

MIPI UniPro Protocol Decoder



Key Features

- Decode UniPro over M-PHY HS-G1 to HS-G3 and PWM-G1 to PWM-G7
- Provides frame and symbol decoding (L1, L1.5 and L2) of UNIPRO waveform across four lanes of up - and/or downstream data.
- Decode Cyclical Redundancy Check (CRC) data and highlights CRC errors.
- Link layer protocol decode
- Recognizes scrambled or unscrambled data
- Color-coded decode overlaid on the waveform is intuitive and easy to read
- Decode information expands as the timebase is adjusted or zoom
- Convenient table display with quick “zoom to message” capability
- Quick search capability for specific link layer frames

The MIPI UniPro Protocol Decoder analyzes acquired M-PHY analog waveforms and provides insight into multiple levels of UniPro protocol information. Data and Control frames are presented in an intuitive table format, where selecting a frame expands its content to a color-coded symbolic level, simultaneously creating a zoom. Decode annotation information is displayed on the physical layer waveform for a quick reference. Teledyne LeCroy provides a wide range of oscilloscope models and probing solutions to support the complete array of UniPro data rates.

Convenient Table Display and Search

Large oscilloscope acquisition memory provides long capture times of UniPro transmissions. Decoded information is conveniently shown in two tables. One table shows the frame-by-frame decode, the other table shows a symbolic decode of the selected frame's payload. In addition, specific frame types may be searched for.

Decode Annotation Complements Physical Layer Views

Decoded UniPro data is annotated on the physical layer waveform. Sections of the protocol are color-coded for easy visual reference. Decode annotation information condenses or expands

depending on the timebase/zoom ratio setting. The decode operation is fast, even with long acquisitions.

Support on Multiple Oscilloscope Platforms

To support the range of possible data rates, the UniPro D decode option is available on a wide range of oscilloscope models.

Teledyne LeCroy WaveLink probes are available in bandwidths up to 25 GHz, to support capture of all current HS Gears. Low loading and excellent noise performance ensure optimal signal fidelity.

Frame-by-frame Decode

Provides capability to decode Data and Control frames from the acquired analog waveforms.

- The table shows the frame type description, channel, start lane, CRC data (if applicable) and frame sequence.

- Touching a frame in the table correlates with the annotated waveform, and automatically zooms in for detail. In all cases, the tables never obscure waveform data.
- Data can be exported into a .csv format file with a single touch.

| UNIPRO | Time | Frame Type | Channel | Start Lane | CRC | Frame Seq |
|--------|-------------|--------------|---------|------------|--------|-----------|
| 8 | -70.2451 ns | DataFrame | Up | 0 | 0x7689 | 0 |
| 9 | 97.5614 ns | EndOfBurst | Up | 0 | | |
| 10 | 280.784 ns | StartOfBurst | Up | 0 | | |
| 11 | 284.208 ns | AFCFrame | Up | 0 | 0x94C9 | 0 |
| 12 | 294.483 ns | IdleSequence | Up | 0 | | |

Symbolic Decode

When an appropriate frame is selected, the symbolic decode table will show the frame contents.

- Symbolic decode results share the same colorization as the selected frame type for a highly intuitive view of the signal down to the bit level.

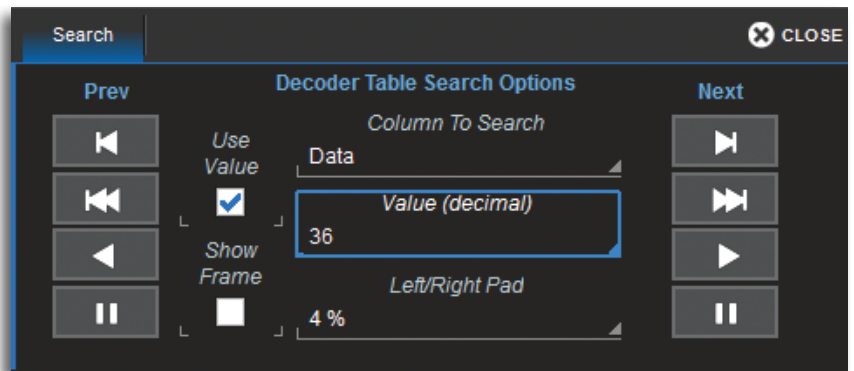
- Clicking a row in the symbolic decode will automatically zoom to the corresponding section of the decoded waveform.

| Index | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-------|----|----|---------------|--------|----|------------|---|------------|-----------------|---|---|---------------|--------|---|------------|---|
| 1 | | | | ESC_DL | | | | | SymblType=ACK=6 | | | TC=0 | CReq=0 | | Reserved=3 | |
| 2 | | | Frame SeqNo=0 | | | Reserved=7 | | | | | | CreditVal=0x0 | | | | |
| 3 | | | | | | | | CRC=0x94C9 | | | | | | | | |

Search and Zoom

Frame Type, Payload, Data, CRC, FrameSeq and other annotations can be quickly located using the Search dialog.

- Prev and Next buttons navigate to matches found in the decoded waveform, simultaneously creating a zoom of each match.
- Optionally, search for a specific value and/or highlight the frame in which the event was found.



