TOPWAY TS18 4G DSP Mainboard Specification

V1.4

We are delighted you have chosen this in-car navigation and audio-visual product. This manual systematically introduces the multiple functions, usage tips, and precautions of the TS18 4G DSP motherboard. Please read the instructions carefully before using the device.

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13 September 2021

Change history:

Version number	Release time	Revise content
V1.0	8 March 2021	First issuance
V1.1	9 April 2021	The USB Host interface supports one output channel
V1.2	24 April 2021	Revision of the specifications for heat-conducting silicone sheets used in thermal management
V1.3	9 September 2021	Remove the fiber optic cable and 360 device, modify the external USB port to dual-channel configuration, and add a built-in SIM card slot.
V1.4	13 September 2021	Note on the US frequency band

Catalogue

1、 Product Introduction

The TOPWAY TS18 4G DSP motherboard, developed based on Spreadtrum's UIS8581A chip (an 8-core Cortex-TMA55 processor with a clock speed up to 1.6GHz and PowerVR Fentale GE8322 GPU running at 550MHz), is a cost-effective 4G Android solution featuring integrated DSP capabilities. This high-performance board delivers a distinctive upgrade for automotive systems.

Feature Introduction:

1. Supports Android 10.0.
2. Supports 4G universal network and 3G (BAND1/5/8).
3. Built-in audio DSP chip and digital audio processor for enhanced sound quality.
4. Supports 1 external SIM card slot with a built-in SIM card tray.
5. It supports two USB output interfaces, one USB Host interface and one USB OTG interface.
6. Supports hardware decoding of 1080P video files.
7. Supports FULL HD (2160x1080) resolution display drivers with 30PIN MIPI or 40 PIN LVDS interfaces.
8. Supports USB camera for dashcam recording and storage.
9. Supports speech recognition.
10. Supports Android or iPhone connectivity.
11. Supports rearview camera for quick reverse display.
12. Supports AHD HD camera input.
13. Built-in WIFI 2.4G/5G,2.4G supports IEEE802.11b/g/n, 5G supports HT20/HT40/ VHT20/VHT40/VHT80, and supports WIFI hotspot.
14. Built-in Bluetooth 5.0 supports Bluetooth contacts, A2DP, and external Bluetooth devices including OBD, mice, controllers, and keyboards.
15. The built-in Bluetooth supports BT network sharing.
16. The integrated positioning module supports GPS+GLONASS and GPS+Beidou positioning systems.
17. Supports capacitive touch on 5 or more points.
18. The TDA7708 built-in digital radio delivers superior audio reception (QN8035 radio optional).
19. Reserve an MFI authentication chip adapter interface for future MFI support.
20. Built-in SD card slot with customizable front SD card.
21. To preserve the CVBS output interface, simply add a adapter board.
22. Supports external USB to CVBS and HDMI output interfaces (requires a USB OTG port, i.e., the USB port of the 4-pin plug).
23. PCB Reserve the built-in fan interface (additional driver circuit is required, the control signal is provided by the motherboard, and automatic temperature control can be achieved).

