Experiment No - 1

Aim:- Debugging a VI, sub VI's

Software used:- Lab View

Theory:- Program subroutines are termed as VIs each VI has 3 components:-

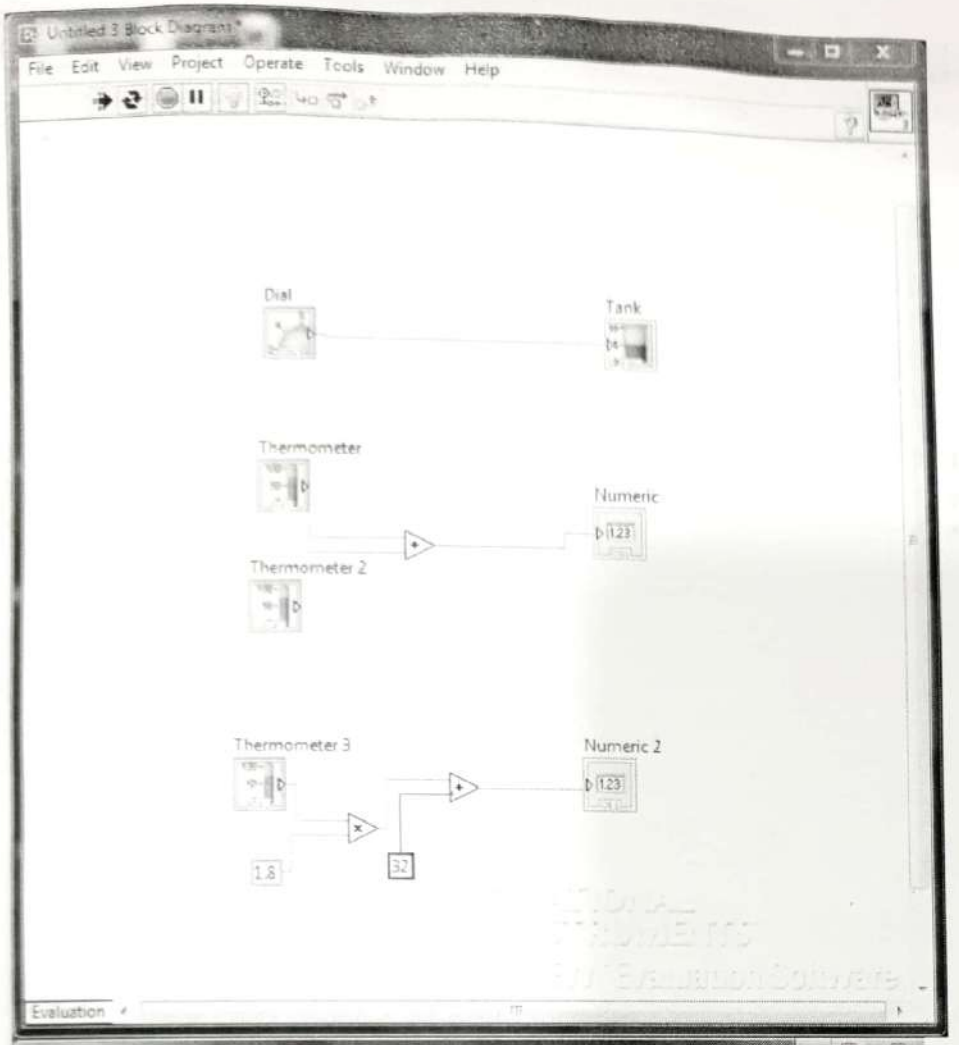
1) Block Diagram
2) Front Panel
3) Connector Panel

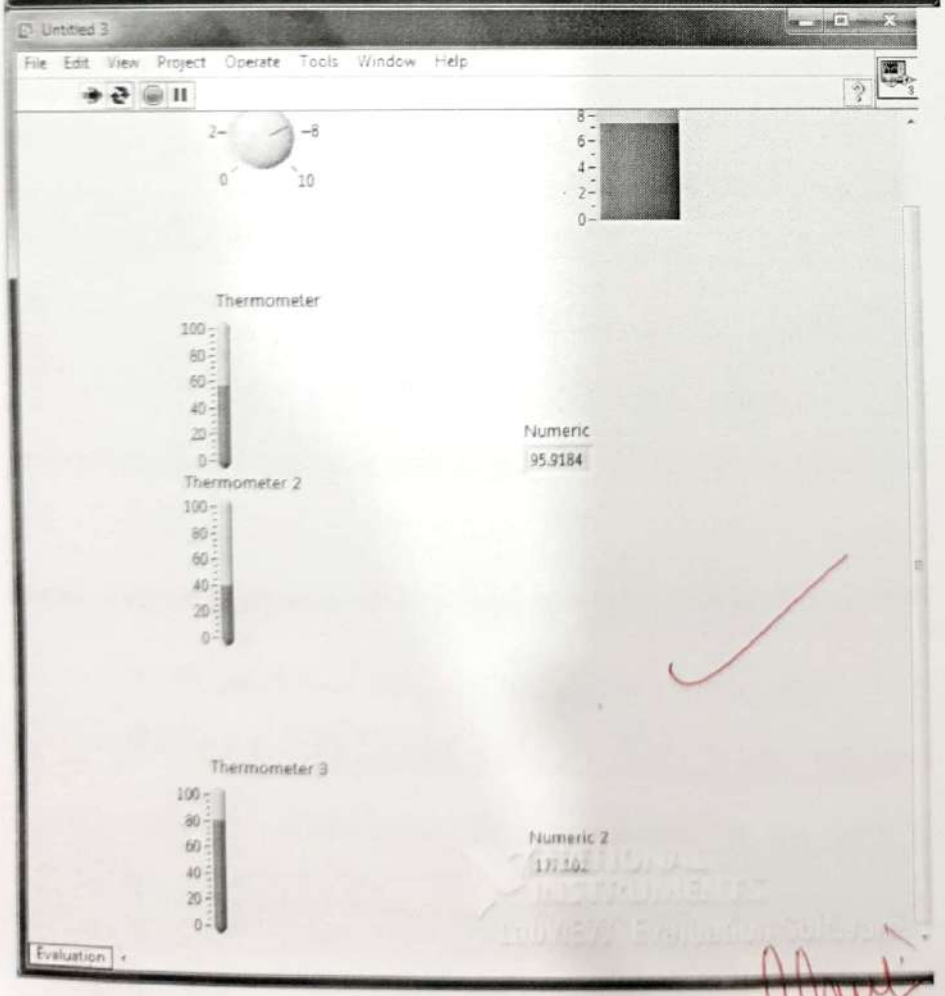
Front Panel:- It is made by using controls and indicators. Block diagram includes objects such as terminals. Sub VI's functions, constant structures & wires which transfer data.

