



SNS COLLEGE OF ENGINEERING



Kurumbapalayam(Po), Coimbatore - 641 107

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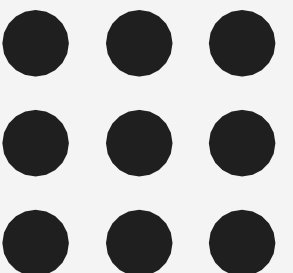
Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai

Department of AI & DS

Course Name - Internet of Things & AI

III Year / V Semester

**CONNECTIVITY TECHNOLOGIES AND
COMMUNICATION PROTOCOLS**





INTRODUCTION TO RFID

- **R**adio **F**requency **I**dentification: Technology that uses radio-frequency waves to transfer data between a reader and a movable item to identify, categorize, track...
- RFID is fast, reliable, and does not require physical sight or contact between reader/scanner and the tagged item



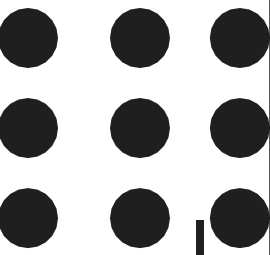


RFID Technology

What is RFID ?

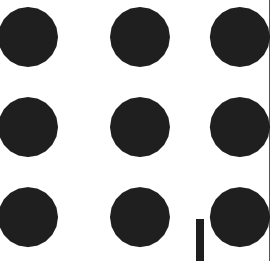
- **R**adio **F**requency **I**dentification
- A micro-chip in a label used to transmit data when the label is exposed to radio waves





RFID systems use radio waves at several different frequencies to transfer data. In health care and hospital settings, RFID technologies include the following applications:

- Equipment tracking
- Personnel tracking
- Ensuring that patients receive the correct medications and medical devices
- Preventing the distribution of drugs and medical devices
- Monitoring patients
- Providing data for electronic medical records systems



According to the frequency, RFID can be divided into three types: LF, HF, UF:

- 1) **Low-Frequency** RFID (100~500KHz): low-frequency RFID has a shorter inductive distance, the reading speed is slower. Low-frequency RFID of 125KHz is commonly used, whose penetration ability is good.
- 2) **High-Frequency** RFID(10~15MHz): high-frequency RFID has a longer sensing distance, the reading speed is relatively high. A High-frequency RFID of 13.56MHz is mainly used.
- 3) **Ultra High-Frequency** RFID (850~950MHz~2.45GHz): Ultra High-Frequency RFID has the longest sensing distance and fastest reading speed, but penetration ability is bad.

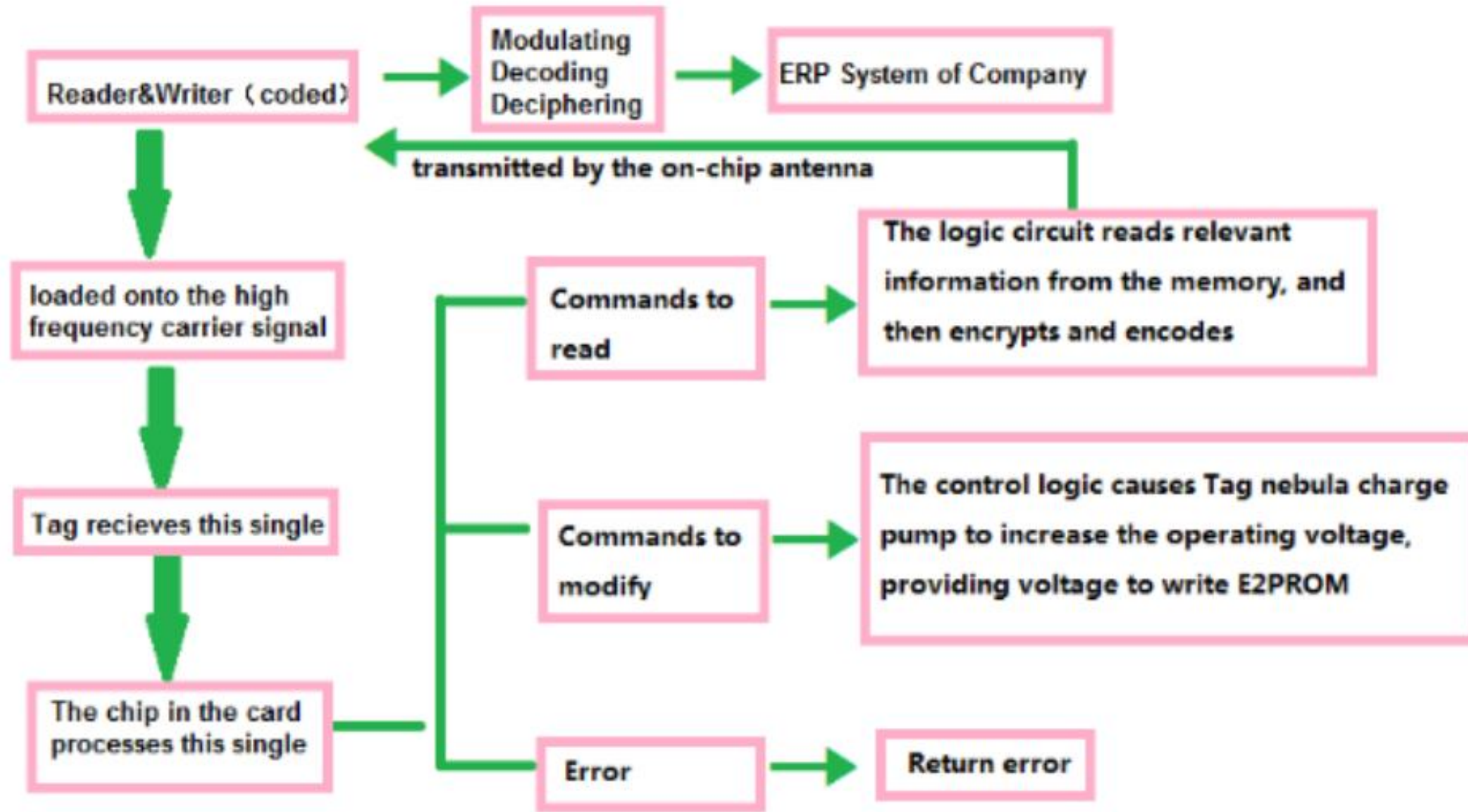
Working Principles of RFID

- RFID is a short form of Radio Frequency Identification. It is working under inductive coupling principle, based on a radio frequency or radio waves.
- RFID depends on the frequency of operation for low frequency and high frequency operation based on the inductive coupling (near field coupling)
- While in case of UHF tags working is based on the electromagnetic coupling (far field coupling)

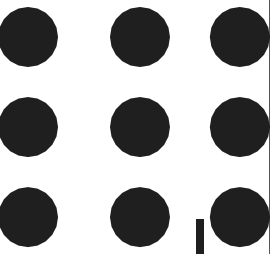
Low frequency and high frequency (Inductive coupling)

- RFID reader continuously sends radio waves at a particular frequency. The radio waves which is send by the reader is of three purposes.
- It includes enough power into tag
- It provide synchronization clock tag to passive tag
- Acts as a carrier for return data from tag

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Schematic of RFID Basic Working Principle



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Ultra-high frequency (far field coupling)

- Consider in UHF, the distance between the reader and the tag is few meters so coupling between the reader and coil will be the far field coupling.
- RFID reader continuously sends the waves at a particular frequency towards the tag. In response, the tag is sending weak signal to RFID reader.
- This week signal will be sent back to RFID reader which is known as back scattered signal.