

# **Importance of Manchester Coding Using Micro-Controllers/Related Data Processing Mechanisms – An Interesting Insight into Manchester Coding & Smart Watch Applications.**

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## **Abstract :**

Smart Watches are modern devices involving cutting edge technologies in all aspects of working and communicating with the surrounding environments by detecting parameters and also providing a means to transmit the related data for further processing via Computers/Tablets/Smart Phones etc.. We wish to highlight the importance of “Manchester Coding” in the context of Smart Watches based on Micro-controllers for example SAML21 Series from ATMEL.

**Keywords :** Smart Watches/Manchester Coding/SAML21 Series of Micro-controllers/Circadian Systems/Data Processing.

## Introduction & Inspiration :

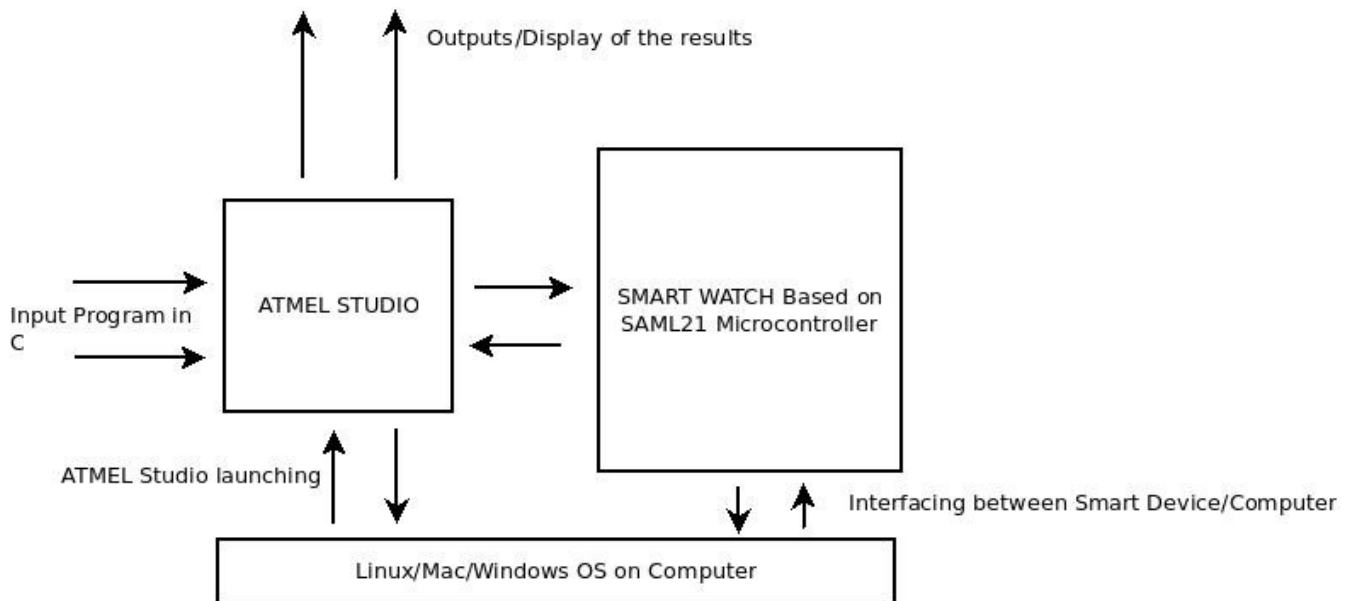
“Manchester Coding is one of the most common data coding methods used today. Similar to BiPhase, Manchester coding provides a means of adding the data rate clock to the message to be used on the receiving end.” - **According to ATMEL Application Note on Manchester Coding.**

## Our source of inspiration is :

[http://www.atmel.com/Images/Atmel-9164-Manchester-Coding-Basics\\_Application-Note.pdf](http://www.atmel.com/Images/Atmel-9164-Manchester-Coding-Basics_Application-Note.pdf)

