

TC4 TempCam Software Overview

Introduction

This document provides an overview of the software available for the TC4 TempCam that is required for set up and commissioning and that can be used as part of an ongoing monitoring system utilizing a standard Ethernet network.

The TC4 TempCam is a multi point, infrared temperature monitor that is designed to provide continuous, non-contact temperature monitoring inside mission critical electrical or mechanical equipment. The TC4 also incorporates a CCTV camera that is used to during installation to target and align the camera and to identify the temperature objects to be measured in the camera field of view. The camera can also be used to inspect the inside of the equipment whenever there is a temperature problem identified. The TC4 is designed as a continuous monitoring alternative to performing periodic manual checks of equipment by using a hand held infrared camera.

The temperature data from the TC4 is provided in a Modbus format, allowing it to be easily integrated to standard SCADA monitoring systems. The video feed is a standard analog CCTV protocol that is easily networked.

Hana Engineering has also developed a PC based software that is used to initially set up and commission the TC4 in place. This software is used to create a “set file” that remembers the specific objects in the field of view that will be monitored for temperature. This set file then is used at a central monitoring point to translate the streaming data into the specific temperature of each object identified during the commissioning process. The equipment necessary for performing this on site set up is a Hana router/encoder (Model TCN8A) that interfaces the PC software to the TC4 TempCam.

The software shown in this overview can also be used as a continuous monitoring platform. It requires the use of at least one Hana router/encoder for up to eight TC4 TempCams. Each router/encoder can be connected to a standard Ethernet network and the software is installed on a PC connected to the network.



Monitoring Example

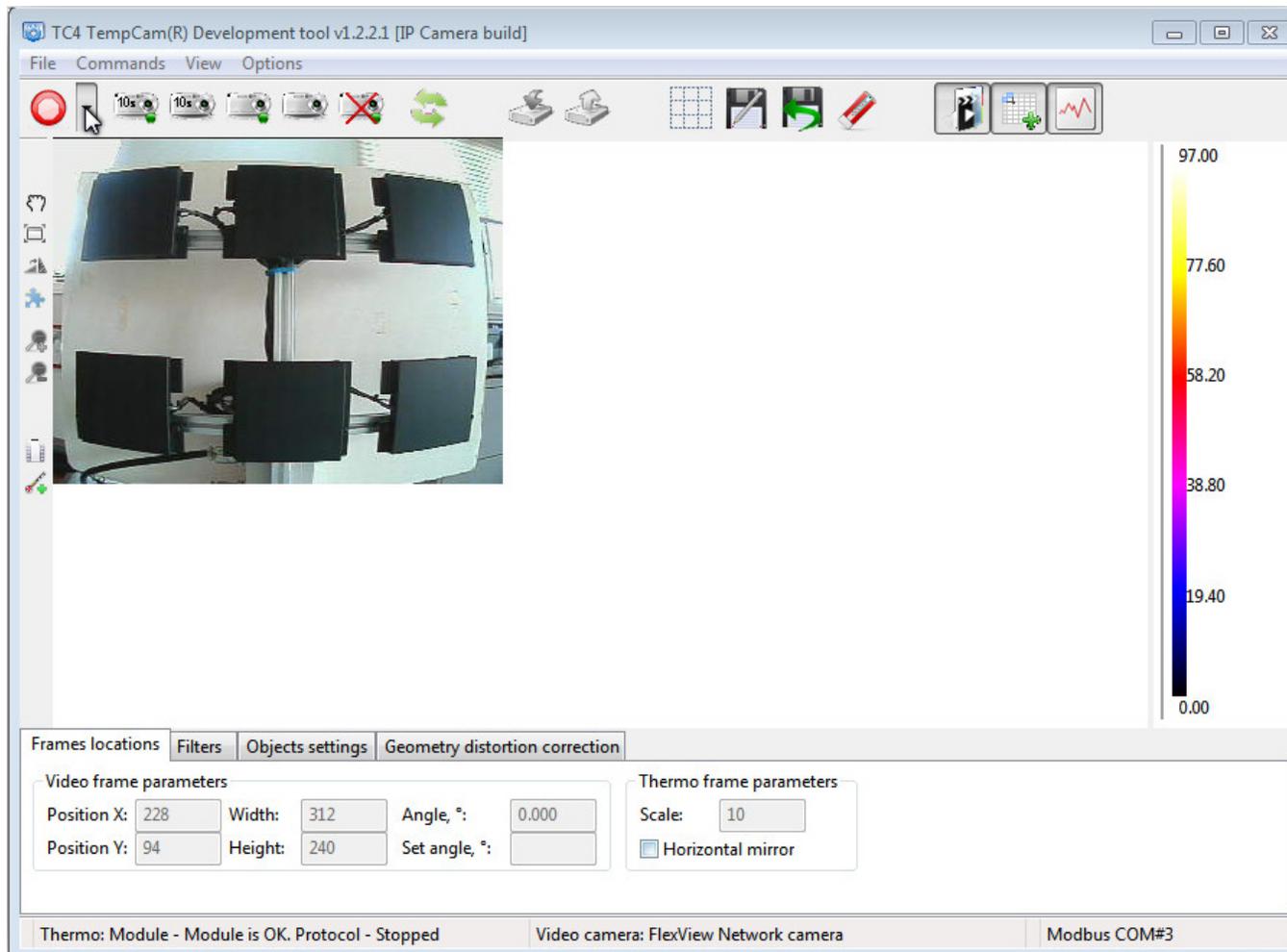
The TC4 TempCam is designed to be installed inside the close quarters of enclosed electrical equipment to monitor the temperature of interior components. Examples of equipment the TC4 is designed for include switchgears, busbars, vacuum breakers and cubicle panels. Typically the camera is placed within 50 to 200 cm of the objects to be monitored. Versions of the TC4 are available with a 50° and 75° field of view, allowing the TC4 Tempcam to view a large area, even when mounted in a very confined space.

