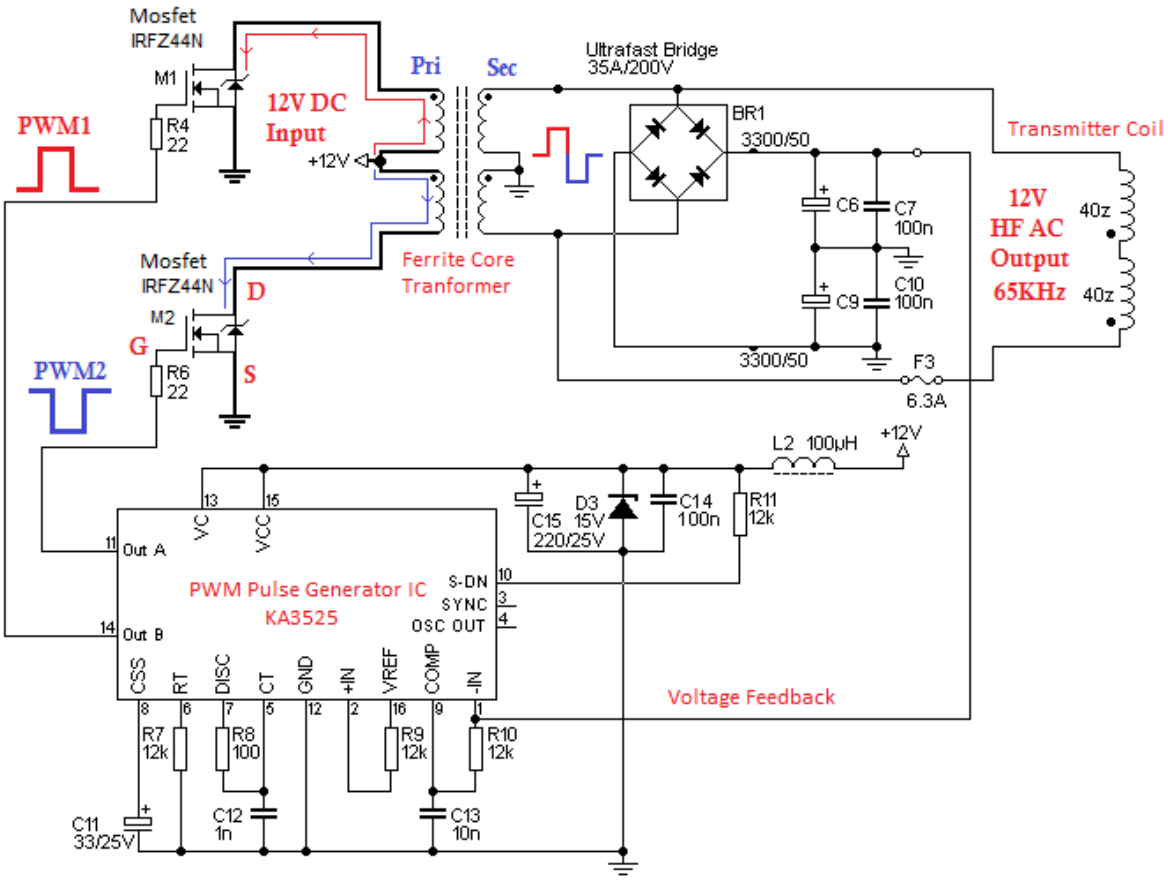
CIRCUIT DIAGRAM OF TRANSMITTER



DESCRIPTION OF TRANSMITTER CIRCUIT

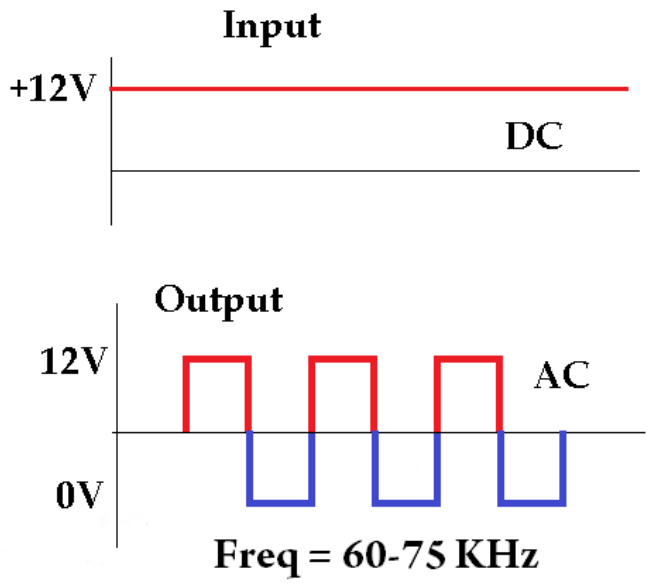
- The transmitter circuit is basically a **high frequency inverter.**
- **Input** to the transmitter circuit is **DC 12V**.
- **Output** of the transmitter will be **AC 12V at 65 KHz frequency**.
- Input 12V DC voltage is supplied by an AC to DC adaptor or SMPS.
- The inverter type used here is a **Half-Bridge inverter**.
- Inverter is designed using **MOSFET** based switches.
- Output of the transmitter circuit is driven by Ferrite core transformer which is a high frequency transformer.

