



# **Lumistar LS-48-M Series Modular Dual Channel Bit Synchronizer**

**Single / Dual Bit Synchronization  
Frame Synchronization  
Bit Error Rate Detection**



## **OPTIONS:**

**Telemetry over IP (TMoIP)  
Data Recording  
PRN Data Simulation  
IRIG Time Code Reader/Gen  
PTP Network Time Reader  
Modular/Portable Versions**

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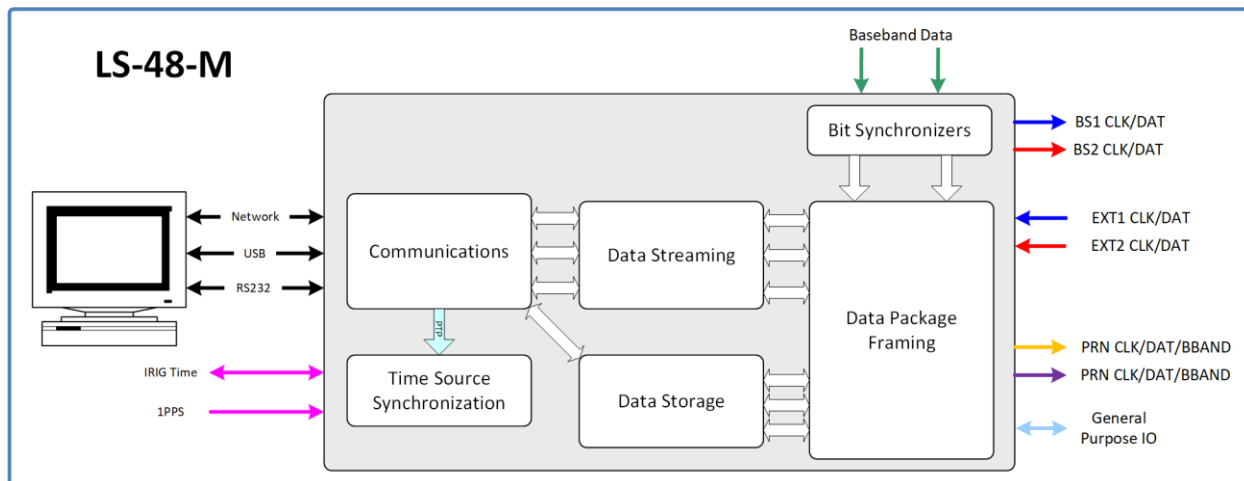
**December 2025**

***Specifications subject to change, consult factory at time of order for latest specifications***

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## LS-48-R1 Specifications:

- The LS-48-M Bit Sync is a child design, based upon the powerful LS-68-M “DPE” (Digital Processing Engine) baseband telemetry processing system. Some functions / capabilities installed in the LS-68-M are removed to produce the capabilities within the LS-48-M design.
- LS-48 is available in Modular, Portable and Rack Mount configurations
- Ground, Mobile, Airborne/Shipboard & Remote Ops
- Flexible/Extensible Firmware-Based Personalities
- Single or Dual Channel Bit Synchronization available
- Single or Dual Frame Sync available
- Data Recording (*Optional*)
  - 64 GB per data channel (two channels each, internally stored)
  - > 7 hours per channel at 20 Mbps
- PRN Generation Capability
  - PRN Simulation
  - Real-time Network Streams
  - Maximum 2 PRN Streams per unit
- User Defined I/O Signals (see User Manual for descriptions)
- TTL and Differential High Speed 422 I/O
- Bit Error Rate Readers
- O-Scope Displays for Bit Synchronizer Input Visualization
- Viterbi Decoding available for Bit Sync Input Channels (*Optional*)
- No Commercial Internal OS
  - Control / Status over Ethernet, USB, and RS-232
  - User Friendly Lumistar App Provided or Use Your Own
  - Compatible with IADS
- IRIG Time Code Reader and Generator Capability (*Optional*)
- IEEE-1588 Precision Time Protocol (PTP) Reader (*Optional*)
- Modular Unit Form Factor
  - 4.0” x 6.0” x 1.13”
  - Approx. 1.1 pounds
- AC Power (1U x 12” Deep Chassis version only)
  - 110 – 240 VAC ; 47-63 Hz
  - 28 watts power dissipation (*Typical*)
- *For more technical information on the LS-48-M Series Products, please refer to the appropriate sections of the User Manual for the LS-68/48 Digital Processing Engine (DPE)*
  - [https://lumi-star.com/uploads/MANUALS/LS-68-M/LS-68-M\\_UserManual.pdf](https://lumi-star.com/uploads/MANUALS/LS-68-M/LS-68-M_UserManual.pdf)



