

RJ-1000 WIFI

User Manual



Single DAT output · 2.4 GHz Wi-Fi · TF card playback

This manual covers controller connections, power wiring, phone setup, program playback, installation dimensions and pixel IC selection. Before the first test, check supply voltage, terminal polarity and the lighting input direction. Start with a small number of pixels.

Product RJ-1000 WIFI single-output pixel controller

Document V1.1 English edition

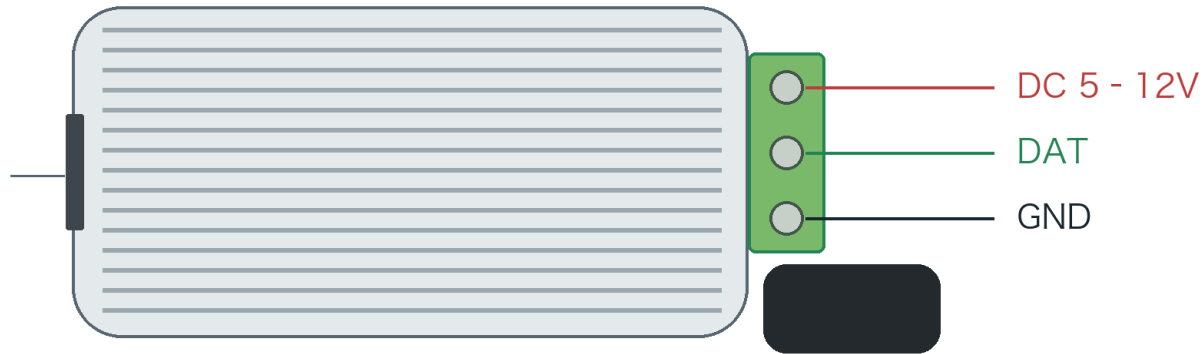
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Product and connections

RJ-1000 WIFI controls addressable lighting through one DAT wire. Use Wi-Fi to manage the controller and programs from your phone. Programs saved to the TF card can play on the controller.

Terminal locations

View as shown; follow the markings on your unit



TF card slot and setup button at the opposite end

Antenna end

Connection	Function	Wiring or use
DC 5–12V	Controller power positive	Connect to the positive output of a suitable regulated DC supply.
DAT	Single pixel-data output	Connect to DIN or DI on the first lighting unit.
GND	Power negative and data reference	Connect to the lighting power-supply negative.
TF card slot	Compatible program storage	Switch off before insertion or removal; fully seat the card.
Setup button	Reconfigure Wi-Fi	Hold for about 3 seconds on firmware supporting this action.
Antenna	Wireless communication	Leave clearance and avoid metal shielding.

Terminal order is shown from this viewing direction. Left/right or top/bottom order changes when the unit is rotated. Identify connections by the markings on the actual unit. DAT is a data terminal; never connect it to supply positive.

Technical specifications

Power, data output, program capacity and live-preview limits are separate specifications. Check voltage and polarity when wiring; select the IC type and pixel count when preparing a program.

Item	Specification
Model	RJ-1000 WIFI
Controller supply	DC 5–12V; observe polarity.
Output	1 DAT output; three-channel RGB, unipolar return-to-zero data.
Wireless network	2.4 GHz Wi-Fi; phone and controller must share the same local network.
Program capacity	RGB file output supports up to 2048 pixels, subject to program format and firmware.
Live preview	Use the pixel count and frame rate supported by the paired app and firmware.

TF card and program files

Use a FAT-formatted TF card recognized by the device; FAT32 is the usual choice. Formatting erases existing files, so back up programs first. Generate and finish writing programs with the companion software. Renaming an arbitrary video to BIN does not make it playable.

