AmigaTemp

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AmigaTemp		
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AmigaTemp

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AmigaTemp

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Chapter 1

AmigaTemp

1.1 AmigaTemp V1.1



What is AmigaTemp

News in AmigaTemp V1.1

Software

Hardware

ARexx

1.2 What is AmigaTemp

AmigaTemp is a simple thermometer for the Amiga computer. You connect it to Joystick port #2. AmigaTemp can measure the temperature on seven different places at the same time.

If you have any questions/problems/bug-reports write to

t194hfl@student.hgs.se

1.3 News in AmigaTemp V1.1

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```
1) ARexx support.

2) Alarm.

3) Supports the SMT-sensor which gives a more accurate temperature than the NTC-resistors

.

4) More display types.

5) Temperature in Celsius or Fahrenheit.

If you have built the old type of sensor with only NTC-resistors
you can still use it with the new version.
```

1.4 Hardware

```
Component list :
NTC (Max 2)
  1 NTC-resistor
   Cable ( 2 conductor )
SMT (Max 5)
              SMT-sensor
                * 1 120 Ohm resistor
 **1 20nF capacitor
   Cable ( 3 conductor )
  9-pin D-Sub Female + Cap
 *) Not necessary but it protects your computer from short circuits.
 \star\star) Not necessary but if you have a long cable and the measured temperature
     is to high you should connect it.
What should I choose ( NTC or SMT ) ?
   NTC-resistors are cheep.
   SMT are quite expensive.
   SMT have high accuracy over a large temperature range.
   NTC-resistors have low accuracy ( The built-in A/D has only 8 bits ).
What you have to think about when you selects NTC-resistors:
   1) Max resistance 528kohm.
   2) The A/D converters have an accuracy of 582k/256 = 2.1kohm,
      a difference in resistance less than 2.1kohm gives no
      temperature difference!
   Suggestion: NTC #1 Outdoors R25 = 10kohm (R25=resistans at 25 degrees \leftrightarrow
      Celsius)
                NTC #2 Indoors R25 = 100kohm
```

If you place any of the sensors inside the cap the computer will

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increase the measured temperature

I take no responsibility if you damage your computer or anything connected to it. The risk is however very small that something will be damaged.

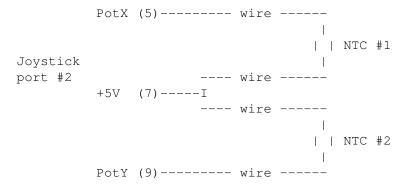
Check all solderings carefully.

Pin numbers are valid for A500 and A1200 and probably for all Amiga computers. If you are not sure check with the manual.

The pin numbers are printed on the D-Sub.

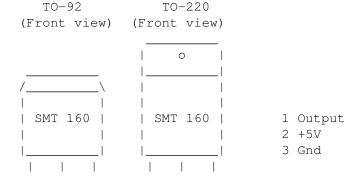
Connect the NTC-resistors between +5V (Pin 7) and PotX (Pin 5) or PotY (Pin 9).

Ex:



Connect the SMT-sensors to +5V (Pin 7), Gnd (Pin 8) and pin 1, 2, 3, 4 or 6.

Ex:



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Mount the cap.

If you are going to measure the outdoor temperature you must protect the sensor from moisture.

1.5 Software

```
You can start AmigaTemp from WB or CLI.

From WB

Double-click on the AmigaTemp icon.
You can also drag the AmigaTemp icon to the WBStartup drawer.
See also Tool Types.

From CLI
Enter AmigaTemp on the command line and press return.
See also Tool Types.