SPECIFICATIONS

| UNIPRO DECODE | |
|---------------------------|--|
| Definition | |
| Protocol Setup | Select Data source |
| Decode Capability | |
| Decode Setup | Select Number of Lanes Up (Default is 1) Select Number of Lanes Down (Default is 0) Select Scrambled Data (On/Off) Select probing (Ddiff, dp & Dn) Select Level (Default is 0 mV) Select Hysteresis (Default is 140 mV) |
| Decode Input | Any analog Channel, Memory or Math trace. |
| # of Decode Lanes | Up to 4 lanes on any upstream/downstream configuration. |
| Location | Overlaid over DATA waveform, on Grid. (Note: Use multi-grid if there is more than one decoder ON) |
| Visual Aid | Color coding for Frame, Start of Burst, End of Burst, Escaped Data PDU Type, Symbol Type, End of Frame, Traffic Class, Credit Value, Reserved Bits, Idle Sequence, Frame Sequence, Credit Value, Payload Data, Cyclic Redundancy Check, Skip Sequence Symbol and Error. Decode information is intelligently annotated based on timebase setting. |
| Search Capability | |
| Pattern Search | Search by Frame Type, Payload, Data, ESCPARAM, PACP FUNCID, Reserved, SubFrame, CRC, SKIP, IDLE and Frame Sequence. |
| Other | |
| Compatible With... | WaveRunner 6 Zi Series, WavePro 7 Zi Series, WaveMaster 8 Zi Series, LabMaster 9 Zi-A Series, and LabMaster 10 Zi Series. Bandwidth of oscilloscope must be equal to bit rate with a minimum oscilloscope sample rate of 4x the bit rate. |

ORDERING INFORMATION

| Product Description | Product Code |
|---|--------------------|
| MIPI UniPro Protocol Decode Options | |
| UniPro Decode Option for WaveRunner 6 Zi Oscilloscopes | WR6Zi-UNIPRObus D |
| UniPro Decode Option for WavePro 7 Zi Oscilloscopes | WPZi-UNIPRObus D |
| UniPro Decode Option for WaveMaster 8 Zi Oscilloscopes | WM8Zi-UNIPRObus D |
| UniPro Decode Option for LabMaster 9 Zi-A Oscilloscopes | LM9Zi-UNIPRObus D |
| UniPro Decode Option for LabMaster 10 Zi Oscilloscopes | LM10Zi-UNIPRObus D |

The M-PHY Decode option is included in the MIPI UniPro Protocol Decode option.

MIPI UniPro Protocol Decode Upgrade Options

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|--|------------------------------|
| MPHY to Unipro Decoder Upgrade Option for WaveRunner 6 Zi Oscilloscopes | WR6Zi-UPG-MPHY-UNIPRObus D* |
| MPHY to Unipro Decoder Upgrade Option for WavePro 7 Zi Oscilloscopes | WPZi-UPG-MPHY-UNIPRObus D* |
| MPHY to Unipro Decoder Upgrade Option for WaveMaster 8 Zi Oscilloscopes | WM8Zi-UPG-MPHY-UNIPRObus D* |
| MPHY to Unipro Decoder Upgrade Option for LabMaster 9 Zi-A Oscilloscopes | LM9Zi-UPG-MPHY-UNIPRObus D* |
| MPHY to Unipro Decoder Upgrade Option for LabMaster 10 Zi Oscilloscopes | LM10Zi-UPG-MPHY-UNIPRObus D* |

* The UPG-MPHY-UNIPRObus D is ONLY for customers who have the MPHY D or MPHY DP.

| Product Description | Product Code |
|--|--------------|
| UniPro Recommended Oscilloscopes & Probes | |
| MPHY GEAR 1 SDA 760Zi-A Oscilloscope 6 GHz, 20 GS/s, 4 Ch, 20 Mpts/Ch (40 GS/s and 40 Mpts/Ch in interleaved mode) Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input | SDA 760Zi-A |
| SDA 806Zi-B Oscilloscope 6 GHz, 40 GS/s, 4 Ch, 32 Mpts/Ch Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input | SDA 806Zi-B |
| 6 GHz Complete Probe System - includes: Dx20-SI Solder-In Tip (Qty. 1), Dx20-QC Quick Connect (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-PT-KIT Positioner Tip Browser (Qty. 1) | D620-PS |
| MPHY GEAR 2 SDA 813Zi-B Oscilloscope 13 GHz, 40 GS/s, 4 Ch, 32 Mpts/Ch Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input | SDA 813Zi-B |
| 13 GHz Complete Probe System - includes: Dxx30-SI Solder-In Tip (Qty. 2), Dxx30-SP Square Pin (Qty. 1), and Dxx30-PT-KIT Positioner Tip Browser (Qty. 1) | D1330-PS |
| MPHY GEAR 3 SDA 820Zi-B Oscilloscope 20 GHz, 80 GS/s, 2 Ch, 64 Mpts/Ch Serial Data Analyzer with 15.3" WXGA Color Display. 50 Ω and 1 M Ω Input (20 GHz, 40 GS/s, 4 Ch, 32 Mpts/Ch) | SDA 820Zi-B |
| 20 GHz Complete Probe System - includes: Dxx05-SI Solder-In Tip (Qty. 2) Dxx05-PT-KIT Positioner Tip Browser (Qty. 1) | D2005-A-PS |

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge



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Local sales offices are located throughout the world.
Visit our website to find the most convenient location.