Advanced Thermoelectric Cooler Controller (ATCC4810)

Features

- Control of thermoelectric modules up to 10A, from 16 to 48V.
- new — Possibility to connect to other ATCC4810 to increase total power delivery.
- Stand-alone module.
- Unidirectional control only (Cold or Hot).
- Real-time data monitoring.
- Compatible with NTC, PTC, RTD sensors.
- Supports fans, with or without tachometer.
- PID controller.
- Alarms detections.
- Easy to configure via PC (USB) or external MCU (SPI).
- Protections circuits : Thermals protections, over-current.
- new — 600kHz PWM control with ramp-up and saturation of command.
- Possibility to connect a display to output temperatures.

Applications

- Air conditioner
- Liquid chillers
- Laser diode cooler
- CCD cooler

Overview

The ATCC is especially made to drive Peltier cells (thermoelectric cells). The Peltier cells are made to transfer thermal energy from a hot plate (not thermally regulated) to a cold plate (thermally regulated). The ATCC regulates the temperature of a plate by controlling the current level applies to Peltier cells. It measures the temperature of the thermally regulated plate, compares it to a setpoint and applies the regulation transfer function, which is a fully configurable PID.

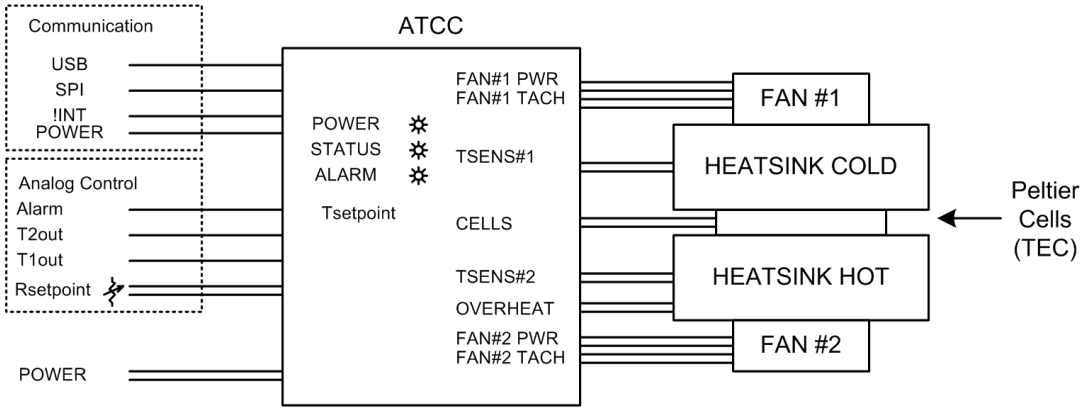

Fig.1 Overview of ATCC external connections

Ordering information

Part Number	Purpose	Temperature range
ATCC4810	Main Board	-20°C to +85°C

All products mentioned above are Lead-free/RoHs compliant.

Sysacom R&D Plus Inc.
275A, Pierre-Le Gardeur Blvd
Repentigny, Québec
Canada J5Z 3A7

Phone : (450) 585-6396
Web : www.sysacom.com

Functions

FUNCTION	DESCRIPTION
FANS	
Output	Two fans outputs (for both plates) are open-drain collector connected to Vin and control driven by MCU. System can operate with or without fan.
Input	Two inputs are provided to read thermostat in order to stop fans if fault is detected (e.g. fan has slow down). Alarm can be set or not, independently.
SENSORS	
Plate temperature sensors	Two temperature sensors must be connected on each plate of TEC in order to detect a temperature fault. Ranges of temperature are fully configurable.
External Set Point	The Set Point can be either external or internal. When using external, temperature is set via a potentiometer.
Current Sensor	A current sensor permit to measure current that goes to the TEC. It can avoid over/under current faults (hardware circuit), but is also an indicator indicating nominal current that goes to the drive, and can limit command.
Thermostat	An input is provided in order to branch a Normally-Closed thermostat on non-regulated plate. As soon as fault is detected, system stops.
Drive thermal protection	Drives possess a thermal flag that can cause the system to stop.
COMMUNICATION	
USB	A mini-B type USB connector can be used to set up parameters of TEC, and to select features of product. An interface permits to easily configure ATCC.
SPI	An external MCU can be connected to ATCC via an external SPI.
OUTPUTS	
Alarm output	An open-drain alarm output is also provided in order to branch an external signal (ex: LED, buzzer).
Status LEDS	Three LEDS indicates states of ATCC (Run, Work, Alarm).
DAC output	Two DAC outputs are used in order to supervise plate temperatures as analog signals.
MECHANICAL	
Terminal Blocks	All signals and supply of the board are connected to PCB pins. These pins can then be interfaced to terminal blocks via an expansion board. Sysacom provides an expansion board, and furnish all footprints in order to make a custom electrical interface.

Specifications

ATCC2707 main board	
Electrical	
Supply/output Voltage (Vdc)	16 to 48
Supply/output Current (A)	Up to 10
Supply/output Power	Up to 480W
No-Load Supply Current (A)	0.4
Alarm output	Up to 40V/0.5A
Fans output current (A)	Up to 0.5
Performance	
PWM frequency (kHz)	600
PWM precision (%)	1
PWM variation speed (%/s)	1
Temperature Error (°C)	+/- 0.1
Temperature Resolution (°C)	0.03
Fan speed (RPM)	Up to 20000
Environment	
Operating Temperature (°C)	-20 to 85

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