Circuit Description for Immobilizer Control Unit

The circuit of Immobilizer Control Unit (hereinafter ICU) consists of following parts.

1. Power Supply
2. LF Antenna Drive
3. K-Line communication Interface
4. Communication Selection
5. Status LED control
6. External EEPROM

A. Power Supply Part

This part consists of TLE4278, varistor, AL-capacitor, T-capacitor, resistors, capacitors and Diodes. This part supplies stable 5 and 12 Volts for the system. Internal circuits based on microcontroller (hereinafter MCU) are operated at 5 volts. And external communication line is normally operated at 12 volts. The power regulator IC is TLE4278.

B. LF Antenna Drive Part

This part consists of PCF7991AT, resistors, capacitors and Coil. The purpose of this part is control of LF Antenna. ICU communicates with Transponder using AM. The carrier frequency used in LF communication is 125 kHz. It is generated by a parallel LC oscillation, C11, C12 and Coil. The PCF7991AT works as both Coil driver and LF Data Transceiver. The PCF7991AT is only operating when the MCU requests Transponder ID to PCF7991AT after turning Ignition Key On or the diagnostic equipment requests “Key coding” Mode or “Key reading” mode to ICU. The operating time is about 500ms.

C. K-Line communication Interface Part

This part consists of L9637D, resistors and Zener Diode. ICU communicates with ECM using K-Line based on KWP2000. The K-Line is bidirectional. So this circuit needs converter IC, L9637D. The L9637D converts 12 volts data into 5 volts data and vice verse.

D. Communication Selection Part

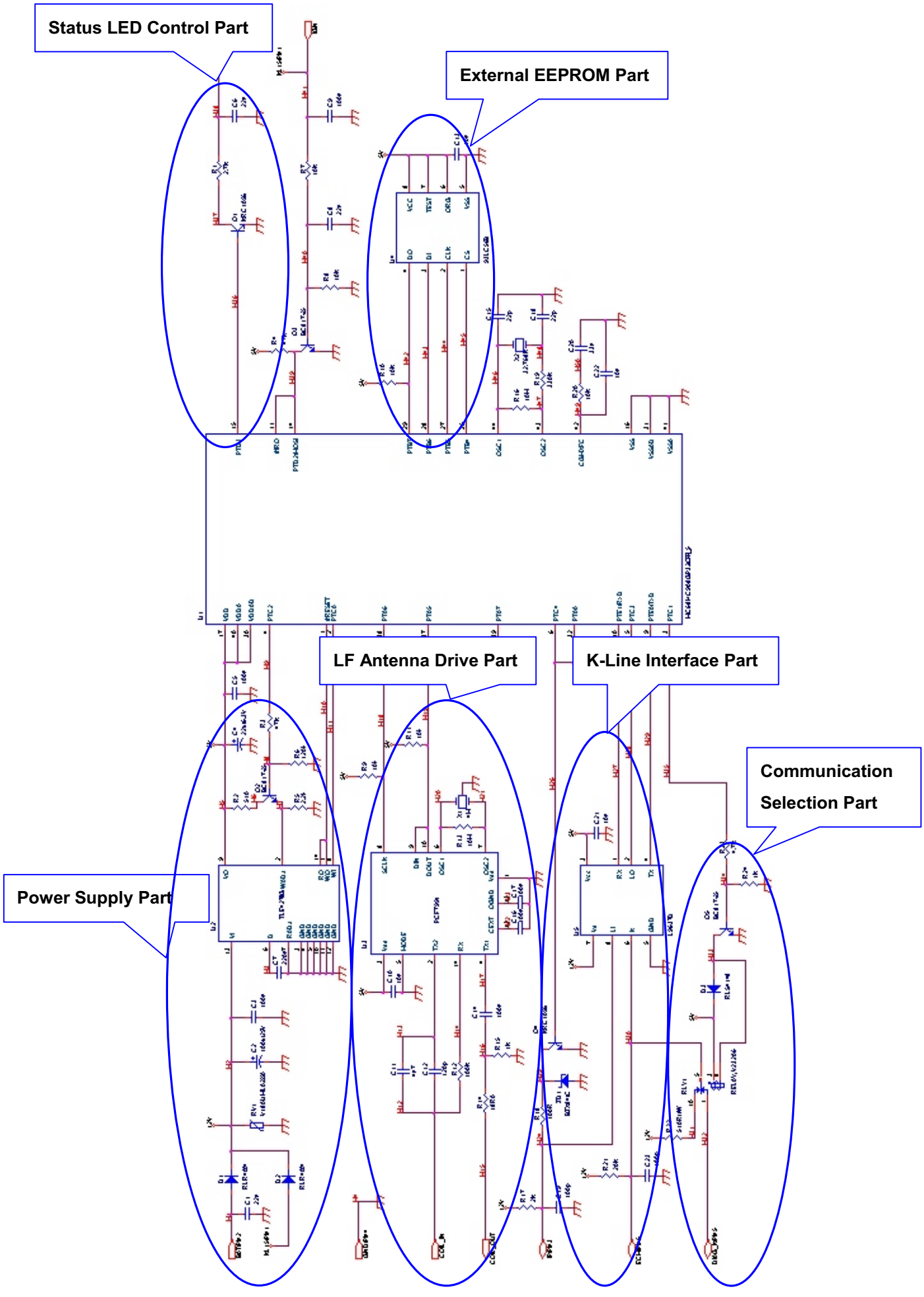
This part consists of Relay, TR , Resistors and Diode. When ICU detects messages from ECM, The K-Line is connected to 510 ohm pull-up resistor.

E. Status LED Control

This part consists of TR, resistors and capacitor. ICU displays current status by using external LED.

F. External EEPROM

This part consists of resistor, capacitor and 93LC56B (EEPROM). An important data is stored in EEPROM.


Status LED Control Part
External EEPROM Part
LF Antenna Drive Part
K-Line Interface Part
Communication
Selection Part
Power Supply Part