While Loop:- It is a control flow statement used to execute a block diagram of the sub-diagram code repeatedly until a given boolean condition is not true

DBL numeric constant is used to pass a double precision floating point numeric value to the block diagram.

Conclusion:- Sub VI's were created for temperature & level measurement & debugged the VI.


Untitled 3 Block Diagram*
File Edit View Project Operate Tools Window Help
Dial
Tank
Thermometer
Numeric
Thermometer 2
Thermometer 3
Numeric 2
1.8
32
Evaluation


Untitled 3
File Edit View Project Operate Tools Window Help
Thermometer
Numeric
95.9184
Thermometer 2
Thermometer 3
Numeric 2
Evaluation

Experiment No 2

Aim :- LabView - Traffic light + programming structure, arrays, clusters

Software used : LabView

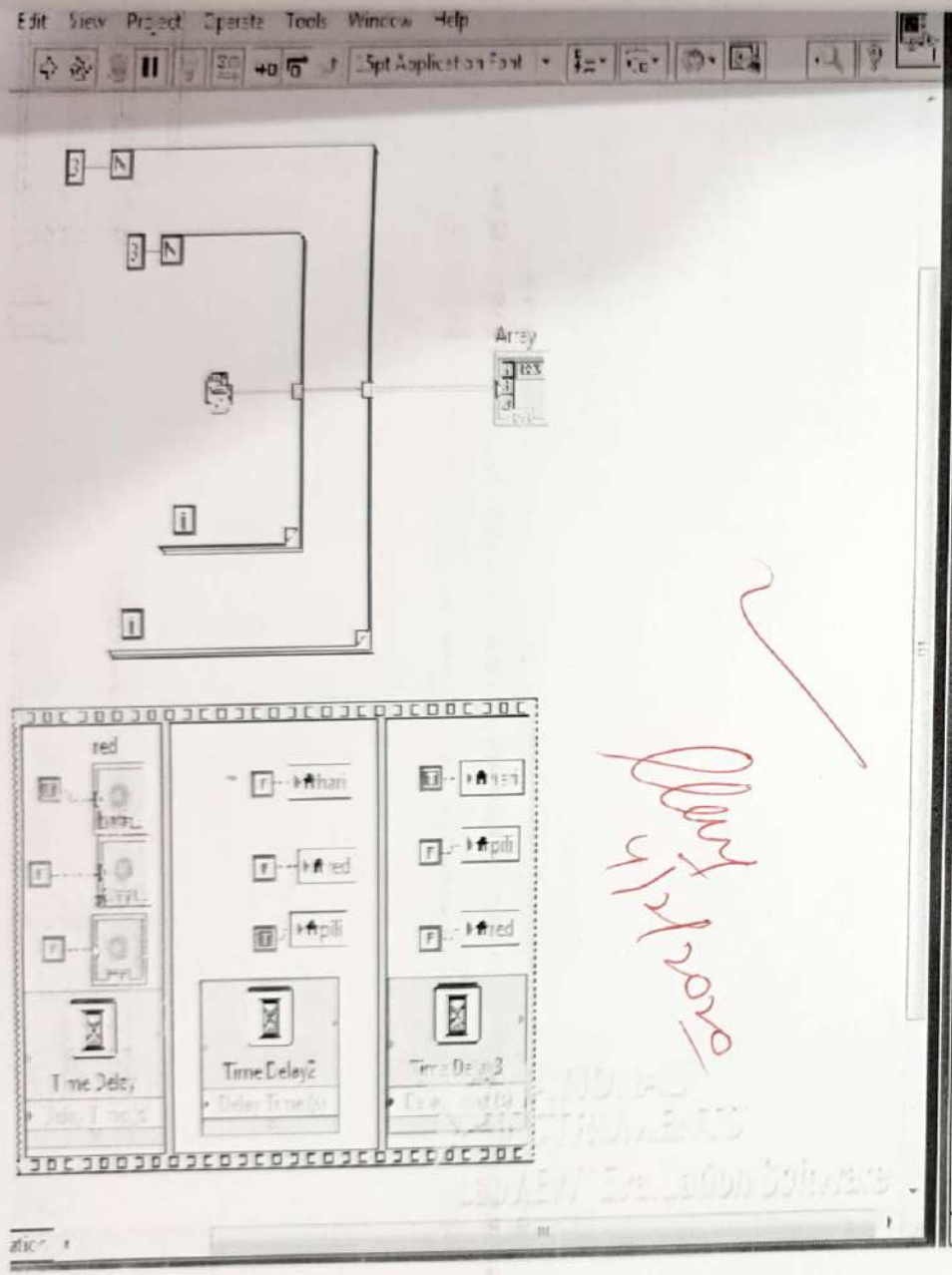
Theory :- Traffic light :- It is an optical signalling devices indicates different signal related to traffic, rail, ~~ro~~ naval etc. It aims at traffic safety.