**BLOCK DIAGRAM**  
**LS-48-M Series Bit Synchronizer**

Some of the primary design objectives of the DPE product line were to reduce the platform size, to provide an “OS-less” environment by eliminating product use of commercial software operating systems for functional processing, to provide easy and flexible field upgrade/enhancements capabilities, and to provide a network appliance for device control and data transport. The unit is controlled and monitored using a 1000/100/10Mbps Ethernet interface with alternate controls being provided by USB and RS-232. Using provided documentation, the customer can develop their own interface GUI, or choose to utilize the provided Lumistar network application.

At the heart of the modular design is a flexible and extensible multi-core DSP Engine that can take on up to twelve “personalities.” The device construction is via two hardware “slices”: Signal Processing and a Control Processing Engine. Operational firmware loads, or “personalities,” are retained internal to the device for quick switching between operational requirements. New firmware personalities and/or control processing revisions are easily updated in the field. No need to return the unit for most modifications.

Listed below are the specifications of the LS-48-M modular unit. It is recommended that the modular unit be purchased with the optional Desktop Chassis (with cooling fans and power supply shown on p. 5). If purchased as a Portable or 1U Rack Mount

version, the Modular unit is installed in the portable case or rack chassis and all IO/Power/Ethernet are internally wired to the external faceplate.

## General Specifications of the LS-48-M Modular Unit

| Category:            | Specifications:                  | Details:                                       |
|----------------------|----------------------------------|--|
| <b>Mechanical</b>    |                                  |  |
|                      | Envelope Dimensions (all slices) | 6.00"(L) x 4.00"(W) x 1.11" (H)                |
|                      | Form Factor                      | Modular Brick                                  |
|                      | Weight                           | ~ 20oz.  |
| <b>Electrical</b>    |                                  |  |
|                      | Individual power requirements    | 9-42VDC; Nom. +24VDC @ 0.875A                  |
|                      | Total Power (all streams)        | ~ 22 Watts (mode and data rate dependent)      |
| <b>Performance</b>   |                                  |  |
|                      | 1 or 2 PCM Bit Synchronizer      | 1kbps to 45Mbps (NRZ)                          |
|                      | 1 or 2 PRN PCM Generators        | PRN Pattern Generators; 1 per PCM Synchronizer |
|                      | PRN Baseband Output              | 15 Pre-mod filters; Variable output Voltage    |
|                      | IRIG Time                        | A, B G; Generator and Reader                   |
|                      | Precision Time Protocol (PTP)    | IEEE-1588                                      |
|                      | Data Sources                     | TTL, Diff, Int. Bit Sync, Int. PRN             |
|                      | Frame Data Size                  | 16 bits; not user selectable                   |
|                      | Data Packaging Framing           | 3 to 65536 data frames                         |
|                      | Bit Sync Inputs                  | Single-Ended 1 and 2; Differential; SIM        |
|                      | Data Recording/Playback FLASH    | Available per channel; 64GB each (optional)    |
|                      | Data Streaming                   | Raw or Throughput Modes Only                   |
| <b>Connectors</b>    |                                  |  |
|                      | Digital I/O Connector            | (3) MicroDSUB-25 Plug                          |
|                      | Power/Digital I/O Connector      | (1) MicroDSUB-25 Receptacle                    |
| <b>Environmental</b> |                                  |  |