Capacity and frame rate

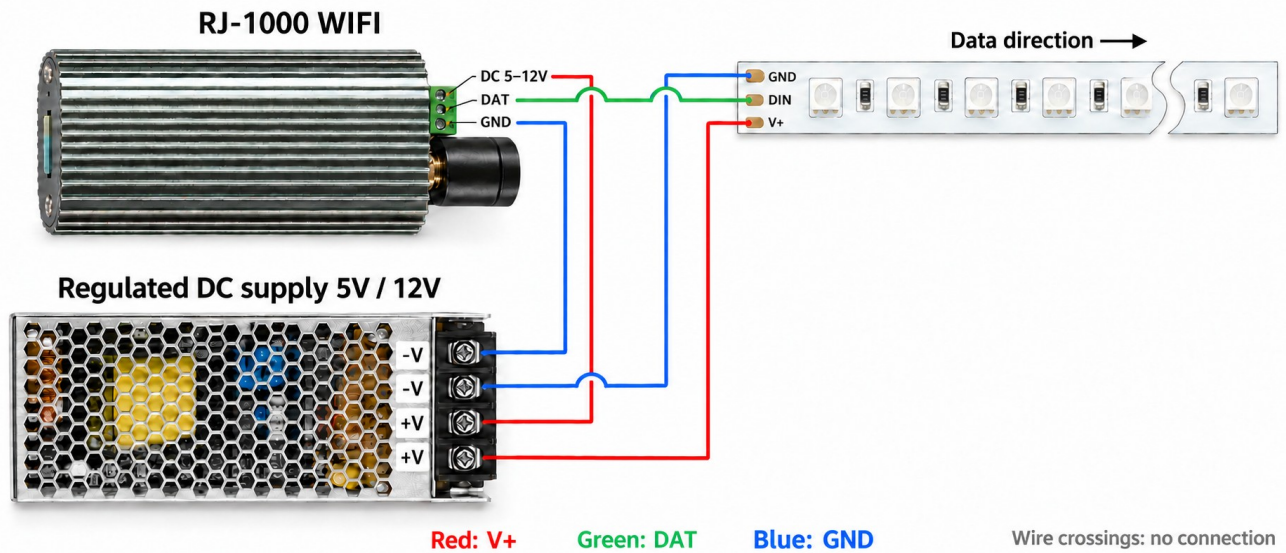
2048 is the RGB file-output pixel limit, not a fixed playback frame rate. One independently controlled RGB unit counts as one pixel. If several LEDs share one driver IC, that group usually counts as one pixel.

Environment and electrical load

Controller terminals provide device power and signal connections. Supply lighting loads directly with suitable wire sizes and power injection based on current and voltage drop. A metal enclosure does not establish a waterproof rating.

Power and lighting wiring

Switch off power before wiring the controller, first lighting unit and common ground. Check terminal tightness and exposed conductors before switching on.



One shared power supply

For 5V lighting, use a suitable regulated 5V supply for both the controller and lighting. For 12V lighting, use a suitable 12V supply. Run separate positive feeds to each load. Connect supply negative to both GND terminals, and DAT to the lighting DIN.

Different controller and lighting voltages

Lighting rated above 12V, such as 24V, needs its own correctly rated supply. Power the controller with DC 5-12V. Connect negatives as required for a common data ground, keeping the positive rails separate. Never connect 24V to the controller power terminal.

Pixel chains and power injection

Data travels from DAT to the first DIN, then from DOUT to the next DIN. Do not feed data into DOUT. For strips with a backup input BI, follow the strip manufacturer's first-pixel wiring. BI is not CLK; do not join wires based only on color.

Inject power along long strips as required by load, wire size and voltage drop. Supply lighting current directly from the power supply, rather than through the controller terminal. Do not parallel the positive outputs of separate supplies unless they are designed for it.

Start with a few pixels at low brightness. Test red, green, blue and white, and verify color order and data direction before expanding the installation.

First use and Wi-Fi setup

Keep the phone near the controller during setup. Use a router offering 2.4 GHz Wi-Fi. Enable Bluetooth and grant nearby-device or local-network permissions when prompted.

01 Check power and install the TF card

With power off, complete the wiring and insert a compatible TF card. Switch on only after checking that each lighting load matches its supply voltage.

02 Enter setup mode

Follow the app for first-time setup. To change a saved network, firmware supporting button setup allows a hold of about 3 seconds to clear the old Wi-Fi information. Do not press the button during uploads or updates.

03 Add the device in LightMX

Open Add Device or the Bluetooth provisioning page. Scan and select the corresponding RJ-1000. If several devices appear, check the name or identifier.

04 Send the router information

Select or enter the 2.4 GHz Wi-Fi name and password, then start setup. Both are case-sensitive. Perform setup in a trusted environment.

05 Confirm the network connection

Wait for the app to report connection or completion. Keep the phone and controller on the same local network. Guest-network or client isolation can block discovery and control.

06 Connect and test a few pixels

Refresh the device list and connect. Select RJ-1000 and the appropriate RGB IC configuration, set the actual pixel count, then test basic colors at low brightness.

Reconnecting and changing networks

After a normal restart, the controller reconnects using saved settings. Reconfigure only when the router, password or availability changes. A setup-button hold clears Wi-Fi information; make sure the new network is available.

