main.vi

Configuration Settings

Operator Access

Report Generation

Exit

Password Input
OK
error out
Enable
error in (no error)
Password

Configuration

Pasword
12345

info

This VI

configuration.vi

operator01.vi

report.vi

Operator

Report

Exit

NSch.vi

Routine to close and open VIs

vars.vi

info	software	hardware
0	1.048576E+8	0
Type	1	0.0021
S/N	8000	0.0021
Purchase Order	1	0.0021
STS Inspector	24.1666	100
Report Revision	2	100
Machine	15000	100
Operator	100	50
Start Time	0.01	50
Agreement		50
Conformance		0
End Time		0
		0
		10
☐ **External Measurements**		5
		0
		-5

Variables passed between 2 VIs

configuration.vi

Configuration Settings

1 Channel | 3 Channels

Channel Mode | Velocity

ICP Sensor

X

Sensitivity 20 mV/

Load **Speed**

Maximum Value 30

Minimum Value 0

10 | 5 | V_{max}

0 | -5 | V_{min}
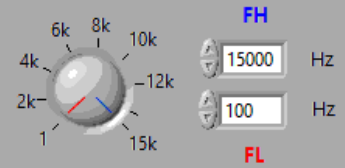
File Size (approximate) 100 MB

Storage Rate 1 s

Resolution 5 Hz

Turbine/Generator Speed Ratio 1 | 24.16
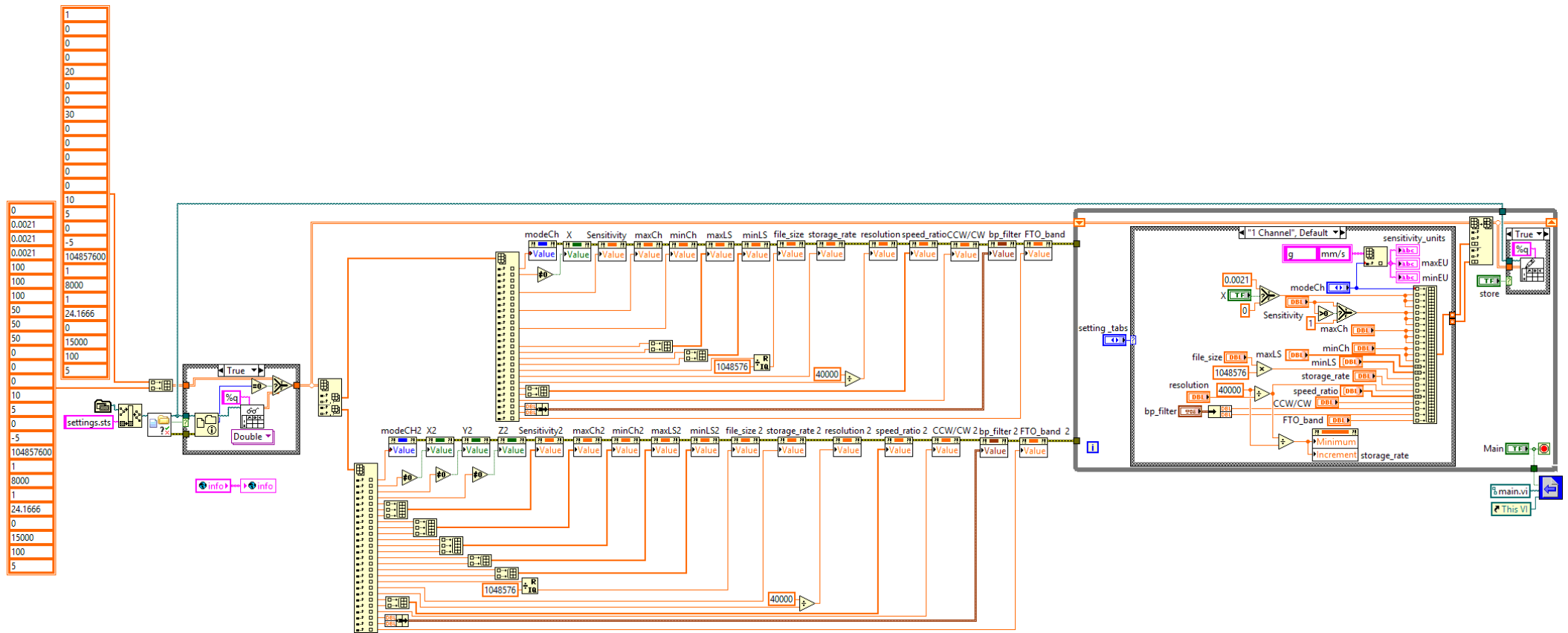
Tracking Filter Bandwidth 5 %

Rotation Direction CCW

Bandpass Filter

6k | 8k | 10k
4k | | ~12k
2k | |
1 | 15k

FH 15000 Hz

100 Hz

FL

Store Settings | Main Menu

Routine to create or open the file named settings.sts
Loads previous settings from file into screen variables
Receives new settings
Saves new settings in the file.

