

Step 1: Set the RTC

Let the actual time be 15:30:00 hours on Monday, the 1st of April in 2002. This results in the following data to be written to the RTC registers:

ADDRESS	200h	201h	202h	203h	204h	205h	206h
DATA	00h	30h	15h	01h	81h	04h	02h

With only a single DS1921G connected to the bus master, the communication of step 1 is as follows:

MASTER MODE	DATA (LSB FIRST)	COMMENTS	
Tx	(Reset)	Reset pulse (480µs to 960µs)	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	0Fh	Issue Write Scratchpad command	
Tx	00h	TA1, beginning offset = 00h	
Tx	02h	TA2, address = 0200h	
Tx	<7 data bytes>	Write 7 bytes of data to scratchpad	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	AAh	Issue Read Scratchpad command	
Rx	00h	Read TA1, beginning offset = 00h	
Rx	02h	Read TA2, address = 0200h	
Rx	06h	Read E/S, ending offset = 6h, flags = 0h	
Rx	<7 data bytes>	Read scratchpad data and verify	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	55h	Issue Copy Scratchpad command	
Tx	00h	TA1	(AUTHORIZATION CODE)
Tx	02h	TA2	
Tx	06h	E/S	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	

Step 2: Clear the data of the previous mission

Set the EMCLR bit to 1, enable the RTC, and then execute the Clear Memory command. The RTC oscillator must be stable before the Clear Memory command is issued. Wait 500 μ s after issuing the Clear Memory command before proceeding to step 3. This results in the following data to be written to the Status register:

ADDRESS	20Eh
DATA	40h

With only a single DS1921G connected to the bus master, the communication of step 2 is as follows:

MASTER MODE	DATA (LSB FIRST)	COMMENTS
Tx	(Reset)	Reset pulse (480 μ s to 960 μ s)
Rx	(Presence)	Presence pulse
Tx	CCh	Issue Skip ROM command
Tx	0Fh	Issue Write Scratchpad command
Tx	0Eh	TA1, beginning offset = 0Eh
Tx	02h	TA2, address = 020Eh
Tx	40h	Write status byte to scratchpad
Tx	(Reset)	Reset pulse
Rx	(Presence)	Presence pulse
Tx	CCh	Issue Skip ROM command
Tx	AAh	Issue Read Scratchpad command
Rx	0Eh	Read TA1, beginning offset = 0Eh
Rx	02h	Read TA2, address = 020Eh
Rx	0Eh	Read E/S, ending offset = 0Eh, flags = 0h
Rx	40h	Read scratchpad data and verify
Tx	(Reset)	Reset pulse
Rx	(Presence)	Presence pulse
Tx	CCh	Issue Skip ROM command
Tx	55h	Issue Copy Scratchpad command
Tx	0Eh	TA1
Tx	02h	TA2
Tx	0Eh	E/S
		(AUTHORIZATION CODE)
Tx	(Reset)	Reset pulse
Rx	(Presence)	Presence pulse
Tx	CCh	Issue Skip ROM command
Tx	3Ch	Issue Clear Memory command
Tx	(Reset)	Reset pulse
Rx	(Presence)	Presence pulse

Step 3: Set the search condition and Mission Start Delay and clear the alarm flags

In this example, the rollover is disabled and the search condition is set for a high temperature only. The mission is to start with a delay of 90min (005Ah) and the alarm flags TLF, THF, and TAF are cleared. This results in the following data to be written to the special function registers:

ADDRESS	20Eh	20Fh	210h	211h	212h	213h	214h
DATA	02h	00h*	00h*	00h*	5Ah	00h	00h

*Writing through address locations 20Fh to 211h is faster than accessing the Mission Start Delay register in a separate cycle. The write attempt has no effect on the contents of these registers.

With only a single DS1921G connected to the bus master, the communication of step 3 is as follows:

MASTER MODE	DATA (LSB FIRST)	COMMENTS	
Tx	(Reset)	Reset Pulse (480µs to 960µs)	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	0Fh	Issue Write Scratchpad command	
Tx	0Eh	TA1, beginning offset = 0Eh	
Tx	02h	TA2, address = 020Eh	
Tx	<7 data bytes>	Write 7 bytes of data to scratchpad	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	AAh	Issue Read Scratchpad command	
Rx	0Eh	Read TA1, beginning offset = 0Eh	
Rx	02h	Read TA2, address = 020Eh	
Rx	14h	Read E/S, ending offset = 14h, flags = 0h	
Rx	<7 data bytes>	Read scratchpad data and verify	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	55h	Issue Copy Scratchpad command	
Tx	0Eh	TA1	(AUTHORIZATION CODE)
Tx	02h	TA2	
Tx	13h	E/S	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	

Step 4: Set the temperature alarms and write the Sample Rate to start the mission

In this example, the temperature alarms are set to -5°C for the low temperature threshold and 0°C for the high temperature threshold. The sample rate is once every 10min, allowing the mission to last up to 14 days. This results in the following data to be written to the special function registers:

ADDRESS	20Bh	20Ch	20Dh
DATA	46h	50h	0Ah

With only a single DS1921G connected to the bus master, the communication of step 4 is as follows:

