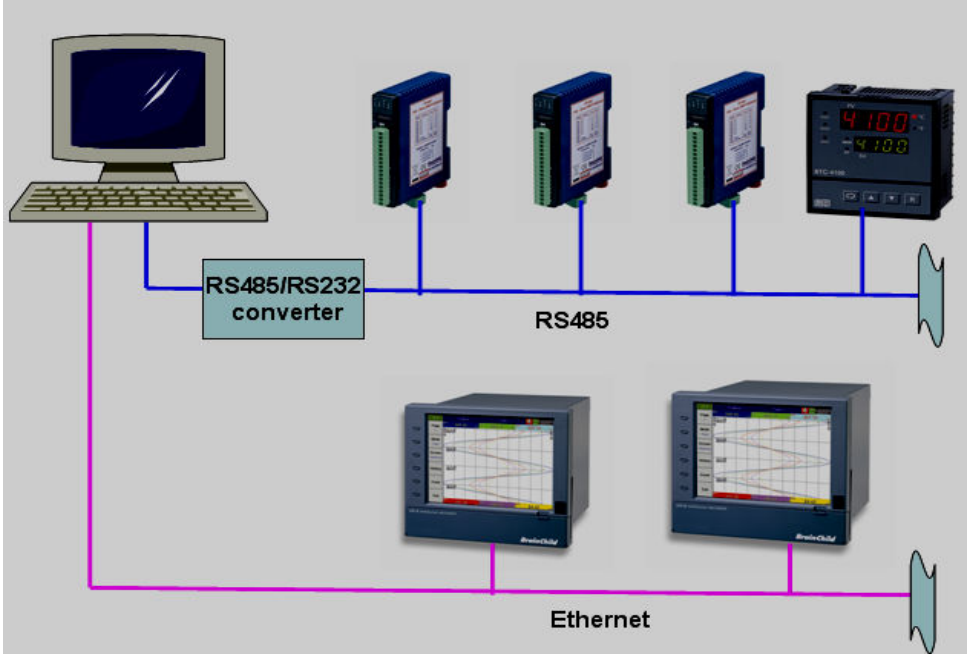


Fig3: Application by both Serial port and Ethernet

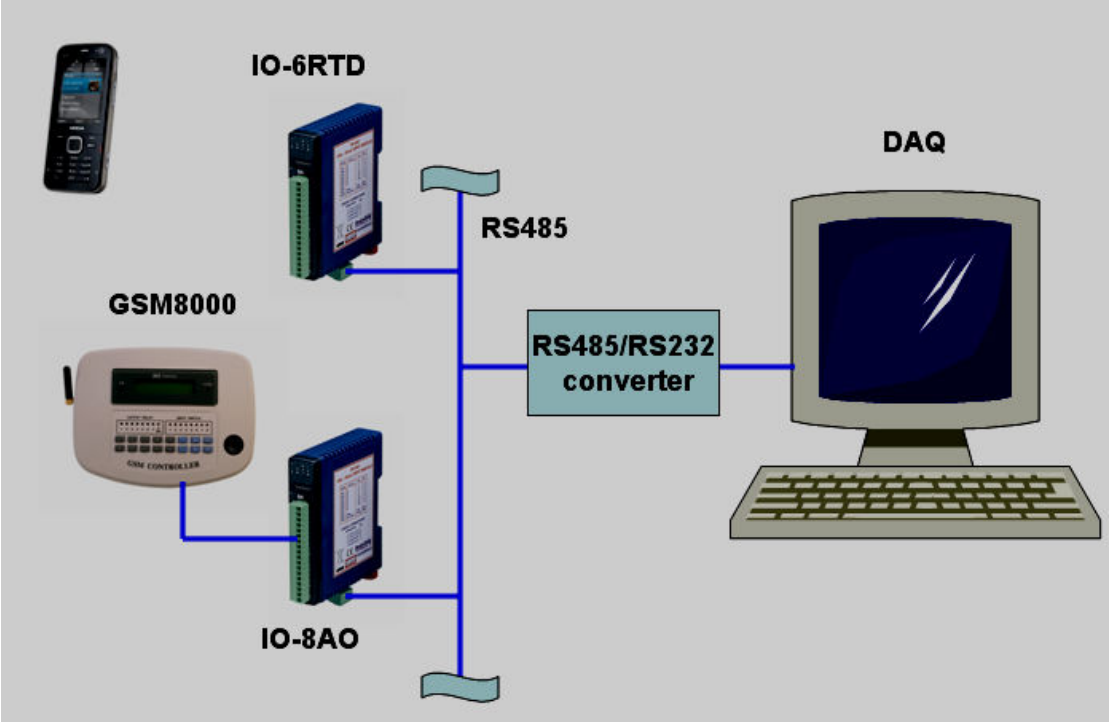


Fig: Send alarms to mobile by SMS

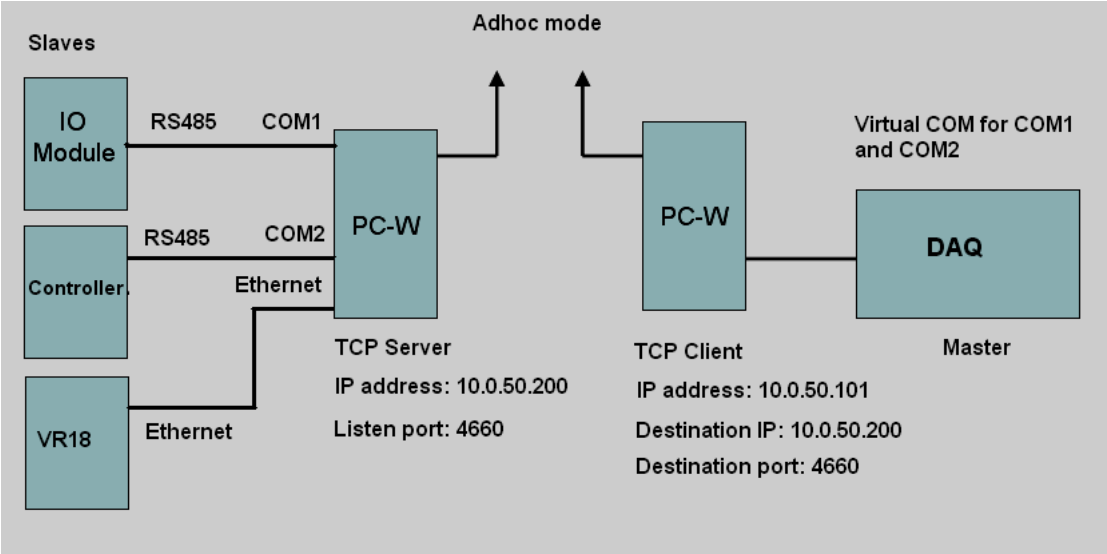


Fig: Data exchange between Master and Slaves via wireless devices, Maximum distance till 800 meters

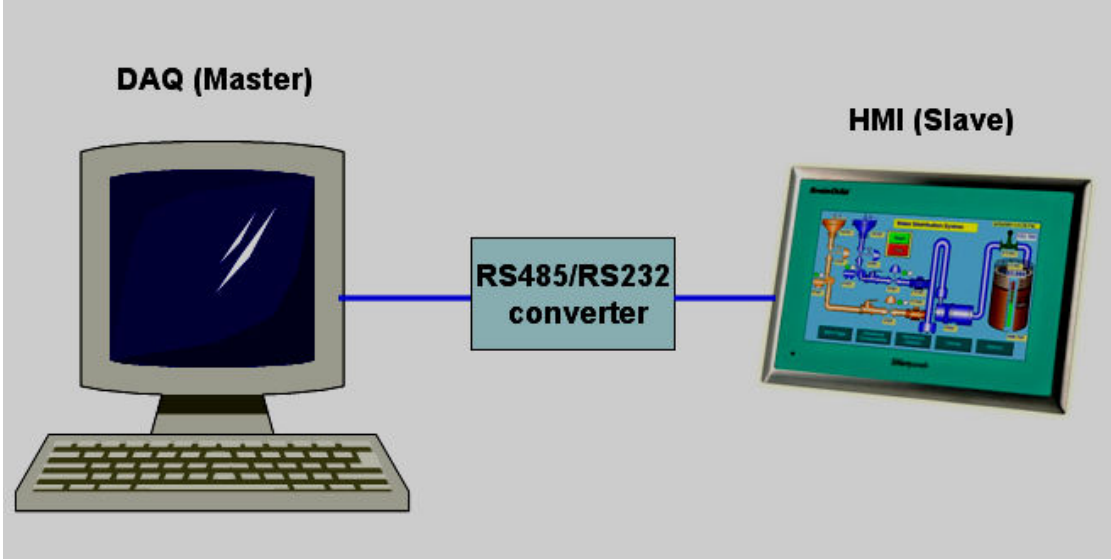


Fig: Data exchange between Master and Slave by Modbus RTU protocol

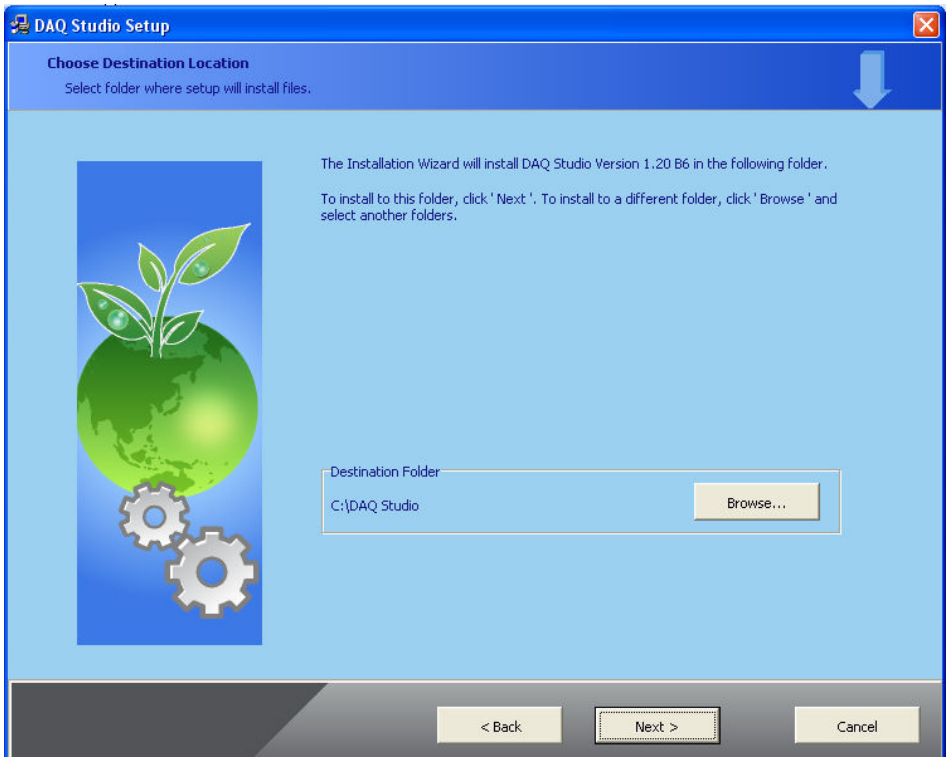
2. Software Installation

2.1 DAQ software installation

Log in to computer using administrator rights

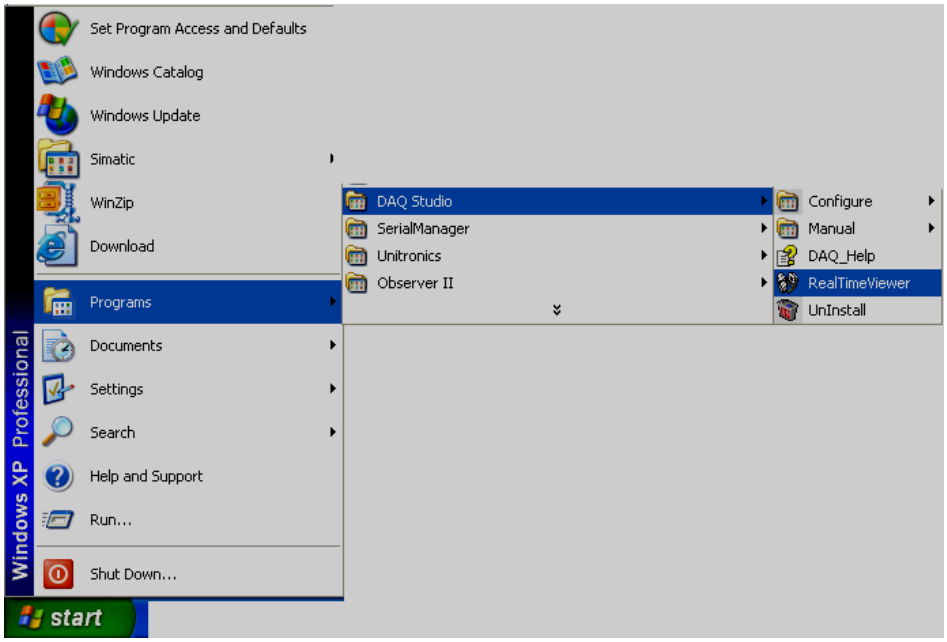
Install DAQ software from CD. It installs Real Time viewer, Historical viewer and IO studio software into PC. IO Studio software is used to configure Modbus based IO modules. IO studio requires .Net frame work and it will be installed during installation of DAQ software

Insert Hardware lock (Key pro) in PC at USB port. With out hardware lock, DAQ software will run for one hour in demo mode



Run DAQ as follows

Start-Programs-Data acquisition studio-Real time viewer



2.2 DAQ software Uninstall

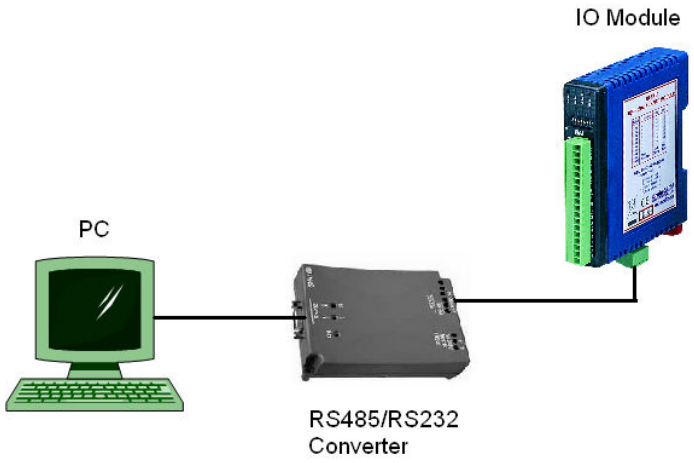
Start-Programs-Data Acquisition studio-Uninstall

3. IO STUDIO

This is a tool useful for setting configuration of IO module and used for diagnostics purpose. This tool will be installed during installation of Data acquisition software and can be opened from Start-Programs-Data acquisition Studio-IO Studio

Ex: Set communication settings
Read IO status in PC,
Force Outputs to test the Output modules

Do not open IO Studio and Real time viewer at same time in your PC. First complete IO module configuration using IO studio software, close IO studio, and then open Real time viewer

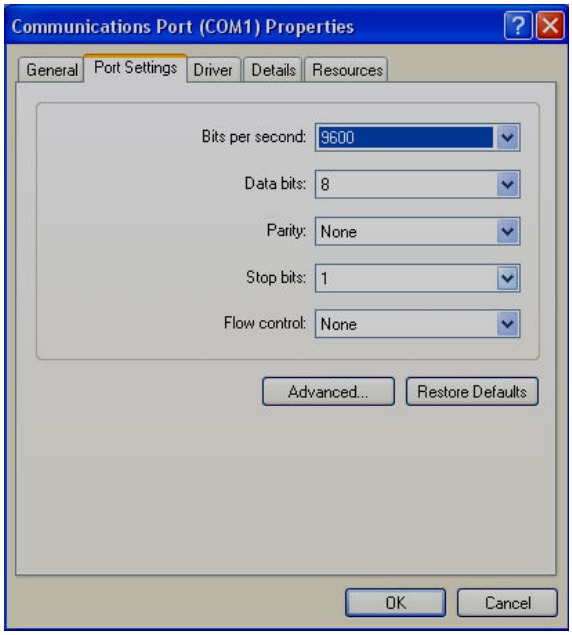


Note: For IO studio software, it requires to install dot net frame work 2.0. It is not supported for Windows ME, Windows NT and Windows 2000

IO Module: Set address say 1 for the IO Module using DIP switches on the Module itself.

Connect 24V DC Power supply to the IO module and make sure that Dip switch10 is OFF to allow communication of IO Module with PC on Default communication settings. If you are using RS232/RS485 converter make sure that you have selected all the communication settings properly as follows.

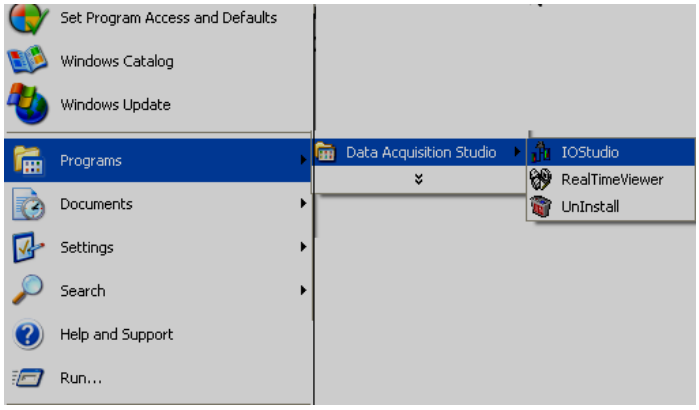
BAUD RATE	9600
DATA BITS	8
PARITY	NONE
STOP BITS	1

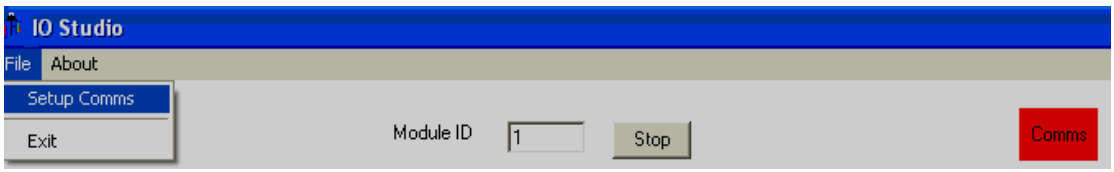


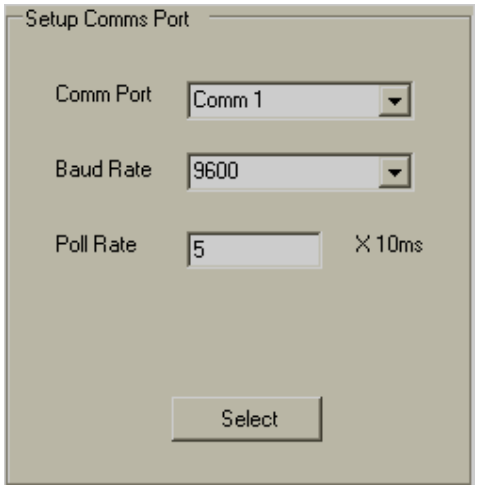
In the PC, select above settings at the COM port.

Right click on My computer –Properties - Hardware-Device Manager- COM ports

Open IO studio software



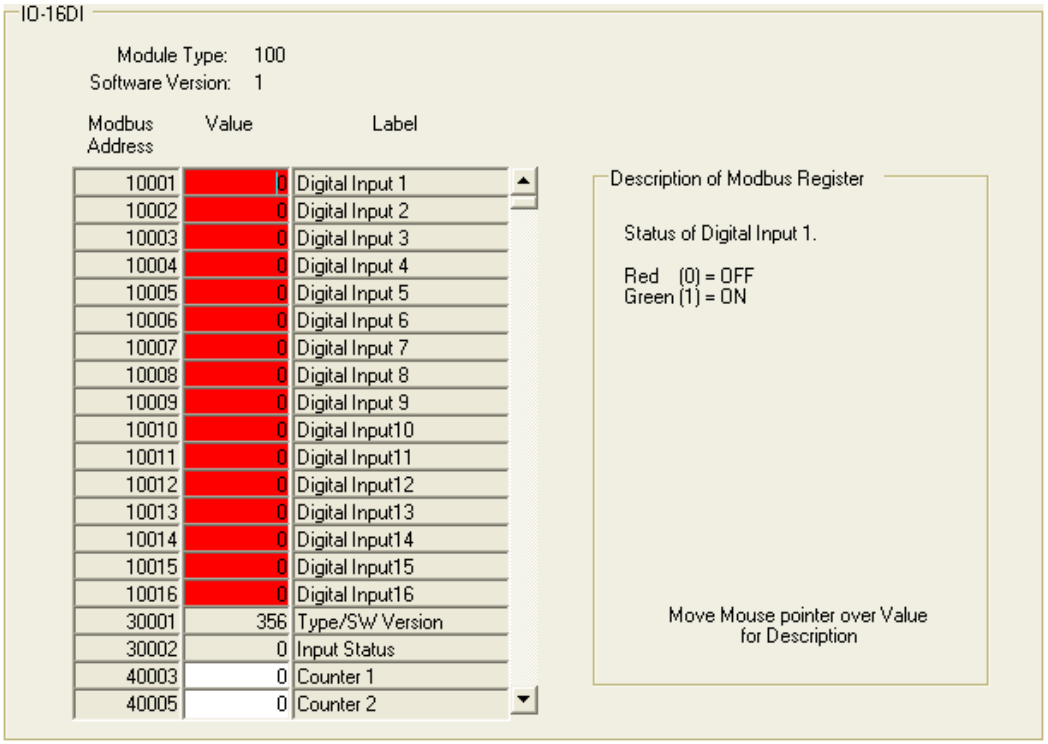


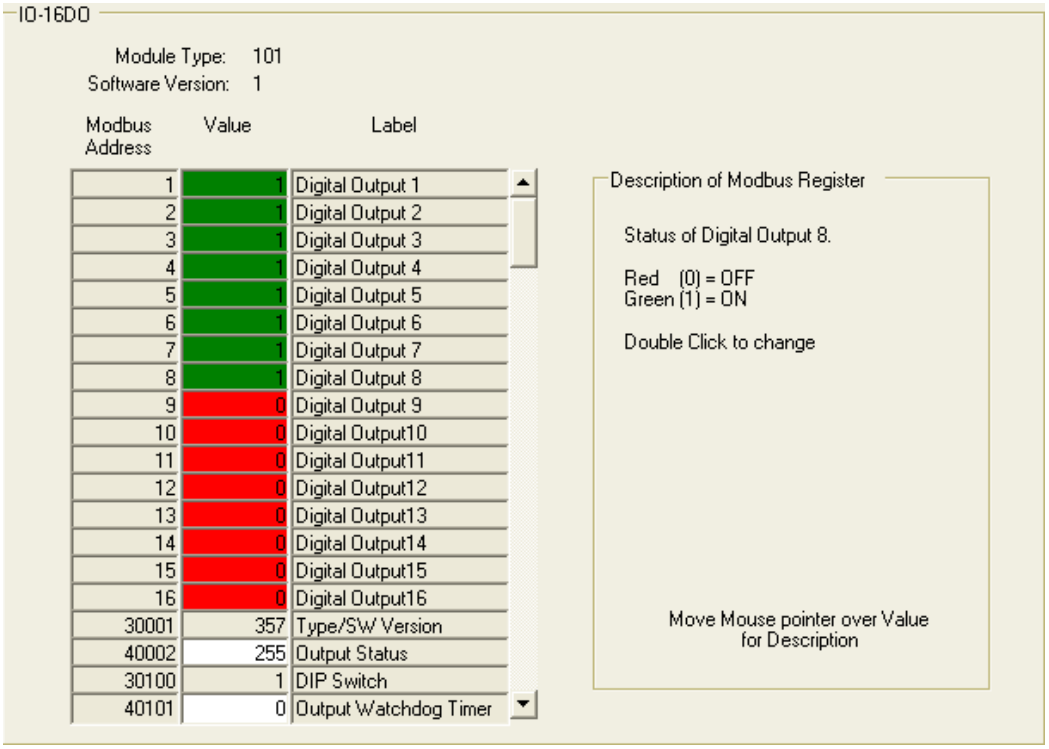


If every thing is proper, IO Studio will read the IO Module and show the status of the IO registers.

If there is a problem, please check the following

Dip switch settings in IO module
Communication cable
RS485/RS232 converter communication settings
COM port number in PC and driver settings
Close Real time viewer


IO-16DI
Module Type: 100
Software Version: 1
Modbus Address
Value
Label
10001 0 Digital Input 1
10002 0 Digital Input 2
10003 0 Digital Input 3
10004 0 Digital Input 4
10005 0 Digital Input 5
10006 0 Digital Input 6
10007 0 Digital Input 7
10008 0 Digital Input 8
10009 0 Digital Input 9
10010 0 Digital Input10
10011 0 Digital Input11
10012 0 Digital Input12
10013 0 Digital Input13
10014 0 Digital Input14
10015 0 Digital Input15
10016 0 Digital Input16
30001 356 Type/SW Version
30002 0 Input Status
40003 0 Counter 1
40005 0 Counter 2
Description of Modbus Register
Status of Digital Input 1.
Red (0) = OFF
Green (1) = ON
Move Mouse pointer over Value for Description


IO-16DO
Module Type: 101
Software Version: 1
Modbus Address
Value
Label
1 1 Digital Output 1
2 1 Digital Output 2
3 1 Digital Output 3
4 1 Digital Output 4
5 1 Digital Output 5
6 1 Digital Output 6
7 1 Digital Output 7
8 1 Digital Output 8
9 0 Digital Output 9
10 0 Digital Output10
11 0 Digital Output11
12 0 Digital Output12
13 0 Digital Output13
14 0 Digital Output14
15 0 Digital Output15
16 0 Digital Output16
30001 357 Type/SW Version
40002 255 Output Status
30100 1 DIP Switch
40101 0 Output Watchdog Timer
Description of Modbus Register
Status of Digital Output 8.
Red (0) = OFF
Green (1) = ON
Double Click to change
Move Mouse pointer over Value for Description

IO-4RO

Module Type: 113
Software Version: 1

Modbus Address	Value	Label
1	1	Relay Output 1
2	1	Relay Output 2
3	0	Relay Output 3
4	0	Relay Output 4
30001	369	Type/SW Version
40002	3	Output Status
30100	1	DIP Switch
40101	0	Output Watchdog Timer
40102	0	Modbus Master Timeout
40103	0	Modbus Master Rate
40121	1	Baud Rate
40122	0	Parity
40123	0	Stop Bit
40124	0	Reply Delay

Description of Modbus Register

Status of Relay Output 2.

Red (0) = OFF
Green (1) = ON

Double Click to change

Move Mouse pointer over Value for Description

IO-8DIO

Module Type: 102
Software Version: 1

Modbus Address	Value	Label
10001	0	Digital Input 1
10002	0	Digital Input 2
10003	0	Digital Input 3
10004	0	Digital Input 4
10005	0	Digital Input 5
10006	0	Digital Input 6
10007	0	Digital Input 7
10008	0	Digital Input 8
17	1	Digital Output 1
18	1	Digital Output 2
19	1	Digital Output 3
20	1	Digital Output 4
21	0	Digital Output 5
22	0	Digital Output 6
23	0	Digital Output 7
24	0	Digital Output 8
30001	358	Type/SW Version
30002	0	Input Status
40003	15	Output Status
40004	0	Counter 1

Description of Modbus Register

Status of Digital Output 4.

Red (0) = OFF
Green (1) = ON

Double Click to change

Move Mouse pointer over Value for Description

IO-8AI

Module Type: 103
Software Version: 1

Modbus Address	Value	Label
30001	359	Type/SW Version
30002	0	Current Input 1
30003	0	Current Input 2
30004	0	Current Input 3
30005	0	Current Input 4
30006	0	Current Input 5
30007	0	Current Input 6
30008	0	Current Input 7
30009	0	Current Input 8
30010	21845	Input Status
30100	1	DIP Switch
40121	1	Baud Rate
40122	0	Parity
40123	0	Stop Bit
40124	0	Reply Delay

Description of Modbus Register

0 - 20mA Current Input 1

Range = 0 - 4095 (12 bits)

Move Mouse pointer over Value for Description

IO-8AIV

Module Type: 104
Software Version: 1

Modbus Address	Value	Label
30001	360	Type/SW Version
30002	0	Analog Input 1
30003	0	Analog Input 2
30004	0	Analog Input 3
30005	0	Analog Input 4
30006	0	Analog Input 5
30007	0	Analog Input 6
30008	0	Analog Input 7
30009	0	Analog Input 8
30010	21845	Input Status
30100	1	DIP Switch
40121	1	Baud Rate
40122	0	Parity
40123	0	Stop Bit
40124	0	Reply Delay

Description of Modbus Register

0 - 10V Voltage Input 1

Range = 0 - 4095 (12 bits)

Move Mouse pointer over Value for Description

IO-8TC

Module Type: 105
Software Version: 1

Modbus Address	Value	Label
30001	361	Type/SW Version
30002	166	Thermocouple Input 1
30003	-32768	Thermocouple Input 2
30004	-32768	Thermocouple Input 3
30005	-32768	Thermocouple Input 4
30006	-32768	Thermocouple Input 5
30007	-32768	Thermocouple Input 6
30008	-32768	Thermocouple Input 7
30009	-32768	Thermocouple Input 8
30010	215	CJC Temperature
30011	21844	Input Status
30016	65415	Calibrate Raw Data
40017	0	Calibrate Control
30100	1	DIP Switch
40101	1	Thermocouple Type
40102	50	Line Frequency
40103	100	CJC Offset
40104	1	Display Units °C/°F
40121	1	Baud Rate
40122	0	Parity

Description of Modbus Register

Thermocouple Input 1

Range = -xxx.x to +yyyy.y

Example: 101.4°C will be read back as 1014

Move Mouse pointer over Value for Description

IO-6RTD

Module Type: 109
Software Version: 1

Modbus Address	Value	Label
30001	365	Type/SW Version
30002	8500	RTD Input 1
30003	-32768	RTD Input 2
30004	-32768	RTD Input 3
30005	-32768	RTD Input 4
30006	-32768	RTD Input 5
30007	-32768	RTD Input 6
30008	1364	Input Status
30016	34423	Calibrate Raw Data
40017	0	Calibrate Control
30100	1	DIP Switch
40101	1	RTD Type
40102	50	Line Frequency
40103	0	Display Units °C/°F
40121	1	Baud Rate
40122	0	Parity
40123	0	Stop Bit
40124	0	Reply Delay

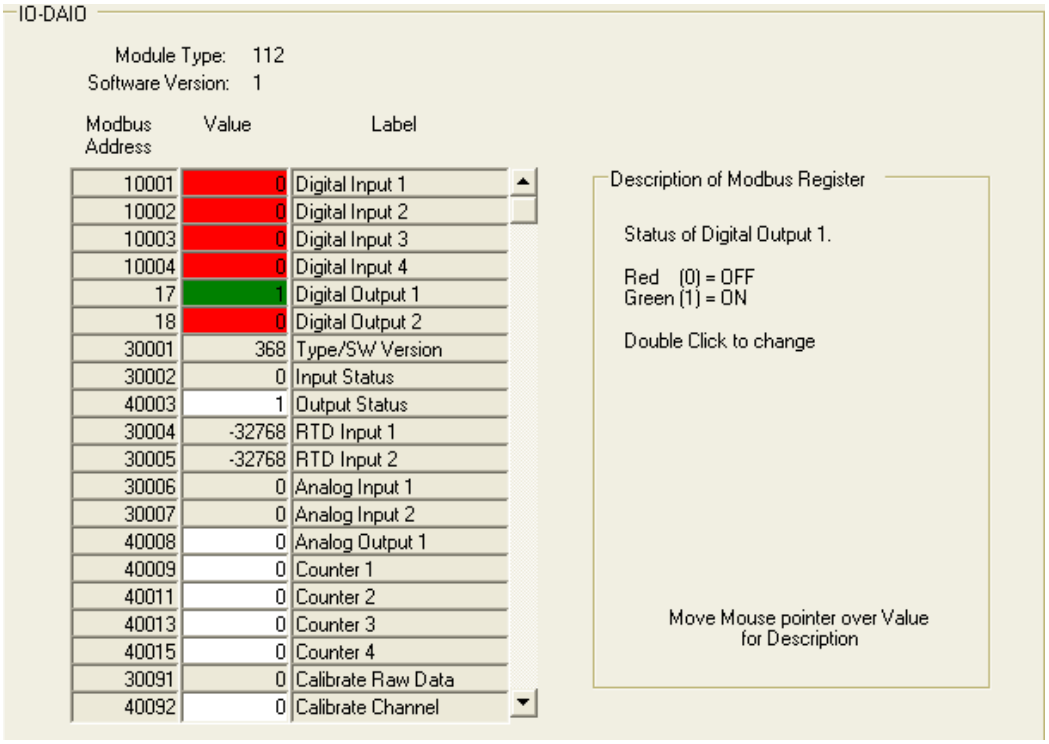
Description of Modbus Register

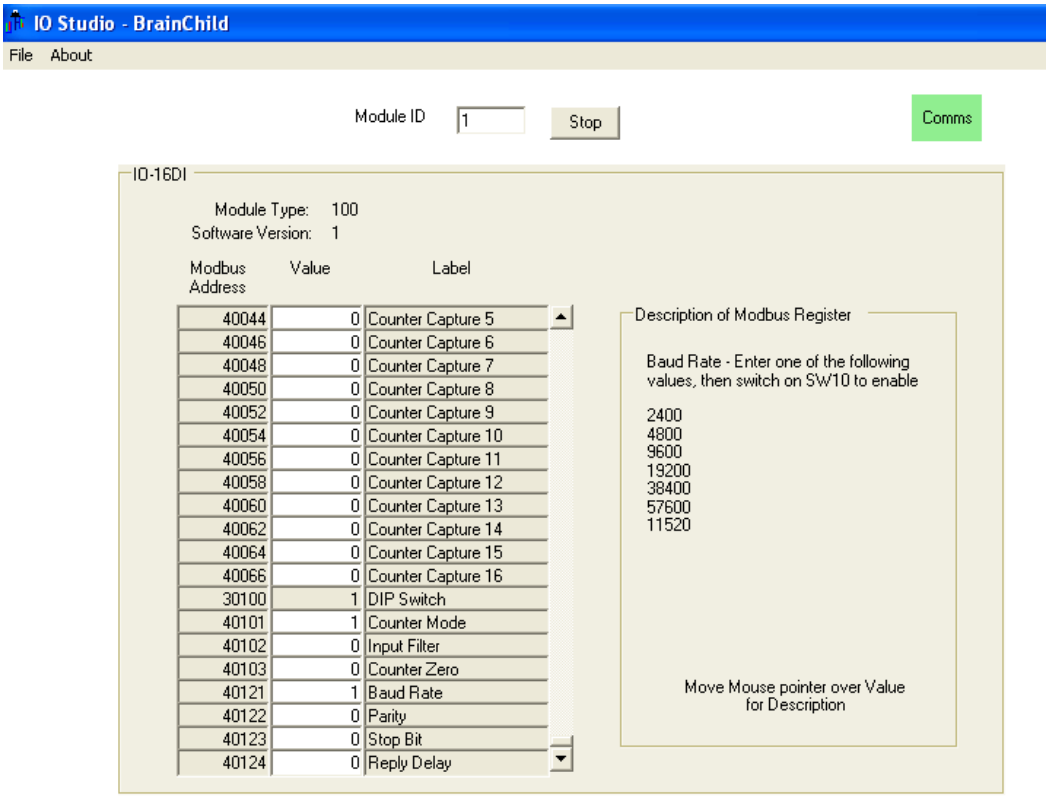
RTD Input 1

Range = -xxx.x to +yyyy.y

Example: 101.4°C will be read back as 1014

Move Mouse pointer over Value for Description


IO-DAIO
Module Type: 112
Software Version: 1
Modbus Address
Value
Label
10001 0 Digital Input 1
10002 0 Digital Input 2
10003 0 Digital Input 3
10004 0 Digital Input 4
17 1 Digital Output 1
18 0 Digital Output 2
30001 368 Type/SW Version
30002 0 Input Status
40003 1 Output Status
30004 -32768 RTD Input 1
30005 -32768 RTD Input 2
30006 0 Analog Input 1
30007 0 Analog Input 2
40008 0 Analog Output 1
40009 0 Counter 1
40011 0 Counter 2
40013 0 Counter 3
40015 0 Counter 4
30091 0 Calibrate Raw Data
40092 0 Calibrate Channel
Description of Modbus Register
Status of Digital Output 1.
Red (0) = OFF
Green (1) = ON
Double Click to change
Move Mouse pointer over Value for Description


IO Studio - BrainChild
File About
Module ID 1
Stop
Comms
IO-16DI
Module Type: 100
Software Version: 1
Modbus Address
Value
Label
40044 0 Counter Capture 5
40046 0 Counter Capture 6
40048 0 Counter Capture 7
40050 0 Counter Capture 8
40052 0 Counter Capture 9
40054 0 Counter Capture 10
40056 0 Counter Capture 11
40058 0 Counter Capture 12
40060 0 Counter Capture 13
40062 0 Counter Capture 14
40064 0 Counter Capture 15
40066 0 Counter Capture 16
30100 1 DIP Switch
40101 1 Counter Mode
40102 0 Input Filter
40103 0 Counter Zero
40121 1 Baud Rate
40122 0 Parity
40123 0 Stop Bit
40124 0 Reply Delay
Description of Modbus Register
Baud Rate - Enter one of the following values, then switch on SW10 to enable
2400
4800
9600
19200
38400
57600
11520
Move Mouse pointer over Value for Description

Configuration:

For ex: If you want set baud rate, enter the required value in the register 40121, and then press enter in the PC keyboard. Set all the parameters once and then switch off the power supply to the IO Module. Now switch on the Dip switch 10 on the module to make above settings effective. After power on, the IO Module will have new Communication settings. Please note that at this point of time, IO module may not communicate with PC because you may have different settings at RS232/RS485 converter and also COM port settings in the PC.

Testing the IO Module:

For ex: If you want to test Digital Output module 16DO module. It contains total 16 digital outputs. You can connect IO module with PC as explained above via RS232/RS485 converter. You can force digital output from low to high and check its status at the IO module and also you can observe LED status on the IO Module itself.

 Do not open IO Studio and Real time viewer at same time in your PC. First complete IO module configuration using IO studio software, close IO studio, then, open Real time viewer

4. Configuration

4.1 Tools in DAQ software

4.1.1 Tool Bar

Configuration data

New project or close existing project

Open existing project

Select page (Choice)

Measured data or Historical viewer

Arrange all (Show default screen layout-mix-digital values, bar graph, trends, Alarm page)

Display Events/Alarms list

Display Digital Values

Display Bar graph

Display Trend

Display all channel - Digital

Check status of Counters, Digital inputs, Digital Outputs etc.

Save

Option

Delete this project

 Print

 Bank setting

 Channel configuration

 Channel Display configuration

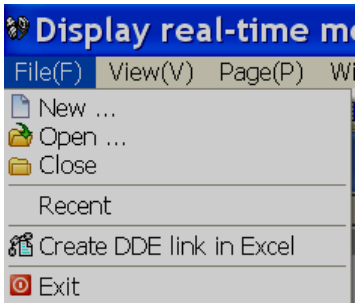
 Tools (Counter, Timers, Totalizers configuration)

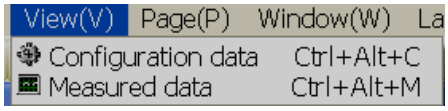
 Customized Comments for Alarms

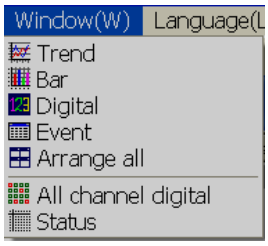
 Project Auto Configure

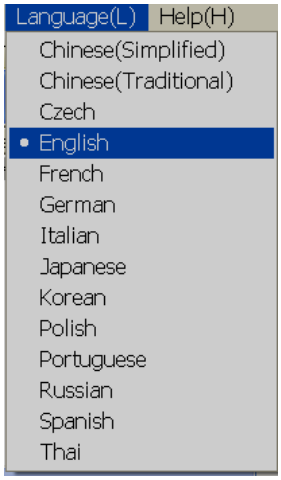
 Close and return to main program

4.1.2 Menu Bar







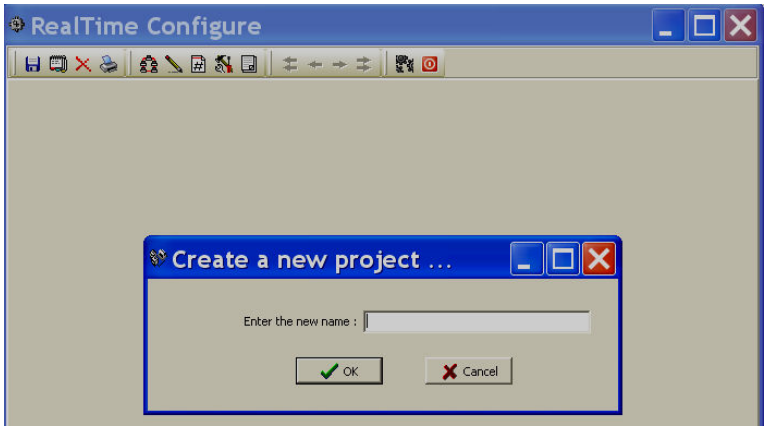


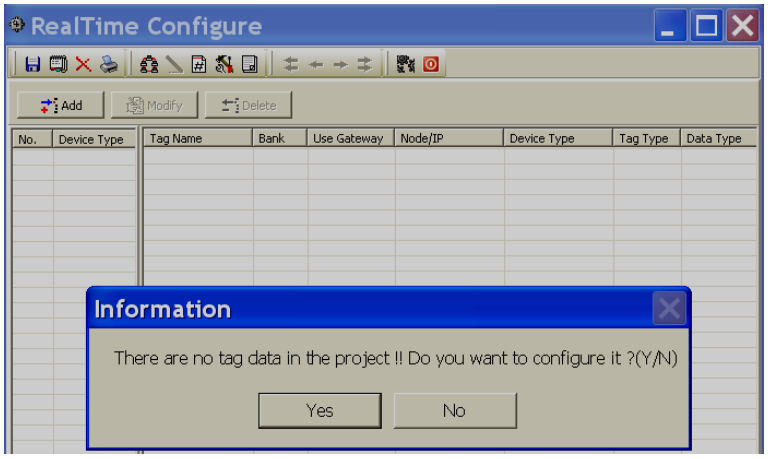
4.2 Bank settings

4.2.1 RS232 bank setting

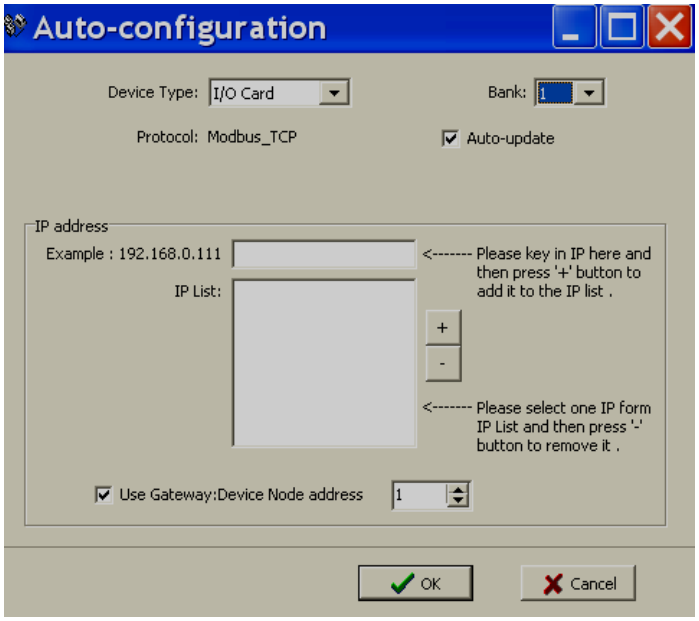
Open Real time viewer from Data acquisition studio software

Start-Programs-Data acquisition studio-Real Time viewer



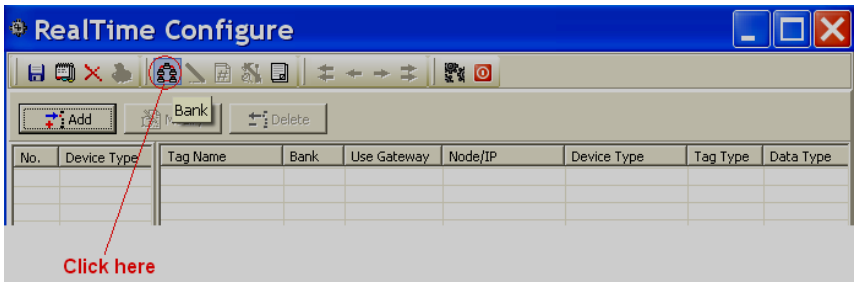


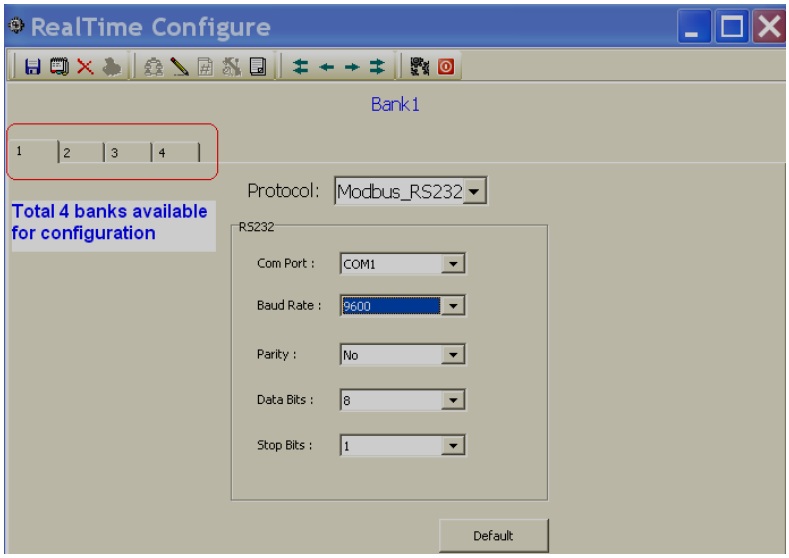
Click on “NO”



Click on “Cancel”