If the phone cannot find the controller

Check Bluetooth, nearby-device and local-network permissions, then confirm setup mode. After provisioning, confirm that both devices share the same network. App page names may vary by version.

Program creation and playback

Build the project to match the actual lighting layout and select the RJ-1000 output profile. Count independently controlled pixels, which may differ from the number of LEDs.

Pixel count and color order

For example, a WS2811 strip with three LEDs per driver IC normally counts each group as one pixel. A strip of 300 LEDs may therefore have 100 independent pixels. Follow the actual circuit grouping.

Test red, green and blue first. If colors are swapped, select the matching RGB/GRB order or output profile. Power wiring cannot correct color order. A three-channel RGB configuration cannot replace a four-channel RGBW configuration.

Upload and play offline

01 Define the layout and content

Set the controller model, pixel count, positions and connection direction in the companion software. Create the required effects, images or video program.

02 Generate a compatible program

Choose the appropriate RJ-1000 output type. Use a compatible BIN file generated by the software; renaming a video or arbitrary binary file to BIN is insufficient.

03 Upload and wait for completion

Write the program to the TF card through the app or a device-supported transfer method. Maintain stable power and networking. Wait for write confirmation before playback.

04 Select and adjust playback

Select the program on the control page, adjust brightness and playback speed, and play or stop as needed. Available controls depend on the firmware and software.

Live preview and large pixel counts

Live preview checks wiring and effects. Its pixel count and frame rate depend on app/firmware negotiation. Older firmware may send fully padded frames; versions supporting the actual pixel count can reduce unnecessary data. File-output capacity and preview limits are separate.

Single-wire data passes through every pixel, so more pixels increase frame transmission time. A 2048-pixel capacity does not guarantee 50 frames per second for every program. Reduce the pixel count per output or the frame rate when needed.

DAT protocol and IC selection

DAT uses unipolar return-to-zero signaling: each data bit contains a HIGH pulse followed by LOW. Pulse widths distinguish 0 and 1; a LOW interval at the end of a frame provides latching or reset.

DAT single-wire return-to-zero signal

Pulse width distinguishes 0 and 1; the reset interval stays LOW



Not to scale. Match timing and reset duration to the specific IC.

Matching the RGB output

The baseline output is three-channel RGB: 24 bits per pixel, with 8 bits each for R, G and B. Match data rate, logic levels, reset interval and color order. Similar IC names or a single-wire interface do not guarantee identical configurations.

Check	Requirement
Data structure	RGB uses 24 bits; RGBW usually uses 32 bits. RGBWW and high-bit-depth devices need their own encoding.
Polarity	Return-to-zero and return-to-one are not directly interchangeable. DAT is neither a power rail nor a differential interface.
Rate and reset	Match 400 kbit/s, 800 kbit/s or other rates and the reset interval to the exact device.
Channel order	The lighting defines RGB, GRB, BRG or another order. Confirm with basic-color tests.
Backup data	DI/BI redundancy is different from DATA plus CLOCK. Follow the strip's first-pixel wiring diagram.

How to use the following tables

“RGB family” identifies three-channel single-wire devices to evaluate; match timing and test the actual lighting before use. “Dedicated configuration” covers differences such as extra channels, return-to-one polarity, bit depth or control words. These tables support identification and selection, not guaranteed compatibility for every listed IC.

IC voltage ratings and strip voltages never increase the controller supply limit: use DC 5–12V for the controller.

Common RGB return-to-zero ICs

Common devices and identifiable suffixes are grouped by manufacturer family. Check the exact datasheet for package, revision, low-current and voltage variants. [1–8]

