Einfach & Flexibel
USB-Messtechnikprodukte
von Agilent Technologies
Topics

- USB Modular Instruments Overview
- USB Modular Instruments Features
- Examples
Typical Test Environment

**Source**
- Power Supplies:
  - E3600A
  - U8000A
  - U2722A
- Function Generators:
  - E3220A
  - U2761A

**Measure**
- Digital Multimeters:
  - 34405A
  - U1250/40
  - U2741A
  - Oscilloscope:
    - U1600
    - U2701A/U2702A
- USB Data Acquisition Systems:
  - U2100A/U2300/U2500A/U2600A

**Analyze**
- Control

*Image of electronic test equipment and instruments.*
“Just what I need: simplicity and flexibility that’s so versatile I can easily arrange and rearrange the configuration to fit my changing measurement needs.”

No more…

cluttered desktops

With fully featured, paperback-sized

modular instruments

Have a mobile set of instruments…

with or without a test cart
Agilent USB Modular DAQ Products

Modular Data Acquisition (18 models)

- **U2300A Series – Multifunction DAQ** (7 Models)
  - U2352A
    - 16SE/8DI, 16-bit, 250kS/s
  - U2351A
    - 16SE/8DI, 16-bit, 250kS/s with 2 AO
  - U2354A
    - 16SE/8DI, 16-bit, 500kS/s
  - U2353A
    - 16SE/8DI, 16-bit, 500kS/s with 2 AO

- **U2781A – Modular Chassis** (1 Model)
  - U2781A
    - 6 slots chassis

- **U2500A – Simultaneous Sampling DAQ** (3 Models)
  - U2541A
    - 4 chn, 16-bit, 250kS/s
  - U2542A
    - 4 chn, 16-bit, 500kS/s
  - U2531A
    - 4 chn, 14-bit, 2MS/s

- **U2100A & U2600A – Isolated Digital IO** (6 Models)
  - U2121A
    - 16 Inputs, 16 Outputs
  - U2122A
    - 32 Inputs
  - U2123A
    - 32 Outputs
  - U2651A
    - 32 Inputs, 32 Outputs
  - 2652A
    - 64 Inputs
  - U2653A
    - 64 Outputs

- **U2800A – Signal Conditioner** (1 model)
  - U2802A
    - 31 chn Thermocouple Signal Conditioner

- **USB interface**
- **Easy & Quick Setup Software Convenience**
USB Modular Instruments Products
U2700A series Agilent USB Modular Instruments and chassis (7 models)

<table>
<thead>
<tr>
<th>Category</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td>(1 models)</td>
<td>6 slot chassis (U2781A)</td>
</tr>
<tr>
<td>Oscilloscope</td>
<td>(2 models)</td>
<td>2chn 100MHz 8-bit, 500MSa/s (U2701A)</td>
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<tr>
<td></td>
<td></td>
<td>2chn 200MHz 8-bit, 500MSa/s (U2702A)</td>
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<td></td>
<td></td>
<td>3chn 20V/120mA 1μA/100pA res (U2722A)</td>
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<tr>
<td>Power supply</td>
<td>(1 model)</td>
<td>5.5 digits 100Sa/s (U2741A)</td>
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<td></td>
<td></td>
<td>32chn switch matrix (U2751A)</td>
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<tr>
<td>Digital Multi meter</td>
<td>(1 model)</td>
<td>20Mhz FG with 14-bit 50MS/s 64k AWG (U2761A)</td>
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<tr>
<td>Switch</td>
<td>(1 model)</td>
<td></td>
</tr>
<tr>
<td>Function Generator</td>
<td>(1 model)</td>
<td></td>
</tr>
<tr>
<td>Switch matrix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB Modular Instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenient [ Work in comfort ]</td>
<td></td>
<td>Portable [ Carry your instruments with you ]</td>
</tr>
<tr>
<td>Simple Setup [ Improve Efficiency ]</td>
<td></td>
<td>Affordable [ Low start up cost ]</td>
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</tbody>
</table>

Parametric Test Fixture (U2941A)
Overview: Soft Front Panel

Say No More to Small Instrument Screens!
Size now depends on your LCD Display or your laptop/PC!

