ISSN 2250-3153

Instant data transmission in daily use

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Abstract- This paper builds about the analysis of electricity board efforts to providing electricity each required places and to maintaining all the complications. To reduce a complication about meter reading, implement a transmitter into that meter which can be able to provide instant reading of that meter to a specified location/substation.

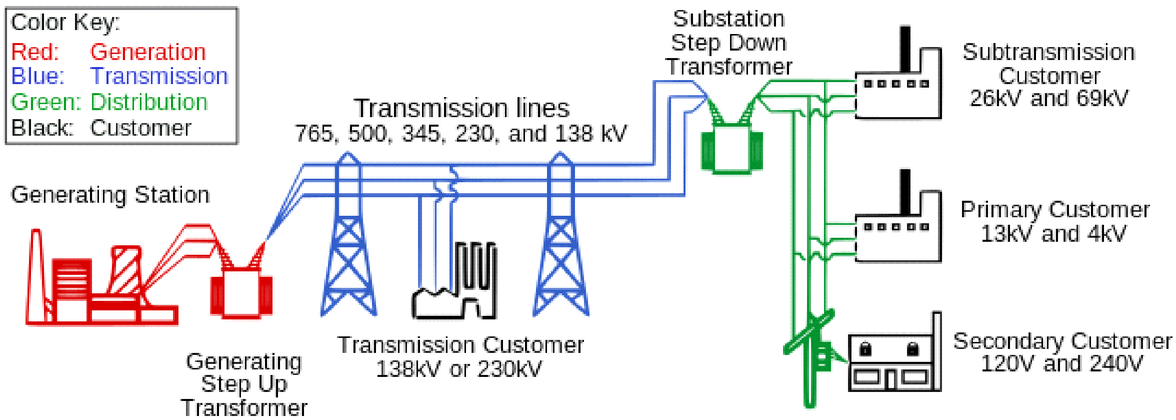
Index Terms- Transmitter, Reciever.

I. Introduction

Electric energy is measured in watts and metered and billed in kilowatt-hours. A watt equals the voltage multiplied by the amperage or current. If electric energy was a stream, the voltage would be the width and depth of the stream. The amperage would be how fast the stream is flowing. Wattage is simply how much water is in the stream at a given time. Watt-hours is how much water passes through the stream in an hour's time. For example, if a 120v electric motor draws 10 amps, the connected load would be 1200 watts or 1.2 kilowatts. The motor would consume 1.2 kWh over a one-hour period and 12 kWh over a ten-hour period.

An electricity meter, electric meter, or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device.

Electric meters work very much like an electric motor. Th energy entering the home is passed through a set of small wires surrounding a shaft. The current passing through the wires creates an electric field that "induces" the shaft to turn. The shaft is connected to a graduated disk and a set of gears that turn a set of numbers much like an odometer in a car. A set number of revolutions of the large disk corresponds to one kilowatt-hour.

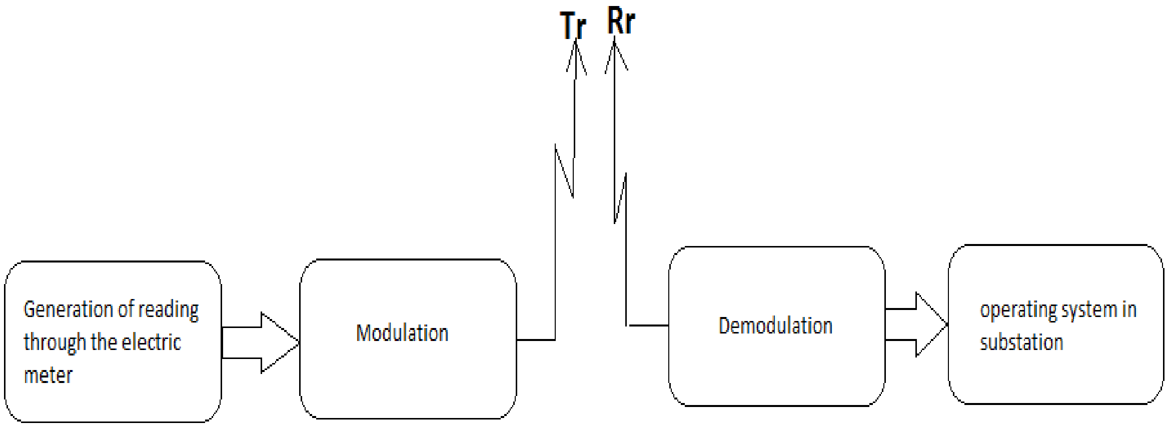


Our meter is read approximately every 30 days. Electric utility personnel come onto your premises to read the meter and write the reading onto a meter reading sheet. The past month's reading is subtracted from the current reading to determine the monthly kWh usage. You can always compare your usage against the monthly readings provided on your utility bill.

