



FSC1400
SYSTEM FAN
SPEED CONTROLLER KIT

No. FSC1400-xx Revision A

INSTALLATION GUIDE

Publication No. 8401400-031612



WARRANTY

The following is an abbreviated version of Trenton Systems's warranty policy for computer products. For a complete warranty statement, contact Trenton or visit our website at www.TrentonSystems.com.

All boards used in systems delivered by Trenton are covered under a pass-through warranty. For example, if Trenton PICMG 1.3 SHBs and backplanes or embedded motherboards are used in a system then these Trenton boards will carry a five-year warranty. All other system sub-components including but not limited to system fan speed controller boards, power supplies, DVDs, CD-ROMS, etc. are covered under their original manufacturer's warranty. All systems built by Trenton are warranted against defects in material, workmanship and design for a period of one year from date of delivery. Repair or replacement products will be warranted for a period of three months from the date of shipment or for the remainder of the original warranty period for that particular product, whichever is longer. Any software or firmware that is delivered by Trenton will be warranted for a period of one year to perform in accordance with published specifications prepared, approved and issued by Trenton and/or the appropriate 3rd party vendor. Contact Trenton for the complete system warranty policy.

Buyer agrees that if a Trenton product proves defective, Trenton is only obligated to repair, replace or refund the purchase price of this product at Trenton's discretion. The warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Trenton; or if failure is caused by accident, acts of God, or other causes beyond the control of Trenton. Trenton reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

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Products returned for repair must be accompanied by a Return Material Authorization (RMA) number, obtained from Trenton Systems prior to return. Freight on all returned items must be prepaid by the customer, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned from Trenton Systems via Ground, unless prior arrangements are made by the customer for an alternative shipping method

To obtain an RMA number, call us at (800) 875-6031 or (770) 287-3100. We will need the following information:

- Return company address and contact
- Model name
- Serial number from chassis label
- Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report for each item and return the product(s) to our Gainesville, GA facility:

TRENTON
2350 Centennial Drive
Gainesville, GA 30504
Attn: Repair Department

Contact Trenton for our complete service and repair policy.

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Handling Precautions

WARNING: The system fan controller board and the system itself include components that may be damaged by electrostatic discharge.

To protect sensitive components from electrostatic damage, be sure to observe the following precautions when handling or storing the backplane:

- Rackmount computer weight varies from 20lbs. (9.08kgs.) to 60lbs. (27.24kgs.), use proper lifting techniques and at least two individuals when moving and installing the system.*
- When removing or installing boards and sub-components, keep these components in their static-shielded bag and/or packaging until you are ready to for component installation.
- Handle the sub-components by their edges.
- Do not touch any sub-component I/O connector pins. Do not apply pressure or attach labels to the board-level sub-components.
- Use a grounded wrist strap at your system or ground yourself frequently by touching the metal chassis of the system before handling any sub-components.
- Ensure the systems external power source has a solid connection to an earth ground.
- Use antistatic padding on all work surfaces when installing or removing sub-components.
- Avoid static-inducing carpeted areas.

*Actual system weight is a function of the specific computer platform and the system configuration.

Before You Begin

INTRODUCTION

It is important to be aware of the system considerations listed below before installing your Trenton system fan controller. Overall system performance may be affected by incorrect usage of these features.

EXTERNAL POWER SOURCE

After the FSC1400 installation is complete, incoming power must be re-supplied to the specific system connection(s) located on the rear of the chassis. Proper power connection ensures that the main system power supply is connected to a power source with a solid earth ground and is capable of delivering the correct voltage level and type need by the specific system configuration.

INTERNAL 5V CURRENT LIMIT

The typical maximum current limit for the 5V line output from the system power supply is usually around 25A. The system's power monitoring circuits will shut the system down in the unlikely event that more than 25 Amps is drawn from the power supply. The specific sensed level and shutdown operation depends on the specific system configuration

CHASSIS AIRFLOW

When installing the system, ensure that a minimum free air space is available around the system. Typical installations have a minimum of 4-6 inches (101-152mm) behind the chassis and 1-3 inches (25-75mm) in front of the chassis. However, specific clearance requirements are a function of the unique system chassis design.