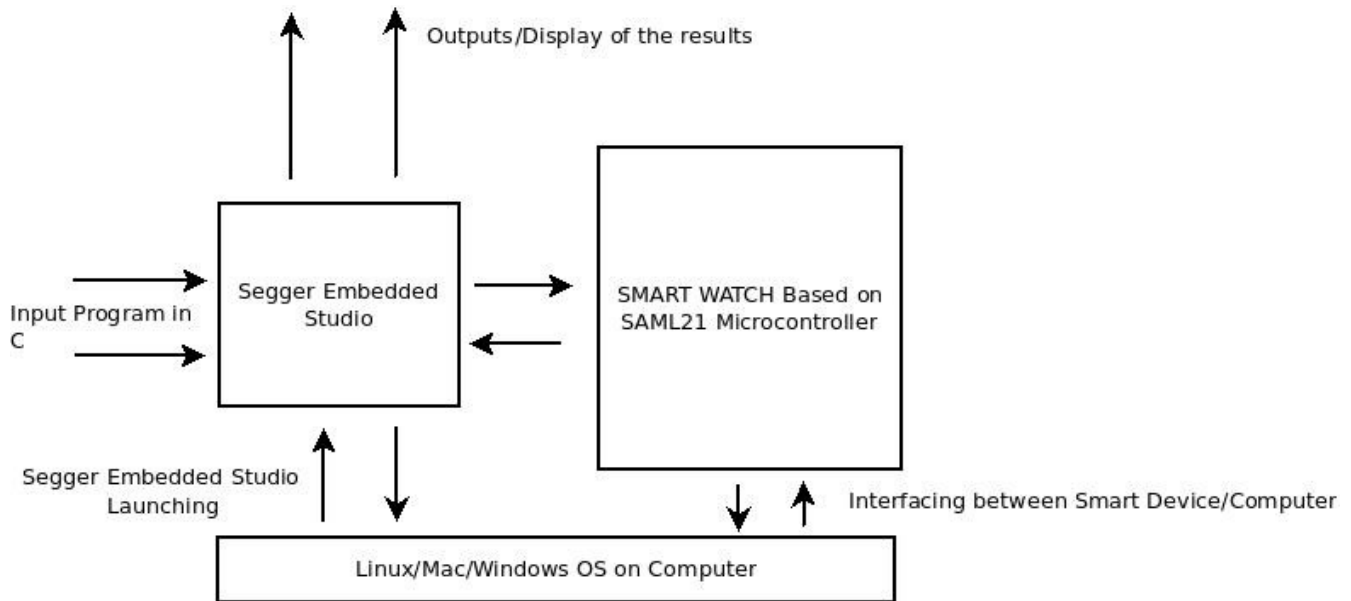
*We are not going into details because there is already lot of published literature available on “Manchester Coding “ topic. Readers are referred to the references listed below in this short note.*

## Informatics Frameworks of Embedded Systems Development :



**Figure[a] : Approximate Framework to test Manchester Coding Concepts involving Smart Watch based on SAML21 Micro-controller.**

**Please Note :** Simple Procedures to implement Manchester Coding Techniques are very well discussed in the above mentioned source prepared by ATMEL. Since it is a simple technical note it is not possible for us to communicate or describe the implementation in detail. Readers are advised to refer to all the information links provided for their information to proceed further. There could be other available IDEs/ways & means to develop embedded systems. We are not promoting any product/s.



**Figure[b] : Approximate Framework to test Manchester Coding Concepts involving Smart Watch based on SAML21 Micro-controller.**

**Additional Information on Software/IDEs Used :**

[i] <https://www.segger.com/products/development-tools/embedded-studio/>

[ii] <http://www.microchip.com/avr-support/atmel-studio-7>

**\*\* Learn about Manchester Encoding, a simple and effective way to improve high-speed or wireless digital communications.**

Manchester Encoding: What Is It, and Why Use It? - December 23, 2016 by Robert Keim

<https://www.allaboutcircuits.com/technical-articles/manchester-encoding-what-is-it-and-why-use-it/>

## **Conclusion with Future Perspectives :**

We have put forward a simple technical note highlighting the importance of Manchester Coding and its applications in designing, developing and testing micro-controller based applications for example - SAML21 based Smart Watch.

## **Acknowledgements :**

No competing financial interest/s is/are declared in preparing this manuscript. This manuscript is meant to inspire others to develop more advanced communication software and its applications based on Manchester Coding Techniques in the demanding area of sleep studies using novel methodologies. The Authors strictly abide by all copyright agreements in using open source software or other such technologies used in this paper. Special thanks to all who made this happen. We thank FAPESP R&D funding via Versor Innovations/Tech 4 People Project, Santo Andre, SP, Brazil for generously supporting our research work.

## **References :**

1. [https://en.wikipedia.org/wiki/Manchester\\_code](https://en.wikipedia.org/wiki/Manchester_code)
2. [https://en.wikibooks.org/wiki/Communication\\_Systems/Line\\_Codes](https://en.wikibooks.org/wiki/Communication_Systems/Line_Codes)
3. [https://www.rug.nl/research/portal/en/publications/luminance-coding-of-the-circadian-system\(890953ba-f3ba-4cc6-8cd4-bd86c642c439\).html](https://www.rug.nl/research/portal/en/publications/luminance-coding-of-the-circadian-system(890953ba-f3ba-4cc6-8cd4-bd86c642c439).html)
4. [http://pcbheaven.com/wikipages/manchester\\_coding/](http://pcbheaven.com/wikipages/manchester_coding/)
5. [http://www.atmel.com/Images/Atmel-9164-Manchester-Coding-Basics\\_Application-Note.pdf](http://www.atmel.com/Images/Atmel-9164-Manchester-Coding-Basics_Application-Note.pdf)