FreeMASTER

Real-time data visualization tool simplifies motor control application development

The motor control drive represents a real-time embedded application with a number of system variables and control parameters. These parameters and variables need to be observed and evaluated in real time in order to optimally develop, set up and tune the control algorithm. Traditionally, developers use code debuggers and oscilloscopes for the development of motor control applications.

Unfortunately, such traditional development is quite arduous. The limiting factor of oscilloscope usage is that the current and voltage signals of the drive often differ from the values processed by the processor. The measured signals are affected by the sensing circuitry, by measurement noise and also by the offset and gain error of the analog-to-digital converter. Since the developer needs to evaluate the measured signals on the processor side, the oscilloscope does not allow effective development of the complex application.
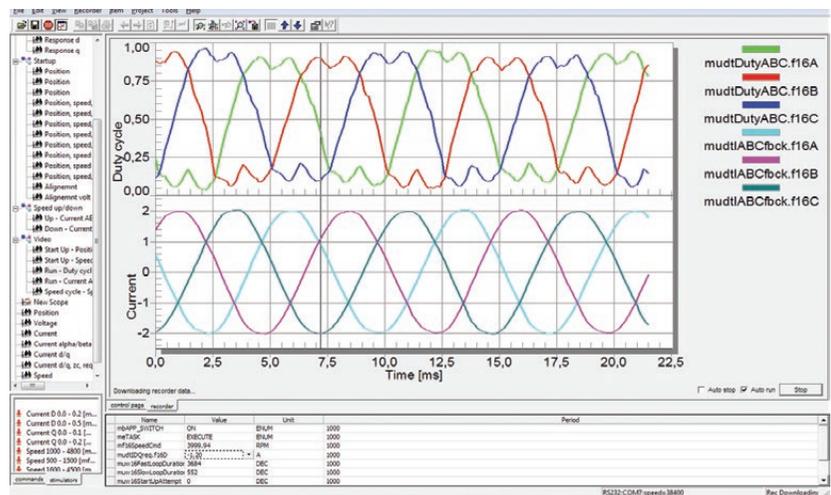
FreeMASTER

In order to help the users in the development of real-time embedded applications, Freescale offers FreeMASTER, a real-time debug, monitor and data visualization tool. It supports a completely non-intrusive monitoring, visualization and control of embedded system variables that is key for real-time application development and tuning.

Key Features

Real-Time Control

Control page enables effective control of the application. HTML form is supported so the user can easily design a custom project. The visualization

Figure 1: FreeMASTER Visualization Screen

area enables use of third-party instrumentation components inserted into the HTML code as embedded ActiveX objects. This allows for creation of a user-friendly display of complex real-time data dashboards.

Real-Time Data Visualization

Variable window displays the selected variables or the memory location of the target processor. The important part of the setting is the real type transformation of the variables. It enables transformation of the variable available on the target processor into a format that is more understandable for users (volts, amps, RPM).

Real-Time Data Scope

The tool enables visualization of the variables of the target processor in a way similar to that of classical oscilloscopes. It enables the display of up to eight courses in a single scope window. The oscilloscope is useful for tracking variables that change relatively slowly. A typical example is the speed of the motor.

The **recorder** window enables the visualization of fast changing variables. A small routine, which resides in user code, stores the selected variables in the on-board memory buffer that is then loaded onto the PC and displayed as a course. The recorder is very useful for tracking variables which change so fast that they cannot be tracked by the scope. A typical example is the motor current.

The **stimulator** enables stimulation of the selected variables in time. A typical example is the speed profile of the washing machine application.

Availability

Freescale supports automotive, industrial and appliance MCUs and DSCs including 56F8xxx, S08, Kinetis, S12/S12X, Qorivva and ColdFire V1/V2/V4. A variety of communication interfaces are supported. The selection includes BDM, SCI, CAN, USB, MQX I/O, and JTAG. FreeMASTER is available for use with Freescale products and can be downloaded at **freescale.com/FreeMASTER**.

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