# SPD1200N4

## SOURCE-PRESERVING ENGINEERING REFERENCE




SPD1200N4 / SOURCE-PRESERVING USER MANUAL

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SECTION 01

# Document Control and Source Coverage

Model SPD1200N4. Source manual issue: 2025.10. The supplied model DOCX is the only technical authority for this customer-facing English transcription.

All nine embedded source media items are inventoried in the internal QA record. Customer-visible derivatives change only language inside controlled overlay boxes; mechanical geometry and source dimensions are retained.

The source dimensions table states only 7.7 mm × 16.7 mm. No third dimension or complete 3D envelope is released in this manual.

The supplied legacy desktop source screenshot is archived in QA only. It is not published as an operational control interface because no executable or verified software behavior was supplied.

| SOURCE ELEMENT | CUSTOMER PRESENTATION |
|---|---|
| **Technical, pin, and protocol tables** | Source-bound American English transcription |
| **Mechanical figure** | Model-specific source figure; no cross-model drawing |
| **Optical-window and application figures** | English text overlays on retained source geometry |
| **Legacy desktop screenshot** | QA archive only; not an operational claim |

SECTION 02

# Product Overview

The SPD1200N4 source describes a compact, high-accuracy 905 nm laser rangefinder module with UART-TTL communication. Its exact source-stated performance, dimensions, power, and environmental entries are retained in the controlled table below.

The source lists auxiliary ranging in handheld night-vision devices, thermal imagers, telescopes, and laser illuminators, plus civilian monitoring, aviation, communications, railway, law-enforcement, smart-water, and outdoor-sports scenarios. Suitability remains subject to the stated integration conditions and civilian-use boundary.



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SECTION 03

# Technical Specifications

All values below are source-stated. Standards and classes are not independently certified by this transcription.

| NO. | PARAMETER | SOURCE-STATED SPECIFICATION |
|---|---|---|
| 1 | Laser wavelength | 905 nm ± 5 nm |
| 2 | Beam divergence | < 4.5 mrad |
| 3 | Optical material | Aspheric lens |
| 4 | Receiver aperture | Diameter 6.5 mm |
| 5 | Ranging distance | 0.2 m–1200 m; maximum 1500 m (nighttime)<br>Strong sunlight or low visibility may affect range. |
| 6 | Ranging accuracy | ±0.3 m (d ≤ 100 m)<br>±0.3 m + d × 0.7‰ (100 m < d < 1200 m) |
| 7 | Measurement frequency | 2–15 Hz or 4–15 Hz, adaptive |
| 8 | Valid measurement rate | ≥ 98% |
| 9 | False-alarm rate | ≤ 1% |
| 10 | Communication interface | UART-TTL; customizable |
| 11 | Baud rate | 115200 bps (default) |
| 12 | Supply voltage | 3.3–5 V |
| 13 | Startup time | ≤ 200 ms |
| 14 | Operating power | Average ≈ 0.45 W; maximum ≤ 0.75 W |
| 15 | Operating temperature | −20 to +60 °C |
| 16 | Storage temperature | −30 to +70 °C |
| 17 | Protection rating | Lens chamber: IP67 |
| 18 | Laser safety class | IEC Class I (source-stated) |
| 19 | Dimensions | 7.7 × 16.7 mm (square; only two source-stated dimensions) |
| 20 | Weight | ≈ 5 g |
| 21 | Shock | 1000 g/ms (10 times/s along the optical axis) |



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| NO. | PARAMETER | SOURCE-STATED SPECIFICATION |
|---|---|---|
| 22 | Vibration | 5–50–5 Hz, 1 octave/min, 2.5 g |
| 23 | Reliability | MTBF ≥ 1500 h |

SECTION 04

# Functional Description

The complete module supports single and repeated measurements.

Single ranging: the source states that low-reflectivity targets may be measured repeatedly until stable distance data is obtained and reported through the serial interface in the defined format.

Repeated ranging: the source states that continuous distance measurement is supported; the narrative calls 2 Hz a typical configurable refresh rate and 15 Hz the maximum, while the technical table separately states 2–15 Hz or 4–15 Hz adaptive. The discrepancy remains unresolved.



