Whirlpool Corporation ▪ 2000 M-63 ▪ Benton Harbor, MI 49022

Rebel UI Module
(FCC ID: A5UEICHRB01)
USER GUIDE

Contents

Figures

Tables

1 Introduction

1.1 Purpose and scope

The purpose of this document is to provide details regarding the use of rebel UI Module. This document also describes the application and operation of it. Moreover, it declares the FCC compliance notices, too.

1.2 Revision History

Date	Change Description	Revision
16-04-2019	Initial release	0.1
18-04-2019	Review comments are implemented	0.2
29-04-2019	Release to TuV	1.0

2 Module Overview

2.1 Module Application

REBEL UI Module is the platform which will be used across different appliances categories (Refrigeration, Cooking, Laundry, Dishwashers, etc.) based on Qualcomm Snapdragon 660 (SDA 660) processor.

The Rebel UI Module is 2.4G/5G Wi-Fi-connected graphical user interface. It supports LCD with touch-screen and audio video interfaces.

2.2 System Level Architecture

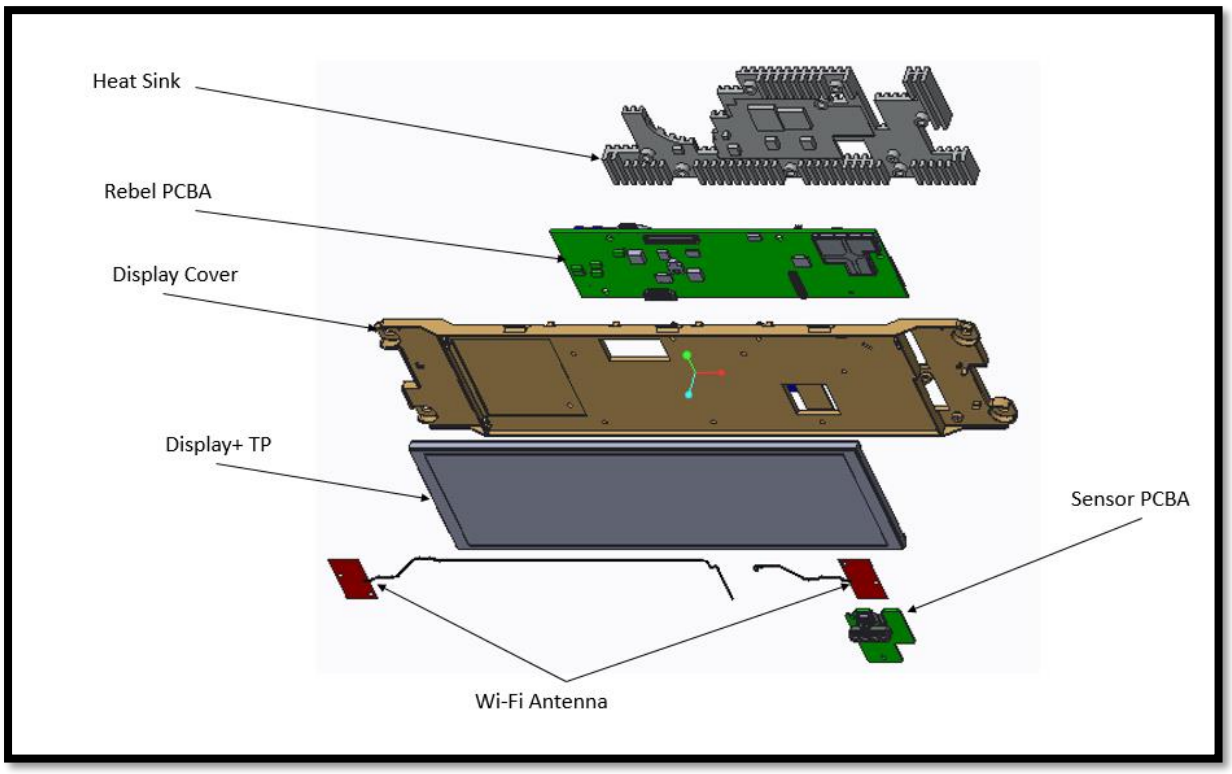

Figure 1: System Block Diagram

REBEL UI module consist of the PCBA and Heat Sink, all other external peripherals connected are accessories only.