II. Transmitting and Recieving

Now, if a transmitter is implemented in the meter then the generated reading is to be transmited to a substation during a specified time of period. On the otherhand we can say, that the reading generates continuosly and transmitter transmit the reading to the substation. An implementation is to be also require in substation to recieve that readings.

Some time before when electric meter is not introduced, reading is carried out by a rotating plate. But now in elecronic meter readings get a form of PULSE, so it will be easy to send it through a transmitter by using any of the modulation technique (as Pulse code modulation).



The transmitter uses mobile communication networking architecture to transmit the signal to substation and only one man require to operate these in substation.

Electrical communication transmitter and receiver techniques strive toward obtaining reliable communication at a low cost, with maximum utilization of the channel resources. The information transmitted by the source is received by the destination via a physical medium called a channel. This physical medium, which may be wired or wireless, introduces distortion, noise and interference in the transmitted information bearing signal. To counteract these effects is one of the requirements while designing a transmitter and receiver end technique. The other requirements are power and bandwidth efficiency at a low implementation complexity.

Modulation is a process of encoding information from a message source in a manner suitable for transmission. It involves translating a baseband message signal to a passband signal. The baseband signal is called the modulating signal and the passband signal is called the modulated signal. Modulation can be done by varying certain characteristics of carrier waves according to the message signal. Demodulation is the reciprocal process of modulation which involves extraction of original baseband signal from the modulated passband signal.

Several factors influence the choice of a digital modulation scheme. A desirable modulation scheme provides low bit error rates at low received signal to noise ratios, performs well in multipath and fading conditions, occupies a minimum of bandwidth, and is easy and cost-effective to implement. The performance of a modulation scheme is often measured in terms of its power efficiency and bandwidth efficiency. Power efficiency describes the ability of a modulation technique to preserve the fidelity of the digital message at low power levels. In a digital communication system, in order to increase noise immunity, it is necessary to increase the signal power. Bandwidth efficiency describes the ability of a modulation scheme to accommodate data within a limited bandwidth.

The nature of the information generating source classifies a modulation technique as an analog or digital modulation technique. When analog messages generated from a source passe through a modulator, the resulting amplitude or angle modulation technique is called analog modulation. When digital messages undergo modulation the resulting modulation technique is called digital modulation.

Specific waveforms are required to represent a zero and a one uniquely so that a sequence of bits is coded into electrical pulses. This is known as line coding. There are various ways to accomplish this and the different forms are summarized below.

1. Non-return to zero level (NRZ-L): 1 forces a a high while 0 forces a low.

2. Non-return to zero mark (NRZ-M): 1 forces negative and positive transitions while 0 causes no transitions.

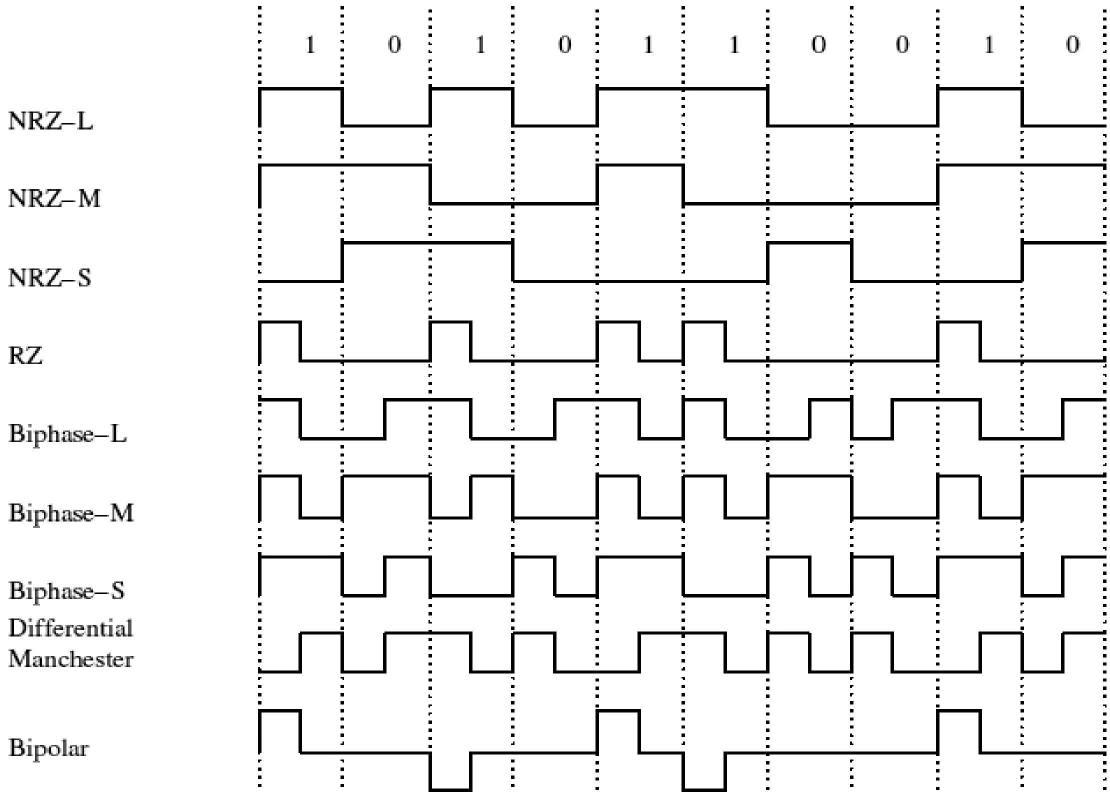
3. Non-return to zero space (NRZ-S): 0 forces negative and positive transitions while 1 causes no transitions.

