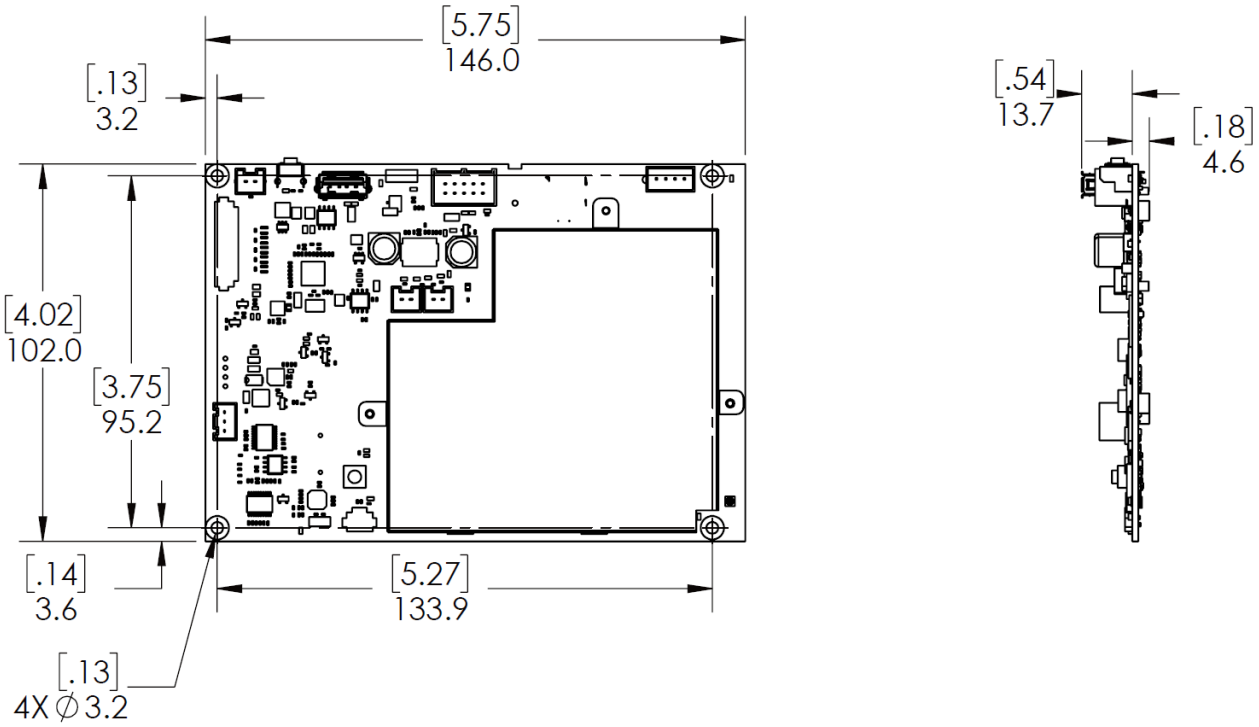
Bosch Automotive Service Solutions Inc

USER'S MANUAL – Control Module PN SP01500243

Description

The product is an Android based control board that provides user interface via an externally connected capacitive touch TFT LCD and speakers. It provides multiple USB ports to communicate with other devices and provides a Wi-Fi and Bluetooth radio. Wi-Fi and Bluetooth require an external antenna through a U.FL connector.

Mechanical Dimension



Pinout Table

Left Speaker		
J1	1	OUT-
	2	OUT+
Right Speaker		
J2	1	OUT-
	2	OUT+
USB OTG		
J3	1	OTG_VBUS
	2	USB_OTG_DN
	3	USB_OTG_DP
	4	USB_OTG_ID
	5	GND
DCIN		
J4	-	Not Populated
Headphone / Aux USB		
J5	1	PGND
	2	PGND
	3	GND
	4	USB GND
	5	HPOUT_L
	6	USB_H1_D+
	7	HP_DET_O
	8	USB_H1_Di
	9	HPOUT_R
	10	USB_H1_VCC
DCIN		
J6	1	9-36VDC IN
	2	9-36VDC IN
	3	EXGND
	4	EXGND
Micro SD		
J7	1	SD2_DATA2
	2	SD3_DATA3
	3	SD3_CMD
	4	VDD
	5	SD3_CLK
	6	VSS
	7	SD3_DATA0
	8	SD3_DATA1
	9	GND
	10	SD3_CD_B
	11	GND
	12	GND
	13	GND
	14	GND
Headphone		
J8	-	Not Populated

