



## **AdvanReader-m-160 Data sheet**

Version: **1.8** Date: **3<sup>rd</sup>**

**November 2021**

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## Change Document Record

Date	revision	Changes
23 <sup>th</sup> December 2015	1.0	Initial version of this document
16 <sup>th</sup> March 2016	1.1	Added band support in new M6e module
8 <sup>th</sup> August 2016	1.2	Added model differences
22 <sup>th</sup> August 2016	1.3	Added RF power restrictions
5 <sup>th</sup> January 2017	1.4	Fixed the PCB version diagram of the m2 version
3 <sup>rd</sup> May 2019	1.5	Updated list of available RFID bands
12 <sup>th</sup> November 2019	1.6	Changed the name to AdvanReader-160. This is just a marketing name change, it is the same HW.
19 <sup>th</sup> October 2020	1.7	Added note to the maximum operating temperature
3 <sup>rd</sup> November 2021	1.8	Updated list of battery features

### Products Covered by this Guide

Readers from the AdvanReader™ family 160 Series

In particular the Data Sheet covers the following product codes:

ADRD-m4-SMA-160

ADRD-m2-SMA-160

ADRD-m4-eSMA-160

ADRD-m2-eSMA-160

### Model differences

ADRD-m4-SMA-160 is the PCB version (non enclosed) of the 4 port RFID reader. ADRD-m4eSMA-160 is the enclosed version of ADRD-m4-SMA-160.

ADRD-m2-SMA-160 is the PCB version (non enclosed) of the 2 port RFID reader. ADRD-m2eSMA-160 is the enclosed version of ADRD-m2-SMA-160.

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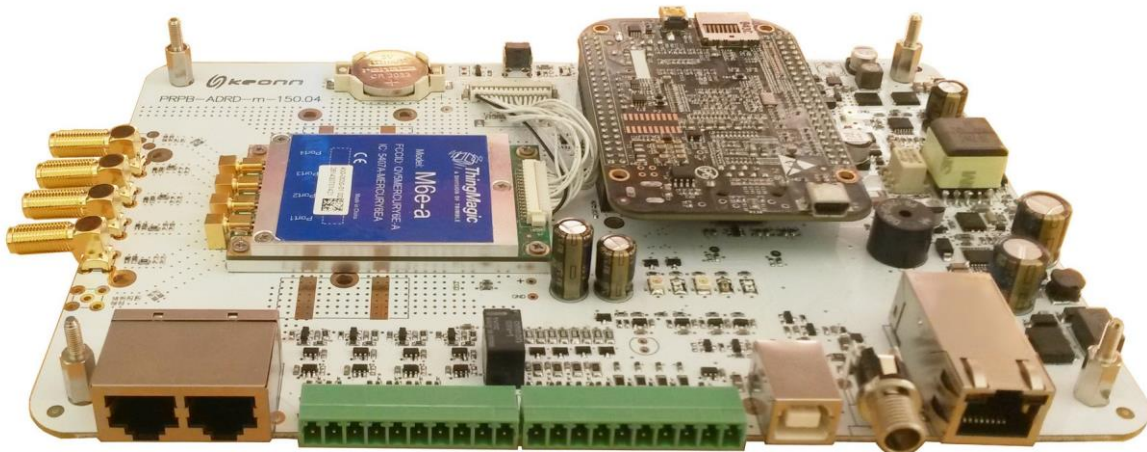
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## 1- Datasheet

### 1.1- AdvanReader-m4-160 Technical Data



Capture 1: ADRD-m4-eSMA-160



Capture 2: ADRD-m4-SMA-160

## AdvanReader-m4-160 Specifications

**Air Protocol Interface** EPCGlobal UHF Class 1 Gen 2 / ISO 18000-6C

### Supported regions

FCC (NA, SA) (902 - 928) MHz  
 ETSI (EU, IN) (865.6 - 867.6) MHz  
 MIC (KR) (910 - 914) MHz  
 SRRC-MII (P.R.China) (920.125 – 924.875) MHz<sup>1</sup>  
 Argentina (AR) (915.0 – 928.0) MHz  
 Australia (AU) (920.0 – 926.0) MHz  
 Bangladesh (BD) (925.0 – 927.0) MHz  
 New Zealand (NZ) (922.0 – 927.5) MHz  
 Hong Kong (HK) (865.0 – 868.0) MHz  
 Indonesia (ID) (923.0 – 925.0) MHz  
 Israel (IS) (915.0 - 917.0) MHz<sup>2</sup>  
 Japan (JP) (916.8 - 920.8) MHz<sup>3</sup>  
 Macao (MO) (920.0 – 925.0) MHz  
 Malaysia (MY) (919.0 – 923.0) MHz  
 Philippines (PH) (918.0 – 920.0) MHz  
 Russia (RU) (866.0 – 868.0) MHz  
 Taiwan (TW) (922.0 – 928.0) MHz  
 Thailand (TH) (920.0 – 925.0) MHz  
 Singapore (SG) (920.0 – 925.0) MHz  
 Vietnam (VN) (866.0 – 869.0) MHz

