August, 2002

This is documentation for the new Windows software for Quasar Electronics kits 3112 and e118. The author uses his own names for these kits in the following documentation:

Kit 3112 - Pocket Sampler, and
Kit 3118 - DAS005

Kits may be bought from Quasar Electronics Ltd.

$ # ^K INTRODUCTION

I-SEE for Parallel Port Data Acquisition Modules is a general purpose data acquisition and control program which allows you to monitor the analog and digital inputs and control the digital outputs using the following data acquisition modules.

> DAS005, DAS010, DAS015 and Pocket Sampler

Note - If you want help on any of the screens in the I-SEE screen press the F1 key. Note the I-SEE_P.rtf file is included which can be printed out using Word.

The I-SEE program is based around the concepts of Tags. A tag can be any of the following

> an analog input
>
> an analog output
>
> a digital input
>
> a digital output
>
> a calculated variable.

The user defines the name of each tag eg In_Temp. and its properties. The properties determine how each of the tags are to be used

eg In_Temp may be analog input 1 on the data acquisition module.

The user views the current value of each tag on a Screen. Each screen can display 20 Tags, 10 of which can be analog inputs, outputs or calculated values and 10 digital inputs or outputs. The user can manually enter values to send to the analog or digital outputs

The user can also view the tags on graphs or trends. Each graph or trend can display 4 tags with each tag individually colored and labelled. Each graph or trend will display up to 200 of the last points.

The values of the tags can be logged to a floppy or hard disk. The values are saved in a comma delimited file which can be read by Excel or other spreadsheet programs. The starting and stopping of the logging can be controlled by the number of readings required, the value of a tag (eg start when In_temp>22 and stop when it is below 18.) and the time of day (eg start at 1:00AM and stop at 5:00AM. The readings logged to disk can be time and date stamped.

I-SEE also monitors the values of the first 14 tags and what their minimum and maximum values have been.

I-SEE also possesses its own control language consisting of a number of if-then-else lines. These lines allow logical and mathematical calculations to be carried out on the tags to produce tags that are calculated variables or to output values to the analog or digital outputs.

[$] Introduction

[#] INTRODUCTION

^K Introduction

eg Average of two temperatures   @Av_Temp=(@In_TEMP1+@InTEMP2)/2.

I-SEE allows supports alarms. For example you might be monitoring a number of freezers. If any of the temperatures in the freezers rises about 5 degrees then you want an alarm to be raised. I-SEE allows any of the tags to be alarmed. The control language can be used in conjunction with the alarms to set a digital output to turn on an external siren.

In summary I-SEE supports

> 32 Tags
>
> 10 Tag Dispaly Screens .
>
> 10 Graph or Trend Screens.
>
> 20 Alarms
>
> 50 If -Then-Else Control Language lines

Before you can display readings and view graphs the user must first configure the analog inputs, digital inputs, trends or graphs, alarms, control language and logging of data. Once everything is configured the user can then save the configuration details to a file.

The user is recommended to configure the operation of the program in the following order

1. Set up the Parallel Port (See Parallel Port)

2. The type of data acquisition module connected to the parallel port.

3. Set up the tags (See Setting up Analog Inputs)

4. Set up the period on how often the analog and digital inputs are to read and how often

often tags are to be logged to disk. (See Setting up Periods)

5. Set up the screens (See Setting up Digital Inputs)

6. Set up the trends (See Setting up Trends)

7. Set up the alarms. (See Setting up Alarms)

8. Set up the control language. (See Control Language)

9. Set up the data logging parameters (See Logging Parameters)

10. Set up the start and stoppping of data logging (See Starting and Stopping Logging)

11. Save the configuration to a setup file. (See File Menu)

An example configuration file is provided called "sample.suf" which the user can examine and alter. It shows a typical setup on how the analog inputs, digital inputs, trends, alarms, control language and logging is set up. From the main menu click File then click Load. Select the file sample.suf. The user can then view the various screens available from the main menu.

Note if the user wishes to use the same configuration automatically each time the I-SEE program is started then the configuration should be saved to a file with the name "Default.suf" in the same directory as the I-SEE Program.

For more accurate results the user may need to calibrate the DAS005. See the help section titled Calibration.