Set “Bank” settings properly first and save it

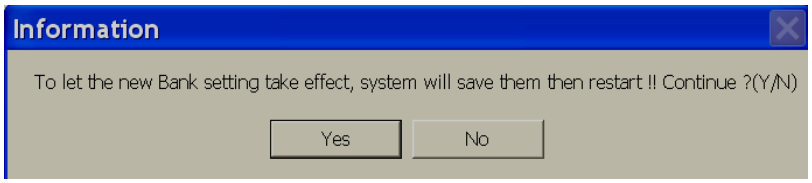




Total 4 banks available for configuration and they are for accepting incoming connections from various ports

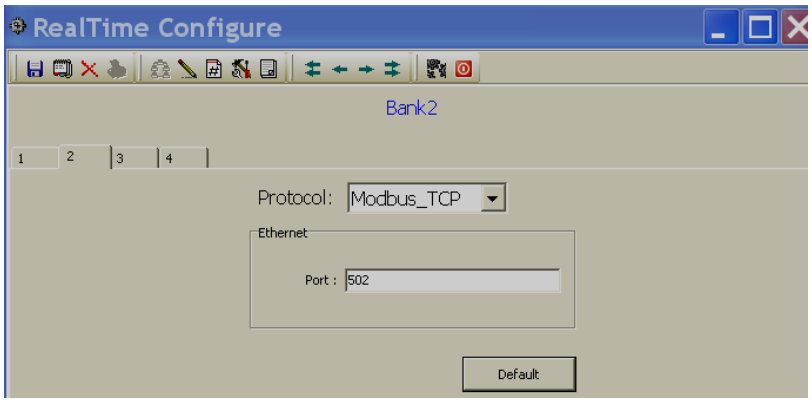
For ex: Bank1: Set as Modbus_ RS232

Now, you can receive data to DAQ software from any of above ports if they are available
After completing Bank settings, click on icon  "Save" and then click on icon 



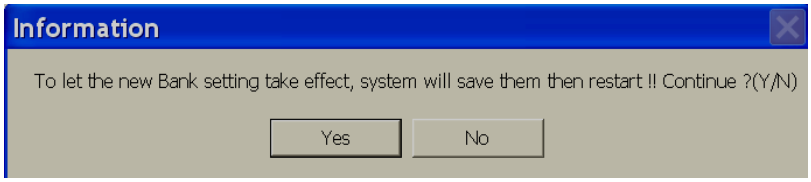
Click on "Yes", now DAQ will be closed

4.2.2 Ethernet Bank setting



Select Modbus_TCP protocol in any freely available Bank. Port number should be 502 for Modbus TCP protocol

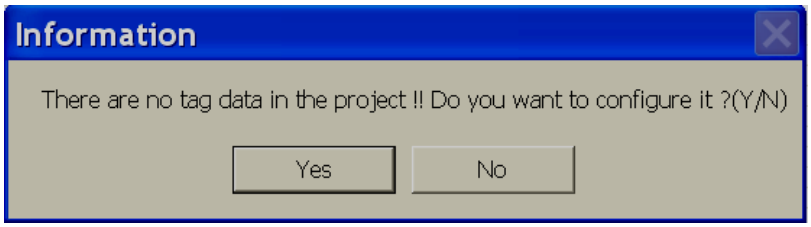
After completing Bank settings, click on icon “Save” and then click on icon



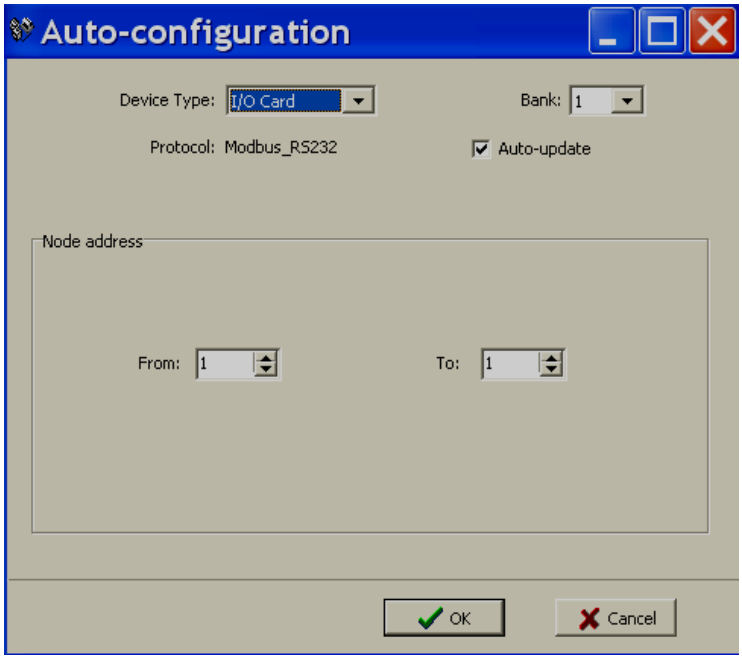
Click on “Yes”, now DAQ will be closed

4.3 Create New Project for IO modules

Open DAQ software
Start-Programs-Data acquisition studio-Real Time viewer

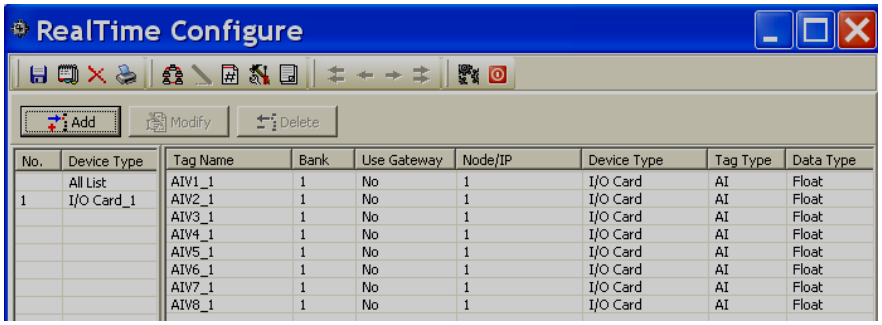


Click on “Yes”

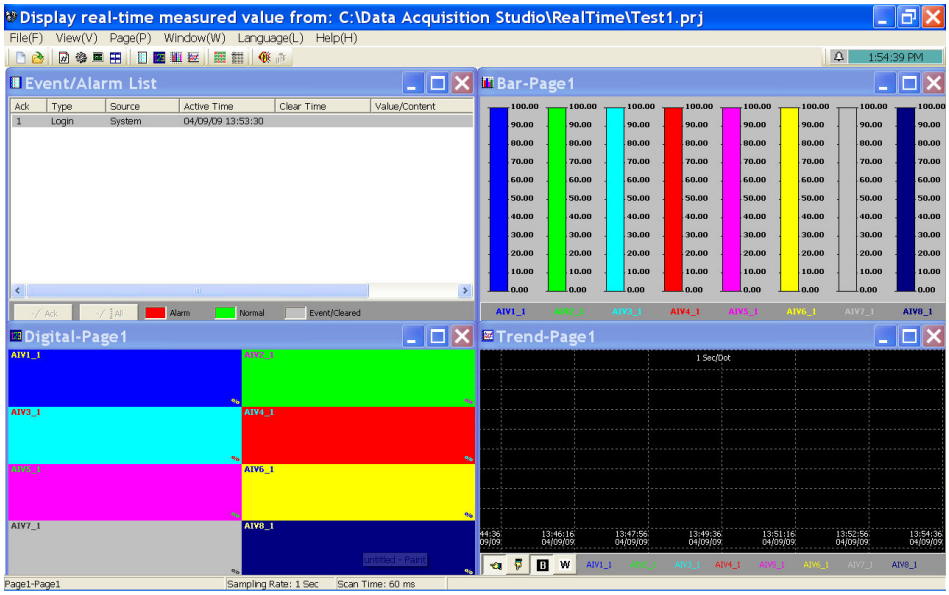


Select the Bank properly and enter Address of IO module as shown above. Click on “OK”

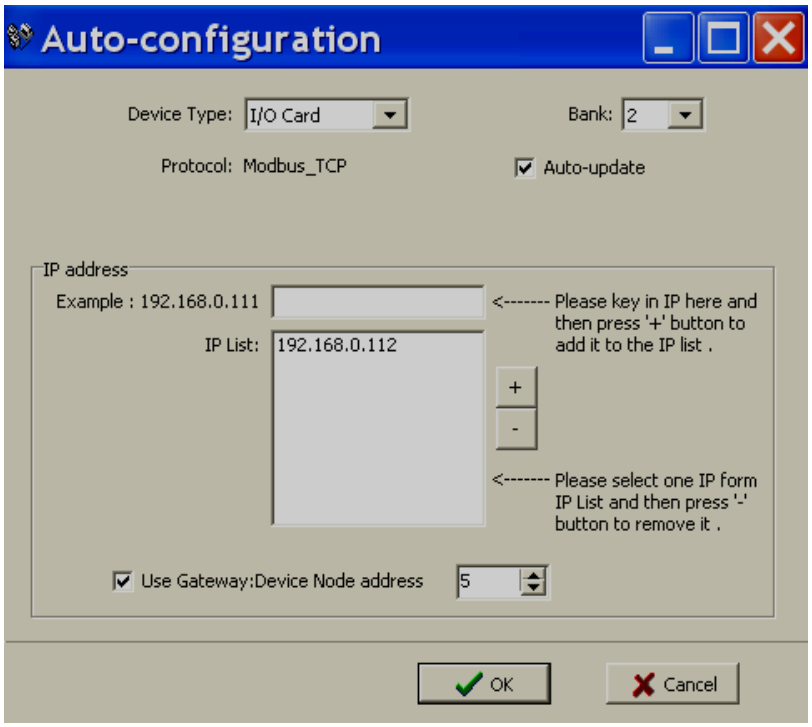
Note: If you have more than one IO module already connected in RS485, then select “Auto-Update” and then you can enter starting and ending address of IO module in above screen to acquire tag data base of all the IO modules at a time. Alternatively, other modules can be added individually as explained later



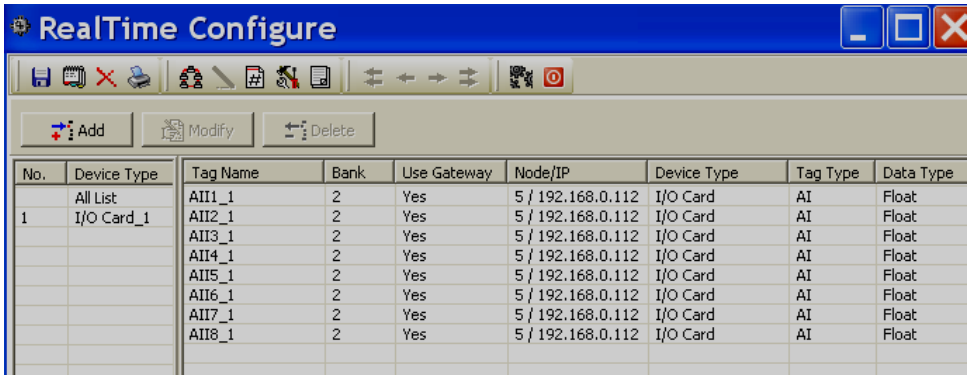
Click on icon “Save”. It shows Real time viewer screen in PC



If it is by Ethernet, screen shots will be as shown below



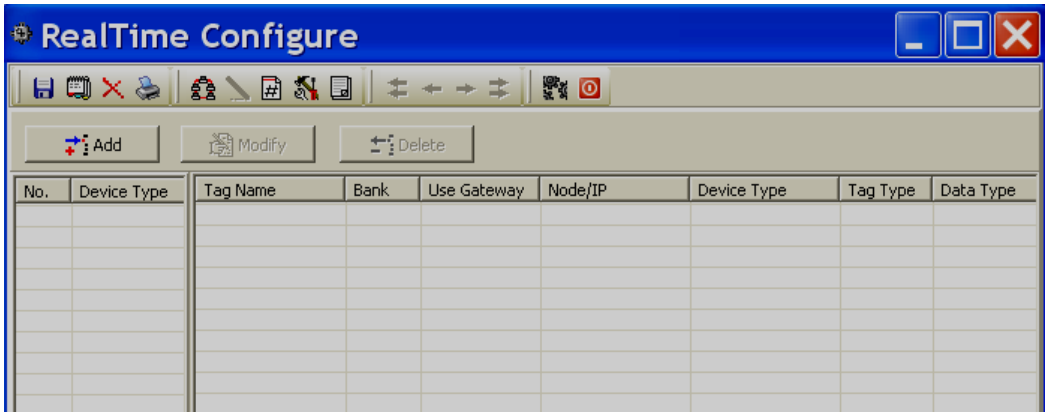
Note: When Ethernet is used in a bank, it is not possible to add many IO modules to the tag data base at one step. It requires adding each IO module individually



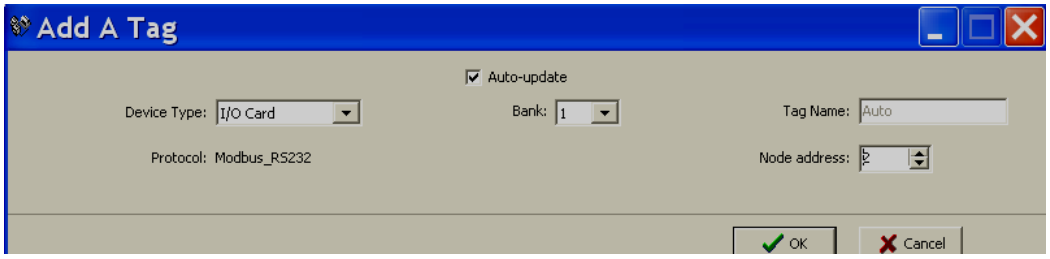
4.3.1 Add new IO module by RS232/RS485

Make sure that IO module is connected to PC via RS485 converter
Bank setting is made properly for RS232, say at Bank1

In Real time viewer, click on Icon Configuration data icon 

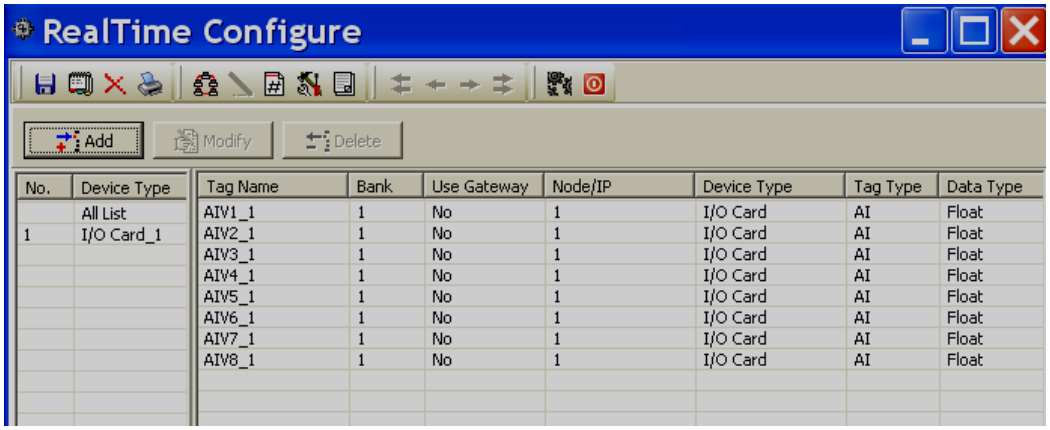


Click on “Add” button



Select Bank properly

Enter node address of the IO module and click on “OK”. If the module is connected properly, it acquire data base of selected IO module automatically



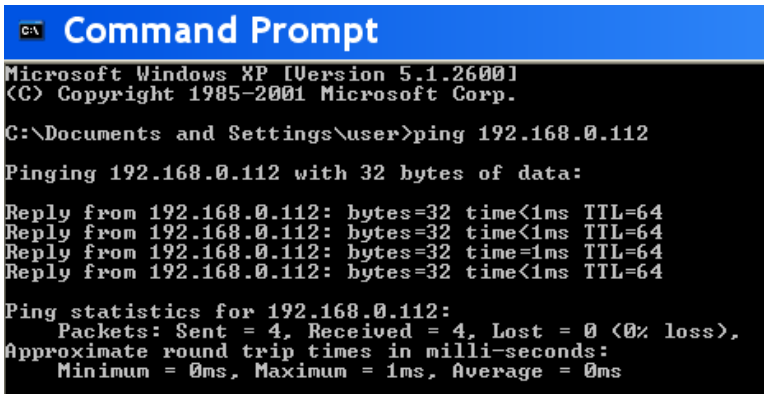
4.3.2 Add new IO module by Ethernet

Make sure that IO module is connected to PC via PC-E converter

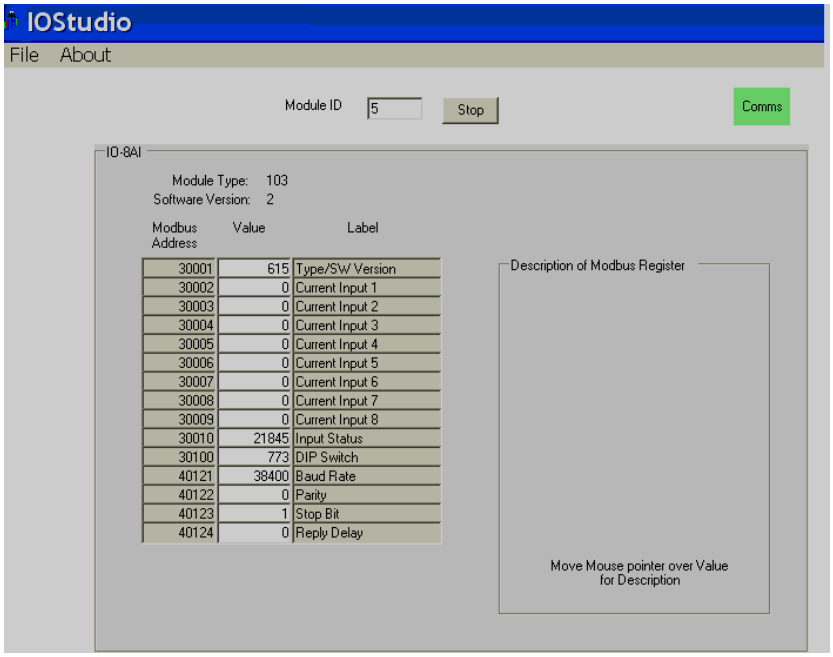
Ex: Module ID = 5
IP address of PC-E is 192.168.0.112

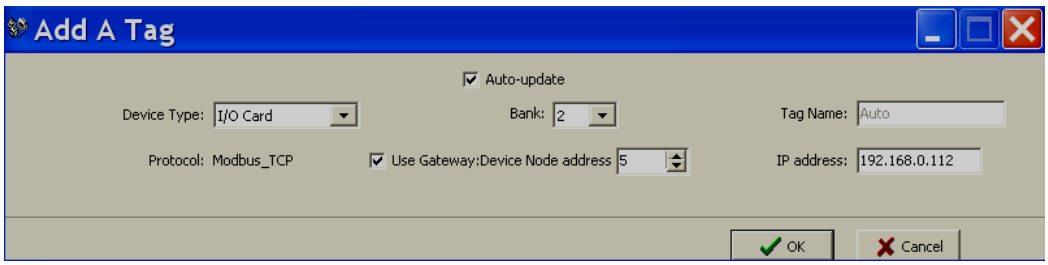
Make sure that Bank setting is made properly for Modbus_TCP, say at Bank2

Use “Ping” instruction at Dos prompt and make sure that PC-E is working fine



Use IO studio software and make sure that IO module is working fine and you are able to see registers of IO module in PC





Select IO card in Device type

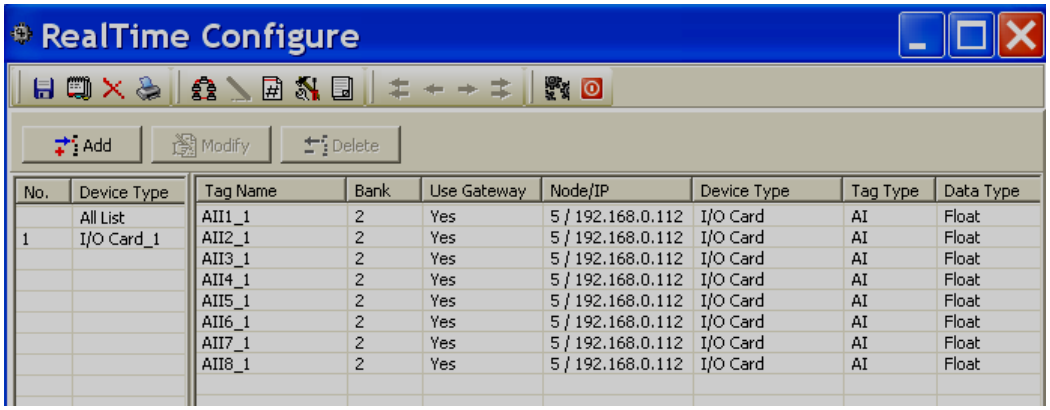
Select Bank properly as per Bank settings

Select Use Gateway and Select address of IO Module

Enter IP address of PC-E converter which is connected to IO modules via RS485 converter

Click on “OK”

If IO module is connected properly to PC via PC-E, then tag data base of IO module will be added as shown attached



No.	Device Type
	All List
1	I/O Card_1

Tag Name	Bank	Use Gateway	Node/IP	Device Type	Tag Type	Data Type
AII1_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII2_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII3_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII4_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII5_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII6_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII7_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float
AII8_1	2	Yes	5 / 192.168.0.112	I/O Card	AI	Float

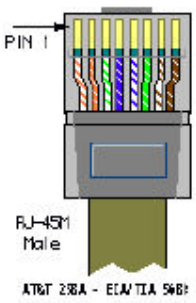
4.4 Create a New project for Paperless Recorder

4.4.1 Create a New project by Ethernet

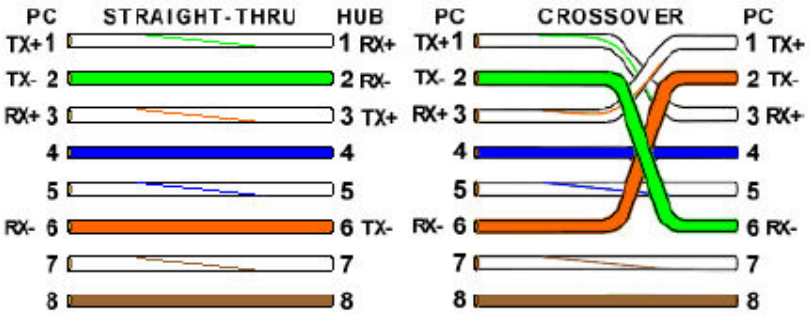
1. Check IP address of Paperless Recorder. Press “Config” key, select “System info”, press “Enter” key. Note down IP address of Recorder. For example, it is 192.168.0.30

2. If Paperless Recorder connected to PC directly, then, use cross over Ethernet cable. If Paperless Recorder connected to PC via LAN, then, use straight cable

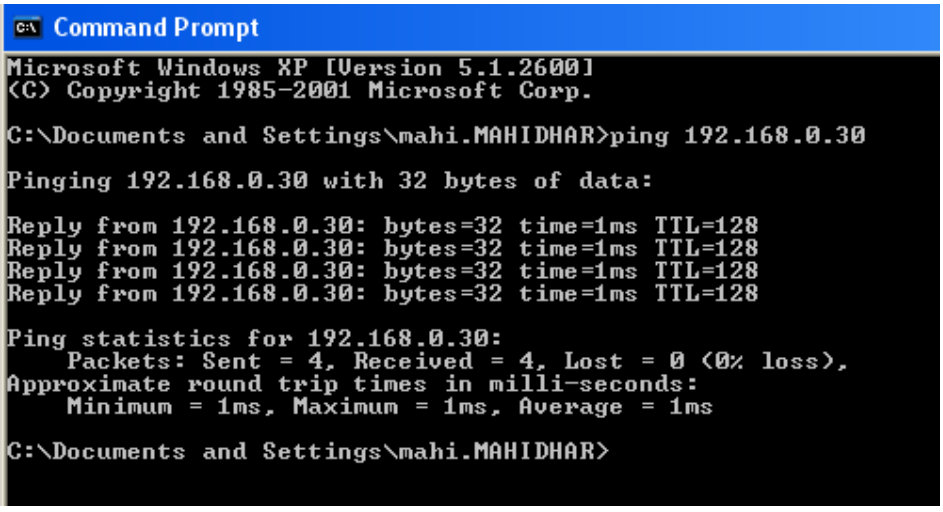
Straight Through Cable VR18-LAN/HUB	
RJ-45 PIN	RJ-45 PIN
1 Tx+	1 Rc+
2 Tx-	2 Rc-
3 Rc+	3 Tx+
6 Rc-	6 Tx-



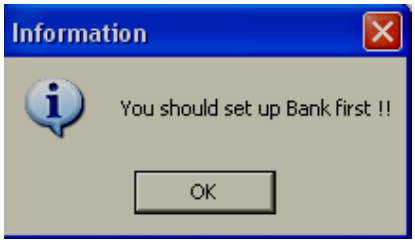
Crossover Cable VR18-PC/Notebook	
RJ-45 PIN	RJ-45 PIN
1 Rx+	3 Tx+
2 Rc-	6 Tx-
3 Tx+	1 Rc+
6 Tx-	2 Rc-



3. At Dos prompt, using “Ping” instruction, check if communication is OK between Paperless Recorder and PC. If it is OK, then, you should get reply as follows. If there is no reply, then, check Ethernet cable and IP address of Paperless Recorder

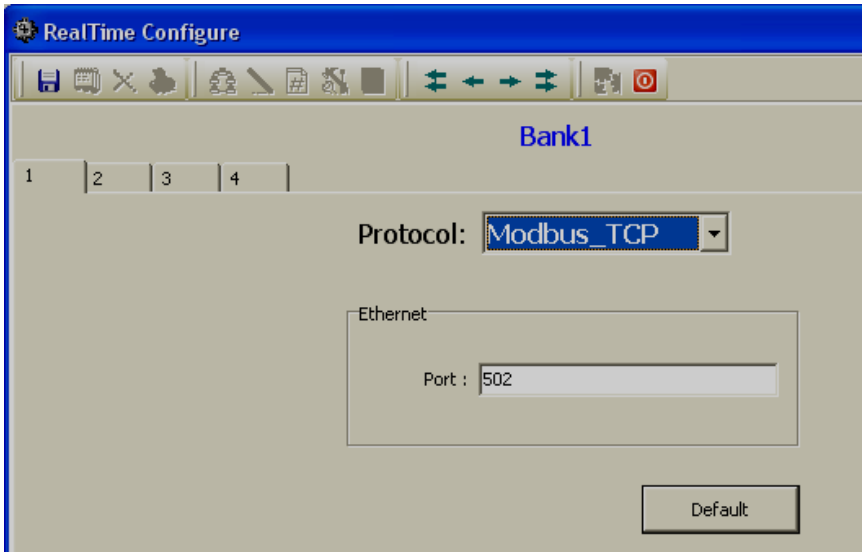


4. Open the Real time viewer from Start-Programs-DAQ Studio-Real time viewer

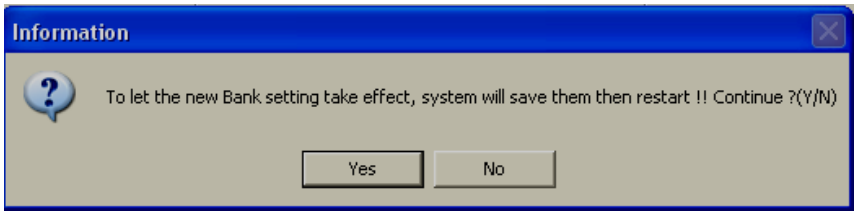


5. Click “OK”

6. For bank1, select Protocol as Modbus_TCP, make sure Port number is 502 as shown

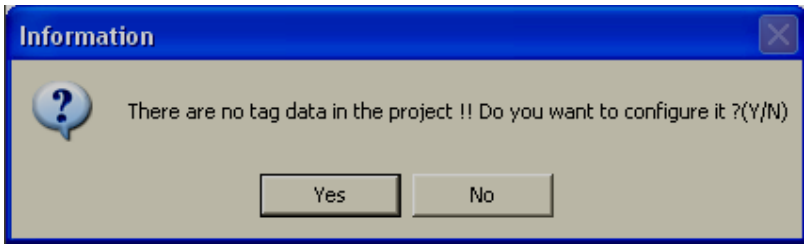


7. Click at Save icon . Then, click “Return” icon

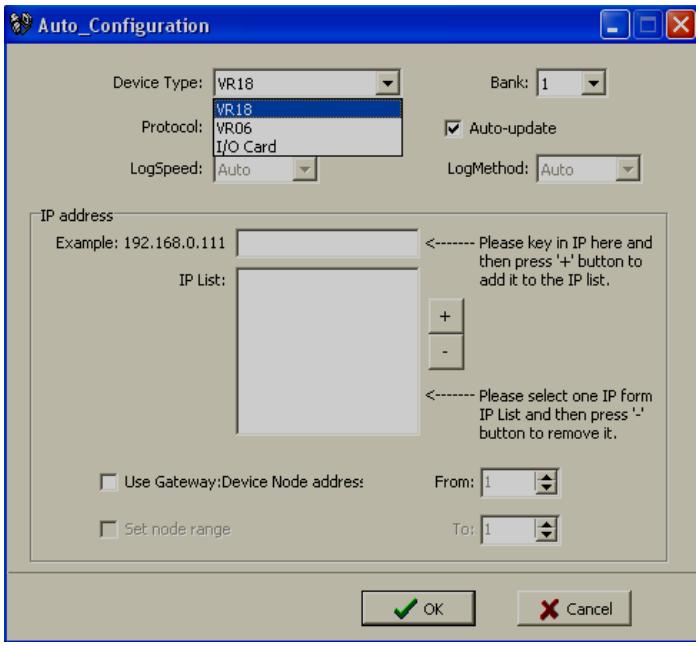


8. Click “Yes”. Then, open Real time viewer again from Start-Programs-DAQ Studio-Real time viewer

9. Enter the new name for the project. Click “OK”

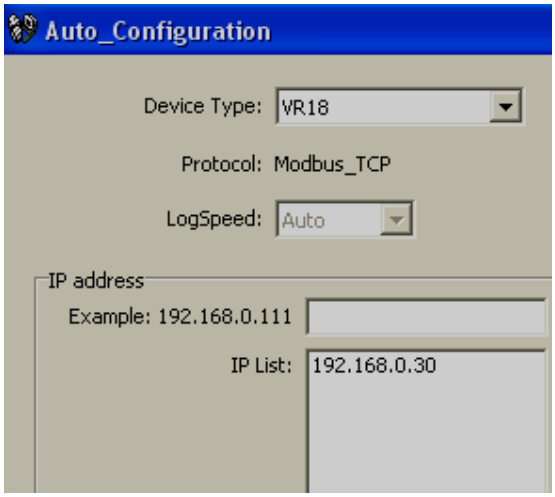


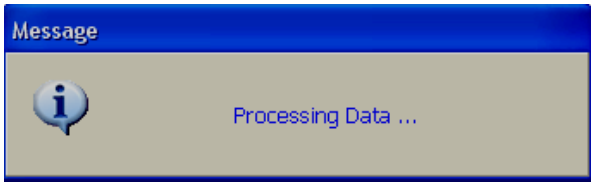
10. Click at “Yes”. Then, it appears the following screen



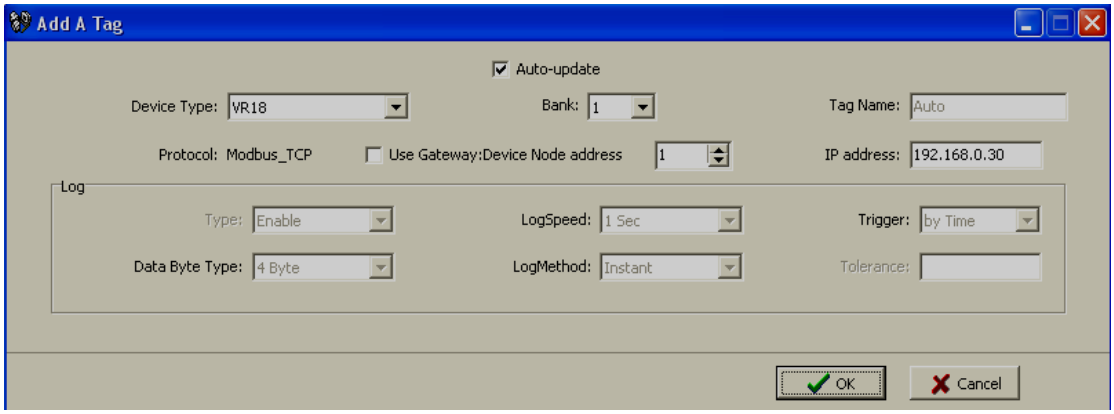
11. Select the required Recorder at device type

12. Enter IP address of the Recorder. Then, click at “+”. Then, IP address should appear in IP List as shown. Then click “OK”

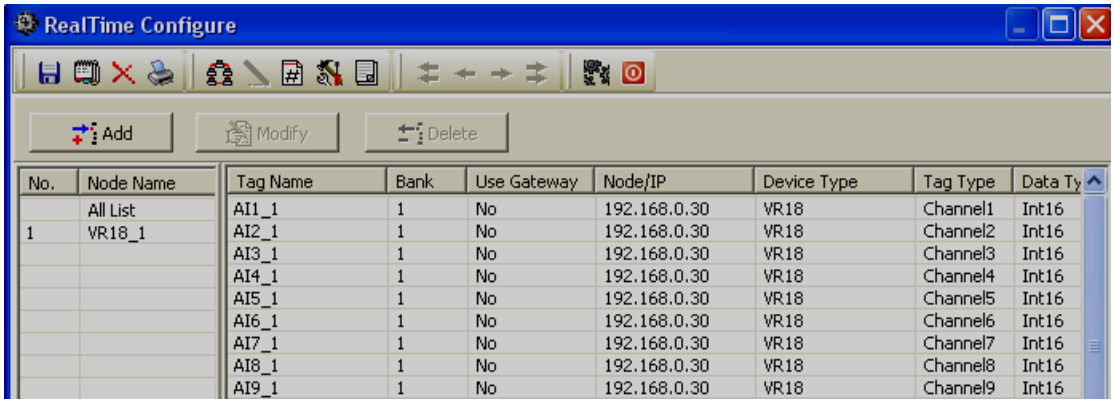




If no is selected for auto configuration, then, it appears the following screen



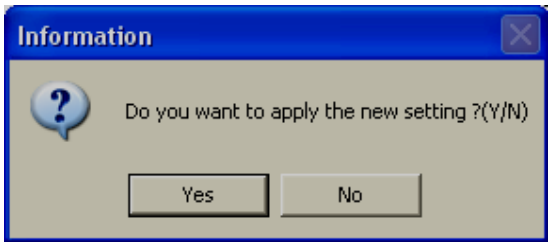
13. If there is good communication between Recorder and PC, data base will be updated and it appears the following screen



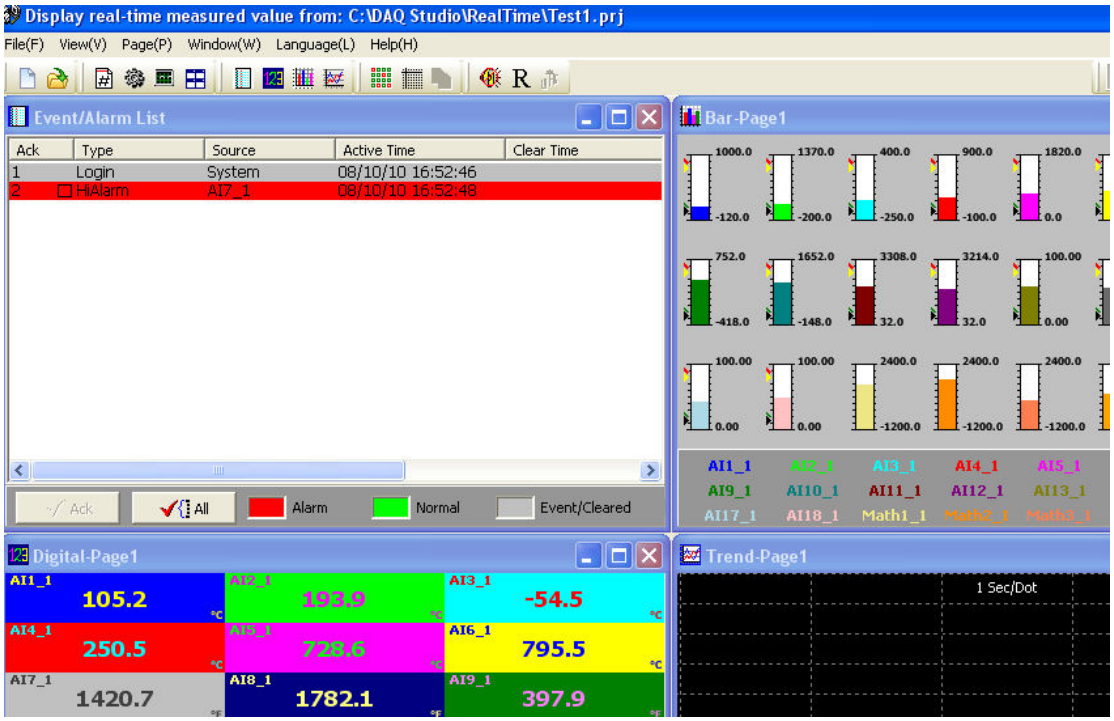
14. If required, it is possible to add one more Recorder from here

    Click at “Add”, then follow on screen instructions and enter IP address of second Recorder

15. Click at Save icon . Then, click “Return” icon



16. Click “Yes”. Then, it appears Real time screen showing digital values, bar graph, Real time trend, Real time alarms etc.

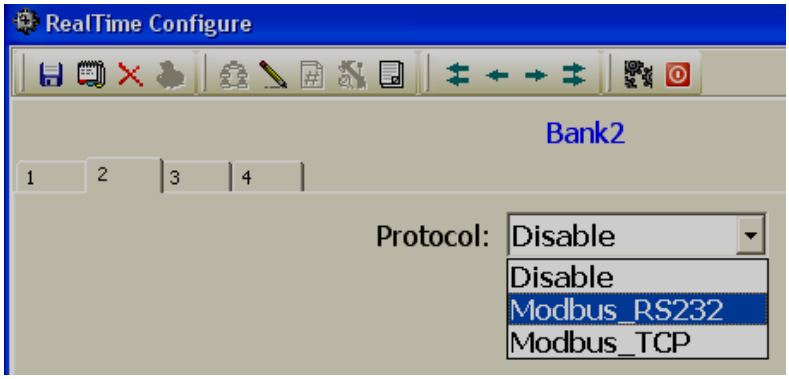


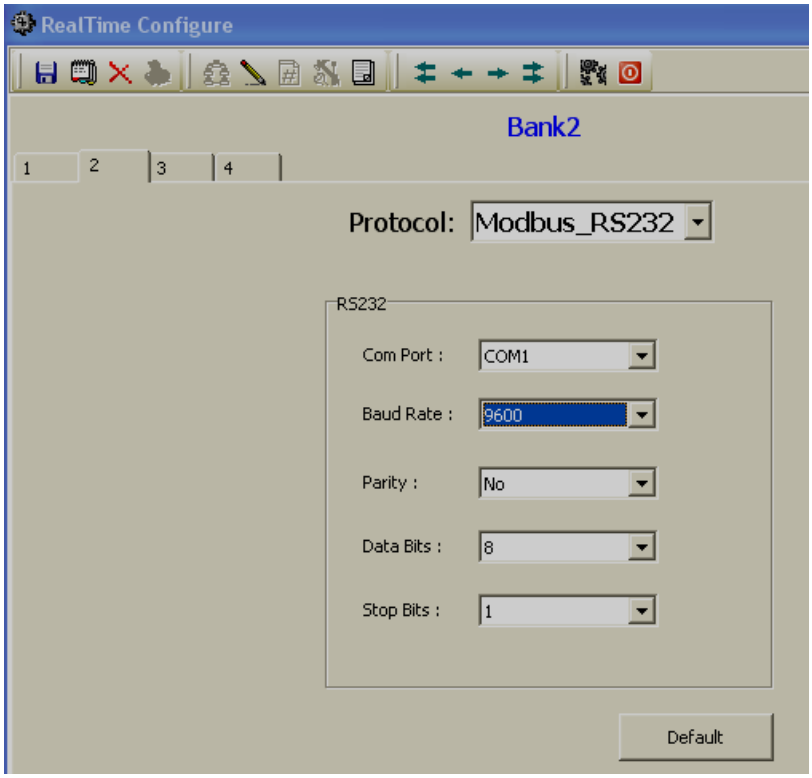
4.4.2 Create a New project by RS485

1. In recorder, press “Config”. Then, select “Instrument”. Press “Enter” Key. For communication, select PC Transfer = RS232/RS485/RS422. Set address properly. Example: 1. Set Baud rate, example: 9600 bps. Set Data format, example:Parity=None, Data bits=8, stop bits=1

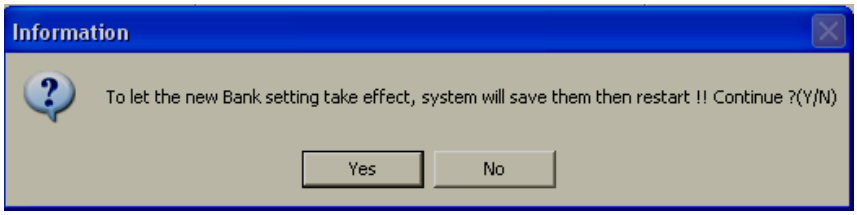
2. Open Real time viewer

3. Set bank properly for RS232. Example: Select Bank2, set protocol = Modbus_RS232 and then enter all other communication settings exactly same as defined at Paperless Recorder

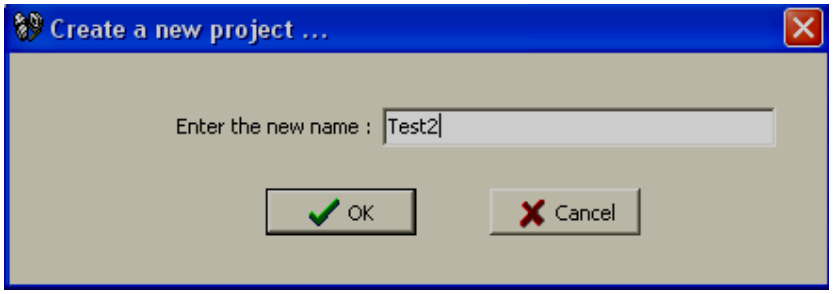




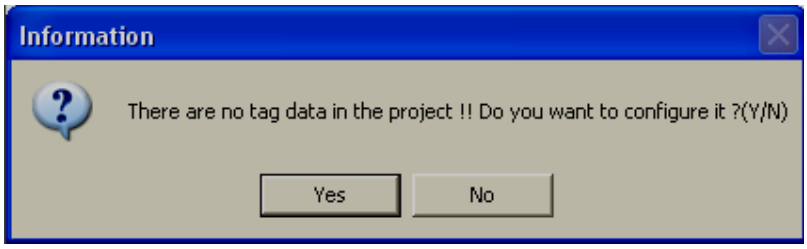
4. Click at Save icon . Then, click “Return” icon .



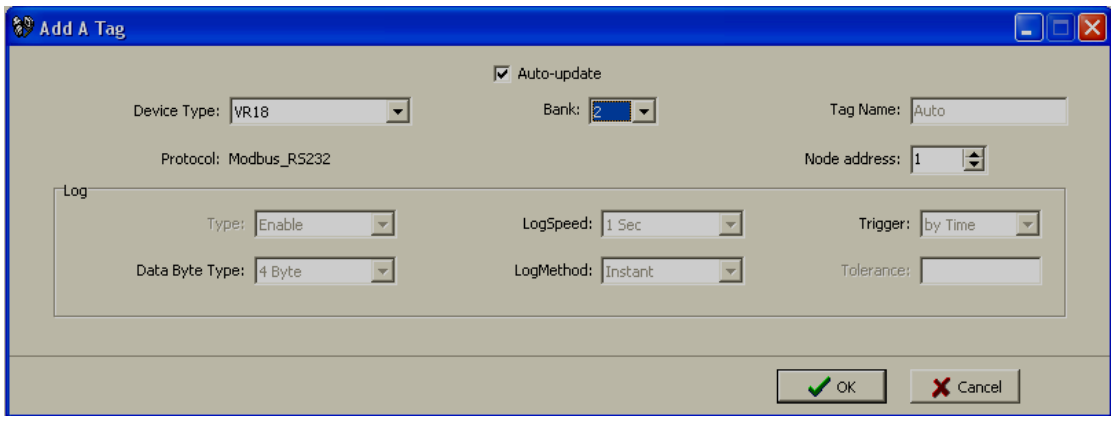
5. Open Real time viewer again.



