

LEROAD 12.3-inch Multimedia Car System Product Specification

Product Name: 12.3-inch Multimedia Dashboard

Material number: 0701SNAZZ003/TA3820017A

colophon :

edition	Write/Revise Instructions	Revisioner	Revision date	remarks
1.0	Create Document	Xu Kaili	2025/9/23	

FCC Caution.

§ 15.19 Label requirements. (Suit for Verification (VOC) and Certification (ID))

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.

§ 15.21 Information to user.(Suit for Verification (VOC) and Certification (ID) and Declaration of Conformity(DOC))

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.105 Information to the user. (Suit for Class A and Class B digital device(unintentional radiator or intentional radiator))

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 or more 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.

***RF warning for Mobile device:(Suit for FCC Part 15.247 of ID)**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

1. Product specifications:

1.1 Key features:

system PERFORMANCE	product size	325*142*60.6mm
	hull	aluminum alloy die casting
	way to install	M5*10mm internal thread mounting hole * 4
	host protection level	IP65
	antistatic rating	Air discharge $\leq 15KV$; Contact discharge $\leq 5KV$
	working temperature	-20°C~70°C
	storage temperature	-40°C~80°C
electrical parameter	joggle	Waterproof car wiring harness
	input voltage	DC: 12-90V power supply
	rated operational current	500mA@48V
	maximum operating current	1A@48V
system function parameters	turn-off leakage current	<5mA @48V
	CPU	Qualcomm SM6115 4*A73+4*A53 8-core
	basic frequency	Maximum clock speed: 2.0 GHz
	RAM	LPDDR3 4G
	ROM	32G
	GPU	Adreno 610@950MHz
	MCU	GD32E235C8T6
	OS	Android 14
	USB	USB2.0 OTG
	Camera	AHD&CVBS&TVI in 720P 25 fps/30 fps and standard CVBS signal
	Audio-In	1 x MIC analog audio input
	Audio-Out	5.1 RCA audio outputs (front left, front right, rear left, rear right)
	WIFI	Dual-band (2.4/5GHz), 802.11 a/b/g/n/ac, supports AP/STA/P2P mode
	PDA	Bluetooth V2.1+EDR, V5.0 compliant
	reception	FM+AM North America 200KHZ step
	vehicle communication	CAN bus network/LIN wire (optional)
TP liquid crystal display parameters	Antennas	Wi-Fi , Bluetooth,
	hard wire detection line	Left turn signal, right turn signal, and headlight detection
	Display size	12.3-inch model: Dimensions: 109.512 mm (Height) x 292.032 mm (Width)
	interface mode	MIPI
	resolution ratio	720*1920
	Viewable perspective	IPS
	luminance (LCM)	600CD/M2 up to 800
	touch	Incel/FT8205
	Touch screen type	full contact capacitive screen

LEROAD 12.3-inch Multimedia Car System Product Specification

1.2 Software parameters:

Module	Feature	Description
SYSTEM	OS edition	Android 14
	User Manual	Describe the main functions of the system.

LEROAD 12.3-inch Multimedia Car System Product Specification

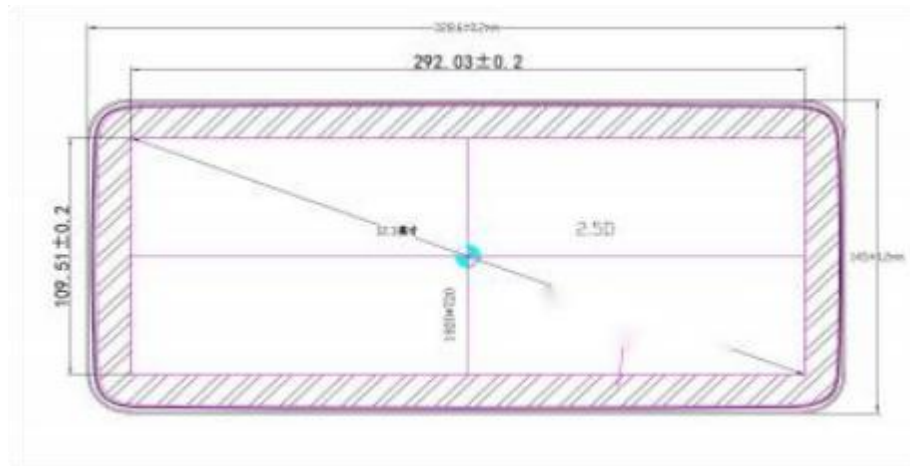
	language	Supports Simplified Chinese, Traditional Chinese, and English
	Recent Apps	Recent app usage history, switch between quick apps
	Touch buttons	Quick access bar shows frequently used keys
	App Title	Display of WiFi, Bluetooth, and CP status
	Notification	Display notifications and running apps in the background
	Theme	Default support for day/night interface switching
	Font	Android default font
	Language and audio region	Chinese/English/North America
Home Screen	situation display	Vehicle status dashboard display
	Apply shortcut icon	support
	APP icon	support
	Media information shows	support
	Wallpaper	support
Tuner	FM	87.5 MHz~108.0MHz 65 MHz~74MHz (OIRT)
	AM	522KHz~1620KHz
	RDS/RBDS	support
	long and short range	LOC/DX
	Pre-set radio	FM (FM1/FM2/FM3):18, supports up to 35 AM (AM1/AM2):12
	Browse and play	Browse and play the current station
	Auto channel search/channel save	Stores all automatically searched radio stations
	Manual channel search or save	Can be saved to preset (favorite) radio stations
	automatic preset radio	FM autosave
File Management	look over	support
	duplicate	support
	shear	support
Audio Processor	EQ	32 segments EQ
Input Method	theChineselanguage	support
	English	Multilingual keyboard
	internationalization	support
Wi-Fi	double mode	2.4G &5G

