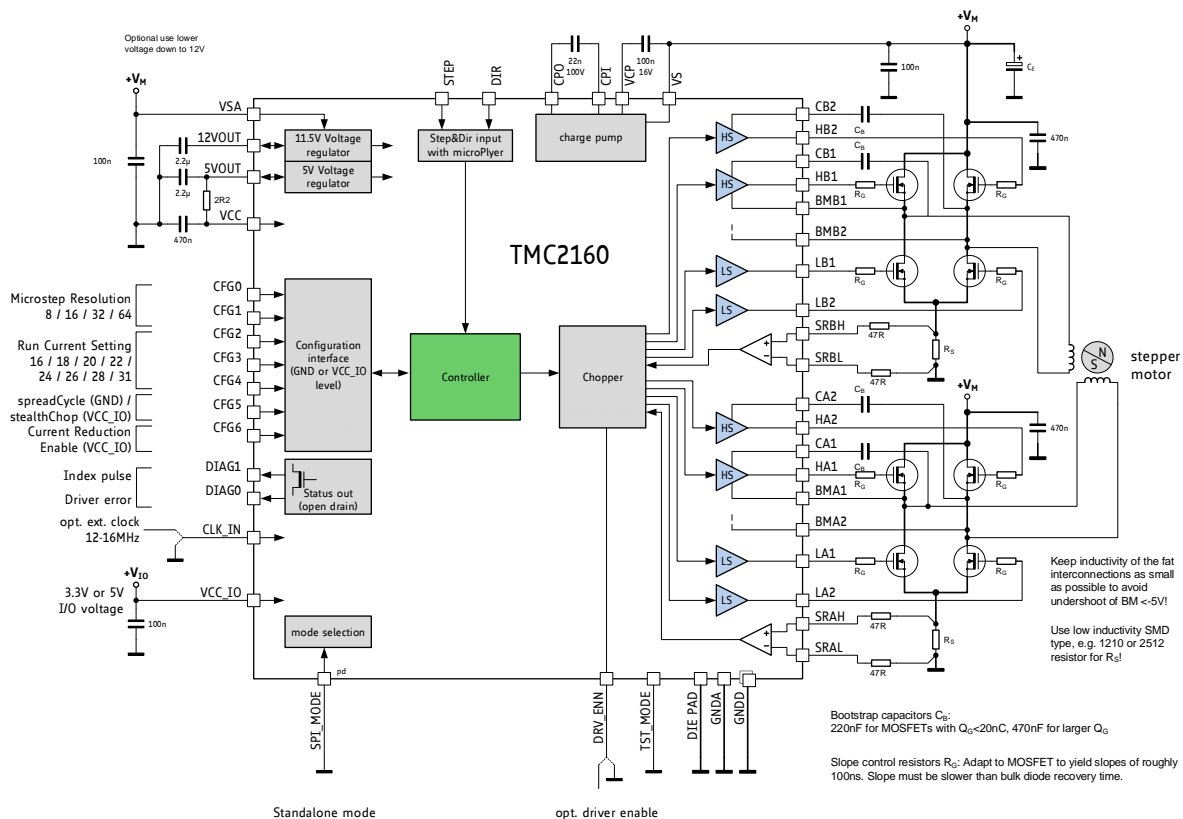# 20 Standalone Operation

For standalone operation, no SPI interface is required to configure the TMC2160. All pins with suffix CFG0 to CFG6 have a special meaning in this mode and can bei tied either to VCC_IO or to GND.

Figure 20.1 Standalone operation with TMC2160 (pins shown with their standalone mode names)

To activate standalone mode, tie pin SPI_MODE to GND and pin SD_MODE high. In this mode, the driver acts as a pure STEP and DIR driver. SPI and single wire are off. The driver works in spreadCycle mode or stealthChop mode. With regard to the register set, the following settings are activated:

GCONF settings:
GCONF.diag0_error = 1: DIAG0 works in open drain mode and signals driver error.
GCONF.diag1_index = 1: DIAG1 works in open drain mode and signals microstep table index position.

The following settings are affected by the CFG pins in order to ensure correct configuration:

CFG0/CFG1: CONFIGURATION OF MICROSTEP RESOLUTION FOR STEP INPUT		
CFG1	**CFG0**	**Microstep Setting**
GND	GND	8 microsteps, *MRES*=5
GND	VCC_IO	16 microsteps, *MRES*=4
VCC_IO	GND	32 microsteps, *MRES*=3
VCC_IO	VCC_IO	64 microsteps, *MRES*=2

CFG4/CFG3/CFG2: CONFIGURATION OF RUN CURRENT

CFG4	CFG3	CFG2	*IRUN* Setting
GND	GND	GND	*IRUN*=16
GND	GND	VCC_IO	*IRUN*=18
GND	VCC_IO	GND	*IRUN*=20
GND	VCC_IO	VCC_IO	*IRUN*=22
VCC_IO	GND	GND	*IRUN*=24
VCC_IO	GND	VCC_IO	*IRUN*=26
VCC_IO	VCC_IO	GND	*IRUN*=28
VCC_IO	VCC_IO	VCC_IO	*IRUN*=31

CFG5: SELECTION OF CHOPPER MODE

CFG5	Chopper Setting
GND	spreadCycle operation. (*TOFF*=3)
VCC_IO	stealthChop operation. (*GCONF*.en_PWM_mode=1)

CFG6: CONFIGURATION OF HOLD CURRENT REDUCTION

CFG6*)	Chopper Setting
GND	No hold current reduction. IHOLD=IRUN
VCC_IO	Reduction to 50%. IHOLD=1/2 IRUN

Hint
Be sure to allow the motor to rest for at least 100ms (assuming a minimum of 10MHz f_{CLK}) before starting a motion using stealthChop. This will allow the current regulation to set the initial motor current.

*) CFG6: Attention
CFG6 pin draws significant current (20mA) when driven to a different level than CFG5, because the output driver tries to make CFG6 level equal to CFG5. Therefore, a 0 Ohm resistor is required to pull up/down CFG6. Due to this, setting CFG6 different from CFG5 is only recommended with external VCC_IO supply at 3.3V level.