operator01.vi

Operator Parameters

USB-4432 detected 🟢

Test Configuration:
`1-Channel Mode ▼`

Machine ID :
`Machine01 ▼`

Operator Name :
`Eric Visser ▼`

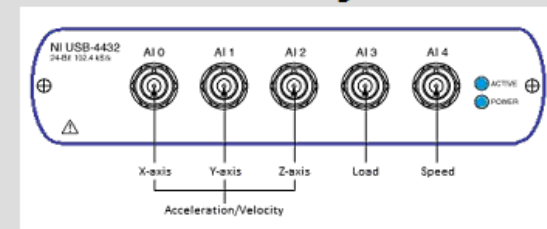☐ **Manual Load/Speed Input**

Information

Type :
` `

S/N :
` `

Purchase Order :
` `

STS Inspector :
` `

Report Revision:
` `

Connection Diagram

NI USB-4432
24-Bit 102.4 kS/s

AI 0   AI 1   AI 2   AI 3   AI 4   ● ACTIVE
                                        ● POWER
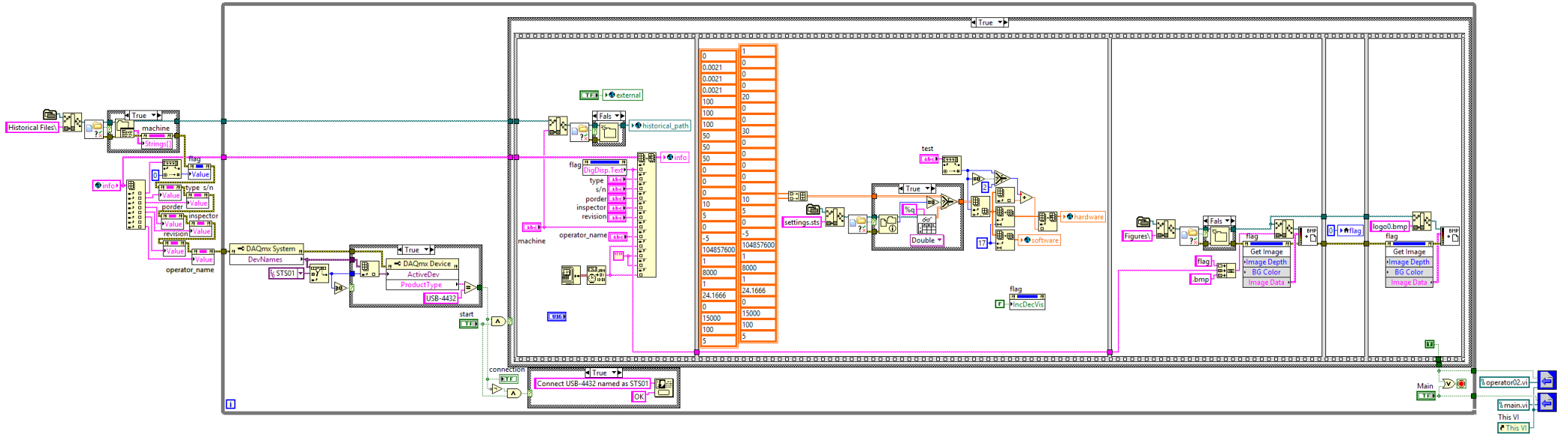
⚠