LEROAD 12.3-inch Multimedia Car System Product Specification

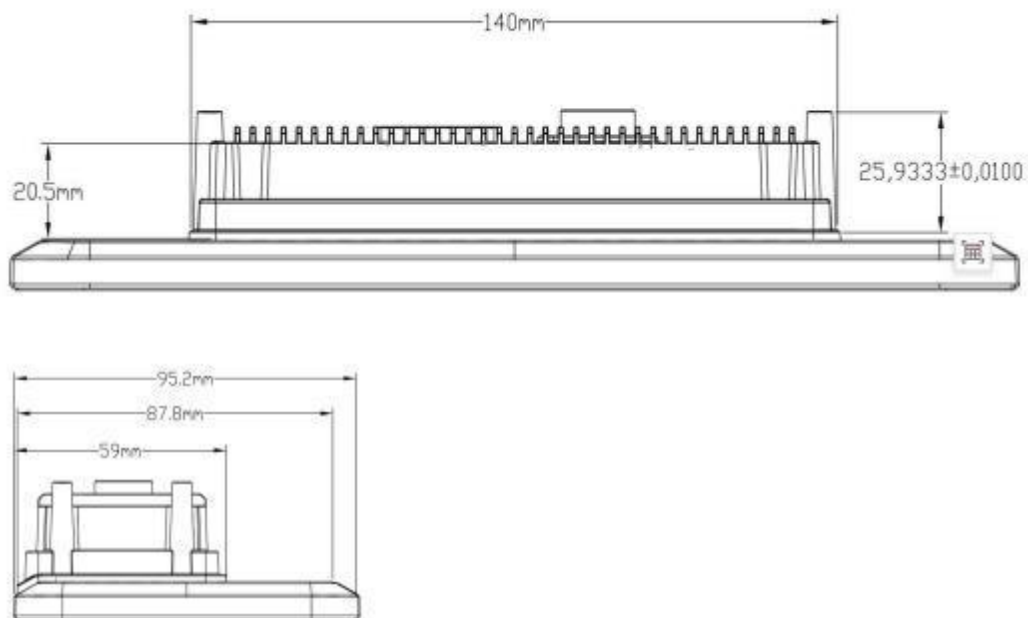
BT	A2DP	Supports playing Bluetooth music
	HFP	Supports Bluetooth calls
	Private pattern	Supports audio switching between mobile and car devices
	PBAP	Supports Bluetooth contact book download
	AVRCP	Audio key control
Settings	network settings	WLAN, WLAN hotspot
	Bluetooth Settings	BT set up
	Sound Settings	Default volume, volume balance (sound field), and sound effects settings
	Display settings	Display brightness settings, startup screen, and wallpaper
	Language and Input Method	Set default
	Date and time	Network time, time format
	Factory Settings	Engineering Model Configuration
	system	Upgrade and restore factory settings
	About the device	Version information
Vehicle Info	Instrument data synchronization	Rely on CAN messages, radio information, song information, and Bluetooth call information
	Vehicle information display	CAN dependent message
RVC	CVBS/AHD	Supports CVBS/AHD camera reverse video and CVBS format auto recognition
	Dynamic trajectory	Depends on CAN to report corner information. If no corner information is available, it will not be displayed.
	static trajectory	Display static trajectory lines. Static trajectories are not displayed by default and can be configured.
	radar detection line	CAN reports radar information. If no radar information is available, the detection line is not displayed.
	Reversing camera display time	Normal reverse ≤ 3 seconds
	Silent reverse	Configurable
	Display settings	Brightness/Contrast/Saturation
Phone Link	Mobile Internet	CarPlay, Android Auto
Upgrade	Local Upgrade/OTA	Supports USB/OTA updates for MCU, Android, and vehicle software
Others	Media scan	support
	available machine time	Cold start ≤ 30 seconds, hot start ≤ 5 seconds (ACC signal wake-up system)
	system on/off scheme	deep sleep/wake
	system hibernation power consumption	5mA@48V

Instrument appearance and size:

