USB⟶RS-232 Adapters

20 September 2010

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Contents

List of Figures

List of Tables

[1] `$Header: d:/Downloader2/RCS/USB.tex,v 1.2 2010-08-23 09:18:24-07 Hamilton Exp Hamilton $`
[4] `tocdepth = 4`

1 USB⟶RS-232 Adapter Perfomance Data

Times to download `app_hlf_bin.h64` a 1,306,792 byte file. With an early the Downloader II version of 0.0.4. Descriptions of each USB⟶RS-232 adapter are contained in Section 2, page 13, which follows.

Adapter	Gap	Msg/Sec	Bytes/sec	Duration	Errors	TOs	Error Rate
A	840 μs	141	9.9	2:12	1	0	0.01
A	920 μs	140	9.8	2:13	3	0	0.02
B	920 μs	140	9.7	2:14	60	0	—
B	920 μs	139	9.7	2:15	74	2	—
C	3.16 ms	91	6.3	3.26	0	0	0
C	3.16 ms	91	6.4	3.25	0	0	0
E	1.00 ms	120	8.4	2:42	793	2	4.08
E	1.00 ms	120	8.4	2:42	791	3	4.08
F-A	3.92 ms	100	7.0	3:07	0	0	0
F-A	3.92 ms	100	7.0	3:07	0	0	0
F-B	3.92 ms	100	7.0	3:07	0	0	0
H	3.08 ms	91	6.4	3:25	0	0	0
I	800 μs	140	9.8	2:13	0	0	0
I	800 μs	140	9.8	2:13	3	0	0.02
Desktop Port	760 μs	145	10.1	2:09	7	0	0.04
Desktop Port	760 μs	146	10.2	2:08	4	0	0.02
LapTop Port	640 μs	145	10.1	2.09	32	0	0.17
LapTop Port	640 μs	146	10.2	2.08	35	0	0.19

Table 1: Performance of several different USB⟶RS-232 adapters on Aug 20.

Note

1. Testing on Aug 20, 2010

   1.1 All USB⟶RS-232 tests were done with the front two USB ports on Perrin's old PC. When an attempt to use the rear ports was made, there was a request to reload the CD to get them working there. This was ignored and testing was only done using the front ports. One test was done on each of the two ports on the front with the same adapter and, since the results were almost identical, all further testing was done on only one port.

   1.2 **C**: had one download failure with too many TOs, otherwise working normally. Happened at the end of the run.

   1.3 Unit **C** often sends several blocks of data that are 1.44ms long with a following gap of 480μs. Spectra usually sent an OK reply.

[5] `$Header: d:/Downloader2/RCS/UsbRs232.inc,v 1.7 2010-09-03 10:11:50-07 Hamilton Exp Hamilton $`

1.4 Unit **C** also sends out a 5.72 ms block of data with a 160μs gap and the a last 840μs block of data. Spectra usually sent an OK reply.

1.5 **D**: Lost or loaned away

1.6 **E**: had one download failure with too many TOs. Errors at that time were 780, otherwise working normally. Happened at the end of the run.

1.7 **E**: normally runs with an error rate near 4%.

1.8 **F**: had one download failure with too many TOs. The only errors at that time were 16 TOs. Otherwise a normal run. Happened at the end of the run, running time was 3:09. Spectra acknowledged download and transferred it to flash.

1.9 Unit **F** is a two port unit. The lower numbered port was called **A** the higher one was called **B**.

1.10 **G**: Was not reliably detected by the operating system. Could not reliably identify the unit attached. After being connected awhile, was not recognized by the Downloader II.

1.11 **H**: Similar to **C**, it is made by the same manufacturer and is the same model.

1.12 Normal format of data, as seen on the oscilloscope, for all units except for **C** and **H** is a single solid block of data.

1.13 All testing was done on a stand alone PC (the old Perrin computer), **except** for the laptop testing which was done on a computer connected into the Pelco Ethernet system. While transmitting data to the Spectra IV, it was observed that many times there were very short gaps in the download data. It is unclear if these "gaps" in the data caused the high observed error rate when using the laptop or not.

1.14 Of the original set of adapters the following are no longer available: **J**, **K** and **L**. (And **D** from the basic set.)

1.15 USB⟶RS-232 converters **A**, **B**, **G** and **I**, appear to be physically identical, but have the widest range of operation. Some of them work with no reservations and one of them used to crash the computer.

1.16 Looks do not determine the quality of operation and successful working on one project does not guarantee successful operation in a downloader application.

1.17 Two of the best units had no installation CD nor instructions and in one case it was impossible to determine the manufacturer's name.

2. Testing on Aug 23, 2010

2.1 Found that moving the adapter from one to the other of the front mounted USB connectors changed how they perform. This was done by carefully examining oscilliscope pictures. The "gap" size changes and the data the adapter **C** generates changes.