We endeavour to make our software functional, reliable, value for money and simple to use. If you have any suggestions on how we can improve our product or you have identified a fault in its operation we would be most appreciative if you could contact us or our distributors

Ocean Controls

$ # K FILE MENU

New

This commands resets all the analog input and logging configuration back to default values.

Load

This command loads in a configuration or setup file. This file contains information on how the type of data acquisition module, tags, periods, screens, trends, logging, alarms and control language is configued. Note if the user wishes to use the same configuration automatically each time the program is started then the configuration should be saved to a file with the name "Default.suf" in the same directory as the I-See Program.

Save

This command saves the current configuration detailing the type of data acquisition module, tags, periods, screens, trends, logging, alarms and control language to a file

Save As

This command saves the current configuration detailing the type of data acquisition module, tags, periods, screens, trends, logging, alarms and control language to a file of your choice.

Exit

This command causes the ISEE program to stop and return the user back to the Windows operating system.

$ File Menu

FILE

K File Menu

PARALLEL PORT

The user sets the address of the PC's parallel port that the Data Acquisition Module is connected to. From the main menu click the option PrinterPort.

If the Data Acquisition Module is connected to Parallel Port 1 or Parallel Port 2 click the corresponding button. If the Data Acquisition Module is connected to a parallel port not having either address 378H or 278H click the other address button and enter the address as a hexadecimal value.

The user then clicks the **FIND PORT** button. The computer will then check the address for a parallel printer port and then display the type of port and the mode it is currently operating in. If it is an **ECP** port then the mode has to be changed to **SPP** (standard parallel port) before it can be used with the data acquisition module. This is done by clicking the **INITIALISE** button.

Note if the type of port is ECP, the computer may have to be rebooted before a printer can be used on this port.

Click the exit button to leave the printer port screen.

$ Parallel Port

PARALLEL_PORT

K Parallel Port

$ # K DATA ACQUISITION MODULE TYPE

From the main menu choose DAQ TYPE and a window opens showing the current DAQ Type selected. Click on the option showing the module connected to the serial port of the PC. The modules supported are DAS005, DAS010, DAS015 and Pocket Sampler.

$ DAQ Type

DAQ_TYPE

K DAQ Type

$ # K SETTING UP TAGS

From the main menu choose SetUp a menu appears. Choose Tags and a window opens showing the tag details for the first tag. The I-SEE program is based around the concepts of Tags. A tag can be any of the following

>
an analog input

an analog output

a digital input

a digital output

a calculated variable.

The user defines the name of each tag eg In_Temp. and its properties. The properties determine how each of the tags are to be used

eg In_Temp may be analog input 1 on the data acquisition module.

There are 32 tags available. Each tag has the following properties which determines its behaviour.

Number - Each Tag has a number associated with it. The tag number cannot be altered by the user.

Name - This is the name of the tag. The tagname can be up to 8 letters in length. The tag name can include numbers but cannot be all numbers. Other characters not allowed include +,-,*,/, @ and space. Examples include Pump1, DH_Flow, OvenTemp etc.

Label - This entry allows the user to associate a label or description to the tag. Eg. "Inlet Temperature" or "pH"

Variable Tag - A tag can be an analog or digital value. If it is a digital it can have only two values such as 0 or 1, True or False, On or Off etc. An analog tag can have a range of values eg from 0 to 100 degrees, -10 to +10 metres etc.

Variable Details - A digital or analog tag can be an input, an output or a general purpose variable.

DAQ Address - If the tag is a digital or analog input then the address of the DAQ module has to be entered here. It always has the value of 1.

I/O Number - If the tag is an analog or digital input or output then the number of the input or

output on the Data Acquisition Module must be entered here. **Note the I/O numbers start at 1 not 0.**

If a Tag has been set to Analog then the next five entries allow the user to convert from the raw values of the Analog input or output to engineering units. The raw values for the Data Acquisition Module are the raw ADC or DAC values. These are

DAS005 for ADC 0 = 0mVs 4000 = 4000mV

DAS010 for ADC 0 = 0mVs 4000 = 4000mV

DAS010 for DAC 0 = 0mVs 4000 = 4000mV

Pocket Sampler ADC 0=0mV   255=2470mV

For example for a DAS005 the raw analog input value of 0 corresponds to a pressure of 0 KPa while the raw analog input value of 4000 corresponds to a pressure of 1000KPa. Hence the entries are

Raw Value 1=0 and **Eng. Value1**=0 and

Raw Value2=4000 and **Eng. Value2**=1000 and

Units = KPa.