(1) Front Vie

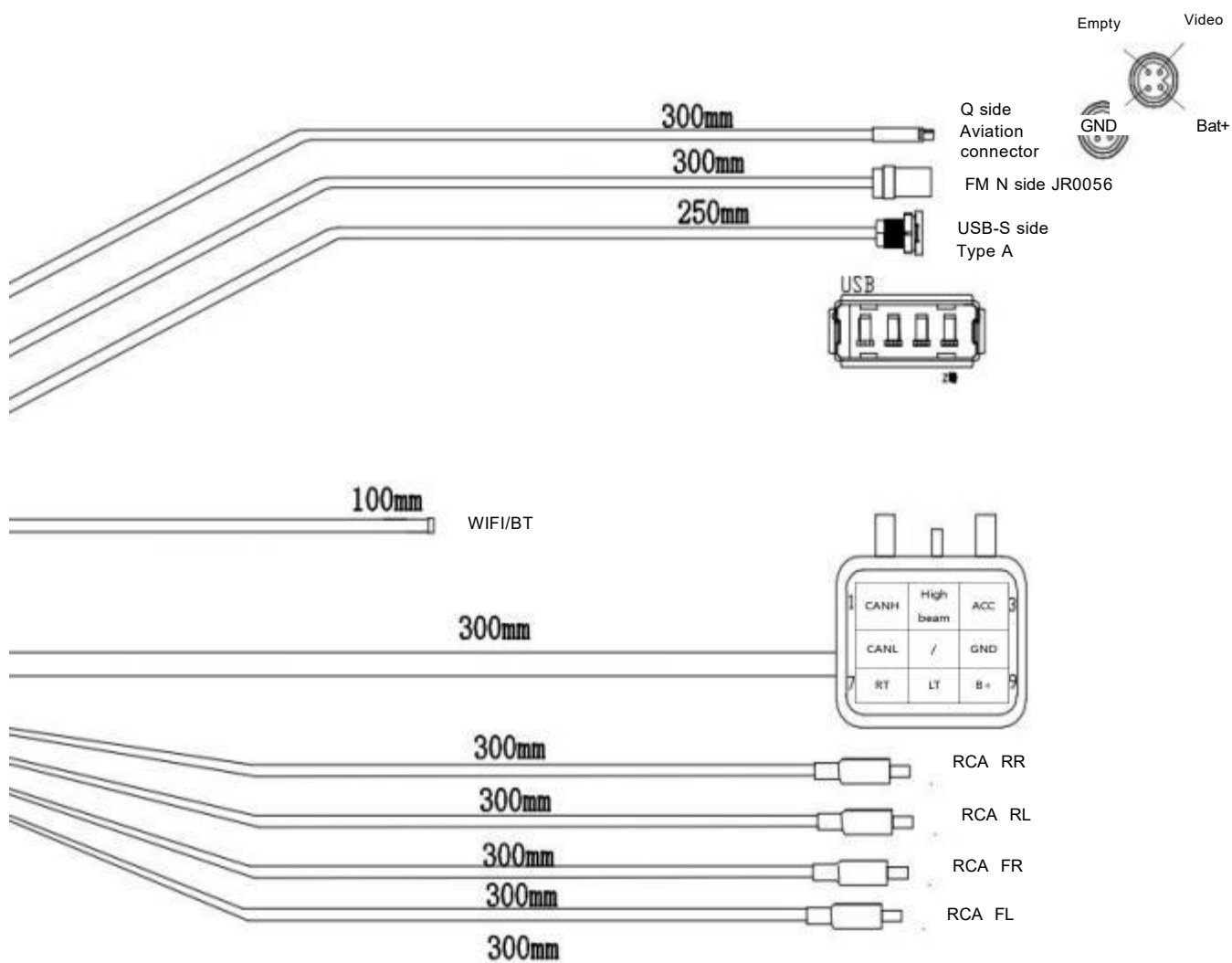


(2) Side View



2. Wire harness interface description:

2.1 Wiring Harness Interface Description:



4. Operational Guidance

4.1 Power Supply for the System

The voltage range is 12-90V, with a typical value of 48V.

4.2 Connection Interface

Ensure the correct connection between the vehicle's infotainment system and external functional modules to maintain stable system communication, thereby optimizing system performance and ensuring maximum stability.

4.3 WIFI Antenna: The right antenna is key to ensuring optimal reception performance.

5. Working Environment and Electrical Characteristic

5.1 WI-FI parameters:

IEEE 802.11 ETONSpec.							
order number	Test Items	Required Spec. Room temp:@25°C,			signalling		
		protocol	data transfer rate	Limit	CH1	CH7	CH13
1	RXLEVEL	11b	11Mbps	≤-80dBm	-86	-86	-86
		11g	54Mbps	≤-70dBm	-73	-71	-72
		11n	MCS7	≤-67dBm	-68	-69	-71
2	Transmit Power Level	11b	11Mbps	16+1/-2 dBm	15.46	15.85	15.85
		11g	54Mbps	11±2 dBm	10.39	11.29	10.37
		11n	MCS7	11±2 dBm	10.36	13.91	10.65
3	Transmit Center Frequency Accuracy	11b	+/- 25ppm		PASS	PASS	PASS
		11g	+/- 25ppm		PASS	PASS	PASS
		11n	+/- 25ppm		PASS	PASS	PASS
4	EVM	11b	11Mbps	≤25%	4.91	5.16	5.02
		11g	54Mbps	≤-27dB	-34.97	-34.11	-33.46
		11n	MCS7	≤-27dB	-32.11	-27.29	-31.18

order number	Test Items	Required Spec. Room temp:@25°C,			signalling		
		protocol	data transfer rate	Limit	CH36	CH64	CH149
1	RXLEVEL	11a	54Mbps	≤-68dBm	-68	-69	-71
		11n	MCS7	≤-67dBm	-67	-67	-69
2	Transmit Power Level	11a	11Mbps	11+1/-2 dBm	11.74	11.68	11.46

