Selec Controls

Interfacing Microcontroller

-HW Assignment 11-

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1 Objective

To develop knowledge of selecting & Interfacing Microcontroller as per Application requirement.

2 Assignment Details

Select 'Renesas RL78 / G12 family ' Microcontroller suitable for following Application

1. Interface 12VDC, 20mA Buzzer (use HA6 Circuit)
2. Interface HONGFA Relay , 1Form A , 12 VdC coil supply , 10A Contact rating (use HA9 circuit)
3. Sense Healthiness of Mains AC Power supply , Mains supply > 100VAC is healthy condition (use HA8 circuit)
4. Measure Sensor response , which O/P is in the range of 5mV to 100mV, amplified suitably for Single ended ADC of selected Microcontroller (use HA7 circuit)
5. Interface non isolated RS 485 port. (use TI make SN65HVD08)

3 Design Considerations

controller Selection:
- The microcontroller should be able to handle analog voltage from the op-amp circuit, i.e. inbuilt ADC.
- Should be able to understand TTl logic.
- Low power consuming
- should provide with at least 1 interrupt pin for RS485.
- min of 2KB of ROM.
- The Renesas RL78 / G12 family has a device R5F1026AASP suitable for this application.

stal and capacitors:
- The for operating at 12MHz
- Crystal ECS-120-8-33B-CZM-TR
- the crystal cpacitors required will be,

$$C_{l1} = C_{l2} = 2 * (C_l - C_p)$$

From data sheet we get $C_l = 8$ pf, $C_p = 2pf$

$$C_{l1} = C_{l2} = 12pf$$

Reset
- Reset pin is active low.
- the Reset pin will be connected to 3.3 V through a 1KΩ resistor and to GND through a push button.

/P and O/P devices

Buzzer
- It is an Output device requiring 1 GPIO with low current requirement.
- attach Buzzer circuit to PIN 17.
- Pin 17 is a PCLBUZ0 i.e a programmable pin dedicated to buzzer.

Relay
- It is an Output device requiring 1 GPIO with low current requirement.
- attach Buzzer circuit to PIN 19.

Opto Isolator circuit
- It is an input circuit with TTL logic.
- only requires Digital input pin.
- assigning PIN 4/ PORT 40, since it is only input pin.

Op-Amp Circuit
- It is an input circuit with analog input.
- Requires ADC pin.
- Assigning pin 18 since it is an Analog Input pin (ANI3)

RS485
- Requires a Digital Tx and Rx pin
- Pin 15 is TxD0 for D (of RS485)
- Pin 16 is RxD0 for R (of RS485).
- Since RS485 is half duplex, we can control the RE and DE Pin from same interrupt pin of microcontroller.
- Interrupt Pin 6 i.e INTP0 for RE and DE

Default
- Vss to GND
- Vdd to 3.3V
- set TTL analog voltage ref at AV_{refm} and AV_{refp}

4 Block Diagram