Barn Livestock Alarm System

Functional Specifications Manual

ENEL 387

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March 2019

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1. System Information

1.1 Description

The barn livestock alarm system's purpose is to inform someone, most likely the owner, if their livestock's heat lamps burn out, or break. Most farmers have back-up generators during a power outage, so this is mainly in case the bulb no longer works. This is an important issue when farming because when certain animals, such as pigs or chickens, do not have heat and/or light, they will most likely end up dying unless the owner is lucky enough to check on them in time.

To assist the user with this issue, the alarm system will make use of cadmium sulfoselenide(CDS) cells to know when to alert the user. When the CDS cell corresponding to the stall of the users choosing does not sense light anymore, it will trigger the alarm system to activate. By activating, the alarm system will activate an audible alarm, as well as a relay which will then turn on a 12VDC halogen lamp. The alarm system will also send a message to a remote panel serial LCD screen. The message displayed on the LCD will inform the user which stall the light has burnt out or broken in, as well as read the corresponding temperature sensor for that stall and display the information. On the remote panel, the user will also have the option of an alarm cut-off button. The alarm cut-off will deactivate the alarm for a given amount of time before turning on again, unless the CDS cell senses light again.

1.2 Components

1.2.1 Inputs

1.2.1.1 Four 90-157-0 mode CDS Photo Cells with digital output

1.2.1.2 Four LM35DZ Temperature Sensors with analog output

1.2.1.3 One LS-00002 Tactile Switch on remote panel with digital output

1.2.2 Outputs

1.2.2.1 One JC 12V 10W G4 Halogen Lamp activated by relay

1.2.2.2 One 61-211-0 Mode Miniature Buzzer on remote panel

1.2.2.3 One serial LCD on remote panel

1.2.3 Other

1.2.3.1 One 50-530-0 Mode Srd Spdt Relay on remote panel

1.2.3.2 Power Supply

1.2.3.3 Power Supply Cables

1.3 System Diagram

The functional system block diagram is shown below. This diagram shows the basic system components that make up the barn livestock alarm system.

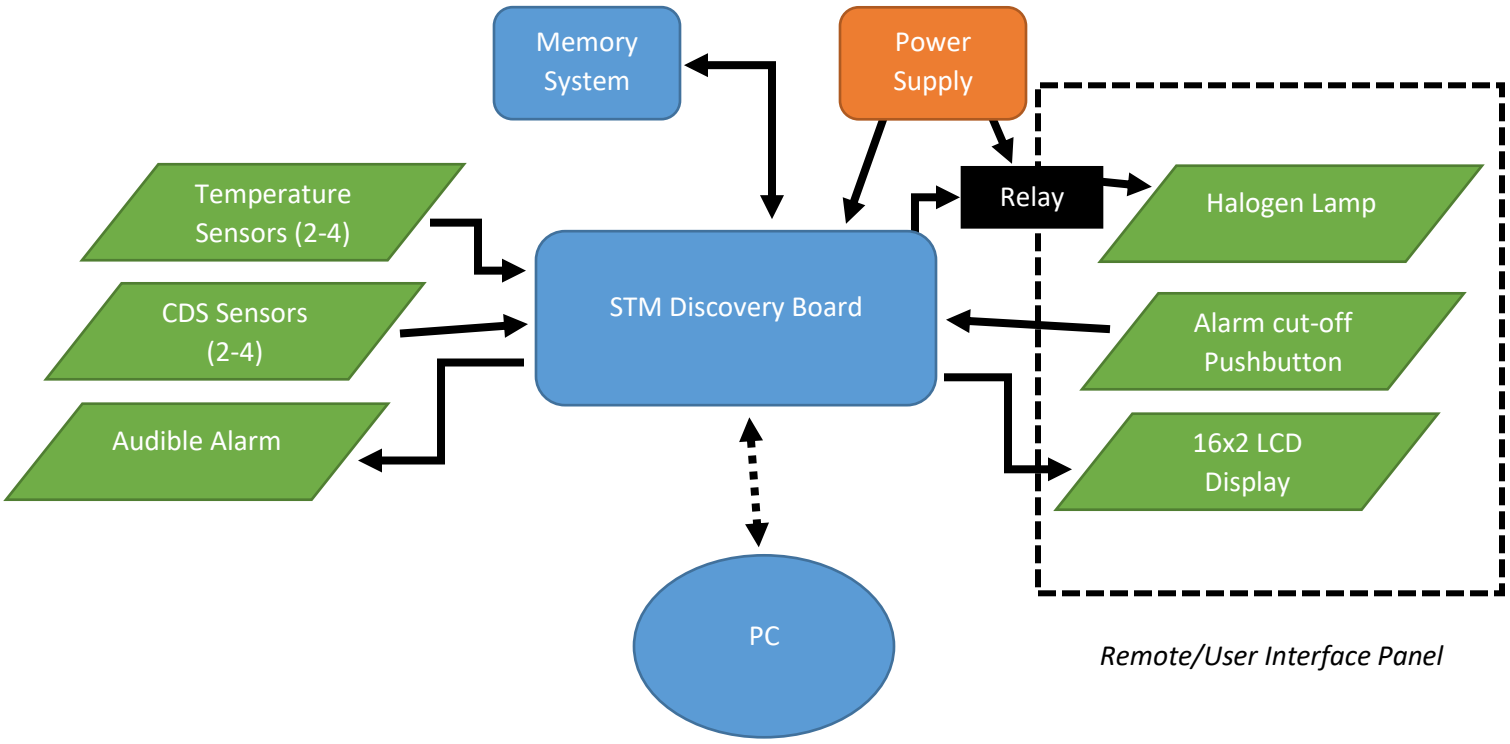

Figure 1.3 – Block Diagram of Barn Livestock Alarm System

2. Operation

2.1 Start-Up

For the system to operate, make sure the STM discovery board and other related components have power supplied. When power is supplied, by default the LCD will be on with nothing being displayed, and everything else should be off as long as the CDS cells sense light.

2.2 Normal Operation

Under normal operation, as soon as one of the CDS cells stops detecting light, the alarm system will activate send the system into Alarm Operation.

2.3 Alarm Operation

In alarm operation mode, the system will turn on the audible alarm, send power to the relay activating the halogen lamp, as well as display a message and temperature corresponding to that CDS location. The user has the option of shutting off the alarm with an alarm cut-off pushbutton located on the remote panel. This would mute the audible alarm. Eventually, after a delay, the system will go back to Normal Operation state.