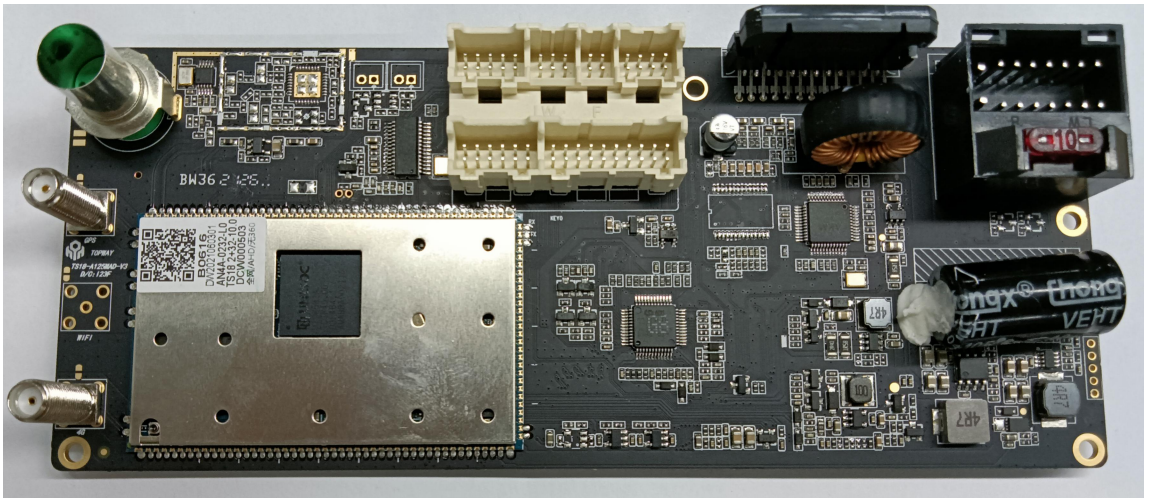
2、Product Feature Parameters

System parameter		
CPU	8 Nuclear A55 processor, up to 1.6GHz	
GPU	PowerVR Fentale GE8322 up to 550MHz	
RAM	LPDDR4X：2GB/3GB/4GB/6GB	
ROM	eMMC(MLC)： 32GB/64GB/128GB	
Operational software	Android 10.0	
Interface parameters		
LCD joggle	Supports 30-pin FFC socket with 0.5mm pitch (8-inch/9-inch/10.1-inch MIPI interface panels)	
	Supports 40-pin FFC socket with 0.5mm pitch (8/9-inch LVDS interface panel)	
Touch joggle	Supports 0.5mm pitch 6-pin FFC socket (universal 6-pin FPC capacitive touchscreen)	
KEY board interface	Supports 12-pin FFC socket with 0.5mm spacing	
SD card interface	Supports 12-pin FFC socket with 0.5mm spacing (customizable)	
SIM joggle	Built-in SIM card slot	
	External SIM card cable (optional)	
Power interface	General Wire Definition	
Radio antenna interface	Common radio antenna (without antenna feed)	
GPS antenna interface	SMA joggle	
4G antenna interface	4G antenna SMA interface	
Audio output interface	5.1 CH line output	
Video output interface VIDOE OOUT	The CVBS interface is reserved and requires an adapter board to enable this feature, compatible with TS8L/TS9L/TS10 motherboard interfaces.	
Audio input interface	AUX input left and right channels	
Video input interface	AUX video input/reverse view input	
USB joggle	One Host interface (4-pin of the 6-pin tail wire) and one OTG interface (4-pin of the tail wire)	
CAN communication interface	UART gorge line	
Configuration parameter		
Surface	4G integrated motherboard	
Mainboard size	167.0mmx69.5mm	
Electrical character		
Input voltage		DC：14.4V
Working temperature		-30～75℃
Storage temperature		-40～85℃

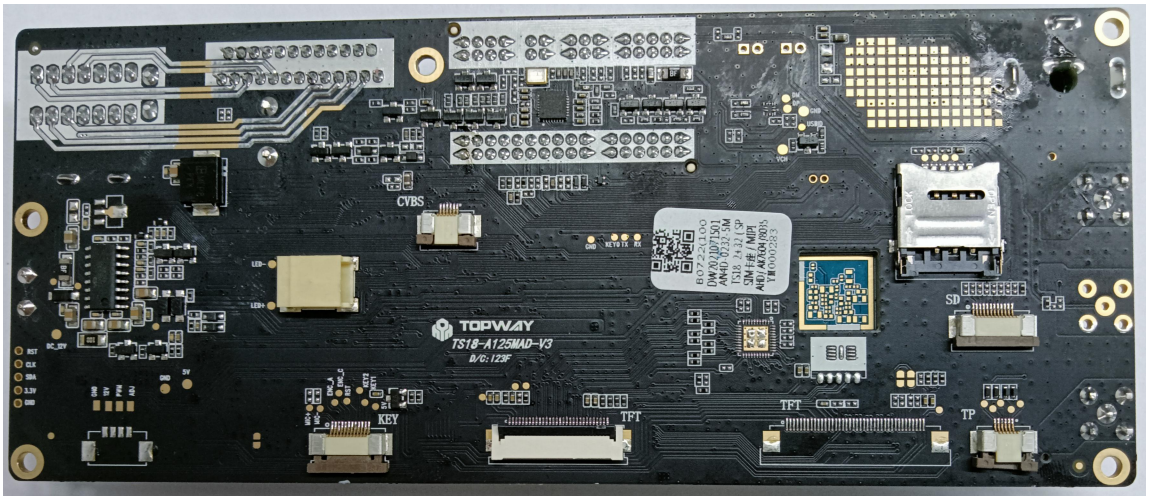
3、 Parameter

3.1 Surface

Front: Image for reference only. The actual product is subject to the shipped item.



