INTERNSHIP REPORT

Larsen & Toubro Embedded system department

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* Tools used:

1. QT software:

A cross-platform SDK used to develop, maintain and simulate software. I used QT to simulate a controller’s functions and also the unit that it is communicating with.

1. Moxa converter:

Moxa is a serial converter that is used to convert between RS-232 and RS-422/485. Moxa was used to test the simulators built using the QT SDK.

1. Virtual port software:

Virtual ports were used to communicate between two simulators internally without any use of hardware.

1. Hercules:

Hercules software was used to see the raw data sent on the serial ports.

* Technical skills developed:

1. Coding guidelines that should be followed to make the code more safe and sophisticated.

2. Writing a portable C++ code in QT which can be easily used in controllers with minimal changes.

3. Developing GUI’s in QT to simulate the behaviour of controllers and the peripheral devices.

4. Use of pragma pack for memory management and handling of data.

5. Implementation of RS-232 protocol.

6. Documentation and design of work flow.

* Projects:

1. CIWS\_MVR:

Muzzle velocity radar (MVR) is a unit which detects the muzzle velocity of the shots fired off a gun. It is mounted on the gun itself. MVR uses RS-232 protocol to communicate with the controller. It has a set of predefined commands that must be given to it by the controller on basis of which it operates. It communicates using data packets consisting of header and checksum.

I created a QT application which simulates the controller and implemented the work flow that must be followed to communicate with the MVR appropriately. The GUI implemented can be used to test the MVR. And the C++ code written can be used in microcontrollers with minimal changes in the latter stages of the project.

2. CIWS\_GCU:

GCU is a gun control unit which controls various operations of the gun. The GCU takes commands from LNTSC (Larsen & Toubro servo controller) to control the operations of the gun like loading, feeding, recocking and firing. It can also control the firing rate of the gun from single shot to 300rpm. GCU uses RS-232 protocol to communicate with the controller. It has a set of predefined commands that must be given to it by the controller on basis of which it operates. It communicates using data packets consisting of header and checksum.

In this project, I simulated the operations of the GCU using QT for testing the LNTSC code. The GUI was capable of taking commands from controller and simulating the operations of the GUI. The GUI also simulated the fail safe mechanisms and capable of detecting the validity of the incoming command in the current operation.