In this overview we will be using a test and training rig that has been designed by Hana Engineering to simulate a typical installation. As shown in the picture below, the test rig includes a mounting stand for the camera and second stand that has six black body heaters. The heater temperature can be individually set using a controller also shown in the picture. In this test setup the camera is approximately 35 cm (14") from the heated sources.



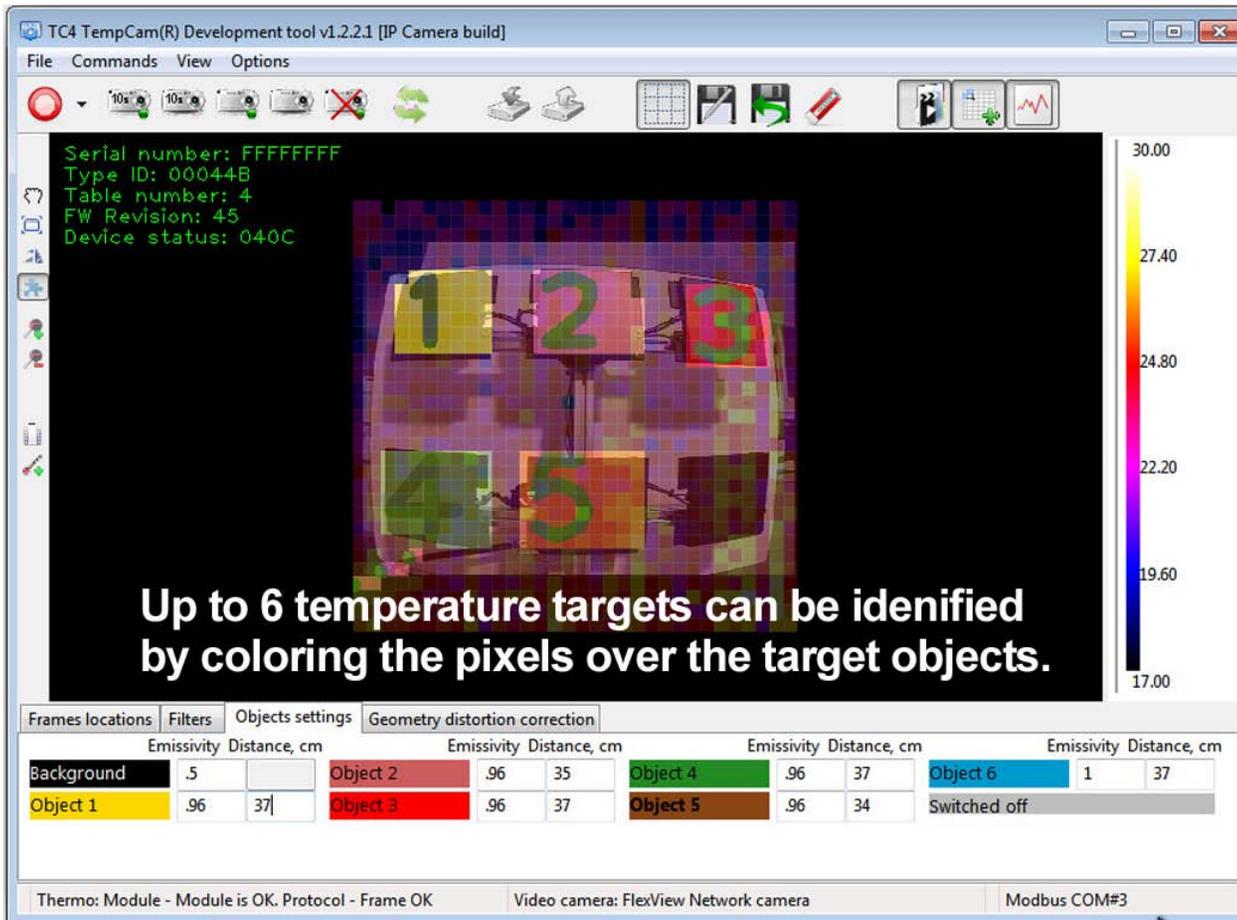
CCTV View

The screen shot below shows the CCTV view of the target objects.



Designating Temperature Targets

The screen shot below shows a combined video and IR view with a pixel grid overlay. As would be typical in a real installation, the equipment is shut off and the heaters are at ambient temperature. Temperature measurement targets (up to 6) can be designated by coloring the pixels in the color corresponding to the object as defined in the lower part of the screen. Each target also requires the input of the emissivity of the target surface and distance from the TC4 TempCam. In this example five of the targets have been designated. As each target is created the number of the target appears on the visual overlay. Once all objects are identified, a set file is created that stores the information on the location and characteristics of the objects identified. This is then used in the monitoring software to identify the temperature of each object for that installation.



Serial number: FFFFFFFF
 Type ID: 00044B
 Table number: 4
 FW Revision: 45
 Device status: 040C

Up to 6 temperature targets can be identified by coloring the pixels over the target objects.

	Emissivity	Distance, cm		Emissivity	Distance, cm		Emissivity	Distance, cm		Emissivity	Distance, cm
Background	.5		Object 2	.96	35	Object 4	.96	37	Object 6	1	37
Object 1	.96	37	Object 3	.96	37	Object 5	.96	34	Switched off		

Thermo: Module - Module is OK. Protocol - Frame OK Video camera: FlexView Network camera Modbus COM#3

Monitoring Mode

This screen shot shows an example of the software in a monitoring mode where the IR image of the targets is shown on the upper left, actual streaming temperature is shown on the bottom and graphed temperatures are shown on the upper right. In this example the heaters are turned on to represent heating that would typically occur in electrical equipment. The software also allows for the definition different types of warnings and alarms. The CCTV camera feed can be activated and the LED light source turned on to inspect the equipment at any time, though this would typically take place on alarm. AN overlay of the IR and visual image is also possible.