Below is the list of accessories (shown in the images)

- LCD
- USB Camera
- Speaker
- Plastic cover (to hold the PCB and LCD)
- Touch Panel with glass
- 8MP Camera Sensor PCB

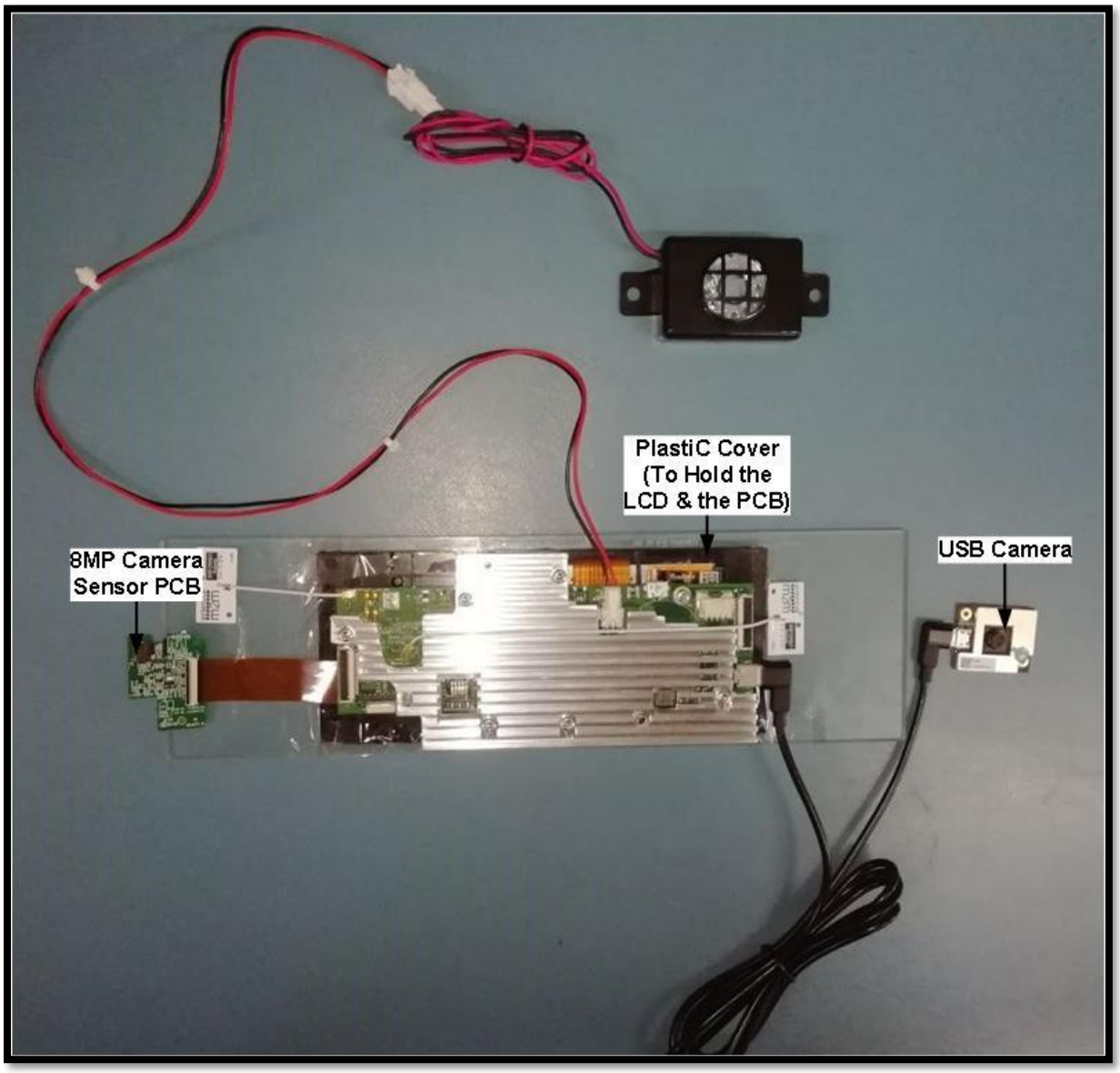

Figure 2: Accessories Details_1