If the Tag has been set to Digital then the next five entries allow the user to convert from the raw values of the Digital input or output to engineering values. The raw values range from 0 to 1. For example the raw digital input value of 0 corresponds to an OFF state while the raw digital input value of 1 corresponds to an ON state. Hence the entries are

Raw Value 1=0 and **Eng. Value1**=OFF and

Raw Value2=1 and **Eng. Value2**=ON and

Units =

The checkbox **Log This Input** should be clicked if the user wants the analog input to be logged to disk once logging has been started

Example 1

Analog Input 3 on a DAS005 Module is to be monitored. It is connected to an oven temperature transducer the output of which gives 0mV at -10 DegC and 2000mV at 1000DegC.

The oven temperature is to be logged to disk

Tag Name - Oven_Tmp

Label - Oven Temperature

Variable Type - Analog

Variable Details - Input

DAQ Address - 0

I/O Number - 3

Raw Value 1 - 0

Engineering Value 1 - -10

Raw Value 2 - 2000

Engineering Value 2 - 100

Units - DegC

Log - On

Example 2

Digital Output 5 on the DAS015 Module is to control a number 1 pump in the plant room (PR). The status of the pump is not to be logged to disk.

Tag Name - PR_Pmp1

Label - Pump 1

Variable Type - Digital

Variable Details - Output

DAQ Address - 0

I/O Number - 5

Raw Value 1 - 0

Engineering Value 1 - OFF

Raw Value 2 - 1

Engineering Value 2 - ON

Units -

Log - Off

The **Next** and **Previous** buttons allow the user to move through the analog inputs to view and or edit them.

To exit from the analog input setup window click the **Exit** button.

$ # K SETTING UP SCREENS

The user can configure up to 10 different tag display screens. Each of the screens can show the value of 10 Analog Tags and 10 Digital Tags. From the screens the user can alter the value of the digital and analog outputs on the DAQ Module.

Screen Title - Enter the title that is shown when the screen appears eg. Plant Room, Pump House etc.

ANALOG TagName - In the two columns marked TagName enter the Tag Names of the Analog Tags that are to appear on the screen. If the Tag name is found in the database then the label or description for that tagname is displayed otherwise an error message will appear.

DIGITAL TagName - In the two columns marked TagName enter the Tag Names of the Digital Tags that are to appear on the screen. If the Tag name is found in the database then the label or description for that tagname is displayed otherwise an error message will appear.

Screen Number - Is the number of the screen and has the range 1 to 10. The user cannot change this value.

Jump To - Allows the user to jump to a screen of choice. When viewing screens with readings the user will be able to click on the Jump To Button to move to this screen. Enter the number of the screen to jump to.

The **Next** and **Previous** buttons allow the user to move through the screen configurations to view and or edit them.

To exit from the Screen Configuration window click the **Exit** button.

$ # k PERIODS

The user can control the period between the analog and digital input readings, logging and the rate trends are carried out.

From the main menu choose Logging then click on the Periods option. The various inputs on the screen are described below.

Time Between I/O Readings - This is the period in between readings of the analog and digital inputs. It also determines the how often the control language and alarms are carried out. If the time is in seconds click the Secs button and enter the period (1 to 32767) into the text box. If the time is in msecs click the mSecs button and enter the period (50 to 32767) into the text box.

Time Between Logged Readings - This is the period between consecutive readings logged or saved to disk. If the time is in seconds click the Secs button and enter the period (1 to 32767) into the text box. If the time is in msecs click the mSecs button and enter the period (50 to 32767) into the text box. **Note the Time between logged readings must be greater than the time between I/O readings. Also the logged period should be a multiple of I/O periods.** For example if the I/O period is 0.25 second and the logged period is set to 0.6 seconds then the time between logged readings on disk will be 0.25 * 3 or 0.75 seconds not as the 0.6 seconds asked for.

The trends can be plotted at the rate where the period between consecutive data points is equal to the I/O period or the log period. Click the appropriate option box.

Click the **Exit** button to save the period configuration and exit the period setup.

$ Periods

PERIODS

k Periods

$ # K SETTING UP TRENDS

I-See is able to display up to 10 different trend or graph screen. Each trend screen can display from 1 to 4 Tags at a time. From the Main Menu choose SetUp and then click on the Trends option.