X-axis   Y-axis   Z-axis   Load   Speed

Acceleration/Velocity

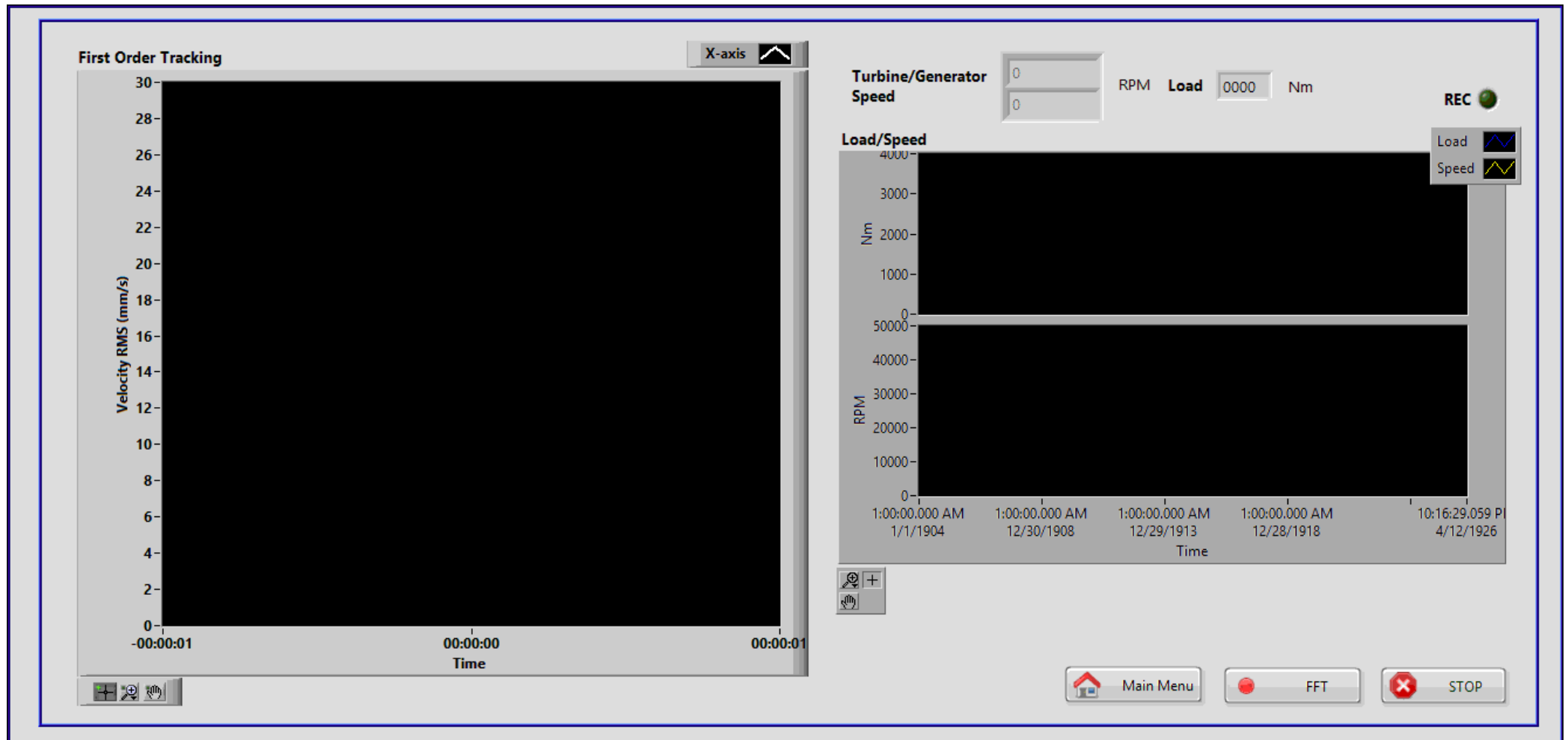✓ Start   🏠 Main Menu
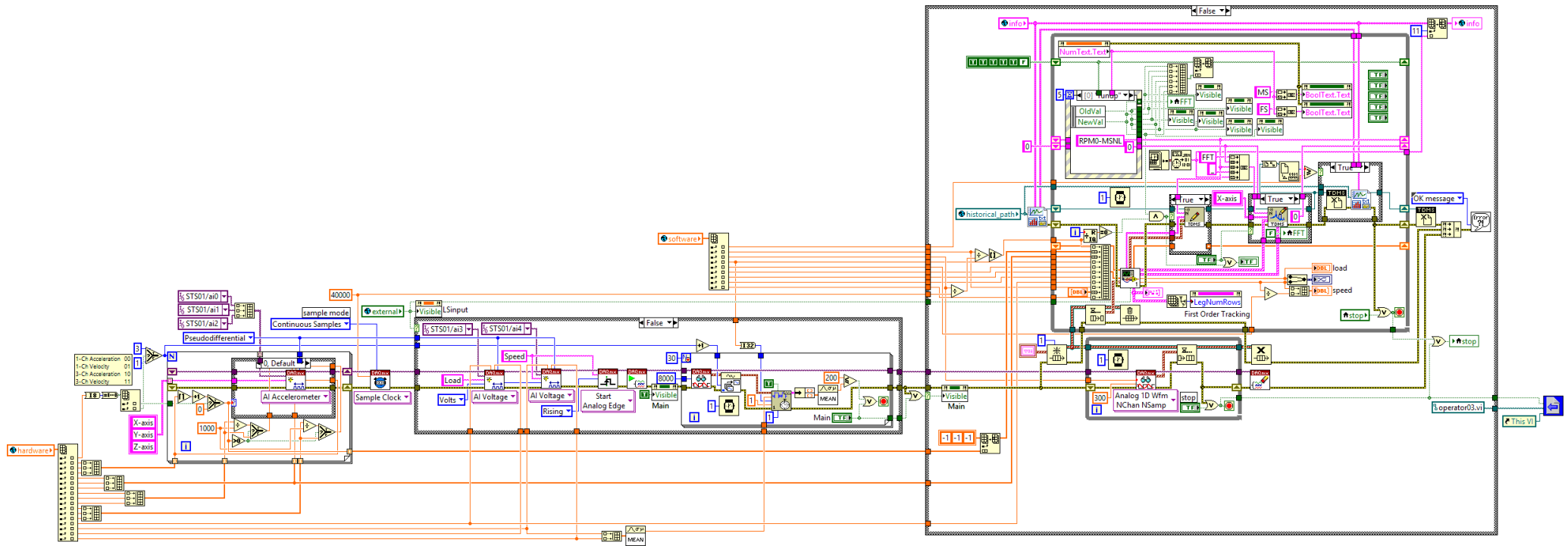
Routine to create the folder named as the Machine ID in Historical Files\
Loads the path into historical_path from vars.vi
Loads operator parameters and time stamp into info from vars.vi
Checks Hardware connection named STS01, type USB-4432
Loads true/false in external from vars.vi (manual/auto mode)
Loads information from settings.sts into hardware and software from vars.vi
Creates the flag images .bmp in the folder Figures\ (Stork flag is saved too)

operator02.vi

First Order Tracking

X-axis

Velocity RMS (mm/s)

