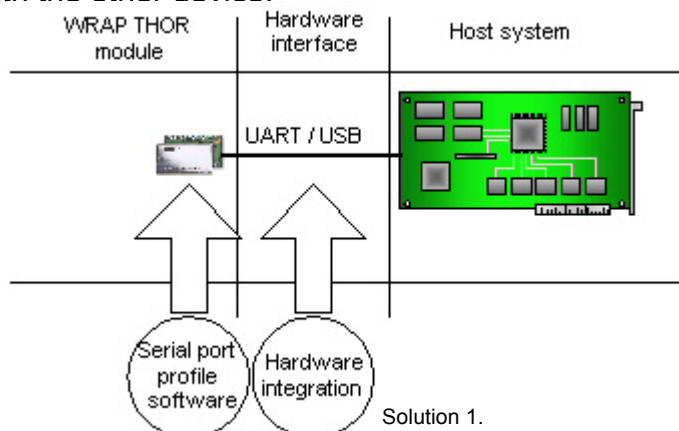# WRAP THOR Implementation Options

Introduction

WRAP THOR™ is a small Bluetooth™ module that offers easy integration and wireless application development possibilities. It has 100m range, small power consumption and UART/USB interfaces for hardware integration.

Implementation Approaches

When creating wireless systems, the designer should carefully think what kind of logic he needs for his application. In the most simple case this would be the division of product into pairs and just replacing the cable between the chosen pairs. In this case the pairs are configured already in the production line and cannot be changed by the end-user. In a more complex case there might not be such a separation of products into preconfigured pairs; The devices might want to communicate more or less arbitrarily with different Bluetooth™ devices and this communication logic has to be implemented somewhere. This brings up the solution concepts of autonomous Bluetooth™ modules, non-autonomous Bluetooth™ modules and hybrids. These are explained in the following chapters.
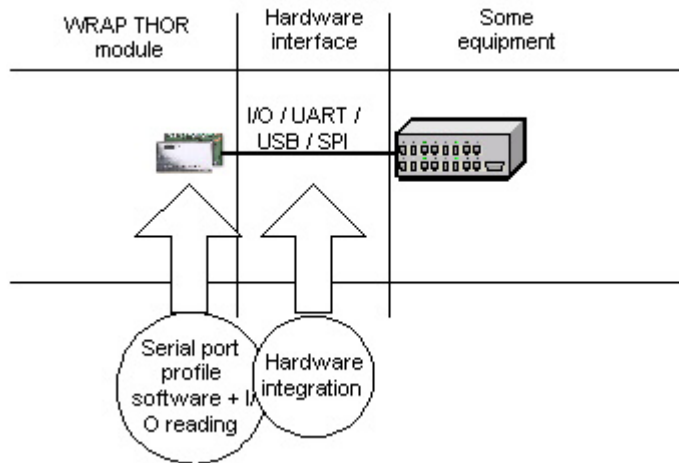
Solution 1. Autonomous Bluetooth™ Modules with Host

The simple case of pre-configured device pairs falls into this category. The WRAP THOR™s can be pre-paired in the production line and when they are integrated in the system, they are completely transparent. This means that the host-system does not even know that the cable has disappeared from its UART and been replaced with a Bluetooth™ communications module! In this solution the WRAP THOR™s contain Bluetooth protocol firmware alongside with the software needed for establishing wireless serial link with the other device.

Solution 1.

