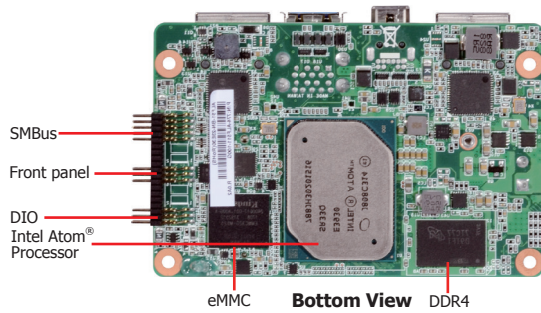
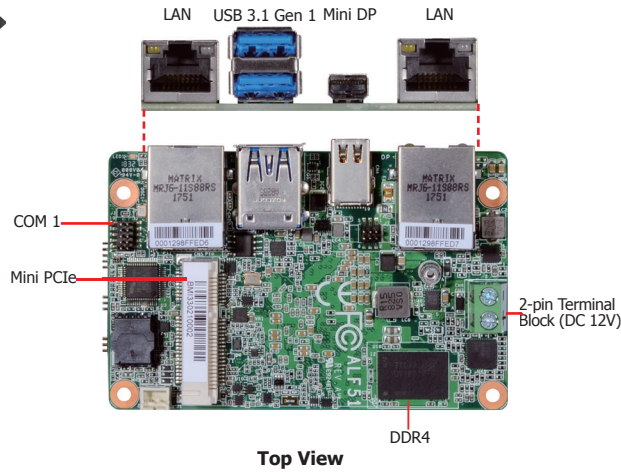


## ALF51

Atom



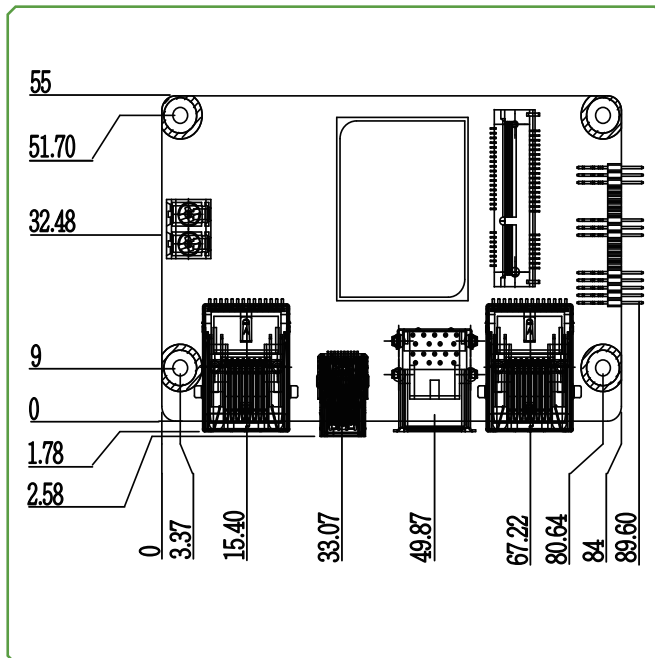
### Features

- Small form factor 1.8" SBC for space-limited applications
- Single Channel LPDDR4 Memory Down up to 4GB
- Mini DP++ resolution supports up to 4096x2160 @ 60Hz
- Expansion and Storage: 1 Mini PCIe, 1 SMBus
- Rich I/O: 2 Intel GbE, 1 COM, 2 USB 3.1 Gen 1, 1 USB 2.0