CHASSIS RACK MOUNTING

The mounting location must be tall enough to accommodate the computer's height and deep enough to accommodate the system's depth, while providing the proper clearances for airflow and cabling. Cabinet depth requirements will vary by specific computer enclosure type and dimensions.

INCOMING SYSTEM POWER & BACKPLANE POWER INDICATORS

CAUTION: Remove the incoming system power connection or connections before installing the FSC1400 System Fan Speed Controller.

CAUTION: Before starting the FSC1400 installation procedure, make sure that all backplane power indicator LEDs are off. Pay particular attention to the status of the 5V LEDs to ensure that they are off.

CAUTION: Ensure that both the chassis and the installer are properly grounded before starting the FSC1400 System Fan Speed Controller installation procedure.

CAUTION: Failure to observe these cautions and follow the FSC1400 installation procedures properly may result in injury and/or system damage.

Chapter 1 - Fan Speed Controller Overview

DESCRIPTION

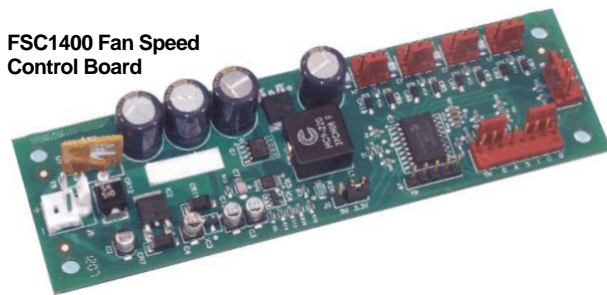
The FSC1400 is a fan speed controller and alarm board designed for use in Trenton’s PICMG 1.3 SHB-based rackmount computers and video wall controllers. The FSC1400 controls and monitors tach pulses from up to four system fans. The controller also accepts fan speed commands (including on/off) and provides individual pass/fail fan status via an I2C interface to the computer’s system host board. Fan speed can also be based on temperature via the provided sensor. The I2C interface also provides temperature readings from an on-board thermistor and EEPROM storage. Voltage to the fans is varied using a current mode buck control circuit, and the FSC1400 is compatible with system fans that provide open collector or voltage source tach pulses.

PACKING LIST

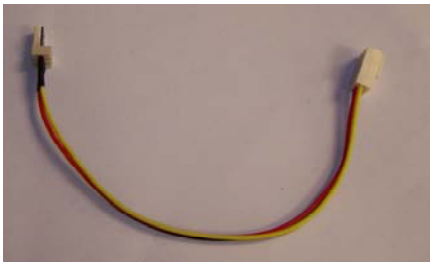
The FSC1400 System Fan Controller Kit includes the following components needed for installing the controller in a Trenton PICMG 1.3-based industrial computer.

- 1 - FSC1400 Fan Speed Control Board
- 4 - Fan Adapter Cables
- 1 - Power Cable
- 1 - External Thermistor
- 1 - Jumper
- 4 – Standoffs

FSC1400 Fan Speed Control Board



Fan Adapter Cables



Power Cable



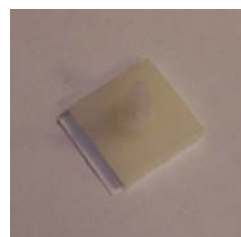
External Thermistor



Jumper



Standoff



Chapter 2 - Installation Instructions

INSTALLATION PROCEDURE

CAUTION: Remove the incoming system power connection or connections before installing the FSC1400 System Fan Speed Controller.

1. Insert the four standoffs through the mounting holes of the FSC1400.
2. Choose the proper location for the FSC1400. Remove the wax paper covering the sticky area of the standoffs. Press the FSC1400 onto the surface to secure it. Remember, it will need to be located where all of the connecting cables will be able to reach it.
3. Connect the power cable to an available 4 pin power plug from the power supply. Connect the other end to J5 of the FSC1400.
4. Connect the Fan Adapter Cables to F1 through F4 (or F3 if only 3 fans).
5. Disconnect the chassis fans from their current power source and connect them to the Fan Adapter Cables.
6. Connect the External Thermistor to J7 (refer to diagram). Mount the Thermistor where it will give an accurate reading of the chassis temperature. Do not mount it close to a localized heat source.
7. If I2C capability is desired, connect I2C data and clk to J7 (refer to diagram).
8. Re-connect incoming system power.