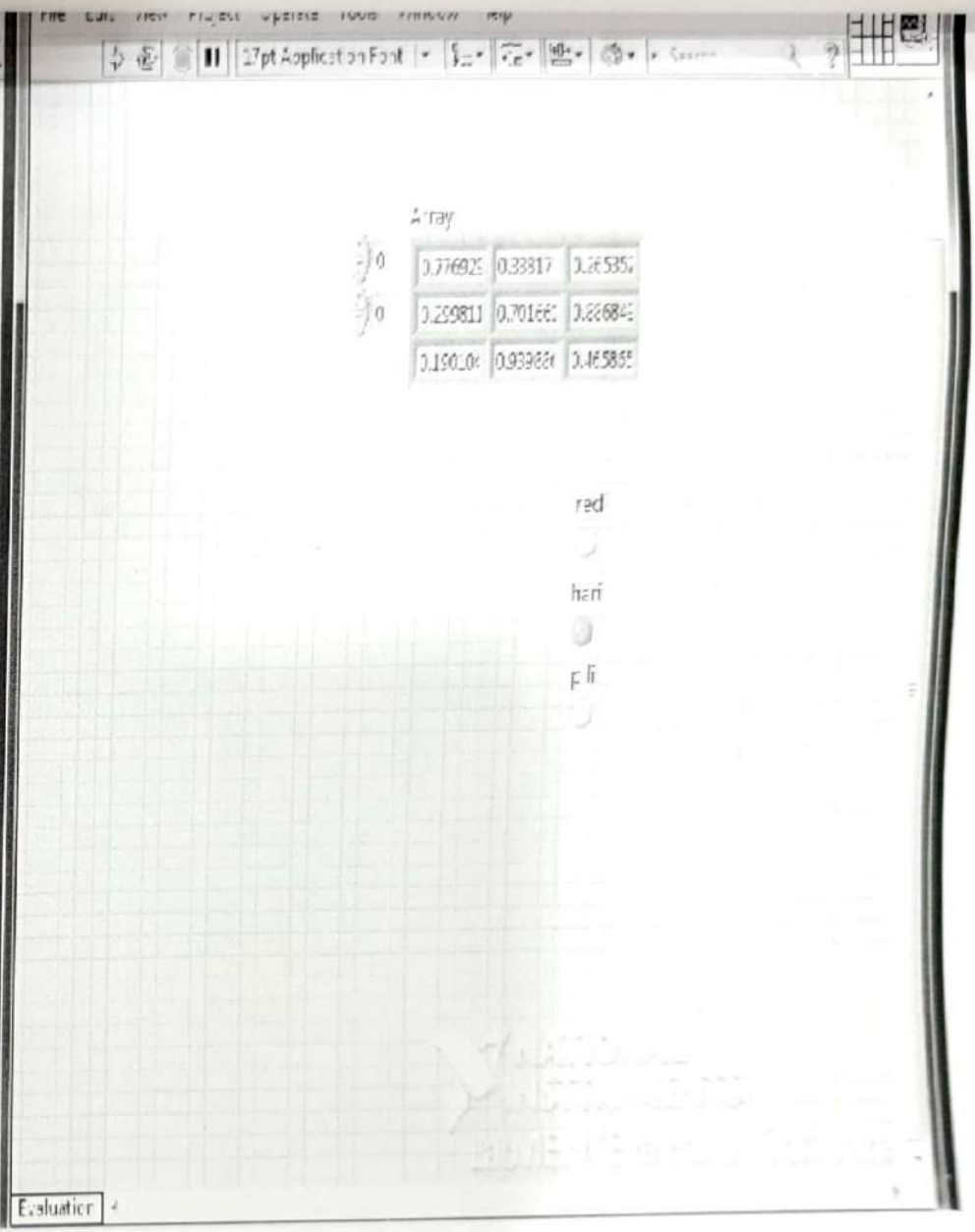
Programming Structure :- programs & can run depending on the value of variables. Structure can be found in LabView structure pallet. You need to draw the cases are for both true & false values.

Arrays :- These functions are used to create & manipulate arrays. You can perform common array operations such as extracting individual data element from an array, inserting, deleting or replacing data elements.

Clusters :- They group data elements of mixed types. eg :- Error cluster in LabView.

Result :- Traffic lights using structures, clusters & arrays were implemented successfully.


Edit View Project Operate Tools Window Help
Array
red
than
red
pili
pili
red
Time Delay
Time Delay2
Time Delay3


Array
red
hari
pili
Evaluation

Experiment NO-3

Aim :- LabView - Waveform Measurement

Software used :- LabView 2018

Theory :- Express VIs

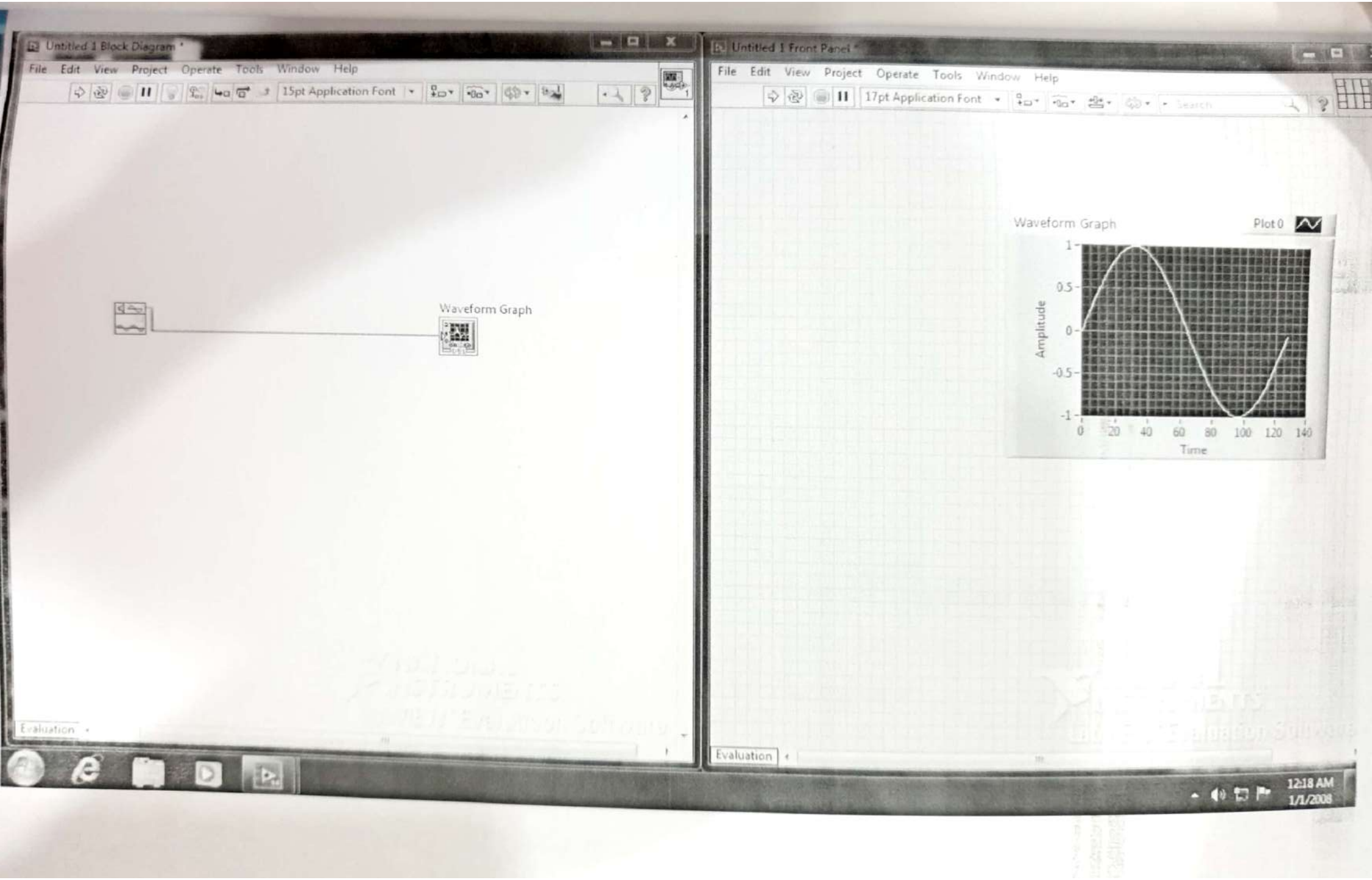
The express VI is a VI whose setting you can configure interactively through a dialog box. Express VIs appear on block diagram as expandable nodes with icons successfully by a blue field. A parameter can be configured and expanded from both locations.

