TB20
Multimedia Player

Specifications

Change History

Document Version	Release Date	Description
V1.0.0	2024-08-05	First release

Introduction

The TB20 is a new generation of multimedia player designed for full-color LED displays. This multimedia player integrates playback and sending capabilities, allowing users to publish content and control LED displays with a computer, mobile phone, or tablet. Working with the superior cloud-based publishing and monitoring platforms, the TB20 enables users to manage LED displays from an Internet-connected device anywhere, anytime.

The TB20 can play content from a USB drive, satisfying various playback demands. Multiple protection measures such as terminal authentication and player verification are taken to keep the playback secure.

Thanks to its reliability, ease of use, and intelligent control, the TB20 becomes a winning choice for commercial LED displays and smart city applications such as fixed displays, lamp-post displays, chain store displays, advertisement players, retail store displays, door head displays, shelf displays, and much more.

Certifications

SRRC, CQC, CE, RoHS, FCC, IC

If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact NovaStar to confirm or address the problem. Otherwise, the customer shall be responsible for the legal risks caused or NovaStar has the right to claim compensation.

Features

Inputs and Outputs

- Loading capacity up to 650,000 pixels

  Maximum width: 2048 pixels, maximum height: 2048 pixels

- Maximum width of an ultra-long screen: 8192 pixels, maximum height of an ultra-long screen: 2560 pixels (maximum loading capacity per Ethernet port: 650,000 pixels)

- 1x Gigabit Ethernet output port

- 1x Stereo audio output connector

  The audio sample rate is fixed at 48 kHz. If NovaStar's multifunction card is used for audio output, audio with a sample rate of 48 kHz is required.

- 1x HDMI 1.3 input connector

In synchronous mode, this connector is used as the video source that can be scaled to fit the entire screen automatically.

Control

- 1x USB 2.0 (Type A) port

  Allows for USB playback, firmware upgrade and storage expansion.

- 1x USB (Type B) port

  Connects to the control computer for content publishing and screen control.

- 1x Fast Ethernet port

  Connects to the control computer, or connects to a LAN or public network for content publishing and screen control.

Performance

- Powerful processing capacity
  - Quad-core ARM A53 processor @1.4GHz
  - Support for H.264 and H.265 4K@30Hz video decoding
  - 2 GB of RAM
  - 32 GB of internal storage
- Flawless playback

  Support for playback of 1x 4K, 3x 1080p, 8x 720p, 10x 480p, or 16x 360p videos

Functionality

- All-round control plans
  - Enables users to publish content and control screens from a computer, mobile phone, or tablet.
  - Allows users to publish content and control screens from anywhere, anytime.
  - Allows users to monitor screens from anywhere, anytime.
- Wi-Fi AP and Wi-Fi Sta can be turned on at the same time
  - Wi-Fi AP

    User terminal devices can connect to the built-in Wi-Fi hotspot of the TB20. The default SSID is "AP+*Last 8 digits of SN*" and the default password is printed on the SSID label.
  - Wi-Fi AP+Wi-Fi Sta

    Users can connect the TB20 to a Wi-Fi network and turn on the Wi-Fi hotspot at the same time.
- Ultra-long-screen solution playback
- Synchronous playback across multiple screens

  Enabling synchronous playback halves the decoding capability of the device.
  - NTP time synchronization
  - GPS time synchronization (The specified 4G module must be installed.)

- RF time synchronization (The specified RF module must be installed.)
- Support for 4G/5G modules
    - The TB20 ships without a 4G/5G module. Users have to purchase 4G/5G modules separately if needed.
    - Network connection priority: Wired network > Wi-Fi network > 4G/5G network (This order of priority is followed when the firmware is earlier than V4.5.0. The networks coexist when the firmware is V4.5.0 or later.)