OPTIONAL: If you are using 5V I2C, move Jumper J6 to 5V. Alarm or “Good” LEDs may be connected to J8. In the diagram, the Red led indicated an alarm condition. The green led indicated proper operation.

NOTE: If only three fans are being monitored, insert the Jumper in J7, connecting “S” to “G” (Refer to Figure 1 – FSC1400 Layout Drawing)

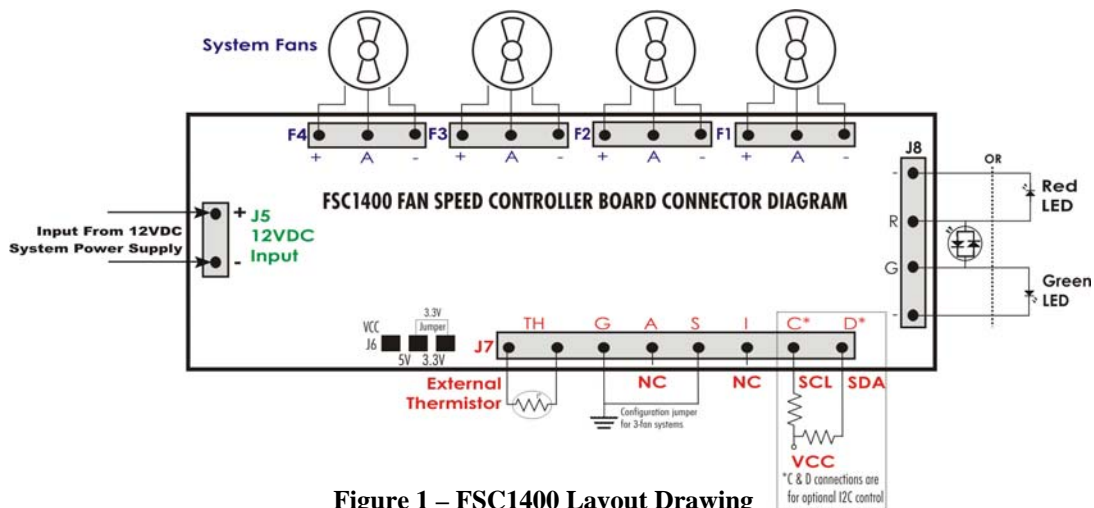


Figure 1 – FSC1400 Layout Drawing

COMPLETED FSC1400 INSTALLATION EXAMPLE

Figure 2 illustrates how a completed installation should look after installing the FSC1400 in a PICMG 1.3-based industrial computer having three system fans.