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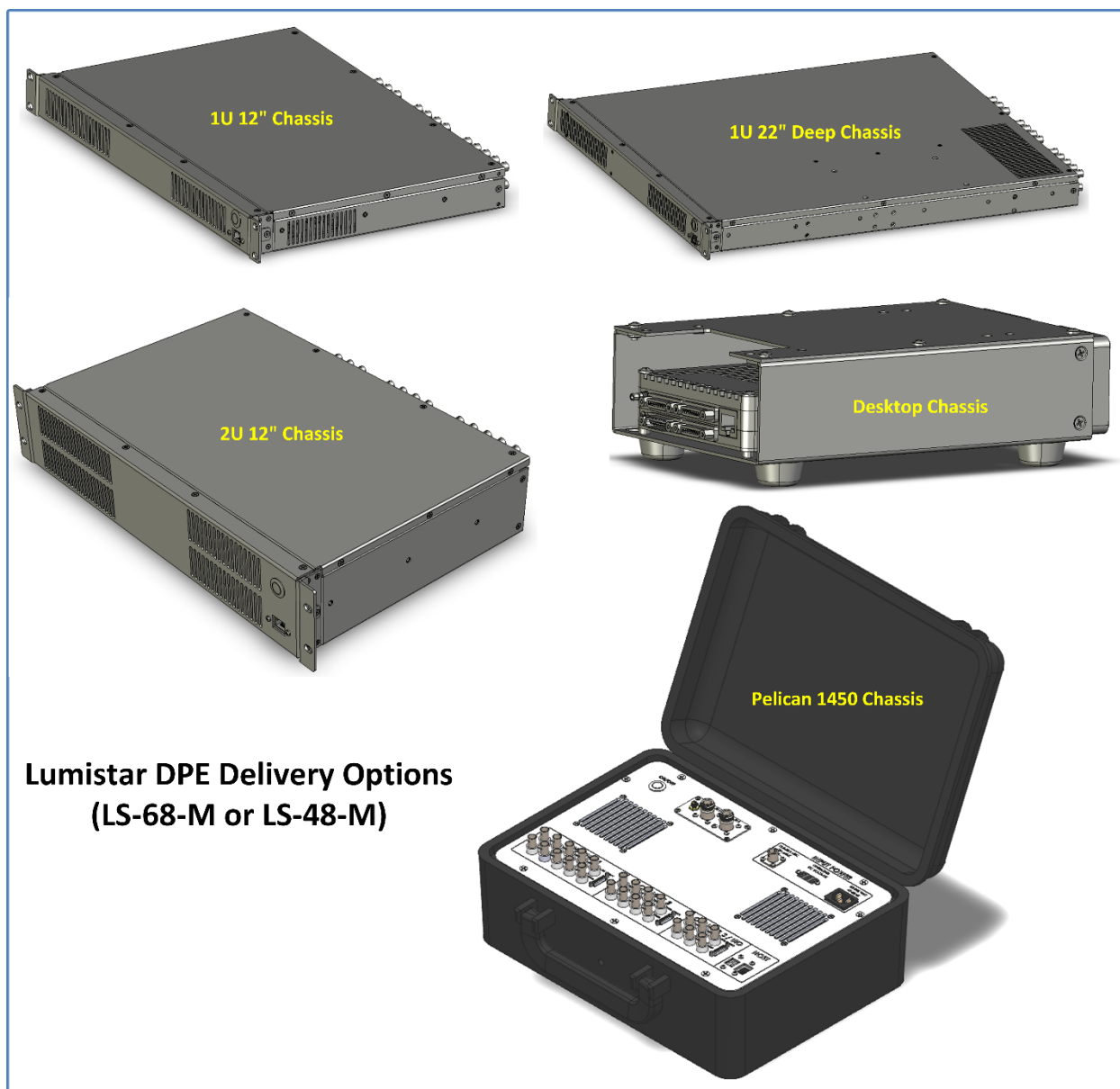
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|  |                          |                          |
|--|--------------------------|--------------------------|
|  | Temperature, Op          | -40 to 85 C (Industrial) |
|  | Temperature, Storage     | -40 to 125 C             |
|  | Humidity, non-condensing | <40C 0-90%, >40C 0-75%   |

