XICHTEE

LMPSH-IP & HRNL-25W TSL UMD 3.1 PROTOCOL GUIDE

Public protocol integration guide

DATASHEET

TSL UMD 3.1

v1.1.193 | BUILD 193

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Document control

DOCUMENT	VALUE
Title	LMPSH-IP & HRNL-25W TSL UMD 3.1 Protocol Guide
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Audience	System integrators, tally-source developers and broadcast engineers

Purpose

This guide explains how LMPSH-IP and HRNL-25W receive TSL UMD (Under Monitor Display) 3.1 tally messages, map the four tally bits to rules, and turn those Rule Active states into configured LED behaviour. It includes the exact frame layout and a working TCP sender example.

NOTE This is a public integration guide for the implemented receive-only interface. It documents TSL UMD 3.1 frames carried in a product-specific TCP stream; it does not describe TSL v4.0, v5.0, UDP or the serial electrical layer.

Compatibility

TOPIC	SCOPE
Products	LMPSH-IP and HRNL-25W
Firmware	v1.1.193 · build 193
Direction	Controller to device only; the device sends no application-layer TSL reply
Wire message	TSL UMD 3.1 fixed 18-byte display message

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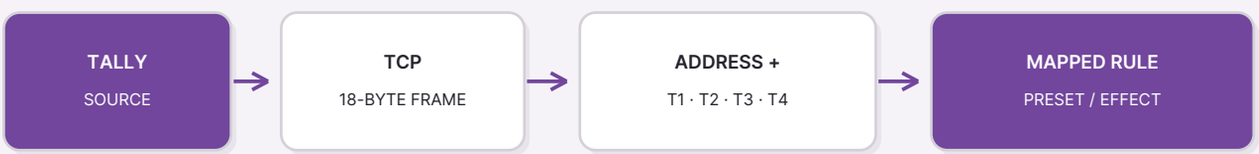
01 · Overview

What the interface does

A tally source opens a TCP connection and sends standard TSL UMD 3.1 display messages. Each message supplies one display address and four on/off tally levels. A device rule can watch one address and one tally bit; the received level becomes that rule's Active state.

FROM TALLY SOURCE TO LIGHT OUTPUT

The protocol changes Rule Active states; the rule and preset determine the visible result.



Result The selected tally bit sets the mapped rule On or Off. No colour value is carried in TSL 3.1.

ITEM	IMPLEMENTED CONTRACT
Role	Receive-only TSL input. No TSL frames are transmitted by the device.
Transport	TCP server on the configured TSL port; stored default 8900.
Connections	0 disables the service; request 1–7 slots. One slot accepts one sender, subject to capacity shared with other enabled network services.
Address range	0–126. Address 127 / header FF is not a broadcast address here.
Tallies	T1–T4 are independent Boolean levels carried in control bits 0–3.
Rule capacity	Five priority rules per segment; product model and licence determine the active segment count.
Visible output	A mapped rule selects its configured preset/effect. TSL 3.1 carries no output colour for this product.

NOTE Treat the TCP port and connection count as LMPSH/HRNL implementation details. The underlying TSL 3.1 message format does not define this TCP service.

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02 · Configure the device

Enable the TCP listener

Open Socket Config in the device web interface. Set the TSL port, allocate at least one TSL 3.1 socket, save the settings, and restart when requested. The service listens after normal operation resumes.

SETTING	VALUE / GUIDANCE
TSL Port	Default 8900. Choose an unused TCP port from 1 to 65535.
TSL 3.1 Sockets	Default 1. Use 0 to disable, or request 1–7 slots. One slot accepts one sender; review Free Sockets with the other enabled services.
Network access	Permit the tally source to reach the selected device TCP port.
Restart	Apply the requested restart before testing a new port or socket allocation.

Map a rule

STEP	ACTION
1	Open Segment Settings and select the rule that should follow TSL.
2	Set TSL Index to the sender's display address, from 0 to 126.
3	Set Bit to 0, 1, 2 or 3. These correspond to Tally 1, 2, 3 or 4.
4	Choose the rule's preset/effect. The incoming TSL bit sets Active; no separate enable step is required.
5	Send a complete 18-byte frame and check both the On and Off levels.

NOTE Leave the TSL Index empty when a rule should have no direct TSL mapping.

IMPORTANT TSL has no authentication or encryption. Keep the listener on an isolated, trusted control network or behind a trusted security boundary.

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03 · Packet anatomy

Fixed-size display message

Send exactly one header byte, one control byte and sixteen display-data bytes. TCP is a byte stream: one record may arrive in several TCP segments, or several records may arrive together. Consecutive frames may be written back-to-back. Do not add a line ending, length prefix, checksum or terminator.

TSL UMD 3.1 · FIXED 18-BYTE MESSAGE

There is no length field, delimiter or checksum. Every message contains all three fields below.

CONTROL BYTE bits 7 → 0

HEADER = 0x80 + address (0–126). T1–T4 are the four Boolean states. BRI is standard brightness.

LMPSH/HRNL consumes the header and T1–T4. Brightness and text remain part of the compatible frame.

FIELD	PUBLIC WIRE RULE
Header	0x80 + address. Valid headers are 80–FE hex for addresses 0–126.
Control	Bits 0–3 carry T1–T4. Bits 4–5 carry standard brightness. Send bits 6–7 as zero.
Display data	Exactly 16 printable ASCII bytes, 20–7E hex. Space-pad a shorter label.

NOTE The device does not use brightness or display text to choose its LED output. Keep both fields standards-compliant so the same source remains portable to ordinary TSL displays.

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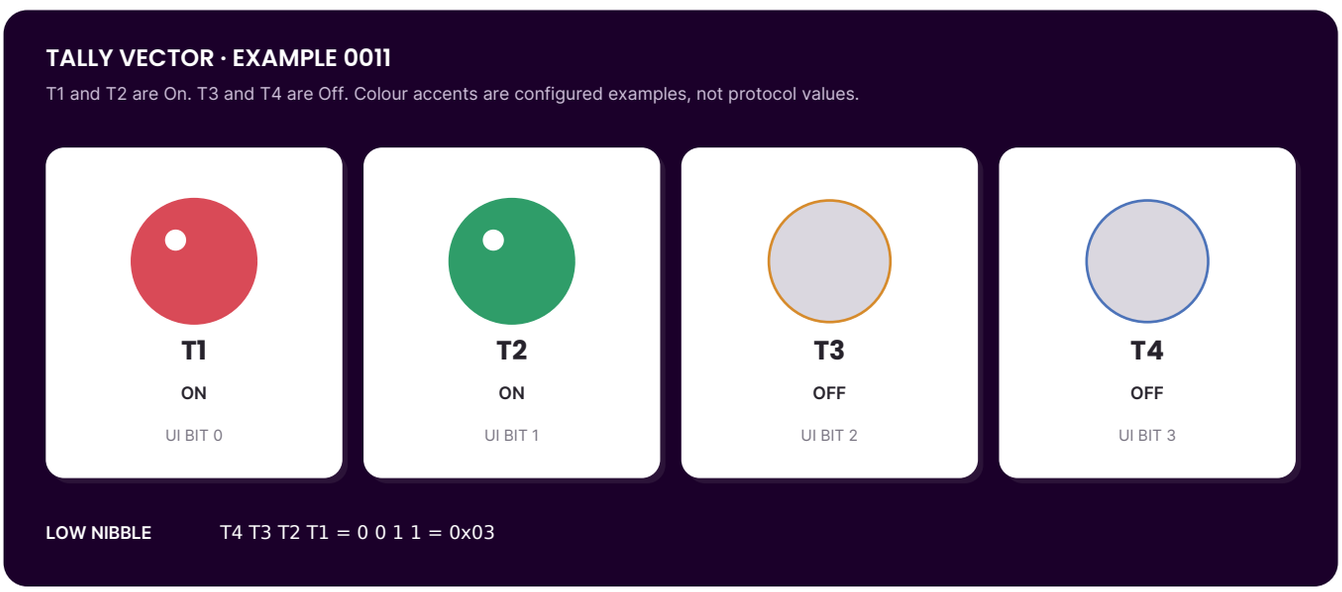
04 · Tally indications

Four Boolean channels

TSL UMD 3.1 carries four Boolean tally channels but does not assign Program, Preview or a colour to them. LMPSH/HRNL lets each rule choose one tally bit and gives the visible colour/effect to that rule's configured preset.



CONTROL BIT	TSL NAME	DEVICE RULE SETTING	WHEN 1
0	Tally 1 (T1)	Bit 0	Mapped rule Active = On
1	Tally 2 (T2)	Bit 1	Mapped rule Active = On
2	Tally 3 (T3)	Bit 2	Mapped rule Active = On
3	Tally 4 (T4)	Bit 3	Mapped rule Active = On

Standard brightness bits

b5:b4	TSL 3.1 LEVEL	LMPSH / HRNL
00	Zero brightness	Accepted; ignored for rule control
01	1/2 brightness	Accepted; ignored for rule control
10	1/7 brightness	Accepted; ignored for rule control
11	Full brightness	Accepted; ignored for rule control

IMPORTANT Every frame is a four-bit state vector, not a command for only one tally. When changing one tally, preserve the other three levels or their mapped rules will also change.

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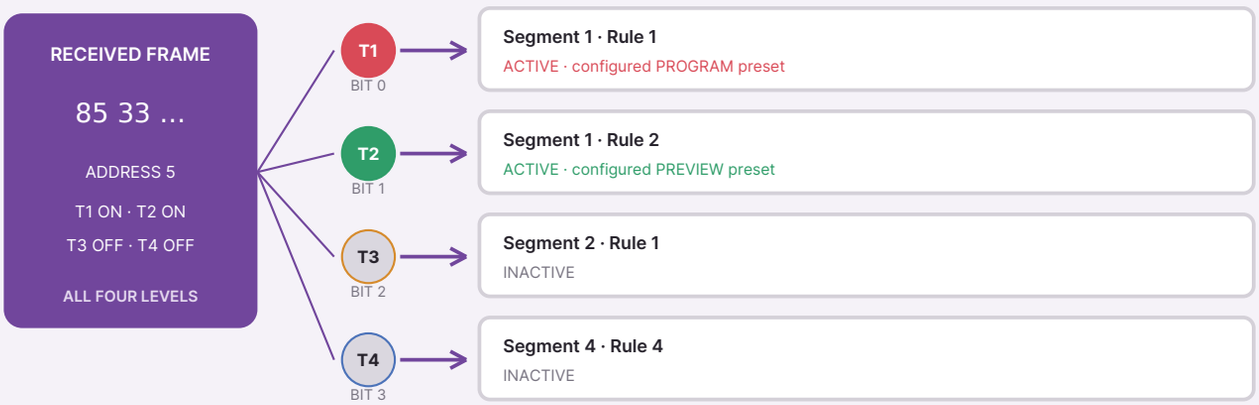
05 · Rule mapping

Address and bit select a rule input

The address selects a group of tally levels. Each configured rule then selects one of those levels through its Bit value. Several rules may watch the same address, and several rules may deliberately watch the same address and bit.

ONE ADDRESS · FOUR INDEPENDENT RULE INPUTS

Example address 5, control 0x33: full standard brightness, T1 and T2 asserted.



Rule 1 has priority while both are active. Clear T1 and Rule 2 appears; clear both and the default returns.

MAPPING CASE	RESULT
Same address, different bits	One frame updates each rule from its chosen T1–T4 level.
Same address and same bit	All matching rules receive the same On or Off level.
No matching rule	The frame is accepted as TSL traffic but changes no rule.
Rule already at that level	The rule stays unchanged; the frame remains a valid level refresh.
Rule has a maintained Follow GPI or Logic input	That maintained input remains in control and TSL does not overwrite the rule.

Priority and Logic

If several rules are active on one segment, the lowest rule number has the highest priority. Lower-priority rules stay active and appear automatically when higher rules clear. When no rule is active, the segment returns to its configured default. TSL addresses and bits can also be used as Boolean inputs in the Logic Matrix; each input starts False and then holds its most recently received level.

IMPORTANT **If more than one TCP sender writes the same address, the latest processed frame sets all four levels. Use one authoritative sender per address; the device does not merge clients. Other accepted control sources can also change an ordinary rule, so use a dedicated rule when TSL ownership must be deterministic.**

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06 · Working sender example

Worked frame

This example addresses display 5, asserts T1 and T2, keeps T3 and T4 off, requests full standard brightness, and sends the label CAM 05 padded to sixteen characters.

PART	CALCULATION	HEX
Header	0x80 + 5 (0x05)	85
Control	brightness 11 + tallies 0011	33
Display data	ASCII "CAM 05" + ten spaces	43 41 4D 20 30 35 + 10 × 20

```
85 33 43 41 4D 20 30 35 20 20 20 20 20 20 20 20 20 20
| | |---------------------- 16 ASCII bytes ----------------------|
| +-- control: T1=1, T2=1, T3=0, T4=0, full brightness
+----- header: address 5
```

Minimal Python 3 sender

```
import socket

DEVICE = "192.0.2.10" # documentation-only address
PORT = 8900
address = 5 # valid range: 0..126
tallies = 0b0011 # T4 T3 T2 T1
label = "CAM 05"

if not 0 <= address <= 126:
raise ValueError("TSL address must be 0..126")
if not 0 <= tallies <= 0x0F:
raise ValueError("TSL tallies must fit four bits")
text = label.encode("ascii")
if len(text) > 16 or any(byte < 0x20 or byte > 0x7E for byte in text):
raise ValueError("TSL label must be 0..16 printable ASCII bytes")
frame = bytes([0x80 + address, 0x30 | tallies])
frame += text.ljust(16, b" ")

with socket.create_connection((DEVICE, PORT), timeout=3) as peer:
peer.sendall(frame)
```

NOTE The sender does not call recv(): this interface returns no application-layer TSL acknowledgement or state packet. Verify the resulting device state separately when the application requires confirmation.

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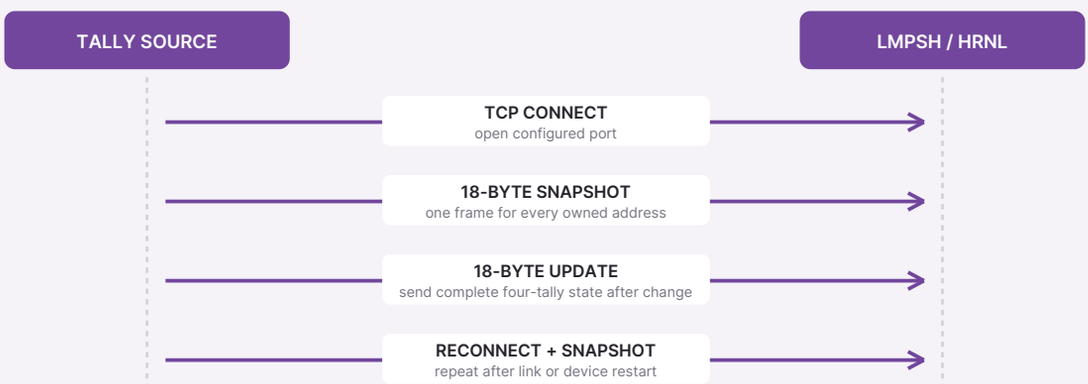
07 · Integration workflow

Establish and refresh state

Treat a TCP session as a one-way delivery path. Send a complete state snapshot immediately after connecting, then send a new complete frame whenever any tally on an owned address changes.

RECOMMENDED TCP SESSION

TSL 3.1 is one-way. The sender restores certainty by sending a complete state snapshot after every connection.



NO TSL APP REPLY Do not wait for ACK, NAK, echoed text or a returned tally frame.

SITUATION	SENDER ACTION
First connection	Send every address the sender owns; do not wait for a request from the device.
One tally changes	Rebuild the control byte with all four current levels, then send the full 18-byte frame.
TCP disconnect	Reconnect, then resend the complete snapshot. A disconnect alone does not clear the last runtime level.
Long idle session	The device may close a connection after 15 minutes without TSL data. Reconnect automatically; a full snapshot once per minute is a safe policy.
Device restart	Reconnect and resend. Runtime Rule Active state is not a persistent tally store.
Cluster	Connect to the current active master. Reconnect and resend after authority moves to a promoted Backup.

IMPORTANT A Follower does not accept TSL input. A standby Backup keeps external input closed until it becomes the ready active leader. Target the current active master, not every cluster member.

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08 · Troubleshooting

Integration checks

SYMPTOM	CHECK
TCP connection is refused	Confirm the TSL port, allocate at least one TSL socket, apply the requested restart, and check network reachability.
Frame has no visible effect	Check address 0–126, active segment, preset assignment, TSL Index/Bit, maintained-input ownership, and higher-priority active rules.
Wrong rule changes	Remember that wire addresses are zero-based and UI Bit 0–3 maps to T1–T4.
Other mapped rules turn off	Preserve all four tally levels in every control byte. A cleared bit explicitly sends Off.
Colour is unexpected	TSL 3.1 did not select the colour. Check the rule priority, assigned preset/effect, and other active rules.
Label does not appear on the device	The 16-byte text field is required for a compatible frame but is not used as a device or rule label.
No TSL acknowledgement arrives	Correct: this receive-only interface sends no application-layer ACK, NAK or state reply.
Write was interrupted or alignment is uncertain	Close the TCP connection, reconnect, and resend the complete snapshot. Do not infer application acceptance from an open connection.
Works on Primary but not Follower/standby Backup	Send input only to the current active master and reconnect after a Cluster authority change.
Intermittent state with several senders	Give each address one authoritative source. The most recently processed frame wins.

Frame checklist

1	18 bytes total
2	Header 80–FE hex
3	Reserved bits 6–7 clear
4	Exactly 16 printable ASCII bytes
5	No CR/LF, checksum or delimiter
6	All four tally levels preserved

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09 · Reference

Quick reference

TOPIC	VALUE
Protocol	TSL UMD 3.1 display message
Product transport	Receive-only TCP server
Default TCP port	8900
Configured connections	0 disabled; request 1–7 slots, subject to capacity shared with other enabled network services
Frame length	18 bytes
Address	0–126; header = 0x80 + address
Tallies	T1–T4 in control bits 0–3
Direct rule map	Five rules per active segment; LMPSH-IP supports up to 2 segments; HRNL-25W normally 5 and up to 45 with Extended Segments
Brightness	Control bits 4–5; accepted but not used for Rule Active
Text	16 printable ASCII bytes; required but not used for Rule Active
Reply	No application-layer TSL reply
State model	Level-based; every frame supplies all four levels for one address
Not implemented by this product interface	TSL v4.0, TSL v5.0, UDP, serial electrical interface and address 127 broadcast

Control-byte examples

HEX	FULL-BRIGHTNESS TALLY STATE
30	All tallies Off
31	T1 On
32	T2 On
34	T3 On
38	T4 On
35	T1 and T3 On
3F	All four tallies On

Standards context

The 18-byte format, address range, tally bits, brightness field and display-data rules follow TSL UMD Protocols · Protocol V3.1. The TCP listener, port, connection count, rule mapping, Cluster ownership and LED result are LMPSH/HRNL product behaviour. See the official TSL UMD Protocol specification.

IMPORTANT Use this interface only on a trusted control network. A valid frame changes live device behaviour and carries no application authentication, encryption, protocol checksum, cryptographic integrity field or replay protection.

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