4. Return to zero (RZ): 1 goes high for half a period while 0 remains at zero state.

5. Biphase-L: Manchester 1 forces positive transition while 0 forces negative transition.

In case of consecutive bits of same type a transition occurs in the beginning of the bit period.

6. Biphase-M: There is always a transition in the beginning of a bit interval. 1 forces a transition in the middle of the bit while 0 does nothing.



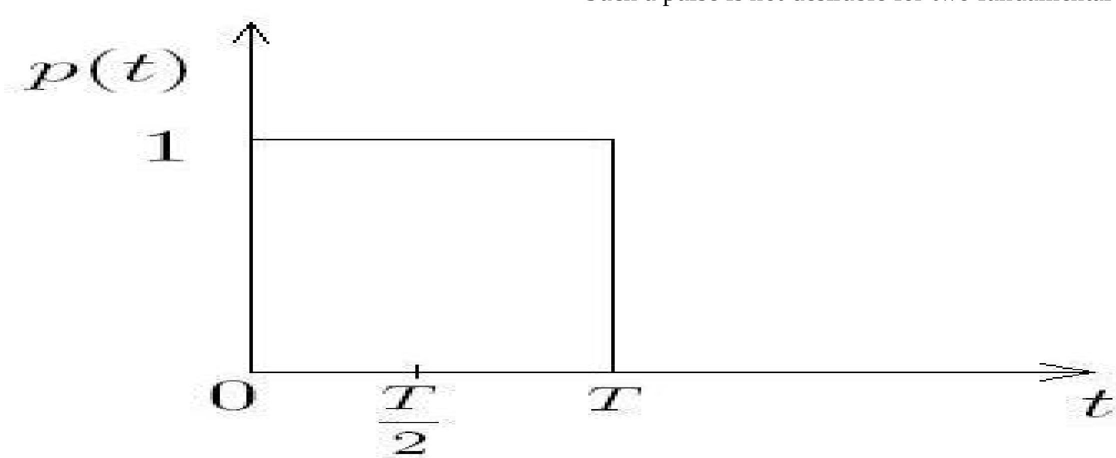
7. Biphase-S: There is always a transition in the beginning of a bit interval. 0 forces a transition in the middle of the bit while 1 does nothing.

8. Differential Manchester: There is always a transition in the middle of a bit interval. 0 forces a transition in the beginning of the bit while 1 does nothing.

9. Bipolar/Alternate mark inversion (AMI): 1 forces a positive or negative pulse for half a bit period and they alternate while 0 does nothing.

III. Pulse Shaping

Let us think about a rectangular pulse as defined in BPSK. Such a pulse is not desirable for two fundamental reasons:



(a) the spectrum of a rectangular pulse is infinite in extent. Correspondingly, its frequency content is also infinite. But a wireless channel is bandlimited, means it would introduce signal distortion to such type of pulses,

(b) a wireless channel has memory due to multipath and therefore it introduces ISI.

In order to mitigate the above two effects, an efficient pulse shaping funtion or a premodulation filter is used at the Tx side so that QoS can be maintained to the mobile users during communication. This type of technique is called pulse shaping technique. Below, we start with the fundamental works of Nyquist on pulse shaping and subsequently, we would look into another type of pulse shaping technique.