## Various Configurations of the LS-48-M Series Rackmount, Portable and Modular



**Lumistar DPE Delivery Options  
(LS-68-M or LS-48-M)**

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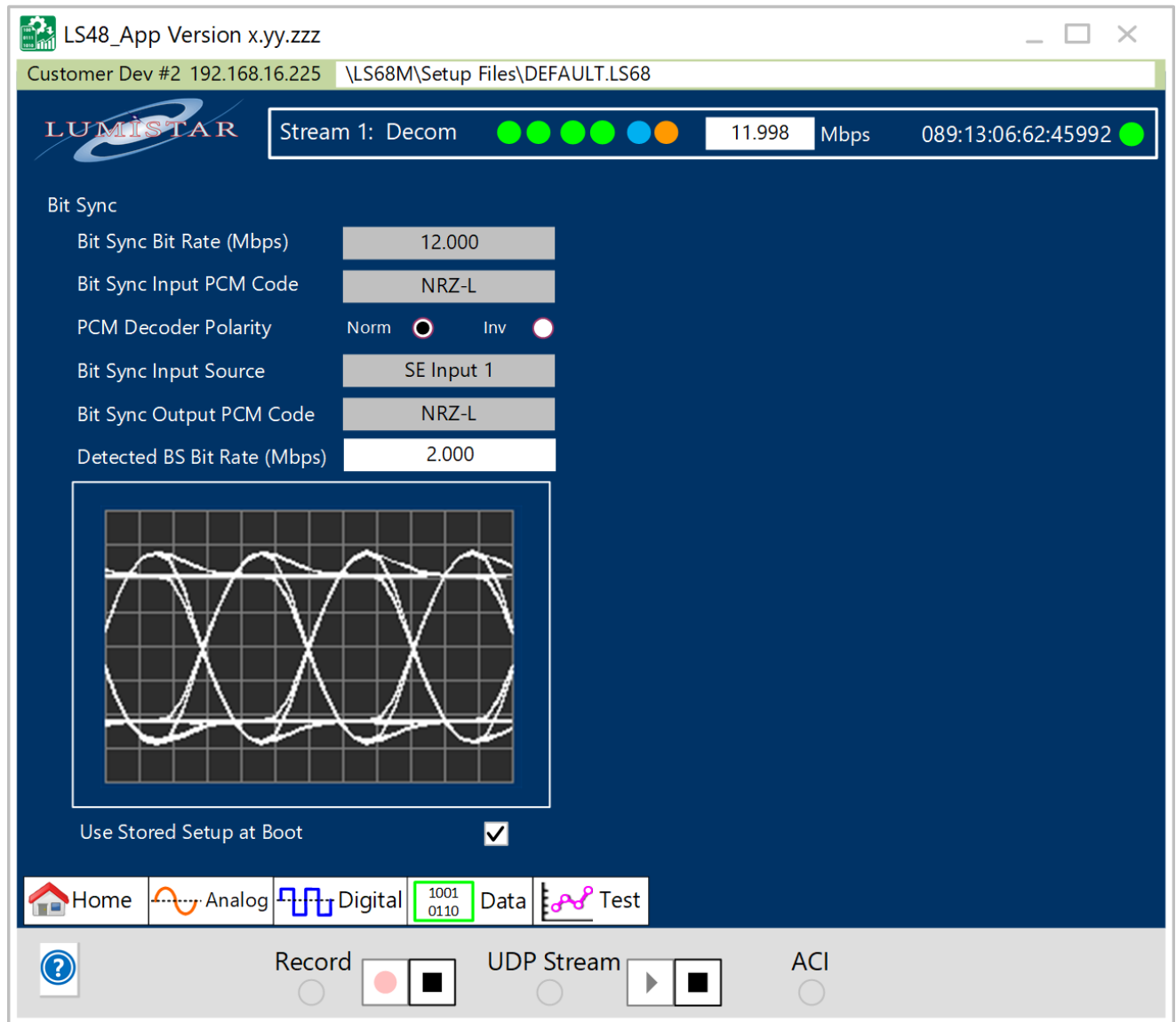
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## Typical GUI for the LS-48-M Series Products