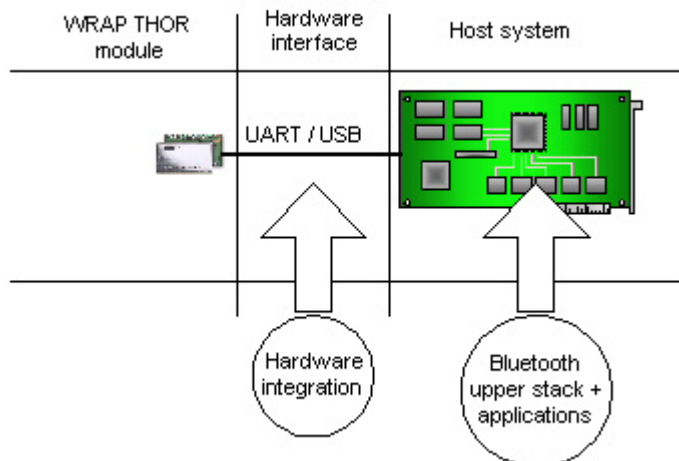## Solution 2. Autonomous Bluetooth™ Modules without Host

In this case some new sensor, meter or equivalent device is equipped with wireless Bluetooth™ interface. Since WRAP THOR™ has I/O the data can be read or set with this hardware interface and all the needed analyzing and transmission logic is inside WRAP THOR™.

Solution 2.

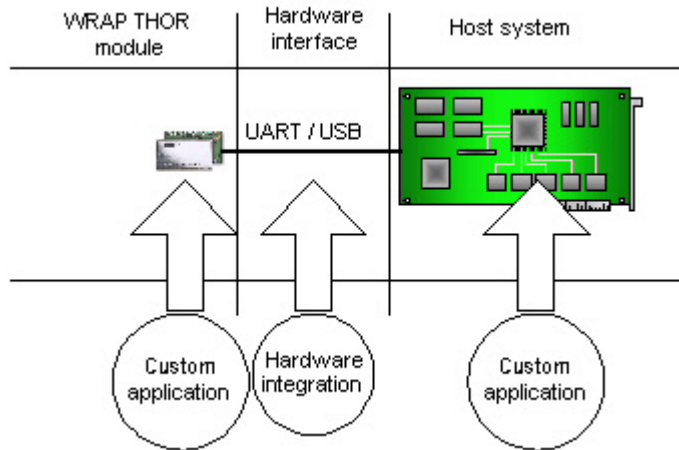## Solution 3. Non-autonomous Bluetooth™ module

This is the case where a host system that is to be equipped with Bluetooth™ functionality needs to perform some serious application level logic and services. In this case the WRAP THOR™ module is integrated with only the Bluetooth™-level functionality but no pre-configured connections or pairings exist. All the connection establishing logic, device inquiry (finding other Bluetooth™ devices), device enumeration and data transmission is initiated from the host system application logic.

Solution 3.

Solution 4. Hybrid

This is silimar to the solution 2, where a host system that is to be equipped with Bluetooth™ functionality needs to perform some serious application level logic and services. The difference is that the host system cannot sustain Bluetooth™ upper layers. In this case roles are divided between WRAP THOR™ and host system. Host system communicates with BlueGiga WRAP THOR ASCII Interface with WRAP THOR™ module. Using this solution no Bluetooth specific functionality is needed in the host system whatsoever but still the Bluetooth functionality can be accessed!

Solution 4.

Summary

In the table below the different approaches for implementing wireless Bluetooth connections are shown. There are some high level use case scenarios and implementation details so that customer can consider his approach more carefully. These use case scenarios are easily modified to support all kinds of different wireless services.

Solution Type	Example Use Case	Integration location and what is needed		
		WRAP THOR software	Host System software	Hardware Interface
Autonomous Bluetooth Module with Host	Simple 1:1 connection between predefines devices	None (Pre-Installed)	None (Bluetooth is transparent)	UART/USB integration
Autonomous Bluetooth Module with Host	New sensor apparatus that uses wirelss Bluetooth interface	Application Logic	None	I/O integration
Non-autonomous Bluetooth Module	Arbitrary connections between all kinds of devices, enumeration, inquiries, Bluetooth profiles (LAN Access points etc...)	None (Pre-Installed)	Bluetooth Upper stack + Application Logic	UART/USB integration
Hybrid	Applications where complex logic is needed but the host system does not offer possibilities to incorporate upper layers of the Bluetooth stack	Application Logic	Application Logic	UART/USB integration