Front Panel : it is the user interface of the VI.

Block Diagram :- It includes terminals, functions, constants, structures and wire which can transfer data among block diagram objects.

Waveform graph :- it displays one or more plots of evenly spaced measurements. The waveform graph plot of evenly spaced sample measurements.

Result :- Different waveforms were studied and generated.


Untitled 1 Block Diagram *
File Edit View Project Operate Tools Window Help
15pt Application Font
Waveform Graph
Evaluation
Untitled 1 Front Panel *
File Edit View Project Operate Tools Window Help
17pt Application Font
Waveform Graph
Plot 0
Amplitude
1
0.5
0
-0.5
-1
0 20 40 60 80 100 120 140
Time
Evaluation
12:18 AM
1/1/2008

Experiment NO - 4

Aim :- Strain & Temperature measurement with NI DAQ cards using LabView.

Software Used :- LabView

Theory :- **Temperature Measurement**

It is one of the most common types of physical measurements. Depending upon the desired accuracy, range and expense, we have several sensors options for measuring temp.

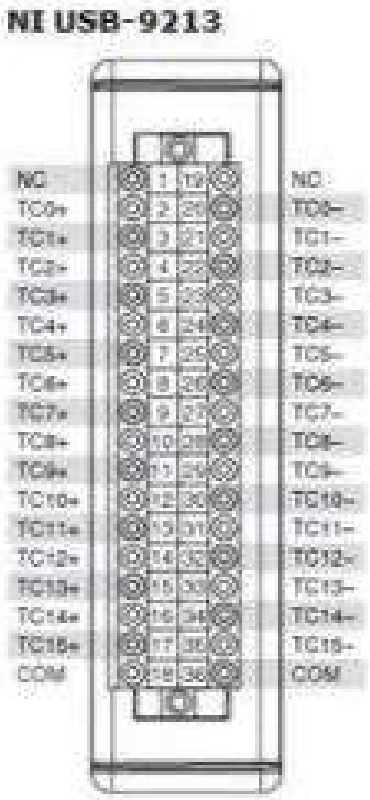
By using NI - USB - 9213

Strain Measurement :-

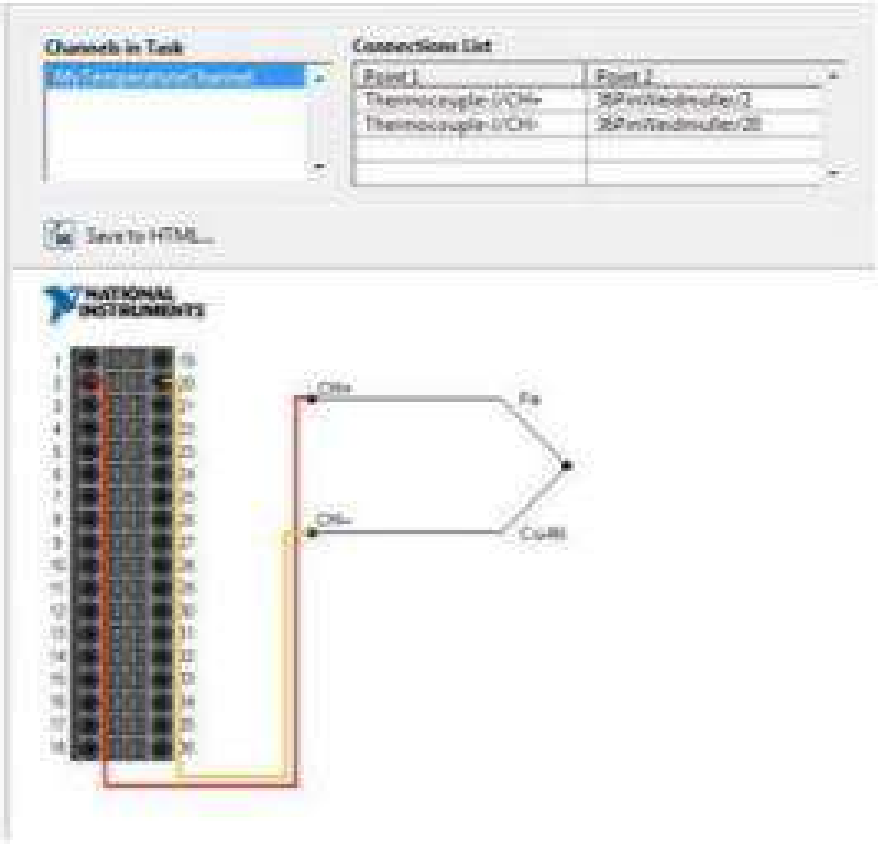
Strain gauge are fundamental sensing devices that function as the building blocks of many other types of transducers, including pressure, load & torque extensively in structural test & monitoring applications.