6. Enter the new name for the project

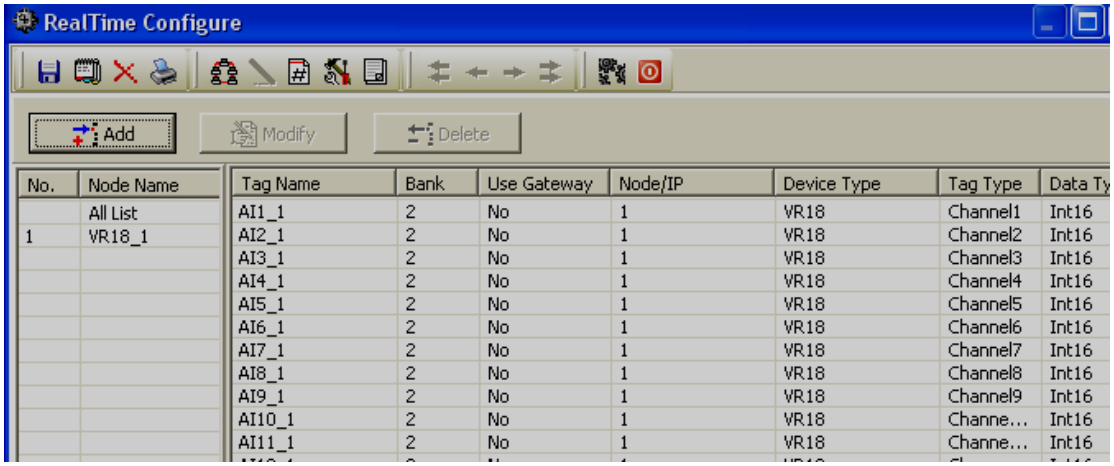


7. Click “No”. Then, click “Add”



8. Select Device type as VR18/VR06 Recorder. Select Bank properly. If should show protocol: Modbus_RS232. Enter node address same as address defined at Paperless Recorder. Then, click “OK”

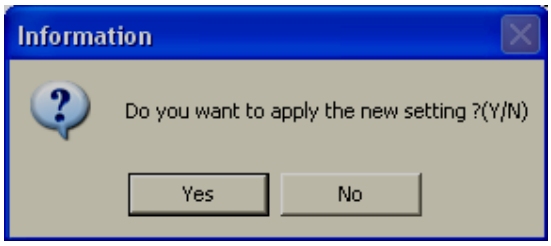
9. If there is good communication between Recorder and PC, data base will be updated and it appears the following screen



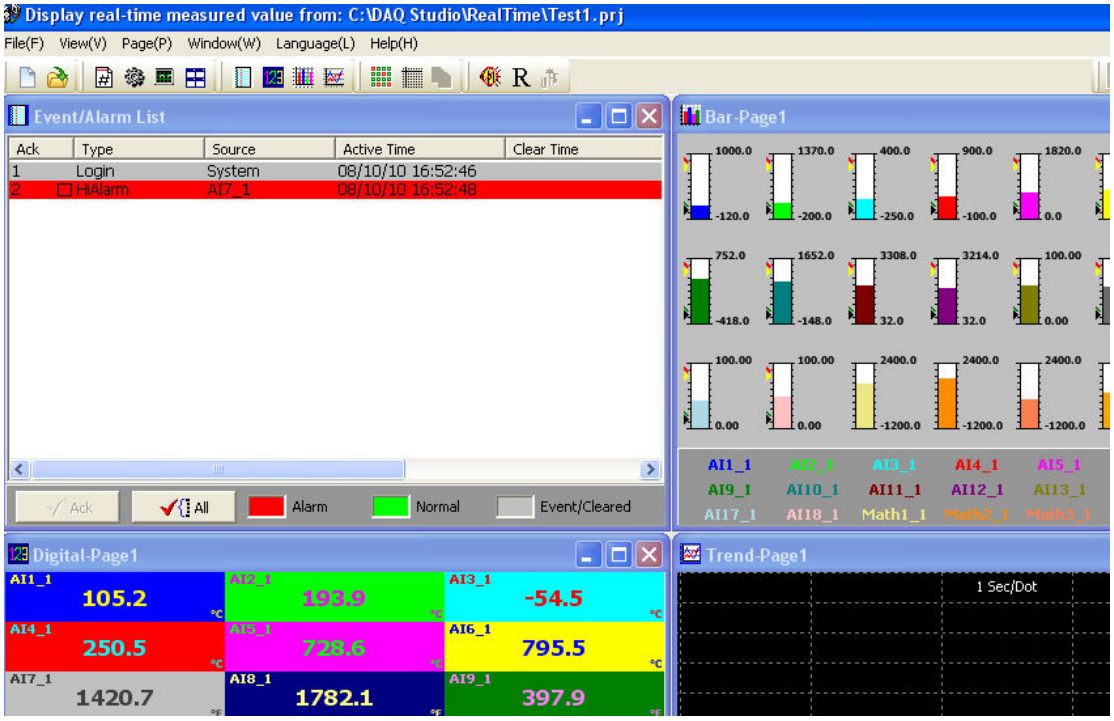
10. If required, it is possible to add one more Recorder from here

    Click at “Add”, then follow on screen instructions and enter node address of second Recorder

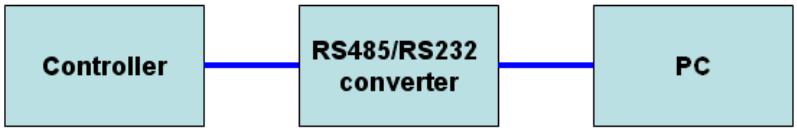
11. Click at Save icon . Then, click “Return” icon



12. Click “Yes”. Then, it appears Real time screen showing digital values, bar graph, Real time trend, Real time alarms etc.



4.5 Create a New project for Controllers



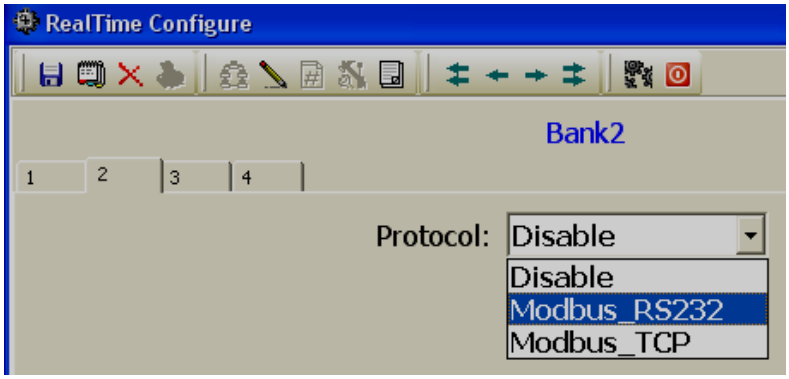
1. In controller, please set communication settings properly

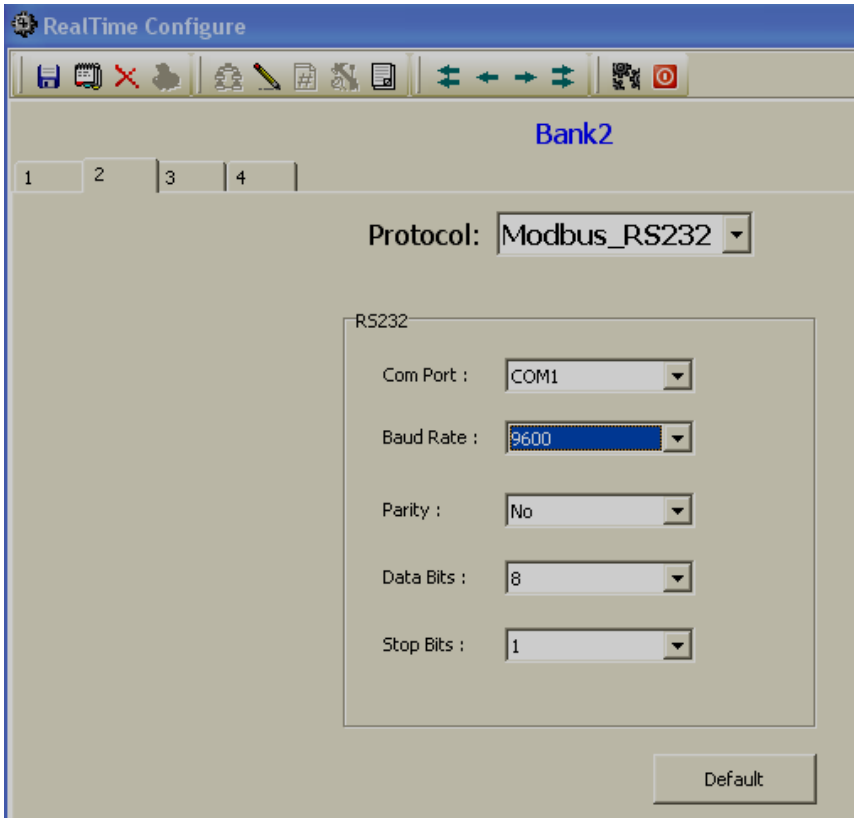
Example: Set Baud rate: 9600 bps. Address: 1, Parity=None, Data bits=8, stop bits=1

2. Set communication settings properly at RS485/RS232 converter

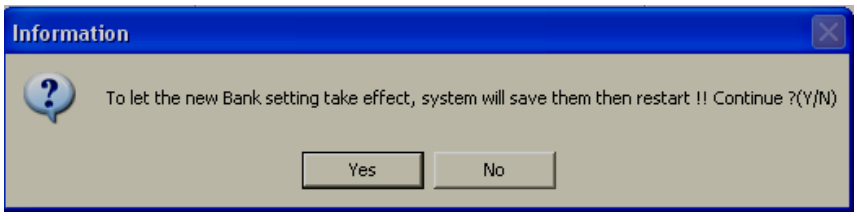
3. Open Real time viewer

4. Set bank properly for RS232. Example: Select Bank2, set protocol = Modbus_RS232 and then enter all other communication settings exactly same as defined at Controller



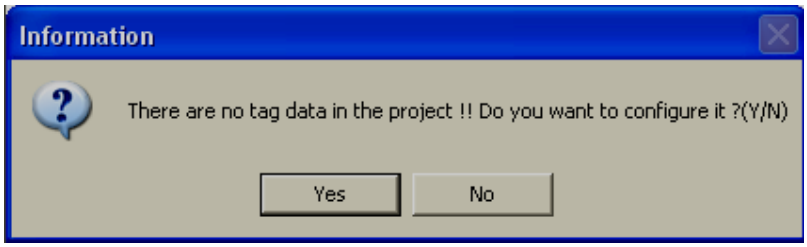


5. Click at Save icon . Then, click “Return” icon .

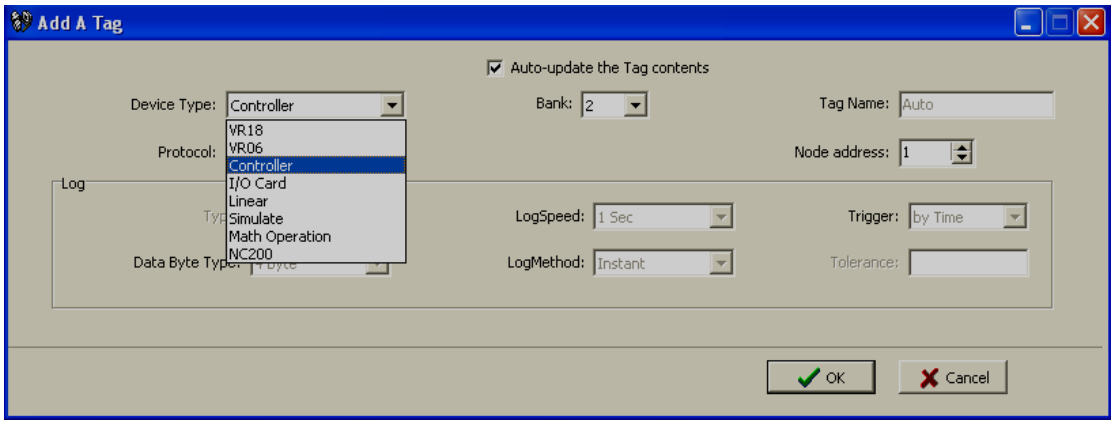


6. Open Real time viewer again.

7. Enter the new name for the project

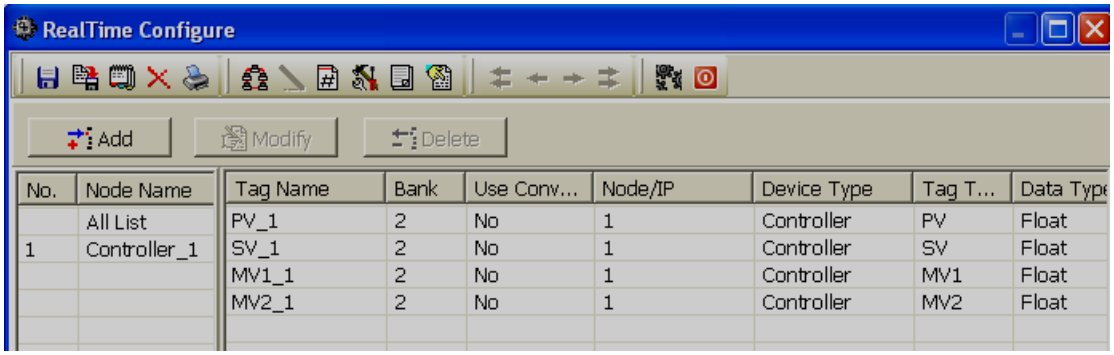


8. Click “No”. Then, click “Add”



9. Select Device type as Controller. Select Bank properly. If should show protocol: Modbus_RS232. Enter node address same as address defined at Controller. Then, click “OK”

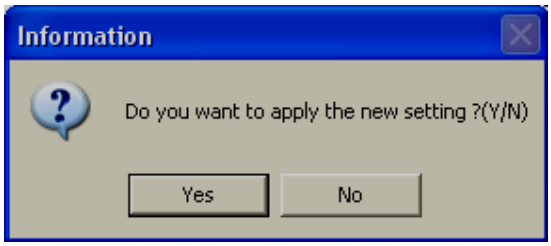
10. If there is good communication between Controller and PC, data base will be updated and it appears the following screen



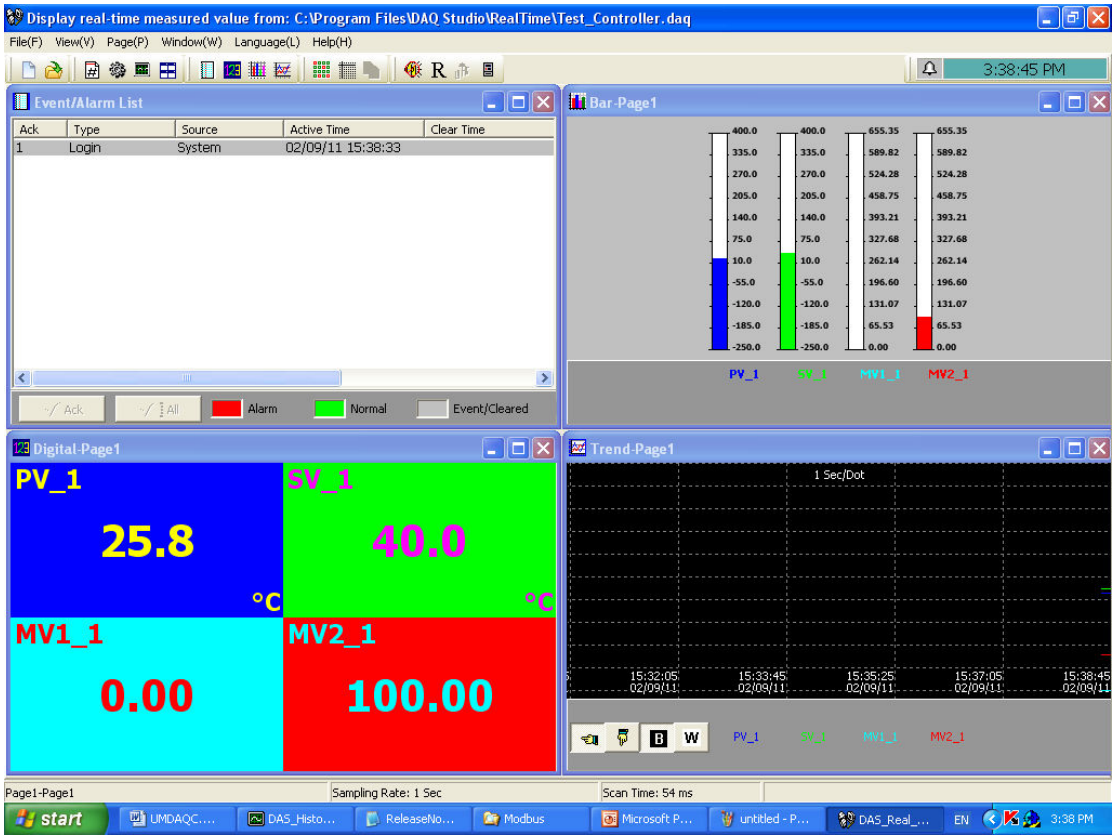
11. If required, it is possible to add one more Controller from here

    Click at “Add”, then follow on screen instructions and enter node address of second controller

12. Click at Save icon . Then, click “Return” icon



13. Click “Yes”. Then, it appears Real time screen showing digital values, bar graph, Real time trend, Real time alarms etc.



4.5.1 Modification of controller parameters in Real time

It is possible to modify max.10 parameters for a controller in Real time.

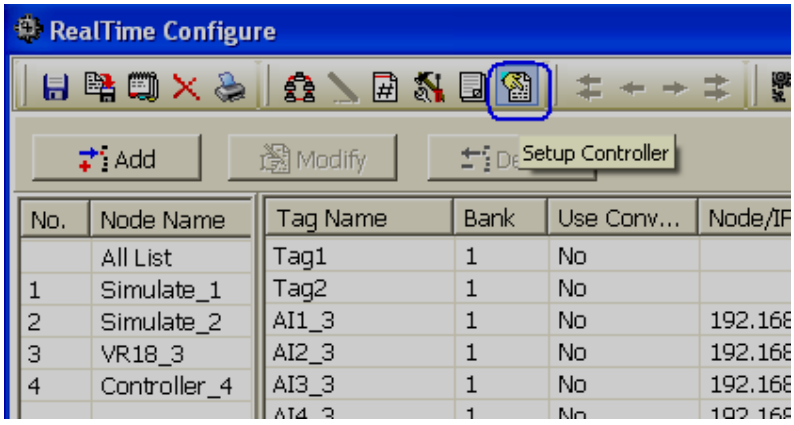
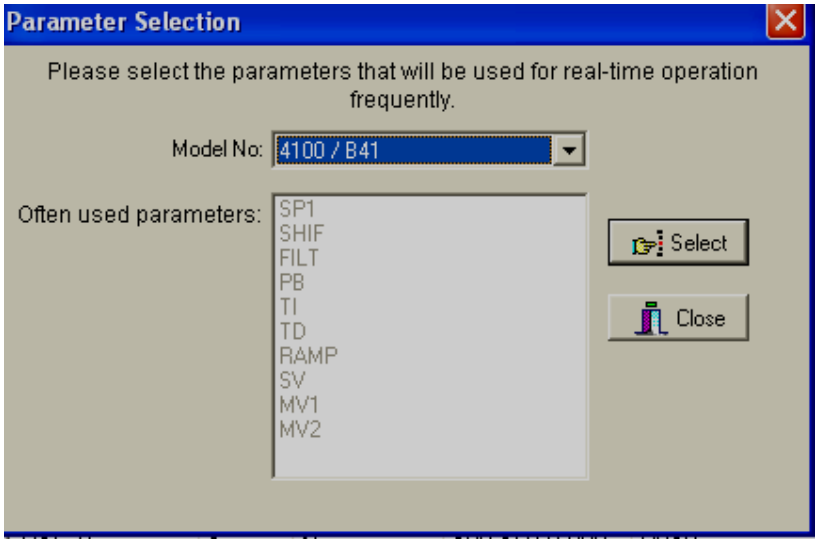
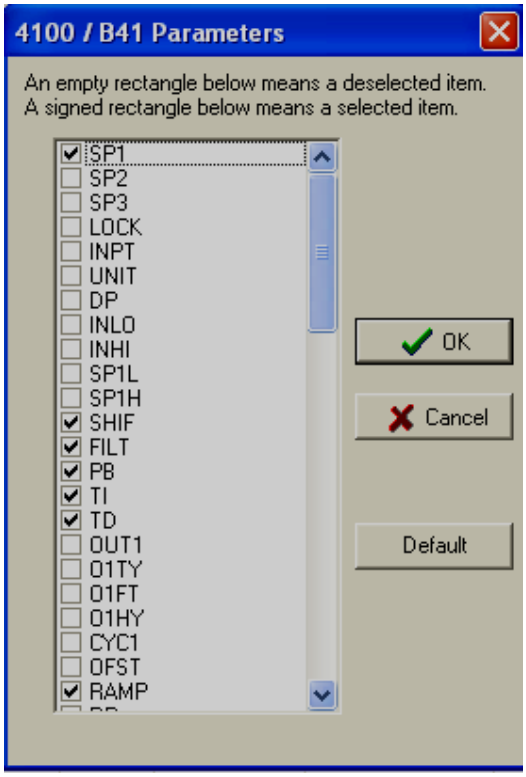
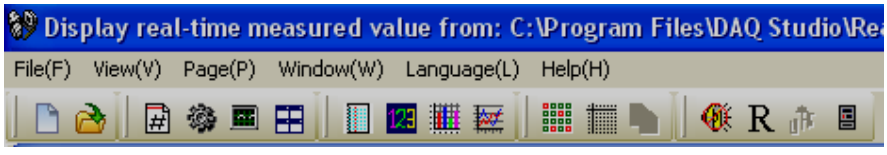


Fig: Design time configuration







Click at  to modify controller parameters

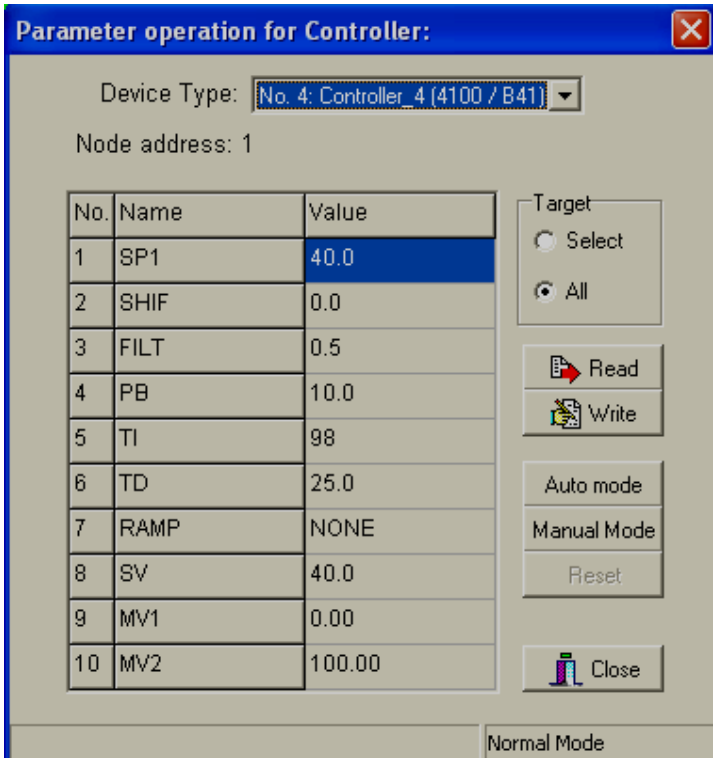
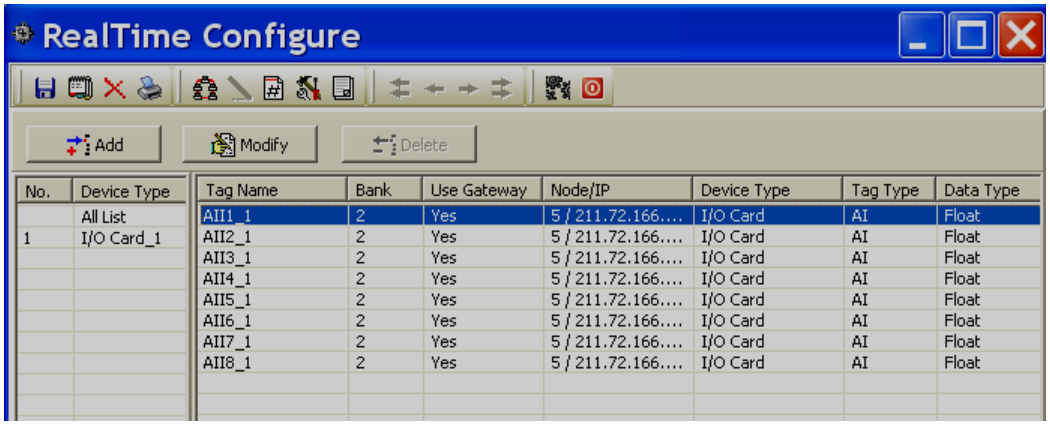


Fig: Real time modification

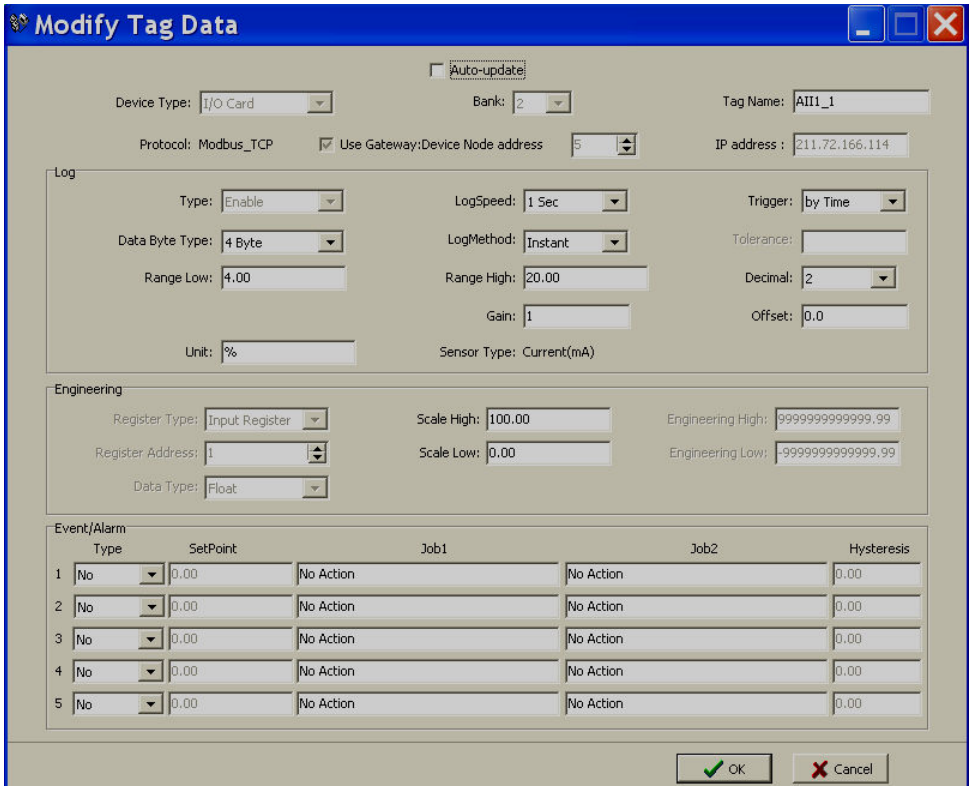
4.6 Channel Configuration

Add IO/Recorder to the data base as explained in previous section.

In Real time viewer, click on Icon Configuration data icon 



Select the required IO card in Device Type and select the Required Tag Name. Then double click on the selected Tag name, it will prompt the following screen



Device Type: Display channel source

Bank: Display current Bank number

Tag Name: It is to define the name for each channel in maximum 9 characters

Auto-Update: If you wish to modify Tag name and modify configuration, deselect it

Use Gateway-Device Node address: It is address of selected device type

IP address: Display current gateway IP address

Log Type: Enable/Disable

Select disable while a specific channel is not required at this time. Select enable while a specific channel is required

Log Speed: It is the logging speed (recording speed) of measured data. Select Log Speed column, then choose 1, 2, 5, 10, 30, 60 or 120 seconds

Log Method: The method of logging measured data. Select the column, and then choose the Log method of Instant, Average, Minimum or Maximum data

Instant: logging in the last measured data at the sampling interval
Average: logging in averaged measured data at the sampling interval
Minimum: logging in minimum measured data at the sampling interval
Maximum: logging in maximum measured data at the sampling interval

Trigger: Select various types like “by time” or “by change” or disable

By Time: Data log based on Log Speed and Log Method

By Change: Depends on Tolerance setting. Log speed and Log Method is disabled if this option is selected and if this option is selected sampling rate is fixed at 1 sec. This option is selected to save memory in PC

If data logging is required in set log speed (fixed time interval), select Trigger as by timer.

If data logging is required only when there is change in process value, then select Trigger as by change. This will save memory

Tolerance: This is enabled if “by change” is selected at Trigger Type. For ex: If tolerance is set at 0.5, then if the new process value is more than or less than 0.5, then only the new sample will be logged

Data Byte Type: Choose 2 or 4 or 8 byte

Range Low: Range low for specific channel in selected device, ex: 4.00 mA for 8AII module

Range High: Range high for specific channel in selected device, Ex: 20.00 mA for 8AII module

Decimal: select one of the options - 0, 1, 2, 3 or 4

Gain: It is a multiplier to correct the sensor error.
The correct value = (the process value + offset) x gain

Offset: It is offset value to correct the sensor error

Unit: The engineering unit of input

Sensor: It displays input type automatically as per the type of IO card selected

Scale Low: Defines the low scale with decimal if necessary. For instance, input 0-10 V, the Scale Low can be set up with value 0.00 to be correspondent to low range 0 V.

Scale High: Defines the high scale with decimal if necessary. For instance input 0-10 V, the Scale High can be set up with value 100.00 to be correspondent to high range 10 V.

4.6.1 Event

The Event is frequently used for Alarm purpose. Event can also be used for digital output DO, Timer, Totalizer, Counter or Report.

Type: There are various types of H, L, HH, LL, R, r or Error to be selected for job or Alarm purpose.

H: High limit. When the process is over high limit, the alarm or job is actuated.

L: Low limit. Any the process is lower than low limit, the alarm or job is actuated

HH: High high limit, to set up another limit higher than high limit for double warning.

LL: Low low limit, to set up another limit lower than low limit for double warning.

R: Increasing rate of change. The job or alarm is actuated when the rate of increasing process value is greater than the specified rate time interval. For example, when the Set point is set to 100_1S, if the process is increasing greater than the value 100 in 1 second, then job or alarm will be actuated.

r: Decreasing rate of change. The job or alarm is actuated when the rate of decreasing process value is greater than the specified rate time interval. For example, when the Set point is set to 50_2S if the process is decreasing greater than the value 50 in 2 seconds, then job or alarm is actuated.

Error: If there is error in channel input, then alarm or job is actuated

Set point: To set up the process value for actuating Job1 and /or Job2

Job1, Job2: When an event occurs, the task to be performed is called the job. A typical example is to trigger sound buzzer in event of high temperature. Each pen can accept five events (or alarms) and each event can create two jobs.

Various types of jobs can be selected:

4.6.2 Jobs

The following jobs are available for configuration to be executed on an event

No Action: Do nothing

Log Alarm (Auto Ack): Record alarm with acknowledgement automatically

Log Alarm: Record alarms

Log Event: Record events

Send Email: Send email if it is configured on an event

Sound Buzzer: Sound the buzzer on an event

DO Latch On: Set digital output / relay on, and then select Target say DO 1. The relay is latched when it is activated. Digital Output relays will be shown if digital output card is configured and available in database

DO Latch Off: Set digital output / relay off, and then select Target say DO 1. The relay is latched when it is activated. Digital Output relays will be shown if digital output card is configured and available in database

DO Process: Set digital output / relay on for process high or low, and then select Target from DO 1 to DO 6. The relay is not going to be latched when it is activated. Digital Output relays will be shown if digital output card is configured and available in database

Enable Timer: Start the timer, and then select Target from Timer1 to Timer 100 or all Timers

Disable Timer: Stop the timer, and then select Target from Timer1 to Timer 100 or all Timers

Preset Totalz: Start the totalizer with a preset value, and then select Target from Tolz 1 to Tolz 50. It requires configuring totalizer via tools and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer

Reset Totalz: Reset totalizer into zero, and then select Target from Tolz 1 to Tolz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer

Enable Totalz: Start the totalizer, and then select Target from Tolz 1 to Tolz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer

Disable Totalz: Stop the totalizer, and then select Target from Tolz 1 to Tolz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer

Preset Counter: Start the Counter with a preset value, and then select Target from Cont1 to Cont50. It requires configuring Counter via tools to appear counter number after selection of Preset counter in the jobs

Reset Counter: Resets the counter into zero, and then select Target from Cont1 to Cont50.

Inc Counter: Increase the counter, and then select Target from Cont1 to Cont50

Dec Counter: Decrease the counter, and then select Target from Cont1 to Cont50

Log Report: Make the report for Counter and Totalizer

Reset MinMaxAve: In Report function, after logging the MinMaxAve data of AI and Math channels for one day for example, then reset historical data in order to logging new data for the next day

Log Message: Log customized comments for alarm as messages on an event. A total of 100 messages available for customer customization

Hysteresis: To avoid job have been activated too often, option available to set for no reaction in 0.1% to 10% of full span (Low Scale to High Scale).

Note:

Each of the IO modules has different sampling rates. For every channel, it requires to specify the sampling rate in data acquisition software. By default DAQ will acquire data from each of the IO module with sampling rate of 1 sec. Minimum available sampling rate is 1 sec. Available options are 1, 2, 5, 10, 30, 60, 120 sec. For ex: If the logging speed is set at 10 second in Instant mode, the DAQ logs using the last of ten measured data values it acquired in last 10 sec at rate of 1 sample/sec. For the same speed in Averaging mode, the DAQ logs using the average of the ten measured data values it acquired at rate

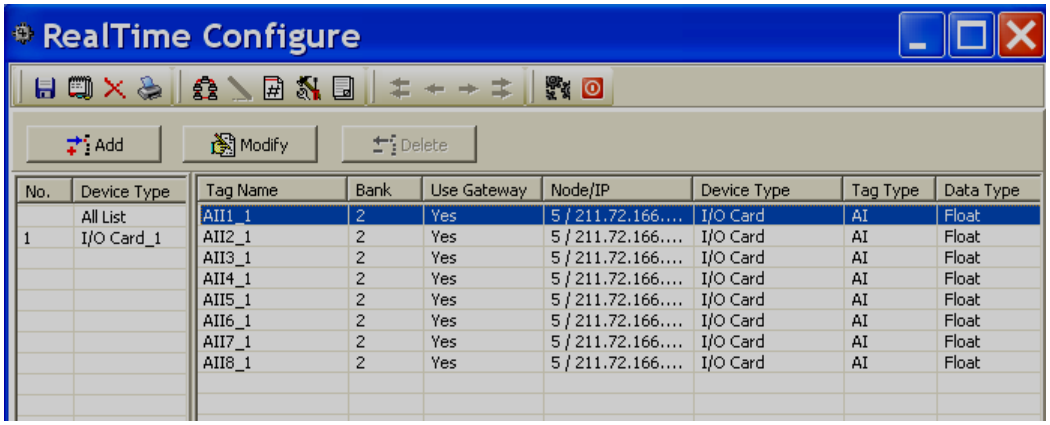
of 1 sample/sec. For the same speed in the Maximum or Minimum mode, then the DAQ logs using the maximum or minimum of the ten measured data values it acquired at rate of 1 sample/sec.

	Sampling	Logging (historical trend)	Display (real time)
Instant	10 S	the last of 10 measured data	the last of 10 measured data
Averaged	10 S	the average of 10 measured data	the last of 10 measured data
Maximum	10 S	the maximum of 10 measured data	the last of 10 measured data
Minimum	10 S	the minimum of 10 measured data	the last of 10 measured data

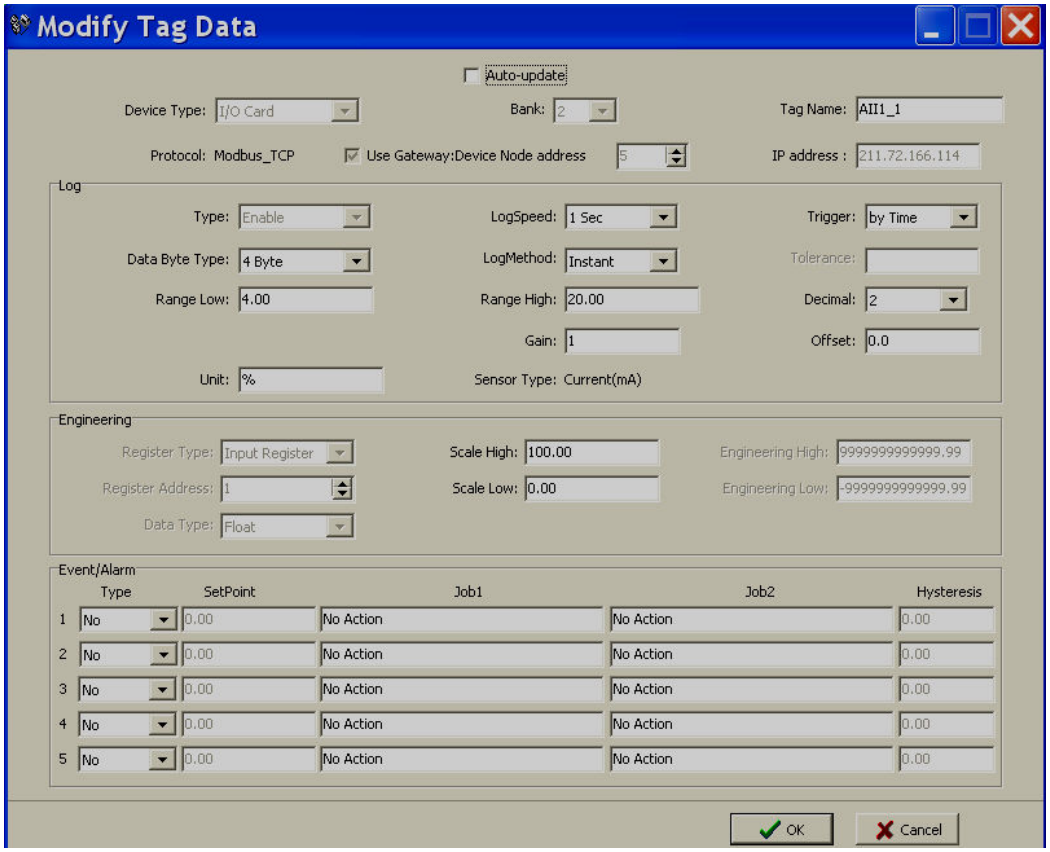
4.6.3 Analog inputs

Add IO module to the data base as explained in previous section.

In Real time viewer, click on Icon Configuration data icon 

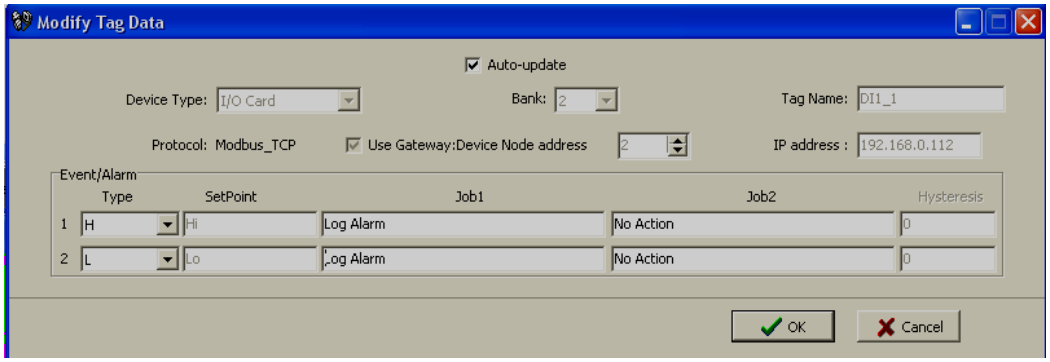


Select the required IO card in Device Type and select the Required Tag Name. Then double click on the selected Tag name, it will prompt the following screen



For Analog inputs, five events are available for each channel. Maximum two jobs can be configured for each event

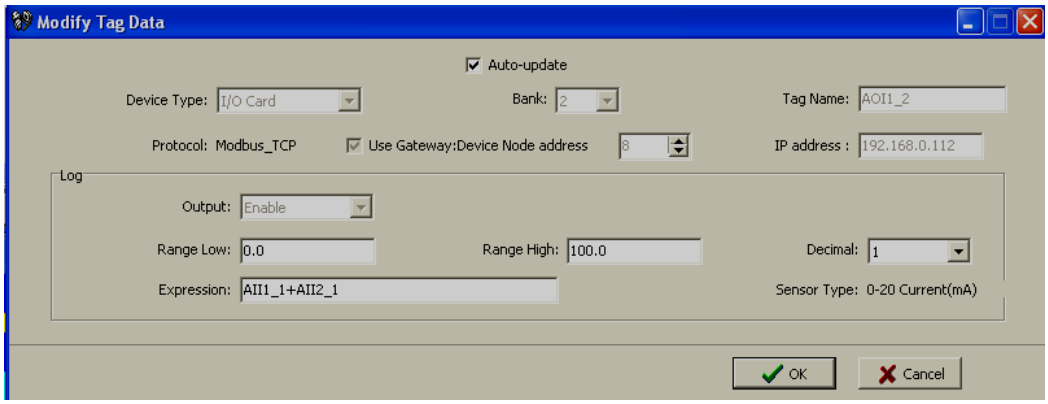
4.6.4 Digital Inputs



For Digital inputs, two events are available for each channel. Maximum two jobs can be configured for each event

Ex: When DI1 is high, Log alarm, when DI1 is Low, Log alarm

4.6.5 Analog Outputs



Output: Select Enable or Disable

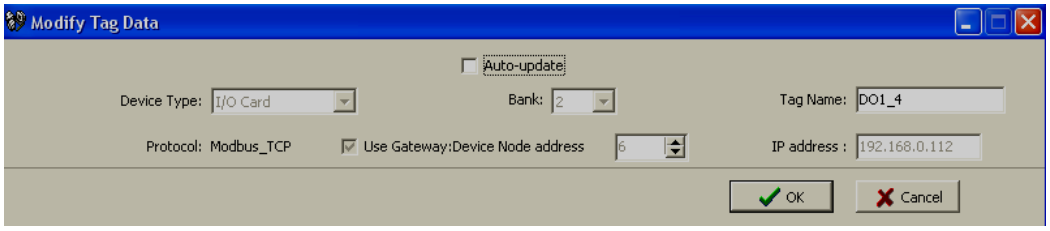
Range Low: Defines the low scale with decimal if necessary. For instance, output 0-20 mA, the Scale Low can be set up with value 0.0 to be correspondent to low range 0 mA.

Range High: Defines the high scale with decimal if necessary. For instance input 0-20mA, the Scale High can be set up with value 100.0 to be correspondent to high range 20mA.

Expression: It is possible to write a formula up to 36 characters. If user attempts to write more than 36 characters in formula, it prompt an error message indicating strings in expression should be less than 36 characters

Mathematic functions are supported and they can be used in expression while writing formula

4.6.6 Digital Outputs



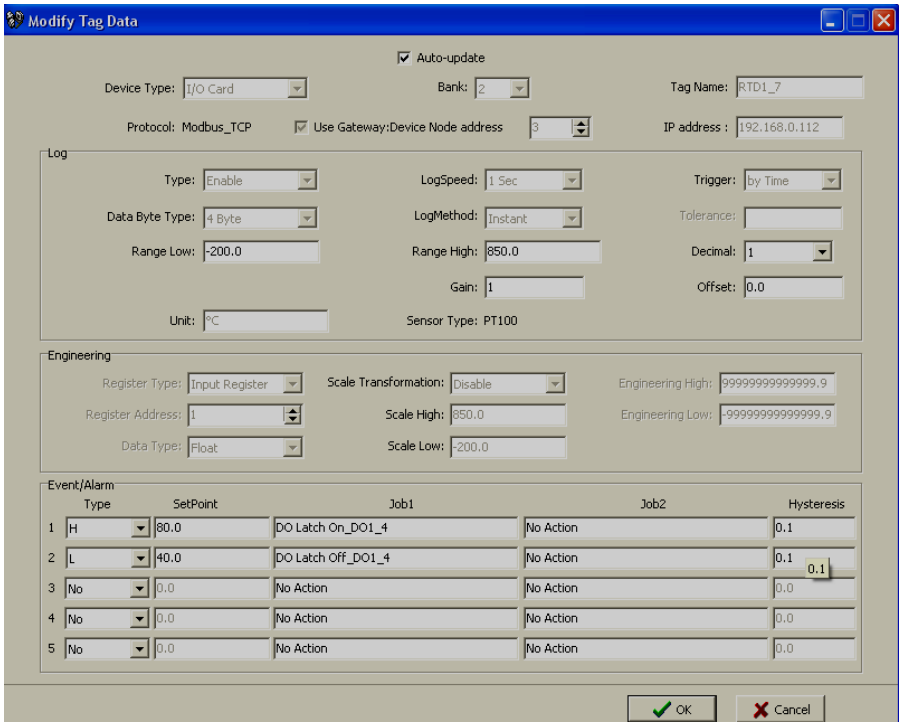
The above screen is useful to change name of tag after de-selecting auto-update. In real time, these digital outputs should be triggered by jobs defined at events.