LEROAD 12.3-inch Multimedia Car System Product Specification

		11n	MCS7	12±2 dBm	12.01	12.06	10.55
3	Transmit Center Frequency	11a	+/- 20ppm		PASS	PASS	PASS
		11n	+/- 25ppm		PASS	PASS	PASS
4	EVM	11a	11Mbps	≤-25dB	-28.83	-26.95	-30.56
		11n	MCS7	≤-27dB	-24.38	-24.2	-30.41

5.3 BT Parameter Table

BT conduction test					
test item	testing standard	SPEC	CH0	CH39	CH78
transmitting power	greater than 5 dBm)	Channel average power (min)	/	/	/
	(over 5 dBm)	Maximum average channel power	6.8	6.7	6.1
modulating characteristic	(140~175kHz)	minimum average frequency shift	PASS	PASS	PASS
	(140~175kHz)	Maximum average frequency offset	PASS	PASS	PASS
	(140~175kHz)	Average frequency offset average value	PASS	PASS	PASS
initial carrier frequency tolerance	(-75KHZ~75kHz)	The maximum frequency deviation of the channel transmission carrier	PASS	PASS	PASS
carrier frequency drift	(-25 to 25 kHz)	Maximum instantaneous carrier frequency drift in the channel	PASS	PASS	PASS
	(<-20KHZ)	drift speed	PASS	PASS	PASS
20dB lower bandwidth	(<1MHz)	20dB lower bandwidth	PASS	PASS	PASS
sensitivity	BER (<0.1%) - 88dB	The maximum BER for low and medium channel levels in high school	-95	-95	-95

5.4 Radio Performance

FM, AM performance metrics

FM (22.5KHZ DEV 1KHz.)	testpoint Test point	unit Unit	repr esent ative value Nor	extreme Limits	#1
1. Frequency Range	87.5	MHz		±0.03	87.5
	108	MHz		±0.03	108
2. Intermediate Frequency	10.7	MHz	10.7	±0.03	10.7
	90.1	dBu	8	≤12	1

LEROAD 12.3-inch Multimedia Car System Product Specification

3. Usable Sens(S/N:30dB)	98.1	dBu	8	≤12	2
	106.1	dBu	8	≤12	2
4. I.H.F Sensitivity(75KHZ 3% T.H.D)	90.1	dBu	10	≤15	3
	98.1	dBu	10	≤15	3
	106.1	dBu	10	≤15	5

LEROAD 12.3-inch Multimedia Car System Product Specification

5. Selectivity ($\pm 200\text{KHZ}$)	98.1	dB	40	≥ 35	100+
6. S/N Ratio	98.1	dB	60	≥ 50	65
7. IF Rejection	90.1	dB	70	≥ 60	100+
8. Image ejection	106.1	dB	46	≥ 40	100+
9. AM Rejection	98.1	dB	45	≥ 35	100+
10.-3 dB Limiting Sensitivity	98.1	dBu	10	≤ 15	10
11. (THD:10%)	98.1	W	18	≥ 16	19
12. POWER(75KHZ DEV 1mV INPUT)	98.1	W	18	≥ 16	21
13. Frequency Response (-3dB)	LOW END	Hz	12	$\leq 50\text{Hz}$	22
	HIGH END	KHz	5	$\geq 2\text{KHz}$	5
14. T.H.D. (22.5KHZ@1mV INPUT)	98.1	%	0.5	≤ 1	0.5
15. Overload distortion (75KHZ@1mV INPUT)	98.1	%	1	≤ 2	0.55
16. Auto stop Level (DX)	90.1	dB	20	22 ± 8	21
	98.1				21
	106.1				21
17. Auto stop Level (LOC)	90.1	dB	35	35 ± 10	36
	98.1				36
	106.1				36
FM STEREO	testpoint Test point	unit Unit	repr esent ative value Nor	extrem e Limits	#1
1. Separation (1KHz 60 dB 98.1MHz)	98.1	dB	30	≥ 20	40
2. Stereo Indicator Sens	98.1	dBu	10	≤ 20	-1
3.S/N Ratio(at 1KHz 60dB 98.1MHz)	98.1	dB	50	≥ 45	65
4. L/R Channel Difference	98.1	dB	0	≤ 2	0

