# REMOTE METER READING OVER POWER DISTRIBUTION LINES.

THESIS PRESENTED

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## DECLARATION

The work submitted in this thesis is the result of my own investigations, except where otherwise stated.

It has not already been accepted in substance for any degree, and also is not being concurrently submitted for any other degrees.

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Delicated to

my loving mother, elder brother

and

teachers

who encouraged me

for my education

## ABSTRACT

The thesis presents the development of a simple technique for remote reading of utility meters using the low voltage power distribution network.

Remotely reading electricity, gas and water meters have distinct advantages over traditional metering methods. Several communication technologies have been designed and implemented for this purpose using wireless techniques, telephone lines, power transmission and distribution lines. In this study, the last one has been selected as the basis for the development of a remote meter reading system applicable to Sri Lanka.

Power line communication over low voltage distribution lines is a cost effective method for data transmission. But it is complex due to large number of branches, tapings, transformers, different line configurations etc., that are present in the distribution network. The main task of this research is to develop suitable techniques for transfer of data over this network.



The basic concept of data transmission in this application is the change of voltage and current wave at the supply end and the load end respectively of the power system. A series of current pulses are generated representing the data to be transmitted from the consumer end. Similarly, a series of voltage pulses are generated at the supply end to represent the commands to be sent to the consumer. These current and voltage pulses are superimposed with the line current and the line voltage at the load end and the supply end respectively on the power line signal.

The prototype system presented in this thesis shows simulation as well as experimental results relating to the data transmitter, and the software design for the communication subsystem interfacing the meter to the distribution lines. A series of measurements are also carried out to find a suitable time of the day for the data transmission. Associated problems such as harmonics generated due to the insertion of data and the effects of load changes in the distribution network are also discussed.