Intro
Menu choices
Calibrate NTC
Calibrate SMT
Window
```

1.6 Tool Types

AmigaTemp supports the following Tool Types:

```
DONOTWAIT
               Needed if program is started from the WBStartup drawer.
   TOOLPRI
               'Exec Task' priority.
   STARTPRI
               Start priority for programs in the WBStartup drawer.
   PUBSCREEN
               Screen name for AmigaTemp.
   CX POPKEY
               Key combination to show the AmigaTemp window.
               Ex 'CX_POPKEY = lalt a' (Press left Alt + a).
   CX POPUP
               If 'CX_POPUP = YES' use window settings from
               AmigaTemp.config.
               If 'CX_POPUP = NO' don't open a window at start-up.
   CX_PRIORITY Commodities priority.
You can also use Tool Types from CLI.
Ex: HD0:>AmigaTemp CX_POPUP=NO
```

1.7 Intro

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When you run the program for the first time you will see a requester. Press OK until it's disappears.

One little window will pop up.

Choose the Config menu and select the sensors you have connected (You see the type and pin number for every sensor in the menu). Click in the Connected gadget in the window that pops up. Click on Use.

Choose the View menu and select View Big. In the window that pops up you choose the order in which the sensors will be viewed. I you have two sensors you click one time on the uppermost gadget and two times on the second gadget.

Click on Use.

Project menu :

Repeat for all windows.

Select Save Config from the Project menu.

The SMT-sensors shows the correct temperature, but the NTC-sensors must be calibrated .

1.8 Menu

Hide : Closes the AmigaTemp window, but the program continues to read the temperature. View the window again with the key combination in CX_POPKEY (Tool Types), or use Exchange (System: Tools/Commodities/Exchange) Small Window: Switch to Small window Window: Switch to Big Compact Window: Switch to Compact window Analog Window: Switch to Analog window Auto Save : When selected all settings are saved every 30 minutes. Save Config : Saves all settings in S:AmigaTemp.config. : About the program. About Quit : Quit the program. Config menu : : Settings common for all sensors: Common Samples NTC : Number of samples for the NTC-resistors. Normally 3. Samples SMT : Number of samples for the SMT-sensors. Normally 1000.

Time between measurements in seconds.

Time :

Feedback:

Normally 3 sec.

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```
Determine how much of the old measurements
                        that should be used in the new temperature.
                        Max 0.999999.
                     NumDec :
                        Number of decimals in the temperature (0-4).
                        View temperature in Celsius or Fahrenheit.
   Config for each sensor :
                     Connected:
                        Select this if the sensor is connected.
                        Name of sensor. This name is viewed in all windows.
                     Max/Min :
                        Alarm if temperature is higher/lower.
                        Text viewed at alarm.
                     Alert :
                        View an Alert if alarm.
                     Req:
                        View a requester if alarm.
                        Uses WB sound setting (Flash screen or play a sound)
                        if alarm.
                     ARexx :
                        The ARexx command 'Alarm' returns 'Max' or 'Min'
                        if alarm. See also ARexx
                     Repeat :
                        If repeat is selected the alarm is repeated
                        every X second (X = Value in Time gadget).
                     Calibrate :
                        For NTC-resistors see Calibrate NTC
                        For SMT-sensors see Calibrate SMT
View menu:
   Select in with order the temperatures are going to be shown.
   You can only choose sensors which are connected.
   See Config/Config for each sensor/Connected.
```

1.9 Window

```
Small Window
Opens a window with only a window title which shows sensor name and temperature.

Big Window
Opens a window which shows the temperature, tendency (+/-) and sensor name. The window also shows max/min temperature and date.
Reset resets max/min temperatures and dates.

Compact Window
Opens a window which shows sensor name, tendency (+/-) and temperature.

Analog Window
```

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Opens a window and shows the temperature in an analog format.

1.10 Calibrate SMT

You don't need to calibrate the SMT sensors , but you can tune the temperature with C1 and C2.

1.11 Calibrate NTC

Before the NTC-resistors shows right temperature they need to bee calibrated. The program must know the resistance at to different temperatures not to close to each other. For example indoor and outdoor temperatures.