Family	Models and common suffixes	Selection notes
WS2811	WS2811, WS2811F, WS2811N; SOP8, SOT23-8 and DFN8 versions	RGB family. Check fast/slow mode and exact revision. [1]
WS2812	WS2812, WS2812B, WS2812C, WS2812B-V6, WS2812B-B-V6	RGB family. Revisions may change electrical or reset requirements. [2]
WS2812 small packages	WS2812B-MINI-V6, WS2812B-MINI-X1-V6, WS2812B-2020-V6, WS2812B-4020-V6	RGB family. MINI, 2020 and 4020 identify package or structural variants. [2]
Other WS2812	WS2812D-V6, WS2812E-V5/W, WS2812S-V6	RGB family. Match the complete suffix and color version. [2]
WS2813	WS2813, WS2813A, WS2813B-V5/W, WS2813C-V3, WS2813B-B, WS2813B-MINI-V1	RGB with redundant data. Check DI/BI wiring and reset. [3]
WS2815	WS2815, WS2815A, WS2815B-V1, WS2815C, WS2815F	RGB with redundant data. Strips commonly use 12V; check the actual rating. [4]
WS2818	WS2818, WS2818B	External RGB driver with redundant data. Check pixel grouping. [5]
SK / LC	SK6812 RGB, LC8812B RGB	Evaluate the three-channel RGB version. RGBW versions appear separately. [6]
UCS RGB	UCS1903, UCS1903B, UCS1903H, UCS1904S, UCS2903, UCS2903B	Single-wire RGB family. Match the full part number and timing. [7]
SM RGB	SM16703P	Single-wire RGB return-to-zero family. Check the installed IC and batch. [8]

Color variants and suffixes

Evaluate WS2813 RGB separately from versions carrying RGW/RGBW or other color suffixes. SK6812 and LC8812B can also have RGB, RGBW, RGBY or WWA variants. The family name alone does not establish the channel count.

TM and multichannel return-to-zero ICs

Titan Micro's selection tables distinguish return-to-zero, return-to-one and redundant-data devices. These distinctions prevent treating every TM part as a direct WS2811 substitute. [9–12]

Family	Models	Protocol or structure	Selection requirements
Basic RGB	TM1803	Return-to-zero; listed at 400 kHz	Match the rate and timing; do not assume 800 kHz. [10]
Basic RGB	TM1804, TM1903, TM1923, TM1935	Three-channel return-to-zero	Check timing, startup state and color order. [9–10]
Multiple RGB groups	TM1809, TM1812, TM1925D, TM1926D	9/12 or 6/9 channels; return-to-zero	Map the actual channel groups. A multichannel IC is not necessarily one RGB pixel. [9–10]
Redundant data	TM1934, TM1908	Redundant-data return-to-zero	Check DI/BI wiring and the input format. [11]
Extended series	TM2903LB, TM2905-12C, TM2905_12CB	Return-to-zero; listed as high grayscale	Confirm input bit width, control words and configuration. Grayscale alone does not prove compatibility. [11]
High bit depth	TM2918, TM2908	Return-to-zero; 16-bit series	Requires high-bit-depth encoding; ordinary 24-bit RGB cannot substitute. [11]
Extended series	TM3905, TM3905L, TM3905L_2, TM3905L_5, TM3906, TM3906B	Return-to-zero; 4096 grayscale levels listed	Check input format, control words and firmware support. [11–12]
Multichannel UCS	UCS1909BS, UCS1912BS, UCS2909S, UCS2912S	6/9/12-channel single-wire cascade	Group driver channels correctly and match timing and program settings. [7]
Four-channel UCS	UCS2904B	Four-channel single wire	Requires RGBW or the corresponding four-channel encoding. [7]

If a suffix is not listed

Provide the complete IC marking, strip voltage, DIN/BI definitions and datasheet. Labels such as “2811 type,” “1903 type” or a supplier abbreviation do not establish rate, channel count or batch compatibility.

Related ICs needing dedicated configuration

These devices may be sold alongside single-wire RGB lighting, but channel counts, bit widths, polarity or interfaces differ. They are not a standard RGB compatibility list for this controller. [6–17]

Difference	Models or series	Required handling
RGBW / other colors	SK6812 RGBW, SK6812 RGBY, LC8812B RGBW/RGBY/WWA	Match all white or other channels and the complete pixel data; three RGB bytes are insufficient. [6]
Four channels	WS2814A, WS2814B, WS2814C, WS2814D, WS2814F	RGBW series requiring dedicated encoding and corresponding firmware. [13]
Four channels	SM16704, SM16704PB, UCS8904	RGBW family requiring an independent white channel and matching data structure. [15–16]
Five channels	WS2805, FW1906	RGBWW/RGBCCT with two white channels; requires dedicated encoding. [16–17]
High bit depth	WS2816A, WS2816B, WS2816C, WS2816B-MINI, WS2816C-MINI	Pixel bit depth differs from 24-bit RGB. [14]
Small high-bit-depth packages	WS2816B-2427, WS2816C-2427, WS2816B-2121, WS2816C-2121, WS2816B-2020, WS2816C-2020, WS2816B-1313, WS2816C-1313	Package suffixes do not remove the need for the correct high-bit-depth protocol. [14]
Return-to-one	TM1814, TM1814B, TM1815A, TM1815B, TM1912	Listed as return-to-one. TM1815A/B also differ at 200/400 kHz; use a dedicated configuration. [9–10]
Four-channel single wire	TM1906-12	Four-channel return-to-zero; requires the correct channel mapping. [9]
Confirm first	TM1824	Listed as return-to-zero; the selection table does not establish the full pixel format. Consult the complete datasheet. [9]

Confirming compatibility

Check the complete datasheet, then connect a few pixels with the correct output configuration. Test colors, continuous changes, blackout and sustained stability. One illuminated pixel does not verify the full chain, all colors or higher frame rates.

