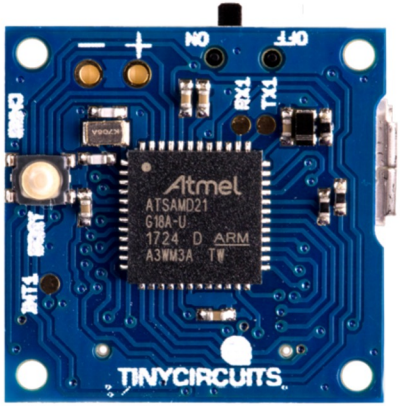
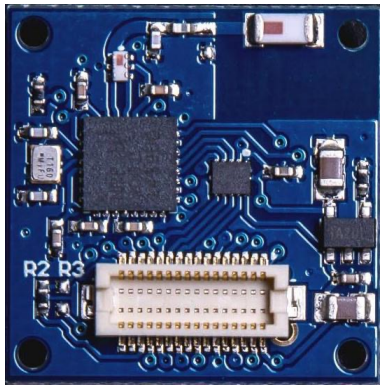
CSE190 Fall 2022



Lecture 14

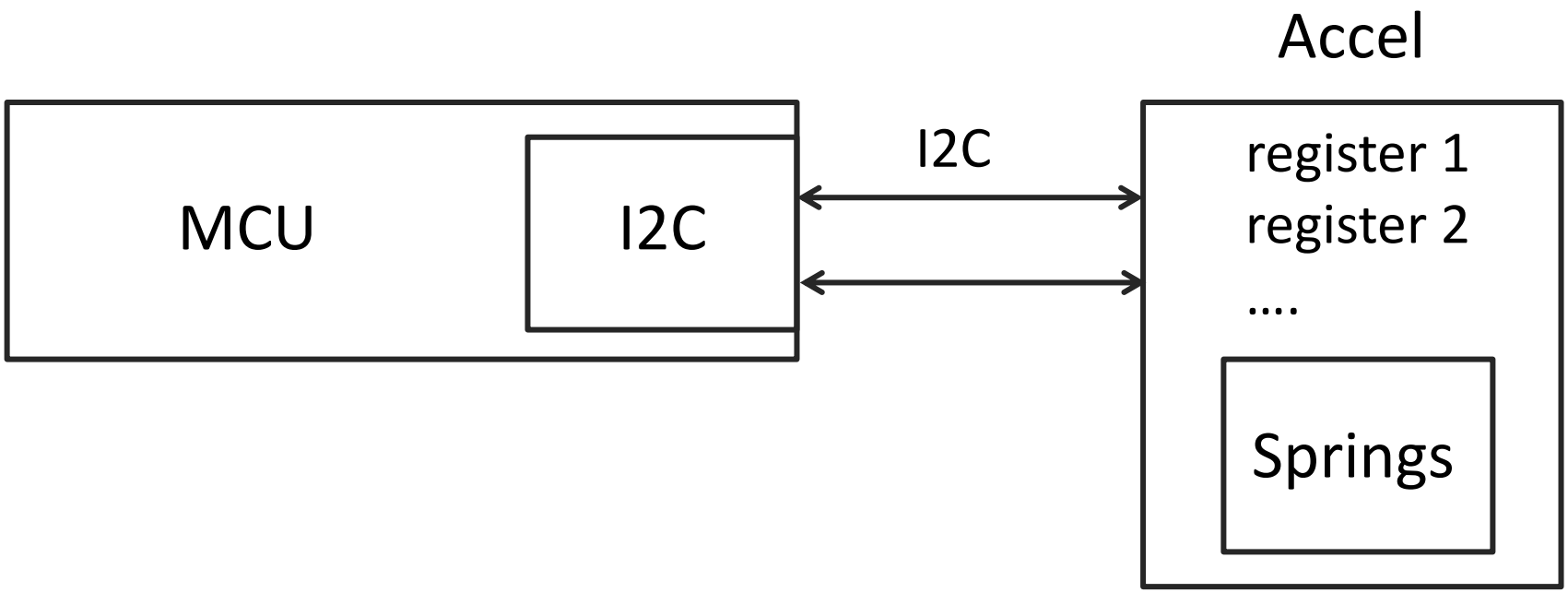
Peripheral example (Accel)