Brazil (902 – 907.5) MHz (915 – 928) MHz by using channel selection  
 Chile (916 – 928) MHz by using channel selection  
 Peru (916 – 928) MHz by using channel selection  
 Taiwan (922 – 928) MHz by using channel selection

Open Region<sup>4</sup> (865 – 869) MHz and (902 – 928) MHz (by using channel selection)<sup>5</sup>

**RF connections** Four 50 ohm SMA connectors for mono-static antennas

**RF Power** Programmable from 5 dBm to 31.5 dBm in 0.5 dBm steps.  
 (Maximum power may have to be reduced to meet regulatory limits)

1 PRC band is only available in CH version.

2 Israeli band is only available in CH version.

3 Japanese band is only available in CH version. RF conducted power is limited to 30 dBm. Please check the AdvanReader-m4-160 User Guide to understand the power restrictions.

4 Open channel specified applies to ETSU/FCC versions. PRC versions open channel is defined between 840 to 845 MHz and 920 to 925 MHz.

5 Band is defined as a carrier sub-set from FCC. There is no specific Surface Acoustic Wave (SAW) filter for the band. Given the maximum conducted power there shouldn't be problems with local regulation.

<b>Max tag read distance</b>	Up to 9 m (33 feet) with 6 dBi gain antennas ( <i>read distance depends strongly on tags used</i> )
<b>Max tag read throughput</b>	Up to 400 tags/s <sup>6</sup>

*Table 1: AdvanReader-m4-160 Specification (part 1)*

6 Only achieved by using certain EPCGen2 settings.

<b>Data communications</b>	Ethernet <ul style="list-style-type: none"> <li>IEEE 802.3 up to 100 Mbps</li> </ul>
	Ethernet over USB (USB mini Type-B connector) <sup>7</sup>
	<b>Maintenance only port<sup>8</sup></b> <ul style="list-style-type: none"> <li>USB Type B connector as an alternative to the Ethernet communications port in case the Ethernet interface is not available. When the USB port is connected, a virtual Ethernet interface will be created in the host computer.<sup>9</sup></li> </ul>
	USB HID (USB Type-B connector) <ul style="list-style-type: none"> <li>USB HID hardware emulation</li> </ul>
<b>Other ports</b>	Wi-Fi <ul style="list-style-type: none"> <li>Through a USB dongle<sup>10</sup> connected to the USB Type-A connector.</li> <li>List of known working dongles can be found <a href="#">here</a>.</li> </ul>
	HDMI port <sup>11</sup> <b>Maintenance only port<sup>12</sup></b>
	Micro SD slot <b>Maintenance only port<sup>13</sup></b>
	USB (Type-A) Host <sup>14</sup> <ul style="list-style-type: none"> <li>Accepts USB memory sticks</li> <li>Accepts USB Wi-Fi dongle</li> </ul>
<b>Power supply</b>	Power Over Ethernet (PoE): <ul style="list-style-type: none"> <li>IEEE 802.3af and 802.3at (Type I &amp; Type II)</li> <li>Power consumption: Class 3 Power supply from 11 to 24 V (DC)</li> </ul>
	<ul style="list-style-type: none"> <li>11 V (DC) @ 2 A</li> <li>24 V (DC) @ 1 A</li> </ul>
	On-board battery for RTC chip (CR2032)

Table 2: AdvanReader-m4-160 Specification (part 2)

7 Only available in the non-enclosed readers.

8 Use this port only for maintenance or troubleshooting operations.

9 Detailed instructions on how to use the maintenance USB port can be found here <http://wiki.keonn.com/series150#TOC-Connection-with-USB>

10 Wi-Fi USB dongle not included.

11 Disabled in the current firmware version.

12 Use this port only for maintenance or troubleshooting operations.

13 Use this port only for maintenance or troubleshooting operations.

14 Use only with USB dongles without USB cables.

<b>Battery Operation</b>	The system is specifically designed for battery assisted operation. <ul style="list-style-type: none"> <li>Battery level can be measured</li> </ul>
<b>Output power</b>	5 V (DC) @ 100 mA non-isolated power supply to feed external devices and circuitry.
<b>On-board sensors and actuators</b>	<ul style="list-style-type: none"> <li>Buzzer</li> <li>Aux Power Supply Voltage<sup>15</sup></li> <li>Aux Power Supply Temperature</li> <li>5 Vcc Voltage<sup>16</sup></li> <li>Power consumption<sup>17</sup></li> <li>IN1 Voltage<sup>18</sup></li> <li>IN2 Voltage<sup>19</sup></li> <li>RTC chip to keep Date&amp;Time between reboots. Battery life time more than 10 years in power off mode.</li> </ul>
<b>On-board LED indicators</b>	<ul style="list-style-type: none"> <li>LED ON (Blue LED)</li> <li>LED status (Orange LED)</li> <li>LED M6e Rx line (Green LED): uart rx line between the CPU and the RFID module</li> <li>LED M6e Tx line (Red LED): uart tx line between the CPU and the RFID module</li> <li>LED Micro Status (Green LED): status of the internal microprocessor that handles USB HID emulation and battery control.</li> </ul>

Table 3: AdvanReader-m4-160 Specification (part 3)

<b>Inputs</b>	<p><b>2 x digital input (IN3 and IN4)</b></p> <ul style="list-style-type: none"> <li>Non isolated</li> <li>0 V (DC) to 30 V (DC) <b>2 x digital/analog input</b></li> <li>10 bits resolution</li> <li>Inputs accepted in the range: <ul style="list-style-type: none"> <li>0 V – 3 V (IN 1)</li> <li>0 V – 10 V (IN 2)</li> </ul> </li> </ul> <p><i>Digital/analog inputs allow digital and analogic inputs by using the</i></p>
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15 Can be used to monitor battery voltage level.

16 Measures the internal 5 V.

17 Measures the aproximate consumption of the device. Without taking into account the efficiency of the internal switched-mode power supply.

18 Measures the voltage value at the Input line #1.

19 Measures the voltage value at the Input line #2.



same physical line.

In case IN 1 uses an input level above 3 V, the AD measure will be always '1'.  
 For example: an input value in the range [2 – 8V] must be connected to IN2 with the big range. While an input range of [0 – 1 V] can be queried in both IN1 & IN2 inputs, although IN1 will provide better resolution.

## Outputs

### 4 x digital outputs (higher power):

- Non isolated
- Maximum output current 100 mA **4 x digital outputs (low power):**
- Non isolated
- Maximum output current 8 mA **1 x relay output**
- OUT9
- Powered by OMRON G5V-1 5DC • Usage
  - 24 VDC / 0.5 A / Resistive load **Other**

### outputs :

- Loudspeaker: 8 ohm / 2 W
- 2 x RJ45 to directly connect to other Keonn devices, such as AdvanMux and AdvanPhaser

Table 4: AdvanReader-m4-160 specifications (part 4)

<b>Power consumption</b>	Idle consumption < 3 W Max consumption (@31.5 dBm) < 14 W <sup>20</sup>  <i>The maximum consumption is measured without external loads and without Wi-Fi.</i>
<b>Temperature</b>	0 °C to + 55 °C <sup>21</sup>
<b>Dimensions (non-enclosure)</b>	222 mm x 146 mm x 24 mm ( 8.74 in x 5.79 in x 0.95 in)

<sup>20</sup> A PoE type I can handle the device at the given operation: maximum RF power and all LED outputs connected. It may not handle external loads and/or Wi-Fi operation. <sup>21</sup> The reader can be operated at full power and at 100 % duty cycle at an ambient temperature of 40 °C.

At higher temperatures, it may be required to reduce the conducted power / duty cycle to avoid the reader automatic protection system to stop the RF module.