LEROAD 12.3-inch Multimedia Car System Product Specification

5.T.H.D.	98.1	%	1.5	≤3	0.06
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AM(MOD:30% 1KHz.)	testpoint Test point	unit Unit	repre senta tive value Nor	extreme Limits	#1
1.Frequency Range	522	KHz		±3	522
	1620	KHz		±3	1620
2.Intermediate Frequency	450	KHz	450	±2	450
3. (S/N:20dB) Usable Sensitivity	603	dBu	28	≤35	26
	999	dBu	28	≤35	27
	1404	dBu	28	≤35	32
4. Maximum Sensitivity	603	dBu	20	≤28	4
	999	dBu	20	≤28	1
	1404	dBu	20	≤28	5
5.S/N Ratio @ 70dBf	999	dB	50	≥40	62
6.IF Rejection	603	dB	60	≥45	90
7.Image Rejection	1404	dB	60	≥40	80
8. Selectivity at MID	+9KHz	dB	40	≥35	100+
	-9KHz	dB	40	≥35	100+

9.Bandwidth -6dB	999	KHz	6	4 ~ 10	4.5
10. AGC	999	dB	50	≥45	92
11.Distortion	999	%	0.5	≤2	0.5
12. Output power (THD:10%)	999	W	18	≥16	19
13. MAX. OUTPUT POWER(80% MOD 400HZ 5mV INPUT)	999	W	18	≥16	21
14、 -3dB Frequency Response	LOW END	Hz	15	≤30	36
	HIGH END	KHz	4	≥2	2.5
15.Auto stop level (DX)	603	dB	30	30± 10	23

LEROAD 12.3-inch Multimedia Car System Product Specification

	999	dB	30	30±10	23
	1404	dB	30	30±10	23

5.5 SD/USB Performance Specifications

Play TCD-784 files via USB	Test Point point	unit Unit	repre senta tive value Nor	extreme Limits	#1
1.S/N Ratio TCD784 TR2=reference	7 (0dB)	dB	65	≥55	68
2. Separation TCD784 TR.2=Reference	8/10(1KHz)	dB	60	≥55	64/64
	9/11(1KHz)	dB	60	≥55	64/64
3.Frequency Response(Ref:1 KHz)	3(20Hz)	dB	-1	±3	-2
	4(100Hz)	dB	0	±3	0
	5(10KHz)	dB	0	±3	0
	6(20KHz)	dB	-1	±3	0
4.T.H.D (1W)	2(0dB 1KHz)	%	0.3	≤1	0.05
5.Output Power (THD:10%)	2(0dB 1KHz)	W	18	≥16	19
6.MAX. Output Power	2(0dB 1KHz)	W	18	≥16	21

6. Main interface display:



(1) System status icon:

icon	function	icon	function
	System time		Connect a USB flash drive to the USB port and display this icon
	WIFI network connection status and signal strength		Display the current BT connection status

(2) Function control buttons:

icon	function	icon	function
	Application Center Button		Car Air Conditioning Quick Button
	Set system shortcut buttons		Volume up button
	Mute button		Music APP shortcut button
	Radio APP shortcut button		Bluetooth phone app shortcut button
	Mikrofon app shortcut button		Quick button for mobile internet apps
	Quick button for playing the previous song		Quick button for playing the next track
	Pause/Play button for music		

(3) Vehicle status display:

icon	function	icon	function
	Left turn signal on		High beam status: On
			Low battery alert: Battery SOC ≤ 20%
	Battery high temperature alarm		brake status indicator
	READY status, display icon		The charging icon appears after connecting the charger
	electrical control fault indicator		The right turn signal is on
	Insulation fault indicator light		Current speed display
	Current fault code: M-Electronic Control, B-Battery		Current position display
	Subtotal distance: reset after vehicle shutdown		Total vehicle mileage
	Current vehicle current display. Positive current shows blue, negative current shows green.		SOC percentage: Red ≤20% Yellow ≤30% Green>30%

7. Air conditioning control page: (Reserved)

7.1 Air conditioning control UI

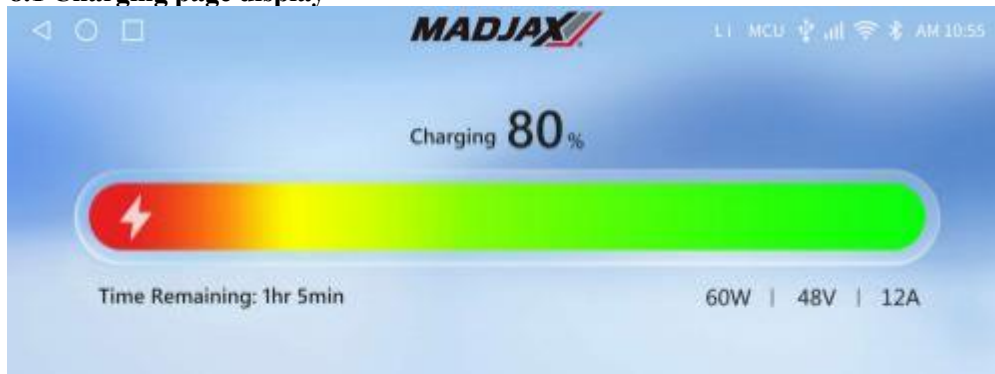


7.2 UI Notes

picture	function	picture	function
	Ventilation mode		fixed frequency mode
	frequency conversion mode		Energy-saving mode
	Strong Mode		air conditioning switch
	automatic wind speed		PTC heating switch
			temperature regulator slider
			wind speed adjustment slider