Result :- We have successfully measured strain and temperature with NI DAQ cards using LabView

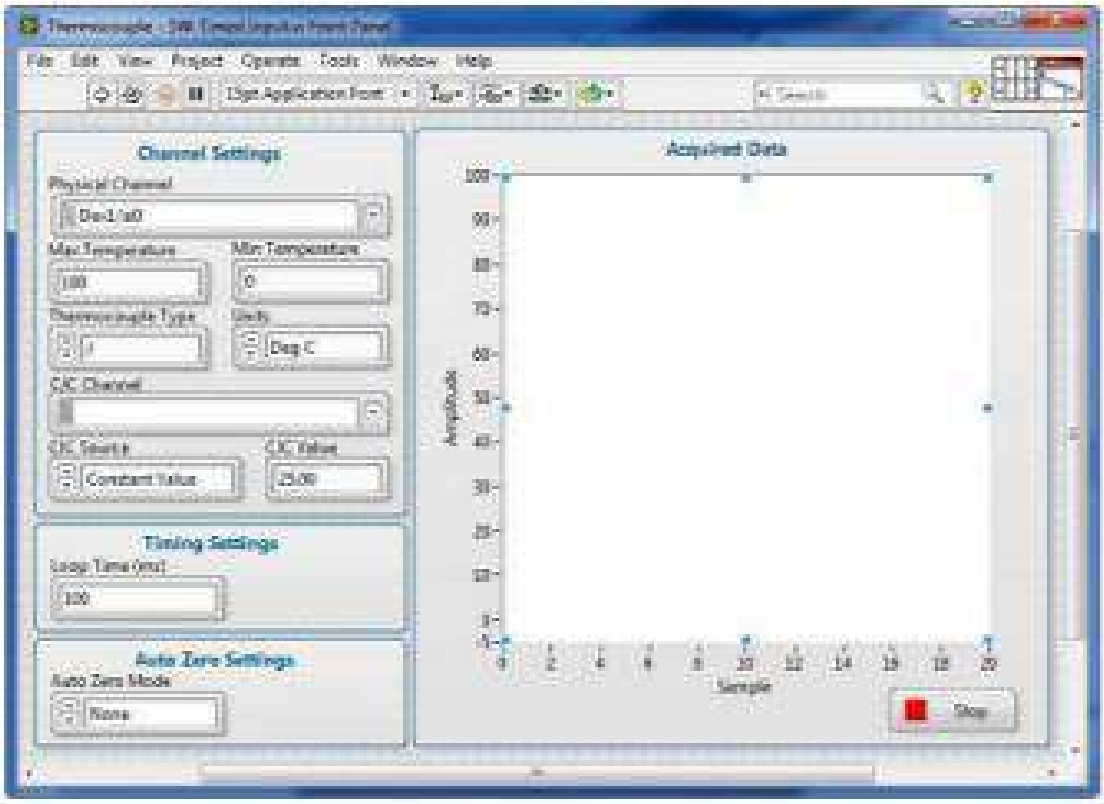
A) Temperature Measurement using Thermocouple