For example on Trend 2 the user wishes to display the In_Temp and Out_Temp. The user first clicks the Next button to display Trend Number 2 and then the following is entered.

Trend Number	2
Tag Number	In_Temp
Tag Number	Out_Temp
Tag Number	
Tag Number	

Clicking the **Next** and **Previous** buttons allow the user to move through the trends and or edit them. Clicking the **Exit** button saves and exits the trend configuration.

$ Setting Up Trends

SETUP_TRENDS

K Setting Up Trends

Alarms can be linked to the value of a Tag. An analog Tag alarm can have high or low level alarms or both while a digital input alarm can have a high or low level alarm. When an analog or digital Tag alarm enters or leaves the alarm state the associated message is displayed at the bottom of the main screen. The status of alarms is checked once a second.

From the main menu choose SetUp and then click on the Alarms option. A window titled Alarm Setup appears. The various inputs on the screen are described below.

Alarms have the following states

Normal or Not in Alarm

In Alarm. The tag has gone into the alarm state.

Acknowledged and in Alarm. The tag is still in the alarm state and the user has acknowledge it.

Out of Alarm but not acknowledged. The tag's value is out of the alarm range but it hasn't been acknowledged by the user.

For a tag in alarm to go back to the normal state, its value must return to the normal range of values and it must be acknowledged by the user.

Enable Alarms - Clicking this box on causes all alarms to be enabled. Individual alarms cannot be enabled and disabled.

Alarm No - This is the number of the alarm. The user is unable to edit this.

Tag - Is the tag name of the input or variable to be alarmed.

High Alarm Value - An alarm occurs if the input or variable is **greater than or equal** to this value. If no high alarm is to occur leave blank.

High Alarm Message - Is the message shown in the alarm status bar and on the alarm history screen when a high alarm occurs.

Low Alarm Value - An alarm occurs if the input or variable is **less than or equal** to this value. If no low alarm is to occur leave blank.

Low Alarm Message - Is the message shown in the alarm status bar and on the alarm history screen when a low alarm occurs.

Normal Message - Is the message shown in the alarm status bar and on the alarm history screen when the input or variable returns to normal.

Clicking the **Next** and **Previous** buttons displays the other alarms. Clicking the **Exit** button saves and exits the alarm configuration.

Example 1

The analog input 4 with the tag name LinePres is to display a high alarm message "Pressure too high" when it's value exceeds 3000 and a low alarm message "Pressure too low" when its value falls below 1000.

K Setting Up Alarms

SETUP_ALARMS

$ **Setting Up Alarms**

Tag - LinePres

High Alarm Value - 3000

High Alarm Message - Pressure too high

Low Alarm Value - 1000

Low Alarm Message - Pressure too low

Normal Message - Pressure OK.

Example 2

A temperature transducer is connected to analog input 2 measures the temperature from 0 to 100 degrees. It has the tag name RoomTemp to display a high alarm message "Temperature too high" when it's value exceeds 70 and a normal message "Temperature OK" when its value falls below 70. The Low Alarm Value shall be set to -10 as it will never be reached.

Tag - RoomTemp

High Alarm Value - 70

High Alarm Message - Temperature too high

Low Alarm Value - -10

Low Alarm Message -

Normal Message - Temperature OK.

Example 3

A level switch connected to Digital Input 2 with tag name DamLevel is to display the high alarm message "Level too High" when its value is 1 and the normal message "Level OK" when its value is 0. The low alarm value is set to -1 as it will never be reached.

Tag - DamLevel

High Alarm Value - 1

High Alarm Message - Level too High

Low Alarm Value - -1

Low Alarm Message -

Normal Message - Level OK

Example 4

A level switch connected to Digital Input 3 with the tag name WellLev is to display the Low alarm message "Level too Low" when its value is 0 and the normal message "Level OK" when its value is 1. The high alarm value is set to 2 as it will never be reached.

Tag - WellLev

High Alarm Value - 2

High Alarm Message -

Low Alarm Value - 0

Low Alarm Message - Level Too Low

Normal Message - Level OK

Alarms as they occur are displayed in the alarm status bar at the bottom of the main screen.

