Introduction to the Design of Smart Products (ME116M)
Spring 2016
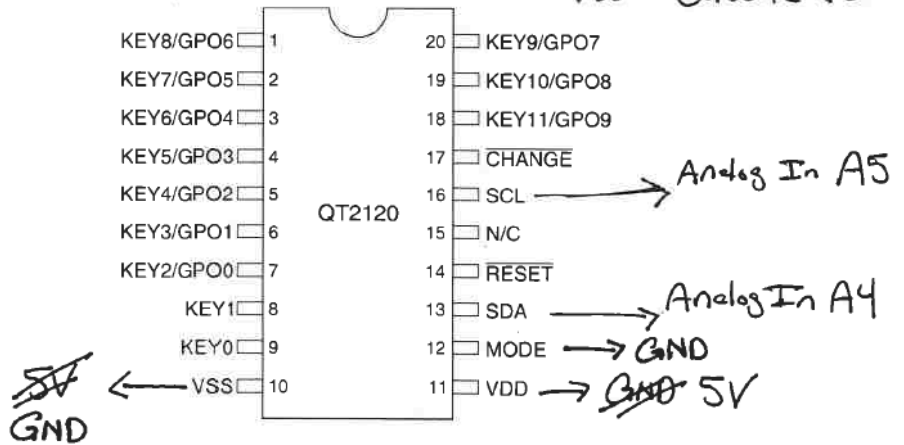**Lab 3**
Pinout / Wiring Diagram

1. Pinouts and Schematics
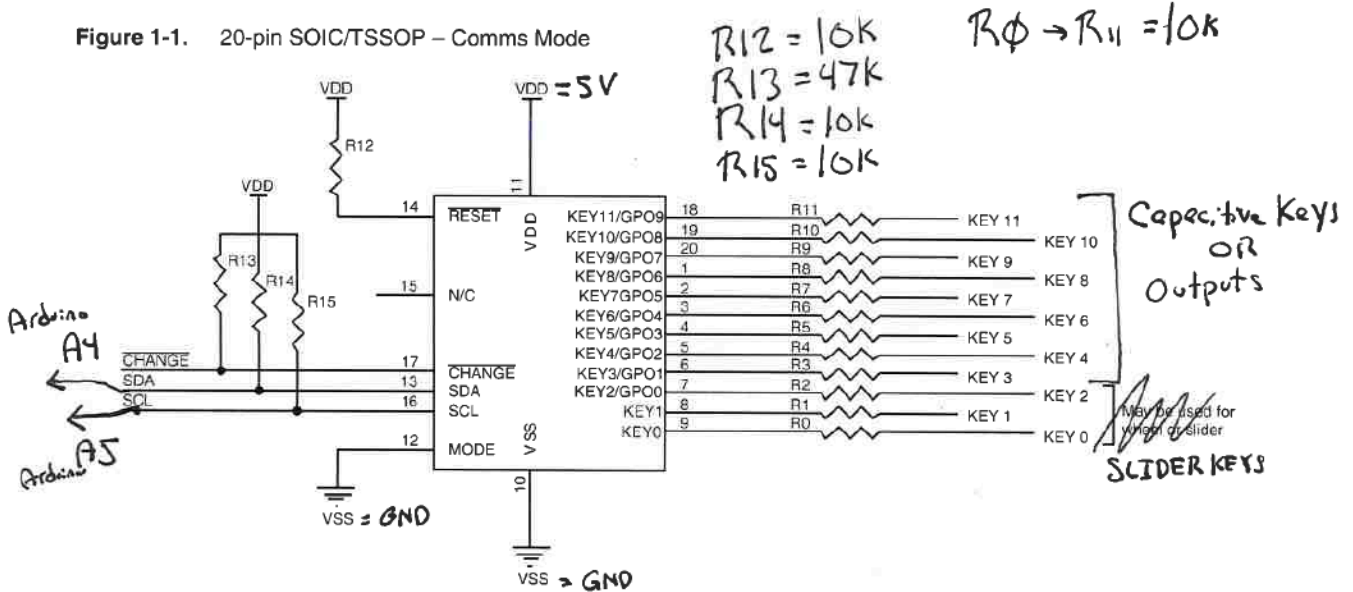
1.1 Pinouts

1.1.1 20-pin SOIC/TSSOP – Comms Mode

V_{DD} = Power (5V)
V_{SS} = Ground (GND)