USB		
J9	1	USB_VCC
	2	USB_NEG
	3	USB_POS
	4	USB_GND
	5	SHIELD
	6	SHIELD
LVDS		
J10	1	LCD_VDD
	2	LCD_VDD
	3	LCD_VDD
	4	LCD_VDD
	5	NC
	6	NC
	7	GND
	8	GND
	9	GND
	10	LVDS1_TX3_N
	11	LVDS1_TX3_P
	12	GND
	13	LVDS1_CLK_N
	14	LVDS1_CLK_P
	15	GND
	16	LVDS1_TX2_N
	17	LVDS1_TX2_P
	18	GND
	19	LVDS1_TX2_N
	20	LVDS1_TX2_P
	21	GND
	22	LVDS1_TX2_N
	23	LVDS1_TX2_P
	24	GND
	25	GND
	26	eDPHPD
	27	NC
	28	LED-
	29	LED-
	30	LED-
	31	LED-
	32	NC
	33	NC
	34	LCD_BLK
	35	LCD_BLK
	36	LCD_BLK
	37	LCD_BLK
	38	LCD_BLK
	39	NC
	40	GND

PCB Shield		
J11	1	GND
	2	GND
	3	GND
	4	GND
	5	GND
LCD Backlight		
J12	-	Not Populated
Debug		
J13	1	UART2_TXD
	2	UART2_RXD
	3	GND
Comm/Keybrd		
J14	-	Not Populated
Cap Touch		
J15	1	NC
	2	NC
	3	GND
	4	CAP_TOUCH_SCL
	5	CAP_TOUCH_SDA
	6	CAP_TCH_RST
	7	CAP_TCH_INT1
	8	VCC_TP
PCB Shield		
J16	1	GND
	2	GND
	3	GND
	4	GND
	5	GND
UFL Antenna		
J17	1	SIG
	2	GND
	3	GND
	4	GND
Power Button		
J18	1	GND
	2	PWRBTN

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Specifications

- Standards
  - 802.11a/b/g/n/ac
  - Bluetooth V4.2+EDR with integrated PA for Class 1.5 and Low Energy (BLE)
- Radio Chipset
  - AMPAK AP6255 (Utilizing BCM43455)
- Operating System
  - Android 8.0+
- Rockchip ARM Cortex-A17 CPU, Quad core processor
- On Board DDR3L 935MHz, 2GB
- Wi-Fi, IEEE 802.11a/b/g/n/ac dual-band radio with virtual-simultaneous dual-band operation
- Bluetooth, V4.2+EDR with integrated PA for Class 1.5 and Low Energy (BLE)
- On Board eMMC, 64GB
- 1 xmicro-SD
- 1 RS232
- 2 2W speaker outputs
- 2 USB 2.0 Host, 1 USB OTG 2.0
- 1 LVDS Output
- 1 Capacitive touchscreen input
- Radio
  - Antenna
    - Dual Band 2.45GHz/5.8GHz
    - Single U.FL connector
  - Operating Frequency
    - WiFi b/g/n Band 2.400GHz – 2.4835GHz
    - WiFi a/n/ac Band 5.180GHz – 5.825GHz
    - Bluetooth: 2402MHz – 2480MHz
  - Modulation
    - WiFi 802.11a 64-QAM,16-QAM, QPSK, BPSK
    - WiFi 802.11b DQPSK, DBPSK, CCK
    - WiFi 802.11g 64-QAM,16-QAM, QPSK, BPSK
    - WiFi 802.11n 64-QAM,16-QAM, QPSK, BPSK
    - WiFi 802.11ac 256-QAM, 64-QAM,16-QAM, QPSK, BPSK
    - Bluetooth Standard: Bluetooth V4.2 of 1, 2 and 3 Mbps
    - Bluetooth Modulation: FHSS, GFSK, DPSK, DQPSK
    - Bluetooth Max Input: GFSK (1Mbps) :-20dBm
π/4-DQPSK (2Mbps) :-20dBm
8DPSK (3Mbps) :-20dBm

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- Output Power

Upper Frequency	*Lower Frequency*	*Power (watts)*
5180 MHz	5240 MHz	0.0107
5190 MHz	5230 MHz	0.0103
5210 MHz	5210 MHz	0.0095
5745 MHz	5825 MHz	0.0081
5755 MHz	5795 MHz	0.0083
5775 MHz	5775 MHz	0.0077
2412 MHz	2462 MHz	0.0173
2402 MHz	2480 MHz	0.0023