8. Charging page:

8.1 Charging page display



8.2 UI Notes

picture	function	picture	function
	SOC quantity of electricity		charging power
	Current battery voltage		Current charging current
			Full of expected remaining time
			Animation of the charging progress bar

9. Multimedia entertainment features:

9.1 Radio functions:

In the app interface, find the radio function and click to turn on the radio



9.2 Music function:

Tap the music icon in the app interface to enter the music playback interface

Supports all audio formats: AAC, MP3, MP2, WAV, WMA, OGG, AU, FLAG, M4A, M4R, MKA, MMF, APE, AIFF, AC3, DTS, AMR, WAV Pack, MID, RA, AIF, DSD

9.2.1 Bluetooth Music Home Page:

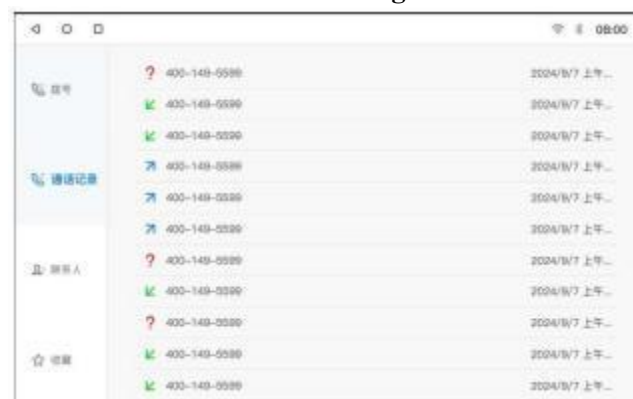


9.4 Bluetooth phone function:

9.4.1 Bluetooth Connection



9.4.2 Bluetooth Phone Home Page



9.4.3 Bluetooth Dial Interface



9.5 EQ Tuning Function:

Tap the EQ icon in the app interface or other feature interfaces (e.g., the radio/music interface) to open the EQ adjustment screen.



icon	function	icon	function
	high frequency gain		low frequency gain
	Switch system preset mode		Current mode
			current frequency gain

9.6 Mobile phone connectivity feature:

This device supports Android and iPhone connectivity. To use it, select Phone Connectivity and choose the phone type you need.

9.7.1 Android phone:

Connect your Android phone via USB or Bluetooth. After connecting, follow the phone's prompts to allow the Android Auto app, then you can project it to the car's display.



9.7.2 iPhone setup: Connect the phone via USB or Bluetooth, follow the prompts to authorize device pairing, then access CarPlay to use the feature.

