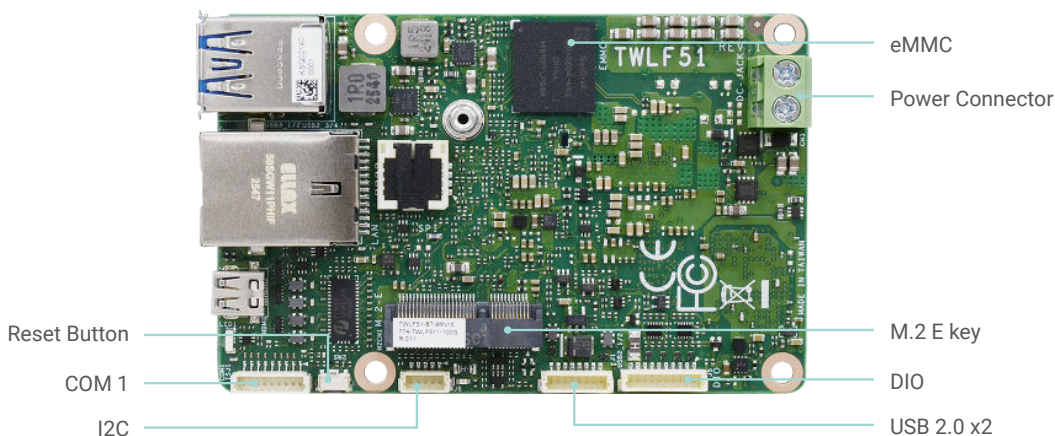
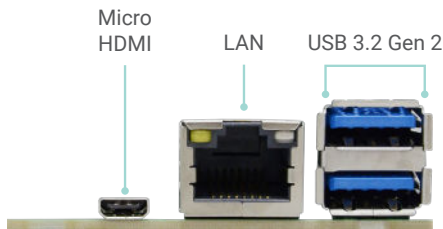