4.6.6.1 DO Example

Temperature, Channel 1, AI1

When temperature, AI1 > 80 ^{O}C, then switch ON digital output1

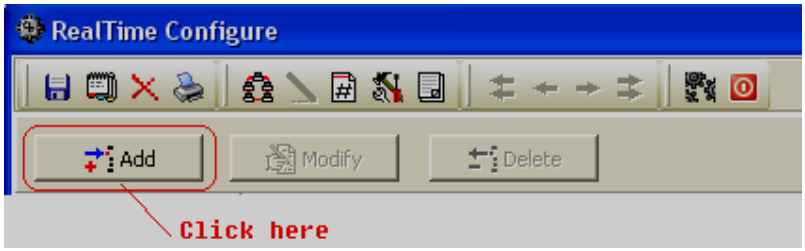
When temperature, AI1 < 40 ^{O}C, then switch OFF digital output1

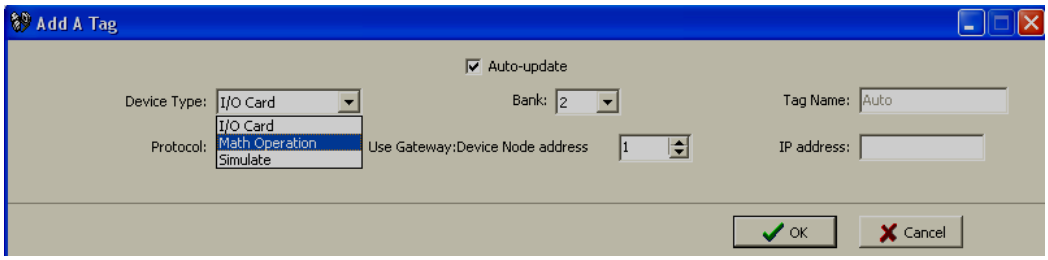


4.6.7 Add a Math channel

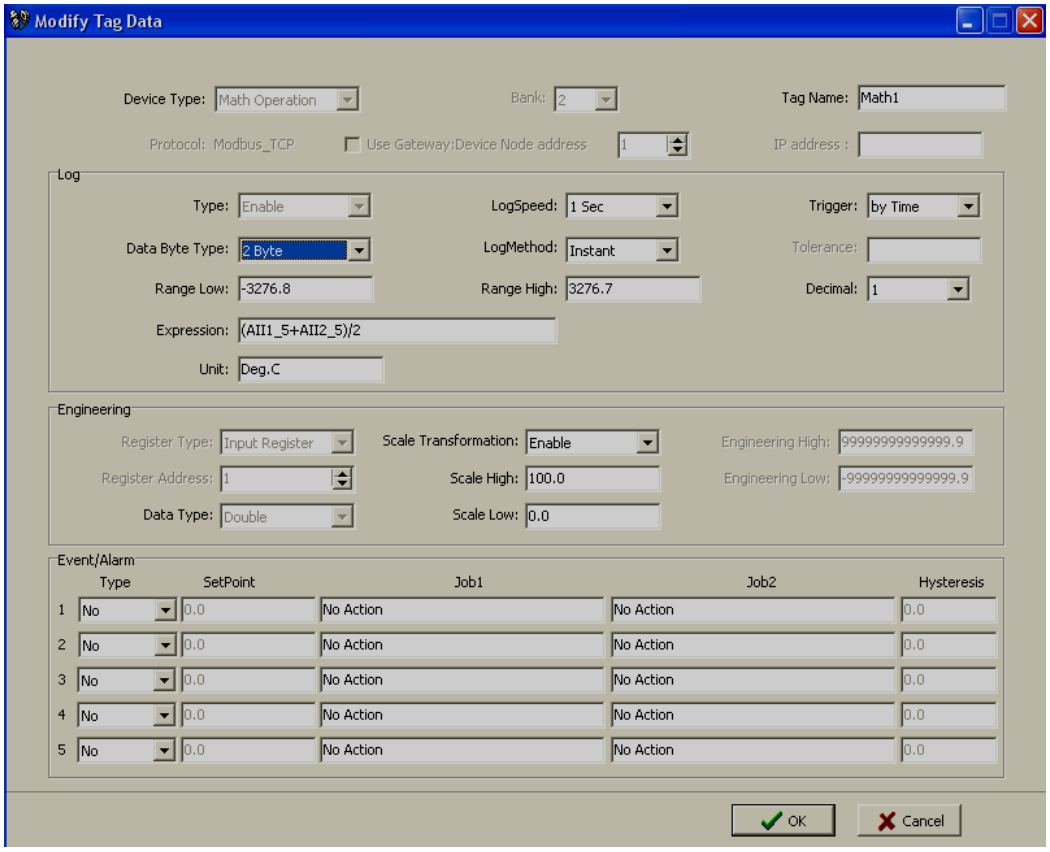
In Real time viewer, click on Icon Configuration data icon 

Now, click on “Add” button

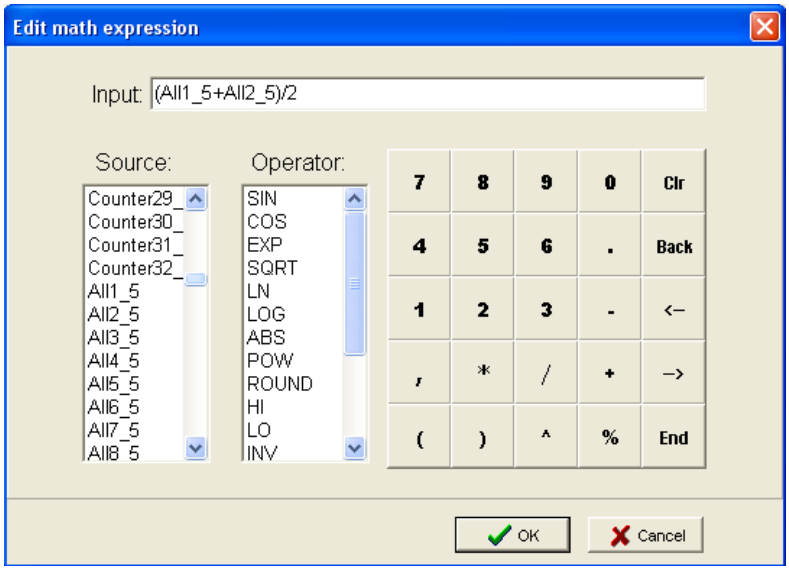




Device type: Select Math operation



Except for Expression, it is similar to do the setting up for Analog input explained earlier. Define the Tag Name, Log Speed, Log Method, Log Speed, Trigger type, Data type, Decimal, Unit, Scale Low, Scale High, and Event. Click on data entry box, it appears Source, Operator and a keyboard. The Source covers all available Analog inputs, Math inputs, Counters and Totalizers. The Operators are Mathematic functions described below. Use Source, Operator and keyboard to define the Math equation. The Math expression / equation can be keyed in maximum 36 characters.



Math Expressions

+	Addition
-	Subtraction
*	Multiplication
/	Division
SIN(x)	sin(x)
COS(x)	cos(x)
EXP(x)	e^x
SQRT(x)	Square root of x
LN(x)	loge(x)
LOG(x)	log10(x)
ABS(x)	Absolute of x
POW (x,y)	x^y
ROUND(x)	The closest integral number to x
HI(x,y)	The bigger value between x and y
LO(x,y)	The smaller value between x and y
INV(x)	1/x
TG(x)	tan(x)
CTG(x)	1/tan(x)
ASIN(x)	Sin-1(x)
ACOS(x)	Cos-1(x)
ATG(x)	Tan-1(x)
x%y	Remainder of x/y

4.6.7.1 Math Example

Relative Humidity – Math application

/*How to Calculate Relative Humidity - Theory

Requirement: Two Analog Inputs, Type: RTD
AI1: To measure dry bulb temperature
AI2: To measure wet bulb temperature

First calculate the saturation vapor pressure (E) for both the dry-bulb (Td) and wet-bulb (Tw) temperatures using the following equations:

Ew = 0.61078*EXP((17.269*Tw)/(Tw+237.3))*(Td-Tw)
Ed = 0.61078*EXP((17.269*Td)/(Td+237.3))*(Td-Tw)

In the above equations the temperatures units are Celsius and the saturation vapor pressure units are milli bars. The function "EXP" is the exponential and not raising something to an exponent.

Then calculate actual vapor pressure (Ea) using the following equation:
Ea = Ew-0.63*(Td-Tw)

Relative Humidity is then calculated using the following equation:
RH = (Ea/Ed)*100
The units of relative humidity are in percent.

Here is an example of the using the equations:

Assume that your dry-bulb temperature (Td) = 40 ^{O}C and
Wet-bulb temperature (Tw) = 30 ^{O}C.

Ew = 0.61078*EXP((17.269*Tw)/(Tw+237.3))*(Td-Tw)
Ew = 0.61078*EXP((17.269*30)/(30+237.3))*(40-30)
Ew = 42.4262 milli bars

Ed = 0.61078*EXP((17.269*Td)/(Td +237.3))*(Td-Tw)
Ed = 0.61078*EXP((17.269 * 40)/(40+237.3))*(40-30)
Ed = 73.7416 milli bars

Ea = Ew-0.63*(Td-Tw)
Ea = 42.4262 - 0.63*(40-30)
Ea = 36.1262 milli bars

RH = (Ea/Ed)*100
RH = (36.1262/73.7416)*100
RH = 48.99 %

*/ End of Theory

DAQ support Virtual Math channels
5 Math channels are required to calculate one RH.

Td = AI1, analog input for dry bulb temperature (PT100)

Tw =AI2, analog input for wet bulb temperature (PT100)

Math1 = EXP((17.269*AI1)/(AI1+237.3))
Math2 = Ed1 = 0.61078*Math1*(AI1-AI2)

Math3 = EXP((17.269*AI2)/(AI2+237.3))
Math4 = Ew1 = 0.61078*Math3*(AI1-AI2)

Ea = Ew - 0.63 * (Td - Tw)

Math5= RH1 = ((Math4-0.63*(AI1-AI2))/Math2)*100

Name: Math1
Expression: EXP((17.269*AI1)/(AI1+237.3))

Name: Math2
Expression: 0.61078*Math1*(AI1-AI2)

Name: Math3
Expression: EXP((17.269*AI2)/(AI2+237.3))

Name: Math4
Expression: 0.61078*Math3*(AI1-AI2)

Name: Math5
Expression: ((Math4-0.63*(AI1-AI2))/Math2)*100

Now, in Math5, you will get Relative humidity in %

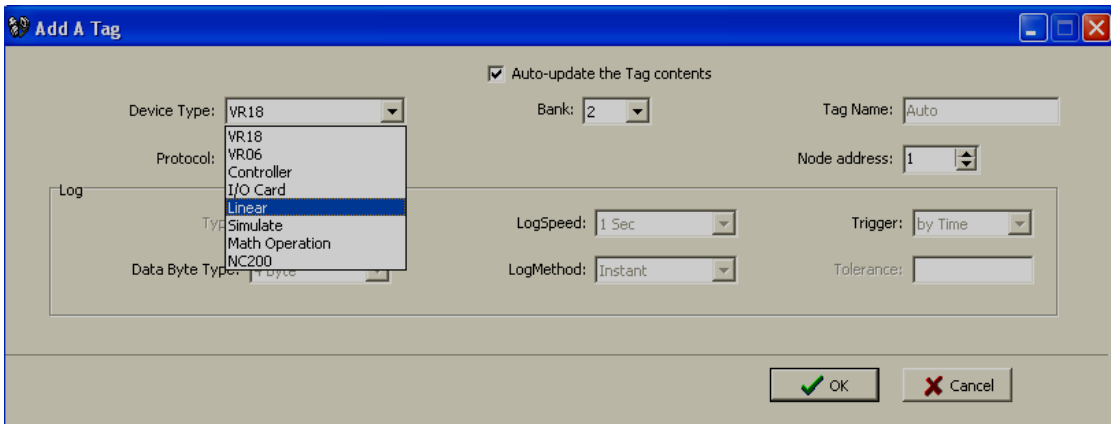
Five events are supported for every Math channel and two jobs are available in every event same as Analog input channel.

Math channels are virtual channels. It contains measured value based on the equations. These values can be recorded similar to physically connected Analog inputs and display digital values, trends, bar graphs etc.

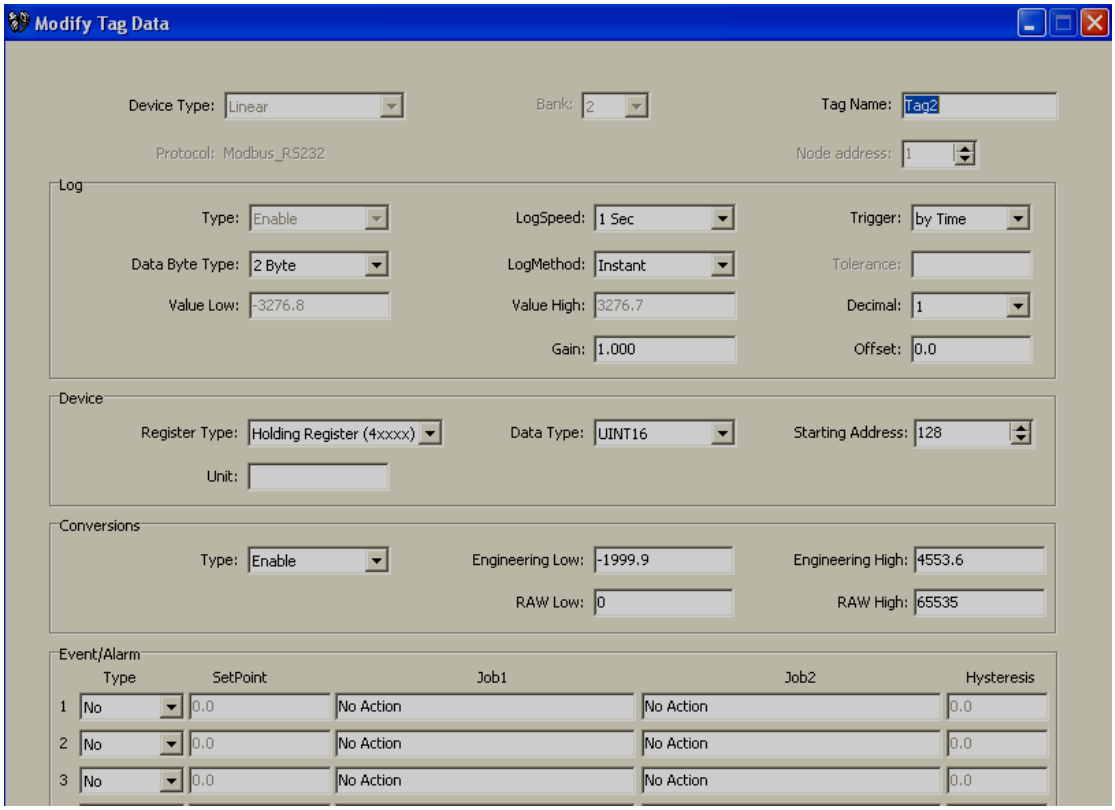
4.6.8 Add third party device

In Real time viewer, click on Icon Configuration data icon 

Now, click on “Add” button



Select “Linear” as shown above, then following screen will open

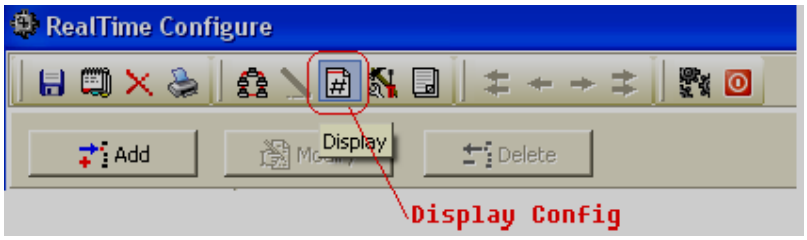


Enter all the required settings, specially address, register type, conversions etc..

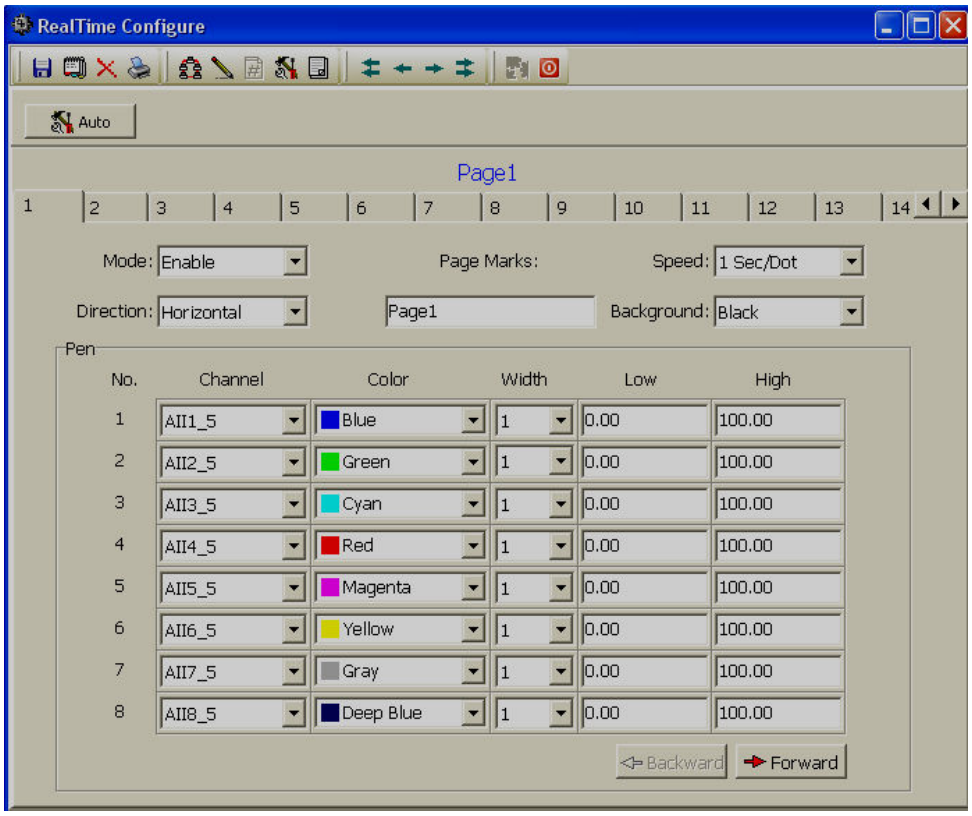
Then, click “OK”, click at Save icon and return icon . If there is good communication, tag will be added and shows Real time data. If there is data mismatch, then, check Engineering and Raw settings Low and High and configure them properly

4.7 Display Configuration

In Real time viewer, click on Icon Configuration data icon



Click on icon for display configuration



Maximum 200 display pages available for user configuration. In each page, maximum 24 tags are allowed per page

Mode: This is for page enable or disable.

Page Marks: This is the name for specific page. Ex: Section Kiln. Maximum 38 characters are allowed

Speed: This is real time trend display resolution. Select one of the options in 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 5 min/dot, 10 min/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hrs/page, 4 hrs/page, 8 hrs/page, day/page and week/page

If you wish to see both Real time and historical combined, then, select say day/page at the display. Then, the Real time trend in screen will be for the last 24 hrs update dynamically

Direction: Selects the trend direction horizontal or vertical.

Background: Defines the background color of Trend mode in black or white

Pen: Defines a specific channel as a drawing pen, its color, width, Display Hi and Display Low.

Channel: Selects a specific analog input AI or Mathematics Math, or selects Disable if a specific channel is not required.

Color: Selects the color for each pen.

Width: Selects the width of trend, 1-thin, 2-medium, 3-wide.

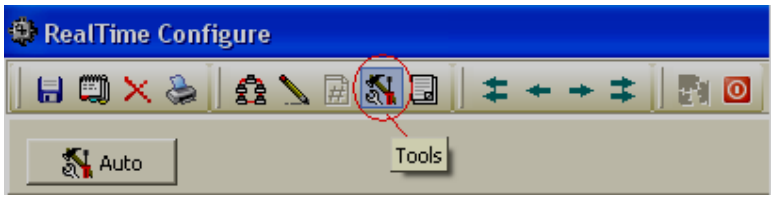
Low: Defines the low scale for a pen on the display.

High: Defines the high scale for a pen on the display.

Forward / backward button: It is to navigate to next/earlier 8 sets of pens for display configuration

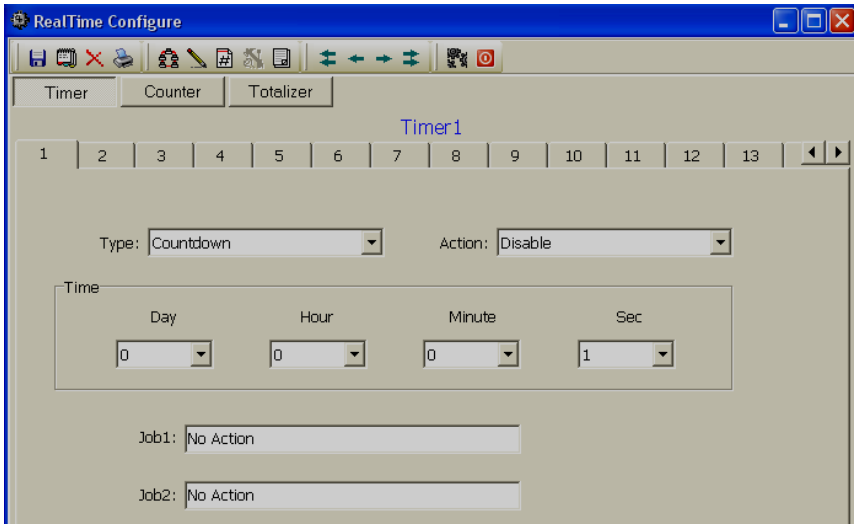
4.8 Tools Configuration

In Real time viewer, click on Icon Configuration data icon 



Click on  icon for Tools configuration

4.8.1 Timers



Maximum 100 timers available for configuration (Till DAQ 1.10, total timers are 50 only). Timers increased from DAQ V1.2 onwards

Type: Countdown, Repeat Countdown, Daily, Weekly or Monthly.

Countdown: Defines the interval of time, e.g. days, hours, minutes and seconds. (Not Real Time clock)

Repeat Countdown: Repeats the previous countdown.

Daily, Weekly or Monthly: The timer works in selected interval of Real Time clock

Action: Disables or enables the timer.

Job1, Job2: various jobs as described in 3.6.2, 2 jobs for each timer.

4.8.1.1 Timer Example

Switch on water pump every day at 8.00 hrs and switch off at 10.00 hrs

This application requires to Daily type timer which works with Real Time Clock.

Configuration settings are as follows.

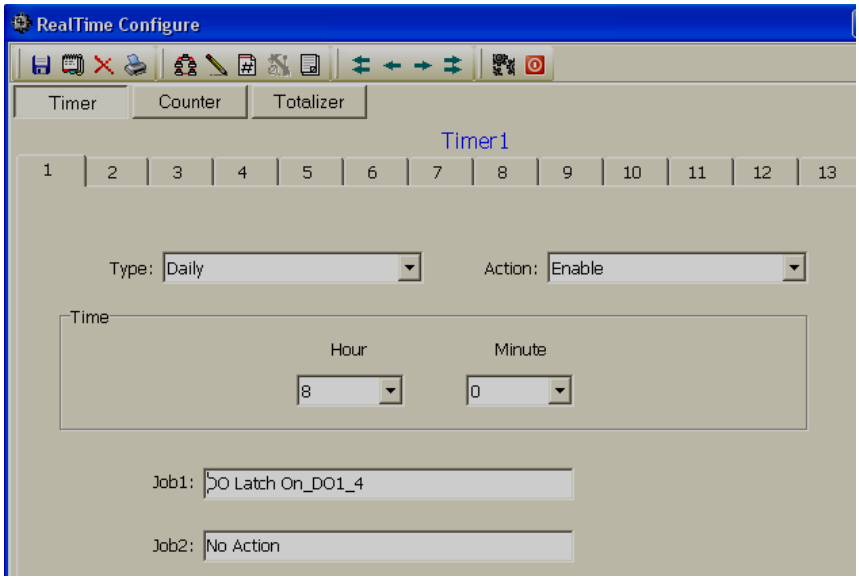
Timer1

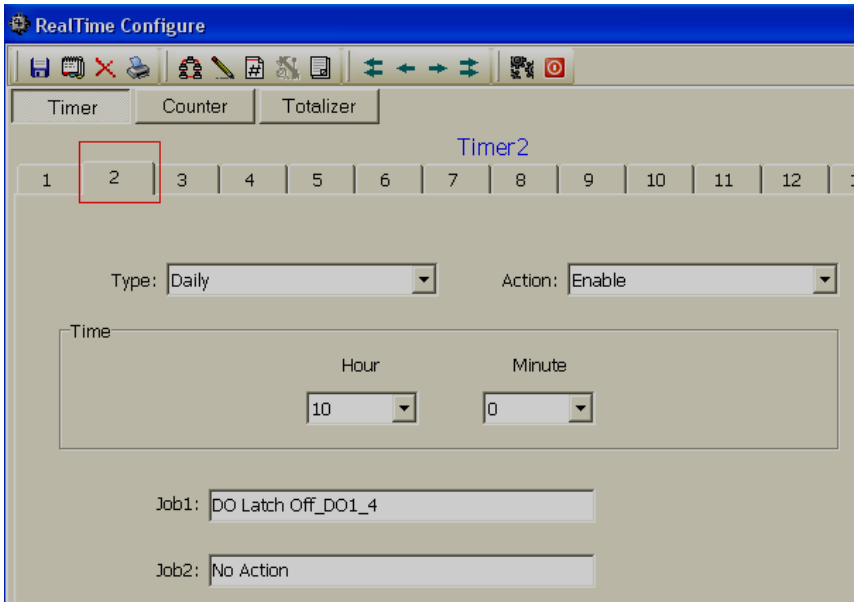
Type: Daily Action: Enable
Time – Hour: 8 Min: 0 Sec: 0
Job1: DO Latch On, Target: DO1
Job2: No Action

Timer2

Type: Daily Action: Enable

Time – Hour: 10 Min: 0 Sec: 0
Job1: DO Latch Off, Target: DO1
Job2: No Action



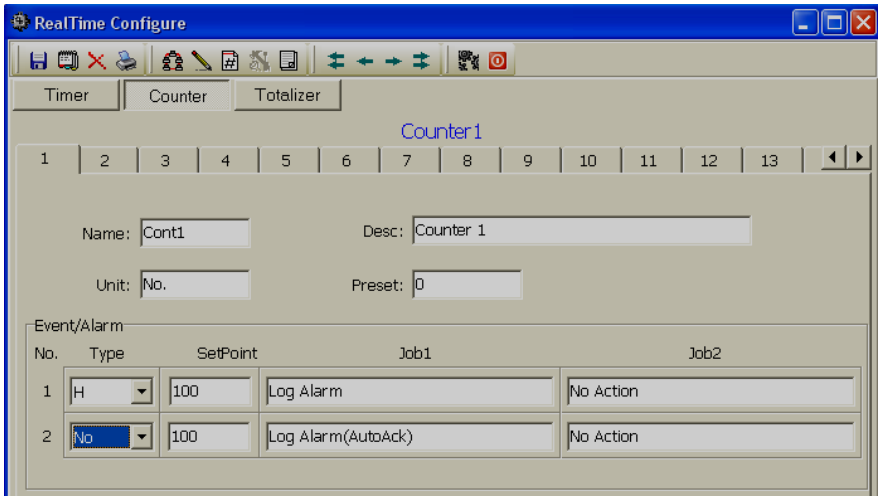


4.8.2 Counters

In Real time viewer, click on Icon Configuration data icon 

Click on  icon for Tools configuration and then click on “Counter” tab

Maximum 100 timers available for configuration (From DAQ 1.2 onwards)



Name: Defines the name of counter.

Desc: Defines the description for a specific counter on the display.

Unit: Defines the unit of counter

Preset: Defines the preset value for the counter. The counter starts from a preset value.

Event: Defines the type, set point, Job1 or Job2.

Type: Select one of three options: None, Process Hi, Process Low

Set point: Defines the set point of process value to trigger the counter.

Job1, Job2: various jobs as described in 3.6.2, 2 jobs for each counter

4.8.2.1 Counter Example

Supervisor wants to know the number of occurrence of an event in a day say pressure switch signal high

Digital input1 is used for Pressure switch. High signal indicates High pressure, Low signal indicates normal pressure

Digital Input1

Event1:
Type: H
Job1: Inc Counter, Target: Counter1

Timer1

Type: Daily Action: Enable

Time – Hour: 23 Min: 59 Sec: 59
Job1: Log Report Target: Counter1
Job2: Reset Counter Target: Counter1

(Reset Counter1 historical data in order to log new data for the next day)

If values meet the following conditions, DAQ will change notation from traditional to scientific

the value is more than 10^5 or less than 1/(10^5)
the value digit-length in display exceeds the allowed range

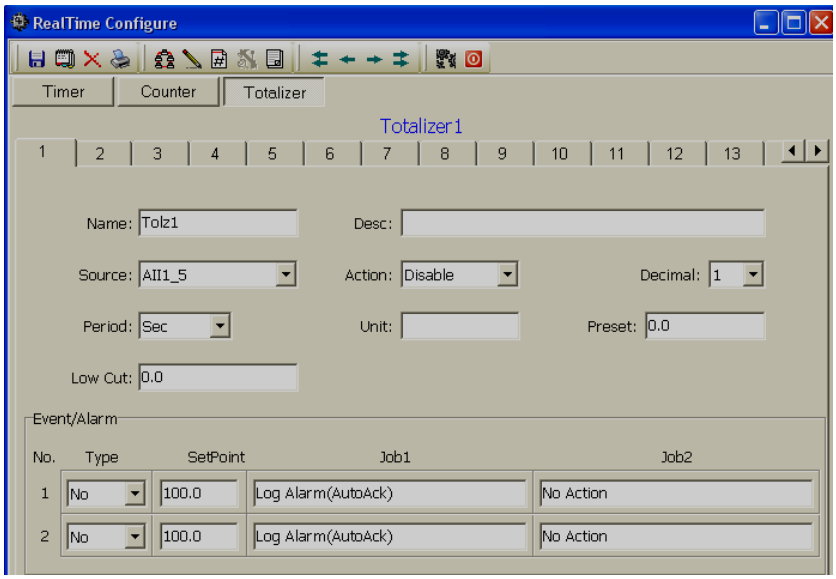
Ex: Up to 5 digits, counter displays value directly Say 0-99999.
100000 will be shown as 1E5 that means 5 zero's after 1
4294967295 will be shown as 4.29497E9 etc.

4.8.3 Totalizers

In Real time viewer, click on Icon Configuration data icon 

Click on  icon for Tools configuration and then click on "Totalizer" tab

Maximum 50 Totalizers available for configuration



Name: Defines the name of the totalizer.

Desc: Defines the description for a specific totalizer on the display.

Source: Select a specific analog input or Math input to be used for totalizing.

Action: Disables or enables the totalizer.

Decimal: Defines the decimal point for the totalizer.

Period: Selects second, minute or hour used for the totalizer.

Unit: Defines the unit of totalizing

Preset: Defines the preset value for the totalizer. The totalizer starts from a preset value.

Low Cut: If Source channel has below this setting, then value is skipped from Totalizing

Event**:** Defines the type, set point, Job1 or Job2.

Type: Select one of three options: None, Process Hi, Process Low

Set point: Defines the set point of process value to trigger the totalizer.

Job1, Job2: various jobs as described in 3.6.2, 2 jobs for each totalizer.

4.8.3.1 Totalizer Example

Water flow rate is in M^3/Sec. Supervisor want to know about total water discharged and want this information daily, weekly and monthly reports

Totalizer1

Source: AI1
Action: Enable
Decimal: 1
Period: Sec
Unit: Cub.Mtr
Preset: 0.0

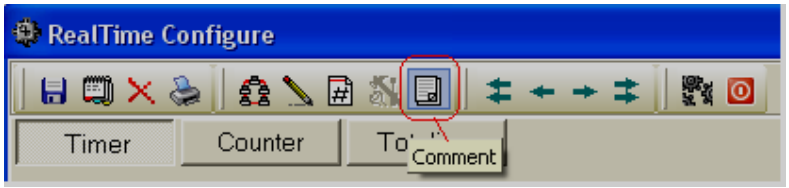
Timer1

Type: Daily	Action: Enable
Time – Hour: 23	Min: 59 Sec: 59
Job1: Log Report	Target: Totalizer1
Job2: Reset Totalizer	Target: Totalizer1

Reset Totalizer1 historical data in order to log new data for the next day

4.9 Comments

In Real time viewer, click on Icon Configuration data icon 

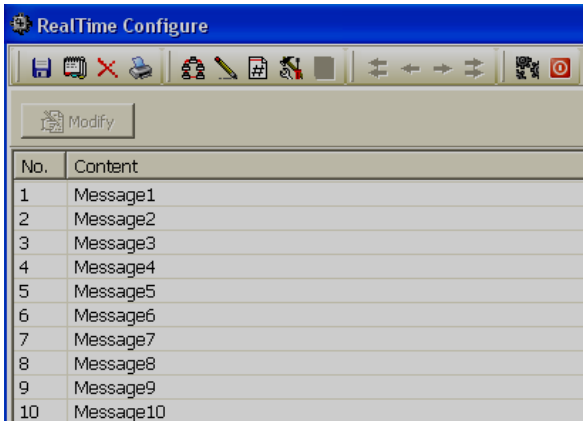


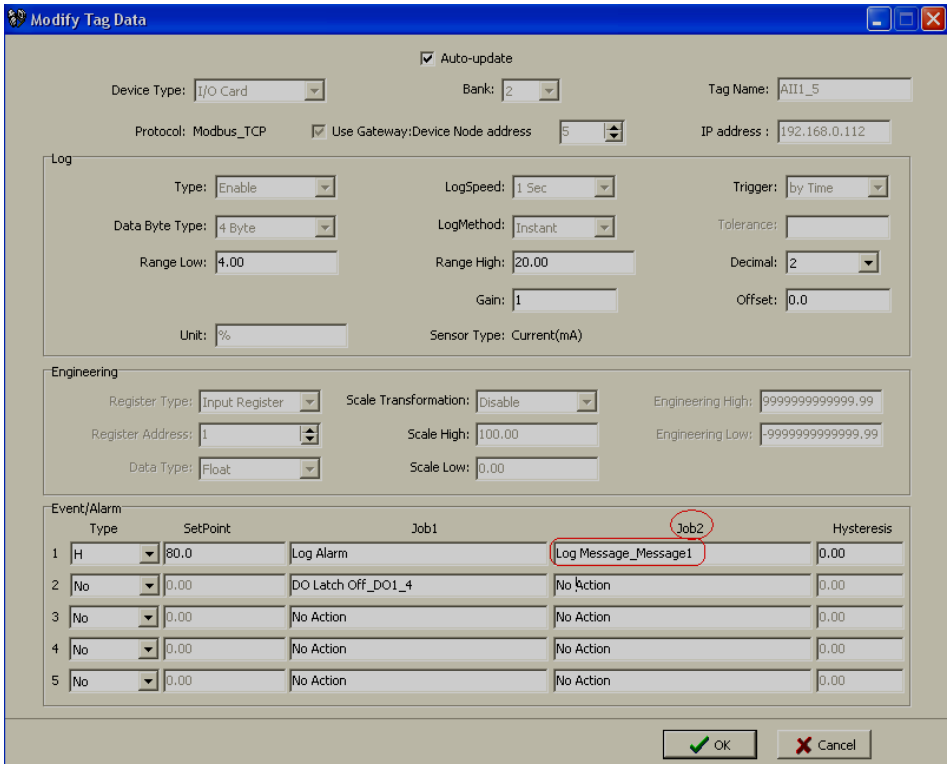
Click on  icon for Comments configuration

100 messages available for display of customized alarms

Maximum 50 characters are allowed in each message and these comments can be assigned as Job function “Log message” in events at the Analog/Digital/Math channel configuration

Ex: Message1 = Tank TK101 level High



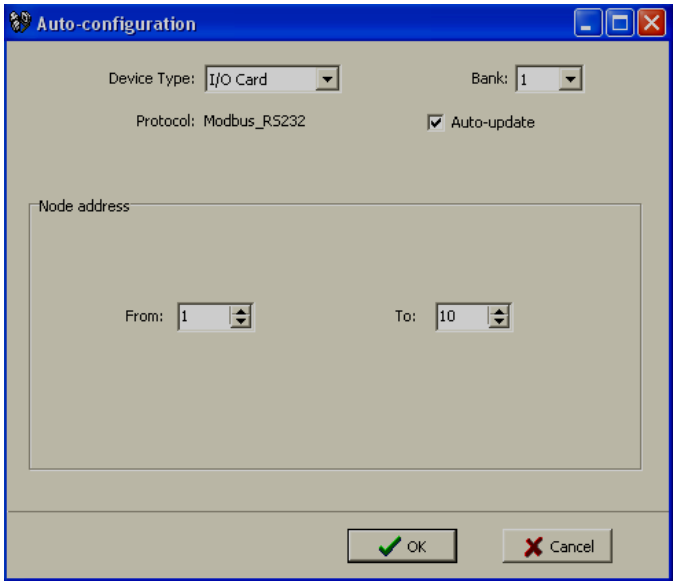


4.10 Project Auto configure

In Real time viewer, click on Icon Configuration data icon 

Click on  icon for “Project auto configure”

If RS232 is selected in the Bank, then if all the IO modules are connected in RS485 network, then it is possible to acquire data base of all the IO modules specifying start and end address of IO modules using Project auto configure function



Device type: Select IO card for addition of IO modules into network

Bank: Select bank from 1 to 4 as per bank configuration

Auto-update: Select if it is required to acquire data base of IO modules and give tag name for the channels automatically

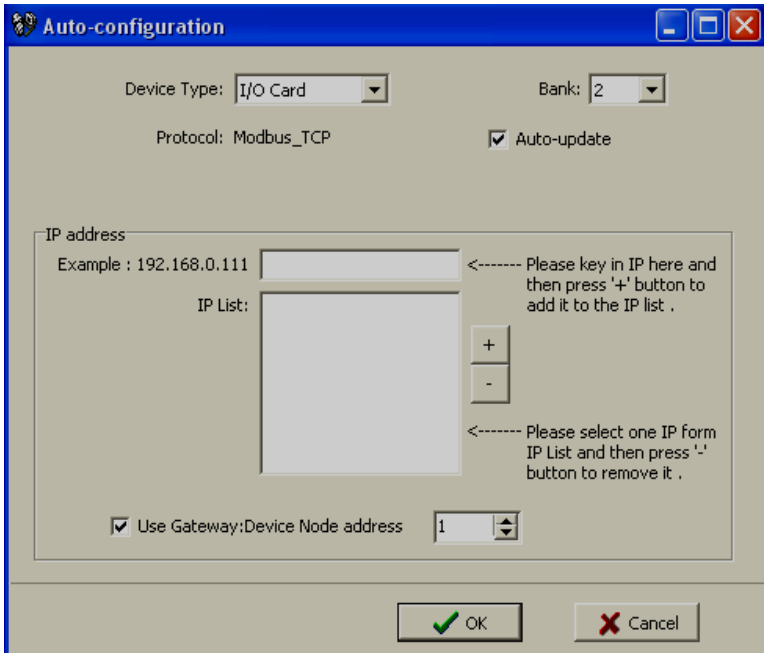
From: Start address of IO module

To: End address of IO module

Click on “OK” to add all the IO modules into network configuration

If Ethernet is selected in the Bank, then it requires IP address of the Gateway and address of each of the IO module to add new IO module each time.

Note: Provision is not available to enter range of IO modules like RS232/RS485



Device type: Select IO card for addition of IO modules into network

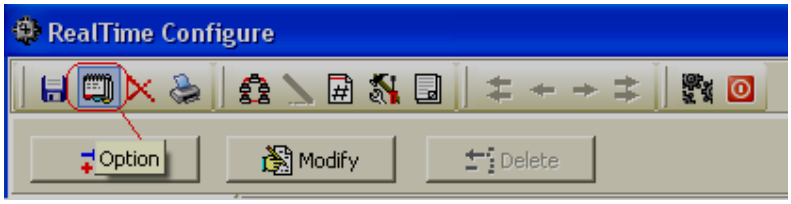
Bank: Select bank from 1 to 4 as per bank configuration

IP address: IP address of the gateway say PC-E converter. May be all the IO modules are connected to PC-E via RS485

Device Node address: Address of slave device to be added to network

4.11 Option

In Real time viewer, click on Icon Configuration data icon 

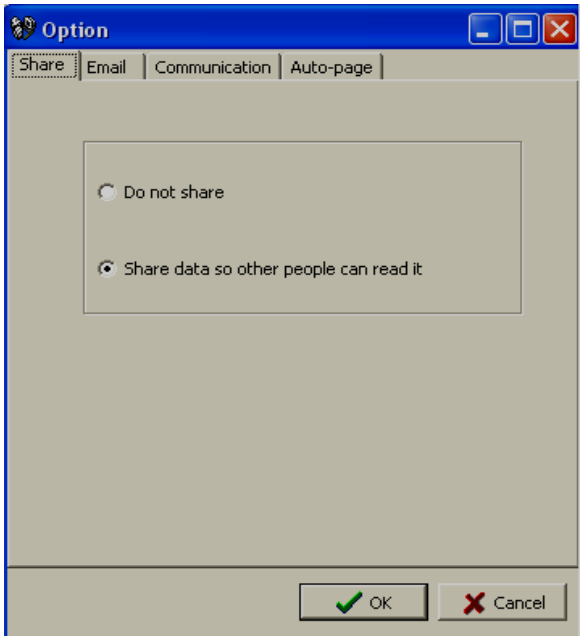


Click on  icon to configure options

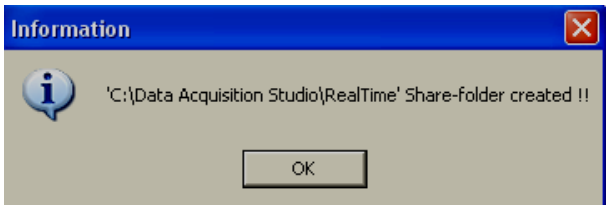
4.11.1 Share

In Real time viewer, click on Icon Configuration data icon 

Click on  icon to configure options, then select “Share” tab



Share/do not share options are available for user selection. If share option is selected, then historical data available in the computer can be shared from other computers. On selection of this share data, shared folder will be created and following message will be shown



For example, you have some Modbus slaves like IO module, recorder etc. and wish to analyze historical data at different computer. While opening project in the second computer, directly link to the project file available under C:\Data Acquisition Studio through network configuration. This will minimize the data transfer between Modbus slaves and the computers and make it more efficient by using available resources through network configurations.

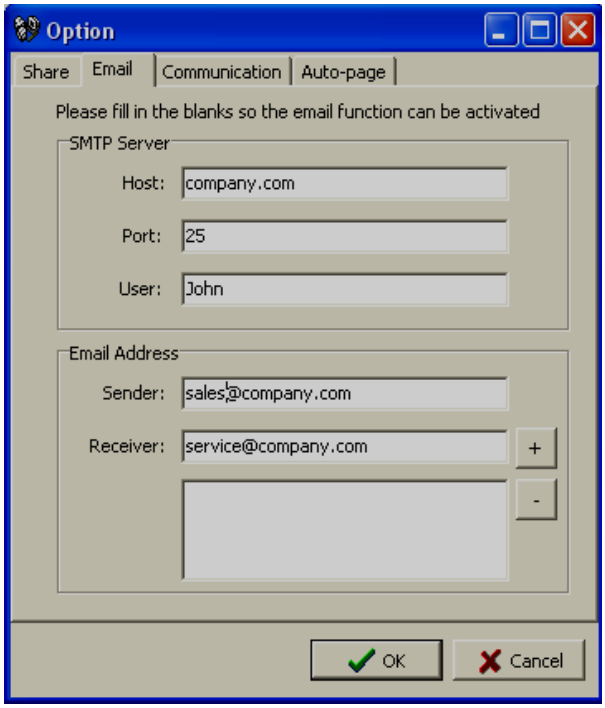
4.11.2 Email

This is to send email on an event like alarm

In Real time viewer, click on Icon Configuration data icon 

Click on  icon to configure options, then select “Email” tab

The default Port number 25 is used to send email from STMP server. If your network administrator configured different port in your LAN for accessing internet/email, then you have to modify the port number accordingly.



To send an email for any event, the procedure is as follows.

Set SMTP server details as below. Please contact system or network administrator for the server details if your computer is connected in LAN.

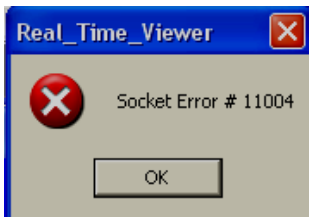
Host, Port, User name, From: Sender email address

To: Receiver email address (Max.10 email addresses can be selected)

In case, email is successful, it delivers as follows

Type:		HiAlarm
Source:		Tag1
ActiveTime:	05/08/09,	13:31:04
Value:		50
Comment:		Levelhigh

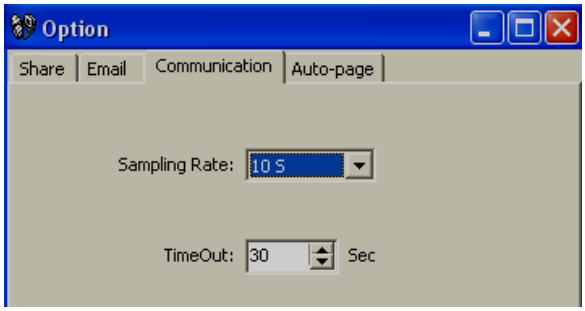
If Email is failed to deliver, then it prompts the following error message. In this case, it requires checking all the email settings



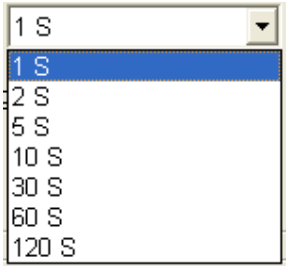
4.11.3 Communication

In Real time viewer, click on Icon Configuration data icon 

Click on  icon to configure options, then select “Communication” tab



Sampling rate: It is used to set data display time for Real-Time Viewer. User can select one from the following for real time monitoring.



Time out: This is time set for generating time out errors related to real time viewer communication.

For example, if IO modules and PC with data acquisition software are located at different places connected through Ethernet across different gateways, and then user can adjust sampling rate and time out settings to avoid errors in communication. When real time viewer is running, please observe the following taskbar at the bottom side of the screen.

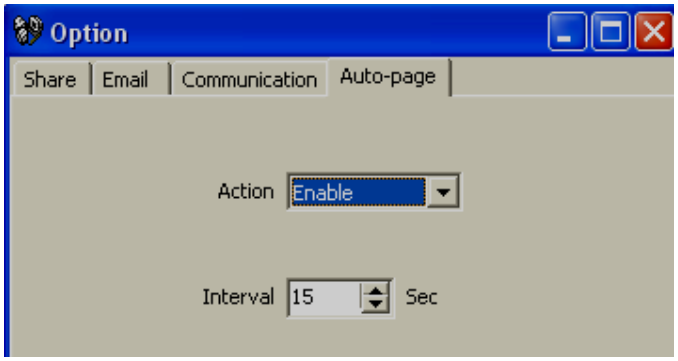
Here, scan time should always be less than sampling rate. Other wise, communication errors will occur. If PC and Modbus slave devices are connected by long distance network, then there might be chances that scan time gets increased. So check this and set sampling-rate more than scan time. Also user can set time out settings to generate communication failure errors. Maximum time out settings possible is 60 sec.

For example, scan time is adjusted and time out setting = 30 sec. This means, if scan time is more than sampling rate for more than 30 sec, then communication errors will be generated.

