iLOG

Internet enabled RTU/Data loggers

infinite

1. Introduction

iLOG™ is a new generation digital RTU/data logger incorporating full Internet capabilities. This step by step tutorial intends to make you familiar with the advanced system capabilities, quickly and easily.

What you need:

- An iLOG-LAN unit with the SCT-04 adaptor.
- A RJ45 LAN cable.
- An Ethernet hub or a local area network outlet port supporting 10BaseT (10 Megabit) Ethernet connection.
- A unique TCP/IP address for the iLOG-LAN unit.
- A valid internet account with dial up connectivity service.
- A valid email account for data transfer.
- A PT100 temperature sensor

What you learn:

- Preparing the unit for a temperature measurement and recording. Setting the alarm limits and other alarm parameters.
- Viewing the iLOG Web page.
- Get an alarm email.
- Receive the recorded data in an email attachement.

2. Setting up a temperature measurement & recording

The most common type of RTD is the platinum resistance thermometer (PRT), with a practical operating range of -250 to 850°C. The most frequently used PRT is the Pt100 - so called because it has a resistance of 100 Ω at 0°C. Figure 1 contains the resistance-temperature curve for a PT100 sensor.
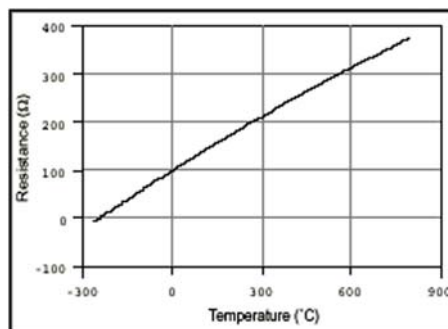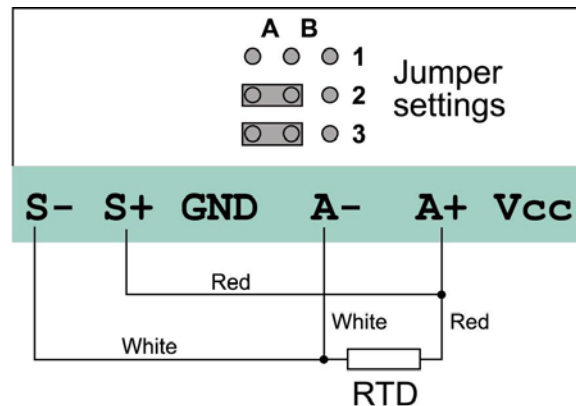

Figure 1. Resistance-Temperature Curve for a 100 Ω Platinum RTD

2. 1 Wiring

Connect the SCT-04 adaptor to the iLOG unit.

- Do not plug in or unplug the 25 pin D-connector during operation.
- Wire the PT100 sensor according to Figure 2 and put the jumpers to the 0-1V range position.

Figure 2. Wiring the PT100 sensor on the SCT-04 terminals.

Measurement is accomplished by driving a current through the sensor and measuring the voltage drop across it. The internal current source is used for the excitation of the RTD sensor by driving a current of 1.24 mA. The input voltage drop is in the 0-1V range.

- Complete the wiring by connecting the power supply to the SCT-04 adaptor.
- Power up the unit and set the Real time clock to the curent date and time:
  `(Menu)> Commissioning> Set RTC`
- Execute the **Factory settings procedure**, so that all device parameters are reset.
  `(Menu)> Commissioning> Factory Settings`
  Press <**OK**> and wait until the Factory settings procedure is completed.
- Set the 'Internet connect' parameter to the 'OFF' state.
  `(Menu)> Setup> Communication> Internet connect → OFF`

2. 2 Setting the measurement parameters

2.2.1 Calculations

The measurement range to set is –50 .. 595°C. The PT100 resistance is 100Ω at 0 °C and 138.5 Ω at 100°C. The resistance change in this almost linear section is 0.385 Ω /°C. Using this scaling factor and assuming an overall linear characteristic:

The input voltage drop at **-50 °C** (**Scale low parameter**) is calculated to:

Vin = (100-0.385*50)Ω * 0.00124 A = 0.1001 V

The input voltage of the internal A/D converter is:

Vadc = 0.1001V * **Gain** = 0.1001 mV * **10** = 1001 mV

The converted value is **1001**. This is the raw reading at scale low (**Sensor low parameter**).