The maximum operating temperature for IEC 62328-1 is 40 °C

**Weight (non-enclosure)**                      280 g (9.88 oz)

*Table 5: AdvanReader-m4-160 specifications (part 5)*

## 1.2- Technical data (Software)

AdvanReader-m-150 Software Specifications	
<b>On-board intelligence</b>	<p><b>BCM (Battery Controller Module)</b></p> <ul style="list-style-type: none"> <li>• MSP430 firmware</li> <li>• Automatic battery protection</li> <li>• Configurable scheduler for active/sleep mode</li> </ul> <p><b>ARM board</b></p> <ul style="list-style-type: none"> <li>• Cortex A-8 CPU (1 GHz)</li> <li>• 512 MB RAM</li> <li>• 4 GByte ROM with Operating System               <ul style="list-style-type: none"> <li>• 1 x USB connector</li> </ul> </li> </ul>
<b>Included software</b>	<b>On-board software</b>
<ul style="list-style-type: none"> <li>• AdvanNet-2.3: advanced driver platform for Keonn components and systems.</li> <li>• Debian Squeeze (Debian 7.8) based distribution.</li> </ul>	
<b>Development</b>	<p><b>External Development:</b></p> <ul style="list-style-type: none"> <li>• AdvanNet based:           <ul style="list-style-type: none"> <li>◦ Test and deploy web-based GUI utility.</li> <li>◦ REST interface that can be used in any development environment.</li> </ul> </li> </ul> <p><b>Internal development environments:</b></p> <ul style="list-style-type: none"> <li>• Java development<sup>22</sup> (Java JRE 1.8 )</li> <li>• C development<sup>23</sup> (libc 2.13)</li> </ul> <p><b>Other options:</b></p> <ul style="list-style-type: none"> <li>• The OS is fully open<sup>24</sup>.</li> </ul>

Table 6: Software Specifications

## 1.3- Mechanical specifications

The following is the mechanical specification for all AdvanReader-m-150.4

<sup>22</sup> Java development offers AdvanNet SDK alternatives: REST API and AdvanNetLib API

<sup>23</sup> C library has to be ported to ARM architecture.

<sup>24</sup> Any OS modification will break technical support.

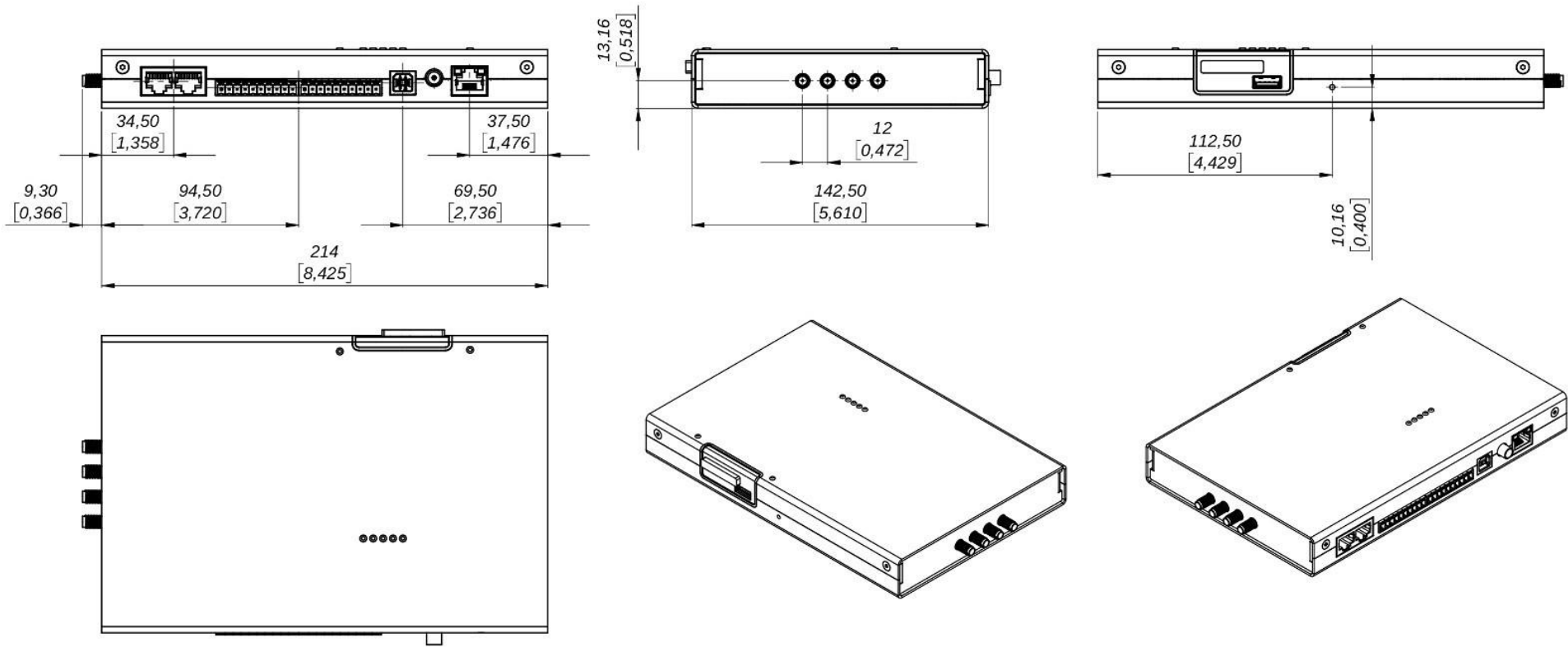


Illustration 1: ADRD-m4-eSMA-160 Dimensions mm [inches]