- 1) Select one of the NTC-resistors from the Config menu and click on the Calibrate gadget.
- 2) Place the NTC-resistor for instance outdoors.
- 3) Enter the outdoor temperature in the Temp1 gadget. (Measured with another thermometer.)
- 4) Wait until the value in 'Res' have been stabilized. 'Res' is the NTC-resistor resistance in ohm.
- 5) Click on the OK gadget. (On the same line as Temp1)
- 6) Place the NTC-resistor for instance indoors.
- 7) Enter the indoor temperature in the Temp2 gadget. (Measured with another thermometer.)
- 7) Wait until the value in 'Res' have been stabilized.
- 8) Click on the OK gadget. (On the same line as Temp2.

```
Temp = Actual temperature.
Res = The NTC resistance.
Max = Maximal temperature that can bee measured.
Min = Minimal temperature that can bee measured.
A = Material constant for the NTC-resistor.
B = Material constant for the NTC-resistor.
```

9) Click on Save.

1.12 ARexx

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```
AmigaTemp V1.1 supports ARexx.
Info:
   Port name : 'AmigaTemp'
   <sensor> : Sensor number between 1 and 7.
            : Result of last command.
   result
            : = 0 \text{ If } OK.
   rc
               = 1 If sensor not connected ->
                   Connected gadget not selected in Config menu for the sensor.
               = 2 If sensor not found ->
                 \langle sensor \rangle < 1 \text{ or } \langle sensor \rangle > 7.
For more info see the example programs in the ARexx drawer!
AmigaTemp ARexx commands:
Version
   result = Version of the program.
DegreeType
   result = 'CELSIUS'
                          if the temperature is in Celsius.
   result = 'FAHRENHEIT' if the temperature is in Fahrenheit.
NumDecimal
   result = Number of decimals in temperature.
NumSensor
   result = Number of sensors. In this version 7.
Temp <sensor>
   result = Actual temperature.
Name <sensor>
   result = Name of sensor.
Tendency <sensor>
   result = '+' if temperature is rising, '-' if temperature is
             falling and ^{\prime} ^{\prime} if temperature is stable.
Reset <sensor>
   Resets max/min temperature and date.
Ouit
   Quits the program.
Max <sensor>
   result = Highest temperature since last reset.
   See also DateMax.
Min <sensor>
   result = Lowest temperature since last reset.
   See also DateMin.
DateMax <sensor>
```

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```
result = Date when the temperature were highest.
DateMin <sensor>
   result = Date when the temperature were lowest.
Alarm <sensor>
   result = 'Max' if temperature is too high and ARexx is selected
            in the Config menu for the sensor.
   result = 'Min' if temperature is too low and ARexx is selected
            in the Config menu for the sensor.
   else result = 'No'
AlarmMax <sensor>
   result = Alarm if temperature is higher than this temperature.
AlarmMin <sensor>
   result = Alarm if temperature is lower than this temperature.
AlarmTextMax <sensor>
   result = Text shown when temperature is too high.
AlarmTextMin <sensor>
   result = Text shown when temperature is too low.
Save
   Save all settings. Same as Save Config in the Project menu.
Load
   Loads saved setting. Avoid this command because the result is hard
   to predict.
```

1.13 SmartTemp

```
SMT160-30
```

The SMT-sensor sends the temperature in digital form to the computer (Duty-cycle modulated). This eliminates the problems with calibration

There are three different versions of the SMT-sensor. TO92 is the cheapest.

```
Data for SMT160-30 (TO92):
```

Total accuracy : +/- 1.2 degree Celsius (-30 - +100 degree Celsius)

Non-linearity : 0.2 degree Celsius

Temperature range : -45 - +130 degree Celsius

Supply voltage : 5V
Supply current : <200uA
Frequency : 1-4kHz
Impedance : 2000hm

1.14 NTC-Resistors

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```
NTC-resistors have a very temperature dependent resistance.
NTC = Negative Temperature Coefficient = lower resistance at higher temperatures.

NTC-resistors consists of chrome, manganese, iron, cobalt and nickel.
R = A * e^(B / T) there

R = Resistance in ohm
T = Temperature in Kelvin = Degree Celsius + 273.15
A = Material constant
B = Material constant
R25 = Resistance at 25 degree Centigrade.
```

1.15 D-Sub

Same type of contact as for a joystick (9-pin female).