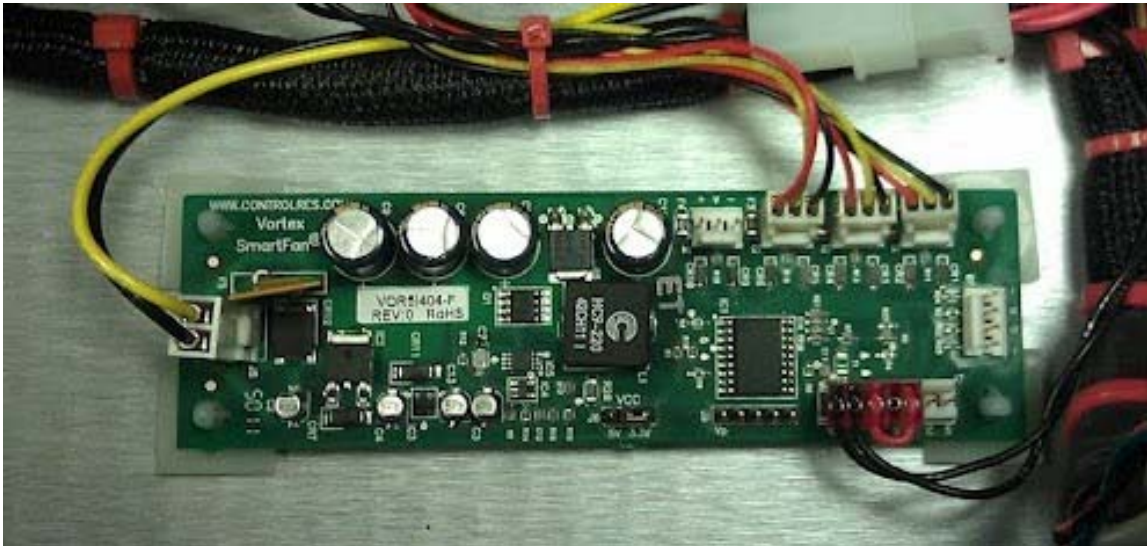


Figure 2 – Three-Fan FSC1400 Installation

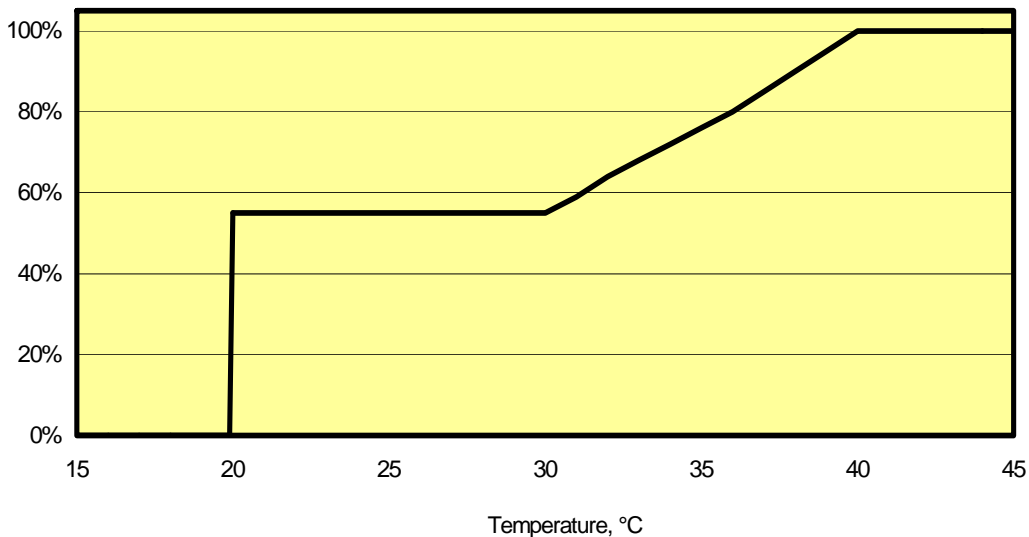
Chapter 3 - FSC1400 Specifications

SPECIFICATIONS

Power Source:	12VDC (+/-20%)
Current Rating:	5A @ 55°C or less
Fans:	Configurable for three or four fans
Fan Voltage Adjustment:	Current mode buck control circuit. Fans can also be turned off.
Storage Temperature:	-40°C to 125°C (Board only; system storage temperature range may be less.)
Operating Temperature:	-20°C to 55°C (Board only, system operating temperature range may be less.)
Board Weight:	1.9 oz. / 40 grams
RoHS Compliant:	Yes

TEMPERATURE-BASED FAN CONTROL

The speed of all fans is proportional to the temperature sensor connected to header J7. The chart below shows fan voltage as a function of sensed temperature. Temperature sensor status and temperature readings are available on the I2C Bus.



I2C-BASED FAN CONTROL

When an I2C speed command is given, the FSC1400 automatically switches to I2C control mode for fan control via the I2C Bus. The speed of all fans is mapped to the command sent through the I2C on header J7. Contact Trenton for a full definition of the I2C protocol implemented on the FSC1400 fan speed controller board.

FSC1400 PRODUCT DATASHEET

For additional information see the TSC1400 product data sheet at:

http://www.trentontechnology.com/images/datasheets/fsc1400_productdatasheet.pdf