4.11.4 Auto-Page

In Real time viewer, click on Icon Configuration data icon 

Click on  icon to configure options, then select “Auto-Page” tab



This function is to rotate pages at set time interval

Action: Enable, Disable options are available

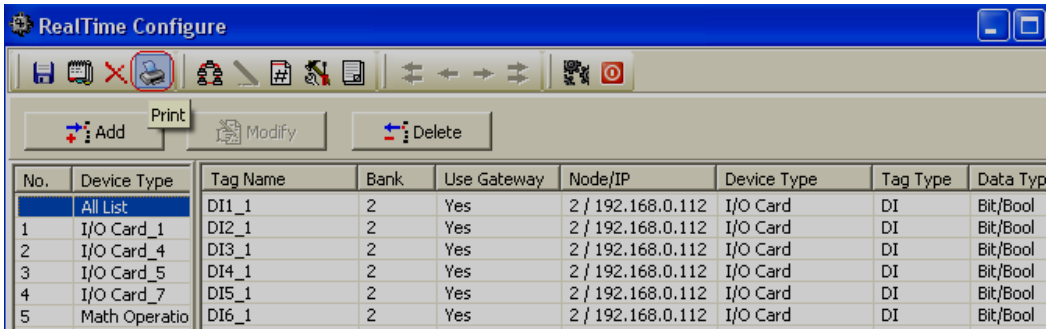
Interval: This is time interval and max. 60 sec. is possible

If this option is enabled and time is set, then, display pages in Real Time Viewer will be rotated cyclically as per set time

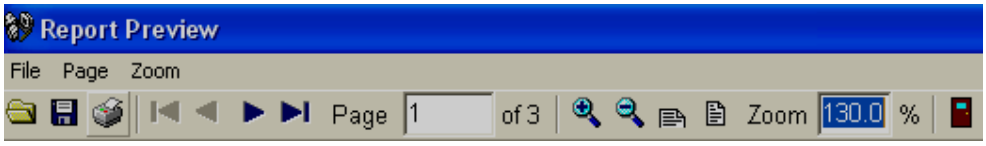
4.12 Print Configuration

It is possible to print channel configuration, Display configuration, Tools (Timers, Counter, and Totalizers) configuration and comments setup

Select the required and then click on Print icon 



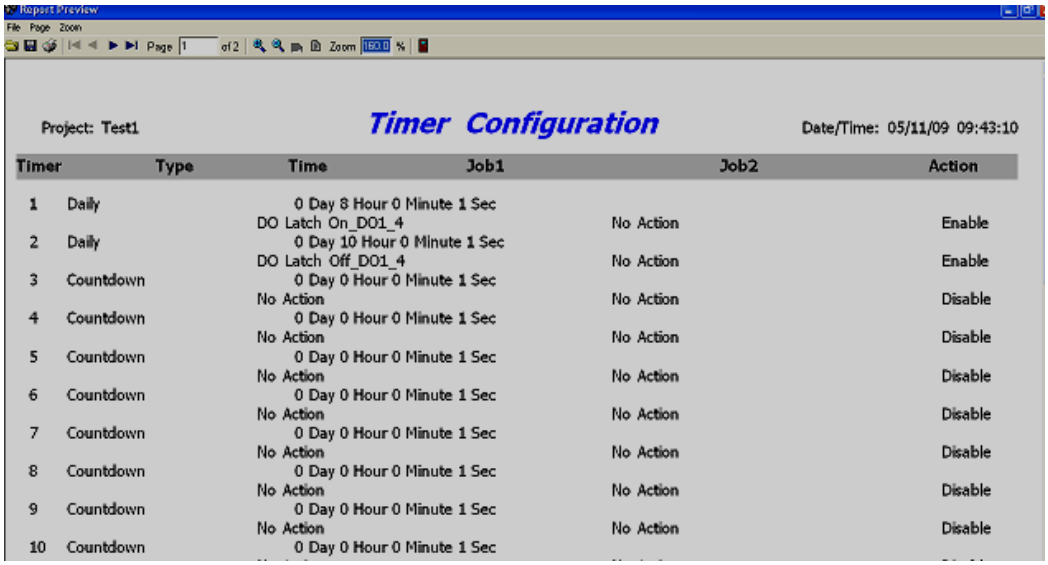
For Counters and Totalizers, maximum 4 channels can be printed at one command. Select the starting counter number say 1, then you can print configuration of Counter 1 to Counter4. If you select Counter 3, then you can print configuration of Counter 3 to Counter 7



Save: this is to save report configuration. Format of files is Rave snap shot (.ndr). You may download any .ndr viewer from internet

Print: this is to take print out of selected configuration file

Exit this is to exit print viewer

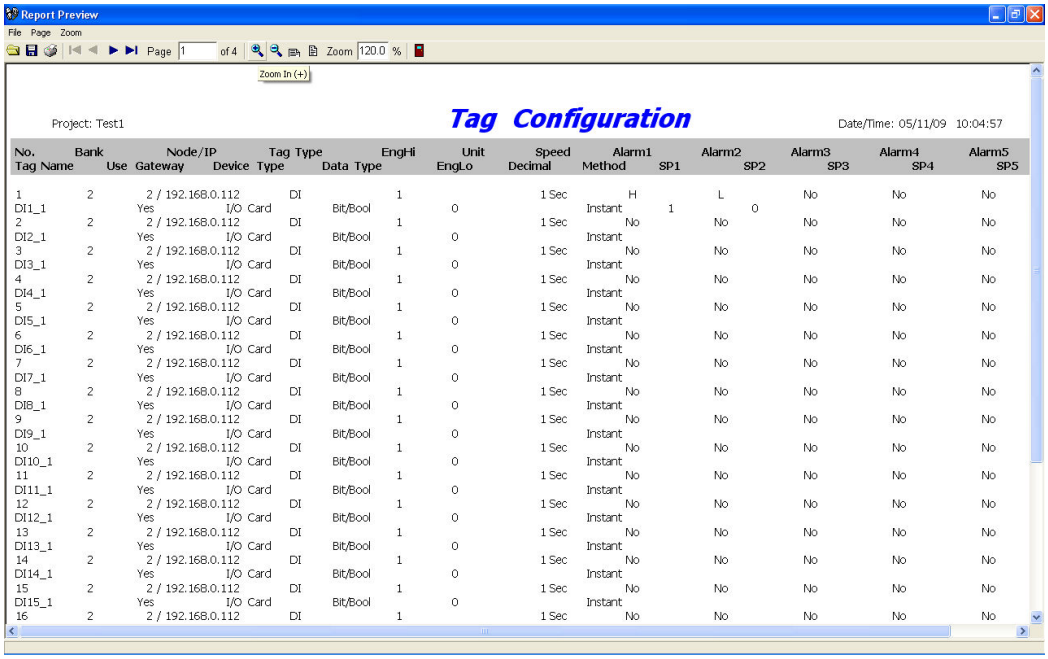


Project: Test1

Timer Configuration

Date/Time: 05/11/09 09:43:10

Timer	Type	Time	Job1	Job2	Action
1	Daily	0 Day 8 Hour 0 Minute 1 Sec	DO Latch On_DO1_4	No Action	Enable
2	Daily	0 Day 10 Hour 0 Minute 1 Sec	DO Latch Off_DO1_4	No Action	Enable
3	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
4	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
5	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
6	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
7	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
8	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
9	Countdown	0 Day 0 Hour 0 Minute 1 Sec	No Action	No Action	Disable
10	Countdown	0 Day 0 Hour 0 Minute 1 Sec			

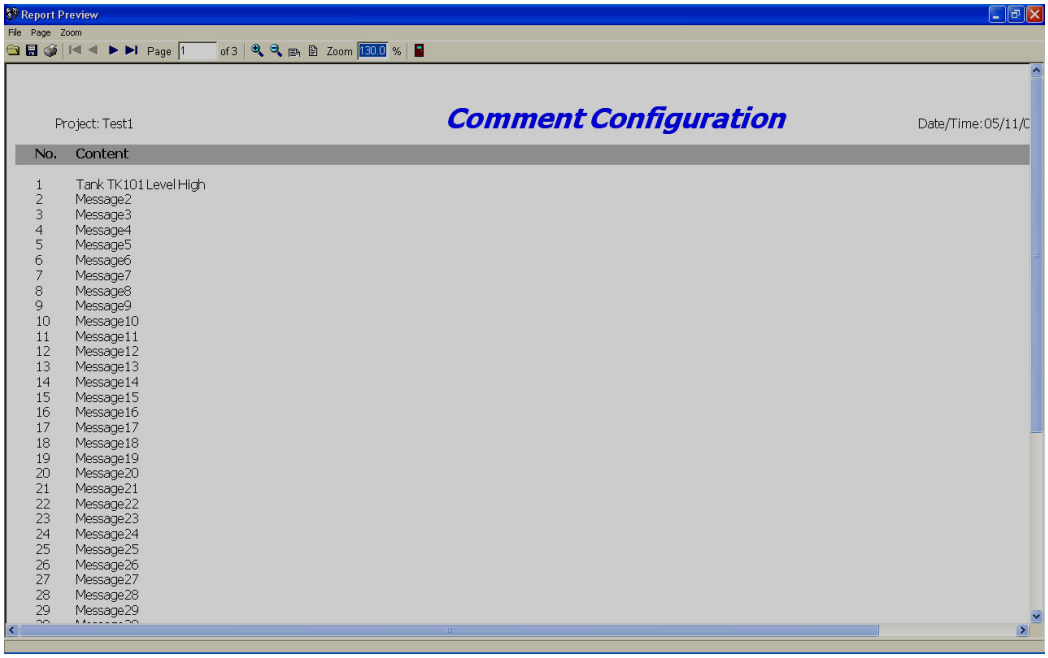


Project: Test1

Tag Configuration

Date/Time: 05/11/09 10:04:57

No. Tag Name	Bank Use	Node/IP Gateway	Device	Tag Type	Data Type	EngHi EngLo	Unit	Speed Decimal	Alarm1 Method	SP1	Alarm2 SP2	Alarm3 SP3	Alarm4 SP4	Alarm5 SP5
1	2	2 / 192.168.0.112	DI		1			1 Sec	H		L	No	No	No
DI1_1		Yes	I/O Card		Bit/Bool	1	0		Instant	1	0			
2	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI2_1		Yes	I/O Card		Bit/Bool	0			Instant					
3	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI3_1		Yes	I/O Card		Bit/Bool	0			Instant					
4	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI4_1		Yes	I/O Card		Bit/Bool	0			Instant					
5	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI5_1		Yes	I/O Card		Bit/Bool	0			Instant					
6	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI6_1		Yes	I/O Card		Bit/Bool	0			Instant					
7	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI7_1		Yes	I/O Card		Bit/Bool	0			Instant					
8	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI8_1		Yes	I/O Card		Bit/Bool	0			Instant					
9	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI9_1		Yes	I/O Card		Bit/Bool	0			Instant					
10	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI10_1		Yes	I/O Card		Bit/Bool	0			Instant					
11	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI11_1		Yes	I/O Card		Bit/Bool	0			Instant					
12	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI12_1		Yes	I/O Card		Bit/Bool	0			Instant					
13	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI13_1		Yes	I/O Card		Bit/Bool	0			Instant					
14	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI14_1		Yes	I/O Card		Bit/Bool	0			Instant					
15	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No
DI15_1		Yes	I/O Card		Bit/Bool	0			Instant					
16	2	2 / 192.168.0.112	DI		1			1 Sec	No		No	No	No	No



4.13 Backup

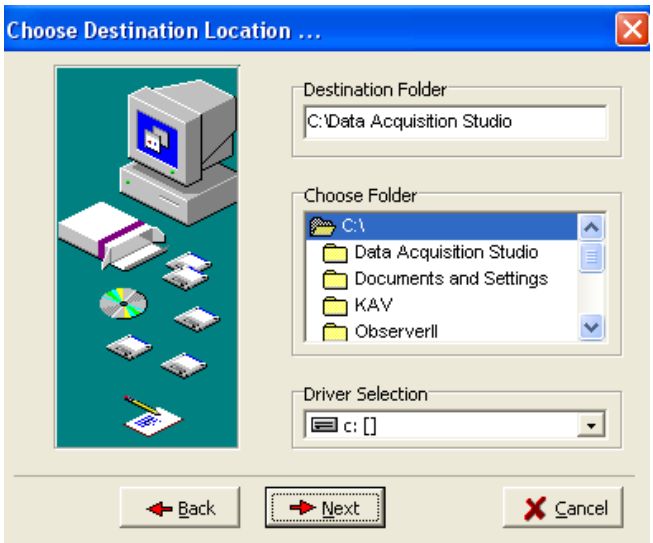
4.13.1 Project and Data backup

By default, project configuration and data files will be stored at the path

C:\Data Acquisition Studio\RealTime\XXX

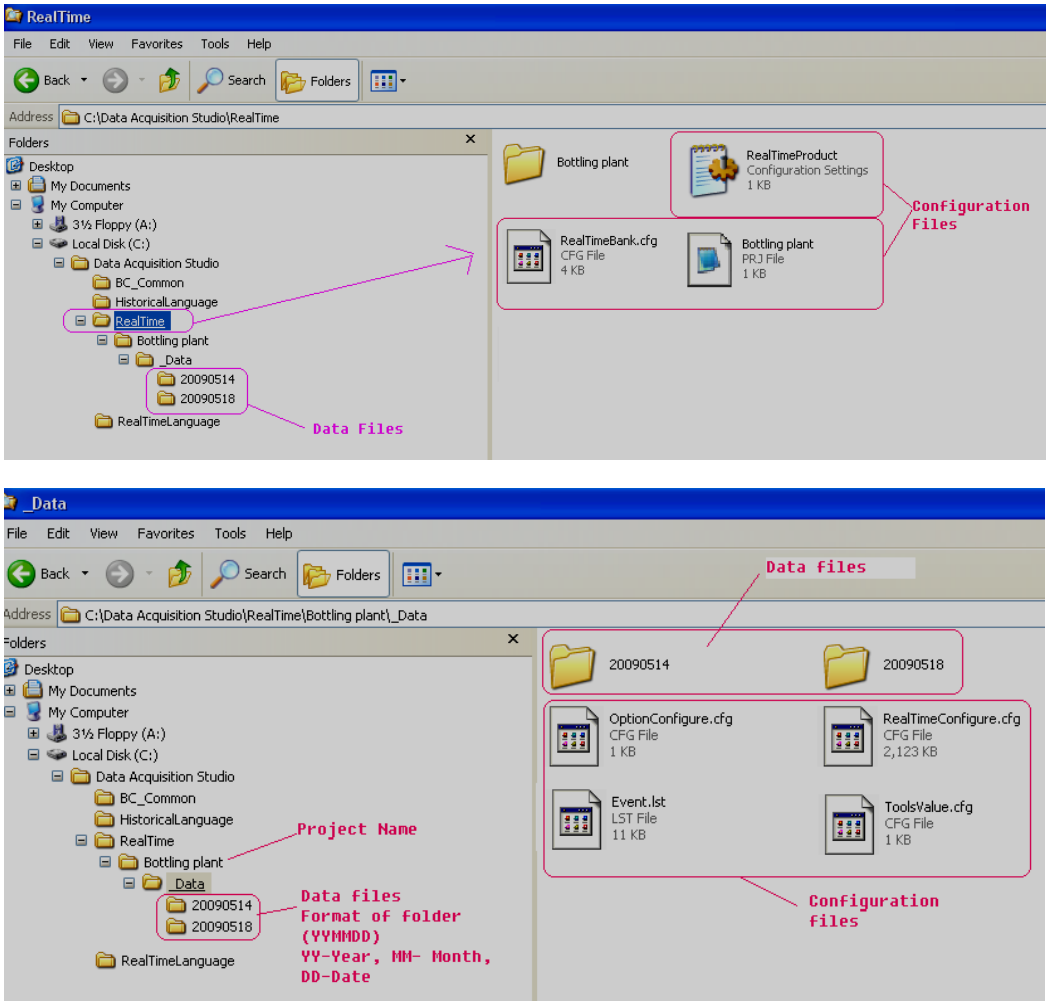
Where XXX is project name

If you need to store data in another drive, then it has to be selected during installation of data acquisition software



For ex: Name of Project: BottlingPlant

Then, when you create a new project, the following files will be created



Take BACKUP of C:\Data Acquisition Studio\RealTime regularly and store in safe place.

4.13.2 Restoring Project with Data

Install Data acquisition software

Copy Realtime folder to C:\Data Acquisition Studio

Open the project from data acquisition software

Start-Programs-RealTime viewer

4.13.3 Sending Project files

In case of any problems in configuration, if you wish to send project files, zip RealTime folder available at C:\Data Acquisition Studio except ***data files*** and send it to us

 If project is running for few days, then RealTime folder may become big size with large storage data. If it is more data, it is difficult to send project files with data by Email. So, before sending project configuration files, you may need to take out large data files first and then send only configuration files. You may first copy total RealTime folder to your desktop, and then remove the data files from RealTime folder at your desktop such that it will contain only configuration files. Then, zip Realtime folder and send it to us

5. Real Time Viewer

It is to view Real time data from slave devices in PC. USB license key is required to run DAQ in PC for more than 1 hr.

Select page (Choice)

New project or close existing project

Open existing project

Configuration data

Display measured data (Historical).

When Real time viewer is running in PC, it stores data in PC at path C:\Program files\DAQ Studio\Real time\Project.daq. Icon is used to archive this historical data. This is similar to historical data stored at devices like Recorders, HMI etc. but not exactly same

Arrange all (Show default screen layout-mix-digital values, bar graph, trends, Alarm page)

Display Events/Alarms list

Display Digital Values

Display Bar graph

Display Trend

Display all channel - Digital

Check status of Counters, Digital inputs, Digital Outputs etc.

To setup Paperless Recorder

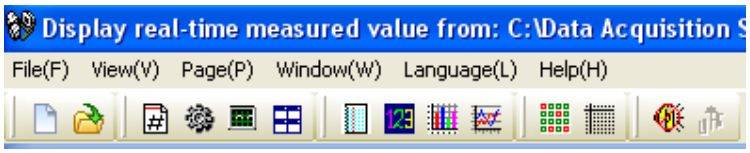
Parameters operate for Controllers. Please check section “Create a new project for Controllers” for more information about this

5.1 Opening project

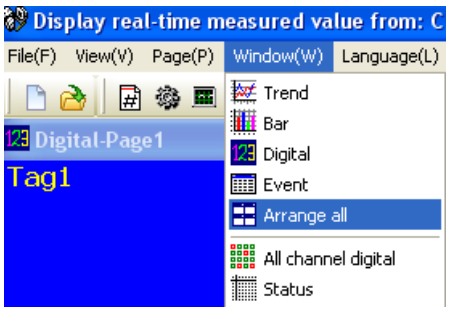
If it is a new project, refer earlier section and create a new project. If it is existing project, open the project by selecting appropriate path

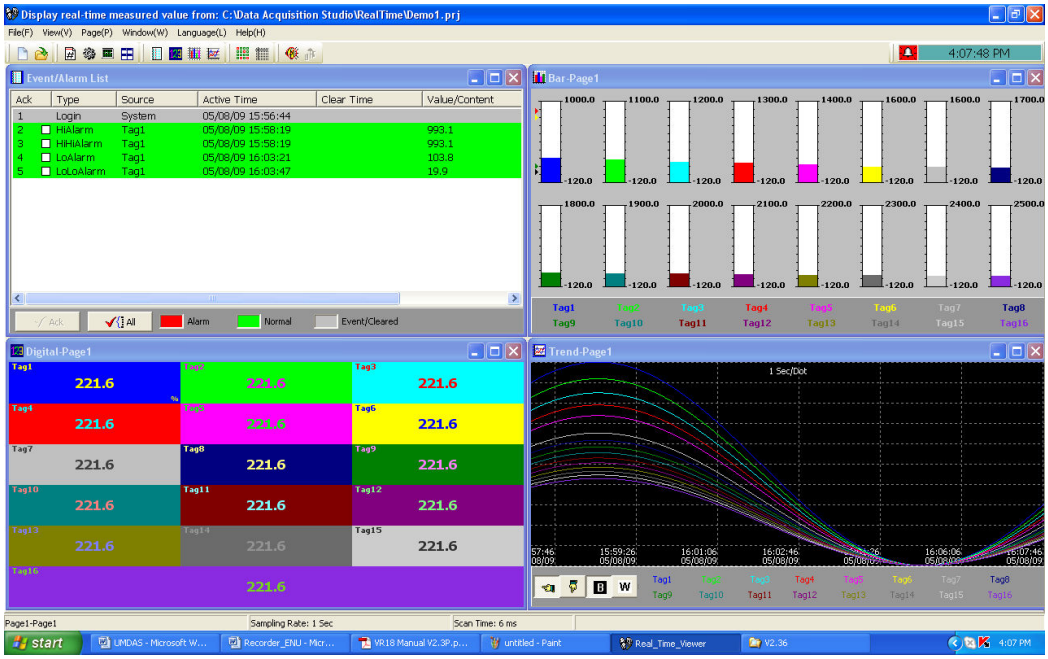
If communication is established between PC and Modbus Slave devices over the selected bank, then after opening Real time viewer. By default the following screen will appear which shows all the components like Events/Alarm list, Bar graphs, Digital values and Trends

5.1.1 Display Arrange All



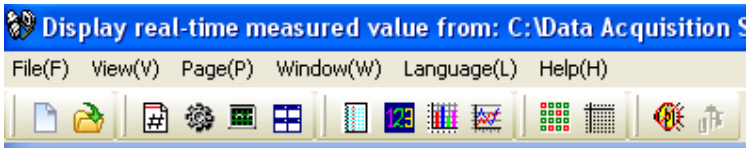
Click on  icon to display Digital values, trends, bar graph & events/alarm list in one screen. Each of the above will be shown in separate windows, alternatively, in Menu click on “Window” and then click on ‘Arrange All”

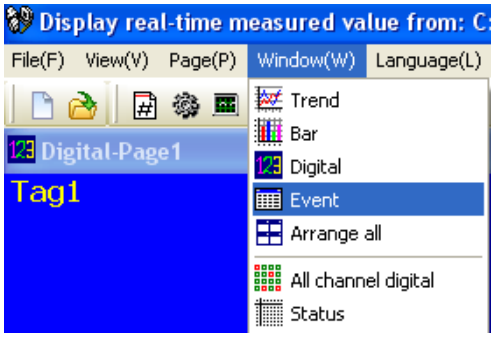


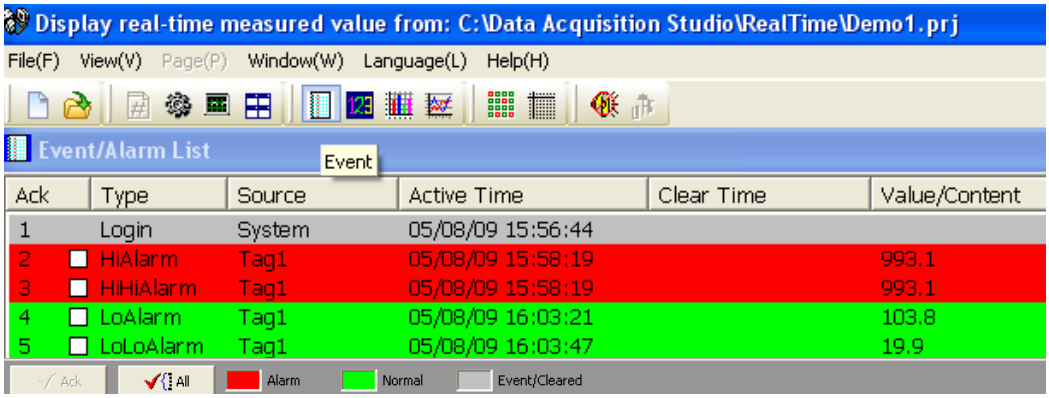


5.1.2 Display Events

Click on Event Icon  to show events in full page, alternatively, in Menu click on "Window" and then click on "Event"







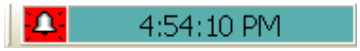
It displays the Ack (acknowledgement), Type, Source, Active time, Clear time and Value of events or alarms. Use scroll bar to move downward or upward. Press **Ack button** to acknowledge the alarm. Events do not need to be acknowledged.

On the Event / Alarm List, three different colors indicate the status of the alarm.

Red - Presently in alarm status

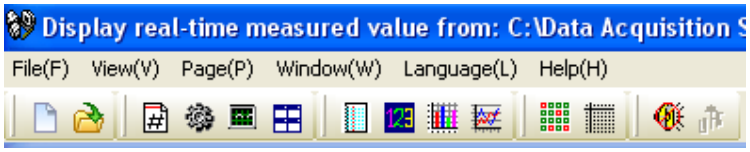
Green – The cause of alarm status was temporary, and has now returned
To normal

Grey – A temporary alarm (in green status), after having been Acknowledged, and then becomes grey.

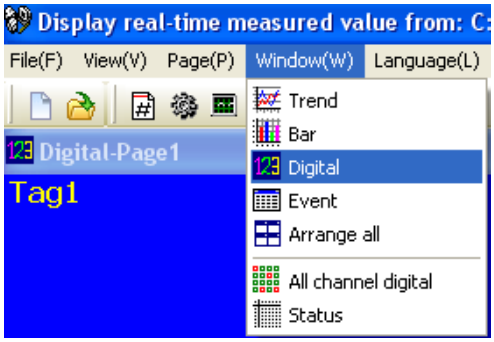


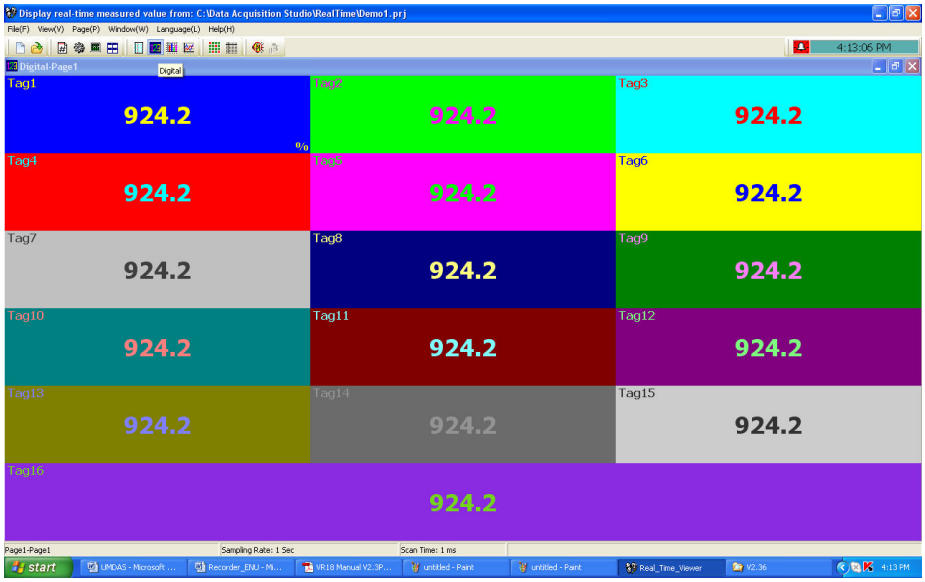
Active Time is the time that alarm status becomes active. **Clear Time** is the time when two conditions are met. Firstly alarm status is cleared and becomes normal, and secondly the user has acknowledged it. If any alarm occurs, the red buzzer icon on the top right starts to flash. After the cause of alarm is no longer met and the alarm is acknowledged, then the red buzzer icon disappears. When Clear Time shows **Terminated** this indicates that turning off the power has terminated the alarm.

5.1.3 Display Digital Values

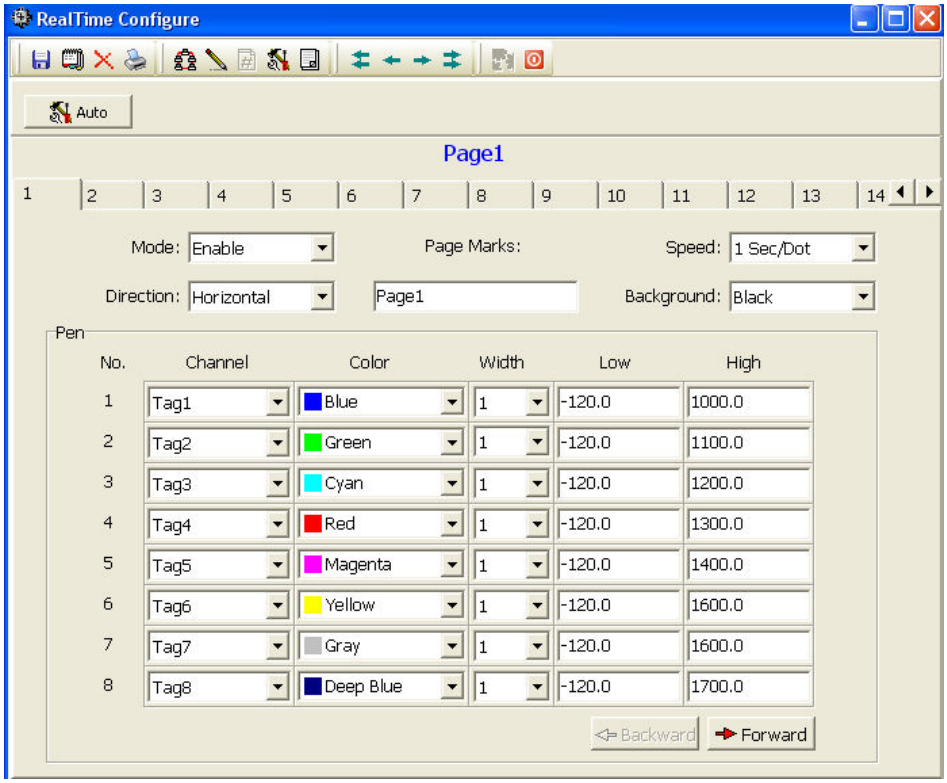


Click on Digital Icon  to show all digital values in full screen, alternatively, in Menu click on “Window” and then click on “Digital”. Maximum 24 channels can be displayed in each page and total 200 display pages available

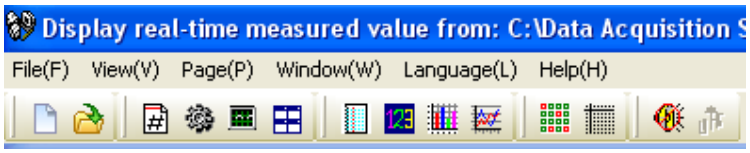




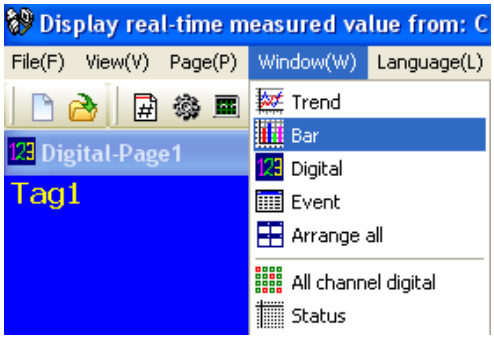
Note: Back ground color for each channel depends on display configuration as shown attached

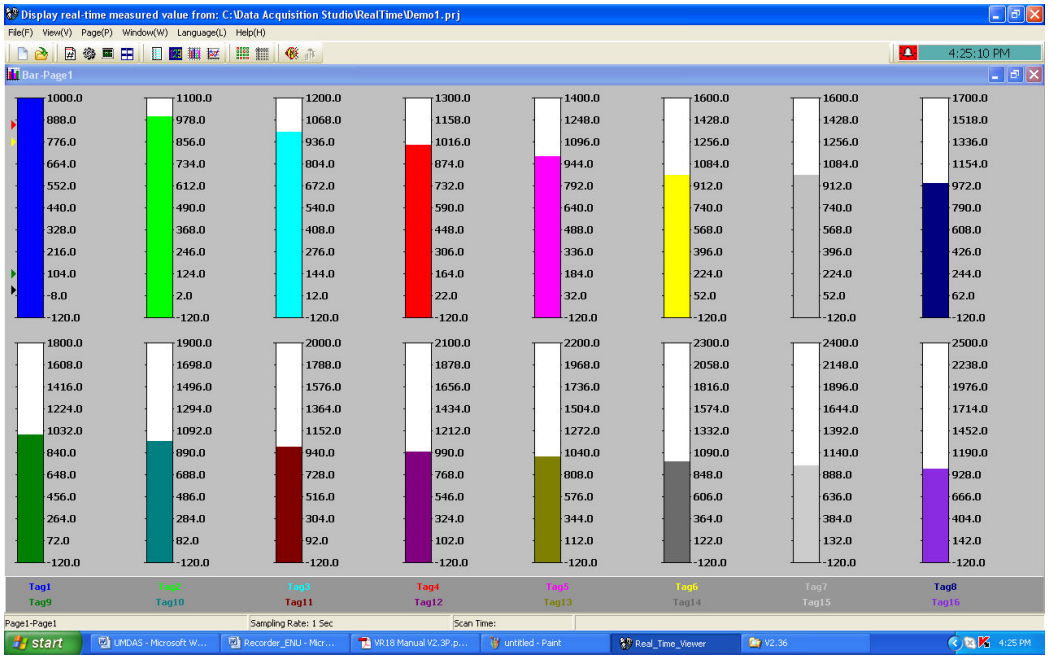


5.1.4 Display Bar Graphs



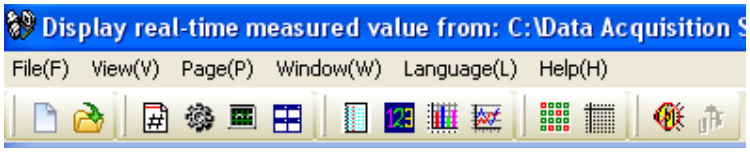
Click on Bar Icon to show Bar graphs in full screen, alternatively, in Menu click on "Window" and then click on "Bar". Maximum 24 channels can be displayed in each page and total 200 display pages available



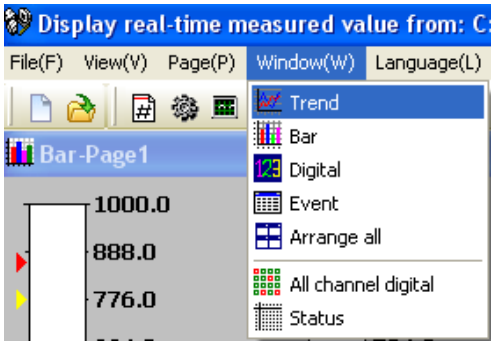


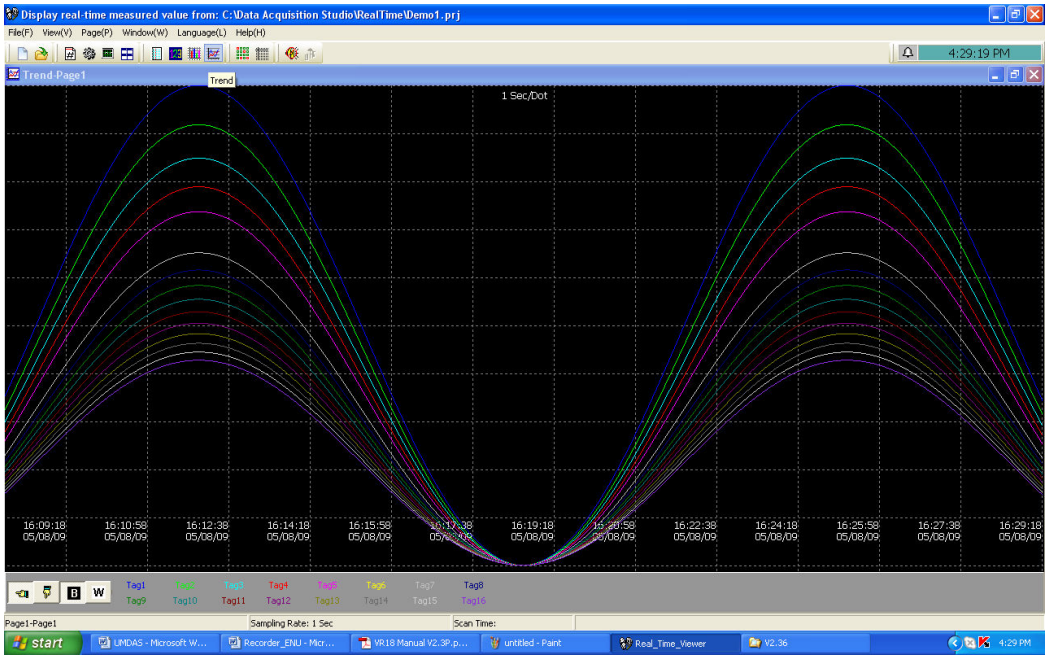
Note: Fill color in graph and display range for each channel depends on display configuration

5.1.5 Display Real Time Trends



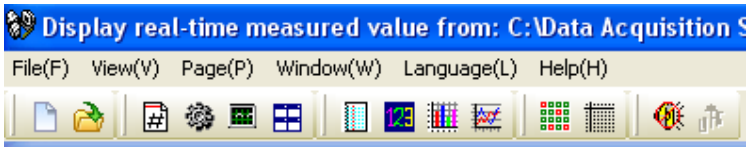
Click on Trends Icon  to show Real Time Trends in full screen, alternatively, in Menu click on “Window” and then click on “Trend”. Maximum 24 channels can be displayed in each page and total 200 display pages available



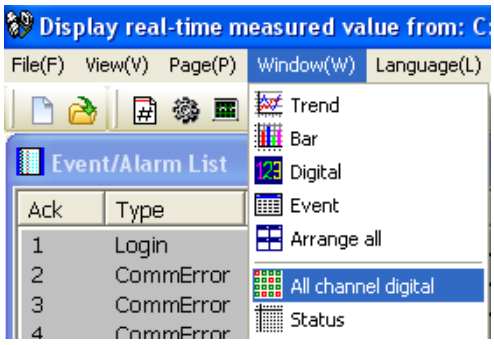


Note: Trend color and trend width for each channel depends on display configuration

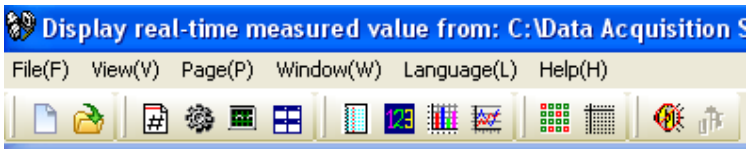
5.1.6 Display All Channel Digital



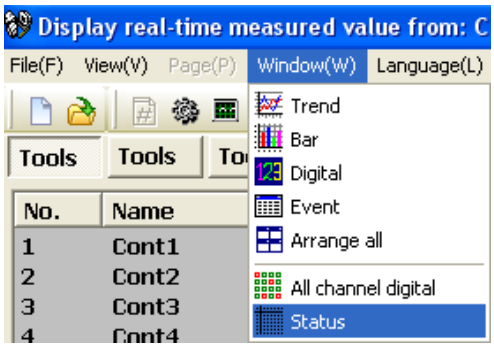
Click on All Channel Digital Icon to show all channels as digital values in full page, alternatively, in Menu click on “Window” and then click on “All Channels Digital”

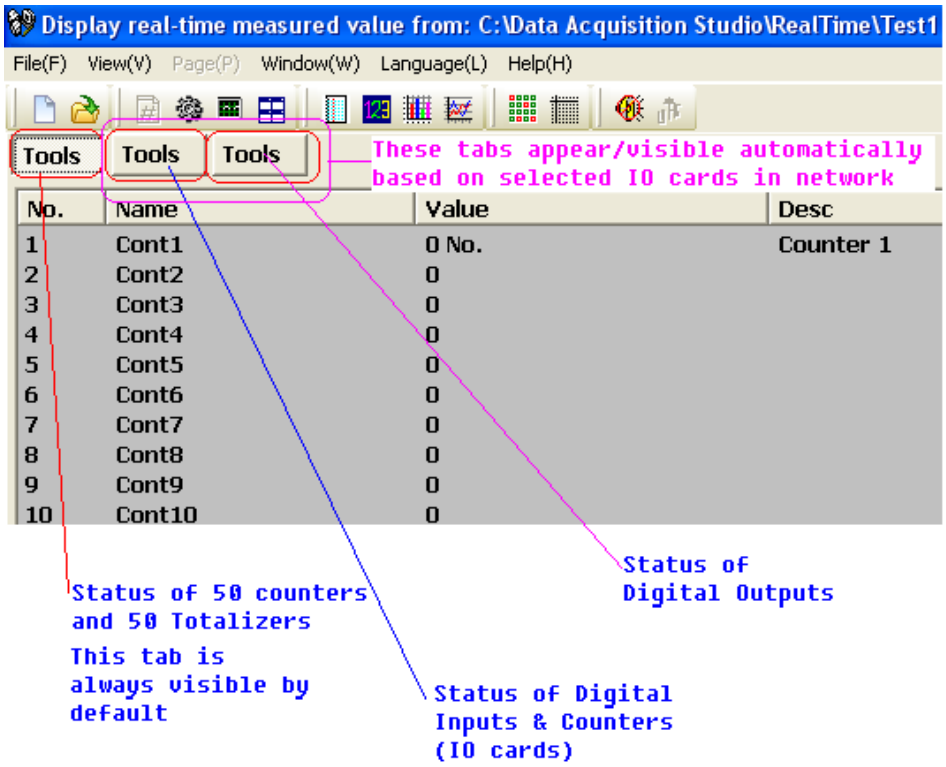


5.1.7 Display Counter & Totalizers

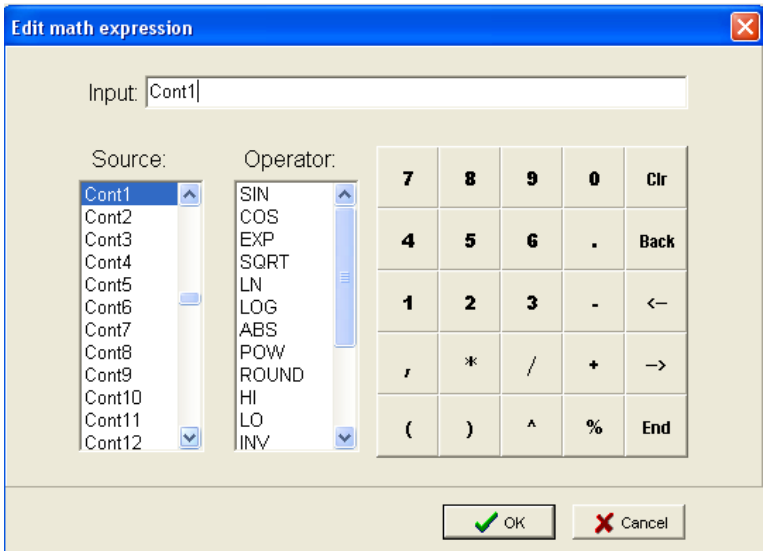


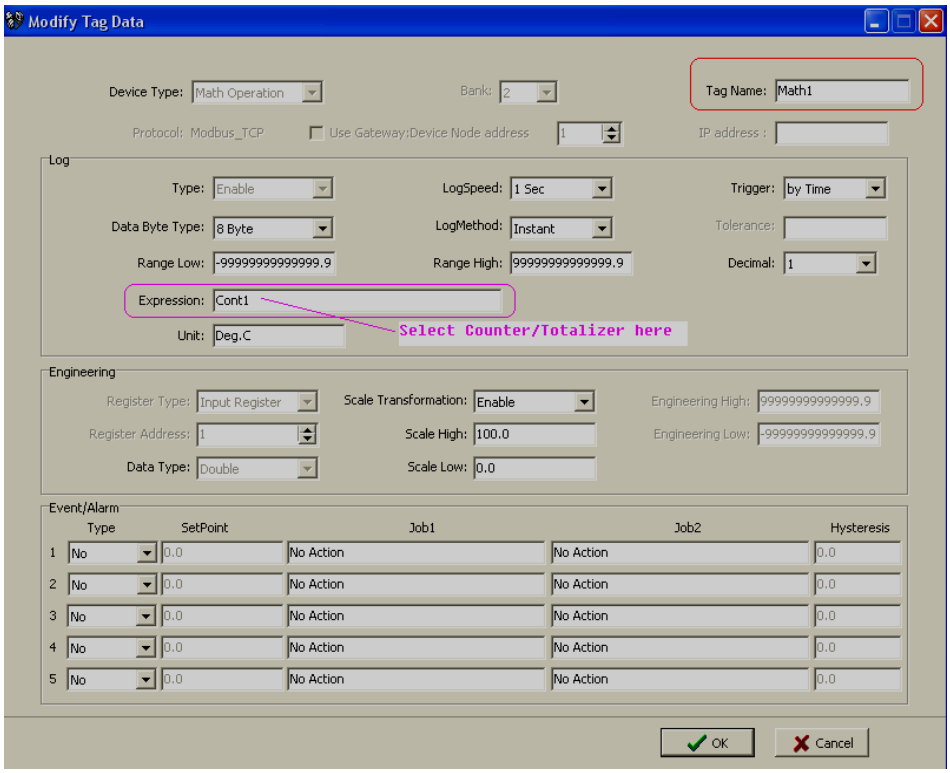
Click on Status Icon , alternatively, in Menu click on “Window” and then click on “Status”, and then click on tab “Tools” to show status of Counters & Totalizers. It display status of all 50 counters and 50 Totalizers. If IO cards are available in network, then other tabs with name “Tools” appear under status and they displays status of Digital Inputs, Counters, Digital Outputs based on selected IO card in the network

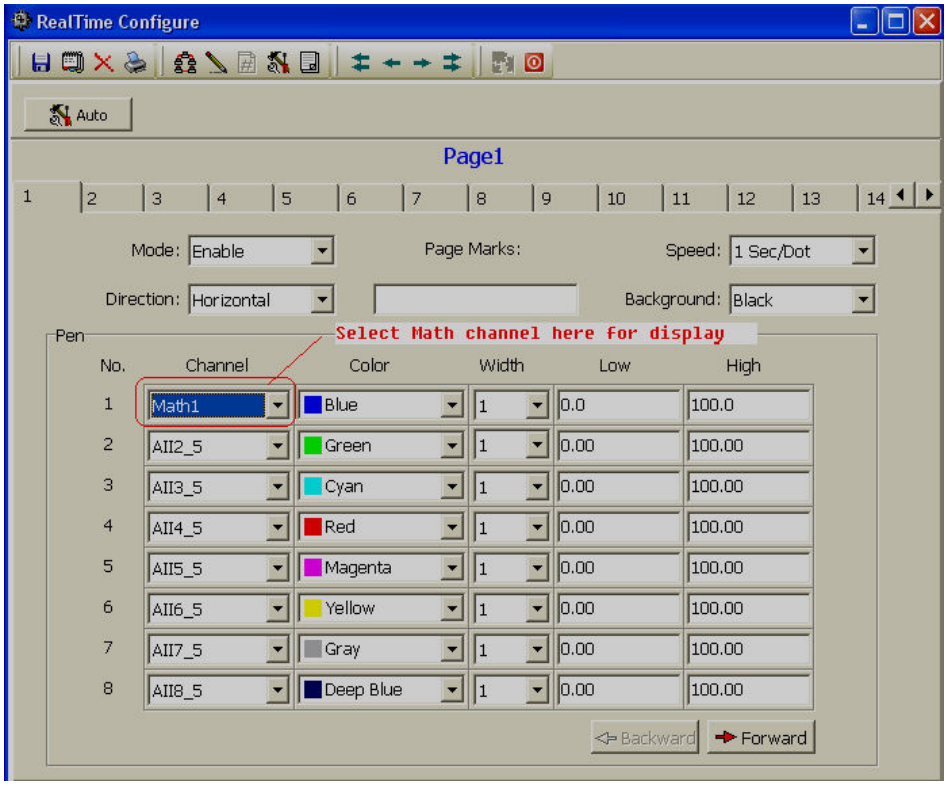




If you wish to see Counter and Totalizer value as channels in main pages, then they can be selected in Math channel and then select specific Math channel in Display pages configuration as shown attached





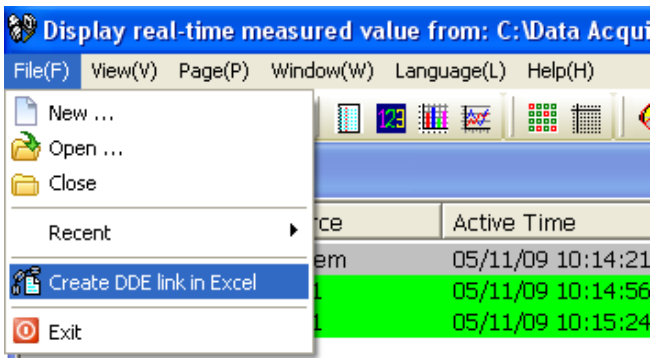


5.2 Data dynamic Exchange (DDE)

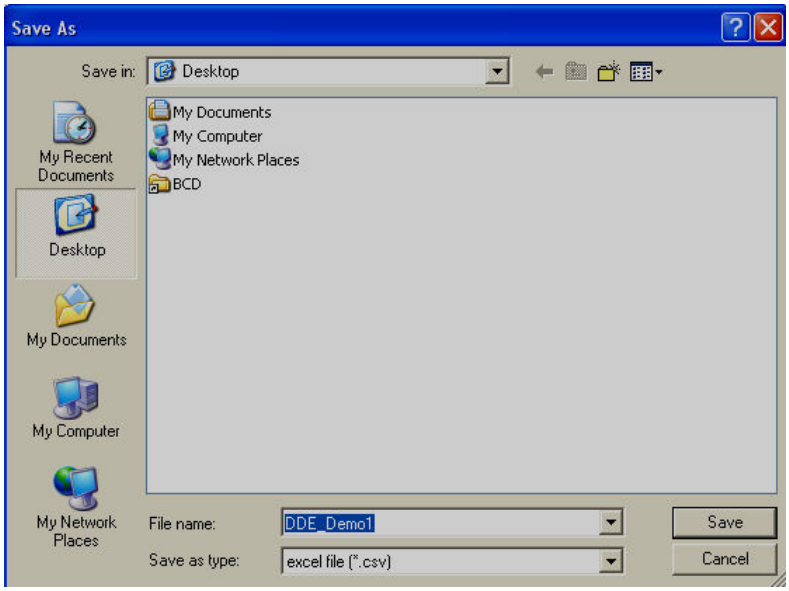
Dynamic Data Exchange (DDE) is a standard inter-application communication protocol built into Microsoft Windows operating systems and supported by many applications that run under Windows. DDE takes data from one application and gives it to another application. It allows Windows programs that support DDE to exchange data between themselves.
Data from DAQ software can be exchanged with Excel on DDE link.

