FP-IND-PREDMNT1 is an STM32Cube function pack including dedicated algorithms for advanced time and frequency domain signal processing and analysis of 3D digital accelerometers.

The package includes pressure, relative humidity and temperature sensor monitoring, and audio algorithms for acoustic emission (AE).

You can use the STBLESensor app and the NUCLEO-F446RE development board to enable a smartphone connection via BLE.

By using the STEVAL-IDP005V1 evaluation board, you can connect a PC via USB to monitor and log the algorithm output, sensor data and equipment status.

This package, together with the suggested combination of STM32 and ST devices, can be used to develop specific industrial predictive maintenance applications for early detection of warning signs of potential failure.

The software runs on the STM32 microcontroller and includes all the necessary drivers for the STM32 Nucleo development board and expansion boards, as well as for the STEVAL-IDP005V1 evaluation board.
1 Detailed description

1.1 What can you do with STM32Cube function packs?

The STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards, and STM32Cube and X-CUBE software, to create function examples, embodying some of the most common use cases, for each application area.

These software function packs are designed to exploit as much as possible the underlying STM32 ODE hardware and software components to best fit the requirements of final users’ applications.

Moreover, function packs may include additional libraries and frameworks which do not present the original X-CUBE packages, thus enabling new functionalities and creating a real and usable system for developers.

1.2 What is STM32Cube?

STM32Cube™ is an STMicroelectronics initiative that helps you reduce development effort, time and cost. STM32Cube covers the STM32 portfolio.

STM32Cube version 1.x includes:

• STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
• A comprehensive embedded software platform specific to each series (such as the STM32CubeF4 for the STM32F4 series), which includes:
  – the STM32Cube HAL embedded abstraction-layer software, ensuring maximized portability across the STM32 portfolio
  – a consistent set of middleware components such as RTOS, USB, TCP/IP and graphics
  – all embedded software utilities with a full set of examples

1.3 How does this function pack complement STM32Cube?

This software is based on the STM32CubeHAL. It extends STM32Cube by providing a board support package (BSP) for the BLE, sensor and microphone expansion boards and middleware components for communication with other BLE devices.

The package contains signal processing library for vibration analysis in time and frequency domain.

It also provides some sample applications to demonstrate the use cases related to industrial predictive maintenance.
### Revision history

**Table 1. Document revision history**

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Changes</th>
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<tbody>
<tr>
<td>22-Feb-2019</td>
<td>1</td>
<td>Initial release.</td>
</tr>
<tr>
<td>07-May-2019</td>
<td>2</td>
<td>Updated cover page features.</td>
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