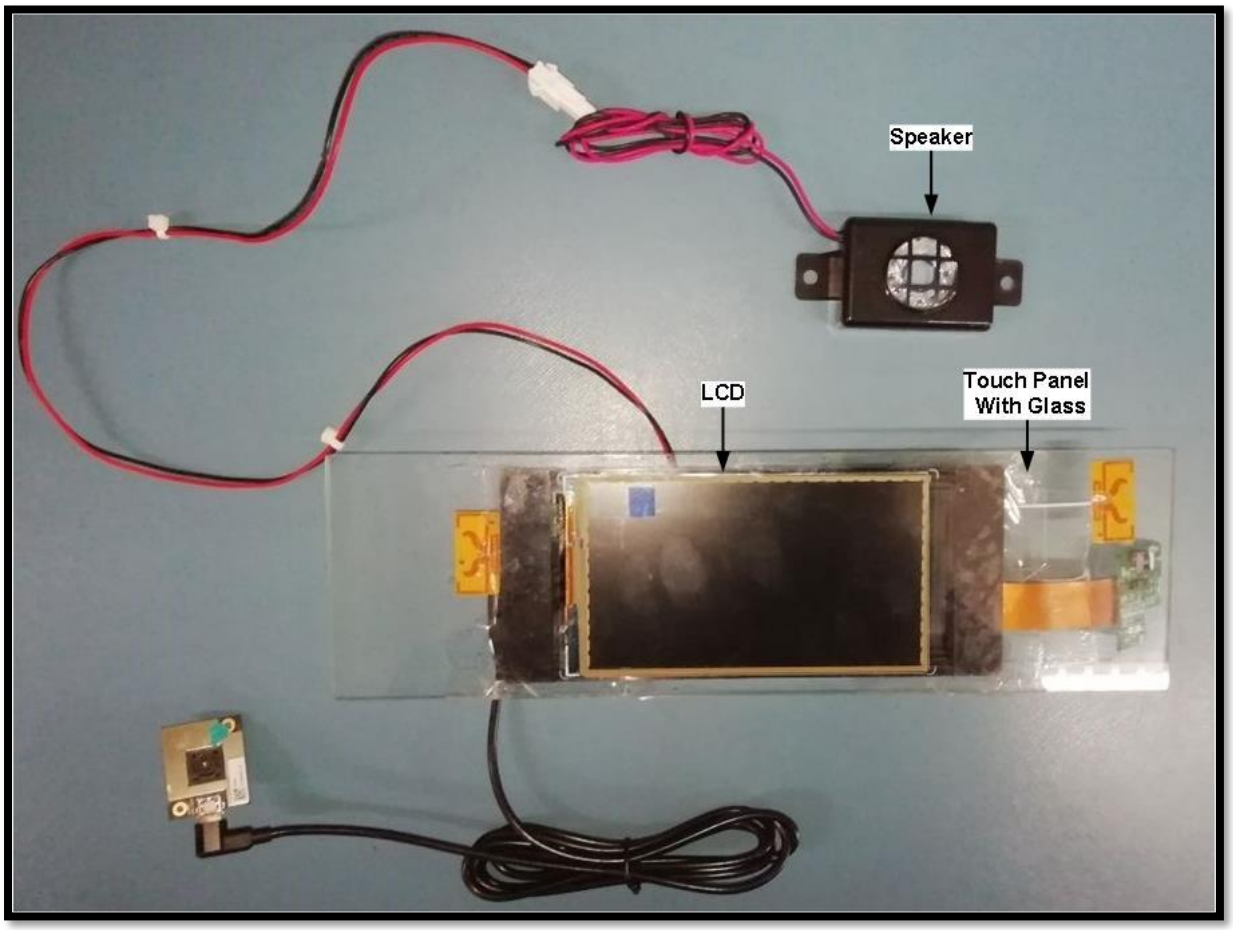

Figure 3: Accessories Details_2

2.3 Major Part Details for the PCB

Figure 2 shows the major connectors of the peripheral supported by the module that resides on the top side of the PCB.

