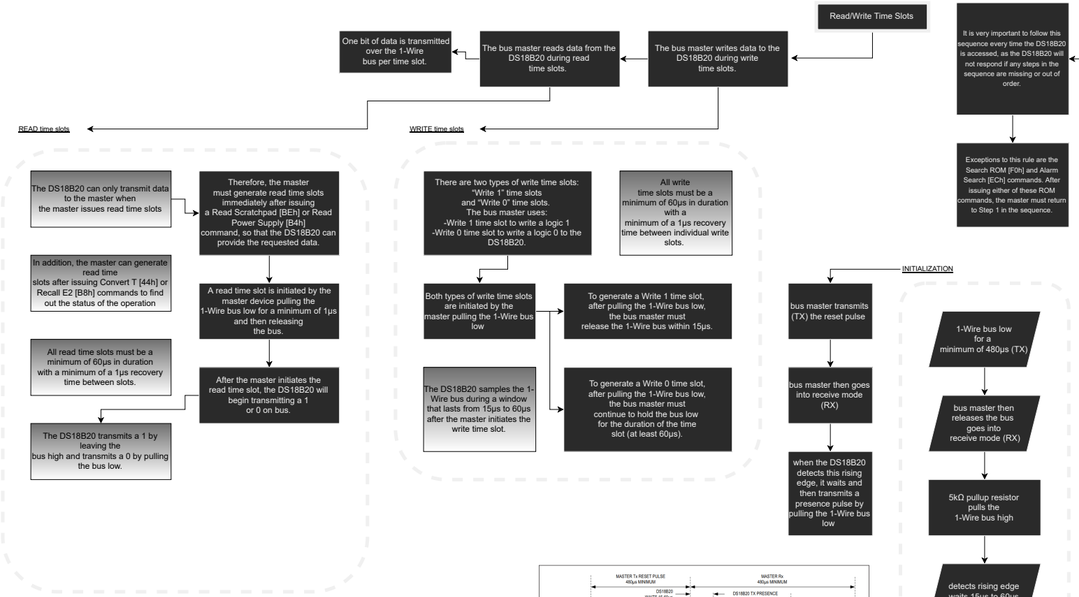

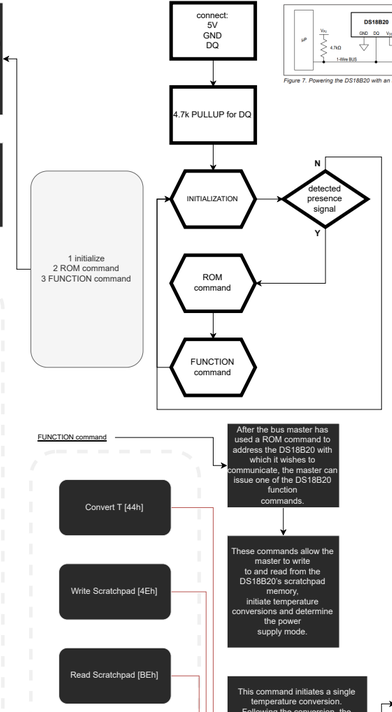

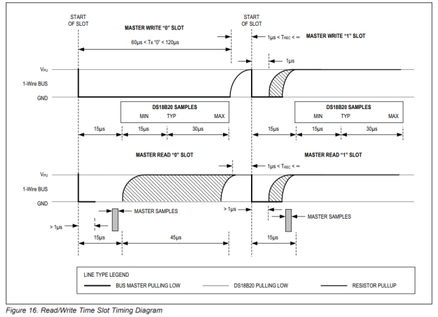

Figure 16. Read/Write Time Slot Timing Diagram

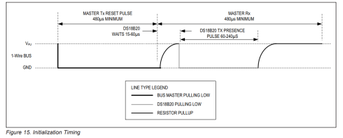

Figure 15. Initialization Timing

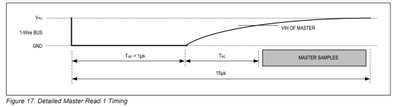

Figure 17. Detailed Master Read 1 Timing

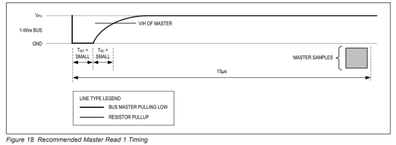

Figure 18. Recommended Master Read 1 Timing

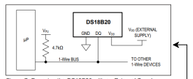

Figure 7. Powering the DS18B20 with an External Supply

If the bus is held low for more than 480µs, all components on the bus will be reset.

These commands also allow the master to determine:
-how many and
-what types of devices are present on the bus

or if any device has experienced an alarm condition.

There are five ROM commands, and each command is 8 bits long.

If there is only one slave on the bus, the simpler Read ROM [33h] command can be used in place of the Search ROM process.