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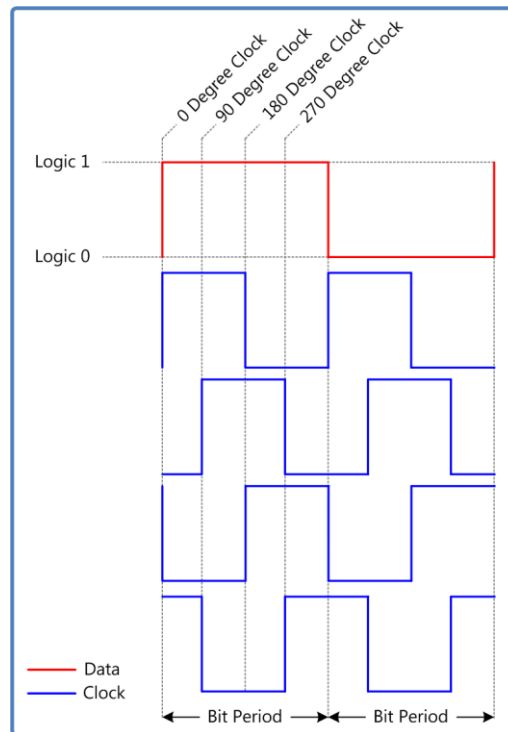
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| PCM Output Encoder Selections |   |
|-------------------------------|---|
| NRZ-L                         | Non Return To Zero - Level                      |
| NRZ-M                         | Non Return To Zero - Mark                       |
| NRZ-S                         | Non Return To Zero - Space                      |
| RNRZ11-L                      | PRN11 Randomized Non Return To Zero - Level     |
| RNRZ11-M                      | PRN11 Randomized Non Return To Zero - Mark      |
| RNRZ11-S                      | PRN11 Randomized Non Return To Zero - Space     |
| RNRZ15-L                      | PRN15 Randomized Non Return To Zero - Level     |
| RNRZ15-M                      | PRN15 Randomized Non Return To Zero - Mark      |
| RNRZ15-S                      | PRN15 Randomized Non Return To Zero - Space     |
| RNRZ17-L                      | PRN17 Randomized Non Return To Zero - Level     |
| RNRZ17-M                      | PRN17 Randomized Non Return To Zero - Mark      |
| RNRZ17-S                      | PRN17 Randomized Non Return To Zero - Space     |
| RNRZ23-L                      | PRN23 Randomized Non Return To Zero - Level     |
| RNRZ23-M                      | PRN23 Randomized Non Return To Zero - Mark      |
| RNRZ23-S                      | PRN23 Randomized Non Return To Zero - Space     |
| BIO-L                         | Bi Phase - Level                                |
| BIO-M                         | Bi Phase - Mark                                 |
| BIO-S                         | Bi Phase - Space                                |
| RZ                            | Return To Zero                                  |
| DM-M                          | Delay Modulation (Miller Code) - Mark           |
| DM-S                          | Delay Modulation (Miller Code) - Space          |
| DBIO-M                        | Differential Bi Phase - Mark                    |
| DBIO-S                        | Differential Bi Phase - Space                   |
| MDM-M                         | Modified Delay Modulation (Miller Code) - Mark  |
| MDM-S                         | Modified Delay Modulation (Miller Code) - Space |

## ***Clock Phase Relationships***



### **Ordering Information for Most Popular Versions:**

| <b>Model Number</b>    | <b>Description</b>   |
|------------------------|--|
| <b>LS-48-M1:</b>       | <b>Single Channel Bit Sync, Modular</b>                            |
| <b>LS-48-M2:</b>       | <b>Dual Channel Bit Sync, Modular</b>                              |
| <b>LS-48-QBS-2:</b>    | <b>Dual Channel Bit Sync, 1U 12" Short Chassis</b>                 |
| <b>LS-48-QBS-4:</b>    | <b>Dual Channel Bit Sync, 1U 12" Short Chassis</b>                 |
| <b>LS-48P-QBS-2:</b>   | <b>Dual Channel Bit Sync, 1U 22" Long Chassis (with Processor)</b> |
| <b>LS-48P-QBS-4:</b>   | <b>Dual Channel Bit Sync, 1U 22" Long Chassis (with Processor)</b> |
| <b>LS-48-P1-QBS-2:</b> | <b>Dual Channel Bit Sync, Portable "Pelican" Chassis</b>           |
| <b>LS-48-P1-QBS-4:</b> | <b>Dual Channel Bit Sync, Portable "Pelican" Chassis</b>           |
| <b>48M-DF</b>          | <b>Desktop Chassis w/ Power Supply (optional)</b>                  |

See Page 5 for other mechanical packaging options.

Consult Lumistar factory for further details.

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