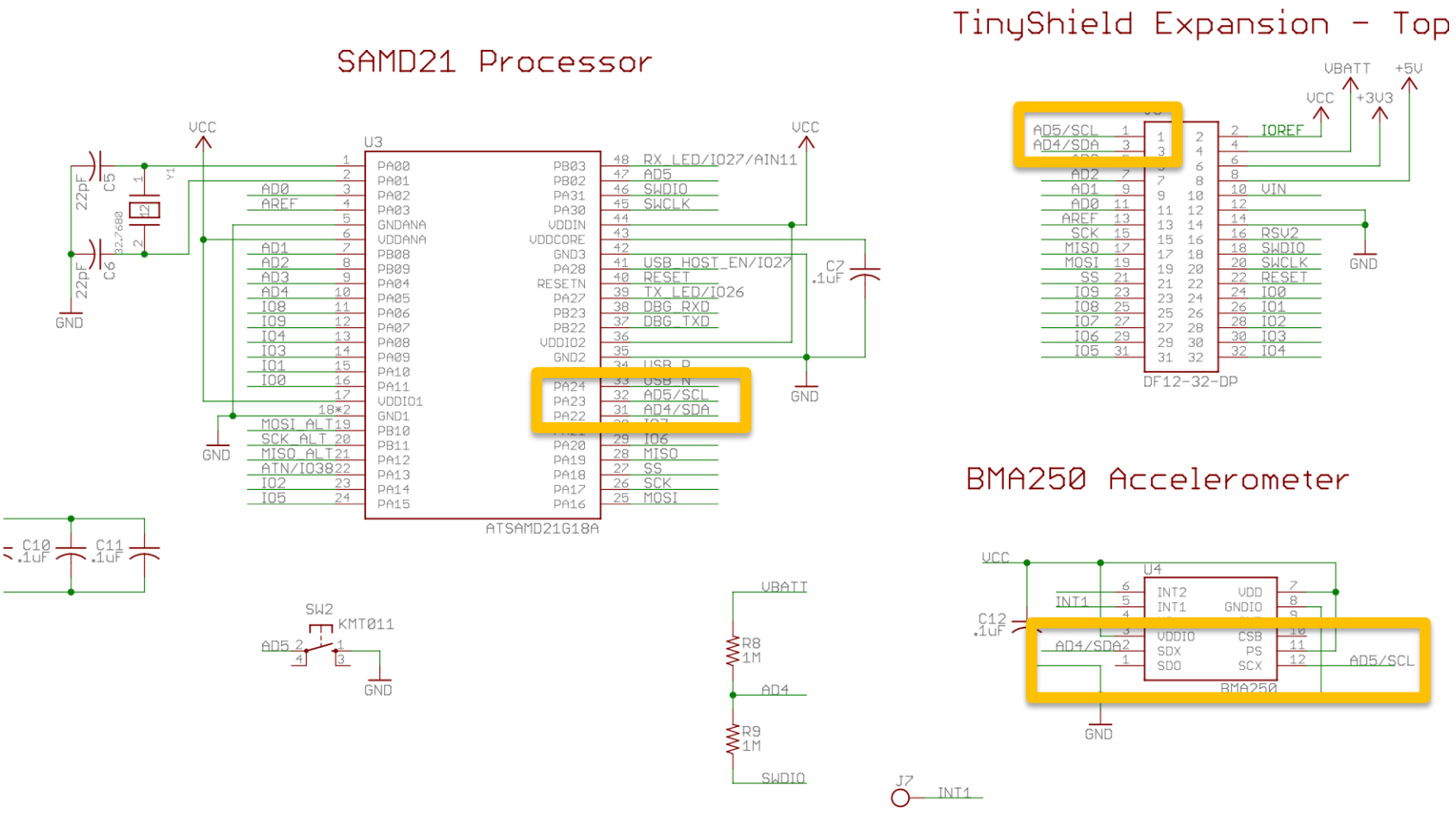
Wireless Embedded Systems

Aaron Schulman

How to operate the accelerometer?