Pin layout (QT2120):

Left	Pin		Pin	Right
KEY8/GPO6	1		20	KEY9/GPO7
KEY7/GPO5	2		19	KEY10/GPO8
KEY6/GPO4	3		18	KEY11/GPO9
KEY5/GPO3	4		17	CHANGE
KEY4/GPO2	5		16	SCL → Analog In A5
KEY3/GPO1	6		15	N/C
KEY2/GPO0	7		14	RESET
KEY1	8		13	SDA → Analog In A4
KEY0	9		12	MODE → GND
VSS ← ~~5V~~ GND	10		11	VDD → ~~GND~~ 5V

1.3 Schematics

Figure 1-1. 20-pin SOIC/TSSOP – Comms Mode

R12 = 10K   R∅ → R11 = 10K
R13 = 47K
R14 = 10K
R15 = 10K

VDD = 5V

Capacitive Keys OR Outputs

May be used for Wheel or slider

SLIDER KEYS

Arduino A4
Arduino A5

VSS = GND

ReadMe.txt

* Library for Arduino interface with QT2120 Capacitive Touch Sensor.
 * Written by Phillip Dupree
 * cargocollective.com/phillipdupree

void InitCapacitive();
void SetPinToKey(int pin);
void SetPinToOutput(int pin);
void SetOutput(int pin, int state);
boolean ReadKey(int pin);
void SetThreshold(int pin, byte threshold);
unsigned int ReadSignal(int pin);
byte ReadSlider(void);
byte ReadRegister(byte addr);
void WriteRegister(byte addr, byte writer);

QT2120 must be wired in COMMS Mode. Do not forget pull up resistors on SDA, SCL (10k), CHANGE (47k), and RESET (10k). Includes 10 Functions. SCL on the QT2120 goes to Analog In 5 (A5) on the Arduino Uno, and SDA goes to Analog in 4 (A4) on the Arduino Uno.

//——High Level Functions ——//

InitCapacitive
-Call this once at the beginning of your code. Enables the Slider and Wire class.
-Your capacitive sensor has the Slider bit enabled, meaning keys 0-2 are reserved for the slider and 3-11 can be set as keyed capacitive inputs, or outputs.

SetPinToKey
-Use this function to set one of pins 3-11 to a key (capacitive input).

SetPinToOutput
-Use this function to set one of pins 3-11 to a digital output.

SetOutput
-Use this function to set one of your digital outputs high or low. For the state parameter, enter 0 or 1. 0 is LOW, 1 is HIGH. Anything else will give you an error.

ReadKey
-Use this function to see if one of your keyed capacitive inputs is high or low. Returns a boolean. "True" means it is HIGH (touch), "False" means it is LOW (no touch).

SetThreshold
-Use this function to set the threshold of one of your keyed capacitive inputs.
-Threshold value in theory determines sensitivity of the key,
The threshold value it must cross to go digital HIGH. Read the QT2120 data sheet for more details.

ReadSignal
-Important. Use this function to read the raw analog value of a key.
-Returns a 16 bit unsigned integer. Could be useful for many things.

ReadSlider()
-Reads the slider value byte from register 5. Returns an unsigned eight bit value.
-Currently, the slider is malfunctioning. This function will come in handy if I get it to work.

//——Low Level Functions——//

ReadRegister
-addr is the address of the register you wish to read.
-Returns one single byte, the value of said register "addr".

WriteRegister
-addr is the address of the register you wish to write to.
-Writes one single byte to said register.