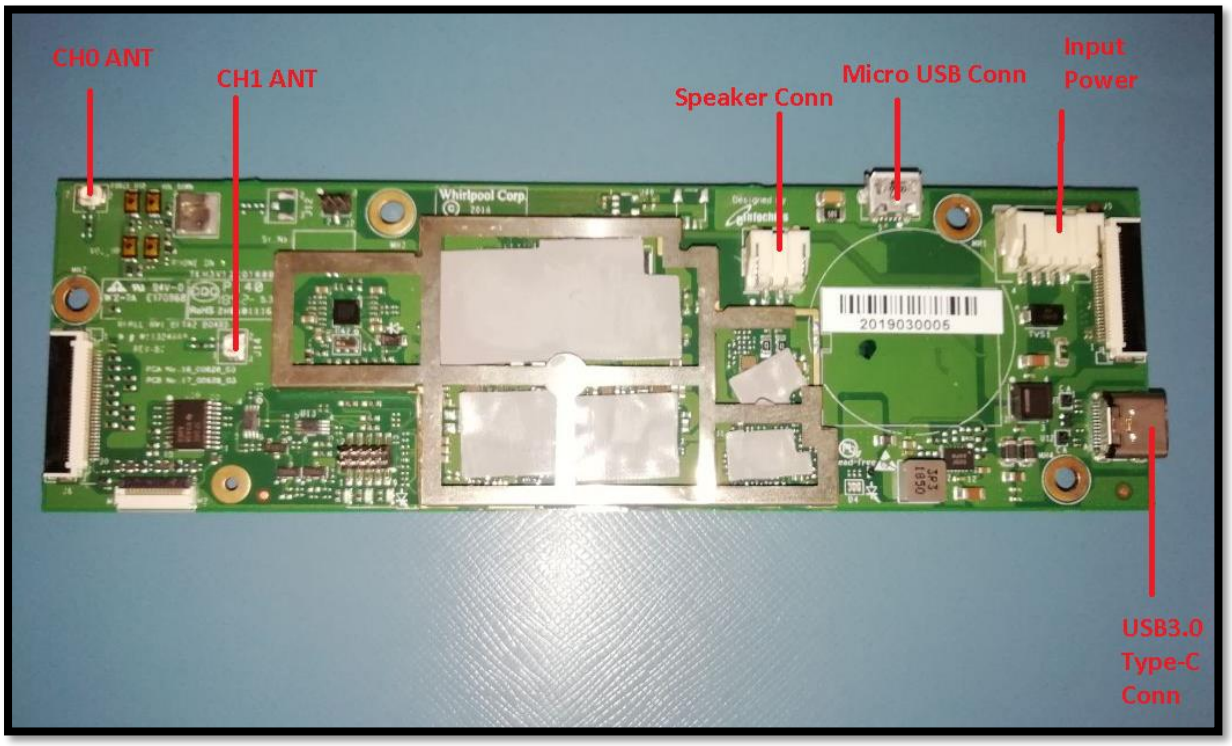

Figure 4: PCB Top Side

Figure 3 shows the major connectors of the peripheral supported by the module that resides on the bottom side of the PCB.

