General

The Daimler Chrysler Corporate PCB is an interface for the customer to communicate with the vehicle's DaimlerChrysler Wireless Control Module (WCM). It combines normal RKE function and transponder functions in a single unit. The Corporate PCB consists of a circuit board and circuit components. The conventional metal key blade which is used to start and unlock doors is molded in the upper housing of the FOB. The Corporate FOB also has Key Pad Polydome Switches on the top surface of the assembly. Pressing the FOB polydome switches will result in the FOB sending the following RF signals to the WCM:

- Lock doors
- Unlock doors
- Activate the vehicle horn in a PANIC mode
- Open a trunk, lift gate, or flipper glass
- Open Sliding Doors
- Remote Start / Kill (unique button sequences)

The Corporate PCB also provide the immobilizer function through LF circuit providing:

- Transponder Functionality (North American and European models only)

The Corporate PCB (internal to housing) can be used for Remote Keyless Entry (RKE) via 315MHz (North American and Japan) and 433.92MHz (European) radio frequency (RF) and for immobilizer functionality via a 125KHz low frequency (LF). The RF link is comprised of a control module (WCM), containing a receiver, and a PCB transmitter which provide the traditional remote keyless entry. The purpose of the WCM's receiver is to receive and demodulate the RF signals from the Corporate PCB and condition the signals for processing by the WCM's microcontroller. For RKE mode, the user presses a Corporate PCB button which shorts the PCB switch traces together via the keypad's carbon pills or pads. Depending on the switch pressed, the transmitter

will transmit a command corresponding to the function of the switch. The WCM also communicates to the Corporate PCB via an LF link (immobilizer mode). Immobilizer mode is used when the user attempts to start the vehicle. When the key assembly is inserted into the ignition and turned, the WCM modulates its antenna located around the lock cylinder in an attempt to communicate (charge) with the PCB via 125 kHz. The PCB will demodulate that information and respond back to the WCM (given a correctly demodulated LF transmission) via a LF Link at 125 kHz. When the WCM receives the correct information via the LF link, the vehicle engine is allowed to remain started. If the correct transmission is not received, the vehicle will turn off approximately two seconds after the ignition was turned on. In transponder mode, coin battery is not required for communication between the WCM and the Corporate PCB.

For the RKE functionality, the PCB determines the user command corresponding to which switch is pressed. The command is Manchester encoded at 2.4 k baud and then modulated with Amplitude Shift Keying (ASK) at 315 MHz for North America (High Power), 315 MHz for Japan (Low Power), and 433.92 MHz for Europe. The RF signal is broadcasted to the vehicle via an RF antenna on the PCB.

The components, which constitute the Corporate PCB device are:

- Microcontroller and Low Frequency Immobilizer (STARC2XL)
- LC Antenna Tank (1 antenna to cover single axis for immobilizer)
- Radio Frequency generation circuit (SAW stabilized Colpitts oscillator for North America and Europe and crystal controlled PLL RF IC for Japan)

LC Antenna Tank

The LC antenna tanks consist of an inductor and a capacitor tuned to 125 KHz. The antenna tank captures the energy radiated from the vehicles LF field and transfers it to the STARC2XL.

Radio Frequency Circuit

The North American and European applications RF section consists of a SAW stabilized Colpitts oscillator, with inductive PCB loop antenna. The Antenna is tuned to the fundamental frequency of 315Mhz for North America and 433.92Mhz for the European Application.
For Japanese applications, the RF section consists of a crystal controlled PLL IC with inductive PCB loop antenna, tuned to the fundamental frequency of 315Mhz. The RF oscillations will start when a command (data high) is sent from the STARC2XL to the PLL IC.
The critical factors of these RF circuits are as follows:

- RF Center Frequency
- Output power at the fundamental, harmonic & spurious content
- Oscillator Start up time
- RF Data bit Rise Time
- RF Data bit Fall Time
- RF Data bit narrow and wide bit widths.