

Reading Rigol DP800 Record (*.ROF) Files with Excel

Date: 07.17.2015

Solution: The Rigol DP800 series of power supplies have the option to data log the output voltage and current using the Record feature.

This application note covers how to convert the binary file format native to the record file type (**ROF*) to decimal using HxD (A hex-to-decimal software package) and the ReadDPROF file, a worksheet created using Microsoft Excel 2010.

The end of this document describes the format of the data in the *ROF file and the Excel functions that were used to convert each data point to decimal.

Steps:

- 1) Configure the DP800 outputs and Devices (DUTs) for your experiment
- 2) Insert a USB stick (FAT32 format) into the USB slot on the back panel of the instrument



3) Enable the record feature by pressing the (...) button on the front panel



- Set the time per sample to record by pressing Period and use the keypad or wheel to increment the time





- Select the destination by pressing Det > Select Browser to highlight the external USB (D:) drive



- Press Browser to enter the D: > Press Save and input the file name





- Press OK when finished entering the filename



4) Enable the Recording by pressing SwitchOff. It will turn to SwitchOn when recording is active.



NOTE: The instrument is collecting data as soon as the Recording is enabled.

5) Enable the outputs or run the output profile using the Timer function



6) Once the test is completed, press (...), and disable the Recorder. As soon as it is disabled, the Record mode will ask if you wish to save the data. Press OK to save.



7) In this experiment, I had the following static output values for the duration of the test:

(maon	Programmable DC Power Supply
CH3V = 1.50V	CH3A = 0.33A
CH2V = 2.08V	CH2A = 0.18A
CH1V = 2.00V	CH1A = 0.02A





8) Remove the USB stick and insert it into a computer. If you open the *ROF file (res1.ROF is use d in this example) you will see the binary values:

🗐 res1.ROF - No	tepad	_			·	
<u>File Edit Forn</u>	nat <u>V</u> iew <u>H</u> elp					
ROF 1 q: · f HN q: · f H ÿ- r: · f ÿ- q: ·	¥¶,@ N Ñ 5Q IN Ð 3Q : JN Î : P IN Ï	[₽] ° ÿ- q: 50 ÿ- α 50 ÿ- α 50 ÿ-	IN Ï 50 •* IN Ñ •* IN Ï 1: •* JN p: •*	Q ÿ- q: '' 3Q ÿ- q: 5Q ÿ- q I 5Q ÿ- I 5Q ÿ-	₹ IN Ð •₹ IN : •₹ KN q: •₹ ∑	5Q ÿ- Ð 5Q ÿ- Ï 5Q IN Î 5Q

- 9) Open the ROF file using hex to decimal conversion software. In this example, I am using HxD, as shareware program from <u>http://mh-exus.de/en/hxd/</u>
- 10) Here is the data in HxD

I

🕬 HxD - [I:\res	1.ROF]															
📓 File Edit	Searc	h V	iew	Ana	lysis	Ext	ras	Win	dow	?							
🗋 👌 🗸 🐻	Sum	U		16		•	AN	SI		•	he	x	•	•			
🔝 1.ROF 📓	res1	.ROF															
Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	OD	0E	OF	
00000000	52	4F	46	00	01	31	0C	00	00	00	00	00	Α5	B6	B8	40	₿OF1¥¶,0
00000010	01	00	00	00	0C	00	00	00	0C	00	00	00	49	4E	00	00	IN
00000020	CF	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ï5Qÿq:
00000030	B7	0C	00	00	49	4E	00	00	D0	00	00	00	35	51	00	00	·INÐ5Q
00000040	FF	06	00	00	71	ЗA	00	00	B7	0C	00	00	48	4E	00	00	ÿq:HN
00000050	D1	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ñ5Qÿq:
00000060	B7	0C	00	00	49	4E	00	00	D1	00	00	00	33	51	00	00	•INÑ3Q
00000070	FF	06	00	00	71	ЗA	00	00	B7	0C	00	00	49	4E	00	00	ÿq:IN
00000080	D0	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ð5Qÿq:
00000090	B7	0C	00	00	48	4E	00	00	DO	00	00	00	33	51	00	00	·HNÐ3Q
000000A0	FF	06	00	00	71	ЗA	00	00	B7	0C	00	00	49	4E	00	00	ÿq:IN
000000B0	CF	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ï5Qÿq:
00000000	B7	0C	00	00	4B	4E	00	00	CF	00	00	00	35	51	00	00	•KNÏ5Q
000000D0	FF	06	00	00	72	ЗA	00	00	B7	0C	00	00	4A	4E	00	00	ÿrJN
000000E0	CE	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Î5Qÿq:
000000F0	B7	0C	00	00	4A	4E	00	00	CF	00	00	00	35	51	00	00	•JNÏ5Q
00000100	FF	06	00	00	71	ЗA	00	00	B7	0C	00	00	49	4E	00	00	ÿq:IN
00000110	CE	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Î5Qÿq:
00000120	B7	0C	00	00	49	4E	00	00	CF	00	00	00	35	51	00	00	·INÏ5Q
00000130	FF	06	00	00	70	ЗA	00	00	B7	0C	00	00					ÿp:



11) Configure HxD bytes-per-row to 4:

Before:

🕪 HxD - [I:\res	1.ROF]				-	-										
📓 File Edit	Searc	h V	ïew	Ana	lysis	Ext	ras	Win	dow	?							
🗋 👌 🗖	Sum	0 E	⇒ A	dapt	to w	indo	w wi	dth		-	he	x	•	•			
📓 res1.ROF			By	/tes p	ber ro	ow								-			
Offset(h)	00	0	C	harse	t				۰ľ	09	OA	0B	oc	OD	0E	OF	
00000000	52	4	0	ffset	base				•	00	00	00	A 5	B6	B8	40	ROF1¥¶,0
00000010	01	0	Vi	sible	colu	imns			•	00	00	00	49	4E	00	00	
00000020	CF	0	Ву	/te g	roup	size			ъţ	06	00	00	71	ЗA	00	00	Ï5Qÿq:
00000030	B7	0 -							-1	00	00	00	35	51	00	00	·INĐ5Q
00000040	FF	0	Re	efres	h			F5		0C	00	00	48	4E	00	00	ÿq:HN
00000050	D1	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ñ5Qÿq:
00000060	B7	0C	00	00	49	4E	00	00	D1	00	00	00	33	51	00	00	·INÑ3Q
00000070	FF	06	00	00	71	ЗA	00	00	B7	0C	00	00	49	4E	00	00	ÿq:IN
00000080	DO	00	00	00	35	51	00	00	FF	06	00	00	71	ЗA	00	00	Ð5Qÿq:

After:

HxD - [I:\res]	1.ROF]					
🔝 File Edit	Search	View	Ana	ilysis Extras Windov	v ?	
0 👌	(m) 🥶		4	▼ ANSI	▼ hex	-
📓 res1.ROF						
Offset(h)	00 01	. 02	03			
00000000	52 4E	46	00	ROF.		
00000004	01 31	. OC	00	.1		
00000008	00 00	00	00			
000000C	A5 B6	5 B8	40	¥¶,0		
00000010	01 00	00	00			
00000014	0C 00	00	00			
00000018	0C 00	00	00			
0000001C	49 4E	: 00	00	IN		
00000020	CF 00	00	00	Ï		
00000024	35 51	. 00	00	5Q		
00000028	FF 06	5 00	00	ÿ		
0000002C	71 3A	00	00	q:		
00000030	B7 00	: 00	00	· · · ·		
00000034	49 4E	: 00	00	IN		
00000038	D0 00	00	00	Ð		
0000003C	35 51	. 00	00	5Q		
00000040	FF 06	5 00	00	ÿ		
00000044	71 3A	1 00	00	q:		
00000048	B7 00	: 00	00	· • • •		
0000004C	48 4E	: 00	00	HN		
00000050	D1 00	00	00	N		
00000054	35 51	. 00	00	5Q		
00000058	FF 06	00	00	¥•••		
0000005C	71 3A	1 00	00	a:		



12) Set Visible Columns to Text

🕬 HxD - [I:\res	1.ROF]				Crew's	
📓 File Edit	Searc	h V	iew Analysis Extras	Window	v ?	
Control Co	Sur ()) •	 Adapt to window w Bytes per row 	idth	▼ hex ▼	
Offset(h)	00	0	Charset Offset base	+ +		
000000004	52 01	3	Visible columns	•	Hex and text	
00000008	00 A5	0 B —	Byte group size	•	Text	
00000010	01	0	Refresh	F5	• Hex	
00000014	0C 0C	00	00 00		-	
0000001C 00000020	49 CF	4E 00	00 00			