- Primary winding of ferrite core transformer is centre tapped which has three wires.
- 12V DC input voltage is fed to through the centre tap of transformer's primary winding.
- Output of half-bridge inverter is taken from secondary winding of the Ferrite core transformer.
- For operating the inverter the required **gate switching pulses** are provided by a **PWM pulse generator IC**.
- Here **IC KA3525** is used to provide **PWM gate pulses** for **switching the MOSFETs**.
- **Half bridge inverter** is designed using two **IRFZ44N N-Channel MOSFETs**.
- The **frequency of the PWM oscillator** IC can be **set by** timing resistors and capacitors **RT** and **CT** respectively which are connected to pin 6 and pin 5.
- Output PWM pulses **PWM1** and **PWM2** are taken from pin 11 and pin 14 of the IC which are given to the gate pin of MOSFETs 1 and 2.
- An ultrafast bridge rectifier is connected to the transformer output to convert the HF AC voltage into DC and provide a voltage feedback to the PWM generator IC KA3525.
- Voltage feedback is used provided to the IC for maintaining stable output voltage from inverter.
- Output voltage will be 12V AC at 65KHZ frequency which is from the secondary winding of the ferrite core transformer given to the transmitter coil.
- Transmitter coil is made up of multiple turns of copper wires which is 40turns used here.

- Transmitter coil used here is basically an air core inductor type.
- It converts high frequency electrical current into electromagnetic waves.

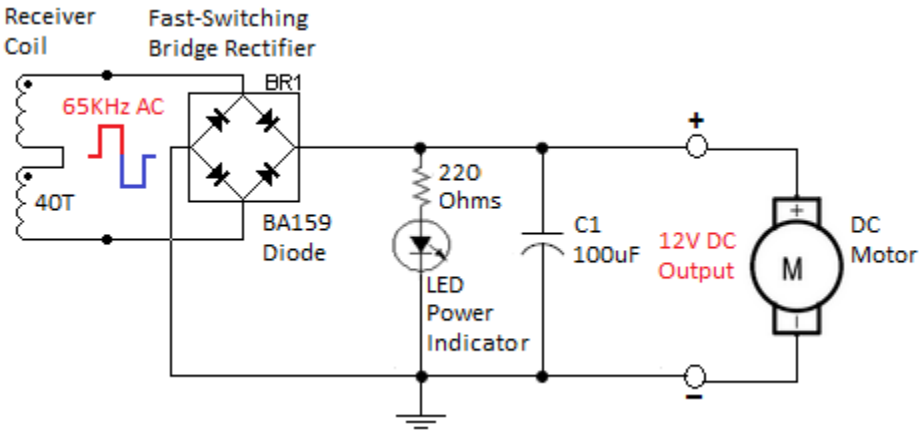
OPERATION OF TRANSMITTER CIRCUIT

- When the power is turned ON, IC KA3525 start producing PWM pulses.
- Both PWM pulses are 90^{o} out of phase with each other.
- So when one MOSFET is in on condition means the other MOSFET will be in off condition.
- When the MOSFET1 is ON condition, input DC current flows through upper half winding of HF transformer and MOSFET2 will be in OFF condition.
- When the MOSFET2 is ON condition, input DC current flows through lower half winding of HF transformer and MOSFET1 will be in OFF condition.
- After a complete cycle an AC output voltage is produced at the secondary winding of the transformer at 65KHZ frequency.
- The HF AC voltage is given to the transmitter coil.
- Thus the power is transmitter wirelessly by inductive coupling using electromagnetic waves.



