Microproject at Vidsel Test Range

TMATS Editor

Table of Contents

1. Background

At FMV Vidsel Test Range (VTR), telemetry is crucial to help verify various airborne test articles. To receive and manage telemetry from test articles, telemetry tracking antennas, receivers and recorders and real-time presentation software are needed. To ensure compatibility with the test article, all hardware and software must be compatible with the Inter Range Instrumentation Group (IRIG) 106-standard. Part of the IRIG 106-standard are Chapter 9 that deals with the Telemetry Attributes Transfer Standard (TMATS) and Chapter 10, Digital Recording Standard.

Making setups for various hardware and verifying these can be rather tedious and currently VTR does not have a tool to help alleviate this problem. VTR is therefore looking for a person to implement TMATS Editor with the goal to be able to create, read and modify TMATS-files for Chapter 10-recorders.

2. Description

2.1 Purpose

The purpose of the TMATS Editor is to replace the current method to create TMATS files for the VTR IMUX G2 recorder.

Consider for instance how to set up a Pulse Code Modulation (PCM) Frame Format. As can be seen in the image below showing a part of this setup, there are several entries that must be done. Consider also that you have to repeat this process manually for up to 12 PCM channels. Add to that bit sync settings, analog channel settings, video settings etc[1], and you find yourself doing a lot of repetitive work with increased risk of erroneous settings.

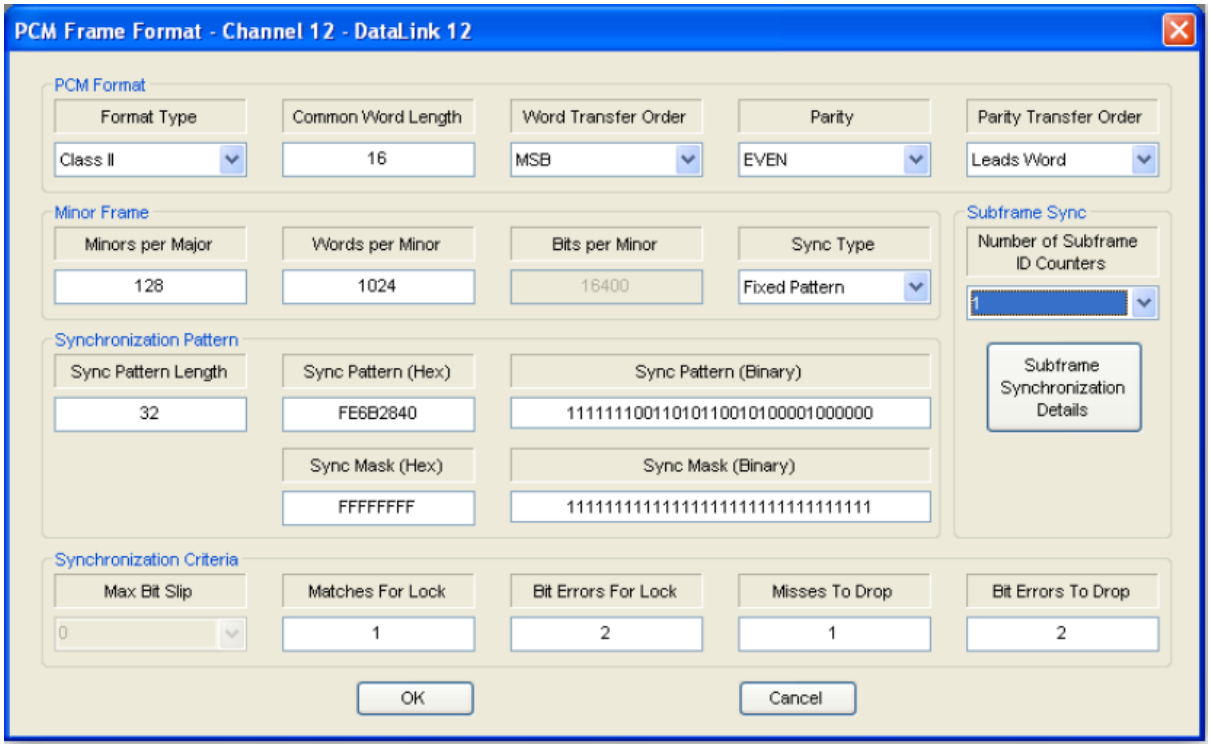

Figure 1 PCM Frame Format Settings

When implemented, the TMATS Editor will be the primary method for handling recorder TMATS files. As such, it will play an important role to help make the setup process for each test involving test articles with telemetry at VTR more streamlined and with higher quality. Functionality like for instance verifying settings and being able to copy them to several channels of the same type will be expected.