TWLF51

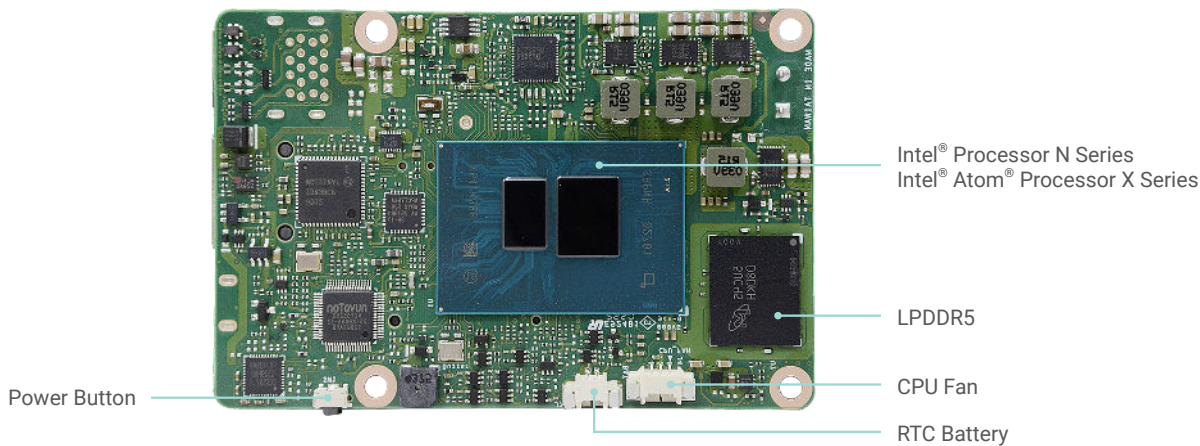


Atom

Intel® Processor N Series
Intel® Atom® Processor X Series
1.8" SBC



Top View



Bottom View

KEY FEATURES



1.8" SBC

Small form factor 1.8" SBC for space-limited applications



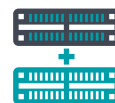
LPDDR5 onboard

Single Channel LPDDR5 memory down up to 8GB



4K High Resolution

HDMI 2.0 resolution supports up to 4096x2160 @ 60Hz



Expansions

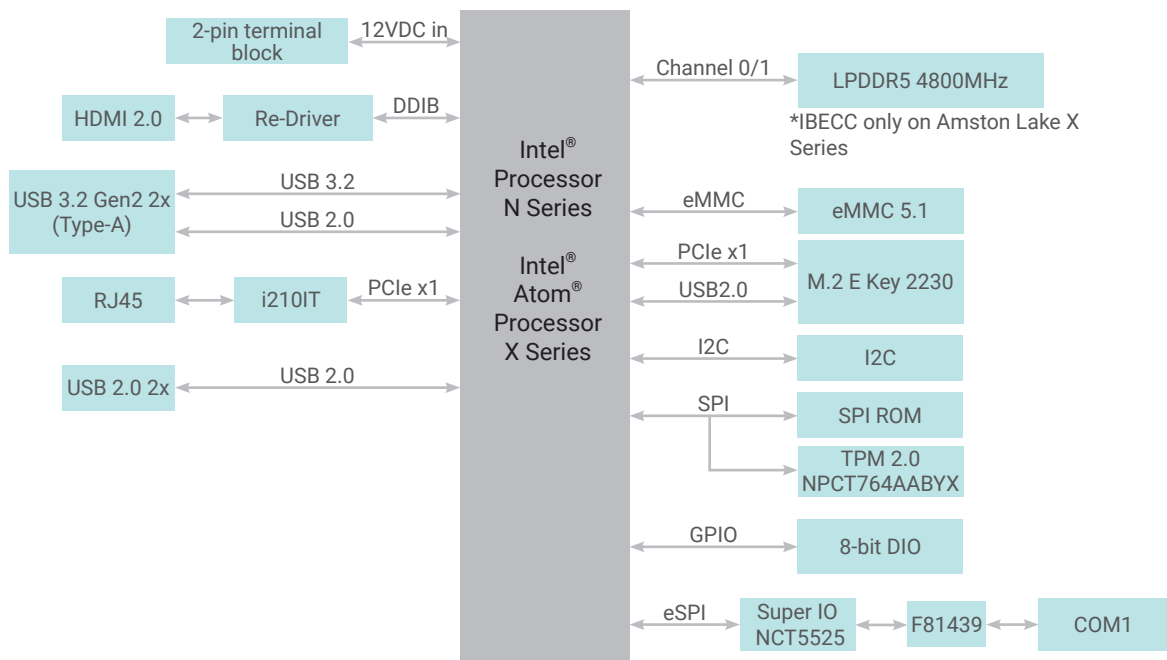
1 M.2 E key,
1 I2C/SMBus (Opt.)



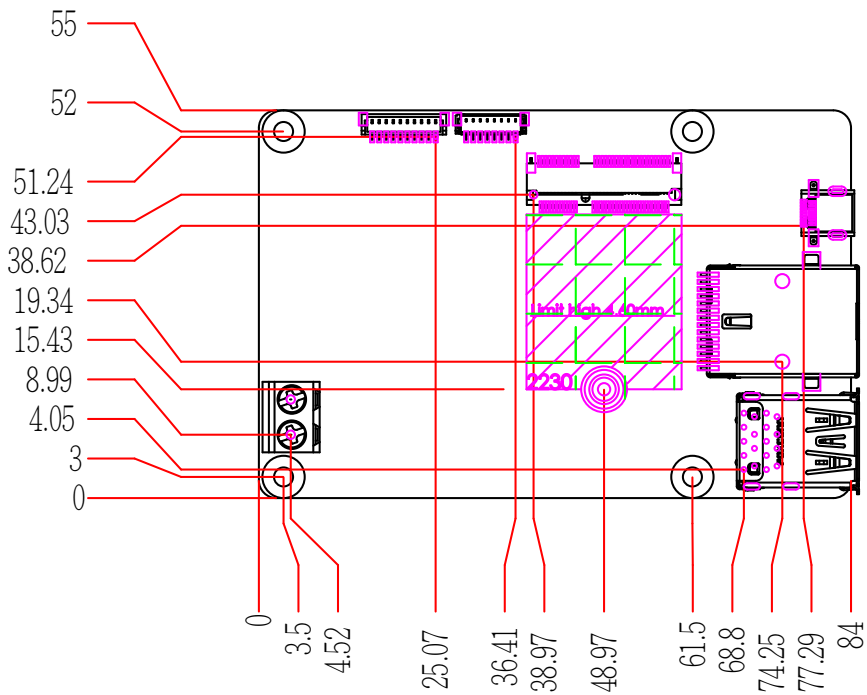
Rich I/O

1 Intel GbE, 1 COM,
2 USB 3.2 Gen2,
2 USB 2.0, 1 Micro HDMI, 1 DIO

BLOCK DIAGRAM



MECHANICAL DRAWING



SPECIFICATION

| | | | |
|------------------------------|---|---|---|
| SYSTEM | Processor | Intel® Processor N series (Code Name: Twin Lake) Intel® Core™ 3 Processor N355, 8 Cores, 1.8~3.9 GHz, 15W Intel® Processor N150, 4 Cores, 1.0~3.6 GHz, 6W Intel Atom® Processor X Series (Code Name: Amston Lake) Intel Atom® Processor x7835RE, 8 Cores, 1.3~3.6 GHz, 12 W Intel Atom® Processor x7433RE, 4 Cores, 1.5~3.4 GHz, 9 W Intel Atom® Processor x7211RE, 2 Cores, 1.0~3.2 GHz, 6 W | |
| | Memory | LPDDR5 memory down up to 8GB Single-channel LPDDR5 4800MHz | |
| | BIOS | AMI SPI 256Mbit | |
| GRAPHICS | Controller | Intel® UHD Graphics | |
| | Feature | OpenGL 4.6, Direct X 12.1, OpenCL 3.0 HW Decode: HEVC, VP9, AV1, AVC HW Encode: HEVC, VP9, AVC | |
| | Display | 1 x Micro HDMI | HDMI 2.0: resolution up to 4096x2160 @ 60Hz |
| EXPENSION | Interface | 1 x M.2 E key 2230 (PCIe Gen3 x1/USB 2.0) | |
| ETHERNET | Controller | 1 x Intel® i210IT(10/100/1000Mbps) | |
| REAR I/O | Ethernet | 1 x GbE (RJ-45) | |
| | USB | 2 x USB 3.2 Gen2, 10Gbps (Type-A) | |
| | Display | 1 x Micro HDMI (HDMI 2.0) | |
| INTERNAL I/O | DIO | 1 x 8-bit DIO | |
| | I2C/SMBus | I2C/SMBus (Opt.) | |
| STORAGE | eMMC | Default 64GB, up to 128GB | |
| WATCHDOG TIMER | Output & Interval | Software Reset, Programmable via Software from 1 to 655,535 Seconds | |
| SECURITY | TPM | dTPM 2.0 | |
| POWER | Type | Single 12V +/-5% DC | |
| | Connector | 2-pin Terminal Block | |
| | Consumption | Typical: x7835RE (w/Cooler), 12V @ 0.39A (4.68W) Max: x7835RE (w/Cooler), 12V @ 3.33A (39.96W) | |
| | RTC Battery | CR2032 Coin Cell | |
| OS SUPPORT | Microsoft | Windows 11 IoT Enterprise | |
| | Linux | Linux | |
| ENVIRONMENT | Temperature | Operating: -5 to 65°C / -20 to 70°C | |
| | | Storage: -40 to 85°C | |
| | Humidity | Operating: 5 to 90% RH | |
| Storage: 5 to 90% RH | | | |
| MTBF | Model: TWLF51-ET-86X78 MTBF (hrs): 693,447 hrs @ 25°C; 510,973 hrs @ 45°C; 372,643 hrs @ 60°C; 291,272 hrs @ 70°C Calculation model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled | | |
| MECHANISM | Dimensions | 1.8" SBC Form Factor | 84mm (3.31") x 55mm (2.17") |
| | Height | PCB: 1.60mm | Top Side: 16.35mm, Bottom Side: 4.00mm |
| STANDARDS AND CERTIFICATIONS | Certifications | CE, FCC, RoHS, UKCA | |

ORDERING INFORMATION

| Model Name | P/N | Processor | Memory | eMMC | Display | GbE | RS-232/422/485 | USB 3.2 Gen2 | USB 2.0 | Power | Thermal | Temp. |
|-----------------|------------------|------------------------------|--------|-------|------------|-----|----------------|--------------|---------|--------|---------|----------|
| TWLF51-BT-86N35 | 770-TWLF511-000G | Intel® Core™ 3 N355, 8C, 15W | 8 GB | 64 GB | Micro HDMI | 1 | 1 | 2 | 2 | 12 VDC | Fanless | -5~65°C |
| TWLF51-BT-86N15 | 770-TWLF511-100G | Intel® N150, 4C, 6W | | | | | | | | | | -5~65°C |
| TWLF51-ET-86X78 | 770-TWLF511-200G | Intel Atom® x7835RE, 8C, 12W | | | | | | | | | | -20~70°C |
| TWLF51-ET-86X74 | 770-TWLF511-300G | Intel Atom® x7433RE, 4C, 9W | | | | | | | | | | -20~70°C |
| TWLF51-ET-86X72 | 770-TWLF511-400G | Intel Atom® x7211RE, 2C, 6W | | | | | | | | | | -20~70°C |

PACKING LIST

| | |
|---|-----------------|
| • 1 TWLF51 board | |
| • 1 Cooler for (-20 to 70°C), (Height: 22mm) | A71-108317-000G |
| or 1 Heatsink for (-5 to 65°C), (Height: 29.36mm) | A71-008376-000G |

OPTIONAL ITEMS

| | |
|--|-----------------|
| • USB 2.0 cable (Length: 200mm, 2 ports) | A81-001201-018G |
| • COM Port cable (Length: 250mm, 1 port) | A81-015130-018G |
| • DIO cable (Length: 200mm) | A81-009715-018G |
| • SMBus cable (Length: 200mm) | A81-009716-018G |
| • Power adapter (60W, 12V, DC jack) | 671-106012-000G |
| • 2-pole terminal to DC Jack cable | A81-004013-000G |
| • Heat spreader (Height: 7.5mm) | A71-808378-000G |