Battery Testing Software

PC-Software for Battery Testing

BatControl

Version 0.3.2

Main Features / Functionality

- Software for running tests with batteries
- Main functionality
  - Implementation of charge and/or discharge routines, access to internal charge counter
  - Burden the battery according to given drive cycles (e.g. FTP75, ECE/EUDC)
  - Discharge / charge the battery according to recorded data (record & replay)
- Automatic execution of sequences of TopCon power supply commands.

Main window:

Overview of core data for charge and discharge operation. Shows live data from TopCon power supply

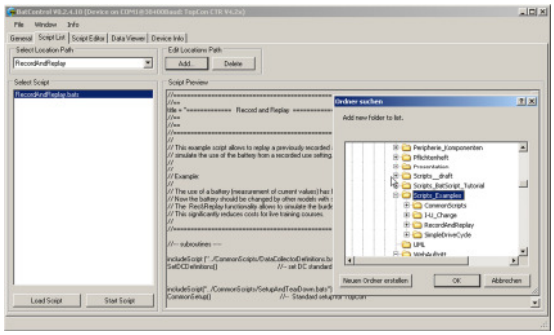
- Presentation / setting core data
- Energy and Charge counter
- Progress information from BatScript

Manual control window with charge/energy counter

Script Selection List:

Main entry point for execution of functional programs and of own functionality (BatScript)

- Selecting folder with BatScripts
- Check and preview the Batscript
- Immediately start a BatScript

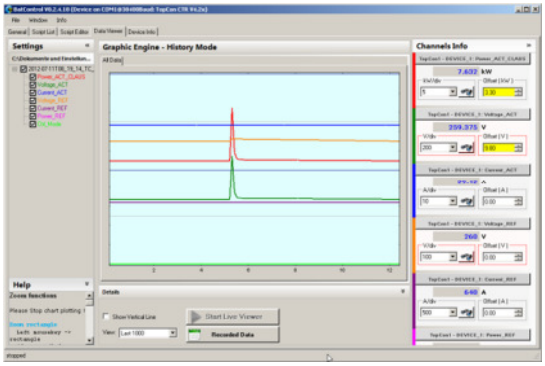


Select scripts from an arbitrary folder

LiveViewer:

Multi-channel data logger for long lasting data acquisition and immediate observertion

- Virtually unrestricted signal recording with direct transmission to PC file.
- Collection of data from different data sources.
- Arbitrary selection from a set of possible signals to be recorded from TopCon.
- Recording with realtime stamp.



Multi-channel data live viewer (various sources)

- Start/Stop programmable by software command.
- Export to CSV data format for further processing of recorded data.

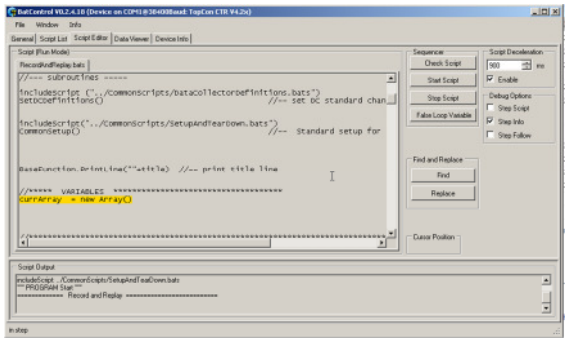
Script Editor and Programming / Debugging

Scripting:

- Software editor with easy to learn (JavaScript alike) script language
- Immediately run a BatScript
- Execute a BatScript in execution mode

Programming:

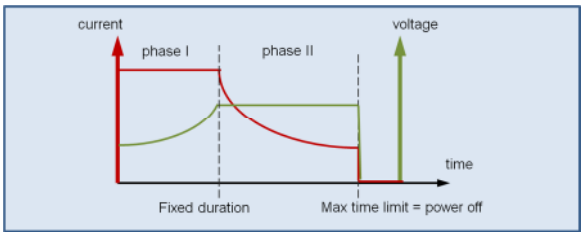
- allows for arbitrary command sequences and automatic test cycles
- programming with intelligent editing support
- Extended debugging capabilities: single step mode, slow motion, interactive loop break
- Printing data being recorded during execution of a script to file, importing data from file to be processed in a script
- Support for up to 3 TopCons (e.g. for synchronized use of test benches)



Scripts are open and easy to use. They can be edited and modified with changing requirements

Example: I-U-charge

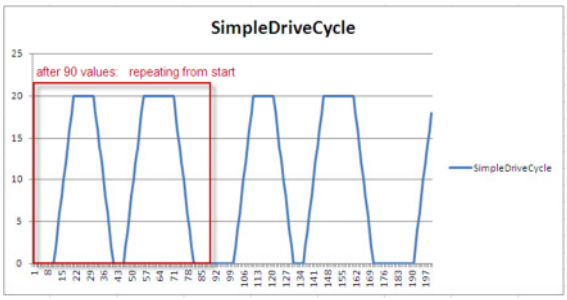
- Implementation of I-U charge process
- Example implementation with time based switching (fixed / max duration)



Provided example implements a I-U-charging process

Example: Drive Cycle

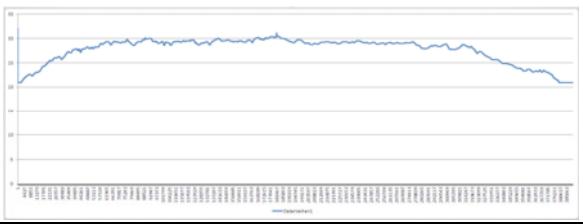
- A script allows to repeatingly run a drive cycle.
- Given example implements a simple two parted drive cycle to explain the underlying concept, easy adaptation to other drive cycles by modification of function “GetSpeedAtTime (..)”. Automatic execution of sequences of TopCon power supply commands.



Implementation of drive cycles as single function eases repeating tests

Example: “Record-and-Replay” (R’n’R)

- Reading in data from CSV file
- Replay measurement in lab environment
- Tested with more than 400.000 data points



Endurance testing using a long array of measured data

BatScript example:

The following example…

- charges battery for 1hour with 40 Amps
- then
  waits until theout current decreases to 5 Amps.
- Afterwards power is switched off

```
//---------- Start of Script ----------------------------------------
//*******************************************
//***  Simple charge algorithm
//***
//*******************************************

TC_1.SetCurrentRef (40)    //-- charge with 40Amps
TC_1.SetVoltageRef (344)   //-- start at 344 Volts

TC_1.PowerOn()             //-- switch output on

BaseFunction.Wait_min (60) //-- wait for 60 min

//-- wait while charge still bigger than  5 Amps ----------
while ( TC_1.GetCurrentAct() > 5)
{
  BaseFunction.Wait_s (30)          //-- check all 30s
}
TC_1.PowerOff()    //-- disconnect battery

//---------- End Of Script ----------------------------------------
```

General information

- Swiss made: developed, implemented and tested in Switzerland by Regatron AG, manufacturer of TopCon product family.

Scope of delivery

- Newest version of TopCon firmware including all needed functionality
- Installer package for PC including:
  - BatControl Test Automation Engine
    with charge and energy counter.
  - TCIO.DLL (communications functions), TCIO-Wrapper DLL (enhanced communications + .NET support)
  - Examples (Charging, drive cycle, Record-and-Replay)
- Operations and Programming Handbook
- Described examples (free to be modified by end user)
- Teaching examples (thoroughly explained in Programming Handbook)

Optional support

- Installation support from your sales partner

Regatron AG
Kirchstrasse 11
CH-9400 Rorschach
Switzerland
Tel +41 71 846 67 44
Fax +41 71 846 67 77
www.regatron.com
topcon@regatron.ch