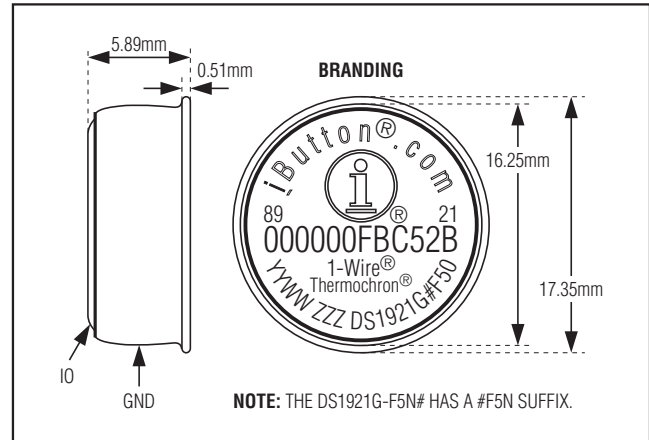
MASTER MODE	DATA (LSB FIRST)	COMMENTS	
Tx	(Reset)	Reset pulse (480µs to 960µs)	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	0Fh	Issue Write Scratchpad command	
Tx	0Bh	TA1, beginning offset = 0Bh	
Tx	02h	TA2, address = 020Bh	
Tx	<3 data bytes>	Write 3 bytes of data to scratchpad	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	AAh	Issue Read Scratchpad command	
Rx	0Bh	Read TA1, beginning offset = 0Bh	
Rx	02h	Read TA2, address = 020Bh	
Rx	0Dh	Read E/S, ending offset = 0Dh, flags = 0h	
Rx	<3 data bytes>	Read scratchpad data and verify	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	
Tx	CCh	Issue Skip ROM command	
Tx	55h	Issue Copy Scratchpad command	
Tx	0Bh	TA1	(AUTHORIZATION CODE)
Tx	02h	TA2	
Tx	0Dh	E/S	
Tx	(Reset)	Reset pulse	
Rx	(Presence)	Presence pulse	

If step 4 is successful, the MIP bit in the Status register is 1, the MEMCLR bit is 0, and the Mission Start Delay counts down.

Common iButton Device Features

- Rugged Chip-Based Data Carrier with Fast, Simple Access to Information
 - Digital Identification and Information by Momentary Contact
 - Unique Factory-Lasered 64-Bit Registration Number Ensures
- Error-Free Device Selection and Absolute Traceability Because No Two Parts Are Alike
 - Built-In Multidrop Controller for 1-Wire Net
 - Compactly Stores Information
 - Data Can Be Accessed While Affixed to an Object
 - Button Shape is Self-Aligning with Cup-Shaped Probes
- Durable Stainless-Steel Case Engraved with Registration Number Withstands Harsh Environments
- Easily Affixed with Self-Stick Adhesive Backing, Latched by Its Flange, or Locked with a Ring Pressed Onto Its Rim
- Presence Detector Acknowledges When Reader First Applies Voltage

Pin Configuration



Package Information

For the latest package outline information and land patterns (footprints), go to www.maximintegrated.com/packages. Note that a “+”, “#”, or “-” in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

PACKAGE TYPE	PACKAGE CODE	OUTLINE NO.	LAND PATTERN NO.
F5 Can	IB#5CP	21-0266	—

Revision History

REVISION DATE	DESCRIPTION	PAGES CHANGED
120407	Added bullet “Water resistant or waterproof if placed inside DS9107 iButton capsule (Exceeds Water Resistant 3 ATM requirements)”	1, 2
	Deleted “application pending” from UL bullet and safety statement	
	Added text to <i>Detailed Description</i> section: Note that the initial sealing level of DS1921G achieves IP56. Aging and use conditions can degrade the integrity of the seal over time, so for applications with significant exposure to liquids, sprays, or other similar environments, it is recommended to place the Thermochron in the DS9107 iButton capsule. The DS9107 provides a watertight enclosure that has been rated to IP68 (See www.maximintegrated.com/AN4126)	
4/09	Created newer template-style data sheet	All
4/10	Overdrive specifications for t_{RSTL} , t_{PDL} , and t_{W0L} split into range $V_{PUP} > 4.5V$ and full range. New values for the full range	2–4
4/11	Updated UL certificate reference; deleted ϵ from the t_{W1L} specification in the <i>Electrical Characteristics</i> table; applied note 13 to the t_{W0L} specification in the <i>Electrical Characteristics</i> table; added more details to <i>Electrical Characteristics</i> table notes 7, 13, and 14	1, 3, 4
9/11	DS1921G-F5N# part number added to the <i>Ordering Information</i> ; branding information updated in the <i>Pin Configuration</i>	1, 41
3/12	Added terminology updates for consistency with similar products; added more details to the <i>Parasite Power</i> section	1, 7, 8, 9, 14
6/13	Removed the UL 913 5th Ed. compliance statement from the <i>Common iButton Device Features</i> section and <i>iButton Can Physical Specification</i> table; reworded the <i>Electrical Characteristics</i> table Note 17	1, 4
11/13	Added the Busy state during Copy Scratchpad to the <i>Command-Specific 1-Wire Communication Protocol—Legend</i> and <i>1-Wire Communication Examples</i> sections	35
3/15	Updated <i>Benefits and Features</i> and <i>Common iButton Device Features</i> sections	1, 41

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