30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

-00:00:01   00:00:00   00:00:01

Time

Turbine/Generator Speed   0   0   RPM   **Load**   0000   Nm

REC

Load/Speed

Load
Speed

Nm

4000
3000
2000
1000
0

RPM

50000
40000
30000
20000
10000
0

1:00:00.000 AM   1:00:00.000 AM   1:00:00.000 AM   1:00:00.000 AM   10:16:29.059 P
1/1/1904   12/30/1908   12/29/1913   12/28/1918   4/12/1926

Time

Main Menu   FFT   STOP
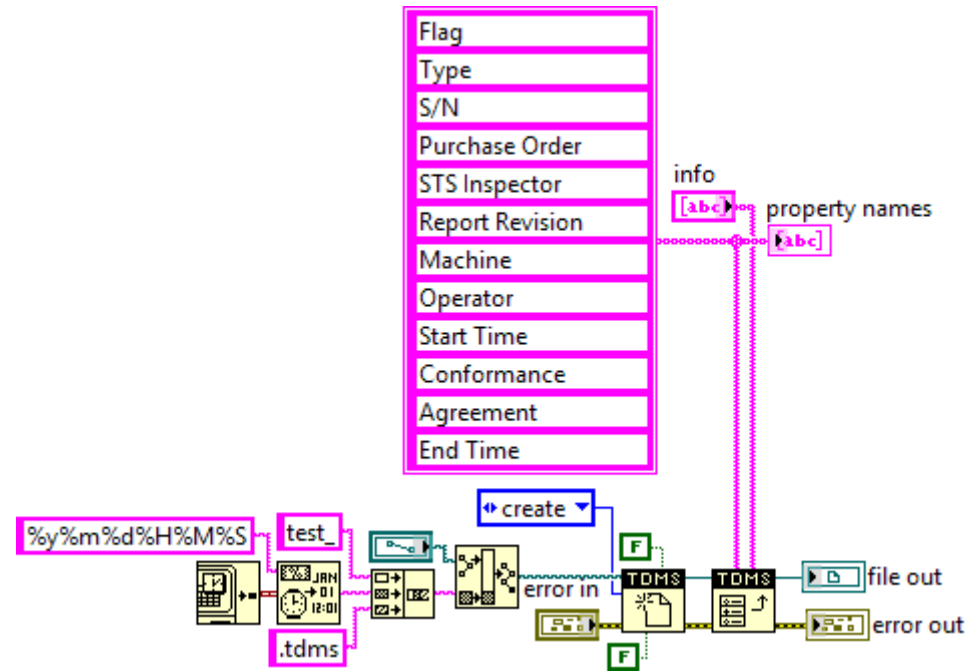
Routine to create the channels X,Y,Z with the settings in hardware from vars.vi

Establishes the sample clock

Loads software and external variables from vars.vi

Creates the channels Speed, Load if the auto mode is activated

Reads speed 30 cycles of 10 seconds

Escapes from the loop if speed is greater than 200 RMS or Main menu button is pressed

A tdms file is created at the path in historical_path from vars.vi

Enters into 2 loops running in parallel with shared queue

One loop reads the channel data in form of waves and enqueues it

One loop dequeues, refreshes graph points and stores the information in the tdms file first created or a new one if reaching the preset size

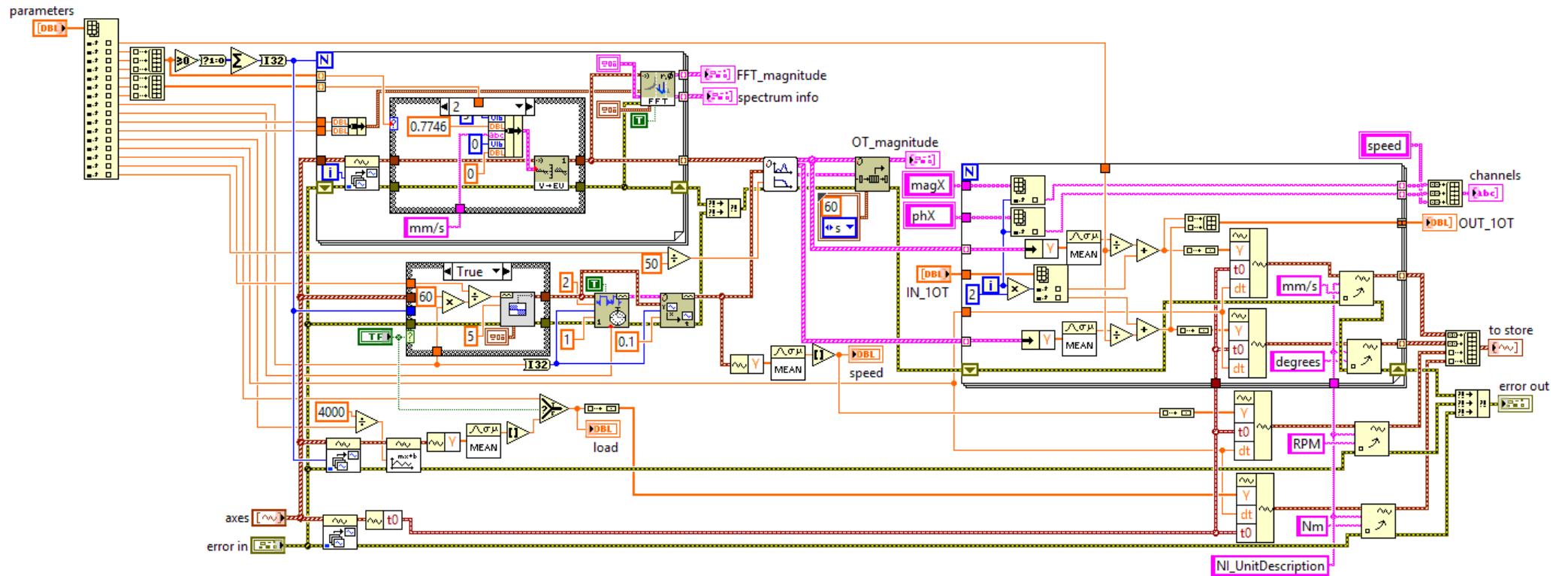An event structure is used to log the group names (+ time stamps) in tdms files