I2C bus connected to accel

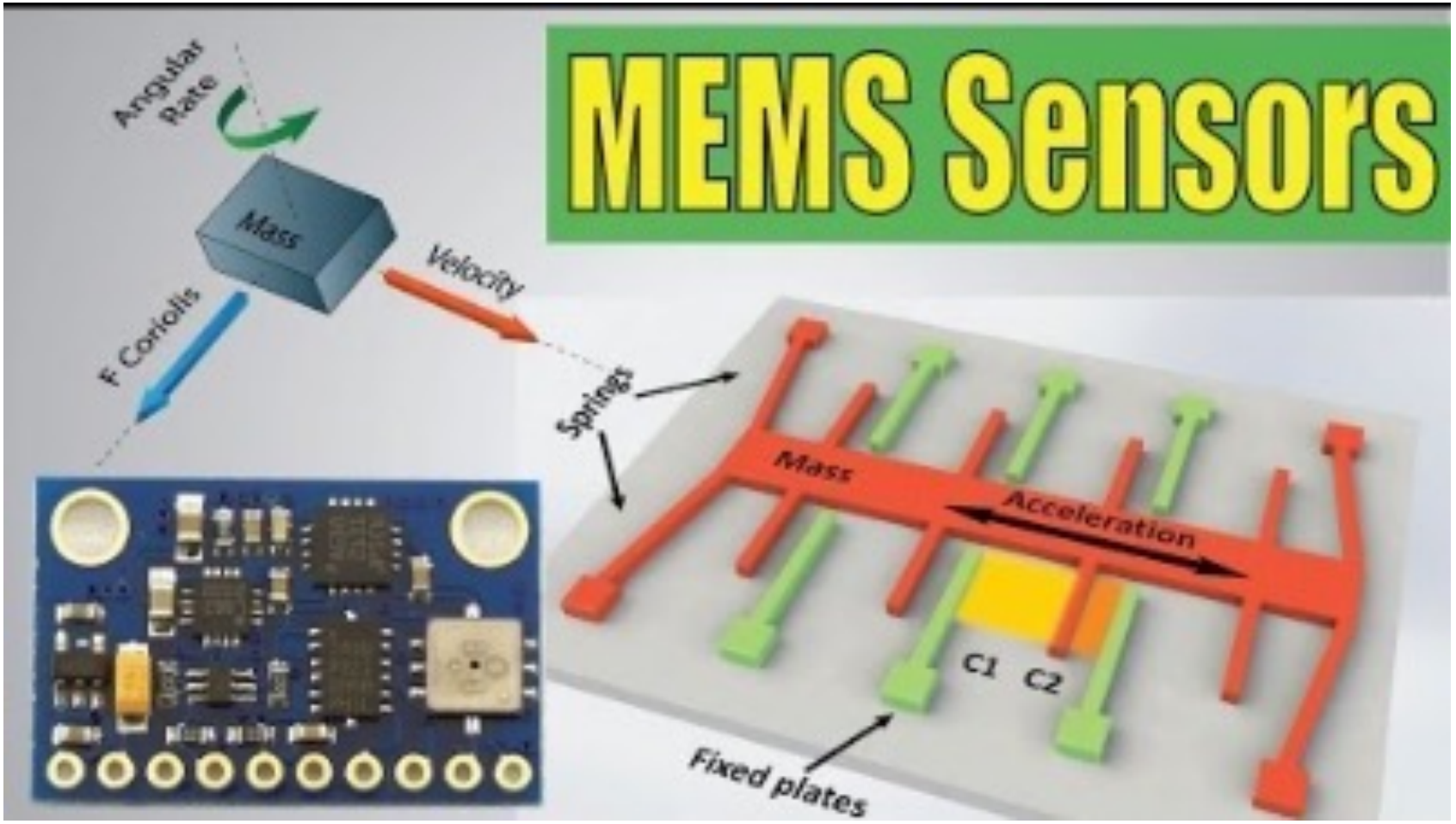


Bus-connected peripherals have registers

5.2 Register map

Register Address	Default Value	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x3F	0x00	*reserved*							
0x3E	0x00	*reserved*							
0x3D	0x00	offset_unfilt_z<7:0>							
0x3C	0x00	offset_unfilt_y<7:0>							
0x3B	0x00	offset_unfilt_x<7:0>							
0x3A	0x00	offset_filt_z<7:0>							
0x39	0x00	offset_filt_y<7:0>							
0x38	0x00	offset_filt_x<7:0>							
0x37	0x00	*reserved*	offset_target_z<1:0>		offset_target_y<1:0>		offset_target_x<1:0>		cut_off
0x36	0x00	offset_reset	cal_trigger<1:0>		cal_rdy	*reserved*	hp_z_en	hp_y_en	hp_x_en
0x35	0x00	*reserved*							
0x34	0x00	*reserved*					i2c_wdt_en	i2c_wdt_sel	spi3
0x33	0x04	*reserved*				nvm_load	nvm_rdy	nvm_prog_trig	nvm_prog_mode
0x32	0x70	*reserved*					self_test_sign	self_test_axis	
0x31	0x00	*reserved*							
0x30	0x00	*reserved*							
0x2F	0x10	*reserved*		flat_hold_time<1:0>		*reserved*			
0x2E	0x08	*reserved*		flat_theta<5:0>					
0x2D	0x08	*reserved*		orient_theta<5:0>					
0x2C	0x18	*reserved*	orient_hyst<2:0>			orient_blocking<1:0>		orient_mode<1:0>	
0x2B	0x0A	tap_samp<1:0>		*reserved*	tap_th<4:0>				
0x2A	0x04	tap_quiet	tap_shock	*reserved*			tap_dur<2:0>		
0x29	0x00	*reserved*							
0x28	0x14	slope_th<7:0>							
0x27	0x00	*reserved*						slope_dur<1:0>	
0x26	0xC0	high_th<7:0>							
0x25	0x0F	high_dur<7:0>							
0x24	0x81	high_hy<1:0>		*reserved*			low_mode	low_hy<1:0>	
0x23	0x30	low_th<7:0>							
0x22	0x09	low_dur<7:0>							
0x21	0x00	reset_int	*reserved*			latch_int<3:0>			
0x20	0x05	*reserved*				int2_od	int2_lvl	int1_od	int1_lvl