^{$} ^{#} ^{K} CONTROL LANGUAGE

The I-SEE program has its own simple control language which enables the user to control the analog and digital outputs on the data acquisition module and carry out calculations and logical decisions. The control language consists of up to 50 IF - THEN -ELSE statements which are carried out continuously. All the statements are calculated before the final state of the analog and digital outputs are activated.

The variables which are recognised are as follows

@xxxx - The symbol @ denotes a tag with the name xxxx in the control language. For example to calculate the average of two temperatures with the tag names Temp1 and Temp2 and assign it to the variable AvTemp is

$$@AvTemp = (@Temp1 + @Temp2)/2$$

@TS - is the current time in seconds since midnight. For example 2:00PM is equal to 14x3600

@HR - is the hour of the day 0-23

@MN - the current minutes of the day 0-59

@SC- the current seconds of the day 0-59

@DW - is the day of the week. 1 is Sunday to 7 for Saturday.

@SU - is the startup. On the first pass of the control language @SU is equal to 0. All other passes @SU will be equal to @SU=1.

In the If statement the following boolean operators are accepted

=   equals

>   greater then

>=   greater than or equal to

<   less than

<=   less than or equal to

<>   not equal

&   and

| or

( )   Parenthisis

In the then and else statements the following operators are accepted

=   equals

+   add

-     subtract

*   multiply

^   raised to the power

/   divide

^{$} Control Language

^{#} CONTROL_LANGUAGE

^{K} Control Language

( )   Parenthesis

 The following functions are also supported

Sin(expression)   Returns the Sine of the angle where the expression is in radians

Cos(expression)   Returns the Cosine of the angle where the expression is in radians

Tan(expression)   Returns the Tangent of the angle where the expression is in radians

Atn(expression)   The ArcTangent of a number returns the angle in radians

Log   Returns the Natural Logarithm of the value of the expression.

Exp(expression)   Returns e (then base of natural logarithms) raised to the power ie value
          of the (expression)

Sqr(expression)   Square Root of the value of the expression

Abs(expression)   Absolute value of the value of the expression

From the main menu choose SetUp and then click on the Control Language option. A window titled Control Language appears. The various inputs on the screen are described below.

Enable Control Language- Clicking this box on causes the control language to be carried out once per second.

Carry out Then statement only when If statement goes false to true box. If this is the first time the if statement is true after being previously false the then statements will be carried out. The then statements will not be carried out again until the if statement goes false then true again. **Note the else statement is ignored.**

Line No . - Is the line number. This user is unable to alter this.

If - This is the "if" expression. If the result of the expression is True the "Then" expressions are carried out. A blank "if" statement is treated as a True statement. If the result of the expression is False the "Else" expressions are carried out.

Then - This is the "then" expressions. Multiple lines of "then" statements can be entered up to a limit of 100 characters.

Else - This is the "else" expressions. Multiple lines of "else" statements can be entered up to a limit of 100 characters.

Example 1.

Let the tag VA1 and the tag AV3 equal the average of analog inputs 1 and 2 with the tag names AI1 and AI2.

    if

    then

        @VA1=(@AI1 + @AI2)/2

        @AV3=@VA1

    else

Example 2.

If analog input 1 and analog input 2 are greater than 2000 and 1000 respectively then digital output 1 in ON.

    if

        @AI1>2000 & @AI2>1000

    then

        @DO1=1

else

@DO1=0

<u>Example 3</u>

If the time is >=2:00pm and <=4:00pm and the day of week is Sunday then set the second digital output to on. Note the times are seconds since midnight.

if

(@TS>=50400 & @TS<=57600) & @DW=1

then

@DO2=1

else

@DO2=0

Please note:

1. Expressions using - signs such as

@AI2= - @AI3 + @AI4

@AI2= - (3.12+9.23)

can produce syntax errors. In cases like these use a "-1*" expression instead of -.

@AI2= -1*AI3 + @AI4 or @AI2=0-@AI3+@AI4

@AI2= -1*(3.12+9.23)

2. When you enter a line in the if, then and else statements the line is first parsed and analysed to check for syntax errors. It is then calculated using the current values of the tags to check for errors.

$ # K LOGGING PARAMETERS

From the main menu choose Logging then click on the parameters option. The various inputs on the screen are described below.

Time Between Readings - This is the period in between readings both displayed on the screen and those logged or saved to disk. If the time is in seconds click the Secs button and enter the period (1 to 32767) into the text box. If the time is in msecs click the mSecs button and enter the period (50 to 32767) into the text box.

