

# Hot Line Communication For Lifts

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**Abstract-** Now a days, there are many technologies that have been developed for data transmission, Hot line communication is one of the technologies that have proved useful for data transmission over a power line. Hot line communication is implemented using the concept of power line communication. Hot line communication system is a system whereby communication signals were sent & received on household & industrial 50hz bearing power line. The aim of the project is to design & develop low cost narrowband power line communication modem circuit to monitor the lift status information for controlling the lift. The source information for digital communication is generated by a lift UPS and this will be sent through power line to destination using KQ330 (power line carrier module) communication. Then the system will receive data and display the information to LCD of lift car.

**Keywords-** Hot line communication, lift, lift UPS, KQ330 (HLC modem)

## I. INTRODUCTION

Power line carrier communication has recently become a popular technology for automation & networking. An elevator or lift is a type of vertical transportation that moves people or goods between floors of building vessel or other structure. Lifts are candidate for mass customization. A lift is essentially a platform that is either pulled or pushed up by a mechanical means. Lift consist of cab mounted on platform within an enclosed space. Lift UPS is an off line UPS which has 3 main parts namely – Charger, Inverter & Batteries. As majority of elevators use 3 phase power supply, the UPS also is 3 phase input & 3 phase output. It means, the lift UPS takes 3 phase supply & feeds to elevator simultaneously charging the batteries. In case of power cut, the inverter turns on battery mode and generates 3 phase output to feed load.

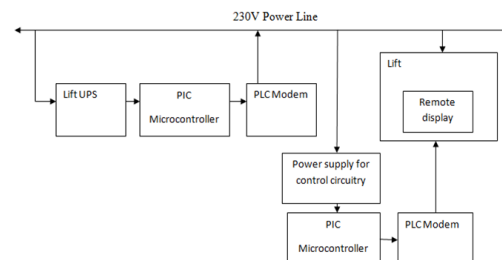
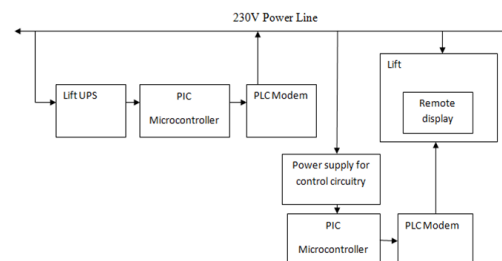
Hot line communication is a technology that uses power lines as its communication medium. Hot line communication provides narrow band data on conductors already used for electric power transmission. HLC offers a unique no new infrastructure approach to enabling rapid growth of energy management technology around the earth. Hot line communication is easy to install technology for many applications. Power line communications is the use of existing

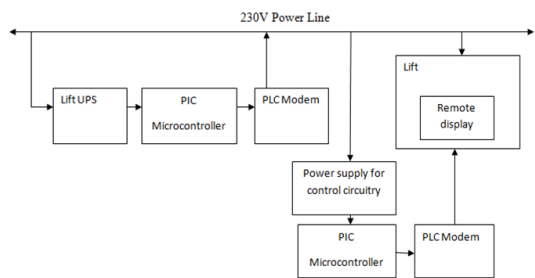
electrical cables to transport data and it has been around for a very long time.

## II. PROPOSED SYSTEM

### A. Block description

The main objective of the hot line communication system is the removal of extra wires connected for data transmission and also to overcome the radio frequency range problem. The system design consists of hardware and software design. The system includes PIC microcontroller, transmitting and receiving circuit, HLC modem KQ330, power supply circuit for KQ330. The design of hot line communication system can be divided into data transmission and reception according to the data flow. For designing a cost effective system without using internet and wi-fi following block schematic is designed:-





Block schematic of system

The basic block schematic of data transmission through power line consists of various blocks.

1) 1.1. PIC Microcontroller (PIC18f25J11) –

PIC18f25J11 is a family of 8 bit microcontrollers. This microcontroller is having 5.5V tolerant input having digital pins. It is self programmable under software control. It is having single supply in circuit serial programming via two pins. Operating range of the PIC microcontroller is 2.0v to 3.6v.

PIC18f25J11 is a family incorporates a range of series and parallel communication peripherals. The device also includes two independent enhanced USARTs capable of both serial peripheral interface and master slave mode of operation.

1.2. HLC Modem (KQ330) –

The communication device used for the communication over power lines is a MODEM commonly known as hot line communication modem. A hot line modem is a device which consists of an encoder, decoder, modulator and demodulator.

Table -1 functional values of KQ330

FUNCTIONS	VALUE
Working rate	120~135KHz
Power	DC +5v
Humidity	90%
Temperature	-25 degree ~ +70 degree

The interface baud rate for the HLC modem is 9600bps, the true baud rate is 100bps,250 byte-buffer.