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SECTION 05

# Electrical Interface Definition

The six-pin order and signal directions below are specific to SPD1200N4.

| PIN | SIGNAL | SOURCE-STATED FUNCTION |
|---|---|---|
| **1** | GND | Power ground |
| **2** | VCC | Positive supply |
| **3** | IO (reserved) | Reserved for expansion |
| **4** | TXD | Signal output: rangefinder module to host |
| **5** | RXD | Signal input: host to rangefinder module |
| **6** | SW-SHOT | Function enable (active HIGH)<br>Source note: Compatible with an active-LOW control requirement |

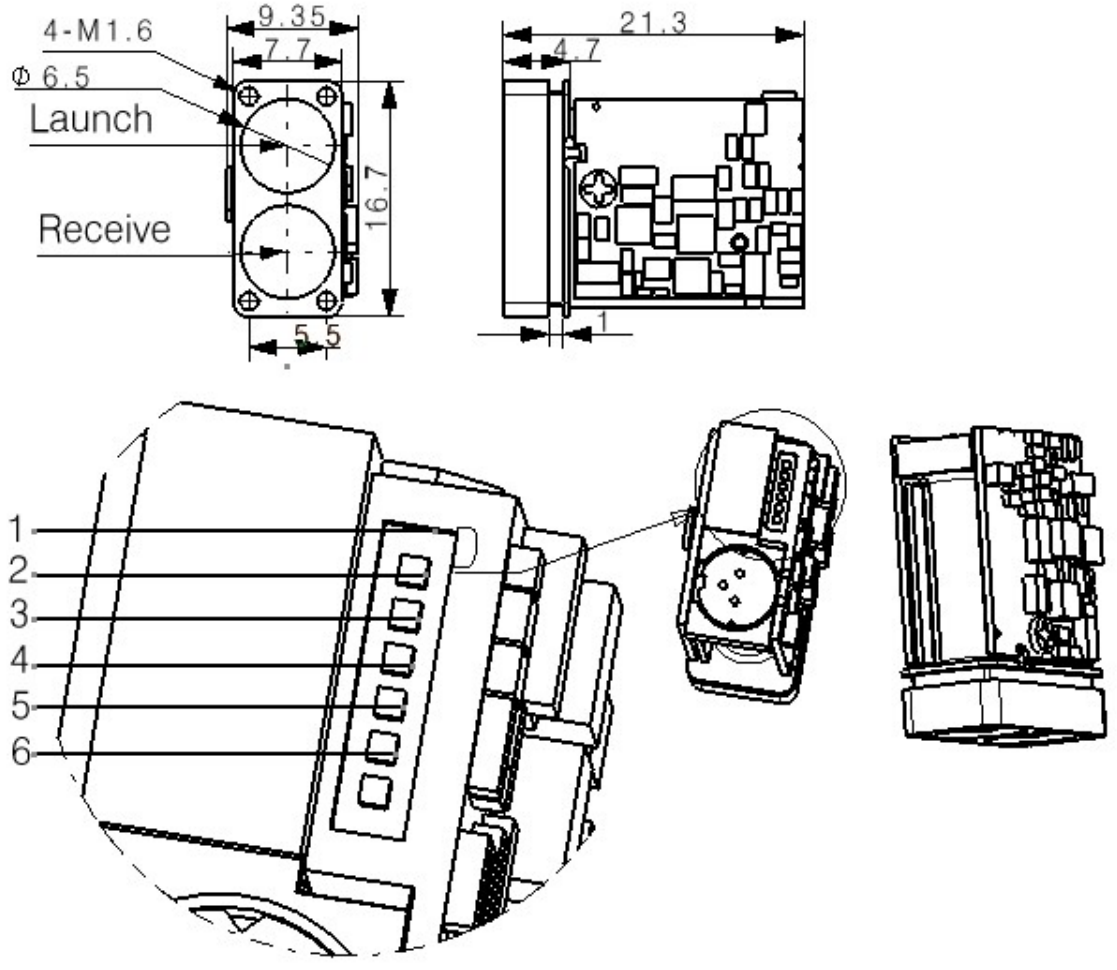


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SECTION 06

# Mechanical and Pin-Callout Reference

Use only this model-specific source drawing. It retains the 7.7 mm × 16.7 mm front dimensions, 21.3 mm local side-view callout, 9.35 mm and 4.7 mm local dimensions, Diameter 6.5 mm aperture callout, four M1.6 mounting callouts, and physical pin callouts 1 through 6. The source technical table supplies only two overall dimensions; the drawing's local callouts must not be promoted into an inferred complete 3D envelope.