Appearance

Front Panel

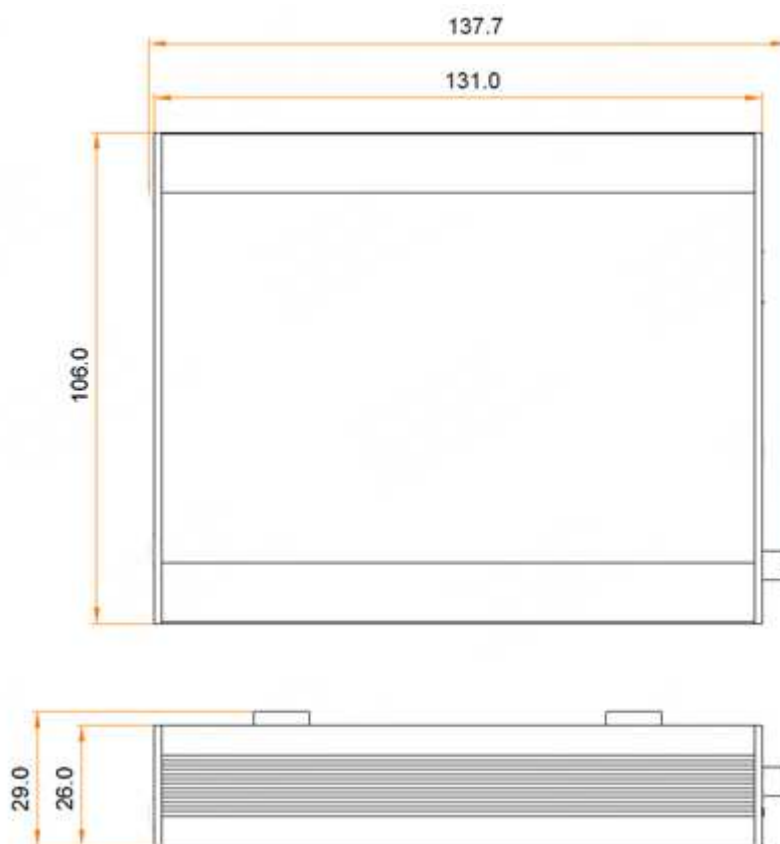| Name	Description
WIFI	Wi-Fi antenna connector (2.4GHz Wi-Fi supported)
AUDIO OUT	3.5mm audio output connector Note: 3-pole audio connectors are supported.
USB	USB (Type B) port Connects to the control computer for content publishing and screen control.
USB 2.0	USB 2.0 (Type A) port Allows for USB playback, firmware upgrade and storage expansion (up to 128 GB). The file system only supports FAT32 and the maximum size of a single file supported by FAT32 is 4 GB.
ETHERNET	Fast Ethernet port Standard RJ45 connector (with built-in LEDs) connecting to the control computer or connecting to a LAN or public network for content publishing and screen control.
12V—	Power input connector
Reserved	Sensor connector (to be implemented in future updates) Connects to a light sensor or temperature and humidity sensor.

[Rear Panel](#)

Name	Description
COM	GPS antenna connector

HDMI IN	1x HDMI 1.3 input connector
	
	• Maximum input resolution: The pixel clock cannot exceed 165 MHz.
	
	• Maximum input: 2048×1024@60Hz
	
	• HDCP 1.4 compliant, backwards compatible with HDCP 1.3
	
	• No support for interlaced signal input
	
	• Support for custom resolutions:
	
	   – Custom width range: 64~2048 pixels (64x64@60Hz~2048x64@60Hz
	
	   – Custom height range: 64~2048 pixels (64x64@60Hz~64x2048@60Hz)
	
	Note: The resolution of HDMI IN can be customized by changing the preset EDID, so the external source must support custom resolutions.
	
	• In synchronous mode, HDMI is used for video input and users can enable full-screen scaling to make the image fit the screen automatically. Requirements for full-screen scaling in synchronous mode:
	
	   – 64 pixels ≤ video source width ≤ 2048 pixels
	
	   – 64 pixels ≤ video source height ≤ 2048 pixels
	
	   – Maximum resolution: 2048×1024@60Hz
	
	   – Images can only be scaled down and cannot be scaled up.
	
	Note: The pixel width and height of the video source must be greater than or equal to the pixel width and height of the screen, respectively.

LED OUT	Gigabit Ethernet output Standard RJ45 connector (with no built-in LEDs)
4G/5G	4G/5G antenna connector for 4G/5G network connection
SIM	SIM card slot Capable of preventing users from inserting a SIM card in the wrong orientation

Indicators

Name	Color	Status	Description
PWR	Red	Staying on	The power supply is working properly.
SYS	Green	Flashing once every 2s	The system is functioning normally.
		Staying on/off	The system is malfunctioning.

Dimensions

Tolerance: ±0.3   Unit: mm

Specifications

Electrical Parameters	Input voltage	DC 5 V to 12 V
	Maximum power consumption	10 W
Storage Capacity	RAM	2 GB
	Internal storage	32 GB

Storage Environment	Temperature	−40℃ to +80℃
	Humidity	5% RH to 95% RH, non-condensing
Operating Environment	Temperature	−20℃ to +60℃
	Humidity	5% RH to 85% RH, non-condensing
	Dimensions (L×W×H)	137.7 mm × 106.0 mm × 29.0 mm
	Net weight	278.5 g
	Gross weight	636.0 g
Packing Information	Dimensions (L×W×H)	333.0 mm×196.0 mm×70.0 mm
	Accessories	• 1x Wi-Fi omnidirectional antenna • 1x Power adapter • 1x Quick Start Guide • 1x Certificate of Approval
IP Rating	IP20 Please prevent the product from water intrusion and do not wet or wash the product.	
System Software	• Android 10.0 operating system software • Android terminal application software • FPGA program Note: Third-party applications are not supported.	