Time Stamp - Click this field on if the user wishes to have the readings time stamped.

Date Stamp - Click this field on if the readings are to be date stamped.

Date Format - Click the option box DD/MM/YY if the date is to be in the format day/month/year

or MM/DD/YY if the date us to be in the format month/day/year

Daily Log Files - Clicking on this check box causes a new log file to be automatically generated each day at 00:00 am. Its name will be Daddmmyy.csv if the Date format chosen is dd/mm/yy or Dammddyy.csv if the Date format chosen is mm/dd/yy. dd is the day of the month, mm is the month, yy is the year. This is recommended if a process is being monitored for a number of days.

New File - Clicking on this check box causes the file to be cleared before data is saved in it. If the user wishes to append data to the file click this option off. Note if the Daily Log File check box is on this option is neglected.

Enter Log File - Clicking on this button allows the user to choose the name of the file to which the analog readings are to be saved. The name of the file is displayed in the entry **Log File Name.** Note if the Daily Log File check box is on the user can choose the directory where the file is to be saved but the file name is of the form Daddmmyy.csv where dd is the day of the month, mm is the month, yy is the year.

Click the **Exit** button to save the configuration details and exit the logging parameter setup.

$ # K STARTING AND STOPPING LOGGING

From the main menu choose Logging then click on the StartStop option. Storage of data can be initiated and stopped in three different ways by the user

(i) the user can elect to log a set number of samples from 1 to 32000. If the user enters 0 then data is logged continually until the user decides to stop logging by clicking the Start Logging checkbox off. To enable this mode of logging click the Number of Samples option ON and enter the number of samples in the text box. Finally click the Start Logging checkbox on at the bottom of the window.

(ii) the user can program data storage to commence when a nominated tag reaches a set value and stop when it reaches another value. If the tag reaches the starting value again the logging will recommence. This way you are only logging regions of interest to you.

Example - Start logging data when Analog input with the tag number TankTemp is greater than 30 degrees and stop logging data when it falls below 20 degrees. The user would first click the **analog input** option on and then enter

Start Logging When	Stop Logging When
TankTemp	
Click on Is >=	Click On Is < =
Enter 30	Enter 20

Finally click the Start Logging checkbox on at the bottom of the window.

Example - Start logging data when digital input connected to a valve with the tag name Valve1 is 1 or High and stop logging data when it becomes 0 or Low. The user would first click the **digital input** option on and then enter

Start Logging When	Stop Logging When
Tag Valve1	
Click on Is High	Click On Is Low

Finally click the Start Logging checkbox on at the bottom of the window.

(iii) the user can log data between certain times of the day. For example the user may only want to read the temperatures between 9AM and 5PM of each day. The start and stop times must be entered in 24Hour format ie HH:MM. The user would enter 09:00 for the start time and 17:00 for the stop time. Finally click the Start Logging checkbox on at the bottom of the window.

$ Start Stop Logging

START_STOP_LOGGING

K Start Stop Logging

Start Logging - Clicking on this check box causes data logging to commence as soon as the user clicks on the **Exit** button. Clicking off this check box causes data logging to stop and the data file to be closed when the **Exit** button is clicked.

Remember the tags that are to be logged must be clicked on in the Setup Tags options.

The data is saved to the file in a comma delimited format with each line of text representing one instant of time. The first line of the file is a heading with the tag descriptions. The order of entry in the line of data is

Time stamp, Date stamp, Tags

$ # K VIEWING READINGS

From the main menu click the View option and then choose Readings.

Each screen can display the current values of 10 Analog Tags and 10 Digital Tags. and are updated once every second. The tags can be inputs, outputs and or variables. Preceeding the TagNames are the following prefixes which identify the type of tag

    I- Means the Tag is an input

    O- Means the Tag is an output

    V- Means the Tag is a general purpose variable

If the tag is an output with the prefix O- then the value can be adjusted by the user. For an Analog output click on the value and type in the new value. Then click on another area of the screen. The program will then automatically send the value to the DAQ Module.

Each digital tag has its own checkbox. To alter the state of the digital output click on the checkbox. I-SEE will then automatically send the value to the DAQ Module.

If the control language is running and it is writing to these analog and digital outputs then it will overwrite the changes made to the values by the user.

Note the user can view the readings and log data to disk at the same time. A button labelled "Logging Data" shows if data is currently being logged to disk.

Clicking the **Jump To** button causes the screen to jump to another predefined screen.

Note the user can view the readings and log data to disk at the same time. A button labelled "Logging Data" shows if data is currently being logged to disk. The display **Log Sample Number** displays the number of readings that have currently been logged to file since logging started.

Clicking the **Next** and **Previous** buttons allows the user to move to the next or previous screen number. Clicking the **Exit** button exits the screen and returns the user back to the main menu.

$ View Readings

VIEW_READINGS

K View Readings

$ # K VIEWING MAXIMUM AND MINIMUM READINGS

From the main menu click the View option and then choose MinMax Readings.

The screen displays the first 14 tags with their maximum and minimum values. The maximum and minimum values can be reset at any time by clicking the **Reset Max/Min** button.

$ # ^K VIEWING TRENDS OR GRAPHS

From the main menu click the View option and then choose Trends.

The user is shown a graph upon which 50 data points are displayed for each tag in the trend group. The graphs are updated once every 2 seconds. By clicking the **Back** button the user can view the previous 50 data points and the sheet number increments. The **Next button** allows the user to view the next most recent 50 data points. The **Back** and **Next** buttons give the user the ability to view a total of 200 data points for each analog reading in the trend group. The **ZOOM** button allows the user to view 50,100 or 200 points at a time. The spin button with the two arrows marked **TREND** allows the user to move to the next or previous trend. At the bottom of the window is a colored legend informing the user what color on the graph represents which Tag.

A button labelled "Logging Data" shows if data is currently being logged to disk.

This window has a display **Rate**. To ensure that the PC is able to read the DAS005 at very short periods the ISEE program measures the time taken to carry out 200 readings. It then calculates the period for one reading and displays it in the Seconds Between Readings display. If this value is greater than the set period by a few percent then the PC is unable to sample at the required rate. To overcome this situation first shut down any other Windows applications running on the PC and then try viewing the readings rather than the trends. The other alternatives to this problem are increase the period between readings, use a faster PC or use a custom program which runs under MS-DOS.

$ View Trends

VIEW_TRENDS

^KView Trends

$ # ^K **VIEWING ALARMS**

From the main menu click the View option and then choose Alarms.

The user is shown a text box which lists the last 50 alarm messages that have occurred. Each alarm message is time and date stamped. The user can scroll through the messages. Clicking the **Acknowledge** button causes all alarm messages marked with the word ALARM to be converted to the word ACKN. This allows a user a method of knowing which alarms he has seen before when he views the alarm history at a later time.

To view the current alarm status of each of the tags click on the button marked **Current**. Clicking on the **History** button returns the user back to the view of the last 50 Alarms.

$ View Alarms

VIEW_ALARMS

K View Alarms

$ # K VIEWING HISTORY

The user is able to view graphs or trends of a variable saved to a Log file. Note the user cannot view the variables being stored in the current logging file. In order to do this you have to cease logging by going to the Start/Stop Logging screen and click off the Start Logging check box.

To view a logged file from the main menu click the View option and then choose History.

The user first selects the logging file by clicking on the **Select File** button and then selecting the name of the required file. The user then clicks on the combo box labelled **Variable to Plot.** A list should appear containing all the variables stored in the log file. Selecting one of the variables causes the first 100 readings of the variable to be plotted on the graph. If the log file is time stamped then the x-axis is labelled with the time otherwise it is simply numbered.

Clicking the arrows of the spin button causes the next or previous 100 variable readings to be displayed on the graph.

$ View History

VIEW_HISTORY

K View History

$ # K CALIBRATION

This option allows the user to calibrate the ADC to establish a gain and offset constant for more accurate readings in the DAS005 and DAS010 modules. The user first connects a known voltage of 0 to 50mV to channel 1, keys its value in mVs into the input voltage display and then clicks the Offset button. The offset constant will appear in the offset display. The user then increases the voltage to between 3950 and 4000mVs, keys its value in mVs into the input voltage display and then clicks the Gain Button. The gain constant will appear in the gain display. The calibration constants are then saved automatically in the file "calibrat.cal" in the root directory of the c: drive. These are then loaded and used each time the I-SEE program is run.

$ Calibration

CALIBRATION

K Calibration