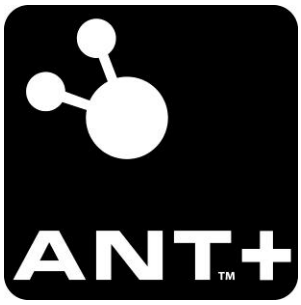

FIT SDK

Introductory Guide

ANT+ Managed Network Document
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Revision History

Revision	Effective Date	Description
1.0	May 2010	Initial release

Table of Contents

1 Overview of the FIT SDK

1.1 SDK Package Contents

The FIT SDK includes:

- FitGen.exe – FIT code generation tool
- config.csv – Configuration file for customizing generated C code
- c\ - C code
    - examples\ - Example encode and decode applications
- cpp\ - C++ code
    - csv\ - CSV conversion tool.
    - examples\ - Example encode and decode applications
- java\ - Java code
    - fit.jar - FIT java package
    - FitCSVTool.jar - Executable CSV conversion tool.
    - FitTestTool.jar - Executable test tool.
    - com\garmin\fit\ - FIT package source code.
        - csv – CSV tool source code
        - test – Test tool source code.
    - doc\ - Java API documentation.

2 Customizing C code for a specific product

The C code can be customized to a product specific set of FIT messages and fields. This allows the code to be optimized for the product to minimize RAM and ROM resource requirements.

1. Modify compile options in fit_config.h to suit product requirements.
2. Modify config.csv to customize the FIT profile for a product(s).
3. Run FitGen.exe to regenerate the C code with the new configuration.

2.1 Generating code for multiple products

Additional columns can be added to config.csv to specify configurations for multiple products. The default product is 'SDK' which includes all possible messages and fields. fit_product.c/h allow the product configuration to be selected at compile time by defining FIT_PRODUCT_<PRODUCT_NAME> in fit_config.h.

2.2 Data Structure Alignment

Message data is accessed directly through auto generated C structures. See FIT_*_MESG type definitions. The order of fields is optimized to minimize the structure padding requirements. The default alignment is 4 bytes and can be configured in config.csv by product.

2.3 Selecting messages and fields

Messages and fields are selected by specifying the number of field elements in the product column of config.csv. A field is not included if the cell is 0 or blank. If no fields are included, then the message is also not included in the source.

For example, the following configuration includes a user profile message with a friendly name with maximum length of 16, gender, age and weight. Language is not included in the message because it is set to 0.

Message Name	Field Name	Product
user_profile		
	friendly_name	16
	gender	1
	age	1
	weight	1
	language	0

2.4 File Structures

Access to some files such as settings can be setup as a fixed structure of message definitions and data. Defining a fixed file structure allows efficient random access of message data. A message can be included in a file structure by added the following option to the message row of config.csv:

f=<file type>,<number of messages in file>

If file type is "all", then the message is included in all file types. The file_id message is required in every file so it is always configured as f=all,1.

For example, the following configuration includes 3 user profile messages in a settings file:

Message Name	Field Name	Product
user_profile		f=settings,3
	friendly_name	16
	gender	1
	age	1
	weight	1
	language	0

The FIT_MESG_OFFSET macro can be used to compute byte offset of a message in a file. For example, the offset of the 3rd user profile in a settings file:

FIT_MESG_OFFSET(user_profile_mesg, 2, USER_PROFILE_MESG_SIZE, FIT_SETTINGS_FILE)

The number of files can specified in the "Files:" row of config.csv.

2.5 Capabilities

Message and field capabilities can be auto generated. See device file type for more information on device capabilities.

A capability is configured by added the following option to the message or field row of config.csv:

c=<file type>,<capability type>,<number of messages>

The options for capability type are: num_per_file, max_per_file, or max_per_file_type. Each message and field can have multiple capability options (for different file types).

3 Using FitCSVTool

The FitCSVTool is a command line utility that converts FIT information stored in csv files, to binary FIT files, and vice versa. It's usage is described below:

```
FIT CSV Tool 1.0.1.0
Usage: java -jar FitCSVTool.jar -b|-c <INPUT FILE> <OUTPUT FILE>
      -b <FIT FILE> <CSV FILE>  FIT binary to CSV.
      -c <CSV FILE> <FIT FILE>  CSV to FIT binary.
      -t Enable file verification tests.
      -d Enable debug output (also enables file verification tests).
      -i Check integrity of FIT file before decoding.
```

Refer to the \examples directory in the FIT SDK for examples of how to correctly define the .csv file. Note, the .csv files may be created with or without specifying definition messages and local message types. If the local message type is not defined in the .csv file, the FitCSVTool will redefine each message with local message type 0. Refer to the WorkoutIndividualSteps.csv file for an example of defining csv's without defining the local message type; and refer to the WeightScaleMultiuser.csv file for an example of defining FIT messages and their respective local message types.