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## TABLE OF CONTENTS


**CHAPTER ONE** INTRODUCTION ..... 1

1.1 Solutions of increase of electricity demand and its Consumers' in Sri Lanka ..... 1

1.2 Importance of remote metering ..... 2

**CHAPTER TWO** SURVEY OF POTENTIAL COMMUNICATION TECHNIQUES FOR REMOTE METER READING 4

2.1 Telephone based communication. ..... 5

2.2 Radio based communication. ..... 6

2.3 Power line carrier communication. ..... 7

2.4 Distribution line carrier communication. ..... 9

2.4.1 Low power radio frequency/power line carrier system (RF/PLC) ..... 10

2.4.2 Power frequency communication (TWAC) 10

2.4.3 Ultra Narrow Bandwidth PLC communication 11

2.4.4 Low frequency signal transmission ... 11

**CHAPTER THREE** PROPOSED DATA TRANSMISSION TECHNIQUE FOR RMR. ..... 12

3.1 Data transfer concept. ..... 12

3.1.1 Outbound signal ..... 12

3.1.2 Inbound signal ..... 14

3.2 Basic communication system design overview. ..... 14

3.2.1 Remote transponder Unit ..... 14

3.2.2 Communication channel. ..... 16

3.2.3 Data collection Unit. ..... 16

3.3 Structure of data transmission system. ..... 16

3.3.1 From Remote Transponder Units to the Primary Data Collection Unit. ..... 19

3.3.2 From Primary Data Collection Units to Secondary Data Collection Units. ..... 19

3.3.3 From Secondary Data Collection Units to Central Reading Unit. ..... 21

**CHAPTER FOUR** COMMUNICATION PROTOCOL ..... 22

**CHAPTER FIVE.** DESIGN AND IMPLEMENTATION OF RMR SYSTEM. ..... 27

5.1 Pulse Design. ..... 27

5.1.1 Modeling of an existing distribution system and construction of a prototype power distribution model. ..... 28



5.1.2 Observation of pulse transmission and detection using computer simulation software ..... 37

5.1.3 Power line disturbances and recommended standards and safety limits of voltage and current ..... 41

5.1.4 Observation of existing disturbances on selected power distribution system. ..... 42

5.1.4.1 Current Wave disturbances. ..... 42

5.1.4.2 Voltage wave disturbance. ..... 42

5.1.5 Theoretical studies on harmonic frequency of different pulse patterns. ..... 47

5.1.5.1 Spectrum analysis of a rectangular pulse signal. ..... 48

5.1.6 Observation of pulse transmission, with the power line disturbances. ..... 51

5.2 Suggested implementation of Transceiver hardware ..... 57

5.3 Software Design ..... 60

**CHAPTER SIX.** OBSERVATION AND RESULT. ..... 63

**CHAPTER SEVEN.** CONCLUSION. ..... 65

Annexes

Appendix A

Appendix B

List of References

## LISTS OF FIGURES


| | | |
|---|---|---|
| Figure 3.1(a) | Superimposed pulses with sinusoidal wave of Voltage/Current at the transmitter | 13 |
| Figure 3.1(b) | Detected pulses at the receiver | 13 |
| Figure 3.2 | Components of the Basic Communication System | 15 |
| Figure 3.3 | Functional Block Diagram of message exchanging System in between DCU and RTU | 17 |
| Figure 3.4 | Selected Distribution Line Diagram | 18 |
| Figure 3.5 | Structure of the data transmission system | 20 |
| Figure 4.1 | Exchanging messages between RTU and DCU | 22 |
| Figure 4.2 | A message block | 23 |
| Figure 4.3 | Communication Protocol at the Substation | 24 |
| Figure 4.4 | Communication Protocol at the Consumer End | 25 |
| Figure 4.5 | Structure of Outbound message | 26 |
| Figure 4.6 | Structure of Inbound message | 26 |
| Figure 5.1a | Simplified Load Distribution System from Ratmalana grid Substation to the Campus premises | 33 |
| Figure 5.1b | Line blocks of main distribution system in Figure 5.1a | 34 |
| Figure 5.2a | The front side of the Laboratory model Power distribution System | 35 |
| Figure 5.2b | The back side of the Laboratory Model Power Distribution System | 36 |
| Figure 5.3 | Current and Voltage pulses fed at the 400V load end And the 33 kV supply end respectively | 38 |
| Figure 5.4 | Voltage waveforms and their filtered outputs on distribution system after applying the voltage pulses | 39 |
| Figure 5.5 | Current waveforms and their filtered outputs on distribution system after applying the current pulses | 40 |
| Figure 5.6a | Feeder current at 33 kV side during daytime | 43 |

| | | |
|---|---|---|
| Figure 5.6b | Feeder current at 33 kV side during nighttime | 43 |
| Figure 5.7a | Frequency spectrum diagrams of current wave at the substation during daytime | 44 |
| Figure 5.7b | Frequency spectrum diagrams of current wave at the substation during nighttime | 44 |
| Figure 5.8 | Harmonics in R, Y and B Phases of Voltage wave in 33 kV line from $2^{nd}$ to $15^{th}$ harmonics | 46 |
| Figure 5.9 | Square wave pulse | 48 |
| Figure 5.10 | Power Spectrum Density for Square shape pulses | 49 |
| Figure 5.11 | Power Spectrum Density for Sinusoidal shape pulses | 50 |
| Figure 5.12 | Frequency spectrum and filtered output of current wave At the 33 kV side of the substation during night time | 52 |
| Figure 5.13 | Frequency spectrum and filtered output of pulse wave | 53 |
| Figure 5.14 | Frequency spectrum and filtered output of resultant Current wave at the 33 kV side of the substation during Nighttime | 54 |
| Figure 5.15 | Frequency spectrum and filtered output of current wave at the 230V side of the distribution transformer | 55 |
| Figure 5.16 | Connection of microcontroller & associated electronic Components | 58 |
| Figure 5.17 | Architecture of 8051 microcontroller | 59 |
| Figure 5.18 | DC Power Supply | 60 |
| Figure 5.19 | Way of operation of microcontroller | 61 |

## LISTS OF TABLES


| | | |
|---|---|---|
| Table 5.1 | Line parameters for different conductors in the system | 29 |
| Table 5.2 | Transformer details | 29 |
| Table 5.3 | General line Inductance and Capacitance values of HV conductors | 30 |
| Table 5.4 | Resistance, Inductance and Capacitance values for the distribution system | 30 |
| Table 5.5 | Design parameters for the model | 32 |
| Table 5.6 | Average values of harmonic components and THD of R, Y and B phases in 33 kV line at the substation | 45 |
| Table 5.7 | Pseudo Code | 62 |