Agilent Measurement Manager software (AMM)
– a familiar, instrument-like interface
Command Logger – A Great Tool for Programmers

- Start Command Logger before starting device configuration
- Log the commands when configuring the device via AMM.
Code Converter – A Great Tool for Programmers

Convert saved command logger file into other languages.

2 converters available:

• Agilent VEE Code Converter.
• Microsoft C#/VC++/VB Code Converter.
Form Factor

Standard Letter Size Page

Less than Half the size of the standard Letter Page

- Length: 6.8 in / 175mm
- Width: 4.1 in / 105mm

FOLD

Same thickness as a Paperback Novel

- Height: 1 or 2 in / 25mm or 50mm
Connecting U2700 Series Modular Instruments

Single unit:

- USB connectivity
- Each instrument has its own software-based control panel
- Multiple instruments can be connected via USB hub to a single notebook PC USB port

System via card cage:

- Single USB cable to connect multi-instruments
- Single AC connection to power all instruments
- Card cage support up to six instruments or three SMUs
- Each instrument will have its own software-based control panel
Research Lab -- Small Engine/Dynamometer Testing

**Task of DAQ:**
Speed, torque, and throttle position signals are measured using the analog input ports of the U2355A.

**Application:**
Performing Dynamometer Testing on Combustion Engines with USB DAQ and Agilent VEE Pro

Available: Seminar Presentation & App Note
Research Lab -- Battery emulation using U2722A SMU
- A 2/5 AAA size rechargeable battery use case

Mobile Applications
for Bluetooth Headset
- Light Weight
- Design for Safe Operation
- Slender & Smaller Footprint
- Long Cycle Life

Requirements

<table>
<thead>
<tr>
<th>Size</th>
<th>AAAA</th>
<th>2/5AAA</th>
<th>1/2AAA</th>
<th>2/3AAA</th>
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</thead>
<tbody>
<tr>
<td>Model No</td>
<td>0840L17</td>
<td>1018L10</td>
<td>1022L14</td>
<td>1029L18</td>
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<tr>
<td>Voltage</td>
<td>3.7V</td>
<td>3.7V</td>
<td>3.7V</td>
<td>3.7V</td>
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<tr>
<td>Capacity</td>
<td>170mAh</td>
<td>105mAh</td>
<td>140mAh</td>
<td>180mAh</td>
</tr>
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</table>

Stage 1
- Detect if the battery inserted is above 0.3V.

Stage 2
- Start charging at 0.1C rate or 10mA.
- Charger operating at CC mode.

Stage 3
- Constantly charging until battery’s voltage increased to 2.5V.

Stage 4
- Charger switch to CV mode and operate at 4.2V and charge at 1C rate or 100mA.

Stage 5
- Once battery reaches 4.2V, the charger will reduce the amount of current sourced.

Stage 6
- Charger stop sourcing current and finally stop charging.
Research Lab: How U2722A meets the requirements

Stage 1 (simulate short circuit)
- U2722A is set to CV mode at 0.3V or lower with 10mA input protection current.
- The charger will not charging at this region.

Stage 2 (simulate 0.1C charging)
- U2722A is set to CV mode at 0.3V – 2.5V with 120mA protection current.
- The charger is charging at 10mA or 0.1C rate as shown.

Stage 3 (simulate 1C charging)
- U2722A is set to CV mode at 2.5V – 4.0V with 120mA protection current.
- The charger is charging at 105mA or 1C rate as shown.

Stage 4
- U2722A is set to CC mode to sink 50mA with 4.3V protection voltage.
- The charger is now sourcing a 50mA current.

Stage 5
- U2722A is set to CC mode to sink 20mA with 4.3V protection voltage.
- The charger is now sourcing a 20mA current.

Stage 6
- U2722A is set to CV mode at 4.3V with 10mA input protection.
- The charger finally stop charging.

Available: App Note
CO2 Tester @ University of Trasilvania

CO2 Tester – University of Transilvania (in Romania) in collaboration with Industrial Company (Steiner)

- Monitoring of CO2 levels.
- Solution for University of Transilvania
- Powered by:
  - Agilent’s U2300A, USB based data acquisition system
  - Agilent Vee
Questions, comments or suggestions?
Thank You