MATLAB EXPO 2016

Messdatenerfassung mit MATLAB – so einfach geht’s

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Typical challenges in Test & Measurement

- Integrating hardware not straightforward
- Multiple tools for accessing, analyzing and sharing data
- Data format conversions necessary

- Handling of streaming data
- Automation of workflow
- Application deployment
Hardware Support - Web Page

Hardware Support

Search Hardware Support

Connect MATLAB and Simulink to Hardware

Search for supported hardware

— Explore hardware by vendor —

Popular ARMs, Arduino, Altera, National Instruments, Berkeley, STMicroelectronics, Keysight

Live Data Streaming to and from Hardware

Directly receive and send real-world inputs and outputs from MATLAB and Simulink.

Generating

Automatically generate algorithms, and

www.mathworks.com/hardware-support
Hardware Support - Add-On Explorer
Example: Read Waveform from Instruments

Use App for Instrument Connection

- Using MATLAB instrument driver
- Using SCPI commands
Instrument Control App
Set up Connection using MATLAB Instrument Driver
Select MATLAB Instrument Driver (*.mdd files)
Read Waveform

```
set also icDevice.

% Create on time: 1 - Nov 2015 13:09:37

% Create a SERIAL object.
interfaceObj = instrfind('Type', 'serial', 'Port', 'COM3', 'Tag', '');

% Create the SERIAL object if it does not exist
% otherwise use the object that was found.
if isempty(interfaceObj)
    interfaceObj = serial('COM3');
else
    fclose(interfaceObj);
    interfaceObj = interfaceObj(1);
end

% Create a device object.
deviceObj = icdevice('teknix_tda210.mdd', interfaceObj);

% Connect device object to hardware.
connect(deviceObj);

% Execute device.
groupObj = g
[data, time] = channel1';

% Delete objects.
delete([deviceObj interfaceObj]);
```
MATLAB Connects to Your Hardware Devices

Instrument Control
Instruments and RS-232 serial devices

Data Acquisition
Plug-in data acquisition devices and sound cards

Image Acquisition
Image capture devices

Vehicle Networks / CAN bus devices
CAN bus devices using CAN and XCP protocols

MATLAB
External Interfaces for connecting other devices
Instrument Control Toolbox

*Enables MATLAB to configure, control, and transfer data with instruments such as oscilloscopes, signal generators, and spectrum analyzers*

- Integrate instruments into MATLAB applications and Simulink models
- Interactive tool for detecting and controlling instruments
- Automatic code generation for faster and easier implementation
- Support for IVI, VXI plug&play, and MATLAB instrument drivers
- Support for common communication protocols
Data Acquisition Toolbox

Acquire and output data from data acquisition boards

- Immediately analyze live or acquired data in MATLAB and Simulink
- Configure hardware without leaving MATLAB
- Incorporate custom analysis into PC-based digital oscilloscope
- Ability to do “one-shot” or continuous acquisition
- Support multiple data acquisition devices and vendors
Image Acquisition Toolbox

*Acquire images and video from industry-standard hardware*

- Acquire live image and video streams directly into MATLAB and Simulink
- Configure hardware without leaving MATLAB
- Enable single-frame and streaming acquisition
- Permit immediate image processing and analysis
- Support multiple image acquisition devices and vendors
Vehicle Network Toolbox
Communicate with in-vehicle networks using CAN and XCP protocols

- MATLAB functions for transmitting and receiving CAN and XCP messages
- CAN and XCP Simulink blocks for interfacing Simulink to a CAN bus or ECU
- Bit packing and unpacking functions and blocks for simplified encoding and decoding of CAN messages
- CAN bus app for visualizing live CAN traffic
- Ability to filter, log and replay CAN messages
- Support for Vector, Kvaser and NI interface hardware
- Support for A2L Description Files and Vector CAN Database

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Test & Measurement Apps
MATLAB Advanced Analytics Algorithms
Extensive toolboxes and apps

- MATLAB programming
- Point-and-click Apps
Summary

- Easy driver installation through hardware support packages
- Data acquisition from a range of devices
- Handling, visualizing and processing data made easy
- One environment covering the whole Test & Measurement workflow

Diagram:

- Access
- Explore
- Prototype
- Scale
- Deploy