After completion of all network configuration (adding of all Modbus slaves), then open Data acquisition studio software from start – programs – Data acquisition studio – Real-time viewer

Project – create DDE link in excel

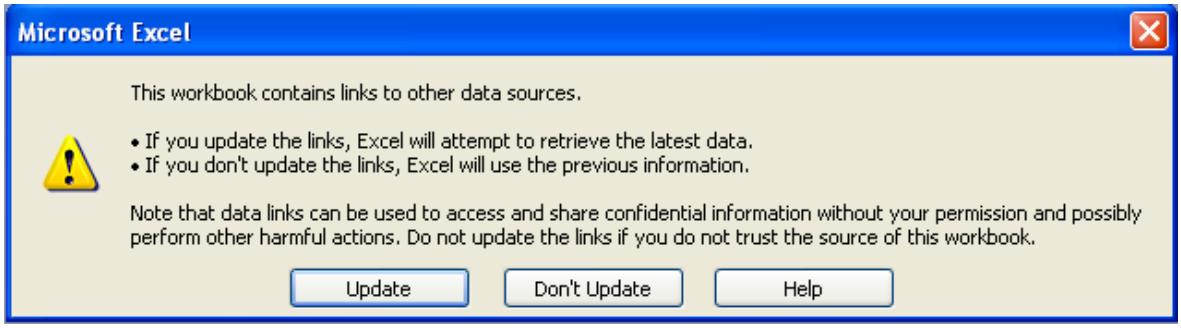


Specify the path and file name as follows.



By default the file name will start with DDE and the project name with underscore. Save the file name in PC at selected path as above to proceed further.

For example, if desk top is selected in the path, then excel file should be available in the desk top. If the MS Office is not installed in the PC, then you cannot open the excel file created as above procedure. Please contact your system administrator to install MS office software in the PC. Now try to open the file from the desk top created for using DDE application with the recorder through Observer software.



Click on update to activate DDE between DAQ software and Excel application. If the DDE is successful, then real time data of the channels should be updated in excel file as shown in sample screen.

DDE expression format to get real time data from the Observer software is as follows.

=RealTime_Viewer|TagService!_TagN

Where N = 1,2,3…..

Application = RealTime_Viewer
Topic = Tag Service

Tag name = _Tag1 (Please observe underscore before the tag number)
It is possible to exchange data related to AI, DI, DO, Counters and Totalizers between DAQ software and third party applications running under windows operating systems via DDE.

Procedure to find the tag number for the tag name to use in DDE applications

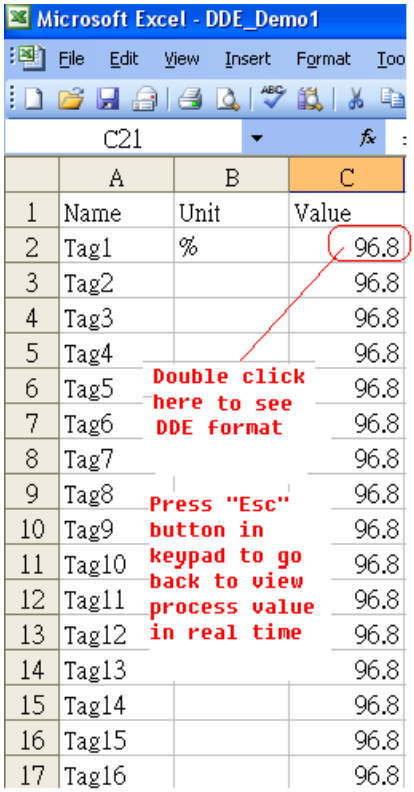
Create DDE link from Real time viewer.
Open Excel file.
Three columns appear in the excel file as Name, Unit and Value as shown in the Excel file.

Name: This is tag name actually defined in the channel configuration

Unit: This is unit for the tag name defined in the channel configuration

Value: This is the specific cell where, process value for the tag will appear in real time.

To find the DDE format for any tag in channel configuration, for a specific tag, double click at "Value" column for the corresponding tag defined at Name. For ex: For Name= Tag1 is at R2C1, double click at cell R2C3 to see DDE format for Tag1. Click on Esc button at the key board to see process value at the cell from displaying DDE format.



	A	B	C
1	Name	Unit	Value
2	Tag1	%	96.8
3	Tag2		96.8
4	Tag3		96.8
5	Tag4		96.8
6	Tag5		96.8
7	Tag6		96.8
8	Tag7		96.8
9	Tag8		96.8
10	Tag9		96.8
11	Tag10		96.8
12	Tag11		96.8
13	Tag12		96.8
14	Tag13		96.8
15	Tag14		96.8
16	Tag15		96.8
17	Tag16		96.8

If any "Error" appears in any cell at excel, possible reasons is no data available at selected tag. Check the channel configuration and make sure value is available

If any "NAME" text appears in the excel file, it indicates that particular tag is not configured properly. Tag name may not available at DAQ software.

Note: If Excel file is not opening from the selected path, then check the following

1. RAM size in the PC is very less. Restart the computer and then create the DDE link once again and open the Excel file.

2. Increase virtual memory in the PC. Please contact system administrator to check the virtual memory settings at the PC.
   My computer-properties-advanced-performance settings –advanced-virtual memory.

DDE with third party applications

Once the data is available at Excel at particular cell, then data can be exchanged with the third party applications like PLC, SCADA, and Visual Basic etc. If data is to be exchanged with PLC, then PLC programmer can write Visual basic macro in Excel from the following link

Excel – Tools – macro

For the source code examples, PLC programmer may check the PLC manuals for DDE sample macros. It is also possible to exchange data from recorder to SCADA applications through DDE.

Example 1

DDE link between Allen-Bradley SLC 5/03 PLC and Excel

Task: Write a block of data (10 floating points) from Excel to PLC.

Name of the Excel file = Reports.XLS
Data Source: D 37 to D 46, data in total 10 cells
Target= PLC, Starting address= F8

User RSLinx to configure PLC and DDE link
DDE topic name in RSLinx= DDE_REPORTS

```
Sub Block_Write()

                'open dde link: testsol=DDE Topic  This is comment only

 RSIchan = DDEInitiate("RSLinx", "DDE_REPORTS")

                'write data thru channel This is comment only

 DDEPoke RSIchan, "F8:2,L10", Range("[Reports.XLS]sheet1!D37:D46")

                'close dde link This is comment only

 DDETerminate (RSIchan)

End Sub
```

Example 2

DDE link between Allen-Bradley SLC 5/03 PLC and Excel

Task: Read a block of data (5 integers) from PLC to excel

Name of the Excel file = Reports.XLS
Data Source: PLC, Starting address= N7:30
Target cells in Excel= A7 to A11

User RSLinx to configure PLC and DDE link
DDE topic name in RSLinx= DDE_REPORTS

```
Sub Block_Read()
        'open dde link: testsol=DDE Topic  This is comment only
RSIchan = DDEInitiate("RSLinx", "DDE_REPORTS")

        'get data and store in data variable This is comment only
data = DDERequest(RSIchan, "N7:30,L5,C1")
        'Paste data into selected range This is comment only
Range("[Reports.XLS]Sheet1!A7:A11").Value = data
        'close dde link  This is comment only
DDETerminate (RSIchan)

End Sub
```

Example 3

DDE between DAQ software and SCADA (Allen-Bradley RSVIEW32)

When the Real time viewer in DAQ is working well in PC, then the tag data from DAQ software will be available in the expression format as follows

=RealTime_Viewer|TagService!_Tag1

Application = RealTime_Viewer
Topic = Tag Service
Tag name = _Tag1 (Please observe underscore before the tag number)

The above tag information can be directly configured in SCADA to enable DDE between DAQ software and RSVIEW 32 SCADA. There is no need to configure any thing at RSLinx.

Procedure for configuration

1) Open SCADA project

2) System – Node – Select DDE server as data source

3) Name = DAQ (No gaps)

4) Application = RealTime_Viewer

5) Topic = Tag Service

6) Check enable in the box. (This node should be selected)

7) Now open the data base

8) Create analog tag with all the details similar to the tag at the DAQ.

9) Select DAQ at the NODE

10) Write the tag address. For ex: analog input 1, AI1 should be written as _Tag1. Please check up excel file for the tag number corresponding to the tag name defined in the DAQ configuration. Please note that underscore is required before the tag number other wise, data will not be exchanged.

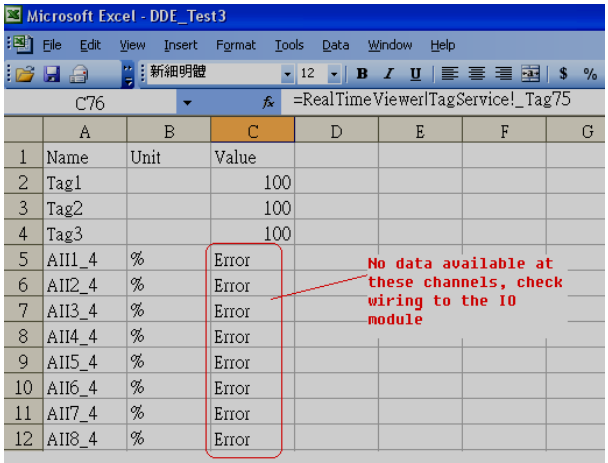
11) Now open the tag monitor and configure for the above tag for checking of DDE with the tag.

If DDE is configured properly, then tag value should appear correctly at the tag monitor with state as “VALID”. If any error message is available, then you have to repeat from step 1. Please note that before checking tag monitor, Real time viewer in PC should be in running condition.

Using DDE, in Excel, it is possible to read status of Math channels, Analog Inputs, Analog Outputs, Digital Inputs, Digital Outputs, Temperature from RTD and Thermocouple type of IO cards, Counter values etc.,

In Excel, for Analog input/RTD/TC IO module at value, if it show “Error”, it means, no data available in specific channel.

For Digital Input, 0 indicates bit is low, 1 indicates bit is high.
For Digital output, “Empty” indicates no digital output, 1 indicates output is available

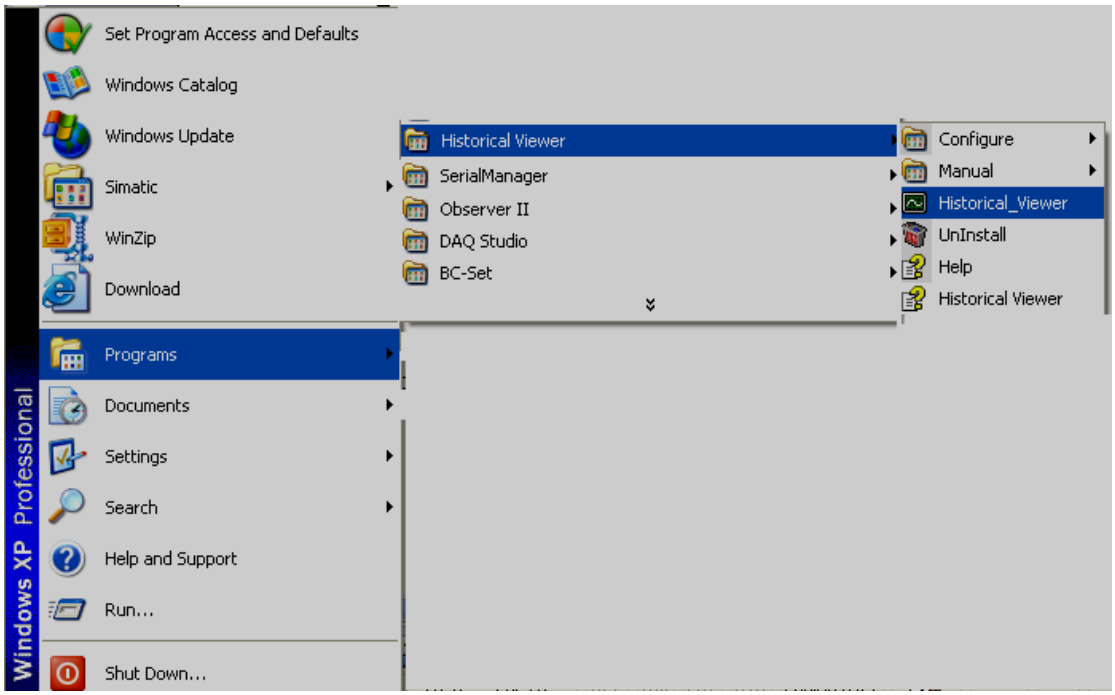


	A	B	C	D	E	F	G
1	Name	Unit	Value				
2	Tag1		100				
3	Tag2		100				
4	Tag3		100				
5	AII1_4	%	Error				
6	AII2_4	%	Error				
7	AII3_4	%	Error				
8	AII4_4	%	Error				
9	AII5_4	%	Error				
10	AII6_4	%	Error				
11	AII7_4	%	Error				
12	AII8_4	%	Error				

6. Historical Viewer

It is a PC based tool to view historical data and historical alarms from HMI & Paperless Recorder.

If you select “Historical viewer” during installation of DAQ software or HMI software, then, historical viewer installed in PC and it can be opened as shown below



By default, historical data from devices after import will be stored at path C:\Program files\Historical viewer\Historical/Project.daq

6.1 Human machine interface (HMI)

6.1.1 Preparation of historical data storage in HMI

Procedure

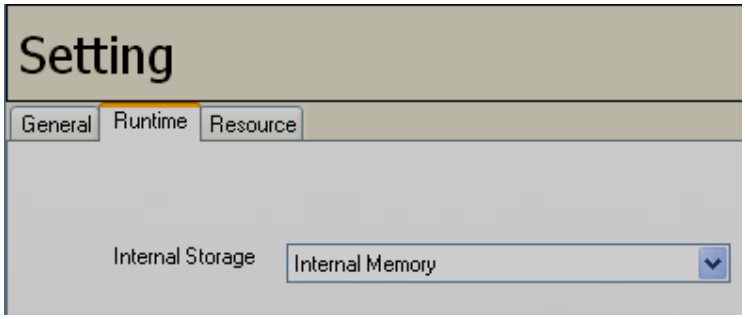
1. Configure data logging, insert historical trend object in HMI, complete configuration of pens, download application to HMI and make sure historical data is showing properly in historical trend at run time.

2. Configure alarms, insert historical alarm box in HMI, download application to HMI and check historical alarms. If required, refresh alarms in Run time using Button linked with

"Update Historical" function and make sure historical alarms showing properly in historical alarm box in Run time

3. Historical data and alarms are stored in internal memory/SD card as per data storage path defined at Project explorer-Setting-Runtime-Internal storage

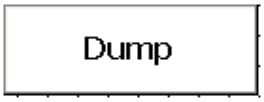
4. Once data logging is configured in HMI, in Run time, historical data will be stored in HMI internal memory or SD card as per configuration. Once alarms are configured properly in HMI and they appear in run time, historical alarms will be stored in HMI internal memory or SD card as per configuration. These historical alarms and historical data can be archived in PC later using historical viewer software.

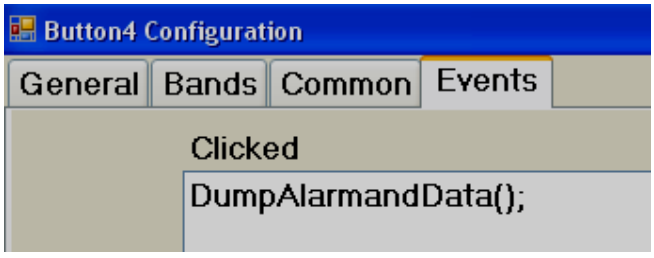


5. Historical data and alarms can be dumped from Internal memory/SD card to USB stick or directly transfer from HMI to PC via Ethernet using Historical viewer software.

6.1.2 HMI data archive in PC using storage device (USB stick)

1. First make sure data logging and historical trend is configured properly in HMI and they are running fine in Run time. Create a button in HMI screen. Link with a function – "Dump Alarms and Data"





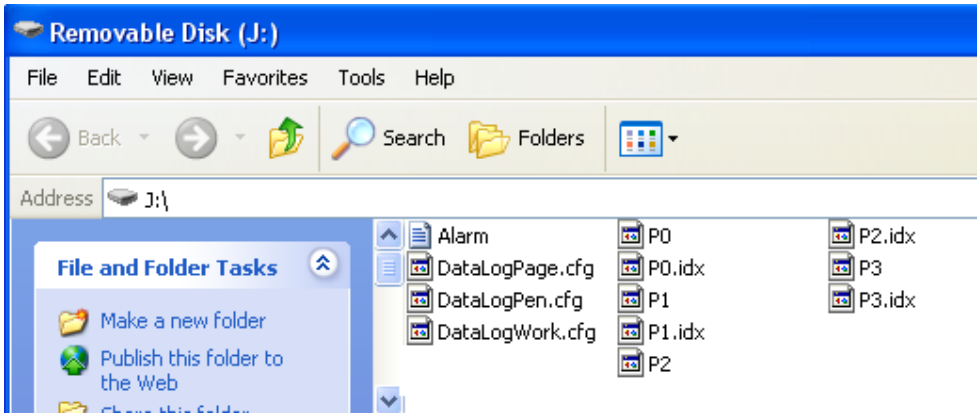
2. Check contents in USB stick. Make sure it is empty at first time and no invalid files are available in USB stick.

3. Insert USB stick in USB port of HMI

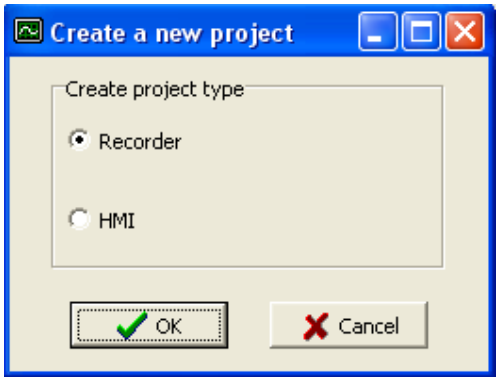
4. In Run time, check if historical data is showing properly or not in historical trend. If required, press “Zoom” and verify the presence of data.

5. Press on “Dump” button. Then, it transfers historical data and alarms from Internal memory/SD card to USB stick

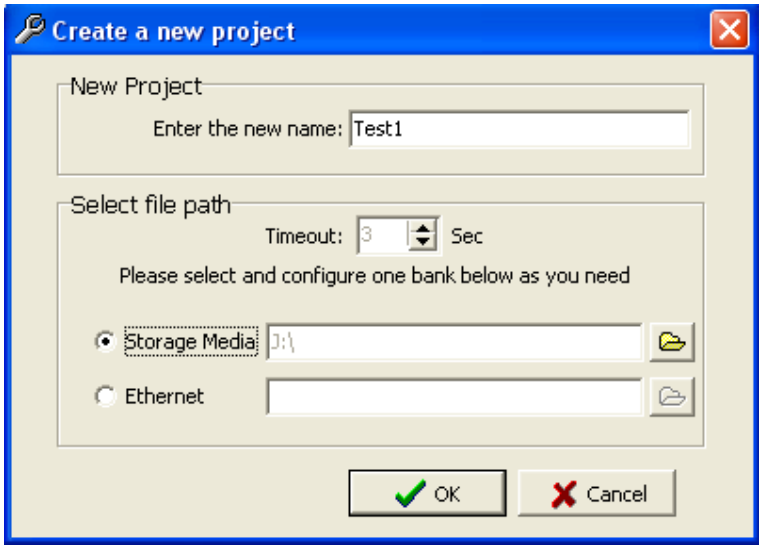
6. Now, remove USB stick from HMI. Insert USB stick in PC and check its contents. It should have files similar to the following



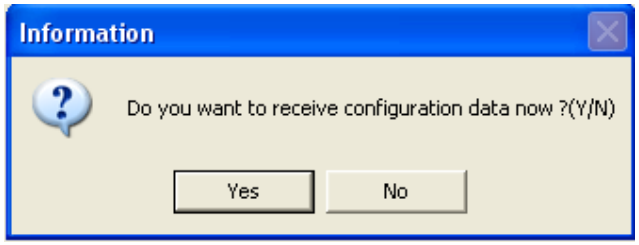
7. Make sure Historical viewer software installed in PC. Double click on “Historical viewer” icon  available at desktop



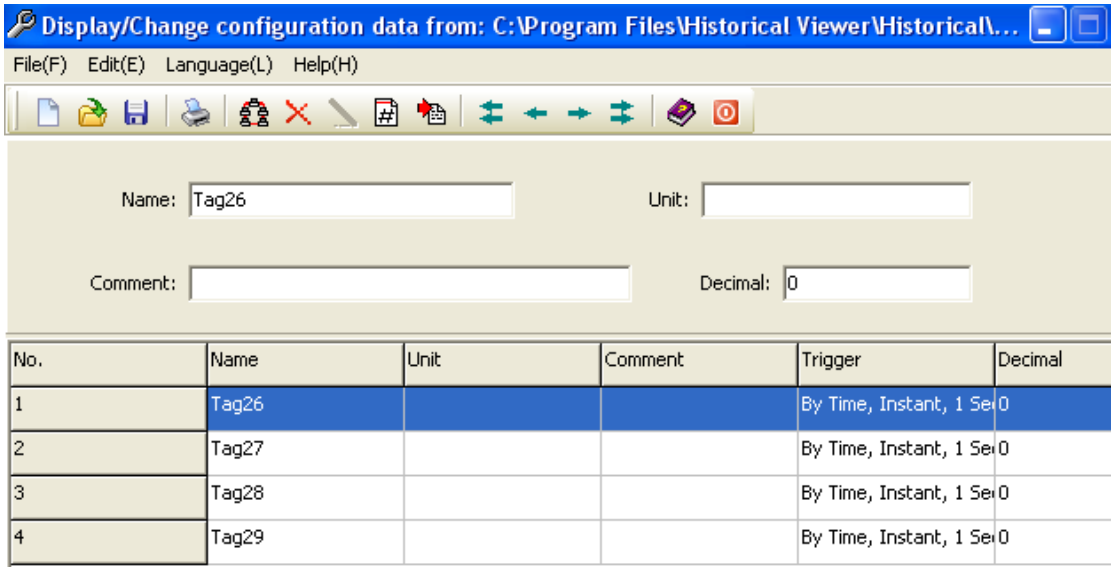
8. Select HMI and click “OK”



9. Enter the Project name. Select “Storage media”, click at open folder icon  and select the path for the USB stick. Then, click “OK”

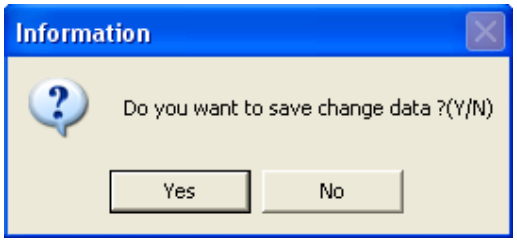


10. Click “Yes”.

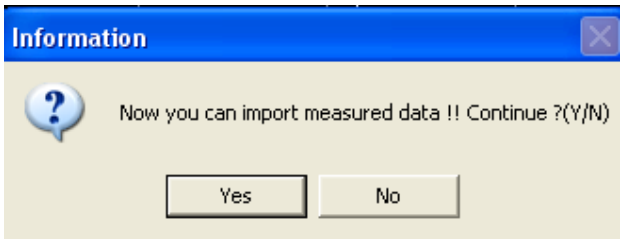


11. All data log tags will be shown here. Enter the unit and select the number of decimal points

12. Click “Save” icon . Then, click Return icon to return to main program

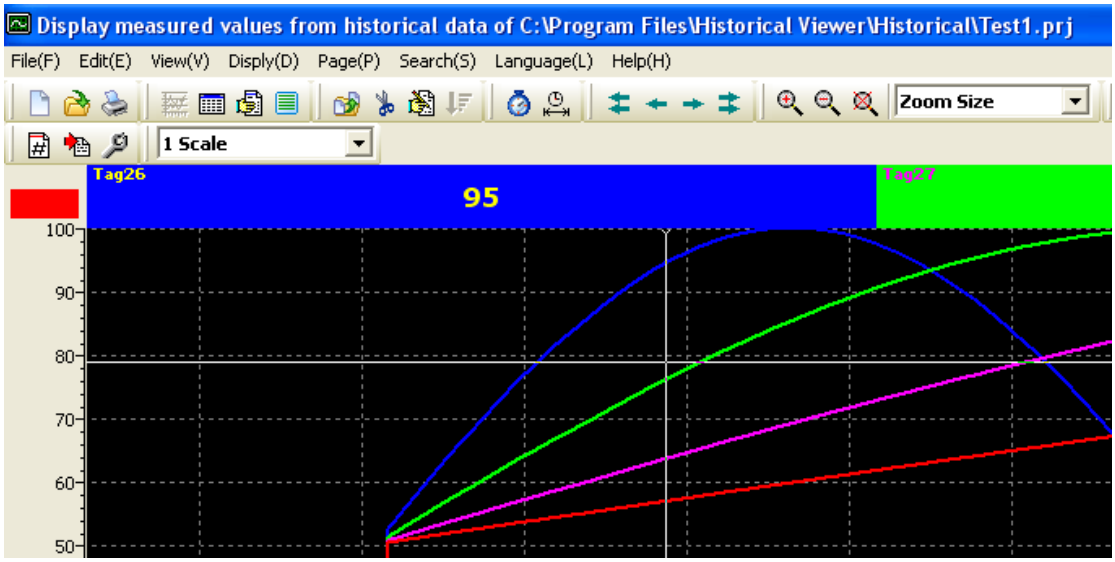


13. Click “Yes’ to save project configuration in PC



14. Click “Yes” to import historical data and alarms from USB stick to PC

15. Click “Yes” to delete data and alarms from USB stick. Click “No”, if you wishes to remain historical data and alarms in USB stick after transferring to PC



16. Now, you can view historical data trend in PC

6.1.3 HMI data archive in PC via Ethernet

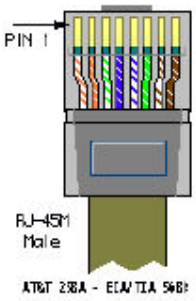
1. First make sure data logging and historical trend is configured properly in HMI and they are running fine in Run time.

2. In Run time, check if historical data is showing properly or not in historical trend. If required, press “Zoom” and verify the presence of data.

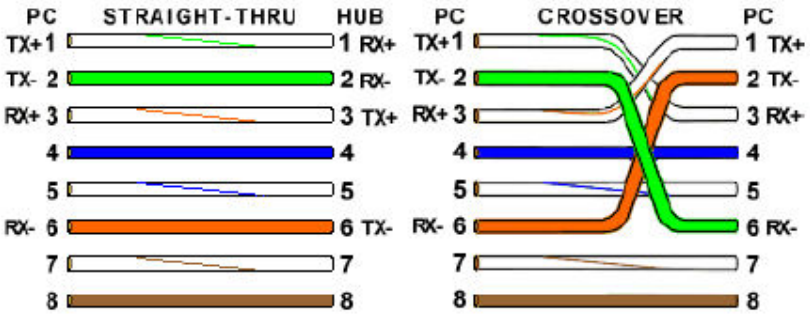
3. Check IP address of HMI using System information at Control centre at HMI startup. For example, it is 192.168.0.203

4. If HMI is connected to PC directly, then, use cross over Ethernet cable. If HMI is connected to PC via LAN, then, use straight cable

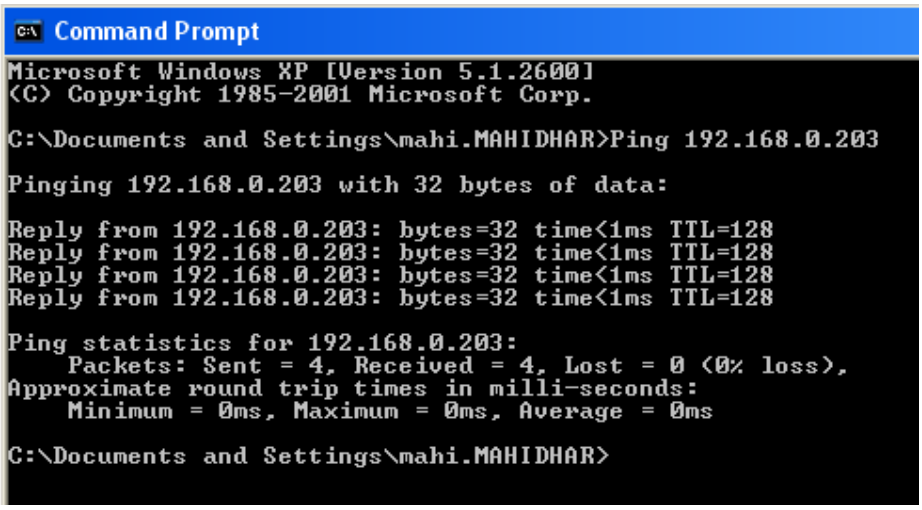
Straight Through Cable VR18-LAN/HUB	
RJ-45 PIN	RJ-45 PIN
1 Tx+	1 Rc+
2 Tx-	2 Rc-
3 Rc+	3 Tx+
6 Rc-	6 Tx-



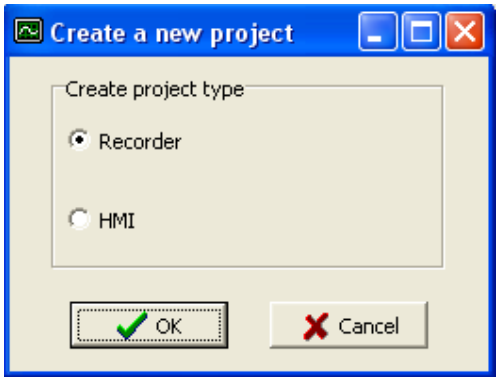
Crossover Cable VR18-PC/Notebook	
RJ-45 PIN	RJ-45 PIN
1 Rx+	3 Tx+
2 Rc-	6 Tx-
3 Tx+	1 Rc+
6 Tx-	2 Rc-



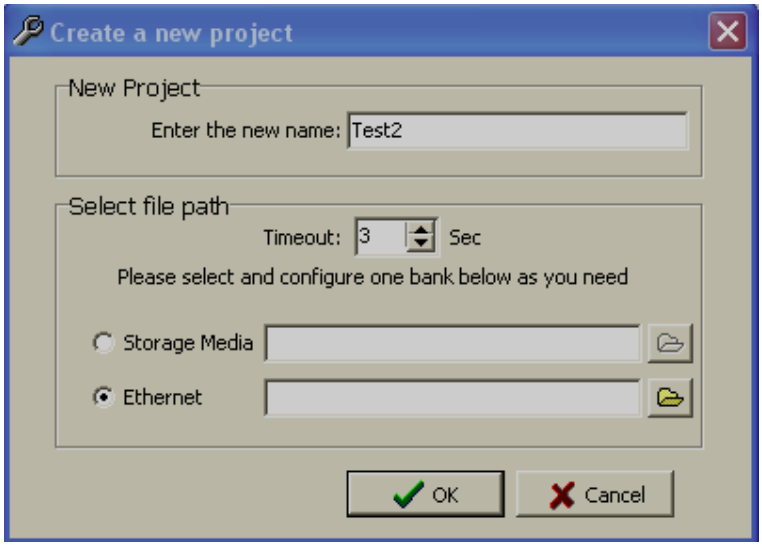
5. At Dos prompt, using “Ping” instruction, check if communication is OK between HMI and PC. If it is OK, then, you should get reply as follows. If there is no reply, then, check Ethernet cable and IP address of HMI



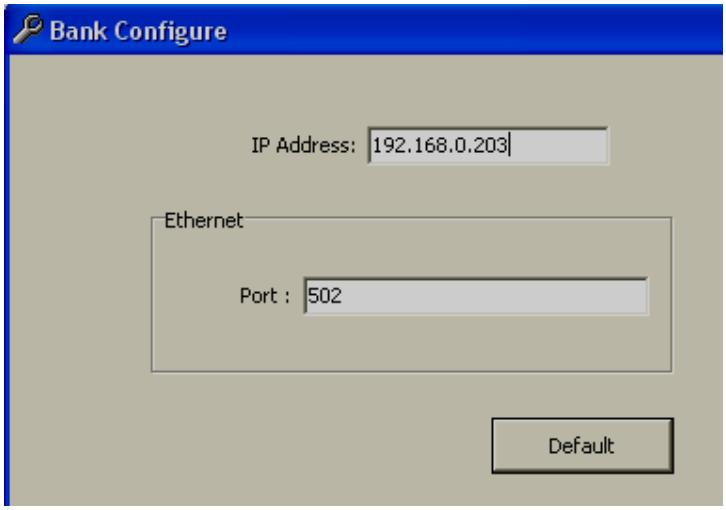
6. Make sure Historical viewer software installed in PC. Double click on “Historical viewer” icon  available at desktop

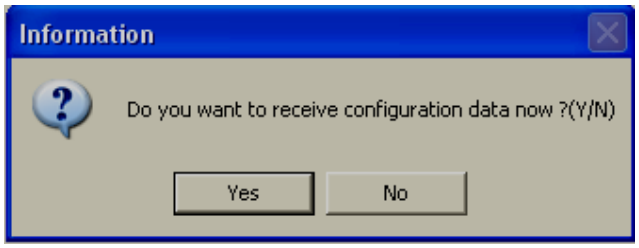


7. Select HMI and click “OK”



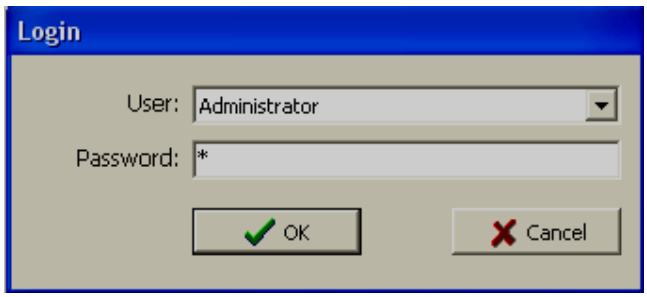
8. Enter the Project name. Select “Ethernet”, click at open folder icon  and Enter IP address of HMI. Then, click “OK”

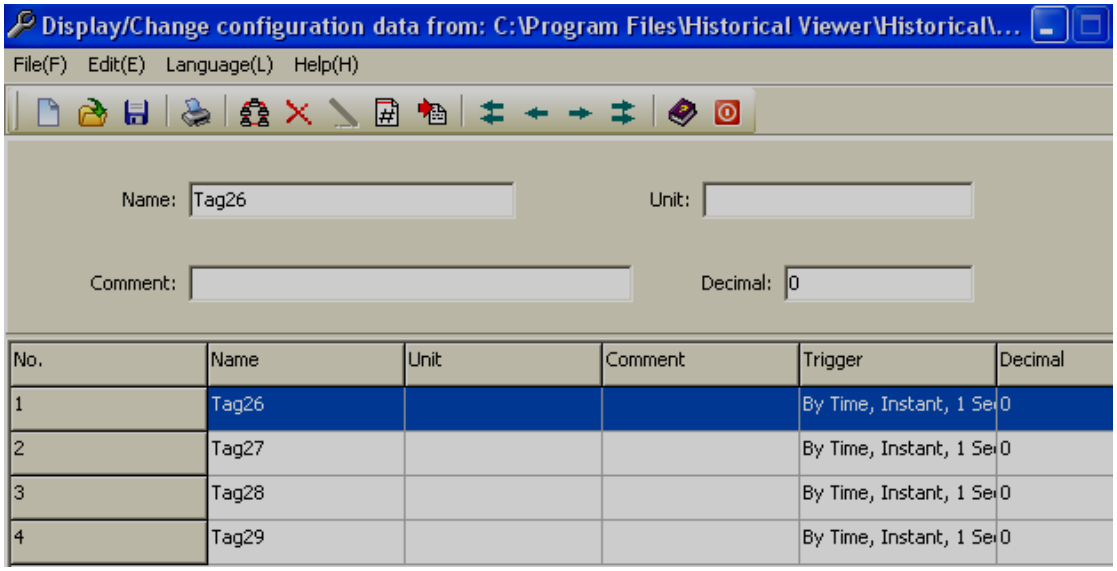




9. Click “Yes”.

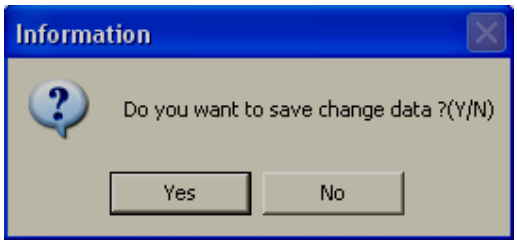
10. If security level is configured for historical viewer, then, it needs to enter user name and password



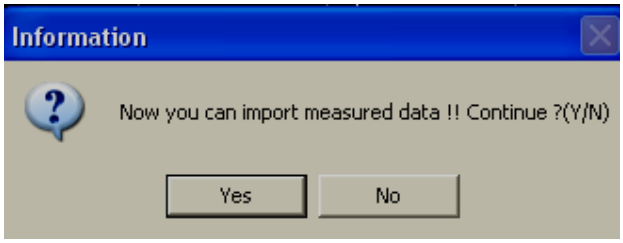


11. All data log tags will be shown here. Enter the unit and select the number of decimal points

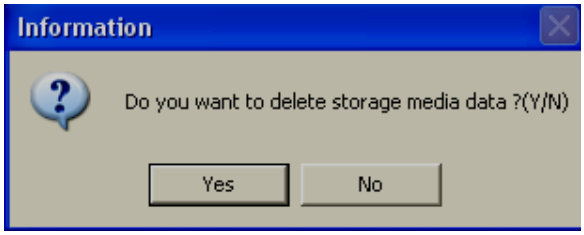
12. Click “Save” icon . Then, click Return icon to return to main program



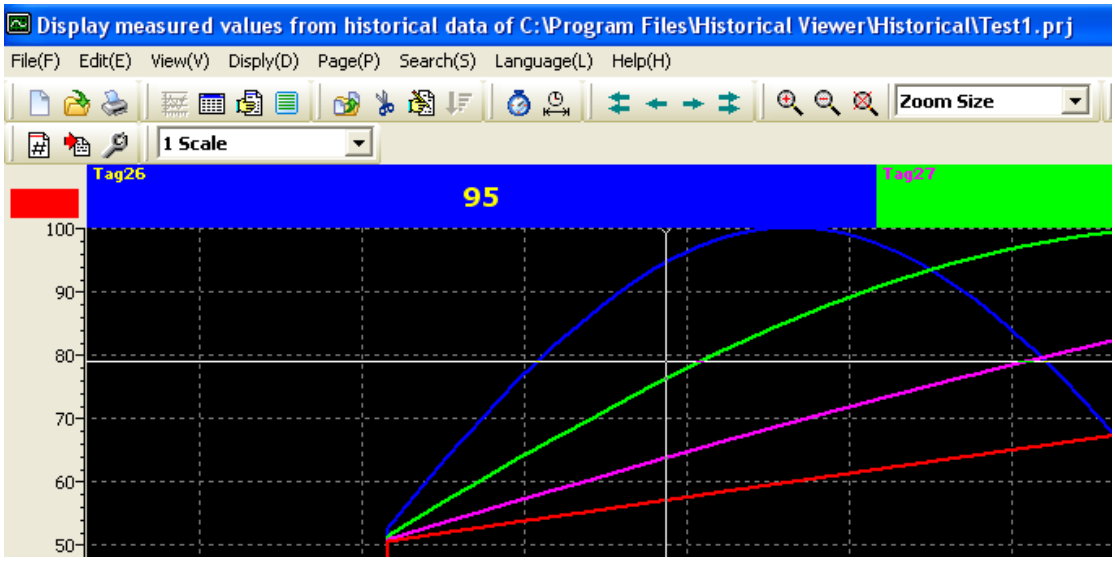
13. Click “Yes’ to save project configuration in PC



14. Click “Yes” to import historical data and alarms from USB stick to PC

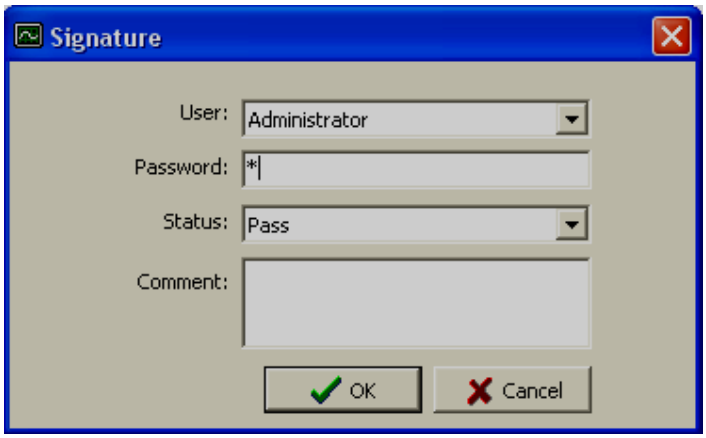


15. Click “Yes” to delete data and alarms from USB stick. Click “No”, if you wishes to remain historical data and alarms in USB stick after transferring to PC



16. Now, you can view historical data trend in PC

17. If security is configured for Historical viewer, then, after seeing the data, if you wishes to close the historical viewer or log out, then, it prompts to digitally sign the record by entering user name and password. Then only, it is possible to exit from historical viewer



6.2 Paperless Recorder

6.2.1 Paperless data archive in PC using storage device (CF card)

1. Check contents in CF card. Make sure it is empty at first time and no invalid files are available in CF card.

2. Insert CF card in Paperless Recorder. Check icons on Top Right side of the Recorder. CF should show 99% empty. If CF card is not inserted properly, then, it shows with Red color mark on CF icon

3. First time, press on “Config” key. Then, press on “Save” key.

   It display message “Do you want to save configuration o storage media?

   Press “Yes” key. Then press “Back” key to return to main menu

   Now, if you check contents in CF card, you should have the following files

   These two files are important to create a new project in PC.

   Note: If you wish to send us configuration files to check your configuration, you need to send these two files back to factory

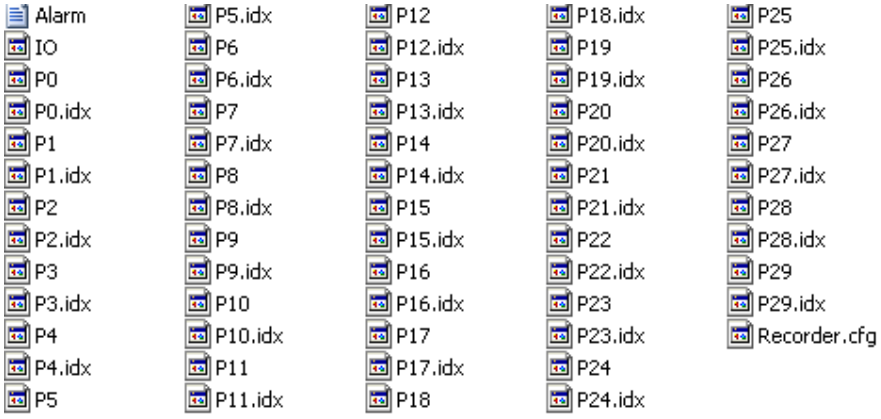
4. In Recorder, Press on “Dump” button.

Do you want to dump historical data and event list to storage media?