13) Now the data should show the Offset and Hex Values

HxD - [I:\res]	.ROF				
🔝 File Edit	Searc	h V	iew	Anal	ysis Extras Window
00-51	Sume	5	++	4	ANSI
res1.ROF					
Offset(h)	00	01	02	03	
00000000	52	4F	46	00	
00000004	01	31	0C	00	
00000008	00	00	00	00	
0000000C	A5	B6	B8	40	
00000010	01	00	00	00	
00000014	0C	00	00	00	
00000018	0C	00	00	00	
0000001C	49	4E	00	00	
00000020	CF	00	00	00	
00000024	35	51	00	00	
00000028	FF	06	00	00	
0000002C	71	ЗA	00	00	
00000030	B7	0C	00	00	
00000034	49	4E	00	00	
00000038	DO	00	00	00	
0000003C	35	51	00	00	
00000040	FF	06	00	00	
00000044	71	ЗA	00	00	
00000048	B7	0C	00	00	
0000004C	48	4E	00	00	



14) Click Export and select

1 00 I	HxD - [I:\res1.ROF]	
FD	File Edit Search View	Analysis Extras Window ?
	New Ctrl+N	4 💌 ANSI 💌
50	👌 Open 🛛 Ctrl+O	
A0	Close Ctrl+F4	
0	🚽 Save Ctrl+S	03
0	Save as	00
		00
	Close all	40
0		00
0	Export >	Pascal
	A Print Ctrl+P	С
0		C#
0	Recent files 🔹 🕨	Java
	Exit	Visual Basic .NET
l o	0000030 B7 0C 00	Editor view
0	0000034 49 4E 00	нтмі
	0000038 D0 00 00 000003C 35 51 00	Richtext



15) Now, open the ReadDPROF.xlsx workbook and select the RawDataFile Tab (at the bottom):

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H ► ► Calculations RawDataFile
Baady Pa



16) Select Data: Import Text, set file type to ALL, select the *RTF file (this is the rich text conversion file from the HxD program)

🔀 🖵	1) · (* ·	. ₹	and so and						-		-	ReadDPRO	F.xlsx - Micr	osoft Excel	-		-		
File	Home	Insert	Page Layout	Formulas	Data	Review Vie	N Develop	er Add-	Ins										
From Access	From Fr Web T	om Irom Othe Sources *	er Existing Connections	Refresh All *	Connection Propertie Edit Links	A ↓ A Z A Z A Z A Z A Z A Z A Sort	Filter Sort & Filter	Clear Reapply Advanced	Text to Rer Columns Dup	iove Data cates Validation Data To	Consolidate	What-If Analysis *	Group Ung	proup Subtot Outline	#클 Show #클 Hide al	/ Detail Detail			
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13						📳 Com	puter					000	00014 0		0				
14						📑 Flo	ppv Disk Drive	(A:)				000	0001C 4	9 4E 00 0	0				
15						💑 Loo	al Disk (C:)		=			000	00020 C	F 00 00 0	00				
16						_0 DV	D RW Drive (D-)					000	00024 3	5 51 00 0	0				
17						-0 DV	D PW/ Drive (E)					000	00028 F	F 06 00 0	00				
18							al Diale (E.)					000	0002C 7	7 0C 00 0	0				
19							ar DISK (Fi)					000	00034 4	9 4E 00 0	0				
20							uaiHD (G:)					000	00038 D	0 00 00 0	0				
21						Bac	KupPartition (I	-1:)				000	0003C 3	5 51 00 0	00				
22					_	- Rer	novable Disk (I	:)				000	00040 F	E US 00 0 1 33 00 0	0				-
23					_	🖉 Jas	on Chonko (SP	H-L720				000	00048 B	7 00 00 0	0				*
24					_	🗣 Netw	ork					F 000	0004C 4	8 4E 00 0	0				Ŧ
25					_		Eile -									AUTO	(* *)		
26					_		File	Jame: res1.	m								s(.)		
27					_										Tools	✓ In	port	Cancel	
28																			

17) Select Delimited and Next

Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the fle type that has describe your date:
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row: 1 File origin: 437 : OEM United States
Preview of file I:\res1.rtf.
<pre>1 {\rtfl\ansi\ansicpg1252\ucl\deff0\deftab720{\fonttbl{\f0\fmodern Courier 2 {\colortbl\red255\green255\blue255;\red0\green0\blue0;\red0\green0\blue1 3 {\info{\author HxD}</pre>
4 {\doccomm http://mh-nexus.de/hxd/}
5{\title I:\\res1.ROF}}
4
Cancel < Back <u>Next ></u> <u>Finish</u>
Page

Page



18) Deselect Tab, select Space , and Finish

Text Import Wizard -	Step 2 of 3	? ×
This screen lets you se below.	et the delimiters your data contains. You can see how your text is affected in t	ne preview
Delimiters		
Semicolon	✓ Treat consecutive delimiters as one	
Comma	Text gualifier:	
Other:		
Data preview		
{\rtfl\ansi\an {\colortbl\red {\author	nsicpg1252\uc1\deff0\deftab720{\fonttb1{\f0\fmodern d255\green255\blue255;\red0\green0\blue0;\red0\green0\b r	lue191
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	Cancel < <u>B</u> ack <u>N</u> ext >	Einish

19) Select Cell A1 for import and press OK



20) Now, the formatted data will be transferred to the Excel Sheet



21) Click on the Calculations tab to see the reformatted data

	А	В	С	Н	I	J
2	HEADER	0	52	52		
3		4	1	1		
4		8	0	0		
5		00000000	A5	A5		
6	Record Period (s)	10	1	1	1	
7	Record Points	14	0C	OC	0C	
8		18	0C	OC		
9	CH1 Voltage 1	00000010	49	49	73	0.0073
10	CH1 Current 1	20	CF	CF	207	0.0207
11	CH2 Voltage 1	24	35	35	53	0.0053
12	CH2 Current 1	28	FF	FF	255	0.0255
13	CH3 Voltage 1	00000020	71	71	113	0.0113
14	CH3 Current 1	30	B7	B7	183	0.0183
15	CH1 Voltage 2	34	49	49	73	0.0073
16	CH1 Current 2	38	DO	DO	208	0.0208
17	CH2 Voltage 2	0000030	35	35	53	0.0053
18	CH2 Current 2	40	FF	FF	255	0.0255
19	CH3 Voltage 2	44	71	71	113	0.0113
20	CH3 Current 2	48	B7	B7	183	0.0183
21	CH1 Voltage 3	00000040	48	48	72	0.0072
22	CH1 Current 3	50	D1	D1	209	0.0209
23	CH2 Voltage 3	54	35	35	53	0.0053
24	CH2 Current 3	58	FF	FF	255	0.0255
25	CH3 Voltage 3	00000050	71	71	113	0.0113
26	CH3 Current 3	60	B7	B7	183	0.0183
27	CH1 Voltage 4	64	49	49	73	0.0073
28	CH1 Current 4	68	D1	D1	209	0.0209
29	CH2 Voltage 4	00000060	33	33	51	0.0051
30	CH2 Current 4	70	FF	FF	255	0.0255
31	CH3 Voltage 4	74	71	71	113	0.0113
32	CH3 Current 4	78	B7	B7	183	0.0183

🖪 🗘 🕨 Calculations RawDataFile 🦄

The raw data format (**ROF*) returns the record period, number of record steps, the Voltage, and Current of all channels.

The calculations tab of the Excel sheet is designed for use with the three channel DP800s and is only formatted for the first four data points. You can the final row of cells to cover all of the data points for your application as well as re-label the channels.



Each data point in the **ROF* file is 4 bytes long.

To calculate the actual decimal value, the sheet:

- Reorders the bytes (AA BB CC DD to DD CC BB AA) using the Excel MID function
- Concatenates the bytes using the CONCATENATE Excel function
- Converts hex to decimal using the Excel HEX2DEC function
- Divides the decimal conversion by 10,000.



Headquarters

RIGOL TECHNOLOGIES, INC. No.156,Cai He Village, Sha He Town, Chang Ping District, Beijing, 102206 P.R.China Tel:+86-10-80706688 Fax:+86-10-80705070 Email: <u>support@rigol.com</u>

USA

RIGOL TECHNOLOGIES,USA INC. 102000 SW Allen Blvd, Suite C Beaverton OR 97005, USA Toll free: 877-4-RIGOL-1 Office: (440) 232-4488 Fax: (216)-754-8107 Email: <u>info@rigol.com</u>

EUROPE

RIGOL TECHNOLOGIES GmbH Lindbergh str. 4 82178 Puchheim Germany Tel: 0049- 89/89418950 Email: <u>info-europe@rigoltech.com</u>