Media Decoding Specifications

Image

Codec	Max Resolution	Format	Remarks
BMP	4096×2304 pixels	BMP	N/A
GIF	4096×2304 pixels	GIF	N/A
JPG	4096×2304 pixels	JPG	N/A
JPEG	4096×2304 pixels	JPEG	N/A
PNG	4096×2304 pixels	PNG	N/A

Audio

Codec	Channel	Bit Rate	Sampling Rate	Format	Remarks
MPEG1/2/2.5 Audio Layer1/2/3	2	8Kbps~320Kbps, CBR and VBR	8kHz~48kHz	MP1, MP2, MP3	N/A
WMA Version 4/4.1/7/8/9, wmapro	2	8kbps~320kbps	8kHz~48kHz	WMA	No support for WMA Pro, lossless and MBR
MS-ADPCM, IMA-ADPCM, PCM	2	N/A	8kHz~48kHz	WAV	Support for 4bit MS-ADPCM and IMA-ADPCM
Q1~Q10	2	N/A	8kHz~48kHz	OGG, OGA	N/A
Compress Level 0~8	2	N/A	8kHz~48kHz	FLAC	N/A
ADIF, ATDS Header AAC-LC and AAC-HE, AAC-ELD	5.1	N/A	8kHz~48kHz	AAC, M4A	N/A
AMR-NB, AMR-WB	1	AMR-NB 4.75~12.2kbps@8kHz AMR-WB 6.60~23.85Kbps @16kHz	8kHz, 16kHz	3GP	N/A
MIDI Type 0/1, DLS version 1/2, XMF and Mobile XMF, RTTTL/RTX, OTA, iMelody	2	N/A	N/A	XMF, MXMF, RTTTL, RTX, OTA, IMY	N/A

Video

Codec	Max Resolution	Max Frame Rate	Max Bit Rate (Ideal Case)	Format	Remarks
H.265	4096×2304 pixels	60fps	150Mbps	MKV, MP4, MOV, TS	Support for Main Profile, Tile & Slice

Codec	Max Resolution	Max Frame Rate	Max Bit Rate (Ideal Case)	Format	Remarks
H.264	4096×2304 pixels	30fps	60Mbps	AVI, MKV, MP4, MOV, 3GP, TS, FLV	Support for field coding and MBAFF
H.263	1920×1080 pixels	60fps	60Mbps	3GP, MOV, MP4	No support for H.263+
VP9	4096×2304 pixels	60fps	60Mbps	WEBM, MKV	N/A
VP8	1920×1080 pixels	60fps	60Mbps	WEBM, MKV	N/A
AVS2	4096×2304 pixels	60fps	60Mbps	MKV, MP4	N/A
MPEG4 SP	1920×1080 pixels	60fps	60Mbps	3GP, MP4, AVI	N/A
MPEG2 MP	1920×1080 pixels	60fps	60Mbps	MPEG-PS, MPEG-TS, MKV, AVI	N/A
MPEG1 MP	1920×1080 pixels	60fps	60Mbps	MPEG-PS, MPEG-TS, AVI, MKV	N/A
VC-1 SP	1920×1080 pixels	60fps	60Mbps	ASF, WMV, MKV, MP4	N/A
Xvid	1920×1080 pixels	60fps	60Mbps	AVI, MKV, MP4	N/A
Sorenson Spark	1920×1080 pixels	60fps	60Mbps	FLV, MP4	N/A
AVS/AVS+	1920×1080 pixels	60fps	30Mbps	TS, MP4, MKV	N/A
MJPEG	1920×1080 pixels	22fps	2Mbps	AVI	N/A

Notes and Cautions

Notes for Installation

When the product needs to be installed on the rack, four M3*5 countersunk cross-head screws with a torque of 3N·m should be used to fix it. The rack for installation shall bear at least 1.2kg weight.

FCC Caution

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

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.

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.

Radiation Exposure Statement

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 and your body.

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

IC Caution

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-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.

This equipment complies with Industry Canada radiation exposure limits set forth for an uncontrolled environment.

Cet équipement est conforme à l'exposition aux rayonnements Industry Canada limites établies pour un environnement non contrôlé.

Radiation Exposure Statement

This equipment complies with Canada 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.

Cetéquipementestconforme Canada limitesd'exposition aux radiations dans un environnement non contrôlé. Cetéquipementdoitêtreinstallé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

Others

This is Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Warning
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 inte rference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance 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 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 interferenceto 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.
Radiation Exposure Statement
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 and your body.

Trademark

NOVASTAR is a trademark of Xi'an NovaStar Tech Co., Ltd.

Statement

Thank you for choosing NovaStar's product. This document is intended to help you understand and use the product. For accuracy and reliability, NovaStar may make improvements and/or changes to this document at any time and without notice. If you experience any problems in use or have any suggestions, please contact us via the contact information given in this document. We will do our best to solve any issues, as well as evaluate and implement any suggestions.

ISED Statement

English: This device complies with Industry Canada license‑exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference, including interference that may cause undesired operation of the device. The digital apparatus complies with Canadian CAN ICES‑3 (A)/NMB‑3(A).

‑ French: Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitationestautorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Radiation Exposure Statement

This equipment complies with Canada 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.

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This radio transmitter [IC:23873-TB20] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

This radio transmitter [IC:23873-TB20] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Connector	Peak gain (dBi)				
			2400-2483.5MHz	5150-5250MHz	5250-5350MHz	5470-5725MHz	5725-5850MHz
ZK-2.4G-RP.SMA.J-195	External Antenna	SMA Connector	2.00dBi	/	/	/	/

Official website
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Technical support
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