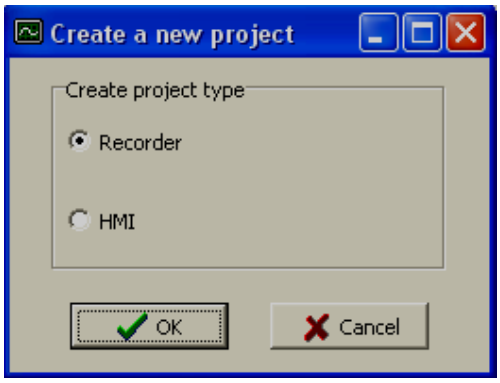
Press on “Yes” key

Then, it transfers historical data and alarms from internal memory to CF card

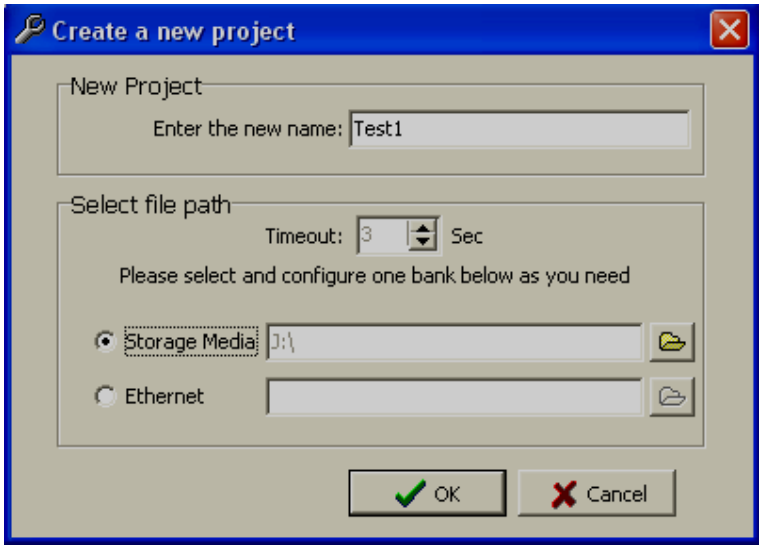
5. Now, remove CF card from Paperless Recorder. Insert CF card in a CF reader, plug in to PC and check its contents. It should have files similar to the following



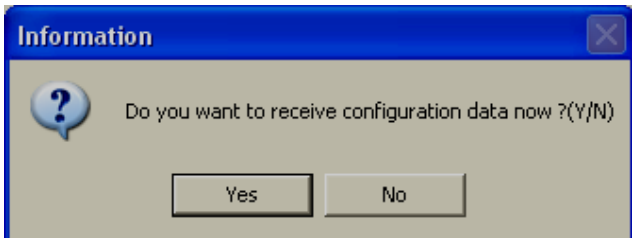
6. Make sure DAQ or Historical viewer software installed in PC. Double click on "Historical viewer" icon available at desktop



7. Select Recorder and click "OK"

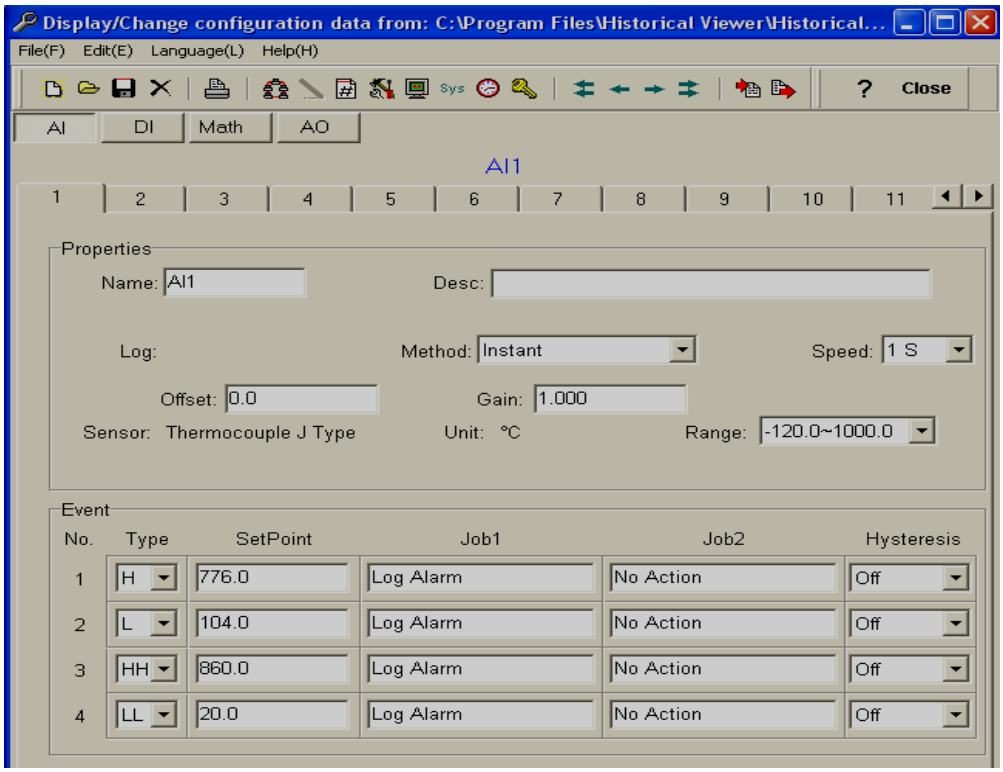


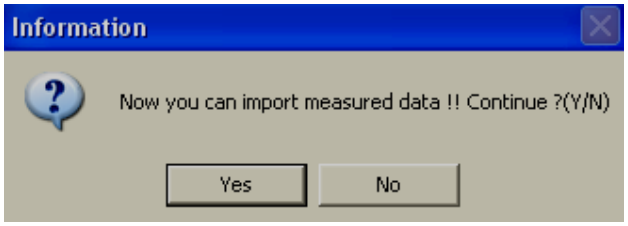
8. Enter the Project name. Select “Storage media”, click at open folder icon and select the path for the CF card. Then, click “OK”



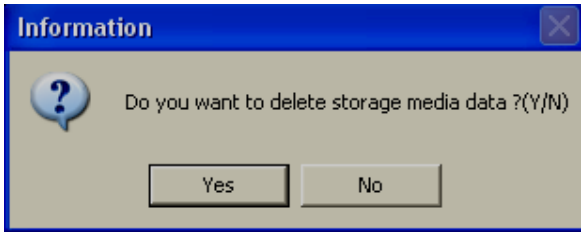
Click “Yes” to receive configuration from CF card to PC. Then, click “Save” icon to save configuration in PC. Then, click “Close”

If IO.dat and Recorder.cfg files are not available in CF card, then, you cannot complete this step

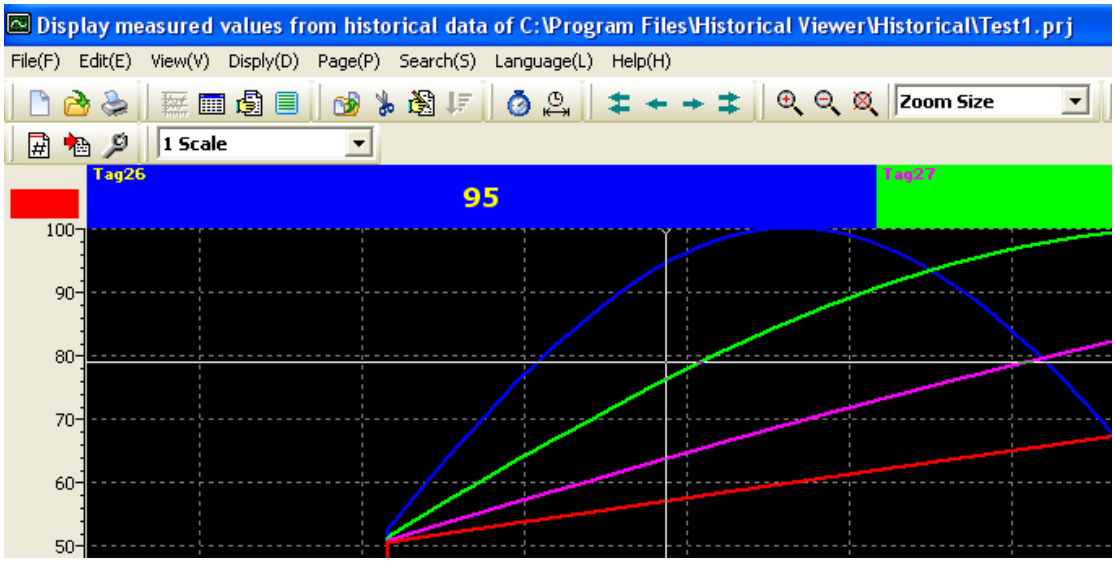




9. Click “Yes” to import historical data from CF card to PC



10. Click “Yes” to delete historical data and alarms from CF card. Click “No”, if you wishes to remain historical data and alarms in CF card after transferring to PC



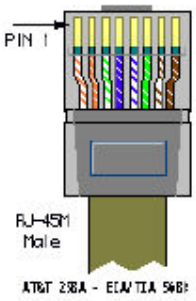
11. Now, you can view historical data trend in PC

6.2.2 Paperless data archive in PC via Ethernet

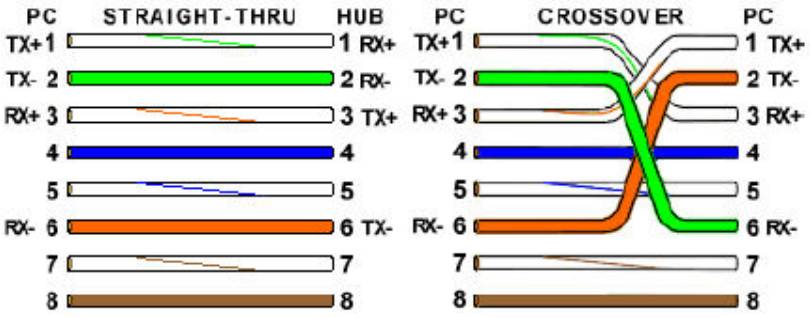
1. Check IP address of Paperless Recorder. Press “Config” key, select “System info”, press “Enter” key. Note down IP address of Recorder. For example, it is 192.168.0.203

2. If Paperless Recorder connected to PC directly, then, use cross over Ethernet cable. If Paperless Recorder connected to PC via LAN, then, use straight cable

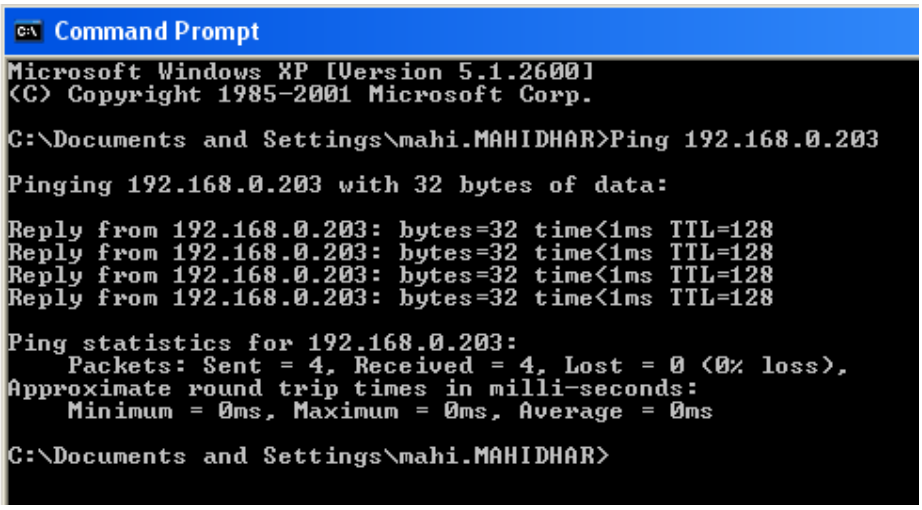
Straight Through Cable VR18-LAN/HUB	
RJ-45 PIN	RJ-45 PIN
1 Tx+	1 Rc+
2 Tx-	2 Rc-
3 Rc+	3 Tx+
6 Rc-	6 Tx-



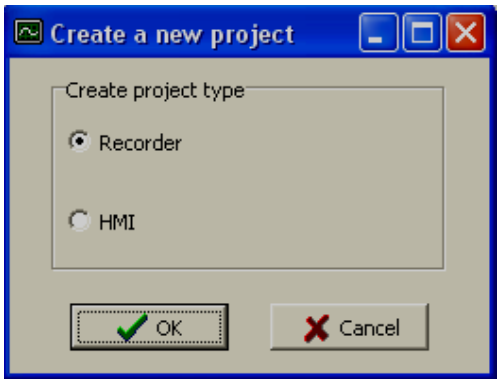
Crossover Cable VR18-PC/Notebook	
RJ-45 PIN	RJ-45 PIN
1 Rx+	3 Tx+
2 Rc-	6 Tx-
3 Tx+	1 Rc+
6 Tx-	2 Rc-



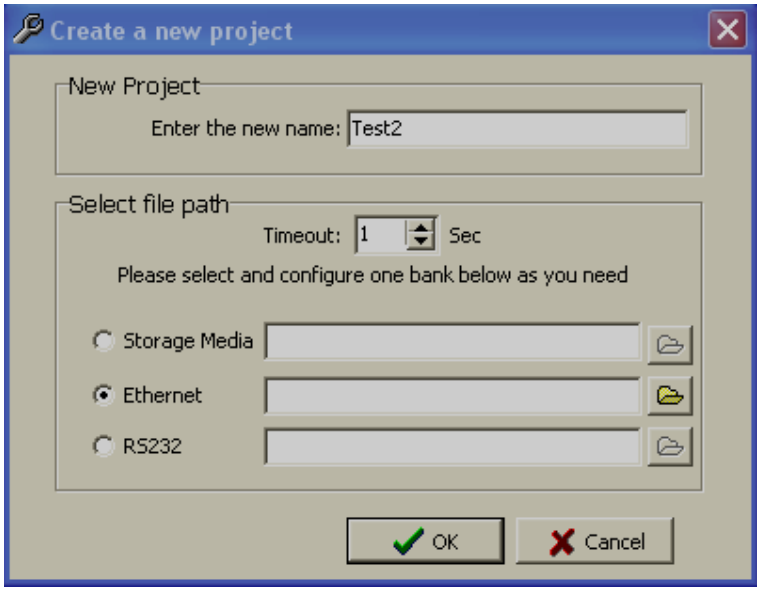
3. At Dos prompt, using “Ping” instruction, check if communication is OK between Paperless Recorder and PC. If it is OK, then, you should get reply as follows. If there is no reply, then, check Ethernet cable and IP address of Paperless Recorder



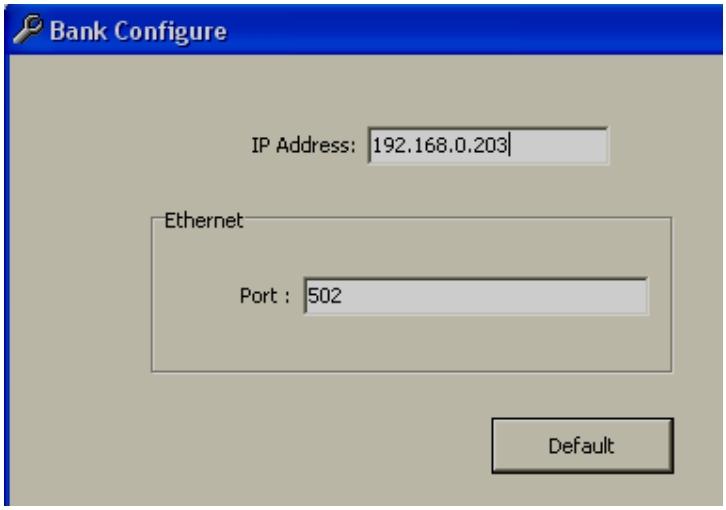
4. Make sure DAQ/Historical viewer software installed in PC. Double click on “Historical viewer” icon available at desktop. Alternatively, click at Start-Programs-Historical viewer

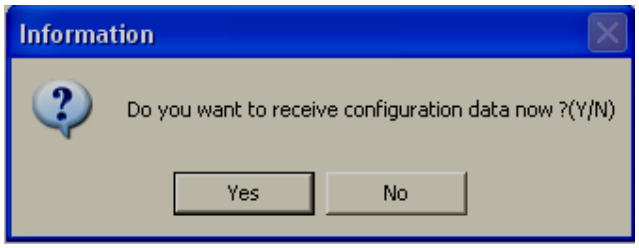


5. Select Recorder and click “OK”



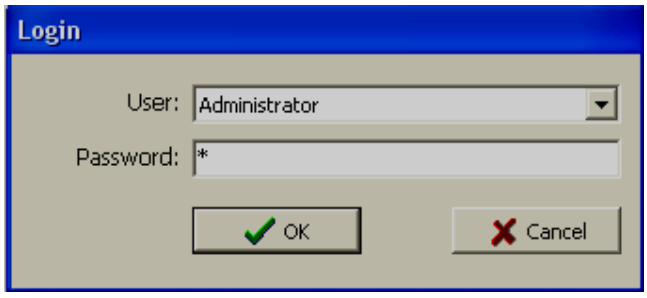
6. Enter the Project name. Select “Ethernet”, click at open folder icon  and Enter IP address of Paperless Recorder. Then, click “OK”



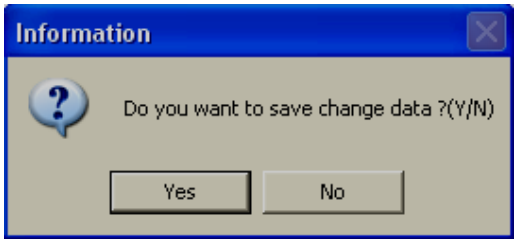


7. Click “Yes” to receive configuration from Recorder to PC

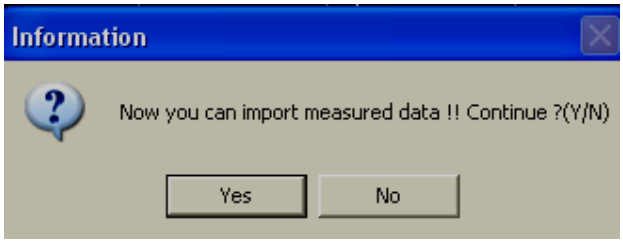
8. If CFR21 is selected in Paperless Recorder, then, it needs to enter user name and password



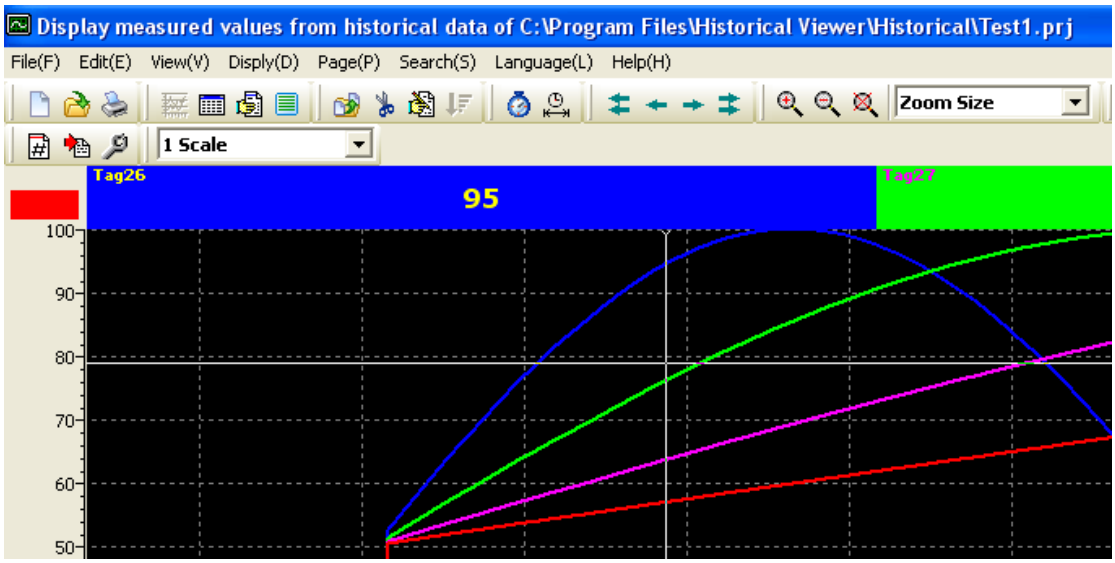
9. Click “OK” to receive configuration from Recorder to PC. Then, click “Save” icon to save configuration in PC. Then, click “Close”



10. Click “Yes’ to save project configuration in PC

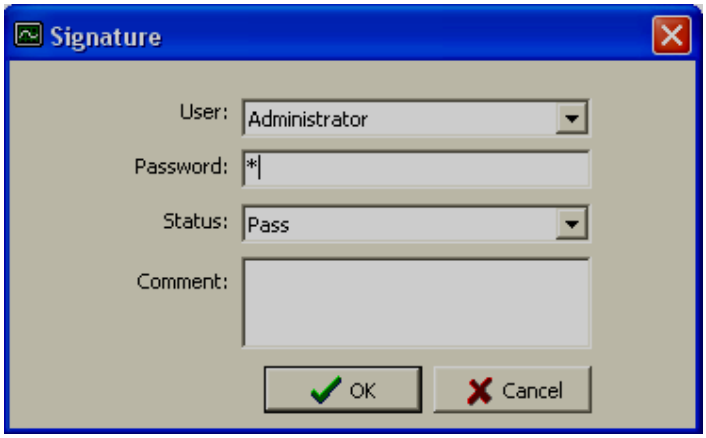


11. Click “Yes” to import historical data and alarms from Recorder to PC



12. Now, you can view historical data trend in PC

13. If CFR21 is configured in Paperless Recorder, then, after seeing the data, if you wishes to close the historical viewer or log out, then, it prompts to digitally sign the record by entering user name and password. Then only, it is possible to exit from historical viewer



6.3 Tools

6.3.1 Tool Bar

To open new project

To open existing project file

Print

Display trend

Display Events and alarm list

Display Report

Display values list

Export data into excel

Copy curves to clipboard

Remark, write a comment

Search by specific time

Search by a period of time

Fast back ward for data monitoring

Backward

Forward

Fast forward

Zoom out

Zoom in

Zoom all

Zoom by time

Zoom by value

Navigate to next page

Close historical viewer and return to Main program

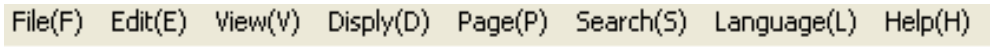
Black background

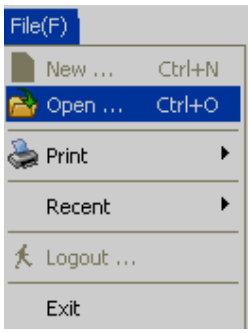
White background

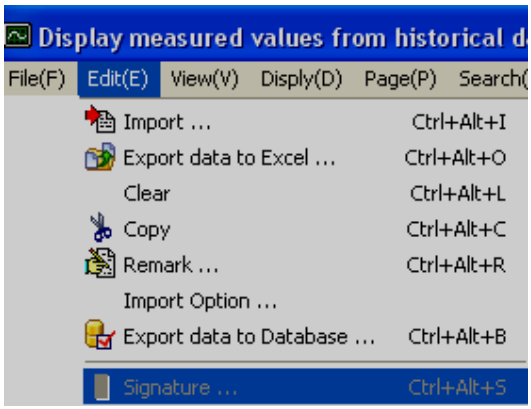
Show graphical representation horizontally

Show graphical representation vertically

6.3.2 Menu Bar







Import: Import historical data from device to PC

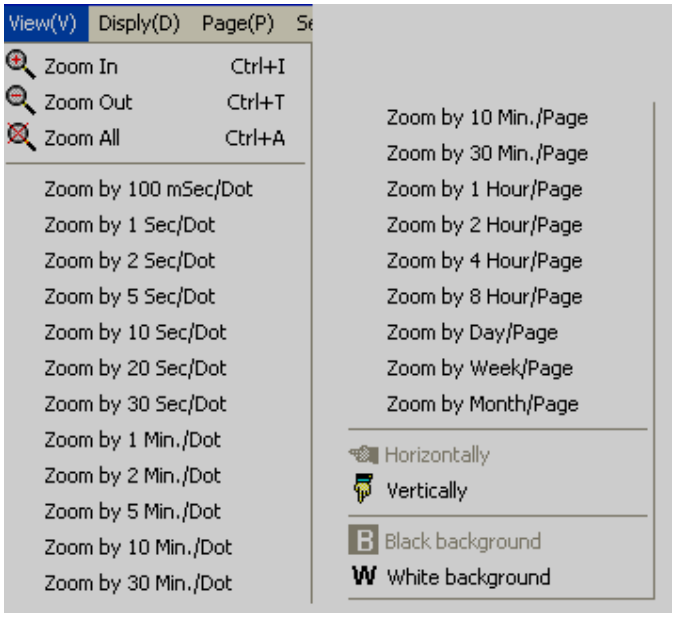
Export data to Excel: To export data to excel

Clear: To clear the clipboard

Copy: To copy the current screen image to clipboard.

Remark: To enter custom comments by user

Import Option: To refresh historical data as per set time interval



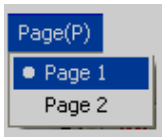
Zoom: Various options available for selection as shown above

Horizontally: To view historical trend horizontally in screen

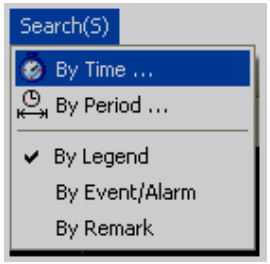
Vertically: To view historical trend vertically in screen

Black background: To set black back ground for historical trend

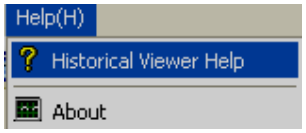
White background: To set white background for historical trend



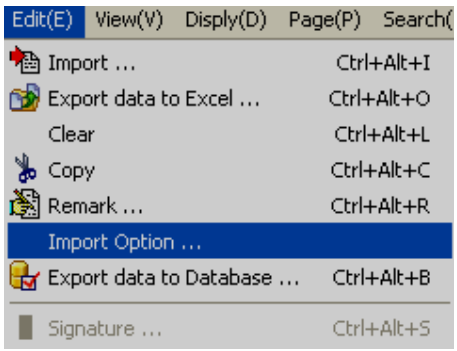
Page: To select the page

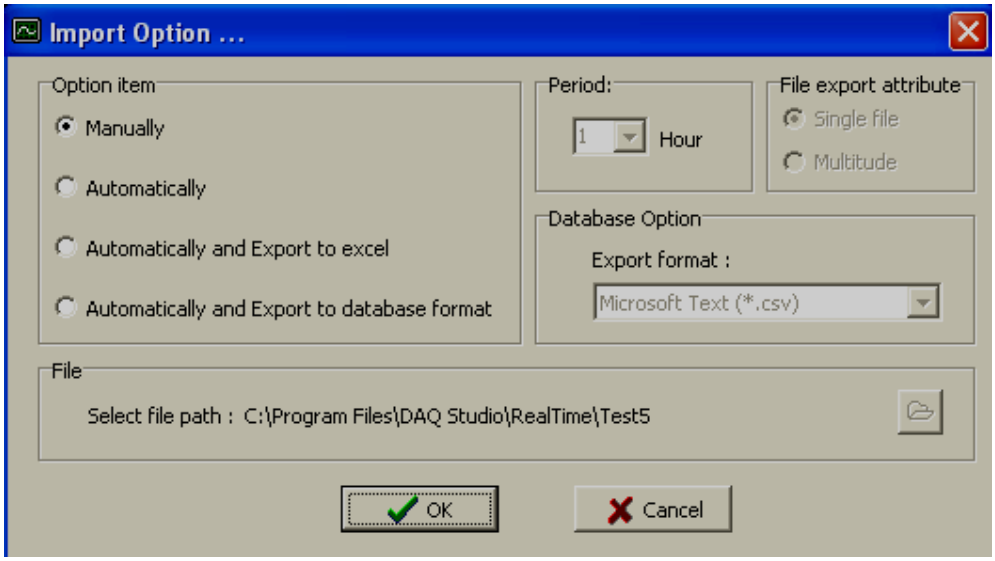


Search: To search historical data by various options



6.4 Import and export options





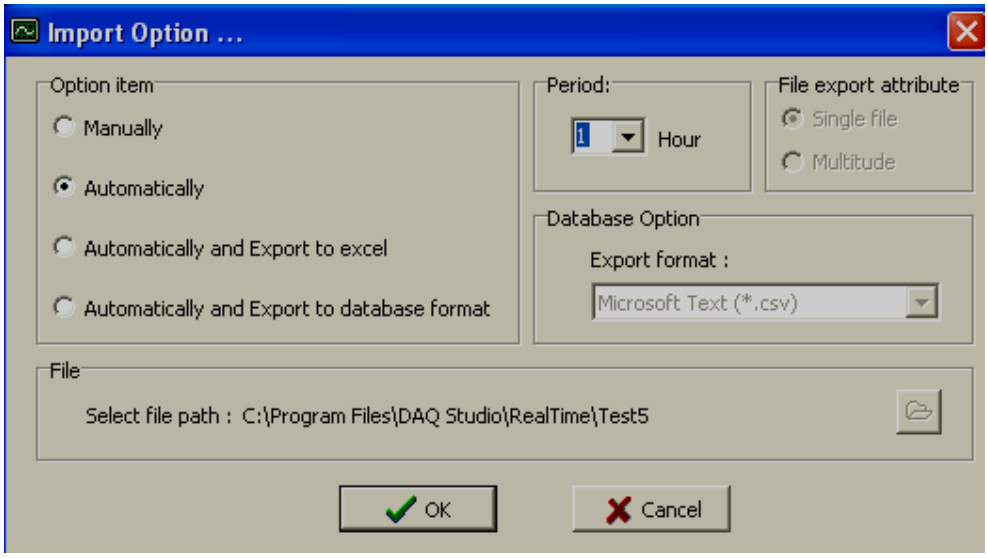
6.4.1 Manually

This is default selection. It is used to import historical data and alarms manually from device to PC. This function is same as click at icon 

Data will be imported from devices like Recorder, HMI etc. to PC and update proprietary database. All database format is proprietary for data security reasons

6.4.2 Automatically

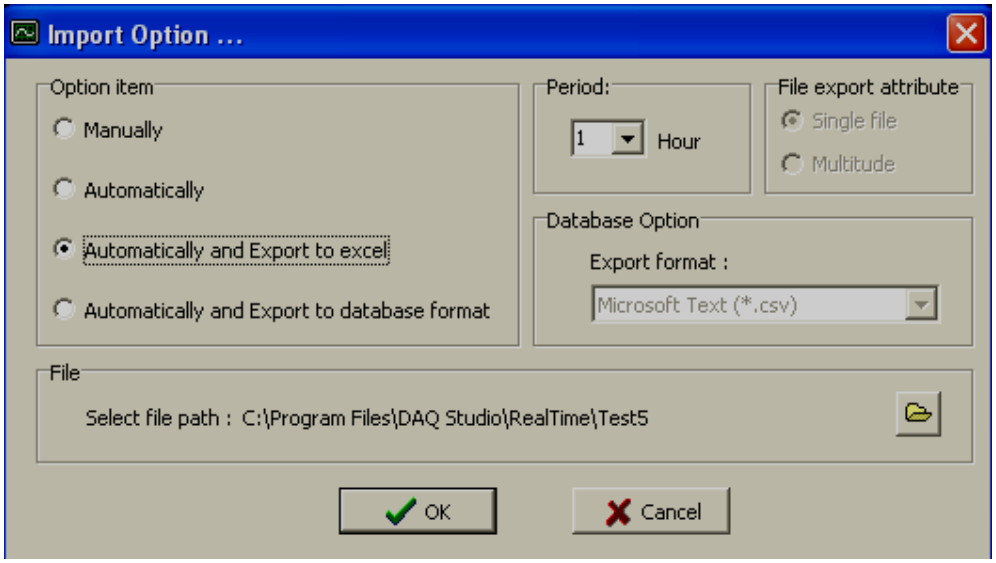
Select this option and select period between 1 to 24 hrs. to automatically import historical data and alarms from device to PC. Automatic works only when device is connected to PC via Ethernet



For ex: If this option is selected, then, data will be imported automatically from devices like Recorder, HMI etc. to PC and update proprietary database. All database format is proprietary for data security reasons

6.4.3 Automatically and export to Excel

Select this option if you wish to import historical data and alarms from device to PC and export to CSV files automatically with preset time interval from 1 to 24 hrs. Remember, the new export will overwrite earlier Excel files. This feature will be useful if you wish to import historical data to other databases. It is required to develop custom applications in third party software to import data from these files and then clear these files if possible.



6.4.4 Automatically and export to database format

Select this option if you wish to import historical data and alarms from device to PC and export to selected format automatically with preset time interval from 1 to 24 hrs. Remember, the new export will overwrite earlier files.

File export attributes

Single file for tags

Each Tag will have one dedicated file.

Multitude

If this option is selected, then, a folder will be created for each 24 hrs and each Tag will have one dedicated file. Ex: Folder name: 201129, year 2011, month = 2, date = 9

6.5 Export data

6.5.1 Export data to Excel

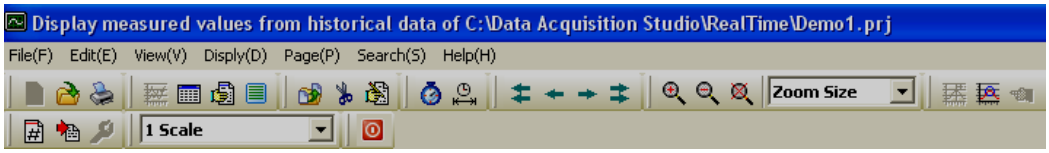
It is to export historical data to Excel files in selected path manually

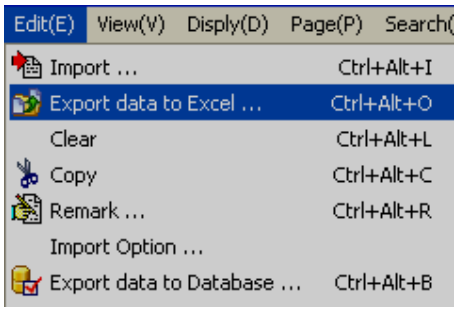
In this case, all the tags will be located in same file(s). For example, if you have 2 tags in the project, all tags will appear in different columns in Excel file as shown below. Two files will be created with names Project name_Pen.csv and Project name_Event.csv

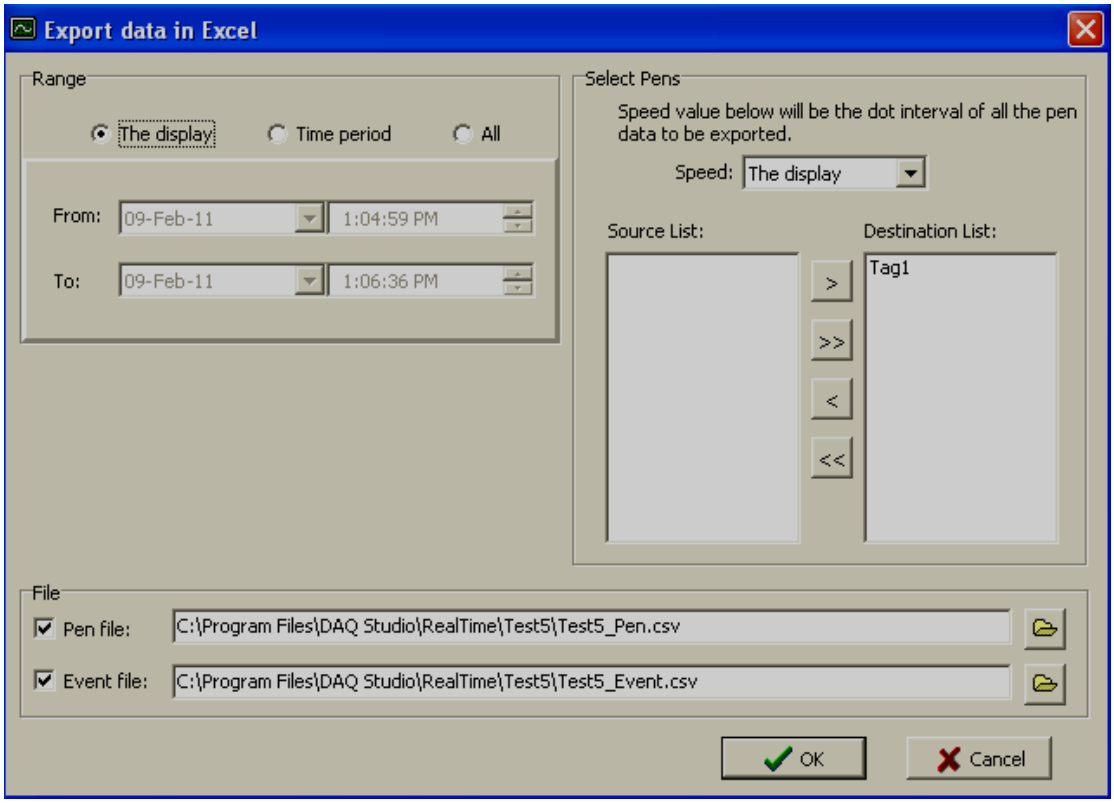
Ex: Test1_Event.csv
Ex: Test1_Pen_csv, Where Test1 is project name

	A	B	C
1	Date/Time	Tag1	Tag2
2		Instant	Instant
3		%	%
4	02-09-11 13:35:54	545.3	507.5
5	02-09-11 13:35:54	546.2	508
6	02-09-11 13:35:54	547.1	508.6

If there is large data, after 65535 rows, it creates new excel file with name Project name (Part X), where X is the file number say 1, 2 etc.







Range

The display: Select this option if it is required to export data specific to display screen (current view).

Time Period: Select this option and enter start data, end date, start time and end time. This is to select historical data with specific time period and then export to excel

All: Select this option if all the historical data needs to export to excel files.

Speed: This is to select resolution for data archival.

100 msec/dot, 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 2 min/dot, 5 min/dot, 10 min/dot, 30 min/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hrs/page, 4 hrs/page, 8 hrs/page, day/page, week/page and month/page

For example: If 1 sec/dot selected, then you can archive data once in a second.

If 1 min/dot selected, then you can archive data once in 1 min

Source List: Tags available for selection for data export

Destination List: Tags already selected for data export

 Move Tag from source to Destination

 Move all Tags from Source to Destination

< Move Tags from Destination to Source

<< Move all Tags from Destination to Source

Pen file: Select path of data files where all the excel files (data) need to be available.

Event file: Select path of event files where all the excel files (event/alarms) to be available.

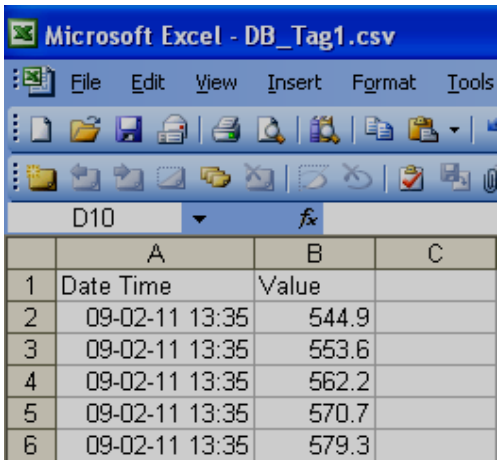
6.5.2 Export data to database

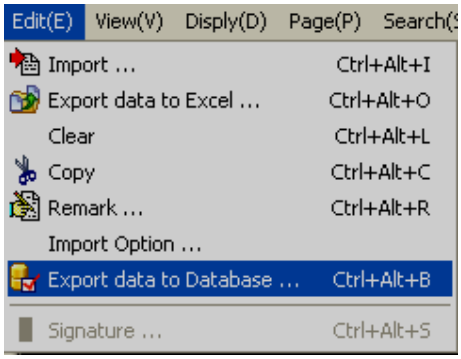
It is to export historical data to database in selected path manually

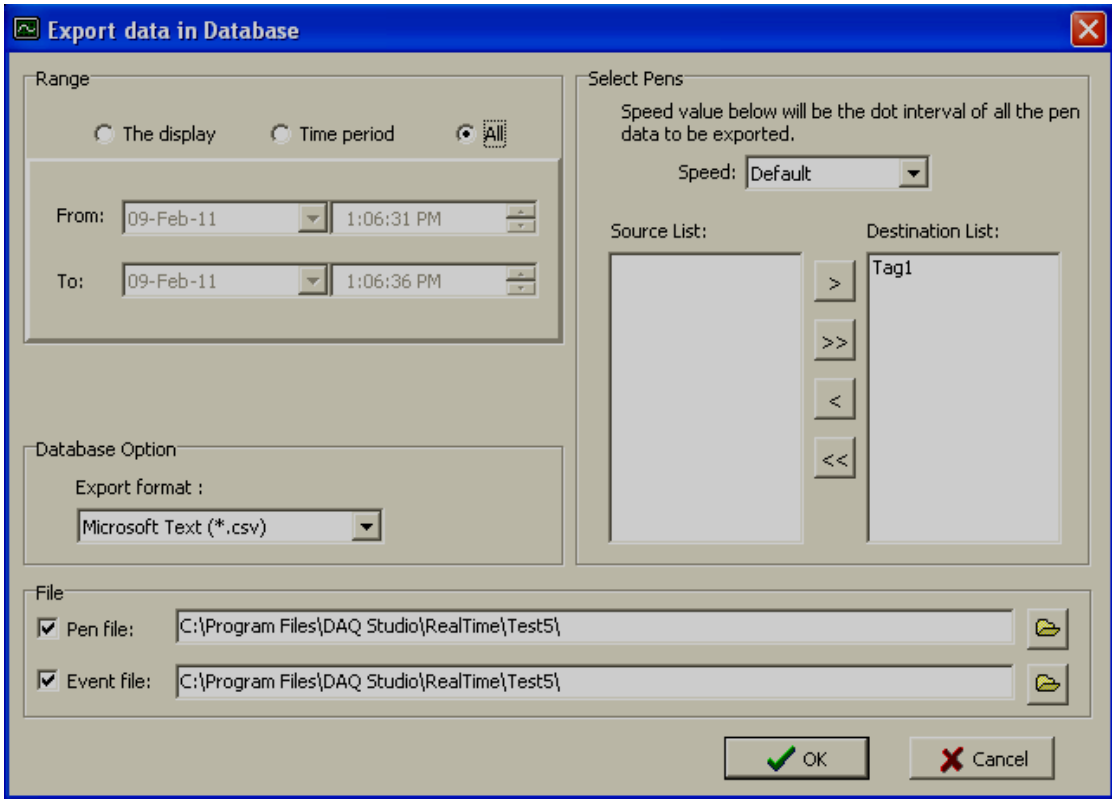
In this case, each tag will have one dedicated file. This is not same as export data to Excel.

For example, if you have 2 tags in the project, 2 files will be created for data itself with names + 1 file for events say alarms

Ex: DB_Tag1.csv, Tag1 data
DB_Tag2.csv, Tag2 data
DB_Event.csv, alarms data



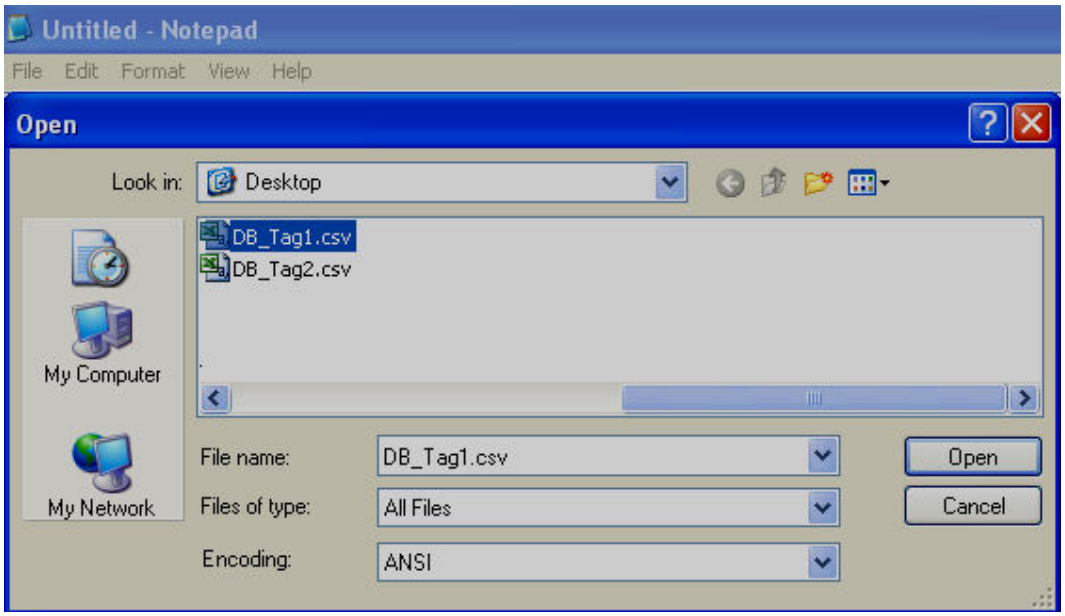




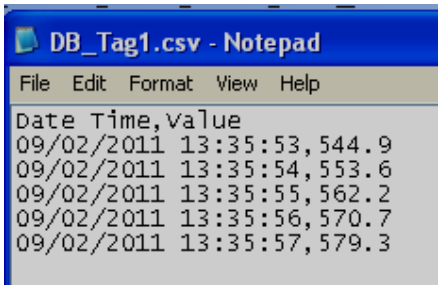
All descriptions are same as in earlier section.

Export format: Currently Microsoft Text (*.CSV) is supported.