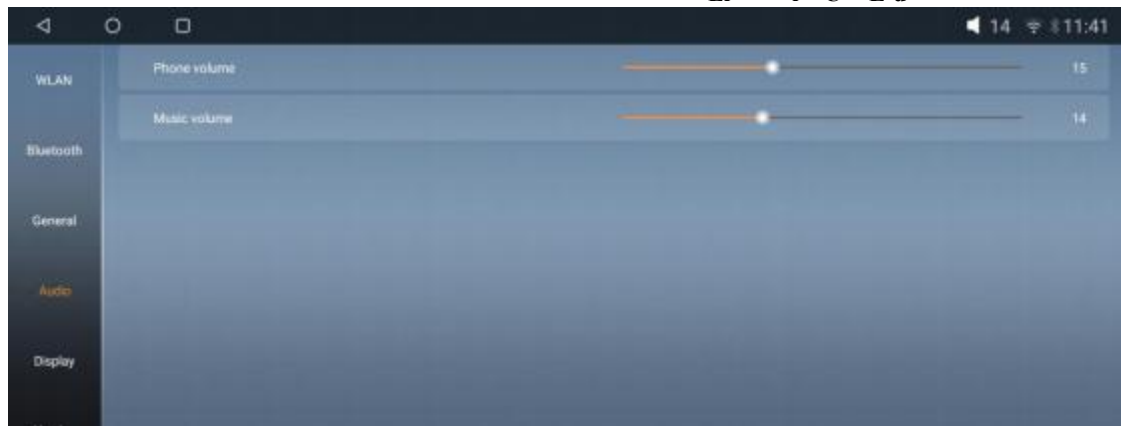


10. System Settings:

10.1 Sound/Volume Settings:

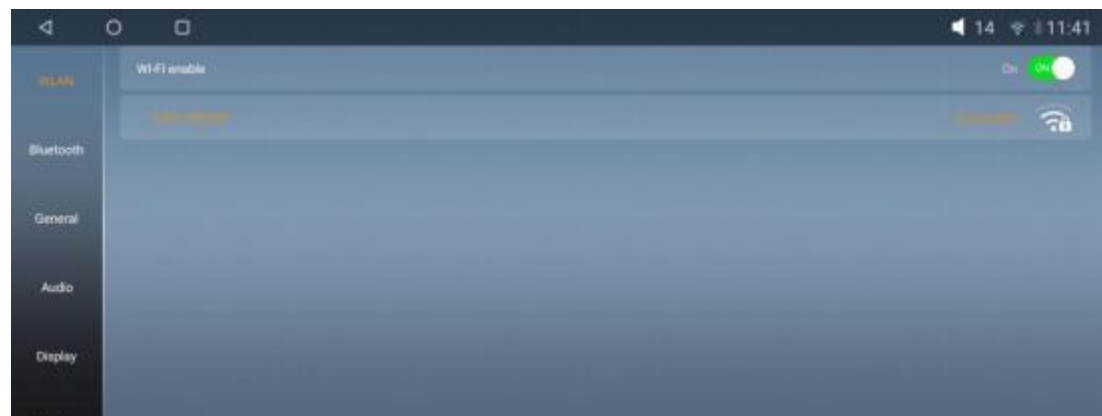
10.1.1 Use the encoder knob switch on the vehicle to adjust the volume

10.1.2 Setting sound and volume in the system



10.2 Network Settings:

Follow these steps to access the app: Go to Settings (Settings) → Select Network & Internet → Tap the WIFI switch on the right, then choose your preferred Wi-Fi network to connect.

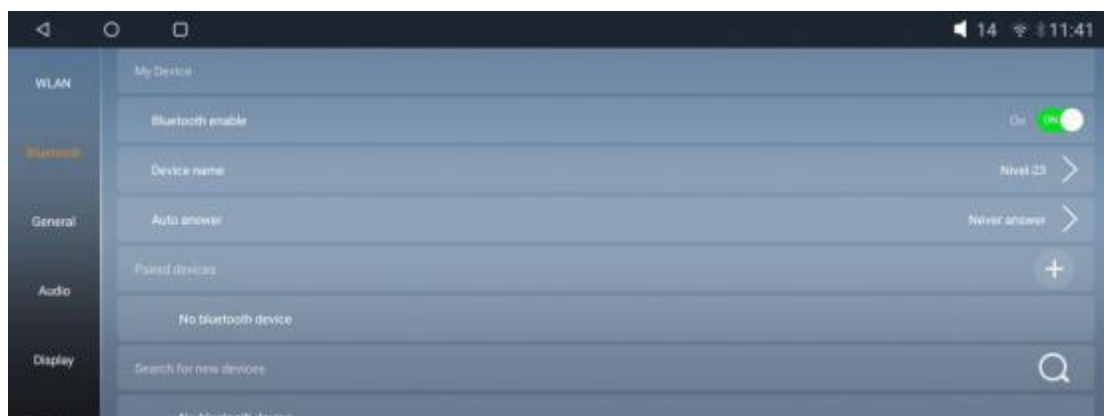


10.3 Bluetooth connection settings:

10.3.1 Tap Bluetooth on the home screen to open the settings. Search for your phone or other Bluetooth-enabled devices, then select Connect.

10.3.2 Features include Bluetooth dialing, searching for Bluetooth contacts, call history retrieval, phone book download, and Bluetooth music playback.

10.3.3 The Bluetooth settings interface allows you to adjust volume, disconnect, and other functions.



10.4 Language Settings:

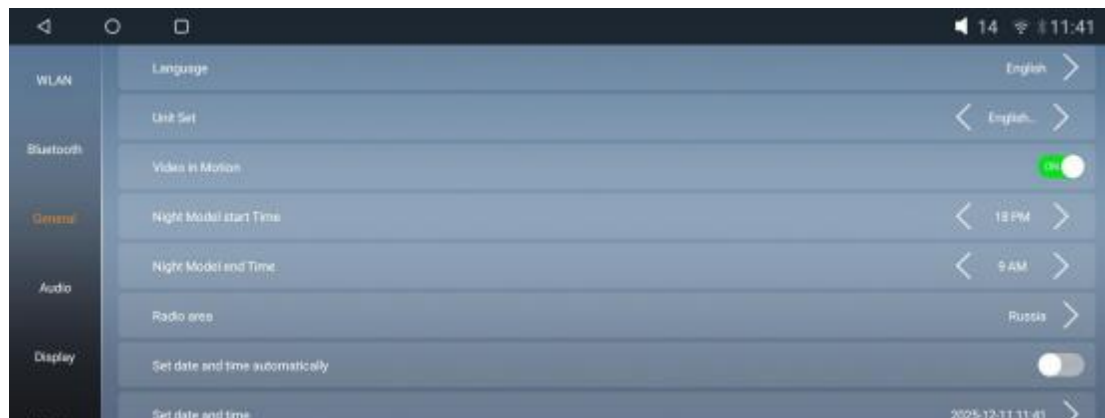
Go to Settings, select General, then click Language. To make changes

Language: Select the desired language, and the system will automatically switch.

