

Overview

The problem our project addresses is the increased risk of infection when nurses need to enter patients' rooms to change IV administration dosages. To fix this problem, our project aims to allow for remote control access to an IV pump that improves efficiency and enhances patient safety. The challenges to this were ensuring that the medical pump did not lose functionality when accessed remotely or wired to a different location, and figuring out how the pump itself receives signals from the keypad. This involved reverse engineering in order to understand the pump itself and then creating our solution based on this understanding.

Objectives

Our objectives were to allow for an Alaris BD medical pump to be accessed remotely through a distanced wired keypad or wirelessly, and to maintain full functionality of the pump while doing so.

Approach

- We started by collecting the materials from the previous group
- We visited Hershey Medical Center to determine the pump we needed to interact with
- Then we ordered a BD Alaris PC Unit and pump modules
- We examined the possible paths of accessing the keypad via the ethernet port, accessing the internals of the PC itself, or through the individual pump modules
- After exploring these paths we decided that we could extend the button inputs via a ribbon cable, or use a logic analyzer to determine what signals were being sent over the existing cable
- From there we used a logic analyzer and used the signals obtained to program a Raspberry Pi to send those signals so it could be done wirelessly
- We created a prototype for the raspberry pi, that digitally displayed the outputs sent
- We made this virtual demonstration into a physical one using LEDs that show the I/O pins interacting with physical wires which shows the viability of this approach

-The resulting product was a Raspberry Pi that mimics the same functions of the keypad and could be accessed remotely with a working PC unit, thus solving the intended problem

Outcomes

-The sponsor's product will be able to save the time that it takes nurses to put on gowns and take them off whenever a dosage adjustment is needed

-This will also save patients from an increased risk of infection within the hospital allowing rooms to remain sterile even when adjustments to treatment are required

-The project reduces the wear on the physical keypad as it will instead be accessed virtually via a different location

-Overall soldering with a working PCU, we have achieved the goal of this project

Youtube Link

<https://youtu.be/76HGZfMxT2o>