Transmitter Circuit Input and Output Waveform

CIRCUIT DIAGRAM OF RECEIVER



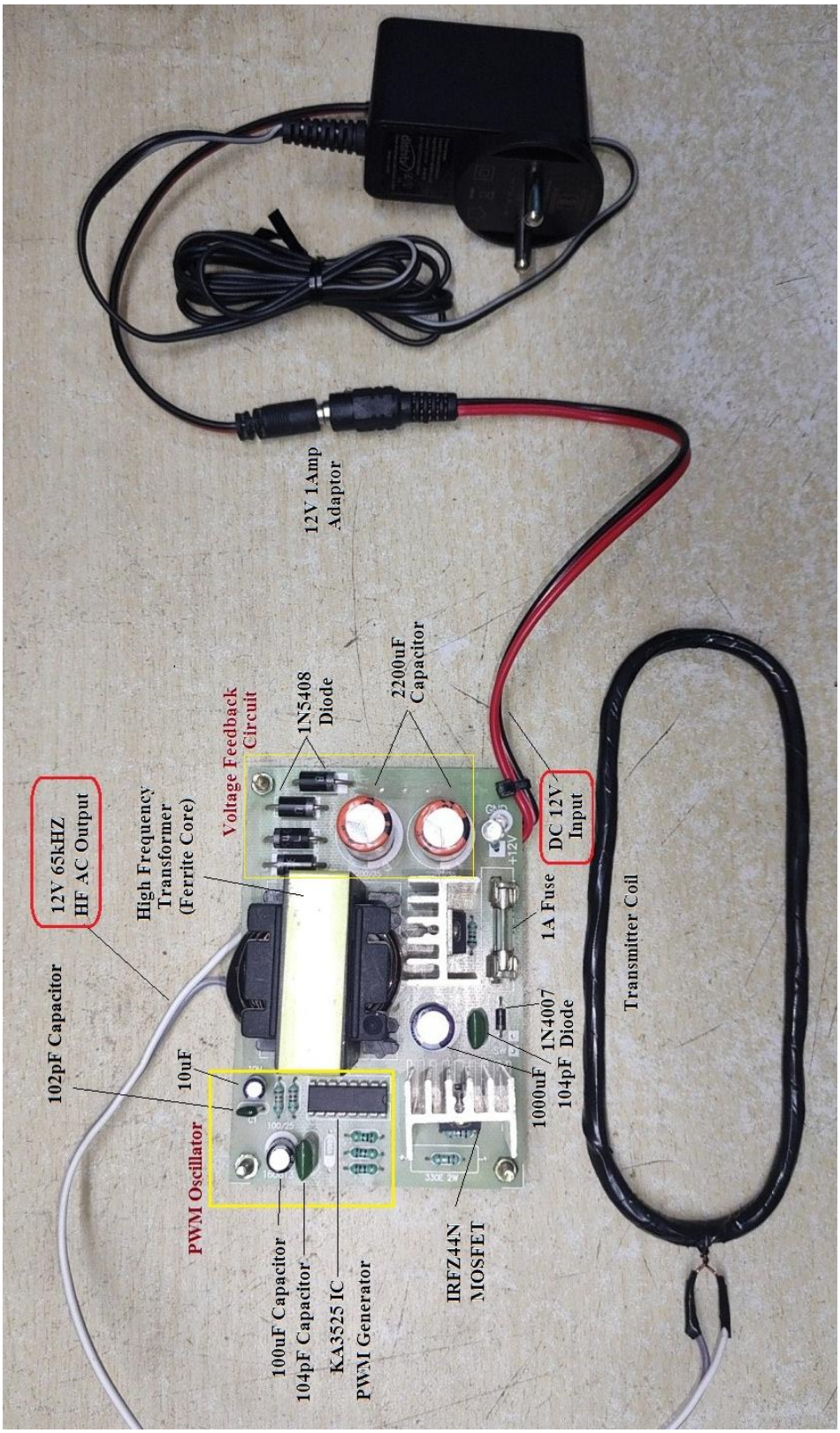
DESCRIPTION OF RECEIVER CIRCUIT

- Receiver coil is connected to a high frequency bridge rectifier.
- High frequency rectifier is designed using fast switching diodes BA159 which can operate at higher frequencies.

OPERATION OF TRANSMITTER CIRCUIT

- Receiver coil converts the electromagnetic waves from the transmitter coil back into high frequency AC voltage output.
- Fast switching bridge rectifier converts HF AC voltage into DC voltage.
- The capacitor filters any ripple after rectification and gives a stable DC voltage output.
- Output of receiver will be 12V DC which can be used for charging the battery of the Electric Vehicle or running the motor.

HARDWARE PARTS OF TRANSMITTER



HARDWARE PARTS OF RECEIVER AND ELECTRIC VEHICLE