0x1F	0x00	*reserved*							
0x1E	0x00	*reserved*		int_src_data	int_src_tap	*reserved*	int_src_slope	int_src_high	int_src_low
0x1D	0x00	*reserved*							
0x1C	0x00	*reserved*							
0x1B	0x00	int2_flat	int2_orient	int2_s_tap	int2_d_tap	*reserved*	int2_slope	int2_high	int2_low
0x1A	0x00	int2_data	*reserved*						int1_data
0x19	0x00	int1_flat	int1_orient	int1_s_tap	int1_d_tap	*reserved*	int1_slope	int1_high	int1_low
0x18	0x00	*reserved*							
0x17	0x00	*reserved*			data_en	low_en	high_en_z	high_en_y	high_en_x
0x16	0x00	flat_en	orient_en	s_tap_en	d_tap_en	*reserved*	slope_en_z	slope_en_y	slope_en_x
0x15	0x00	*reserved*							
0x14	0x00	softreset							
0x13	0x00	data_high_bw	shadow_dis	*reserved*					
0x12	0x00	*reserved*							
0x11	0x00	suspend	lowpower_en	*reserved*	sleep_dur<3:0>				*reserved*
0x10	0x1F	*reserved*			bw<4:0>				
0x0F	0x03	*reserved*				range<3:0>			
0x0E	0x00	*reserved*							
0x0D	0x00	*reserved*							
0x0C	0x00	flat	orient[2:0]			high_sign	high_first_z	high_first_y	high_first_x
0x0B	0x00	tap_sign	tap_first_z	tap_first_y	tap_first_x	slope_sign	slope_first_z	slope_first_y	slope_first_x
0x0A	0x00	data_int	*reserved*						
0x09	0x00	flat_int	orient_int	s_tap_int	d_tap_int	*reserved*	slope_int	high_int	low_int
0x08	0x00	temp<7:0>							
0x07	0x00	acc_z_msb<9:2>							
0x06	0x00	acc_z_lsb<1:0>		*0*					new_data_z
0x05	0x00	acc_y_msb<9:2>							
0x04	0x00	acc_y_lsb<1:0>		*0*					new_data_y
0x03	0x00	acc_x_msb<9:2>							
0x02	0x00	acc_x_lsb<1:0>		*0*					new_data_x
0x01	0x21	*reserved*							
0x00	0x03	Chip ID							

	w/r
	write only


MEMS Sensors
Angular Rate
Mass
Velocity
F Coriolis
Springs
Mass
Acceleration
C1
C2
Fixed plates