GenTDMS.vi

Routine to create a new tdms file tagged with the time stamp

SA.vi

Routine to scale or integrate the velocity or acceleration channels respectively
Calculates FFTs
Creates square signal for the speed in manual mode as input for the FOT
Filters the waves using the first order tracking filter (FOT) and splits them in magnitude and phase
Calculates the mean values
Formats the signals back into waves for storage

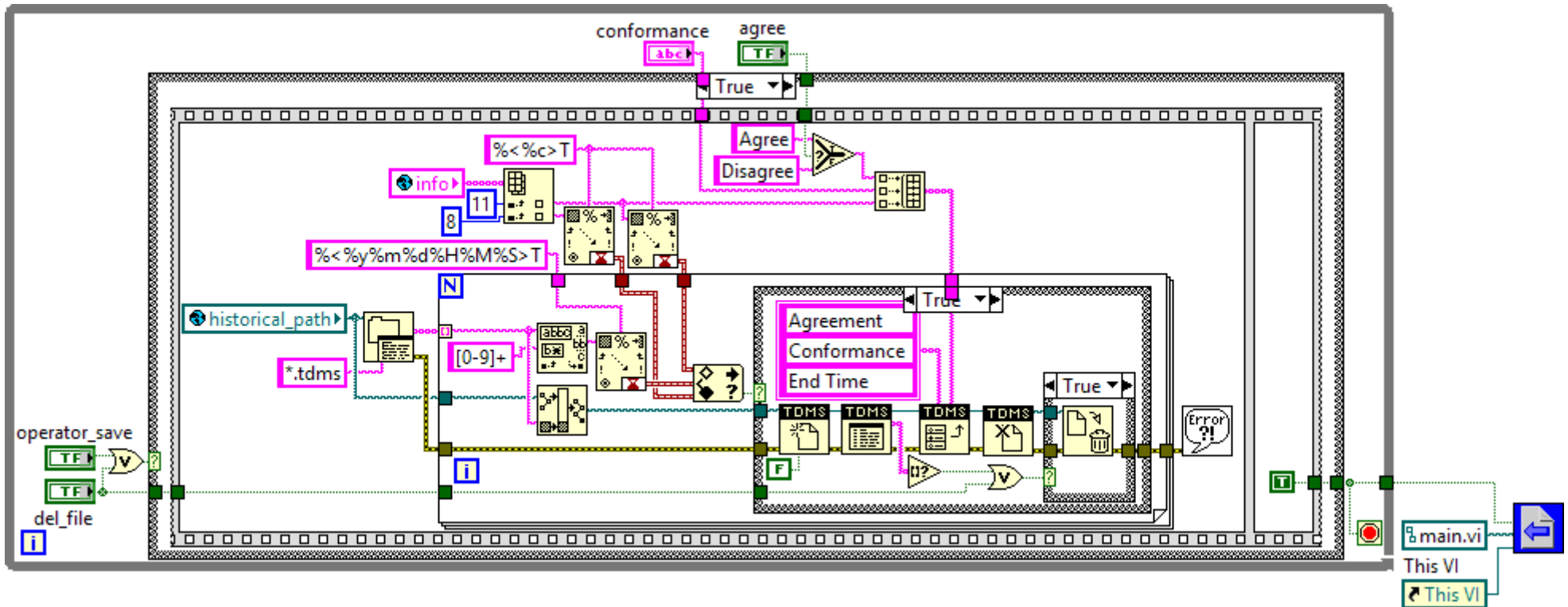# FOT.vi
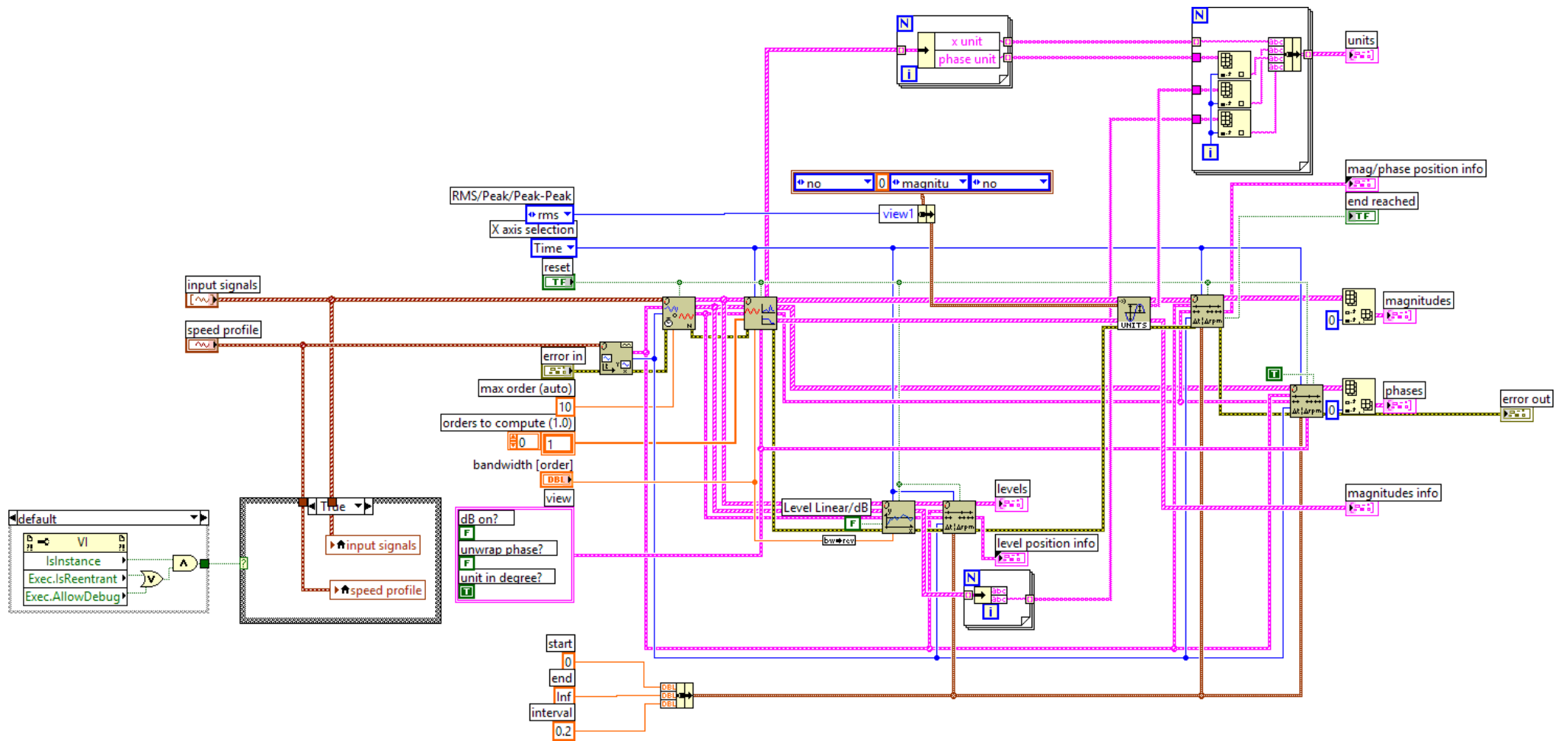
Modified control to allow filter bandwidth as input

operator03.vi

Declaration of Conformity

Why do you agree/disagree?

Disagree

Delete

Save

Routine to log the values from info (vars.vi), end time stamp, agreement acknowledgment and conformity declaration in all the previous tdms files
Deletes the current file if lacking of group data or as decided by the user decides