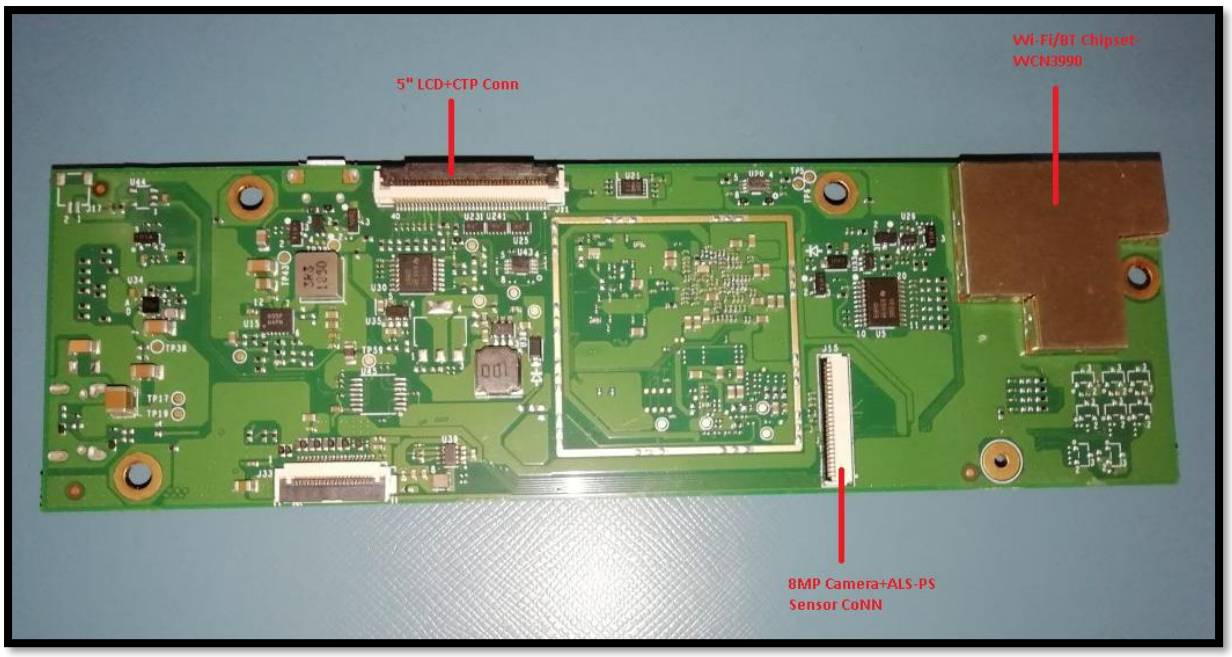

Figure 5: PCB Bottom Side

2.4 Compliance Limits

The register value used for FCC compliance is maximum value and cannot be increased by end user. The RF Output Power configuration is not accessible to End User.

2.5 Module Features and Operation

The rebel UI module intended to operate with pre-certified power supply of typical voltage **12.7VDC** ranging from **11V-13.5V**.

The Module has the high bandwidth Wi-Fi module (WCN3990) for data and video transfer over Wi-Fi interface. Which also supports the communication over Bluetooth.

It supports Wi-Fi (802.11 a/b/g/n/ac - 2x2 MIMO, ISM 2.4GHz at 20MHz/40MHz and 5GHz at 20/40/80 MHz) and Bluetooth (BT5.0).

The USB Type-C Port supports a USB based camera for the appliance cavity. On board speaker connector supports a 1W speaker. There's a connector at the top edge of the PCB where LCD and capacitive touch panel gets connected with the rebel UI Module.

It also has the support of ALS and Proximity sensor and the 8MP camera. To support these features an additional board named camera sensor board will be attached through a FPC/FFC Cable. The DMICs placed onto the Sensor Board Supports the voice capturing and voice recognition functionalities.

3 FCC Compliance Notices

FCC ID: A5UEICHRB01

This rebel module complies with Part 15 of the FCC Rules. The Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including Interference that may cause undesired operation.

Under FCC regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by FCC. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotopically radiated power (e.i.r.p.) is not more than that necessary for successful communication. The radio transmitter FCC: A5UEICHRB01 has been approved by FCC to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with these devices.

One of the below two Antenna configuration will be used:

Table 1: Molex Antenna Configuration

Antenna Type	ANT Chain	ANT MFG	Antenna Part#	Maximum Gain (dBi)	Required Impedance
FPC-Flexible printed circuit	0	Molex	1461530050	3.2dBi(2.4 – 2.5 GHz) 4.75dBi (5.15 – 5.85 GHz)	50 ohms
FPC-Flexible printed circuit	1	Molex	1461530150	2.8dBi(2.4 – 2.5 GHz) 4.2dBi (5.15 – 5.85 GHz)	50 ohms

Table 2: Antenova Antenna Configuration

Antenna Type	ANT Chain	ANT MFG	Antenna Part#	Maximum Gain (dBi)	Required Impedance
FPC-Flexible printed circuit	0	Antenova	SRF2W021-50	2.8dBi(2.4 – 2.5 GHz) 5.1dBi (4.9 – 5.9 GHz)	50 ohms
FPC-Flexible printed circuit	1	Antenova	SRF2W021-150	2.8dBi(2.4 – 2.5 GHz) 5.1dBi (4.9 – 5.9 GHz)	50 ohms

FCC Caution!!!

- Changes or modifications not expressly approved by Whirlpool Corporation could void the user's authority to operate the equipment.

- The antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter."

Part 15B compliance statements for digital devices:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates; uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user manual for the end product must include the following information in a prominent location Instruction:
"To comply with FCC RF radiation exposure limits for general population, the antenna(s) used for this transmitter
Must be installed such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter."

3.1 OEM Responsibilities to comply with FCC Regulations

The rebel UI Modules have been certified for integration into products only by OEM integrators under the following conditions:

1. The antenna(s) must be installed such that a minimum separation

Distance of 20 cm is maintained between the radiator (antenna) and all persons at all times.

2. The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

3.2 End Product Labelling

The rebel UI Modules are labelled with FCC ID. If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labelled in a visible area or display the following:

"**Contains FCC ID: A5UEICHRB01"**

The OEM of the rebel UI Module must only use the approved antenna(s), which have been certified with this module. The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

4 Contact Detail

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