*SPD1200N4 source mechanical and pin-callout figure — local callouts retained; no inferred third overall dimension; not for manufacturing.*

SECTION 07

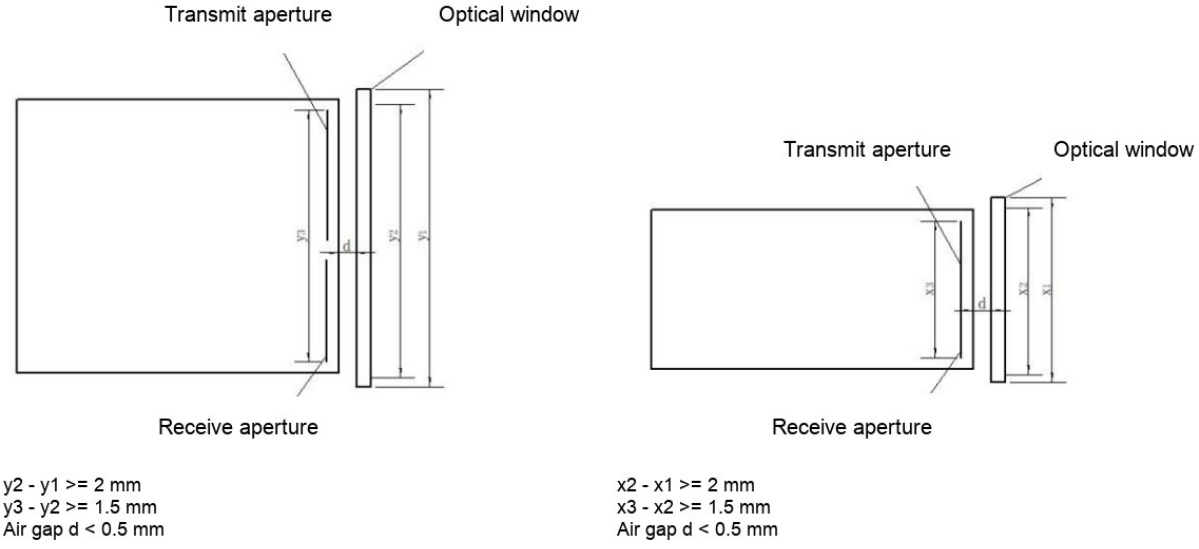
# Optical Window Recommendations

The source recommends H-K9L optical glass or fused silica, a wedge-angle tolerance of no more than 3 arcminutes, surface roughness Ra 0.012, an 855–955 nm anti-reflection coating with transmittance at least 99.5%, and source-referenced remaining requirements per GJB 2485-95 with transmittance at least 98%. These are source recommendations, not independent certification claims.



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The source recommends 2–4 mm window thickness, a transmit optical axis parallel to the window normal, and an air gap d < 0.5 mm. The source geometry and x/y variables are retained without geometric reinterpretation.




*Source optical-window arrangements — English terminology overlay only; variables and dimensional relationships retained.*

SECTION 08

# Host Software Evidence Boundary

An embedded legacy screenshot exists in the source DOCX, but no standalone verified source screen, software binary, source code, release identifier, or connected-device evidence was supplied.

Accordingly, the source screenshot is archived in QA only; this manual does not publish it as an operational desktop/browser control or claim verified software behavior. The protocol transcription below is the only command authority in this release.

SECTION 09

# Source Protocol Transcription

Source communication method: serial. Default baud rate: 115200 bps. Data bits: 8. Frame length: 8 bytes. All data is transmitted and received in hexadecimal.

