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Commentary

Signaling System using Infrared and Radio Frequency Technology in Railways

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DESCRIPTION

An Infrared and Radio (IR) sensor used for detection of the movement of the train on the track. In the infrared spectrum all objects emits thermal radiation. Those are useful for detection through infrared sensor. An IR light emitting diode acts as an emitter and IR photo diode acts as a detector. The detector is sensible to IR light. When IR signal falls on the photo diode the resistance is changed. The change of resistance is proportional to the voltage. This voltage is proportional to the value of the acquired IR signal. The IR sensor on the transmitter transmits continuous flow of Infrared Radio rays. The output terminal of the IR receiver varies with respect to the obtained IR rays.

The overall thirty feet length of scaled rail track is organized into 4 zones. Each zone of the track represents one station. Four IR sensors are positioned at every station for detection and a particular station. Four IR sensors are located at every station to detect the location of the train which is at some distance. Two IR sensors are implanted earlier than and after the level crossing gate for signaling purpose. These sensors will manage in association with the state of open and close of the gate mechanism. The signal conversion is not taken into consideration because the output signal is an order of digital form. The output signal is interfaced to the encoder (HT- 12E) for changing parallel information into serial information with the use of AT89S52 microcontroller.

Radio frequency transceiver operating at 433 MHz is followed as a communication tool between the control room and the sensing stage of the circuit on the railway track. Since Radio Frequency (RF) Communication works on serial communication an encoder is adopted in association with AT89S52 microcontroller to transform n-bit into serial information. The encoder is TTL compatible. It is to be transformed into serial information using encoder. The RF transmitter is used to read the serial information and the signal is modulated using frequency shift key method. The modulated signal is transmitted with the help of antenna. The RF receiver gets the modulated signal through the antenna. Filtering, processing and demodulation are to be carried out at the RF receiver. The serial data at the output stage of the RF receiver is transformed into Transistor Logic (TL) form. HT 12D-HT 12E pair is used as encoder and decoder.

CONCLUSION

The High speed signalling design approach must be able to model the requirements definition structure on the system level using the Technical Specifications for Interoperability (TSIs) as published through the commission of the european communities. The TSI governing signal necessities is for the command and manage signalling subsystem. The TSI identifies some of system requirements that are required to assure interoperability for trains from one european country to run on tracks in another. There are massive constraints in following the TSI technique, the requirements are especially aimed at the European Rail Traffic Management System (ERTMS), the alternative is that they encompass device requirements for interoperability between the various member train manage systems and are not comprehensive in describing the whole set of requirements needed to specify an (Automatic Train Control) ATC system.

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