Pinout of NI – 9213

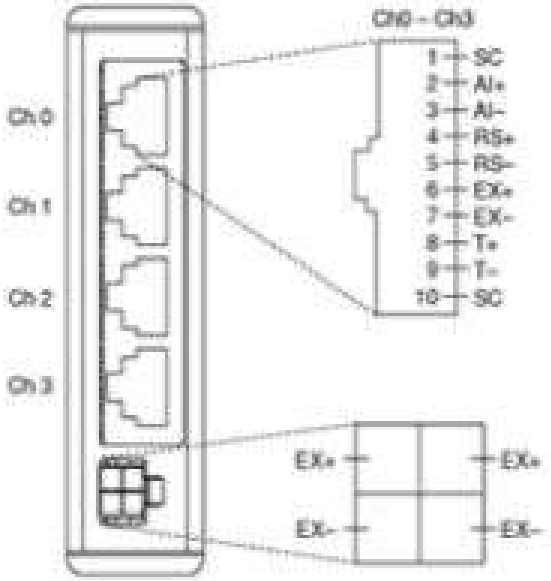


Thermocouple Connection Diagram

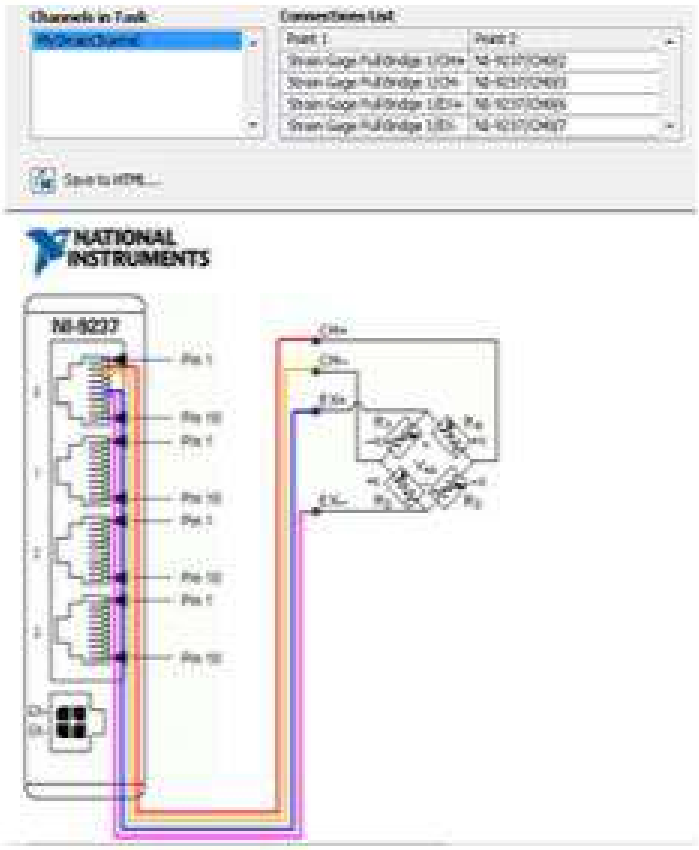


Front Panel

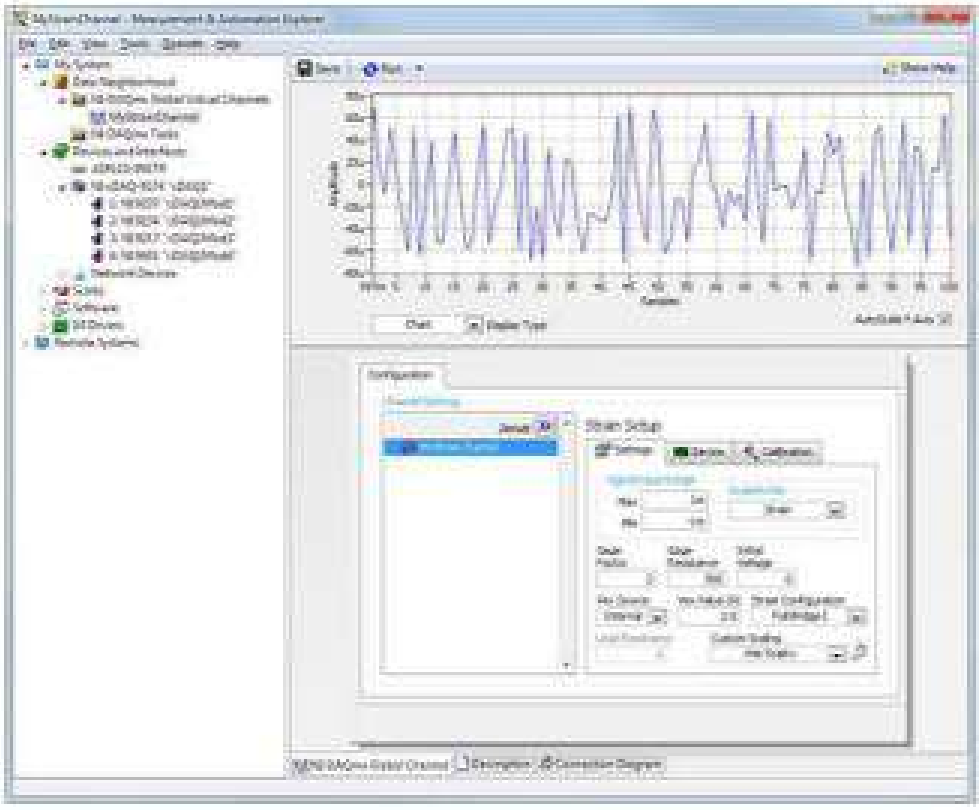
B) Strain Measurement using Strain Gauge



Pinout of NI - 9237



Strain Connection Diagram



Previewing a Strain Measurement in MAX

Experiment NO - 5

Aim: - Signal Generation & frequency analysis by NI-DAQ cards.

Software used: - LabView

Theory: - NI-9219, is designed for multipurpose testing with the NI-9219, you can measure signals from sensors such as strain gauge, resistance, temperature detectors, etc. Data acquisition is the process of measuring an electrical or physical phenomenon as such voltage etc. A s/m consits of sensors, DAQ measurements, hardware & a computer with programmable software.

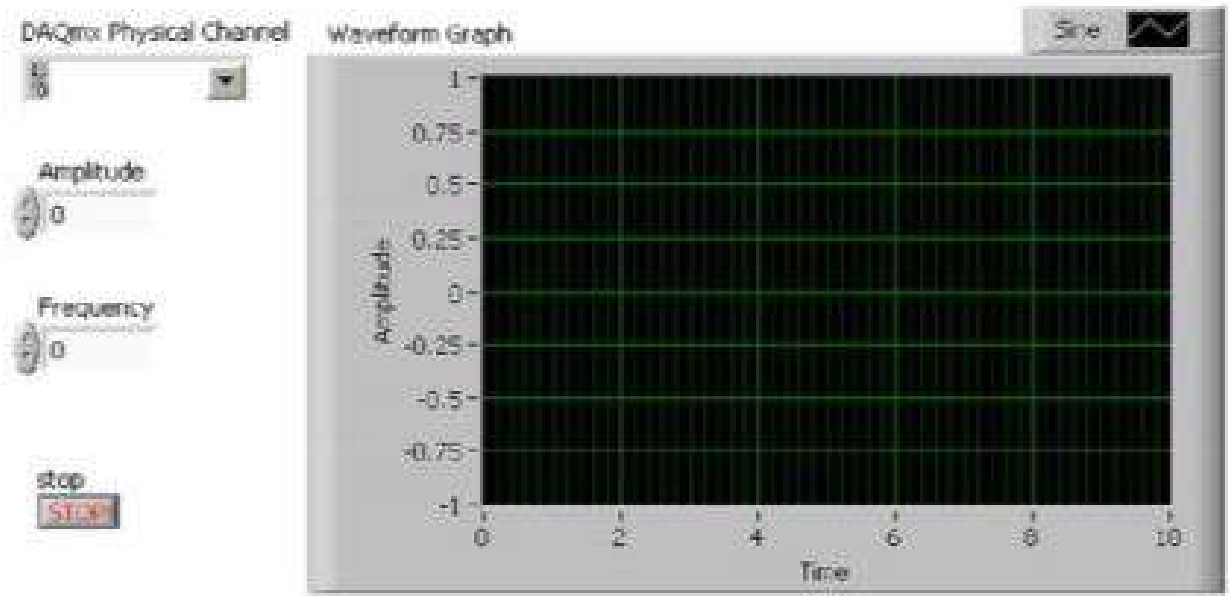
Input: -

	Parameter	Description
1)	Signals	— contains the i/p & o/p signals
2)	error in	— describes the error conditions that occur before this node runs

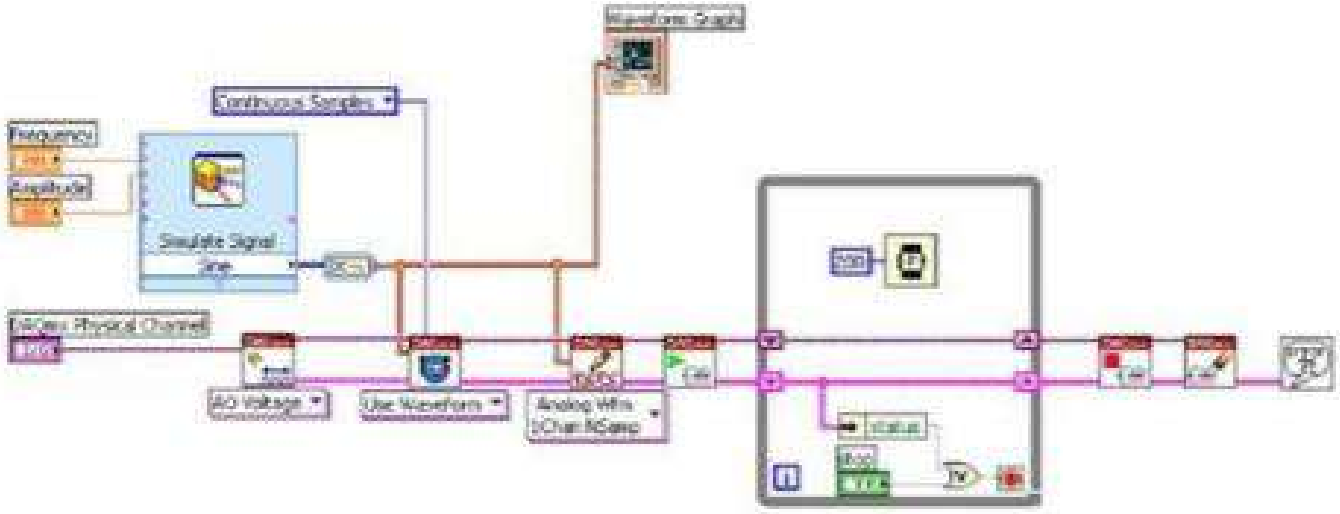
Output: -

	Parameter	Description
1)	Amplitude	— amplitude of detected signal
2)	Frequency	— frequency of detected signal
3)	Error out	— contains error information

Result: - Signal Generation & freq. Analysis were done successfully



Front Panel



Block Diagram

Experiment No:- 6

Aim:- LabView - oscilloscope ± Attribute Nodes, Menus

Software used :- LabView 2018

Theory :- Oscilloscope also known as CRO or DSO is a type of electronic test equipment that graphically displays varying signal voltages usually as 2D plots of one or more signals as a functions of time.