report.vi

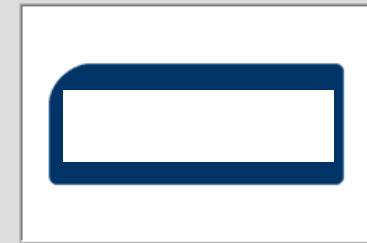## Report Generation

Filter by Machine
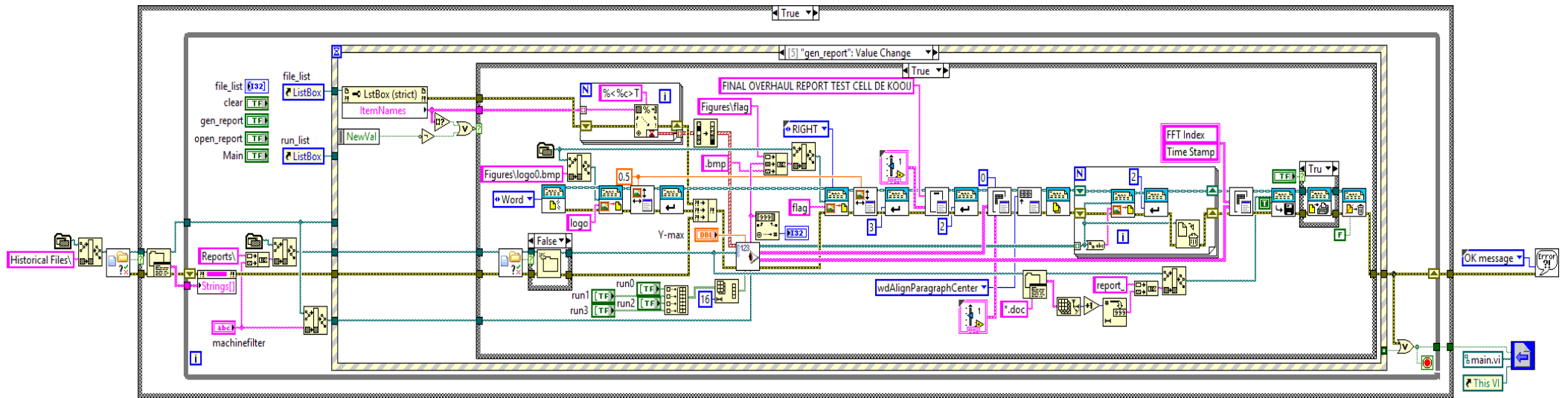
Run Sorted by Date & Time

Files to Generate Report

Clear List

Y-max
30 mm/s

Plots

	Time	1*RPM	Waterfall	Phase
Run-Up: 0 RPM-MSNL	○	●	○	○
Run-Up: MSNL-FSNL	○	●	○	
Run-Up: MSXX-FSXX	○	●	○	
Run-Down: FSXX-0 RPM	○	●	○	○

▷ Generate Report

Open Report

Print

Main Menu

An event structure is used to:

Loads folder names from Historical Files\ into machinefilter

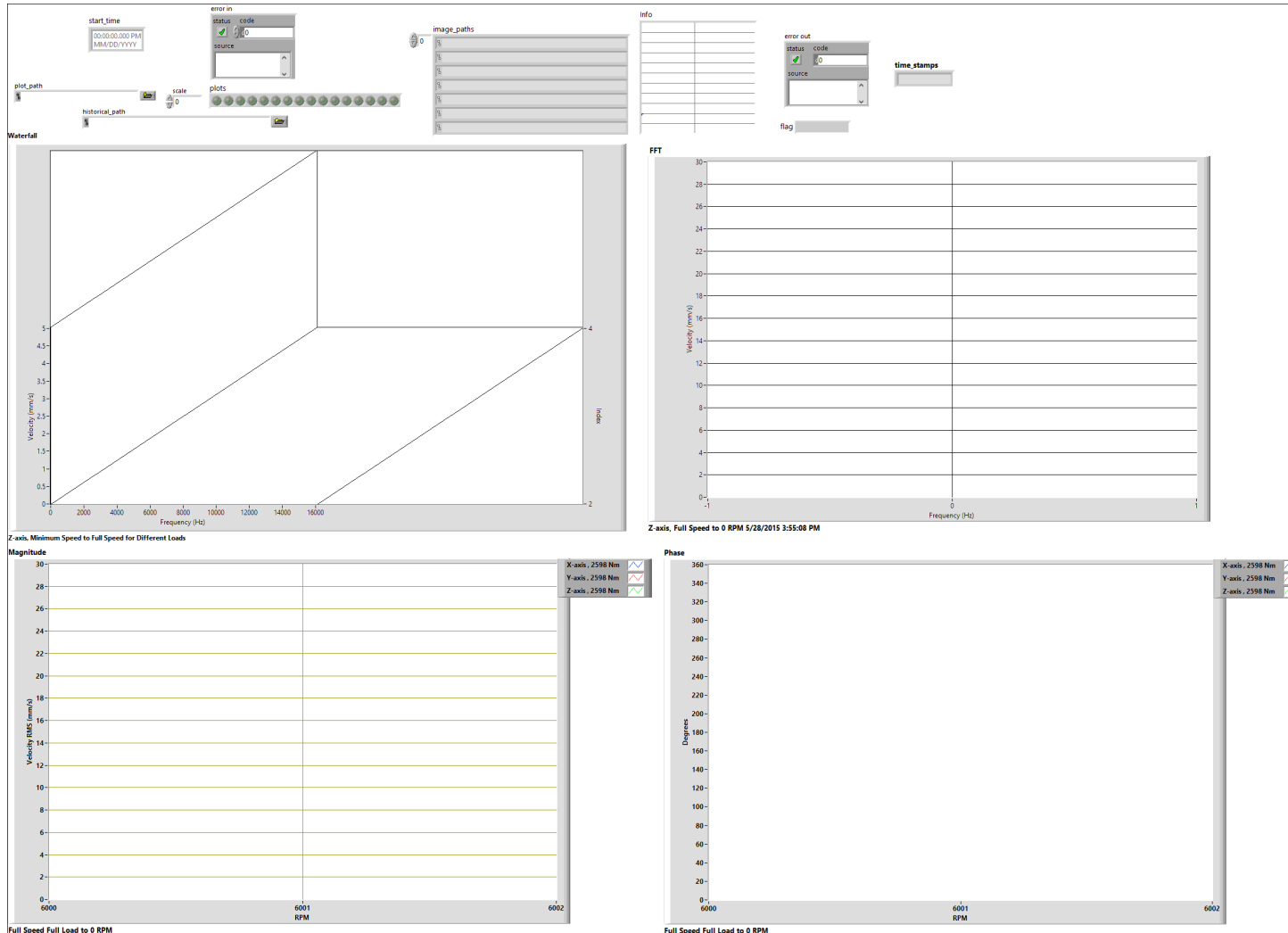Reads start time stamps from tdms files in the folder selected by machinefilter and loads them into run_list