The voltage drop **at 595 °C** (**Scale high parameter**) is:

Vin = (100+0.385*595)Ω * 0.00124 A = 0.408053V

Vadc = 0.408053V * Gain = 0.408053V * 10 = 4081 mV

The converted value is **4081**. This is the raw reading at scale high (**Sensor high parameter**).

2.2.2 Settings

Power up the unit and enter the menu by pressing <**MAIN**> and entering the default password <2466>.

`(Menu)> Setup> Measurement> Analog IN> Select channel> 1`

- Select the submenu '**Description**' and enter a naming for channel 1, e.g. → **Room temperature**. Press <**OK**> to save the entry.
- Select the submenu '**Unit**' and use the arrow keys to select the measurement unit → **°C.**
- Select the submenu '**Scale low**' and enter the value → **–50**.
- Select the submenu '**Scale high**' and enter the value → **595**.
- Select the submenu '**Sensor low**' and enter the value → **1001**.
- Select the submenu '**Sensor high**' and enter the value → **4081**.
- Select the submenu '**Linearization**' and press the **arrow keys** to select → **PT100**. This option is selected to enable PT100 sensor nonlinearity correction at lower and higher temperatures.
- Select the submenu '**Gain**' and press the **arrow keys** to select → **High**. This option sets the channel gain to 10.
- Select the submenu '**RTD supply**' and press the **arrow keys** to select → **ON**. This option is selected to declare the use of the internal current source for sensor excitation.

2. 3 Setting the logging parameters

`(Menu)> Setup> Log> Log channels`

Press the **up arrow key** to select channel 2 and <**F1**> to deselect channel 2 for logging. Proceed in the same way to disable logging for channels 3 and 4. The 'Log channels' screen, after disabling not used channels, should be:

```
     Ch1 Ch2 Ch3 Ch4
Log : *


F1-Change    OK-Next
```

Press <**OK**> to save the settings. Wait until the FIFO is formatted according to the new setting. Enable alarm logging by selecting the option:

`(Menu)> Setup> Log> Logging mode`

Press <**OK**> to leave the field 'Channels' unchanged. Press <**F1**> to enable alarm logging by setting the respective option to 'YES'. Press <**OK**> to save the settings and leave the menu. A new FIFO formatting is initiated.

```
Channels: All
Alarms  : Yes
DI      : No
F1-Change   OK-Next
```

Now set the logging rate to **300** sec (one record every 5 minutes):

(Menu)> Setup> Log> Log rate → 300

Press <**OK**> to save the setting.

2.4 Viewing the main screen

Press '**ESC**' to leave the menus and enter the main screen.

```
Room temperature
C1=25.3 °C
L=0        H=4095
02/05/06    13:12:30
```

The unit logs one record every 5 minutes according to the logging rate setting. We can see these logs by selecting the menu option:

(Menu)> View FIFO> Select channel> 1

```
Channel 1
Record:00001/00003
02/05/06  13:13:06
C1=25.2 °C
```

2.5 Setting the alarm limits

(Menu)> Setup> Measurements> Analog IN> Select channel> 1

- Select the submenu '**Alarm low**' and enter the value → **15** (°C).
- Select the submenu '**Alarm high**' and enter the value → **35.8** (°C).

(Menu)> Setup> Alarm> Prealarm → 0.9 (%)

The prealarm limit is entered in % of the total scale (645°C). The setting above means that a prealarm will be announced if the temperature exceeds the limit of 30°C (0.9%*645°C ~ 5.8°C).

(Menu)> Setup> Alarm> Alarm deadband → 0.3 (%)

The alarm deadband is entered in % of the total scale (645°C). The setting above means that a +/-1.3°C hysteresis will be adapted near the alarm limits to prevent bouncing.

Press '**ESC**' to leave the menus and enter the main screen.