1.3. Power Line –

Power line is nothing but a 230v electrical power line used to give power supply to the lift and UPS.

1.4. UPS (Uninterruptible Power Source) –

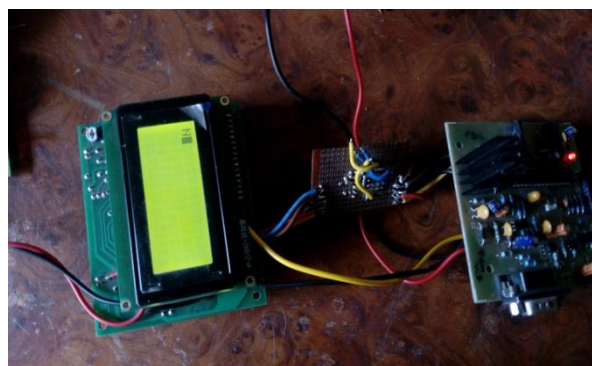
An uninterruptible power supply or uninterruptible power source is an electrical apparatus that provides emergency power to a load when the input power source or mains power fails. The primary role of any UPS is to provide short term power when the input power source fails. The three general categories of modern UPS systems are on-line line-interactive, and standby. In a standby (off-line) system the load is powered directly by the input power and the backup power circuitry is only invoked when the utility power fails.

III. ALGORITHMIC STEPS

- [1] Lift UPS generates the data which will be received by transmitter.
- [2] Process the data in PIC microcontroller (PIC18f25j11)
- [3] Digital data is transmitted to the HLC modem.
- [4] Output of the HLC modem given to the power line
- [5] Receive the data using PIC microcontroller and PLC modem.
- [6] Process the data using PIC microcontroller and HLC modem
- [7] Display the UPS status information to the lift.

IV. EXPERIMENTS AND RESULTS

The proposed scheme is tested using some parameters. The serial communication is carried out first for checking the 9600bps baud rate matching for the transmitter and receiver. The letter ‘N’ is transmitted serially from transmitter to receiver via a direct communication line connected in between. The picture shows the result for the serial transmission and reception.



Serial transmission

The second test to be carried out for the hot line communication system is to check the data transmission and reception using the HLC modem KQ330. The transmission data results are displayed on the digital storage oscilloscope as shown in picture below:

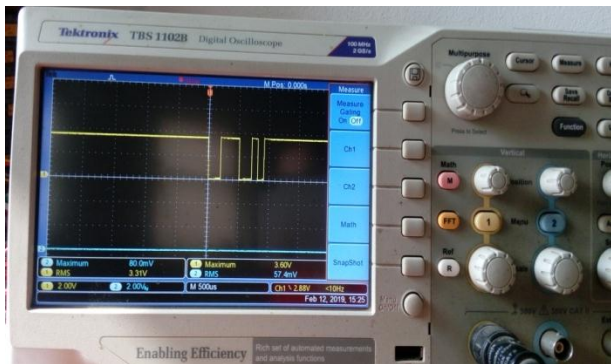


Figure 3. Data waveform for letter 'N' on DSO

The overall system structure of the Hot line communication for lifts is shown in the picture below which consists of the SMPS circuit, transmitter circuit, receiver circuit, KQ330 circuit and 7805 circuit and 230v power supply.

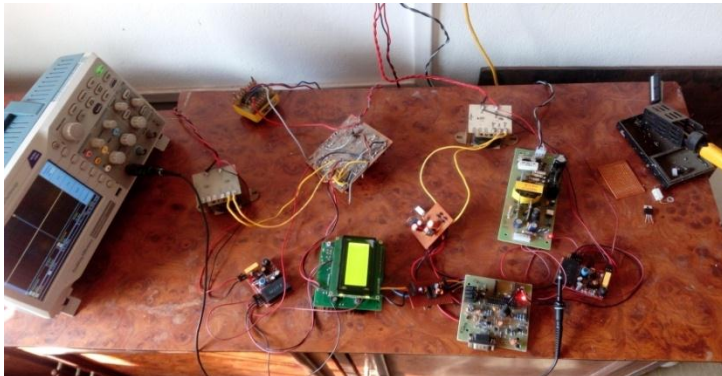


Figure 4. Hot line communication circuit

## V. CONCLUSION

Hot line communication is a technique that allows the exchange of data by means of power line cable that are present in every lift UPS system. This systems are affordable and reliable. This work contributes to words the development of lift UPS communication. A hot line communication system can provide significant cost savings as well as a great comfort for occupants as no wireless medium is used. As part of future work power line communication will be applied with more number of applications.

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