ISSN 2250-3153

IV. Nyquist Pulse Shaping

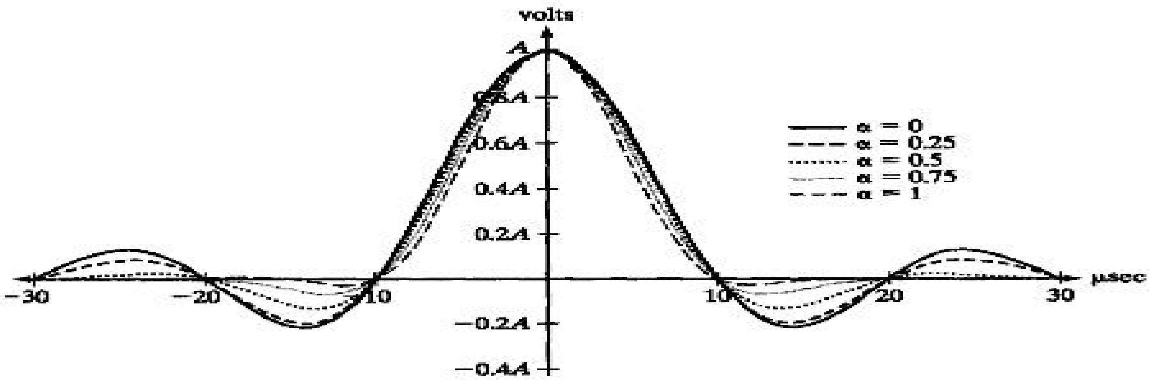
There are a number of well known pulse shaping techniques which are used to simultaneously
to reduce the inter-symbol effects and the spectral width of a modulated digital signal. We discuss here about the fundamental works of Nyquist. As pulse shaping is difficult to directly manipulate the transmitter spectrum at *RF* frequencies, spectral shaping is usually done through baseband or IF processing.

Let the overall frequency response of a communication system (the transmitter, channel and receiver) be denoted as *Heff* (*f*) and according to Nyquist it must be given by:

$$Heff\,(f) = 1/fs\,rect(\,f/fs)$$

Hence, the ideal pulse shape for zero ISI, given by *heff* (*t*), such that,

$$Heff\,(f) \leftrightarrow heff\,(t)$$



is given by:

$heff\,(t) = \sin(\,\pi t/Ts)/\pi t Ts.$

Realization of Pulse Shaping Filters

Since *heff* (*t*) is non-causal, pulse shaping filters are usually truncated within ±6*Ts* about *t* = 0 for each symbol. Digital communication systems thus often store several symbols at a time inside the modulator and then clock out a group of symbols by using a look up table that represents discrete time waveforms of stored symbols.

This is the way to realize the pulse shaping filters using real time processors.

Non-Nyquist pulse shaping are also useful, which would be discussed later in this chapter while discussing GMSK.

Advantage

A most advantage to implement this in meter is reduces human effort for getting reading after each generation. Only one can handle it in substation. Daily reading is updated automatically.

Disadvantage

Only the time of implementation faces some difficulties as:

1. to renew all the exhisted meters.
2. to setup a new arangement in subsations etc.

V. Conclusion

A major chunk has been devoted to digital communication systems which obviously have certain distinction in comparison to their analog counterpart due to their signal-space representation. The important modulation techniques for wireless communication such as QPSK, MSK, GMSK were taken up at length. A relatively new modulation technology, OFDM, has also been discussed. Certain practical issues of concern are also discussed. It should be noted that albeit implementing these efficient modulation techniques, the channel still introduces fading in different ways. In order to prevent that, we need some additional signal processing techniques mainly at the receiver side.

References

[1] "A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets" (http://www1.eere.energy.gov/femp/pdfs/primer.pdf) (PDF). United States Department of Energy Federal Energy Management Program (FEMP). May 2002. Retrieved December 27, 2008.

[2] Hans Dieter Betz, Ulrich Schumann, Pierre Laroche (2009). Lightning: Principles, Instruments and Application.

[3] B. P. Lathi and Z. Ding, Modern Digital and Analog Communication Systems, 4th ed. NY: Oxford University Press, 2009.

[4] B. Sklar, Digital Communications: Fundamentals and Applications, 2nd ed. Singapore: Pearson Education, Inc., 2005.

[5] R. Blake, Electronic Communication Systems. Delmar, Singapore: Thomson Asia Pvt Ltd, 2002.

[6] J. G. Proakis and M. Salehi, Communication Systems Engineering, 2nd ed. Singapore: Pearson Education, Inc., 2002.

[7] T. S. Rappaport, Wireless Communications: Principles and Practice, 2nd ed. Singapore: Pearson Education, Inc., 2002.

[8] S. Haykin and M. Moher, Modern Wireless Communications. Singapore: Pearson Education, Inc., 2002.

[9] W. H. Tranter et. al., Principles of Communication Systems Simulation. Singapore: Pearson Education, Inc., 2004. 128

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