



Model 1701

12-ch 10k Ω Temperature Module

USER MANUAL

Rev.0

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Model 1707 User Manual

Description

The Model 1701 12-ch 10k temperature module is designed as a data acquisition tool for 10k NTC thermistors that can be characterized by the Steinhart-Hart equation. It enables the collection and transmission of process temperatures of up to 12 probes, simultaneously. The 1701 has 4 internally calibrated resistors that allow for a field self-check feature that can be remotely launched. This ensures instrumentation accuracy and validation while in service.

Specifications

Power

Voltage: 9V to 34V or 5V

Current: Max 2mA@24V, 4mA @12V, 8mA@5V

Protection: Reverse Polarity, ESD/Voltage Spike & Fuse protections

A/D

Sample Rate: 20 samples /sec per channel

Resolution: 16 bits

Range: 41°F to 203°F (Accuracy up to $\pm 0.1^\circ\text{F}$)

User configurable Steinhart-Hart coefficients

Communication Protocol

RS-485

Baud Rate: 9600 (Default), 19200, 57600, 115200, 1200, 300

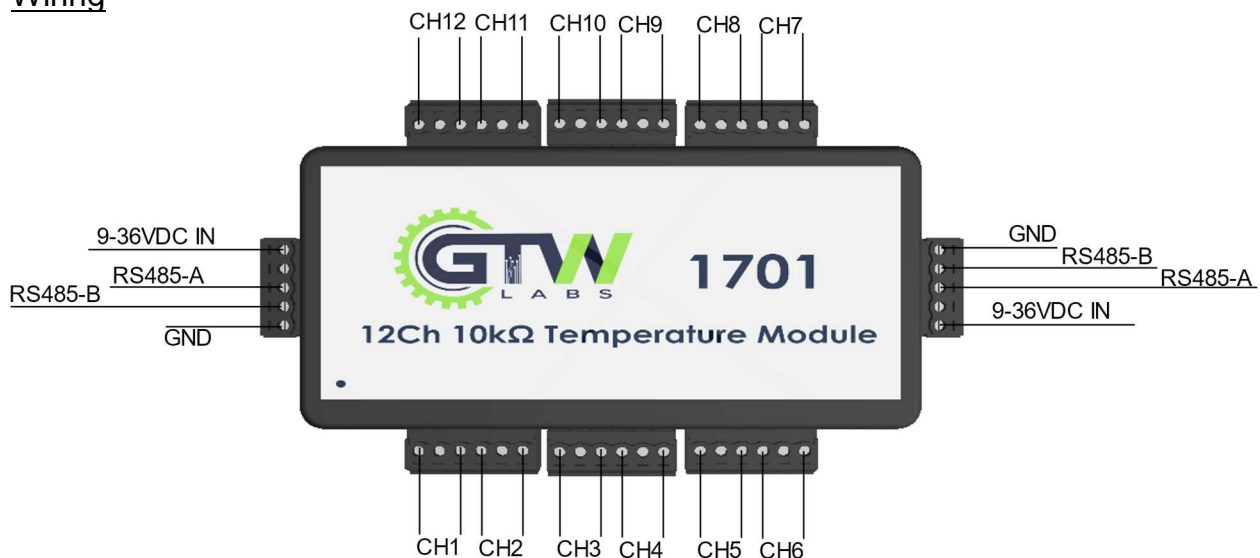
Data Bits: 8

Stop Bits: 1

Parity: None

Adaptor: USB 2.0

Wiring



Commands

Address

The 1707 temperature probe can be called using ASCII commands by its serial number. Each sensor has a unique serial number. The serial number address is 6-character long and cannot be changed.

Typical serial number will resemble 00000 or 03A001.

Commands are structured as [Address][SubAddress][Command]\r. Some commands do not require a sub-address. \r represents carriage return or “enter”. Note that all write commands need to be preceded by the write enable command. See example.

Sample Read Command

Command #000000aRD\r
Response #000000aRD=23.23\r

Sample Write Command

Write Enable Command #000000WE\r
Write Command #000000SS=000000\r
Response #000000SS=000000\r

Address List

Each channel has its own sub-address. See list below.

Channel #	Sub Address
1	a
2	b
3	c
4	d
5	e
6	f
7	g
8	h
9	i
10	j
11	k
12	l

Command List

Command	Sample Response	Description
(a)RD ⁽¹⁾	23.23	Read Temperature of specific channel in °C
RS ⁽²⁾	410200	Read Settings including Primary ID, Baud Rate and delay bytes
SU	410200	Write Settings including Primary ID and Baud Rate of module and delay bytes
WE	WE	Write Enable
RR	RR	Reset module
(a)RCAL	+0.00000E+00+1.00000E+00+0.00000E+00	Read Calibration Constants A, B, C Reading=A+B(Raw Reading)+C(Raw Reading) ²
(a)WCAL	+0.00000E+00+1.00000E+00+0.00000E+00	Write Calibration Constants A, B, C Reading=A+B(Raw Reading)+C(Raw Reading) ²
RSRN	000000	Read Serial Number of Module
RVER	0.1	Read Firmware Version of Module
RUNC	20.22	Read Uncorrected Value
(a)RRES	10000	Read Resistance Value
SELF CAL	SELF CAL	Self-calibration using internal high accuracy on board resistors

1. Address

1701 has 2 types of addresses, Serial Number Address and primary ID address. Serial number address is a 6-character address and cannot be changed. Primary ID address is a single character address and can be modified by user, from 0 (0x30) to ~ (0x7E) both addresses can be used to call the module.

Serial number will be something like 00000 or 03A001.

Primary ID will be some like 1 or A. See table for defaults.

Note (1): bracket means sub address is required.

Note (2):

In RS response, first two characters are hex of primary ID, 41 means A

Second byte 02 is the hex of baud rate. Here is a full list.

0x01 = 19200 baud rate 8N1

0x02 = 9600 baud rate 8N1

0x03 = 57600 baud rate 8N1

0x04 = 115200 baud rate 8N1

0x05 = 1200 baud rate 8N1

0x07 = 300 baud rate 8N1

Third byte 00 is the delay bytes, user can choose to delay 00 to 09 bytes before response to avoid bus collision, 0 means no delay.