Other interfaces and single-wire devices

This table identifies additional interface families. A lighting library's supported-device list helps classify interfaces, but does not prove support in the controller's firmware. [16]

Category	Models	Selection or wiring requirements
Other single-wire devices	GS8208, UCS8903, TM1829	Confirm input bit width, control words, timing and firmware. Single-wire wiring alone does not establish direct compatibility.
Separate clock required	WS2801, WS2803, SM16716, APA102, SK9822, LPD6803, LPD8806	DATA plus CLOCK devices. The exposed three-position controller terminal has no separate CLK; do not connect these as DAT-only devices.
Other clocked device	P9813	Match its data structure and clock interface; it is not a WS2811-style single-wire connection.
DMX devices	DMX512, WS2821, UCS512 and related DMX families	Use the required DMX interface and conversion circuitry. Do not connect a DMX input directly to DAT.

Distinguish the three signal arrangements

Single-wire return-to-zero uses DAT and a common ground. Redundant-data devices use DI and BI to provide an alternate data path. DATA plus CLOCK devices need a separate clock. Suppliers may call all of these "SPI," but their wiring and timing differ.

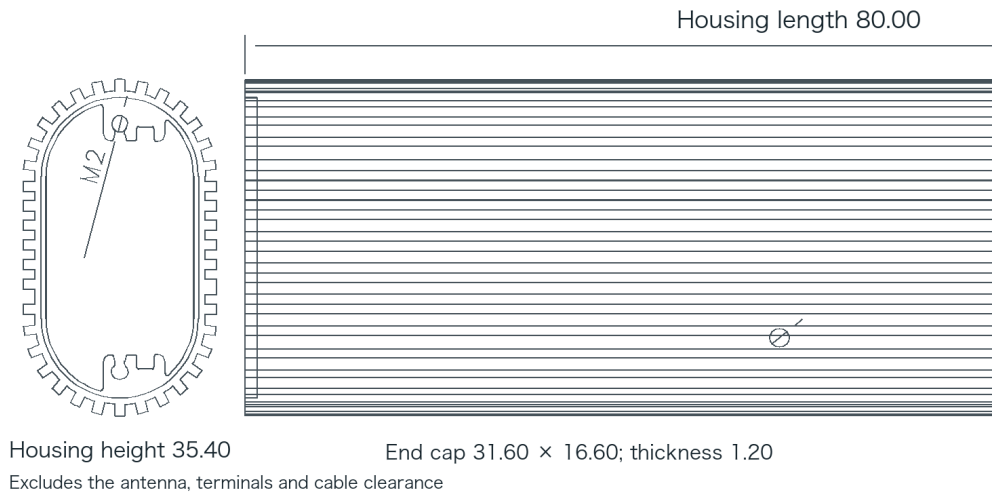
Information needed when selecting lighting

Obtain the complete part number and suffix, RGB/RGBW/RGBWW channel format, rated strip voltage, LEDs per group, DIN/DOUT/BI/CLK labels and datasheet. A three-wire or four-wire appearance alone is insufficient to select an IC configuration.

Dimensions and installation

Housing and end-cap dimensions

Units: mm. Geometry reproduced from the original DWG.



Housing dimensions in millimeters

The housing drawing specifies a length of 80.00 mm and height of 35.40 mm. These exclude the projecting antenna, terminals and cable-bend clearance. Allow installation space based on the complete physical unit.

The end-cap drawing specifies 31.60 × 16.60 mm and a thickness of 1.20 mm. These are component dimensions and must not be used as the overall assembled cross-section.

Installation position

Install in a stable, ventilated location that allows inspection. The metal housing is not a waterproof seal. Keep the unit away from rain, standing water and condensation. Prevent water or metal debris from entering the terminals, TF slot or button area.