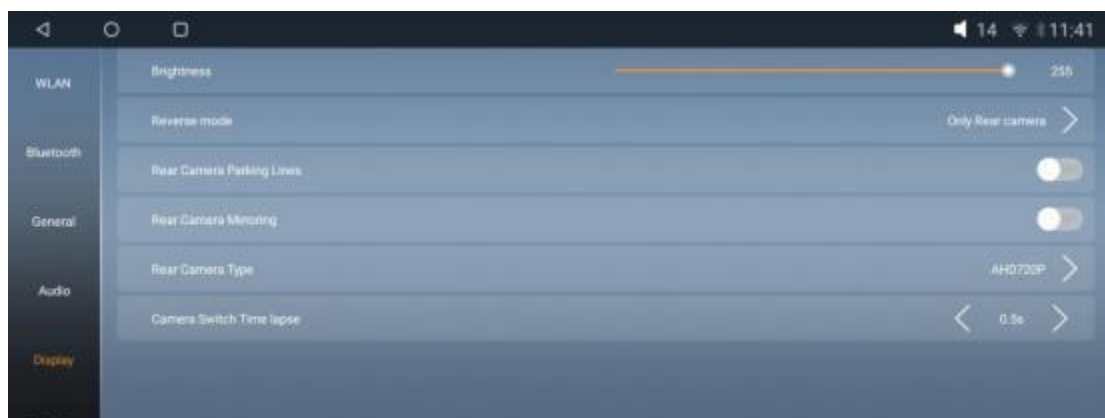


10.5 Date, Time, and Region Settings:

You can set the time and date to update automatically via WIFI or manually. To set them manually: go to Settings> System> Date & Time, then select automatic time zone confirmation or disable network status to manually set the time and date.



10.6 Reverse camera and display settings:



10.7 Vehicle parameter settings:

10.7.1 Set the vehicle speed calculation parameters: wheel diameter/rotation ratio

10.7.2 Set the metric unit

10.7.3 Setting the Vehicle Battery Type and Battery Pack Voltage

10.7.4 CAN Communication Module Online/USB Upgrade

10.8 Restore factory settings:

If the system crashes and becomes unusable, you can restore it to factory settings. Restoring factory settings will clear the current system settings and delete third-party software.

Go to **Android Settings> System> Reset Options> Clear All Data (Restore Factory Settings)**



11. System upgrade matters:

11.1 System Upgrade:

(1) Download the system software package

(2) After decompressing the compressed file, copy it to the root directory of the USB drive

(3) Upgrade method:

Method 1: Insert the upgraded USB drive into the host (4P/6P). When the B+ button is pressed, the system will automatically enter the upgrade mode and display a success message. Then, unplug the USB drive.

Method 2: When the device is powered on, insert the USB flash drive into the host (4P/6P). The host will automatically display an upgrade dialog. Click 'Upgrade' to confirm. After successful upgrade, unplug the USB flash drive.

12. Frequently Asked Questions and Solutions

hitch	Possible reasons and solutions
Cannot boot	1. Upon receiving the device, inspect the outer packaging, display screen, touch screen plastic casing, and the plug-in housing on the back of the device for any damage. Before installation, please power on the device to verify its proper functioning before proceeding. 2. Check if the wiring is correct and verify that the ACC, battery B+, and ground wire GND are properly connected. 3. If the wiring is incorrect, check for signs of smoke, burning, or unusual odors on the device.
linked network	1. Check if the WIFI network settings are correct
Bluetooth pairing succeeded but failed to connect. Sometimes the connection fails	1. Some Android phones may experience this issue during the first connection. Find the newly paired device in the pairing list and reconnect. 2. The connection has not been established due to Bluetooth compatibility issues between the phone and the host. If this occurs, check the host settings in the pairing list on the phone. Both Bluetooth media and phone media settings will be disabled. Turn on these settings, and the connection will work normally.

Linglu 12.3-inch Multimedia Car System Product Specification

repeatedly.	
Bluetooth sound is too low	1. Ensure your phone is in normal output mode. 2. Keep your phone close to the MIC hole to maintain a clear call.
No reverse signal/Black screen	1. Check if the reverse control line (brown) is properly connected 2. Check if the 12-volt control cable for the positive terminal of the reverse light is properly connected. 3. Check if the reverse camera is working properly with its lights on.

Linglu 12.3-inch Multimedia Car System Product Specification

Reverse camera screen	Some models may experience reduced voltage during reverse operation, causing insufficient power supply and display issues. If you encounter screen flickering or blurring while reversing, contact customer service. Installing a filter will resolve the problem.
No audio output	1. Check if the speaker wire is properly connected. 2. Check if the volume setting is "0" (mute).
Mobile internet is unavailable	1. Check if your phone is properly connected to CarPlay 2. Check if the USB cable is connected (Android supports two connection methods; we recommend using USB)
The driving mode cannot view videos	1. Check if the Brake Setting Switch is turned on in Settings> General Settings.
down	1. Press the RESET button to reset the system