These files can be opened from Notepad also and they appear as follows



Select Files of type = “All files” and then, select the path where files are located

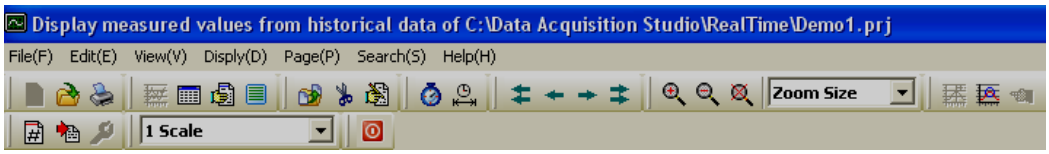


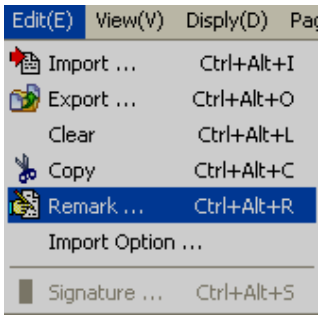
6.5.3 Export data automatically

If you wish to import data from device to PC first and export data automatically, then, select the required options properly at section “Import options”

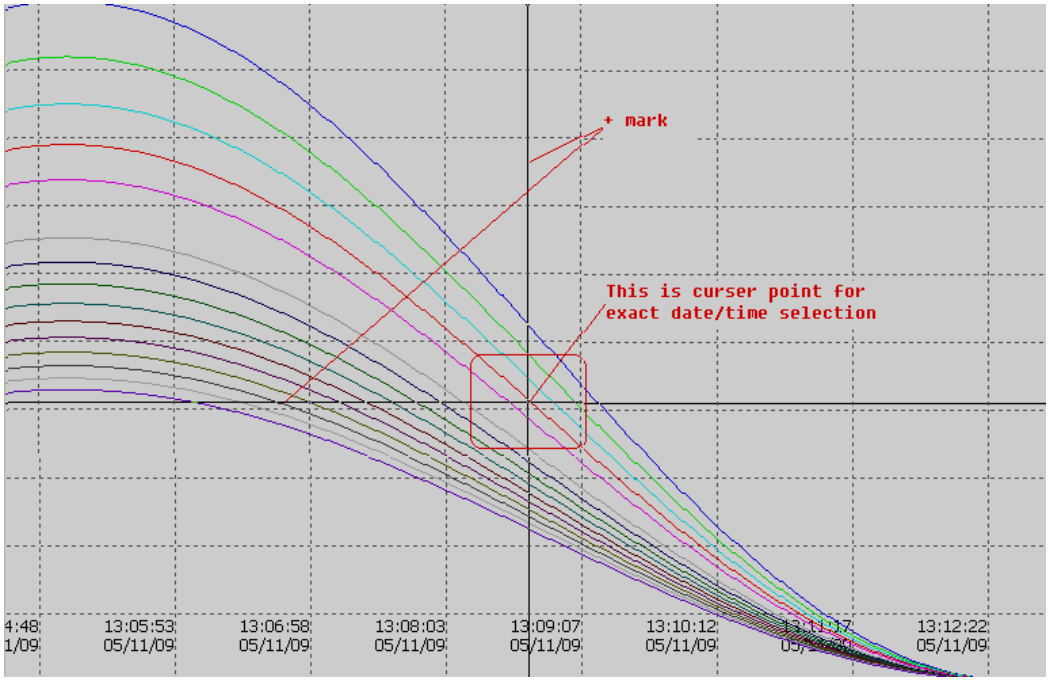
6.6 Remark

This is used to mark comment on data after verification. For example: supervisor checks historical trend and may wishes to mark a comment say “Irregular” at specific date/time. Maximum 40 characters are allowed in each remark.

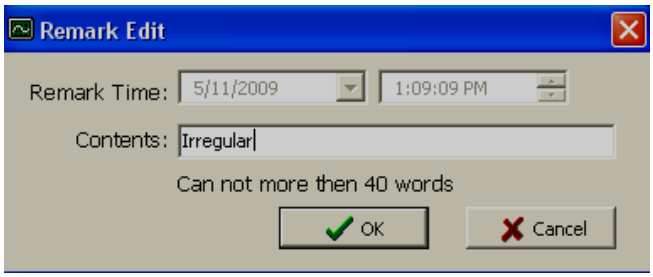




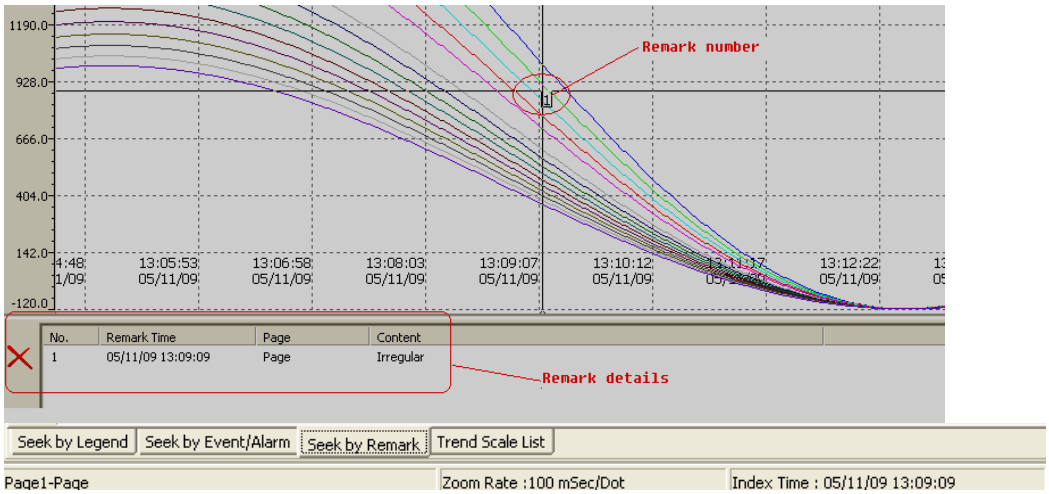
In historical viewer, there is a pointer which moves around the trend for selecting the data. Just use the mouse and left-single click on historical trend, then you can see pointer “+” as shown attached.



Place the pointer at exact date/time required, then in menu, click on “Edit”, then “Remark” and now, it prompts the following.



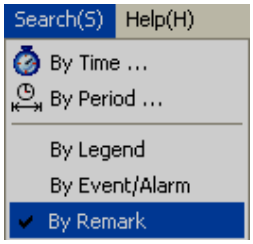
Click on “OK” after writing remark



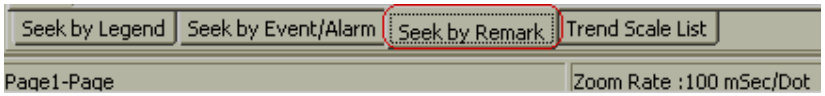
Later, it is possible to search data with respect to above remark by any one of the following ways.

Click on Remark icon 

In Menu, click on “Search”, then select “Remark”

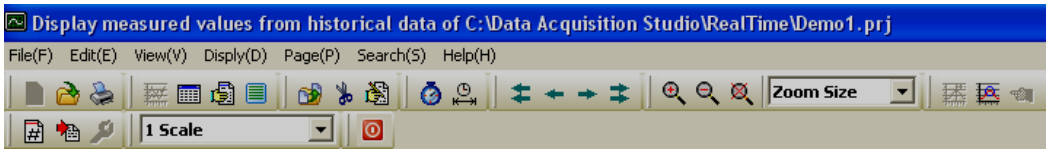


Alternatively, near the task bar at bottom area of the screen, click on “Seek by Remark”



Then, it will show list of Remarks available in a window. Just double click on selected Remark and pointer will navigate to specific remark number automatically at specific date/time.

6.7 View



This is to display trend in monitor with various zoom rate.

Horizontally: To view historical trend horizontally in screen

Vertically: To view historical trend vertically in screen

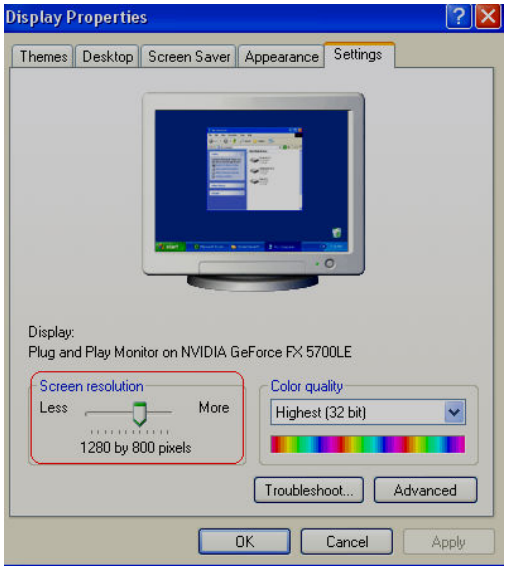
Black background: To set black back ground for historical trend

White background: To set white background for historical trend

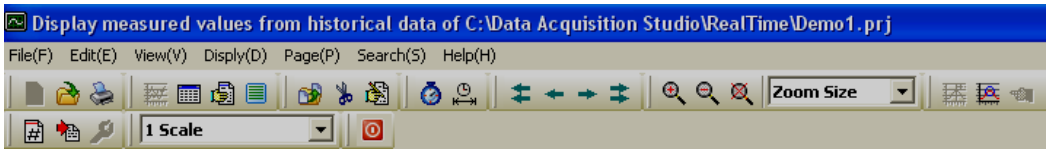
For example: Zoom 1 sec/dot

First check, monitor current display setting

If screen resolution is “1280 X 800” pixels, then you may be able to see data around 900 sec. at right side of the trend, it shows digital values and it occupies remaining pixels.

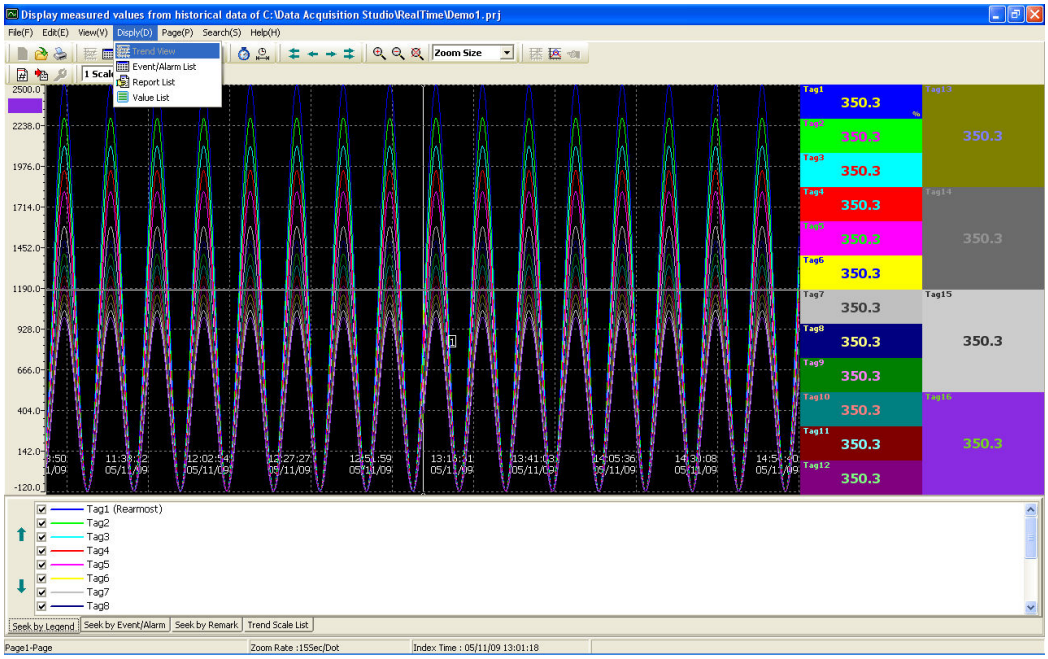


6.8 Display



6.8.1 Trend view

It is to view historical trend

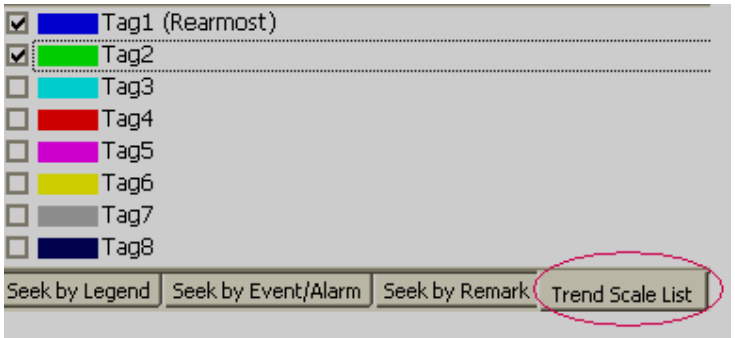


If 24 pens are configured in page1 and if it is required to view only 1 to 8 pens, then select them in window as shown.

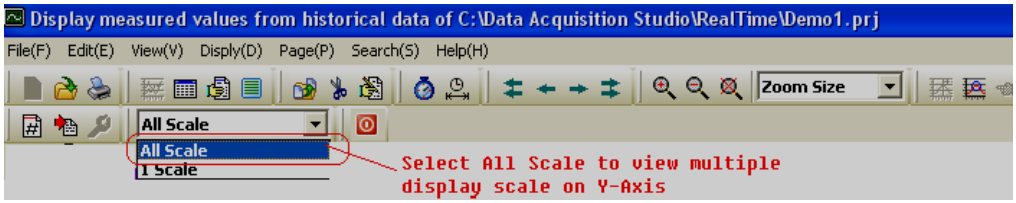
Tag1 scale is -120 to 1000

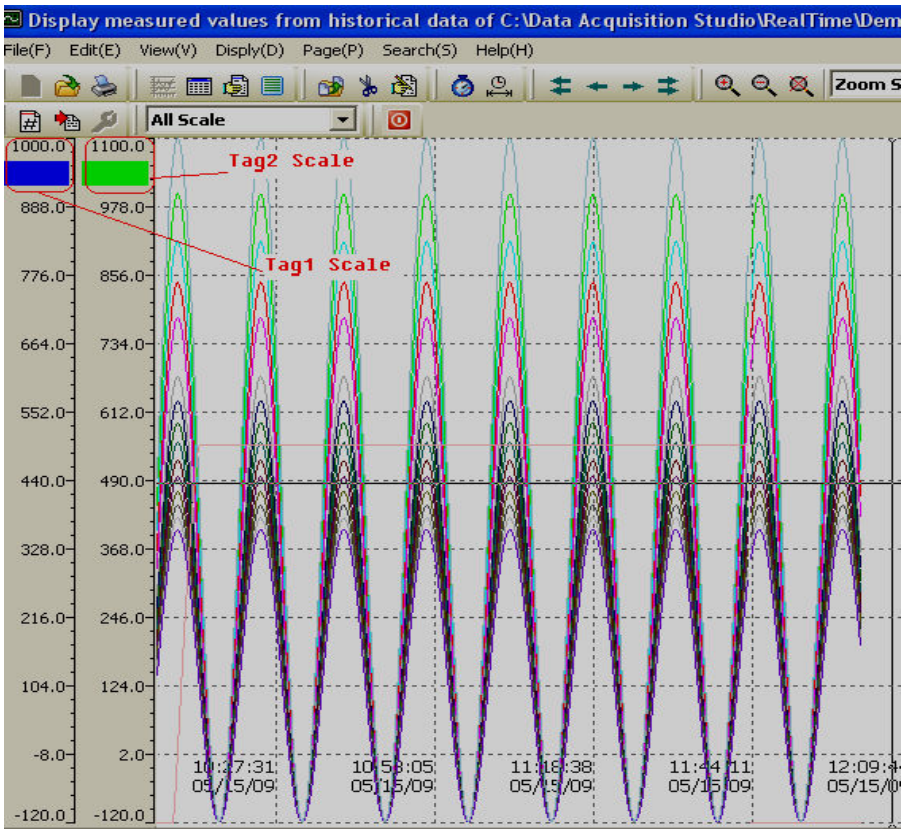
Tag2 scale is -120 to 1100

If it is required to see both the scales, then click on “Trend scale List”, select the required tags.



Select “All Scale” option as shown attached

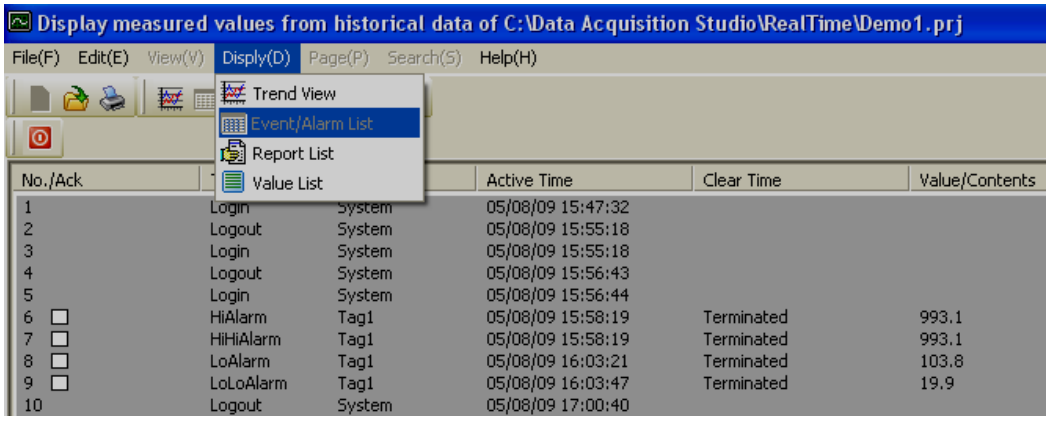




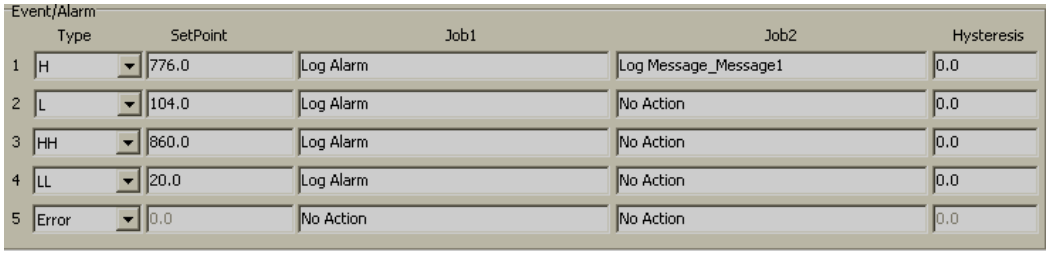
If it is required to change color, width, display scale of specific pen, then do the settings in HMI configuration itself. The settings made at HMI shall be retrieved in historical viewer also. No separate display settings available for Historical viewer.

6.8.2 Events/Alarm List

It is to view list of Events/Alarms



It shows list of Alarms/events as per occurrence of event as per channel configuration.



6.8.3 Reports List (Only for Paperless Recorder)

At present, this is applicable only for Paperless Recorder (Not for HMI)

It is to view list of reports

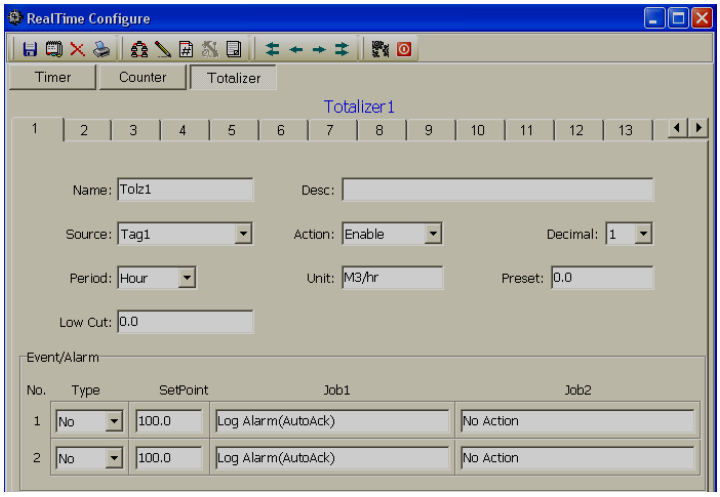
6.8.3.1 Reports Example

A factory operates for 8 hours a day from Monday to Friday, and the staff wish to get the total volume of production from daily, weekly and monthly reports.

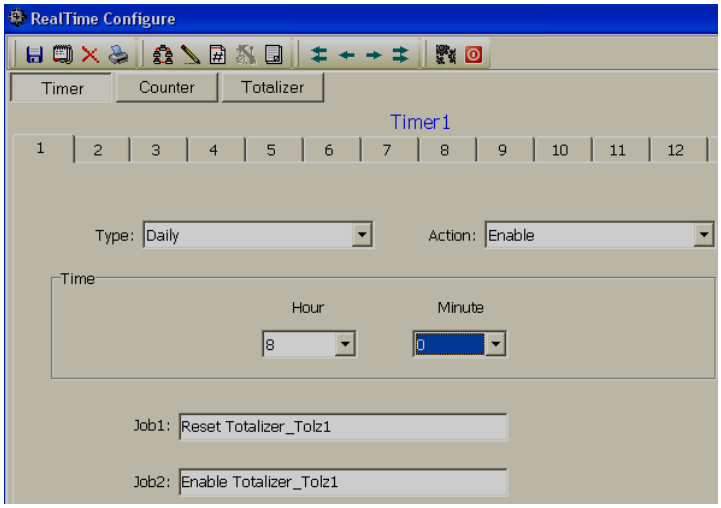
Start totalizer at 8.00 hrs
Stop Totalizer at 17.00 hrs

Source of Process value: Analog input1 (feed rate: 1000 M^3/hr)

Totalizer1 configuration

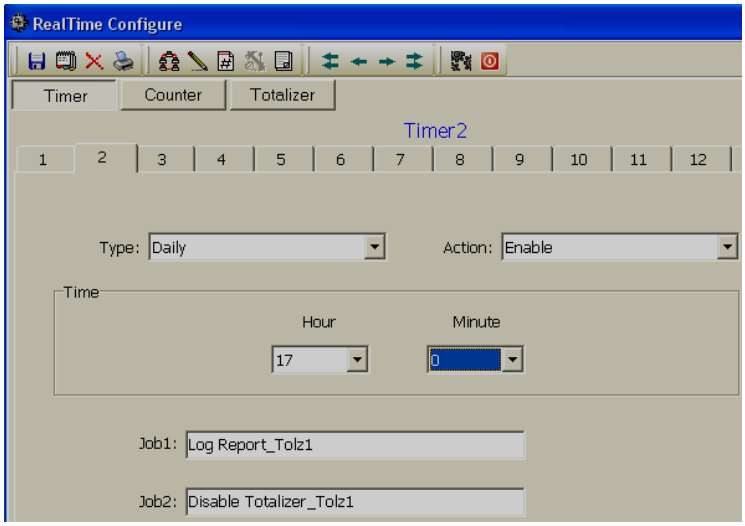


Timer 1 Configuration



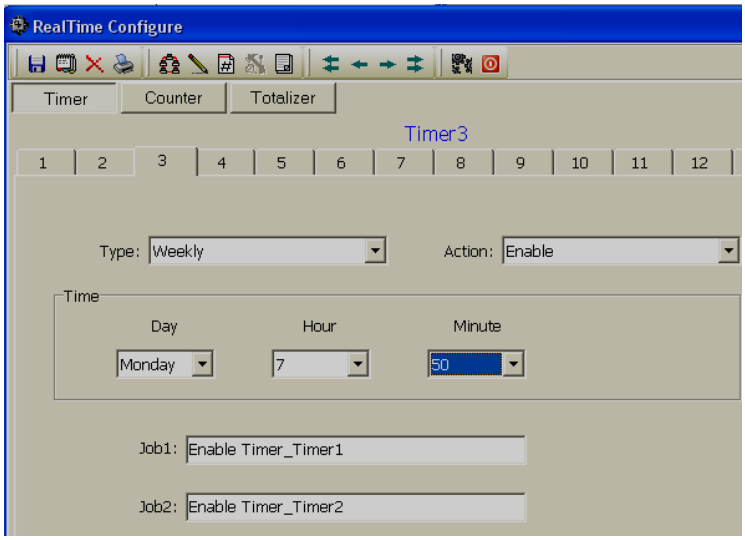
It require to Reset Totalizer at start of totalizing every day to begin recording of new data again

Timer2 Configuration

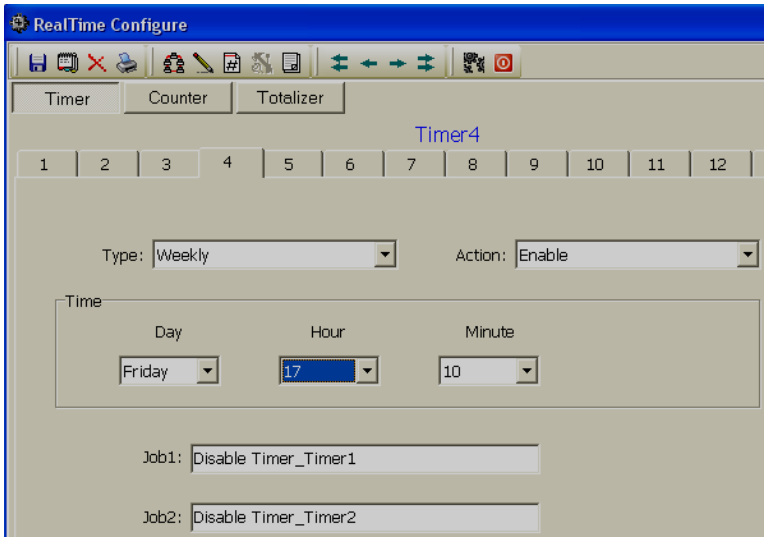


When Log Report function is used, it memorize Totalizer data at specific time which will be used later during reports archival as daily, weekly and monthly basis

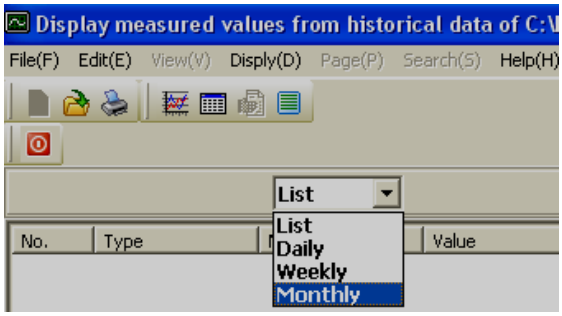
Timer3 Configuration

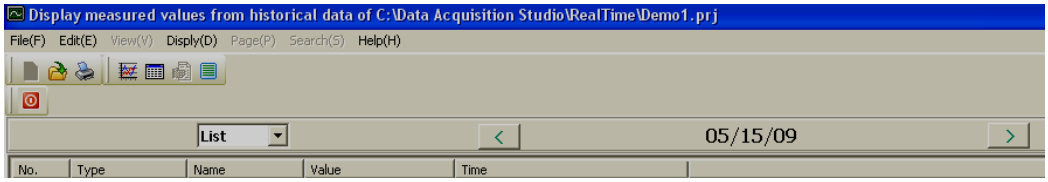


Timer4 Configuration



Now, you can view various reports as follows





List: It lists all the Reports logged with in a day. For ex: three shifts in same day

Daily: Select Daily to list log report for total day. Use < & > soft buttons to navigate reports of other days

Weekly: Select Weekly to list log report for current week (Sunday to Saturday). Use < & > soft buttons to navigate to earlier and next week

Monthly: Select Monthly to list log report for current month. Use < & > soft buttons to navigate to earlier and next months

For ex: 11 may, 2009, Monday, total feed rate is 1000 M^3

12 may, 2009, Monday, total feed rate is 2000 M^3
13 may, 2009, Monday, total feed rate is 3000 M^3
14 may, 2009, Monday, total feed rate is 4000 M^3
15 may, 2009, Monday, total feed rate is 5000 M^3

For the weekly report from May10 to May16, it shows 15000 M^3

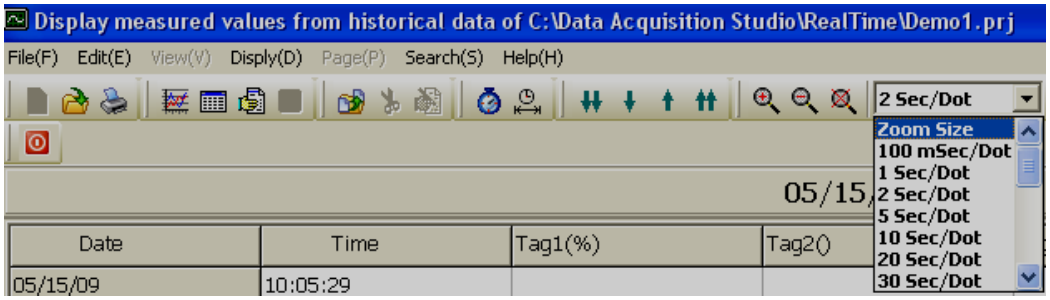
Ex: First week total is 10000 M^3, second week total is 15000 M^3, third week total is 10000 $M^3$and fourth week total is 12000 M^3, then in the monthly report, it will show a total of 47000 M^3

6.8.4 Value List

It is to view data in tabular column

05/12/09 07:59:44 ~ 05/12/09 16:20:01

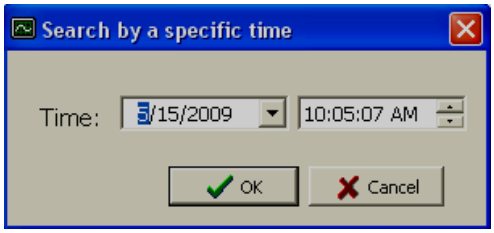
Date	Time	Tag1(%)	Tag2()	Tag3()	Tag4()
05/12/09	14:28:36	897.5	897.5	897.5	897.5
05/12/09	14:28:03	961.0	961.0	961.0	961.0
05/12/09	14:27:31	995.4	995.4	995.4	995.4
05/12/09	14:26:59	996.6	996.6	996.6	996.6
05/12/09	14:26:26	964.5	964.5	964.5	964.5
05/12/09	14:25:54	903.2	903.2	903.2	903.2
05/12/09	14:25:21	812.1	812.1	812.1	812.1
05/12/09	14:24:49	702.4	702.4	702.4	702.4
05/12/09	14:24:16	577.8	577.8	577.8	577.8
05/12/09	14:23:44	440.9	440.9	440.9	440.9
05/12/09	14:23:11	308.2	308.2	308.2	308.2
05/12/09	14:22:39	179.1	179.1	179.1	179.1
05/12/09	14:22:06	69.2	69.2	69.2	69.2
05/12/09	14:21:34	-19.7	-19.7	-19.7	-19.7
05/12/09	14:21:02	-83.9	-83.9	-83.9	-83.9
05/12/09	14:20:29	-115.9	-115.9	-115.9	-115.9
05/12/09	14:19:57	-116.1	-116.1	-116.1	-116.1
05/12/09	14:19:24	-83.2	-83.2	-83.2	-83.2



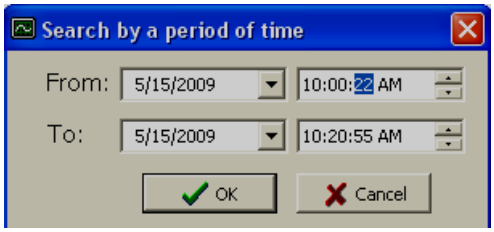
Various Zoom rates are available for selection

100 msec/dot, 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 2 min/dot, 5 min/dot, 10 min/dot, 30 min/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hr/page, 4 hr/page, 8 hr/page, day/page, week/page and month/page

 Search by specific time

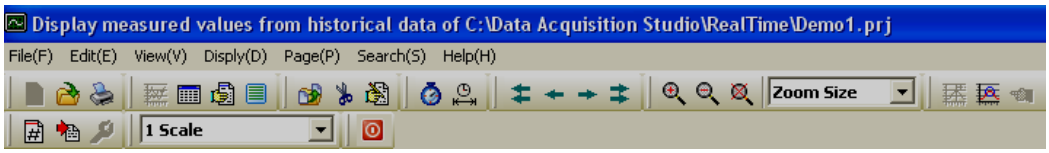


 Search by a period of time



 These are for navigation of pointer in tabular column fast backward, backward, forward and fast forward.

6.9 Page Selection



In Menu, click on “Page” and then select the required page.

Number of pages available for display depends on configuration of display pages in Real time.

Maximum 200 display pages are available and maximum 24 pens (channels) can be configured in each page.

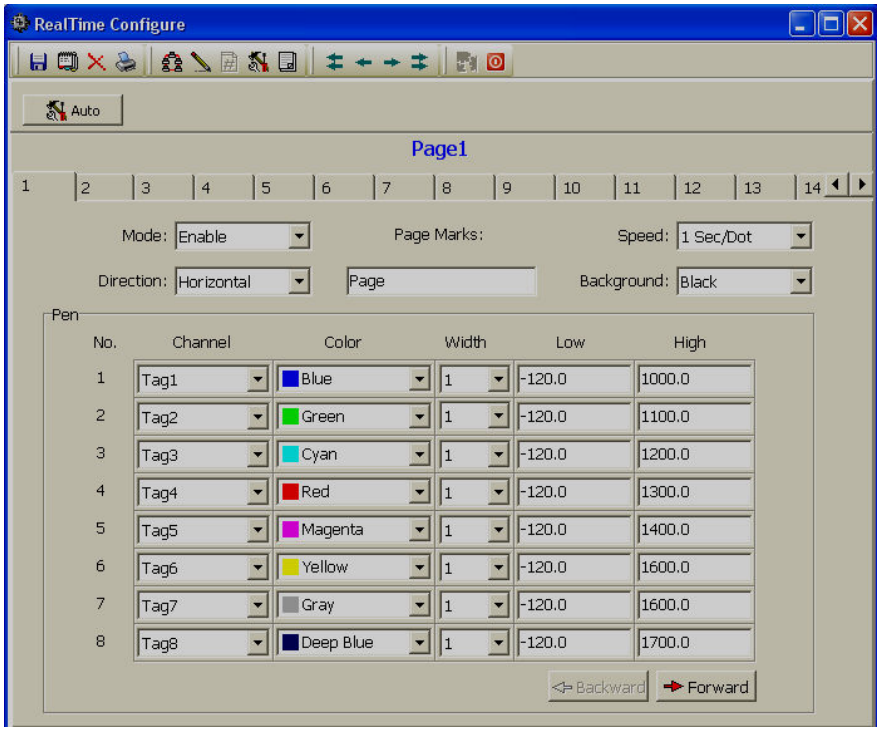


Fig: Display pages configuration in Real time.

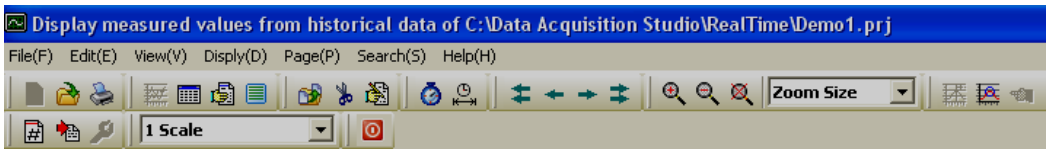
Note: In Mode, if “Disable” is selected, then page will be not visible in either Real time viewer or Historical viewer.

6.10 Search

It is to search data and then take print out of trend if required.

Data can be searched with following criteria.

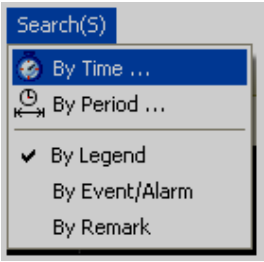
By Time
By Period of Time
Seek by Tag Name
Seek by Event/Alarm
Seek by Remark



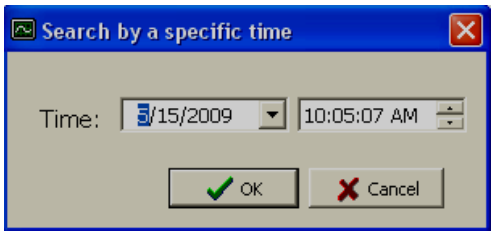
6.10.1 By Time

It is to search data by specifying exact date and time

Click on  icon for search by specific time, alternatively, in Menu, click on “Search” and then Select “By Time”.



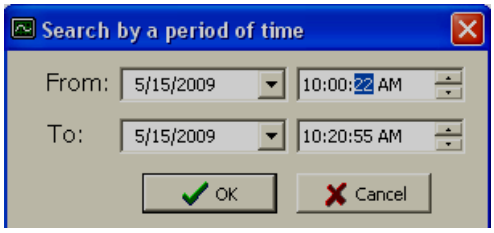
Enter the required date and time of the data to be searched and click on “OK”, then pointer in trend will go to specified date/time.



6.10.2 Period of Time

It is to search data specifying time interval

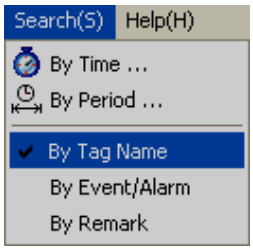
Click on  icon to search data by a period of time, alternatively, click on “Menu”, then select “By period”.



Enter Start date, end date, start time and end time for the data to be searched and click on “OK”, then it displays trend in specified range. To take print, click on Print icon  to open Print viewer and then click on  for printing the trend

6.10.3 By Tag Name

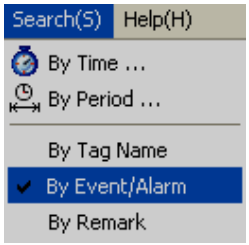
It is to select specific trend for display. For example: You have configured 8 tags in page no.1, to check tag1 clearly, you wish to see only trend1. Then, select this option and select the required tag.

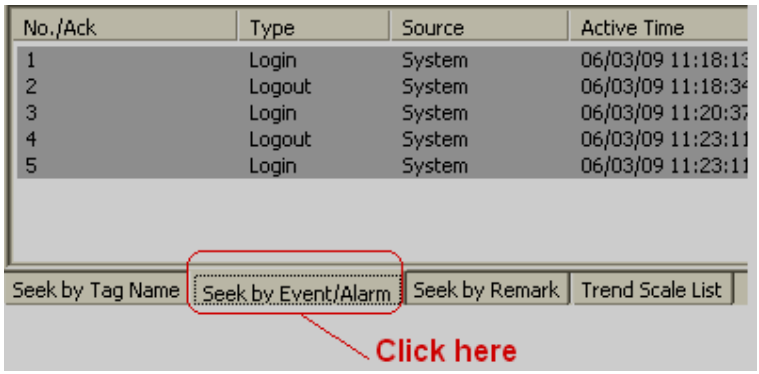


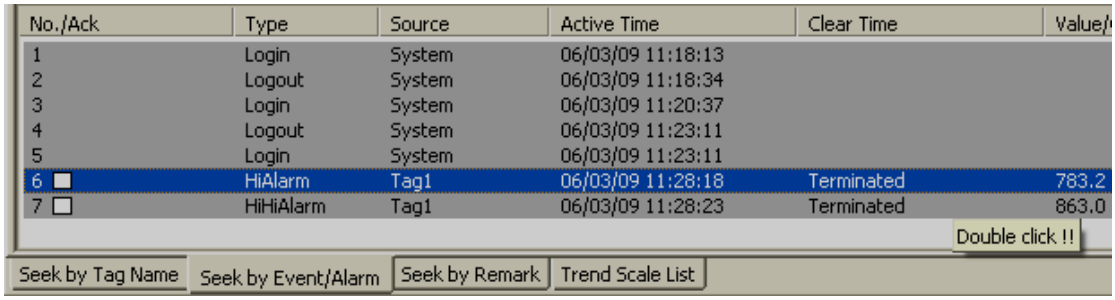
Click on “Seek by TagName”, and then select the required Tag to display in trend. If it requires viewing display scale, click on “Trend scale list” and select the required tag.

6.10.4 By Alarm/Event

It is to view and point to data based on selected event.



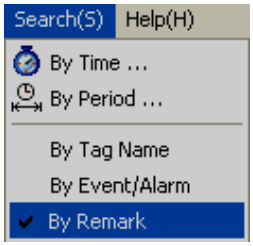


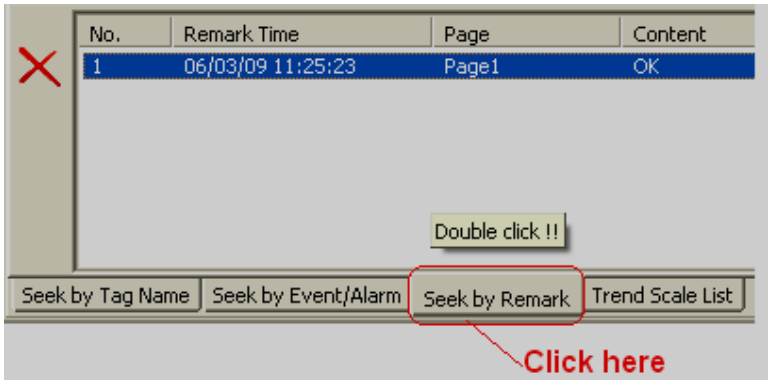


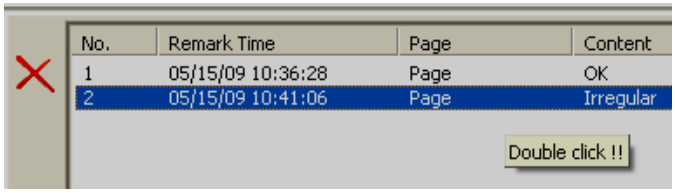
Select the required event/Alarm, then double click on it. Then, pointer in the trend will move to specific time at which event/Alarm is triggered.

6.10.5 By Remark

It is to view and point to data based on selected Remark.





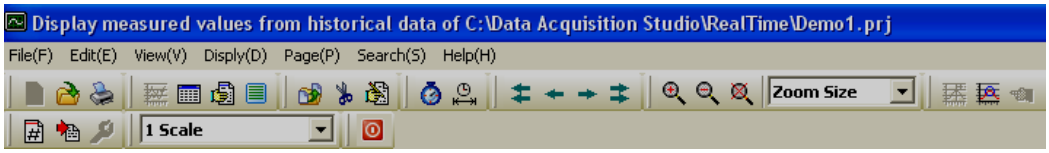


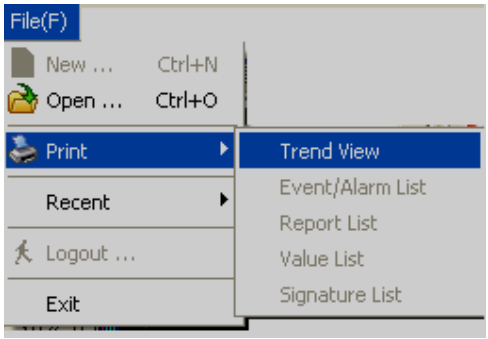
All the list of Remarks will be shown in window at the bottom side of the screen as shown above. Select the Remark and double click. Then, pointer in trend will go to data where specific remark is marked earlier.

6.11 Print

It is to print Trends, Events/Alarms, Reports, Process Values etc.

First it requires to search the historical data as explained in earlier section and then click on Print icon, it open Print preview first and then click Print icon again to take print out.





7. Frequently asked questions

1. What is the difference between Data acquisition studio and IO studio software?

   IO Studio software is a tool used for configuration of IO module from PC and it is also used for IO module diagnostics purpose. It is not for Real time Data logging and archival. Real time viewer is for data logging and archival

2. What is the difference between Observer software, Communicator software and DAQ software?

   Observer software is used for Paperless Recorder

   Communicator software is used for Temperature Controllers

   DAQ software is used for IO modules, Paperless Recorders and Controllers

   DAQ software is similar to Observer software but with additional features. Please check section 1.3 for details information about features available with DAQ software

3. Can I open IO Studio and Real Time viewer at same time in PC?

   No. First open IO studio software for configuration of IO module. Close IO studio software and then open Real Time viewer

4. Can I open Observer software and DAQ software simultaneously in single PC?

   No, it is not possible. It may conflict some of resources and it may generate some error messages.

   It is not required to run Observer software and Data acquisition software simultaneously in same PC as Data acquisition software also covers paperless Recorders and Controllers shortly along with IO modules. In this case, it just need to uninstall Observer software and install data acquisition software

5. I want to run DAQ-Real time viewer in 3 different computers. Do I need to buy 3 nos. hardware lock?

   Yes. It is required to buy 3 nos. USB based hardware lock (Keypro). This is license to use Data acquisition software in single PC. With out this hardware lock, data acquisition software will run in demo mode for 1 hr

6. I have only COM port in PC, I don't have USB port. How I can run DAQ software?

   It requires another PC with USB port. Serial port based hardware lock is not available

7. I want to run Real Time viewer in single PC. I want to view historical data in other 2 computers in LAN. How many hardware locks I need to buy?

It requires purchase of single hardware lock for Real Time Viewer. It is not required to have hardware lock (Keypro) to view historical data in another computers via LAN

8. Can I connect DAQ software to third party devices via Modbus?

   Yes, it is possible

9. Can I connect Recorder/Controllers to DAQ software?

   Yes, it is possible

10. Can I send email from DAQ software?

    Yes, it is possible

11. I want to search data and then export data to excel. Is it possible?

    Yes, it is possible

12. Can I display Real time trends, digital values, bar graphs using DAQ software?

    Yes, it is possible

13. How many trends I can view in single page and how many display pages are available?

    24 pens/page and maximum 200 display pages

14. Can I exchange data from DAQ to another PC? How it is done?

    Use Dynamic data exchange (DDE)

15. Can I switch on Digital Outputs from DAQ software?

    If Digital Output cards like 8DIO, 4RO, 16DO is available in network, and then you will be able to switch on digital outputs based on events

16. Can I include customized mimics into DAQ software?

    No, it is not possible

17. Can I take print out of trends, digital values etc., from DAQ software?

    Yes, it is possible

18. Can I write a formula for computation?

    Yes, you can use Math channels and write formula

19. Do you have internal timers, counters, Totalizers etc., in DAQ software?

    There are 100 timers, 50 counters and 50 Totalizers in DAQ software

20. I want to control the pump based on Real time clock. Is it possible in DAQ?

    Yes, you can use Timer and select type as Daily and then configure start and stop time

21. Can I configure Alarms in DAQ software?

    Yes, it is possible

22. How many Tags supported in DAQ software?

    Maximum 2048 including external and internal memory from DAQ 1.2 onwards

23. What is Tag?

    It is a channel. Ex: AI, AO, DI, DO, Math etc..

24. Can I log report of counter values in digital IO module?

    Yes, you can use 16DI and it support till 1 KHz. You can display counter values of 16DI module in DAQ software in future

25. I wish to see both Real time and historical combined. Is it possible?
    If Real time viewer, Select configuration and adjust display settings say day/page, then Real trend will show last 24 hrs display

26. I want to receive alarms by SMS. Is it possible?
    In this case, select Analog output module like IO-8AOI and then connect with GSM controller. Then, you can receive alarms by SMS.

BrainChild

Brainchild Electronic Co., Ltd.
No. 209, Chung Yang Road, Nan Kang Dist., Taipei, Taiwan, R. O. C.
Tel: 886-2-27861299 Fax: 886-2-27861395
E-mail: sales@brainchild.com.tw
Technical support: service@brainchild.com.tw
Website: http://www.brainchild.com.tw