Wireless and cable routing

Leave space around the antenna. Avoid close contact with large metal surfaces, power wiring or enclosed metal cabinet walls. Route DAT with GND where practical, avoiding long parallel runs with AC or high-current wiring. Keep the cable to the first pixel short.

Mounting and maintenance

Do not crush cables or block the TF slot when securing the unit. Do not carry it by the terminals, cables or antenna. Disconnect power before service, rewiring or card insertion/removal. Keep terminals tight and inspect for heat, corrosion and insulation damage.

Troubleshooting

Stop playback and reduce brightness when behavior is abnormal. Disconnect power if there is a short circuit, unusual odor or excessive heat.

Symptom	Check first	Action
Controller will not power on	Supply, polarity, terminal contact	Use a regulated DC 5–12V supply. Check polarity and secure the conductors.
All lighting remains off	Lighting supply, common ground, DIN direction	Check the lighting voltage, connect DAT to DIN and share ground with the controller.
Colors are swapped	RGB/GRB channel order	Select the matching order in software, then test red, green and blue.
Later pixels are off or shifted	Pixel count, grouping, RGBW format	Count independent pixels. Check program length, channel count and chain breaks.
Flicker or random colors	Voltage drop, ground, data wiring, timing	Test fewer pixels at lower brightness. Check power injection, ground and IC timing.
Not found over Bluetooth	Setup mode and phone permissions	Enter setup mode, grant Bluetooth/nearby-device access, move closer and rescan.
Wi-Fi setup fails	2.4 GHz network, SSID and password	Check letter case and router settings. Reconfigure after changing networks.
Configured but not found in app	Phone network and isolation	Use the same local network. Check guest isolation and local-network permissions.
TF program does not play	Card format, files, write completion	Power off before checking the card. Use compatible files and wait for write confirmation.
Large installations play slowly	Serial transmission time, frame rate, network load	Reduce pixels per output or playback frame rate. Test a locally stored program first.

Information for technical support

Record the controller model, firmware and app versions, exact lighting IC, supply voltage, pixel count and steps that reproduce the issue. Wiring photos should show both the controller terminals and the first lighting input labels.

Use official firmware matching the hardware variant. Maintain stable power and wait for an update to finish; do not disconnect power or remove the card during writing.

IC reference sources

Device revision, strip circuitry and firmware support jointly determine compatibility. Check complete part numbers and matching datasheet revisions when ordering or designing an installation.

[1] Worldsemi WS2811 Family

<https://www.world-semi.com/ws2811-family/>

[2] Worldsemi WS2812 Family

<https://www.world-semi.com/ws2812-family/>

[3] Worldsemi WS2813 Family

<https://www.world-semi.com/ws2813-family/>

[4] Worldsemi WS2815 Family

<https://www.world-semi.com/ws2815-family/>

[5] Worldsemi WS2818 Family

<https://www.world-semi.com/ws2818-family/>

[6] LED Color LC8812B and SK6812 RGB / RGBW product page

<https://www.szledcolor.com/product/view/id/536>

[7] UCS single-wire cascade driver IC selection table

<https://1506302.site.newwan.cn/page136>

[8] Sunmoon SM16703P manufacturer datasheet

<https://suntechlite.com/wp-content/uploads/2024/08/SM16703P-Specification-Sheet.pdf>

[9] Titan Micro single-wire selection table, page 1

<https://www.titanmec.com/product/led-decorative-driver-chip/single-line-series/p/1.html>

[10] Titan Micro single-wire selection table, page 2

<https://www.titanmec.com/product/led-decorative-driver-chip/single-line-series/p/2.html>

[11] Titan Micro redundant-data selection table, page 1

<https://www.titanmec.com/product/led-decorative-driver-chip/double-line-series/p/1.html>

[12] Titan Micro redundant-data selection table, page 2

<https://www.titanmec.com/product/led-decorative-driver-chip/double-line-series/p/2.html>

[13] Worldsemi WS2814 Family

<https://www.world-semi.com/ws2814-family/>

[14] Worldsemi WS2816 Family

<https://www.world-semi.com/ws2816-family308/>

[15] SM16704PB four-channel return-to-zero datasheet

<https://www.jad-leds.com/web/userfiles/download/SM16704PB-Datasheet.pdf>

[16] WLED Project LED interface classification reference

<https://kno.wled.ge/basics/compatible-led-strips/>

[17] Worldsemi WS2805 five-channel RGBWW product page

<https://www.world-semi.com/ws8638-family/>

Sources reviewed for the Chinese master edition on 29 October 2026.