The source uses different checksum scopes for request and reply frames. Preserve the exact source row order and verify checksum handling in the integration implementation.

The LD constant-ON reply row contains only the source marker 55. Source reply contains only 55; no complete reply frame may be inferred.

The four tables below provide a source-bound English transcription of all 35 non-title protocol rows. Consecutive duplicate cells caused by merged source cells are shown once per run.



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| SOURCE ROW | SOURCE-BOUND ENGLISH TRANSCRIPTION |
|---|---|
| 1 | Frame headerH \| Frame headerL \| Function code \| D1 \| D2 \| D3 \| D4 \| checksum |
| 2 | Request \| 55 \| AA \| SUM(Function code+DATA1+…+DATA4) |
| 3 | Reply \| 55 \| AA \| SUM(Frame headerH+Frame headerL+…+DATA4) |
| 4 | [Blank source separator row] |

| SOURCE ROW | SOURCE-BOUND ENGLISH TRANSCRIPTION |
|---|---|
| 5 | Ranging commands |
| 6 | Single ranging \| Request \| 55 \| AA \| 88 \| FF \| SUM[3: 7] |
| 7 | Single ranging \| Request \| 55 AA 88 FF FF FF FF 84 |
| 8 | Single ranging \| Reply \| 55 \| AA \| 88 \| STA \| FF \| DIS_H \| DIS_L \| SUM[1: 7] |
| 9 | Single ranging \| Reply \| STA = other, measurement failed; STA = 1:measurement succeeded DIS_H:High byte of the measurement result; DIS_L: Low byte of the measurement result Data is returned in hexadecimal, The returned hexadecimal value is the actual result multiplied by 10 |
| 10 | Continuous ranging \| Request \| 55 \| AA \| 89 \| FF \| SUM[3: 7] |
| 11 | Continuous ranging \| Request \| 55 AA 89 FF FF FF FF 85 |
| 12 | Continuous ranging \| Reply \| 55 \| AA \| 89 \| STA \| FF \| DIS_H \| DIS_L \| SUM[1: 7] |
| 13 | Continuous ranging \| Reply \| STA = other, measurement failed; STA = 1:measurement succeeded DIS_H:High byte of the measurement result; DIS_L: Low byte of the measurement result Data is returned in hexadecimal, The returned hexadecimal value is the actual result multiplied by 10 |
| 14 | Stop ranging \| Request \| 55 \| AA \| 8E \| FF \| SUM[3: 7] |
| 15 | Stop ranging \| Request \| 55 AA 8E FF FF FF FF 8A |
| 16 | Stop ranging \| Reply \| 55 \| AA \| 8E \| STA \| FF \| SUM[1: 7] |
| 17 | Stop ranging \| Reply \| STA= 0Failed to stop continuous ranging; STA = 1Continuous ranging stopped successfully |
| 18 | Angle measurement \| Request \| 55 \| AA \| 8A \| FF \| SUM[3: 7] |
| 19 | Angle measurement \| Request \| 55 AA 8A FF FF FF FF 86 |
| 20 | Angle measurement \| Reply \| 55 \| AA \| 8A \| STA \| FF \| ANG_H \| ANG_L \| SUM[1: 7] |



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| SOURCE ROW | SOURCE-BOUND ENGLISH TRANSCRIPTION |
|---|---|
| 21 | Angle measurement \| Reply \| STA = 0measurement failed; STA = 1:measurement succeeded ANG_H:High byte of the measurement result; ANG_L: Low byte of the measurement result Data is returned in hexadecimal, The returned hexadecimal value is the actual result multiplied by 10 Valid only for a core equipped with an angle sensor |
| 22 | [Blank source separator row] |

| SOURCE ROW | SOURCE-BOUND ENGLISH TRANSCRIPTION |
|---|---|
| 23 | Power-on self-test |
| 24 | Self-test information \| Reply \| 55 \| AA \| 80 \| STA \| 00 \| ErrCode \| SUM[1: 7] |
| 25 | Self-test information \| Reply \| STA = 0 Power-on initialization failed, ErrCodeis the error code STA = 1 Power-on initialization succeeded |
| 26 | [Blank source separator row] |