Now warm the RTD sensor until the sensor temperature rises above the high alarm limit. When the temperature reaches 30°C, the prealarm is announced by turning **Output 1** on SCT-04 to '**ON**'. High alarm is announced by turning the **Output 2** to '**ON**' if the temperature exceeds the high alarm limit of 35.8°C. The temperature reading on the main screen starts blinking, displaying the alarm condition.

The alarm event is logged in a special alarm log:
(Menu) > View alarm log

```
02/05/06        13:16
Channel 1
High alarm
ESC-Back Anykey-Next
```

3. Setting up an internet connection

3.1 Setting the TCP/IP parameters

Connect the iLOG-LAN unit to the local area network using the RJ45 cable.

Consult your network administrator to get the proper TCP/IP parameters for a LAN connection to the internet.

- Enter the device IP address:

  **(Menu)> Setup> Communication> TCP/IP param> IP address →
  x.x.x.x**

- Enter the Domain name server address:

  (Menu)> Setup> Communication> TCP/IP param> DNS → x.x.x.x

- Enter the Gateway address:

  **(Menu)> Setup> Communication> TCP/IP param> Gateway →
  x.x.x.x**

- Enter the Subnet mask:

  **(Menu)> Setup> Communication> TCP/IP param> Subnet Mask →
  e.g. 255.255.255.0**

- Now, set the 'Internet connect' parameter to the 'ON' state.

  (Menu)> Setup> Communication> Internet connect → ON

  Press <**OK**> to save the setting.

Press '**ESC**' to leave the menus and enter the main screen. The iLOG unit connects to the internet and launches the internal web server.

```
Start web server...
```

Wait until the connection procedure is completed and the main screen appears.

3. 2 Viewing the Web page

Open your internet browser and type in the iLOG-LAN IP address. The unit web page is loaded on the browser screen.

4. Getting an alarm email

4. 1 Setting the email parameters

Set up all email account related parameters:

`(Menu) > Setup > Communication > e-mail`

e-mail SMTP   →   **eg. mail.corpmail.gr**
e-mail POP3   not needed
e-mail Username →   **eg. thomas@indinf.gr**
e-mail Password →   **eg. 4554**
e-mail Recievers →   **eg. george@indinf.gr** (your email address)

Now enable alarm announciation via email:

`(Menu)> Setup> Communication> Alarm send mode`

Select the EMAIL field and press <**F1**> to enable alarm announciation via email.

```
      Alarm Send Mode
      EMAIL       SMS
        *           *
      Arr-Select F1-Change
```

Press <**ESC**> to leave the menus and enter the main screen.

Now warm the RTD sensor again. Keep warming until the sensor temperature reaches the high alarm limit (35.8°C). The iLOG unit initiates an email transmission containing the alarm announciation.

Open your email client application (Outlook express, Eudora, etc.) to view the alarm email with a text content as:

```
iLog01 Room temperature (AI1) High Alarm
```

5. Receiving logged data in an email attachement

Set the data send rate to 30 minutes:

`(Menu)> Setup> Communication> Send rate` → **30**

The unit will send every 30 minutes the data logged during this period.

Now enable data transmission via email:

`(Menu)> Setup> Communication> Data send mode`

Select the Email field and press <**F1**> to enable data transmission via Email.

```
      Data Send Mode
       EMAIL     FTP
         *
      Arr-Select F1-Change
```

Press '**ESC**' to leave the menus and enter the main screen. Wait until you receive a data email.

Open the attachement file (.xls) with Excel. The file contents are similar to the following:

```
Station      iLog01

AI1          Room temperature

DATE         TIME       AI1       ALARM1
02-05-06     13:35:20   27.2
02-05-06     13:40:00   26.1
02-05-06     13:45:00   25.4
02-05-06     13:50:00   24.9
02-05-06     13:58:56   24.2
02-05-06     14:00:00   24
02-05-06     14:05:00   24.2
02-05-06     14:10:00   24.5
02-05-06     14:15:00   24.2
02-05-06     14:20:00   24.5
02-05-06     14:25:00   24

ALARM LIST
DATE         TIME       CHANNEL   TYPE
02-05-06     13:16:36   AI1       H
02-05-06     13:23:54   AI1       L
02-05-06     13:29:02   AI1       H
```

Figure 3. Data file contents