The master learns the ROM codes through a process of elimination that requires the master to perform a Search ROM cycle (i.e., Search ROM command followed by data exchange) as many times as necessary to identify all of the slave devices.

Search Rom [F0h]

When a system is initially powered up, the master must identify the ROM codes of all slave devices on the bus, which allows the master to determine the number of slaves and their device types.

Read Rom [33h]

This command can only be used when there is one slave on the bus. It allows the bus master to read the slave's 64-bit ROM code without using the Search ROM procedure.

Match Rom [55H]

The match ROM command followed by a 64-bit ROM code sequence allows the bus master to address a specific slave device on a multidrop or single-drop bus.

Only the slave that exactly matches the 64-bit ROM code sequence will respond to the function command issued by the master; all other slaves on the bus will wait for a reset pulse.

Skip Rom [CCh]

The master can use this command to address all devices on the bus simultaneously without sending out any ROM code information.

For example, the master can make all DS18B20s on the bus perform simultaneous temperature conversions by issuing a Skip ROM command followed by a Convert T [44h] command.

Note that the Read Scratchpad [BEh] command can follow the Skip ROM command only if there is a single slave device on the bus.

Alarm Search [ECh]

The operation of this command is identical to the operation of the Search ROM command except that only slaves with a set alarm flag will respond.

In this case, time is saved by allowing the master to read from the slave without sending the device's 64-bit ROM code.

After the bus master has used a ROM command to address the DS18B20 with which it wishes to communicate, the master can issue one of the DS18B20 function commands.

Convert T [44h]

These commands allow the master to write to and read from the DS18B20's scratchpad memory, initiate temperature conversions and determine the power supply mode.

Write Scratchpad [4Eh]

Read Scratchpad [BEh]

This command initiates a single temperature conversion. Following the conversion, the resulting thermal data is stored in the 2-byte temperature register in the scratchpad memory and the DS18B20 returns to its low-power idle state.

If the DS18B20 is powered by an external supply, the master can issue read time slots after the Convert T command and the DS18B20 will respond by transmitting a 0 while the temperature conversion is in progress and a 1 when the conversion is done.

Copy Scratchpad [48h]

This command allows the master to write 3 bytes of data to the DS18B20's scratchpad.

The first data byte is written into the TH register (byte 2 of the scratchpad), the second byte is written into the TL register (byte 3), and the third byte is written into the configuration register (byte 4).

Data must be transmitted least significant bit first. All three bytes MUST be written before the master issues a reset, or the data may be corrupted.

Recall E2 [B8h]

This command allows the master to read the contents of the scratchpad.

The data transfer starts with the least significant bit of byte 0 and continues through the scratchpad until the 9th byte (byte 8 – CRC) is read.

The master may issue a reset to terminate reading at any time if only part of the scratchpad data is needed.

Read Power Supply [B4h]

This command copies the contents of the scratchpad TH, TL and configuration registers (bytes 2, 3 and 4) to EEPROM.

This command recalls the alarm trigger values (TH and TL) and configuration data from EEPROM and places the data in bytes 2, 3, and 4, respectively, in the scratchpad memory.

The master device can issue read time slots following the Recall E2 command and the DS18B20 will indicate the status of the recall by transmitting 0 while the recall is in progress and 1 when the recall is done

The recall operation happens automatically at power-up, so valid data is available in the scratchpad as soon as power is applied to the device.

The master device issues this command followed by a read time slot to determine if any DS18B20s on the bus are using parasite power.

During the read time slot, parasite powered DS18B20s will pull the bus low, and externally powered DS18B20s will let the bus remain high.

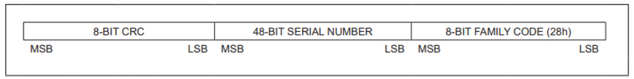

Figure 8. 64-Bit Lasered ROM Code

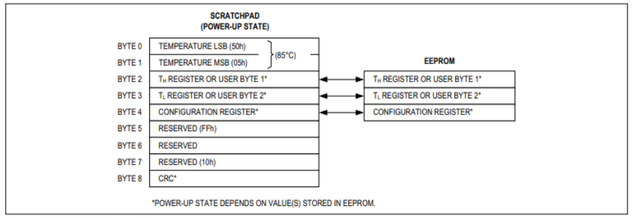

Figure 9. DS18B20 Memory Map

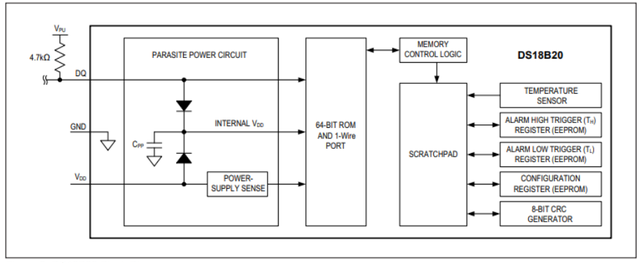

Figure 3. DS18B20 Block Diagram