Focus Control :- The control adjust CRT, focus to obtain the shortest, most detailed trace.

Intensity Control :- It adjusts the brightness.

Beam Finder :- modern oscilloscope have direct coupled direction amplifier which means trace can be detected off screen.

Graticule :- A grid line that saves a reference marks for referrings the displayed trace.

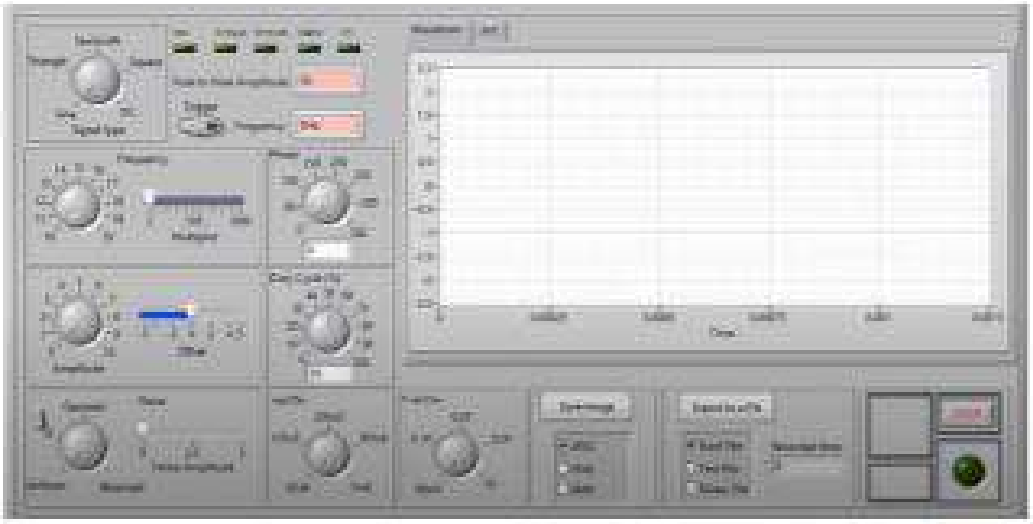
Time base Control :- Selects the horizontal speed of CRT's spot as it creates the trace.

Hold off control :- This sets the time after a trigger during which the sweep circuit cannot be triggered again.

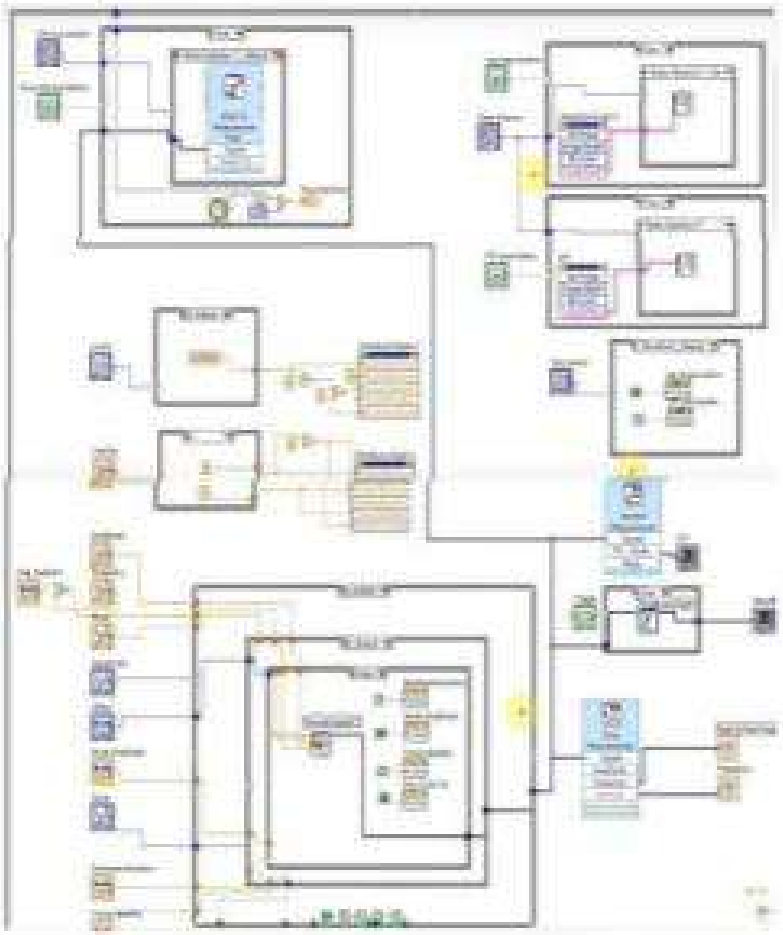
Vertical position control :- moves whole display up and down.

horizontal position control :- moves whole display left and right.

Result :- Successfully generated function generator with oscilloscope in LabView.



Front Panel



Block Diagram

Experiment NO - 7

Aim :- RC circuit and measuring time issues with DAQ cards.