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- Receive Sensitivity 5.0 GHz ISM Band
  - (11a, 20MHz) @10% PER
    - - 6Mbps PER @ -91 dBm, typical
    - - 9Mbps PER @ -89 dBm, typical
    - - 12Mbps PER @ -88 dBm, typical
    - - 18Mbps PER @ -86 dBm, typical
    - - 24Mbps PER @ -82 dBm, typical
    - - 36Mbps PER @ -79 dBm, typical
    - - 48Mbps PER @ -74 dBm, typical
    - - 54Mbps PER @ -73 dBm, typical
  - (11n,20MHz) @10% PER
    - - MCS=0 PER @ -90 dBm, typical
    - - MCS=1 PER @ -88 dBm, typical
    - - MCS=2 PER @ -85 dBm, typical
    - - MCS=3 PER @ -82 dBm, typical
    - - MCS=4 PER @ -78 dBm, typical
    - - MCS=5 PER @ -74 dBm, typical
    - - MCS=6 PER @ -72 dBm, typical
    - - MCS=7 PER @ -71 dBm, typical
  - (11ac,20MHz) @10% PER
    - - MCS=0 PER @ -89 dBm, typical
    - - MCS=1 PER @ -87 dBm, typical
    - - MCS=2 PER @ -84 dBm, typical
    - - MCS=3 PER @ -81 dBm, typical
    - - MCS=4 PER @ -77 dBm, typical
    - - MCS=5 PER @ -73 dBm, typical
    - - MCS=6 PER @ -71 dBm, typical
    - - MCS=7 PER @ -70 dBm, typical
    - - MCS=8 PER @ -66 dBm, typical

        - (11ac,40MHz) @10% PER
            - - MCS=0 PER @ -87 dBm, typical
            - - MCS=1 PER @ -83 dBm, typical
            - - MCS=2 PER @ -81 dBm, typical
            - - MCS=3 PER @ -78 dBm, typical
            - - MCS=4 PER @ -75 dBm, typical
            - - MCS=5 PER @ -70 dBm, typical
            - - MCS=6 PER @ -68 dBm, typical
            - - MCS=7 PER @ -66 dBm, typical
            - - MCS=8 PER @ -64 dBm, typical
            - - MCS=9 PER @ -63 dBm, typical
        - (11ac,80MHz) @10% PER
            - - MCS=0 PER @ -83 dBm, typical
            - - MCS=1 PER @ -80 dBm, typical
            - - MCS=2 PER @ -78 dBm, typical
            - - MCS=3 PER @ -74 dBm, typical
            - - MCS=4 PER @ -71 dBm, typical
            - - MCS=5 PER @ -69 dBm, typical
            - - MCS=6 PER @ -65 dBm, typical
            - - MCS=7 PER @ -63 dBm, typical
            - - MCS=8 PER @ -60 dBm, typical
            - - MCS=9 PER @ -59 dBm, typical
    - Receive Sensitivity 2.4 GHz ISM Band
        - (11b) @8% PER
            - - 1Mbps PER @ -96 dBm, typical
            - - 2Mbps PER @ -90 dBm, typical
            - - 5.5Mbps PER @ -88 dBm, typical
            - - 11Mbps PER @ -87 dBm, typical
        - (11g) @10% PER
            - - 6Mbps PER @ -90 dBm, typical
            - - 9Mbps PER @ -88 dBm, typical
            - - 12Mbps PER @ -87 dBm, typical
            - - 18Mbps PER @ -85 dBm, typical
            - - 24Mbps PER @ -83 dBm, typical
            - - 36Mbps PER @ -80 dBm, typical
            - - 48Mbps PER @ -76 dBm, typical
            - - 54Mbps PER @ -74 dBm, typical

        - (11n,20MHz) @10% PER
            - - MCS=0 PER @ -89 dBm, typical
            - - MCS=1 PER @ -85 dBm, typical
            - - MCS=2 PER @ -84 dBm, typical
            - - MCS=3 PER @ -80 dBm, typical
            - - MCS=4 PER @ -77 dBm, typical
            - - MCS=5 PER @ -75 dBm, typical
            - - MCS=6 PER @ -72 dBm, typical
            - - MCS=7 PER @ -71 dBm, typical
        - Bluetooth Sensitivity @ BER=0.1% for GFSK (1Mbps): -86 dBm
          @ BER=0.01% for π/4-DQPSK (2Mbps): -86 dBm
          @ BER=0.01% for 8DPSK (3Mbps): -80 dBm
- Power Consumption
    - Idle:
    - Full load (including max USB): 2.5A
- Operating Voltage
    - 9-36VDC
- Environmental
    - Storage: -20C to 70C
    - Operating: 0C to 60C

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Regulatory Statements

This device complies with part 15 of the FCC Rules. 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.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IMPORTANT! Changes or modifications not expressly approved by Bosch Automotive Service Solutions Inc could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAN ICES-3 (A)/NMB-3(A)

This equipment complies with radiation exposure limits set forth for uncontrolled environment. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements définies pour un environnement non contrôlé. L'antenne (s) utilisée pour ce transmetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne et ne doit pas être colocalisé ou fonctionner conjointement avec une autre antenne ou émetteur.

UNII Band Operation:
UNII devices that operate within 5.15-5.25 GHz are to be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.