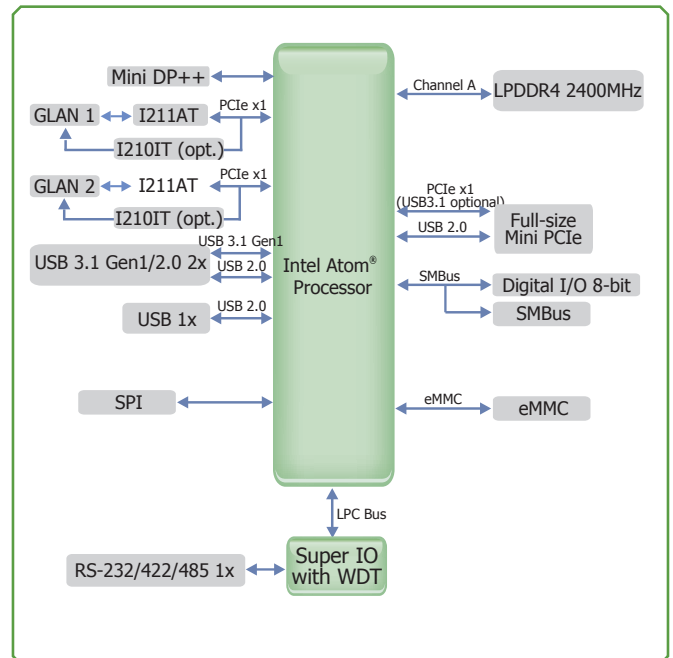
\* Populated by default



### Mechanical Drawing



### Block Diagram



## Specifications

<b>SYSTEM</b>	<b>Processor</b>	Intel Atom® Processor E3900 Family, BGA 1296 Intel Atom® x5-E3940 Processor, Quad Core, 2M Cache, 1.6GHz (1.8GHz), 9.5W Intel Atom® x5-E3930 Processor, Dual Core, 2M Cache, 1.3GHz (1.8GHz), 6.5W Intel® Pentium® Processor N4200, Quad Core, 2M Cache, 1.1GHz (2.5GHz), 6W Intel® Celeron® Processor N3350, Dual Core, 2M Cache, 1.1GHz (2.4GHz), 6W
	<b>Memory</b>	2GB/4GB LPDDR4 Memory Down Single Channel LPDDR4 2400MHz
	<b>BIOS</b>	Insyde SPI 128Mbit (supports UEFI boot only)
<b>GRAPHICS</b>	<b>Controller</b>	Intel® HD Graphics
	<b>Feature</b>	OpenGL 4.2, Direct X 11.1, OpenCL 1.2, OGL ES 3.0 HW Decode: H.264, MPEG2, VC1, VP8, H.265, MPEG4 HW Encode: H.264, MPEG2, MPEG4
	<b>Display</b>	1 x Mini DP++ Mini DP++: resolution up to 4096x2160 @ 60Hz
<b>EXPANSION</b>	<b>Interface</b>	1 x Full-size Mini PCIe (PCIe/USB 2.0, optional USB 3.1 Gen1/USB 2.0)
<b>ETHERNET</b>	<b>Controller</b>	2 x Intel® I211AT PCIe (10/100/1000Mbps) or 2 x Intel® I210IT PCIe (10/100/1000Mbps)
<b>REAR I/O</b>	<b>Ethernet</b>	2 x GbE (RJ-45)
	<b>USB</b>	2 x USB 3.1 Gen 1
	<b>Display</b>	1 x Mini DP++
<b>INTERNAL I/O</b>	<b>Serial</b>	1 x RS-232/422/485 (1.27mm pitch)
	<b>USB</b>	1 x USB 2.0 (1.27mm pitch)
	<b>DIO</b>	1 x 8-bit DIO
	<b>SMBus</b>	1 x SMBus
<b>STORAGE</b>	<b>eMMC</b>	1 x 16GB/32GB/64GB eMMC
<b>WATCHDOG TIMER</b>	<b>Output &amp; Interval</b>	System Reset, Programmable via Software from 1 to 255 Seconds
<b>SECURITY</b>	<b>TPM</b>	fTPM 2.0
<b>POWER</b>	<b>Type</b>	Single 12V +/-10% DC
	<b>Connector</b>	2-pin Terminal Block
	<b>Consumption</b>	Typical: E3940:12V @ 0.29A (3.48Watt) Max.: E3940:12V @ 1.30A (15.6Watt)
	<b>RTC Battery</b>	CR2032 Coin Cell
<b>OS SUPPORT (UEFI Only)</b>	<b>Microsoft/Linux</b>	Windows 10 IoT Enterprise 64-bit Ubuntu 16.04
<b>ENVIRONMENT</b>	<b>Temperature</b>	Operating: 0 to 60°C (Option: -20 to 70°C / -40 to 85 °C) Storage: -40 to 85°C
	<b>Humidity</b>	Operating: 5 to 90% RH Storage: 5 to 90% RH
	<b>MTBF</b>	868,962 hrs @ 25°C; 638,889 hrs @ 45°C ; 465,382 hrs @ 60°C
<b>MECHANICAL</b>	<b>Dimensions</b>	1.8" SBC Form Factor 84mm (3.31") x 55mm (2.17")
	<b>Height</b>	PCB: 1.6mm Top Side: 15mm, Bottom Side: 8mm
<b>CERTIFICATIONS</b>		CE, FCC, RoHS

## Ordering Information

Model Name	P/N	Processor	Memory	eMMC	Display	GbE	RS-232/422/485	USB 3.1 Gen 1	USB 2.0	Power	Thermal	Temp.
ALF51-BN-23E40	770-ALF511-000G	X5-E3940	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	0 to 60°C
ALF51-BN-23E30	770-ALF511-100G	X5-E3930	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	0 to 60°C
ALF51-BN-23N50	770-ALF511-200G	N3350	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	0 to 60°C
ALF51-EN-23E40	770-ALF511-300G	X5-E3940	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	-20 to 70°C
ALF51-EN-23E30	770-ALF511-400G	X5-E3930	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	-20 to 70°C
ALF51-TN-23E40	770-ALF511-500G	X5-E3940	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	-40 to 85°C
ALF51-TN-23E30	770-ALF511-600G	X5-E3930	2 GB	32 GB	Mini DP++	2	1	2	1	12VDC	Fanless	-40 to 85°C

\*Note: N4200 by request

## Packing List

• 1 ALF51 board	
• 1 USB port cable (Length: 200mm)	A81-001063-016G
• 1 COM port cable (Height: 300mm)	A81-015038-016G
• 1 Heat spreader (Height: 11mm)	A71-808314-000G

## Optional Items

• Heat sink for E series CPU 0 to 60°C / wide temp (Height: 27mm)	A71-008110-000G
• Heat sink for N series CPU 0 to 60°C (Height: 23mm)	A71-008113-000G
• Power adapter (60W, 12V, DC jack) + 2 pole terminal to DC Jack cable	671-106012-000G A81-004013-000G