| SOURCE ROW | SOURCE-BOUND ENGLISH TRANSCRIPTION |
|---|---|
| 27 | System settings |
| 28 | Baud rate \| Request \| 55 \| AA \| TYPE \| FF \| SUM[3: 7] |
| 29 | Baud rate \| Request \| TYPE = 01 Set baud rate to 9600 bps TYPE = 02 Set baud rate to 14400 bps TYPE = 03 Set baud rate to19200 bps TYPE = 04 Set baud rate to 38400bps TYPE = 05 Set baud rate to56000bps TYPE = 06 Set baud rate to 57600bps TYPE = 07 Set baud rate to 115200bps TYPE = 08 Set baud rate to 128000bps TYPE = 09 Set baud rate to 230400bps The baud-rate change is not applied immediately, It takes effect only after restart |
| 30 | Baud rate \| Reply \| 55 \| AA \| TYPE \| STA \| FF \| SUM[1: 7] |
| 31 | Baud rate \| Reply \| STA = 0setting failed ; STA = 1 setting succeeded |
| 32 | LD constant-ON mode \| Request \| 55 \| AA \| 86 \| FF \| STA \| SUM[3: 7] |
| 33 | LD constant-ON mode \| Request \| STA = 0,Disable LD constant-ON; STA = 1, Enable LD constant-ON 55 AA 86 FF FF FF 01 84 Enable 55 AA 86 FF FF FF 00 83 Disable |
| 34 | LD constant-ON mode \| Reply \| 55 |
| 35 | LD constant-ON mode \| Reply \| STA = 0: enabled;STA = 1: disabled;STA = FF: operation failed Caution:Do not keep constant-ON mode enabled for a long period |

**SOURCE WARNING —** Do not keep the LD constant-ON mode enabled for a long period.



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SECTION 10

# Safety Warnings and Application Conditions

All laser-class, environmental, and application statements below are source-stated and are not independent certification claims.

Do not look directly into the laser emission aperture. The source states compliance with Class 1.

Operate from −20 to +60 °C and avoid high temperature, humidity, rain, snow, or dust. Do not disassemble the module.

Primarily intended for civilian integration; must not be used in equipment for any military purpose.

The source developer-only spot/beam adjustment mode must not be directed toward human eyes.

Ranging capability and response depend on target reflectivity, reflective area and shape, measurement angle, sunlight, water vapor, suspended particles, rain, fog, snow, and haze. Water surfaces or targets that do not produce adequate diffuse reflection may not be measurable.

For long-distance measurements, the source recommends fixing the module on a tripod to reduce movement.

**WARNING** Laser emission aperture: do not look directly into the emitted beam or aim the developer-only adjustment mode at anyone's eyes.




*English warning equivalent preserving the role of the supplied warning graphic.*

SECTION 11

# Applications and Supplied Product Views

The source application figure identifies high-reflectivity highway signs, medium-reflectivity building walls, trees, and animals as example targets. Achievable range varies with target and environment; the figure is not a performance guarantee.

The compact galleries use only the external product views supplied with this model. No generic or cross-model imagery is substituted.

The single gallery retains all 7 supplied external source product views.

Supplied source video media is listed but not embedded: 849d35739b2cb49a0955b5fda7c86da9.mp4




*English-cleaned source application figure — silhouettes retained without inferred performance values.*




*Supplied SPD1200N4 product views — compact source gallery.*

SECTION 12

# SOURCE DISCREPANCY — ENGINEERING CONFIRMATION REQUIRED

The following source discrepancies remain unresolved and are not normalized in this transcription.

1. The source dimensions list only 7.7 mm × 16.7 mm; do not add a third dimension or a complete 3D envelope.
2. The source frequency lower bound is ambiguous between 2 Hz and 4 Hz; retain the source wording without selecting one.
3. Keep SW-SHOT active-high wording and compatible active-low-control wording separate; do not claim two default logics.
4. Source reply contains only 55; no complete reply frame may be inferred.



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