[1] Refer to the attached G2 GUI User Guide for more information on various settings

2.2 Scope

Either the focus of the project will be to take an already existing open source TMATS reader to expand on or to use parts of as one deem appropriate and combine it with a GUI. The TMATS reader does not currently support editing or creating new TMATS files, but should provide a very good starting point. The GUI will have to be written from scratch and provide means to primarily setup the VTR IMUX G2 recorder.

However if possible with respect to the time frame (see paragraph 3.2), a general support for setting up any Chapter 10 recorder is preferred.

3. Requirements

3.1 Technical Requirements

The paragraphs below describes the requirements for the TMATS Editor

3.1.1 Shall

- TMATS file format must be supported.
- Any TMATS file must be able to be read and displayed in raw, formatted and tree form.
- Any TMATS file must be able to be edited and saved.
- Possibility to create a TMATS file to setup the VTR IMUX G2 recorder.
- Must have a GUI.
- Must be able to run on Windows XP.
- Must be written in C++
- QT must be used to create the GUI.
- GCC must be used to compile the source code.

During development, the submitted software shall

- Be submitted to FMV via the Git source control system
- Be cryptographically signed with a verified PGP key (for git commits)

3.1.2 Should

- Possibility to create a TMATS file to setup any Chapter 10 recorder
- Support for TMATS XML format.

3.1.3 May

- Possibility to create a TMATS file to setup any IRIG 106 compatible equipment
- Extracting the TMATS information from a Chapter 10 file with display, edit and save according to paragraph 3.1.1

3.2 Knowledge Requirements

The paragraphs below describe the knowledge requirements for the applicant.

3.2.1 Shall

The applicant shall (e.g, knowledge required in order to be considered for the project)

- Be confident with idiomatic C++
- Be confident with basic git operations (add, commit, revert, merge…)
- Be fluent in both reading and writing English

3.2.2 Should

The applicant should (e.g, knowledge that *significantly* improves your fit for the project)

- Be familiar with reading and writing of binary- and XML-encoded data streams
- Be familiar with reading and comprehending technical documentation in English
- Be familiar with Windows XP
- Be familiar with Qt 5 and QML

3.2.3 May

The applicant may (e.g, knowledge that improves your fit for the project)

- Be familiar with cryptographic public-key signing

3.3 Schedule Requirements

Implementing the TMATS Editor according to 3.1 is estimated to take four (4) weeks of full-time work. The total project time is therefore, from VTR's point of view, three to four (3-4) months from the start date, taking into account regular course plans and other engagements.

Status updates will be reported to the project manager on a regular basis, decided on between the applicant and the project manager.

A final date whereupon the project should be fully completed according to the requirements above will be decided on between FMV and the applicant together with the signing of the contract.

3.4 Project Completion

The project will be completed upon tests at VTR verifying functionality according to paragraph 3.1.1. Various TMATS-files will be tested and also making TMATS-files compatible with the VTR IMUX G2 recorder.

After completion of the project, the applicant will be invited to come to the base and hold a presentation of their work to the involved personnel.

4. Provided Tooling and Support

FMV will provide the following software, licences, hardware, and documentation for the duration of the project.

4.1 Software

- Windows XP SP3
- Visual Studio 2010

GCC, Qt, and virtualization software for use with the Windows XP installation CD are not listed here, as they are all gratis open-source software. Installation instructions for the aforementioned softwares are available on their respective sites, or through your operating system's package manager.

4.2 Hardware

The VTR IMUX G2 will be used to test and verify the TMATS Editor. No hardware is provided during the development process.

4.3 Documentation

http://www.irig106.org is the primary resource regarding the whole IRIG 106-standard and in particular Chapter 9 and Chapter 10. The TMATS handbook and the IRIG 106 Chapter 10 Programmers Handbook can be found at http://www.irig106.org/docs/rcc/

Resources regarding various source code including the TMATS reader can be found here http://www.irig106.org/wiki/software_download#source_code

Last but not least, a manual for the VTR Wyle G2 recorder is attached to this document.

4.4 Point of Contact

Project Manager Mathias Livbom

E-Mail mathias.eriksson.livbom@fmv.se

Phone +46 929 372 80

To get in touch with the project manager, use e-mail as the primary contact point. Phone calls should be considered a secondary options, available only during office hours (07:00 to 16:00).

Questions will be answered directly when possible, or forwarded to the appropriate person at VTR.

5. Attachments

1. G2 GUI User Guide