Starts drag and drop mode

Clear the file_list

Generate the report in word format attaching flags from Figures\, plot images and other information

Open report in word format

GetTDMS.vi

Waterfall

Z-axis, Minimum Speed to Full Speed for Different Loads

FFT

Z-axis, Full Speed to 0 RPM 5/28/2015 3:55:08 PM

Magnitude

Full Speed Full Load to 0 RPM

Phase

Full Speed Full Load to 0 RPM

This screen opens for some seconds as modal mode & 100% of transparency, thus waterfalls can be exported to .bmp, check VI properties/Window appearance/Customize…
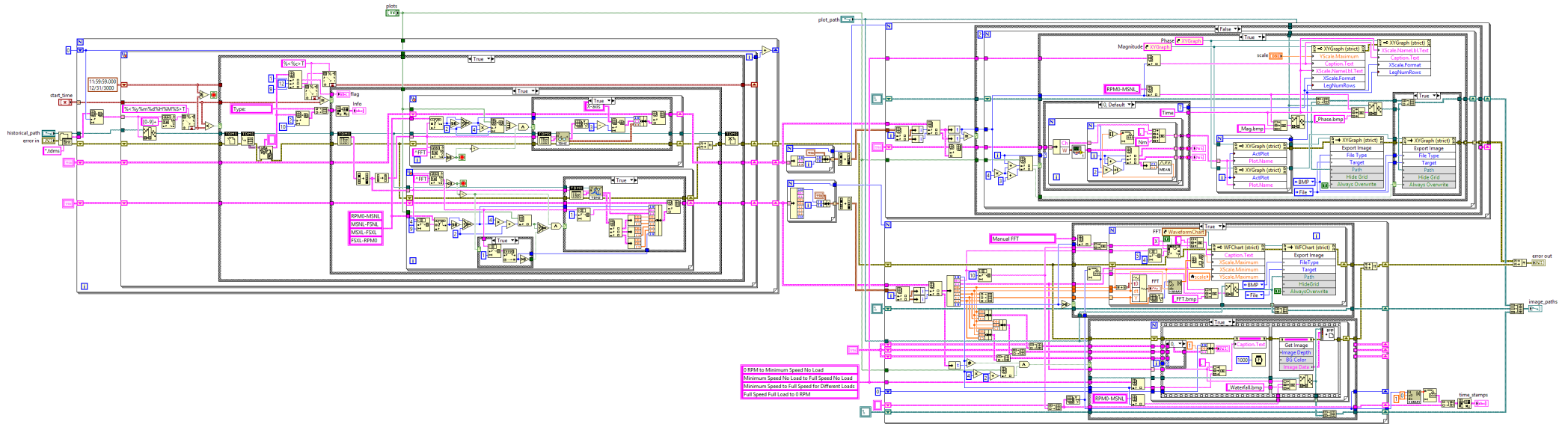
Routine to read data from tdms files with the start time stamps chosen

Divides data into 2 types: FFTs and other groups

Reformats and encapsulates both types into clusters

The FFT and other types are sorted out per selected group for waterfalls, FFT and Bode graphs

Enqueues both cluster types separately to sort them out in ascending order

Runs a loop for each data type to plot out and create temporal .bpm images

Loop 1 sorts all the clusters from the same group (out of 4), retains and plots them out upon completion

Loop 2 plots out all the clusters with the automatic FFTs and sorts-retains-plots all FFTs for the selected waterfalls upon completion

Loops 2 generates the table with FFT indexes and time stamps

WfmToCluser.vi
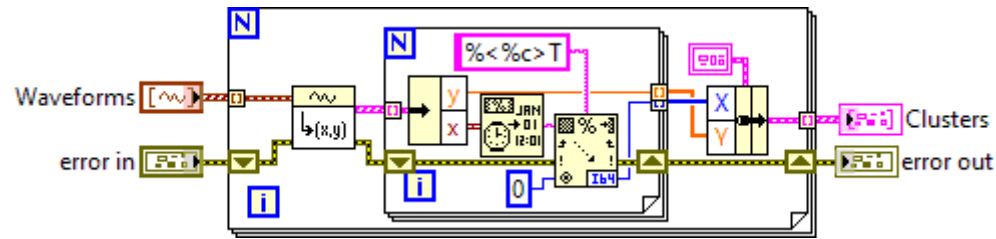
Routine to format waveforms in to clusters