Back: The image is for reference only. The actual product will be shipped as shown.



3.2 Supports 4G

Supports 4G and 3G bands: China Unicom, China Telecom, and China Mobile do not support 2G

4G network frequency band support list					
Supportability BAND	Frequency	Maximum power Max power	Minimum power Min power	Sensitivity sensibility	Remarks
FDD-BAND1	2100MHz	21.6	-48.6	-98.2(10M)	United States: BAND 2-1900MHZ
FDD-BAND3	1800MHz	21.7	-50.2	-97.710M)	United States: BAND4-1700MHZ
FDD-BAND5	850 MHz	21.7	-50.1	-100.2(10M)	
FDD-BAND7	2600 MHz	21.4	-50.1	-97.5(10M)	
FDD-BAND8	900 MHz	21.8	-50.1	-99.7(10M)	
FDD-BAND20	800 MHz	22	-50.1	-98.3(10M)	
FDD-BAND26	850 MHz	21.9	-50.1	-100.2(10M)	Only the US version supports this
TDD-BAND38	2600MHz	21.3	-49.3	-95.6(10M)	
TDD-BAND39	1900MHz	21.7	-48.6	-98.3(10M)	
TDD-BAND40	2400MHz	21.4	-50.5	-96.5(10M)	
TDD-BAND41	2600MHz	21.4	-49.1	-95.7(10M)	
3G network frequency band support list					
WCDMA-BAND1	2100MHz	22.7	-55.4	-108.5	United States: BAND 2-1900M
WCDMA-BAND5	850 MHz	22.8	-56.1	-110	
WCDMA-BAND8	900 MHz	22.8	-56.3	-110	

4、Matters Need Attention

A. When assembling the module, thermal silicone (11.8*11.8*1.2mm, 5W thermal conductivity) should be added to the CPU for easy CPU heat dissipation

B. For compatible heat sinks, please contact our authorized suppliers. For detailed inquiries, please reach out to our sales team.

The heat sink can be procured from the following supplier:

Xinyao: Mr.Du: 13823359582

Yihang: Mr.Zhang: 13760225996

Xin Lei: Mr.Zhang: 13713455638 (Supports control of the entire machine's external fan interface)

C. For screens with MIPI LCD interface, use the 30-pin contact wire.

D. The display parameters of the integrated board with MIPI interface are as follows:

Screen settings	VCOM		AVDD	
	Demand for voltage	Set up parameters	Demand for voltage	Set up parameters
10.1 cun	4.05V	12	10.08V	4
9 cun	4.83V	18	11.61V	8

The parameters listed above are applicable to Jingmaoyuan/Baochuang screens (BOE glass).

1. The system software defaults to 10.1-inch screen parameters. If the customer manufactures 9-inch screens, the parameters must be adjusted accordingly.

2. If the customer requires a different manufacturer's LCD screen, adjust these two parameters according to the screen specifications.

3. If the customer requires a display from another manufacturer, adjust these two parameters according to the specified AVDD and VCOM ranges.

			14档AVDD电压调节范围8.54V到13.42V 默认10V（4档）											
13	12	11	10	9	8	7	6	5	4	3	2	1	0	
13.42	13.14	12.76	12.37	12	11.61	11.23	10.85	10.45	10.08	9.7	9.32	8.93	8.54	

31档VCOM电压调节范围2.5V到6.4V 默认4V（12档）-20201012																													
30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6.38	6.24	6.12	6	5.86	5.73	5.6	5.47	5.35	5.21	5.09	4.95	4.83	4.69	4.57	4.44	4.317	4.181	4.05	3.923	3.801	3.665	3.544	3.407	3.286	3.151	3.028	2.892	2.771	2.634	2.498

E. If the low-end product needs to support Carplay function, the customer needs to manually solder a module of authentication chip (note that the module model is a small module, which is smaller than the module used in the Allwinner platform, and the use should be distinguished). The module is defined as our standard general definition, and the soldering position is as follows: