



# TCC160

Asynchronous Full-Color LED Display Control Card



Specifications

## Change History

| Document Version | Release Date | Description   |
|------------------|--------------|---------------|
| V1.0.0           | 2024-08-21   | First release |

## Introduction

The TCC160 is an asynchronous full-color LED display control card from NovaStar. It integrates sending and receiving capabilities, allowing users to publish content and control LED displays with a computer, mobile phone, or tablet. Working with cloud-based publishing and monitoring platforms, the TCC160 enables users to manage LED displays from an Internet-connected device anywhere, anytime.

The TCC160 comes with 16 standard HUB75E connectors for communication. The hardware and software designs take into full consideration the on-site setup, operation and maintenance, making setup easier, operation more stable, and maintenance more efficient.

Thanks to its stable and secure integrated design, the TCC160 saves space, simplifies cabling, and is suitable for the applications requiring small pixel capacity, such as storefront displays, vehicle-mounted displays, displays in communities, and lamp-post displays.

## Certifications

CE, FCC, RoHS, TBK

**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

- Maximum capacity per TCC160: 512×512 (260,000) pixels  
Maximum width/height: 2048 pixels (pixel capacity not exceeding 260,000)
- Maximum capacity when multiple TCC160 cascaded: 650,000 pixels  
Maximum width/height: 2048 pixels (pixel capacity not exceeding 650,000)
- Maximum width of an ultra-long screen: 8192 pixels, Maximum height of an ultra-long screen: 2560 pixels (maximum capacity per Ethernet port: 650,000 pixels)
- 1x Stereo audio output

### Control

- 1x USB 2.0 (Type A) port

Allows for upgrade, USB playback, storage expansion, and log export.

- 1x USB (Type B) port

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

- 2x RS485 connectors

Connect to light sensors, temperature and humidity sensors, or other modules to implement corresponding functions.

## Performance

- Powerful processing capacity
  - Industrial-grade processor
  - Quad-core 1.4 GHz processor
  - Hardware decoding of 4K videos
  - 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
  - Allows 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 allows the built-in Wi-Fi hotspot of the TCC160 to be connected. The default SSID is “AP+*Last 8 digits of SN*” and the default password is printed on the SSID label of the product.
  - Wi-Fi STA allows users to access the TCC160 directly and connect the TCC160 to the Internet.
- Ultra-long-screen content playback
- Synchronous playback across multiple screens
 

Enabling synchronous playback halves the decoding capability of the device.

  - NTP time synchronization
  - GPS time synchronization
- Support for 4G modules
 

The TCC160 ships without a 4G module. Users have to purchase 4G modules separately if needed.
- Support for GPS positioning and GPS time synchronization
- Support for relay (maximum DC 30 V 3 A)
- Quick adjustment of dark or bright lines

The different brightness of seams caused by splicing of modules or cabinets can be corrected to improve the visual experience. The correction is easy and takes effect immediately.

- Temperature and voltage monitoring

Real-time monitoring of the temperature and voltage of the receiving card, without the need for other external devices.

- Bit error detection

The Ethernet port communication quality of the receiving card can be monitored and the number of erroneous packets can be recorded to help troubleshoot network communication problems.

- Firmware program readback

The receiving card firmware program can be read back and saved to the local storage.

- Configuration parameter readback

The receiving card configuration parameters can be read back and saved to the local storage.

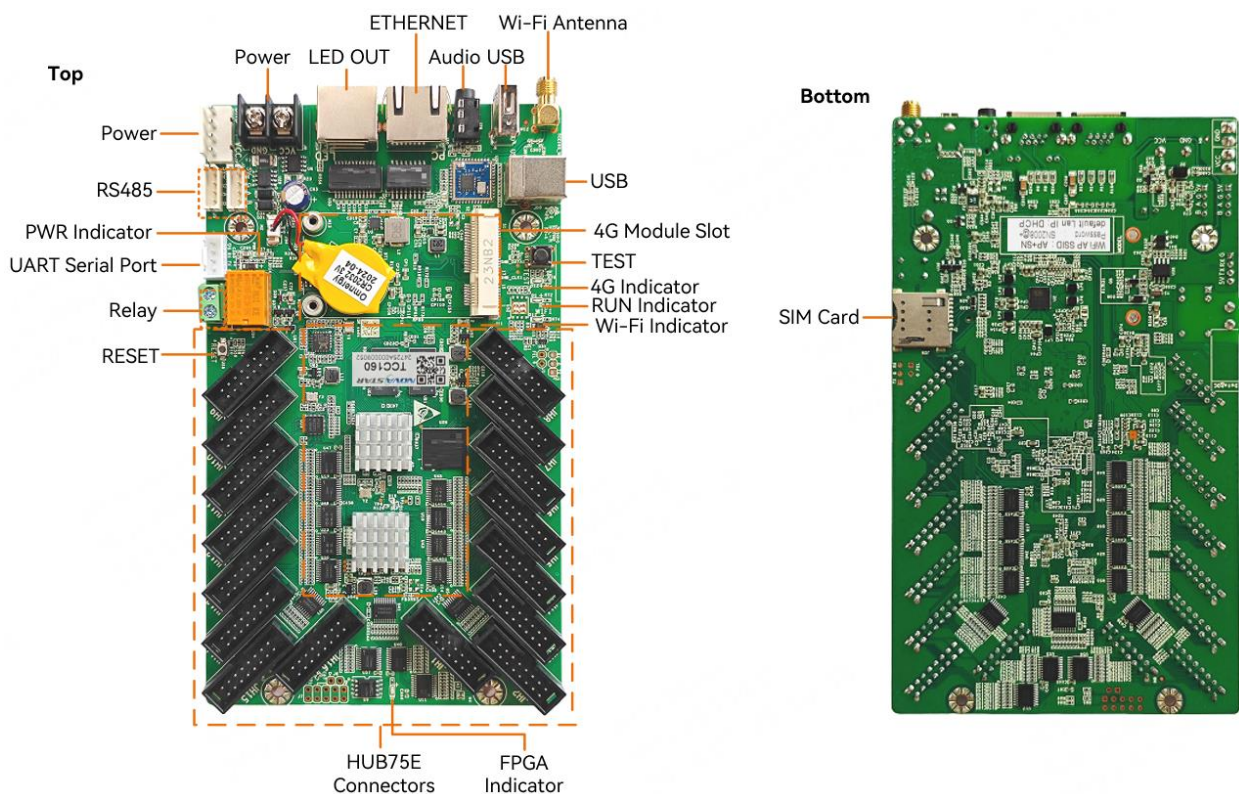
- Mapping 1.1 (available for cascaded receiving cards)

The cabinets can display the controller number, receiving card number, and Ethernet port information, allowing users to easily obtain the locations and connection topology of receiving cards.

- Dual program backup (available for cascaded receiving cards)

Two copies of firmware program are stored in the receiving card at the factory to avoid the problem that the receiving card may get stuck abnormally during program update.

## Appearance



All product pictures shown in this document are for illustration purpose only. Actual product may vary.

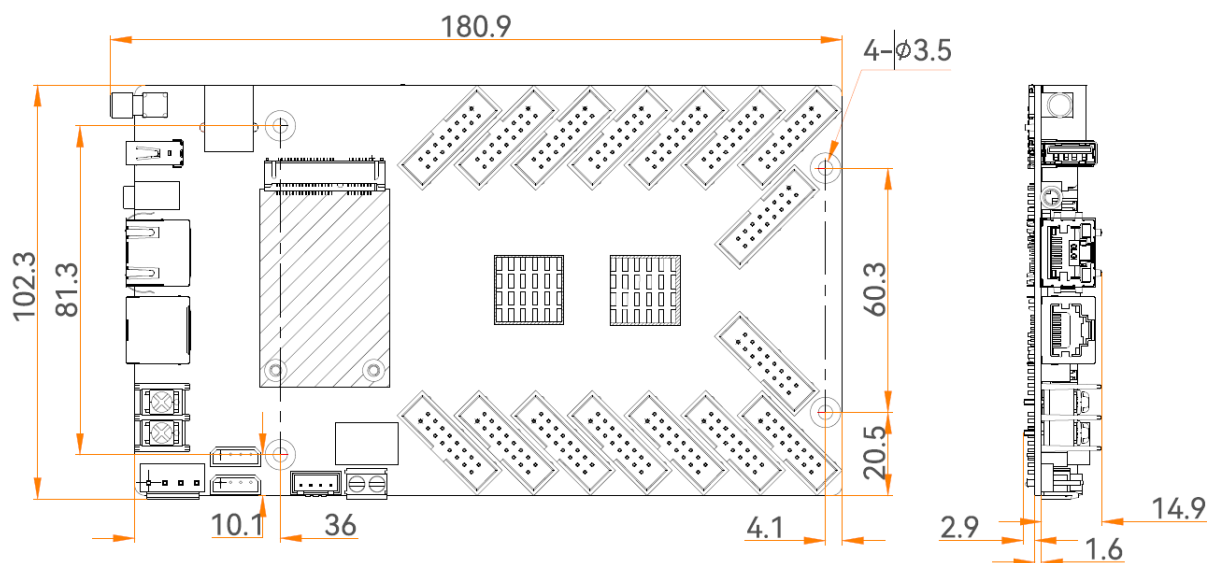
Table 1-1 Connectors and buttons

| Name              | Description                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power             | Power input connector                                                                                                                                                                                                                                                                                                                                                                  |
| LED Out           | Gigabit Ethernet port<br>Standard RJ45 connector (with no built-in LEDs) for cascading receiving cards<br>Multifunction cards cannot be connected.                                                                                                                                                                                                                                     |
| ETHERNET          | Fast Ethernet port<br>Standard RJ45 connector (with built-in LEDs) connecting to a network or control computer                                                                                                                                                                                                                                                                         |
| Audio             | Audio output connector<br>OMTP headphones can be connected.                                                                                                                                                                                                                                                                                                                            |
| USB               | <ul style="list-style-type: none"> <li>• 1x USB 2.0 (Type A) port allowing for upgrade, USB playback, storage expansion (up to 128 GB), and log import and export.<br/>Only the FAT32 file system is supported and the maximum size of a single file is 4 GB.</li> <li>• 1x USB (Type B) port connecting to the control computer for content publishing and screen control.</li> </ul> |
| Wi-Fi Antenna     | Wi-Fi antenna connector (2.4 GHz Wi-Fi supported)                                                                                                                                                                                                                                                                                                                                      |
| SIM Card          | SIM card slot<br>Capable of preventing users from inserting a SIM card in the wrong orientation.                                                                                                                                                                                                                                                                                       |
| HUB75E Connectors | HUB75E connectors<br>Connect to LED modules.                                                                                                                                                                                                                                                                                                                                           |
| Relay             | 2-pin relay control switch for remote screen control                                                                                                                                                                                                                                                                                                                                   |
| UART Serial Port  | Connects to a third-party GPS module for positioning and time synchronization (to be implemented in future updates)                                                                                                                                                                                                                                                                    |
| RS485             | RS485 connectors<br>Connect to light sensors, other sensors or modules to implement corresponding functions.                                                                                                                                                                                                                                                                           |
| RESET             | Factory reset button<br>Press and hold this button for 5s to reset the device to the factory settings.                                                                                                                                                                                                                                                                                 |

## Indicators

| Indicator | Color | Status                      | Description                                                                                                  |
|-----------|-------|-----------------------------|--------------------------------------------------------------------------------------------------------------|
| PWR       | Red   | Staying on                  | The power supply is working properly.                                                                        |
| 4G        | Green | Staying on                  | The network connection and device communication is normal.                                                   |
|           |       | Flashing once every second  | The SIM card is abnormal.                                                                                    |
|           |       | Off                         | No 4G module is detected.                                                                                    |
| RUN       | Green | Flashing once every 2s      | The system is functioning normally.                                                                          |
|           |       | Staying on/off              | The system is malfunctioning.                                                                                |
| WiFi      | Green | Staying on                  | Built-in Wi-Fi Sta is turned on, but no Wi-Fi network is connected.                                          |
|           |       | Flashing once every 2s      | Wi-Fi Sta is configured and a Wi-Fi network is connected successfully.                                       |
|           |       | Off                         | Wi-Fi Sta is turned off.                                                                                     |
| FPGA      | Green | Flashing once every second  | The receiving card is working properly, the Ethernet cable connection is normal, and there is a video input. |
|           |       | Flashing 3 times every 0.5s | The Ethernet cable connection is normal but there is no video input.                                         |
|           |       | Flashing once every 0.2s    | Loading of the program in the application area fails and the backup program is working.                      |

## Dimensions



Tolerance:  $\pm 0.3$  Unit: mm

To make molds or trepan mounting holes, please contact NovaStar for a higher-precision structural drawing.

## Specifications

|                         |                           |                                 |
|-------------------------|---------------------------|---------------------------------|
| Electrical Parameters   | Input voltage             | 5 V~12 V                        |
|                         | Maximum power consumption | 12 W                            |
| Storage Capacity        | RAM                       | 2 GB                            |
|                         | Internal storage          | 32 GB                           |
| Operating Environment   | Temperature               | -40°C to +80°C                  |
|                         | Humidity                  | 0% RH to 80% RH, non-condensing |
| Storage Environment     | Temperature               | -40°C to +80°C                  |
|                         | Humidity                  | 0% RH to 80% RH, non-condensing |
| Physical Specifications | Dimensions (L×W×H)        | 180.9 mm × 102.3 mm × 19.4 mm   |
|                         | Net weight                | 149.6 g                         |
|                         | Gross weight              | 348.6 g                         |
| Packing Information     | Dimensions (L×W×H)        | 278.0 mm × 218.0 mm × 63.0 mm   |
|                         | List                      | • 1x TCC160                     |

|                 |                                                                                                                                                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <ul style="list-style-type: none"> <li>• 1x Omnidirectional Wi-Fi antenna</li> <li>• 1x Quick Start Guide</li> <li>• 1x Certificate of Approval</li> </ul>          |
| System Software | <ul style="list-style-type: none"> <li>• Android 10.0 operating system software</li> <li>• Android terminal application software</li> <li>• FPGA program</li> </ul> |

The amount of power consumption may vary depending on various factors such as product settings, usage, and environment.

## 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 codec 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                                            |

| Codec                                                                                   | Channel | Bit Rate                                                           | Sampling Rate | Format                                      | Remarks |
|-----------------------------------------------------------------------------------------|---------|--------------------------------------------------------------------|---------------|---------------------------------------------|---------|
| ADIF, ATDS Header<br>AAC-LC and AAC-HE, AAC-ELD                                         | 5.1     | N/A                                                                | 8kHz~48kHz    | AAC, M4A                                    | N/A     |
| AMR-NB, AMR-WB                                                                          | 1       | AMR-NB<br>4.75~12.2kbps@8kHz<br><br>AMR-WB<br>6.60~23.85kbps@16kHz | 8kHz, 16kHz   | 3GP                                         | N/A     |
| MIDI Type 0/1, DLS<br>version 1/2, XMF and<br>Mobile XMF,<br>RTTTL/RTX, OTA,<br>iMelody | 2       | N/A                                                                | N/A           | XMF,<br>MXMF,<br>RTTTL,<br>RTX, OTA,<br>IMY | N/A     |

## Video

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

| Codec          | Resolution       | Maximum Frame Rate | Maximum Bit Rate (Ideal Case) | Format              | Remarks |
|----------------|------------------|--------------------|-------------------------------|---------------------|---------|
| 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     |

**Note:** The output data format supports YUV420 semi-planar. YUV400 (monochrome) is also supported by H.264.

## Notes and Caution

### FCC Cautions

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.

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 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 20 cm between the radiator and your body.

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

Country Code selection feature to be disabled for products marketed to the US/Canada.

- The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- The transmitter module may not be co-located with any other transmitter or antenna.

As long as the three 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.

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