Software used :- LabView

Theory :- For resistance measurement DAQ card can be used for acquisition of resistance in ohm. The daq card used is NI 9240. For a capacitor, capacitance is measured by NI 9283 given by

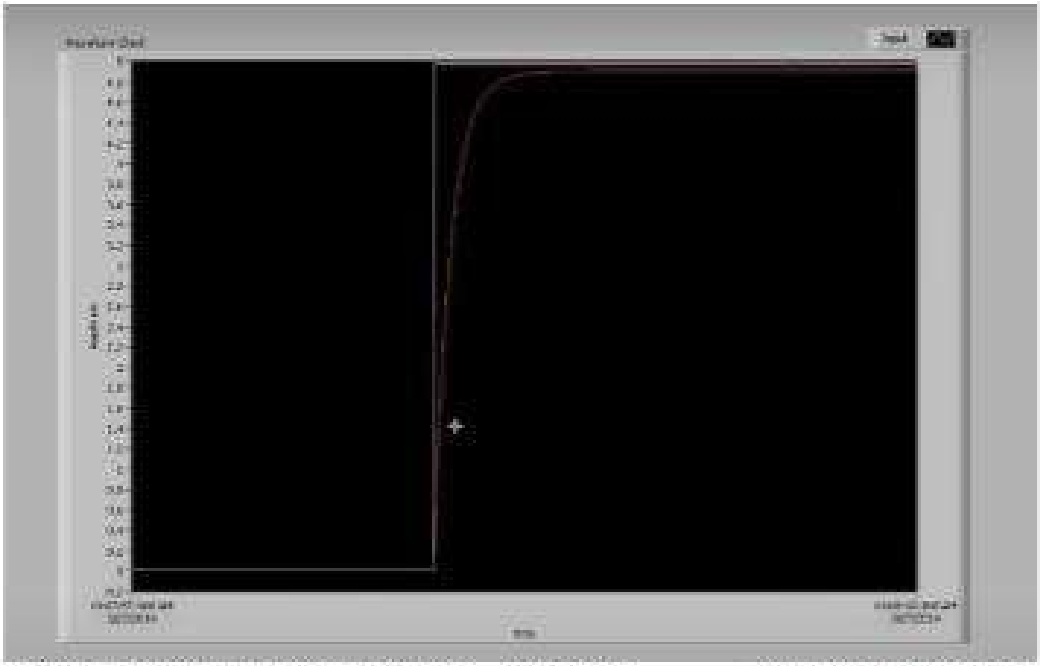
$C = Q/V$ where Q = charge & V = voltage

An RC circuit is an electrical circuit composed of resistors & capacitors. A first order RC circuit consist of 1 resistor & 1 capacitor

The RC time constant, τ is equal to product of resistance & capacitance. It is time required to charge capacitor through resistor from initial voltage to 63.2% of applied DC voltage.

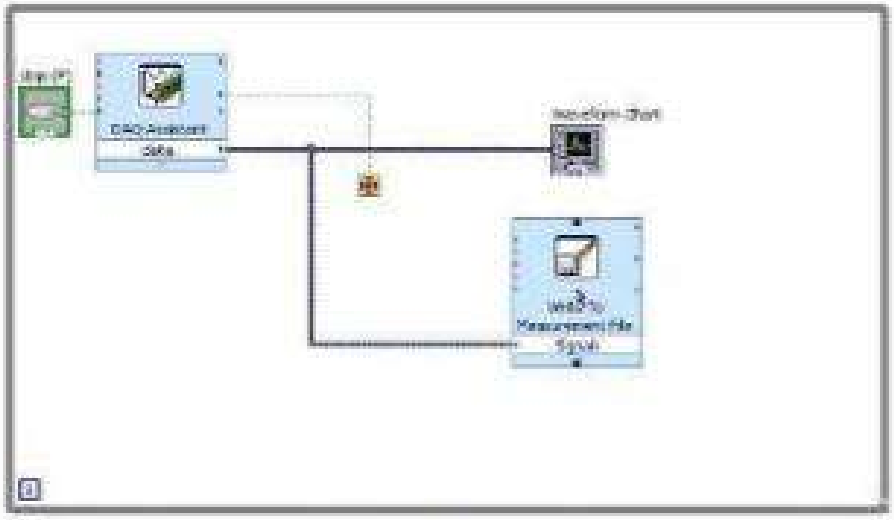
$$V_0 = V(T) = V_0(1 - e^{-t/\tau})$$

Result :- RC circuit with its timing was studied in labview.



White Line: Step input with amplitude 5 – White Line Red Line: RC Response

Front Panel



Block Diagram

Experiment NO - 8

Aim:- Opamp circuit & its characteristics

Software used:- LabView

Theory:- The formula Node is a convinient text based node, one can use to prepare mathematical operations on the block diagram formula nodes are useful for equations that have many variables

Inverting amplifiers:- It is one of amplifiers in which the output is exactly 180° out of phase with respect to input. output is an inverted amplified version of input; gain of inverting amplifier is given as:-

$$\text{gain} := A_V = \frac{-R_f}{R_i}$$

Non-Inverting Amplifier:- It is the one in which output is in phase wrt input.

$$\text{Gain} \Rightarrow A_V = 1 + \frac{R_f}{R_i}$$

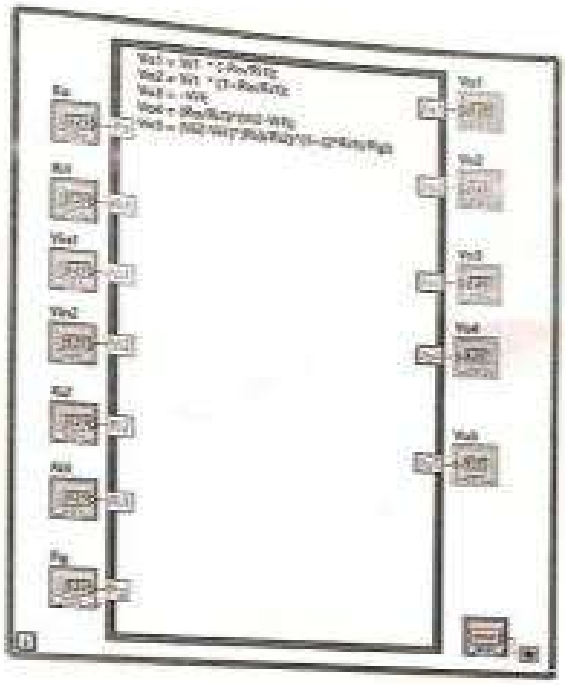
Voltage follower:- It is simply a circuit in which o/p follows input, means output voltage is same as that of input voltage

Differential Amplifier:-

$$\text{Gain} = \frac{-R_O}{R_L}$$

Result:- Successfully implemented different op Amp circuits in LabVIEW.

Front Panel



Block Diagram

Vo1 = Voltage output of Inverting Amplifier
Vo2 = Voltage output of Non-Inverting Amplifier
Vo3 = Voltage output of Voltage Follower
Vo4 = Voltage output of Differential Amplifier
Vo5 = Voltage output of Instrumentation Amplifier
Vi1, Vi2 = Input Voltages
Ro = Feedback Resistor
Rg = Gain Resistance