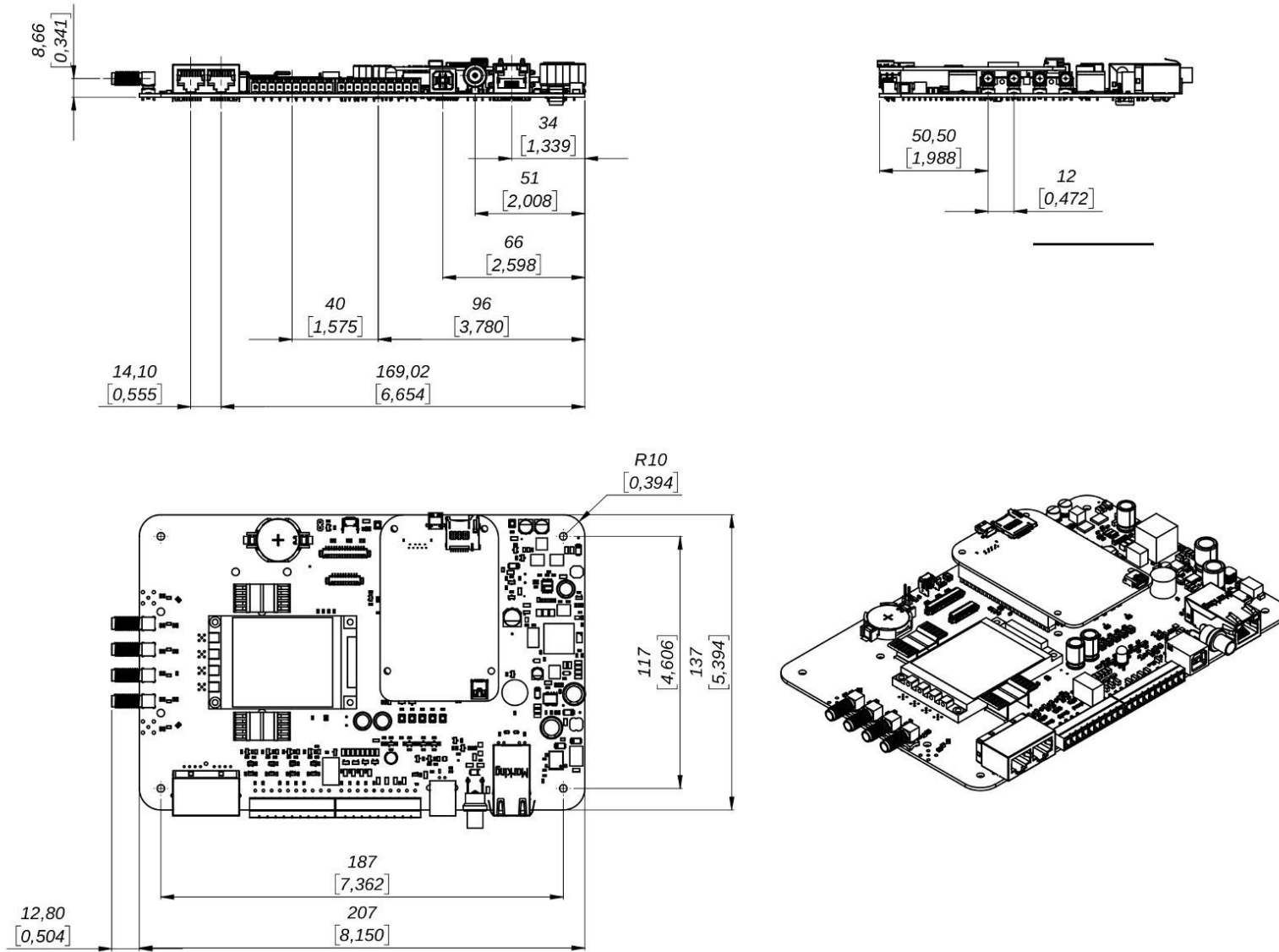


Illustration 2: ADRD-m4-SMA-160 Dimensions mm [inches]