2.2 Typical timings from adapter **A** while downloading a Spectra IV:

2.2.1. In Figure 3, page 6 is shown the length of a "typical" block of data.

2.2.2. In Figure 4, page 7 is shown the duration of a "typical" inter block gap duration.

2.2.3. In Figure 5, page 8 is shown the duration between the end of a data block and the start of a reply.

2.2.4. In Figure 6, page 9 is shown the duration between the end of a reply and starting the next data block.

2.3 Unexpected timings form adapter **C** while downloading a Spectra IV:

2.3.1. In Figure 7, page 10 is shown the length of an abnormal block of data.

2.3.2. In Figure 8, page 11 is shown the length of the first sub-block in the data.

2.3.3. In Figure 9, page 12 is shown the length of the first sub-block gap in the data.

abce

Figure 1: USB to RS-232 Adapters: A, B, C and E

fghi

Figure 2: USB to RS-232 Adapters: F, G, H and I

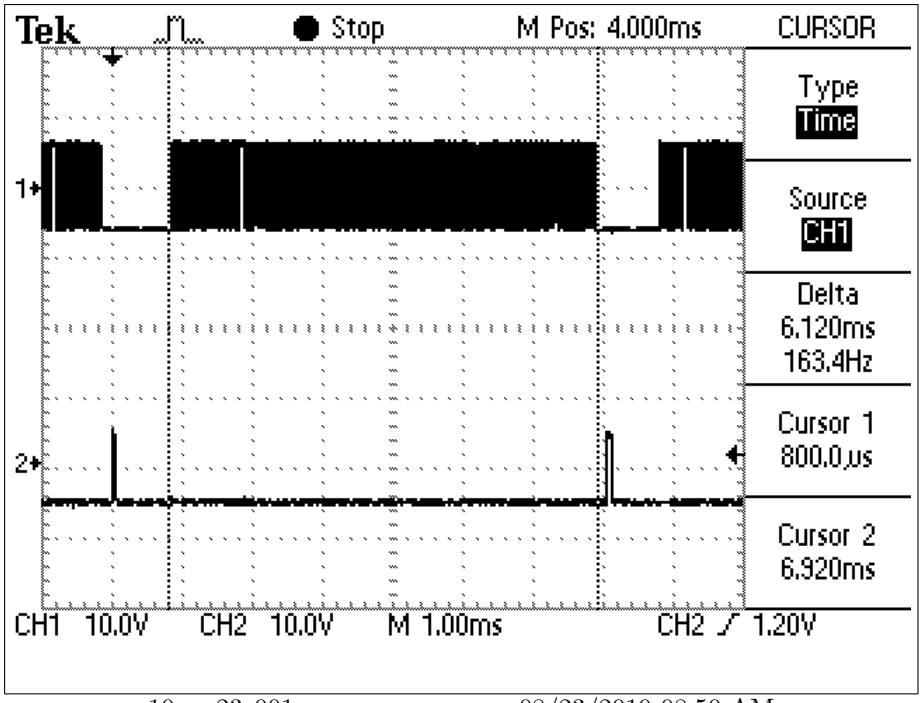

Figure 3: Adapter A Block Time

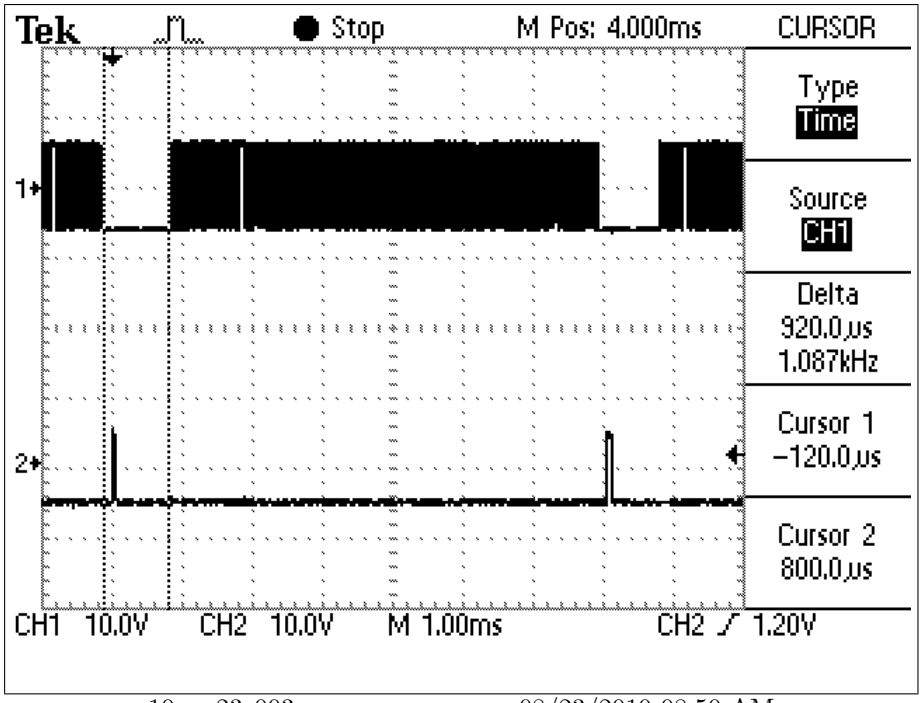

Figure 4: Adapter A “Gap” Time

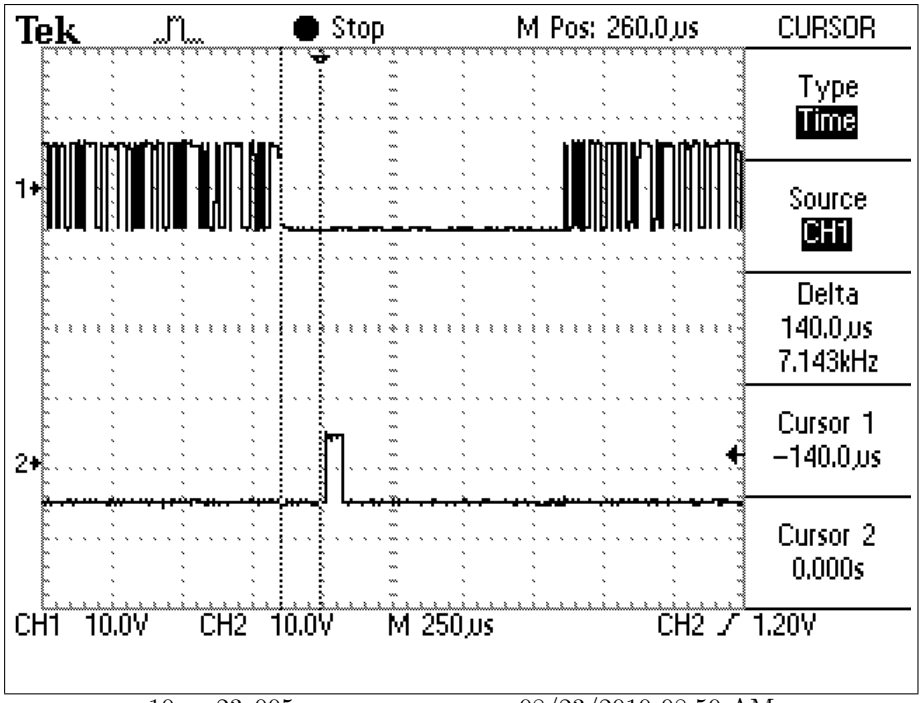

Figure 5: Adapter A Response Time

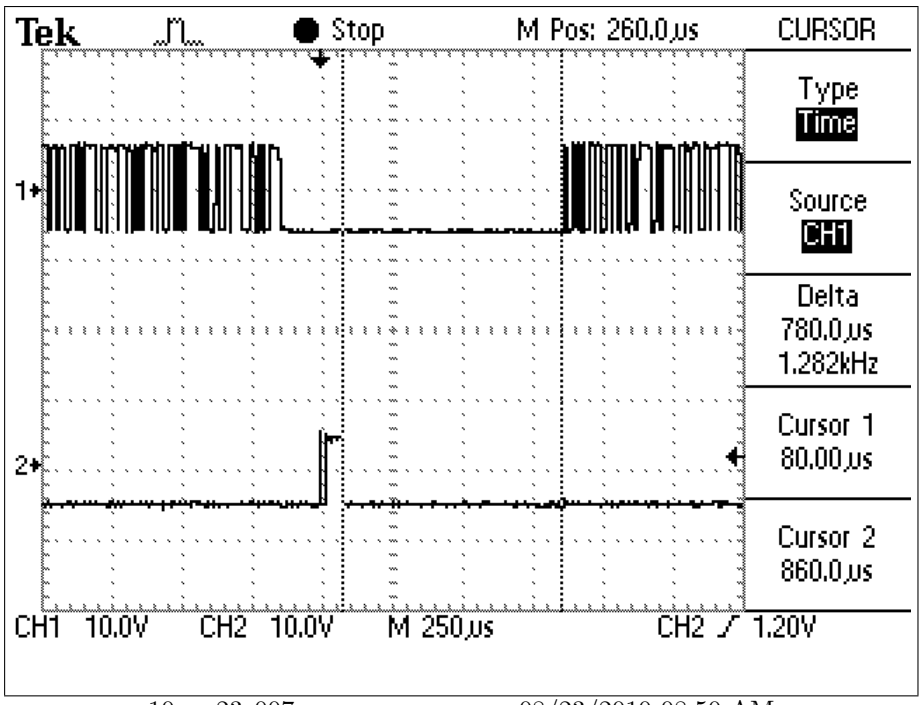

Figure 6: Adapter A Response to Send Time

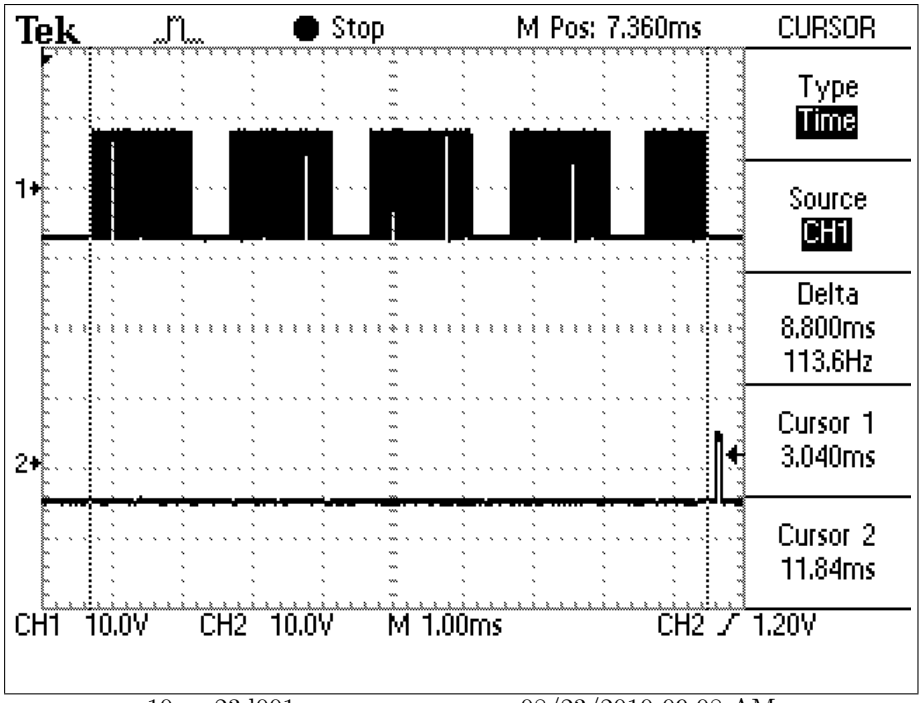

Figure 7: Adapter C Block Time

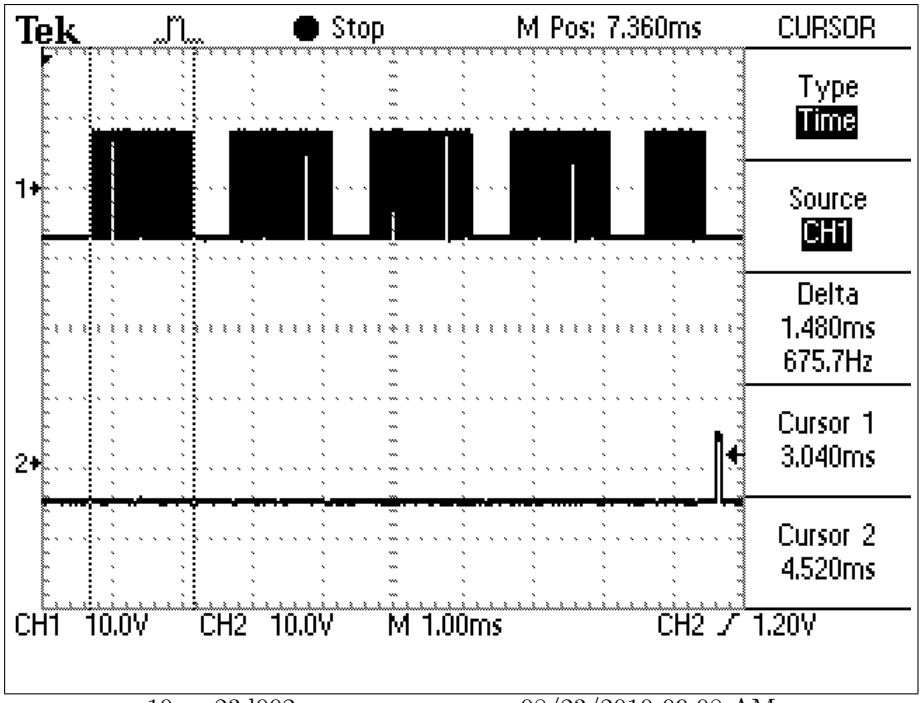

Figure 8: Adapter C First sub block time

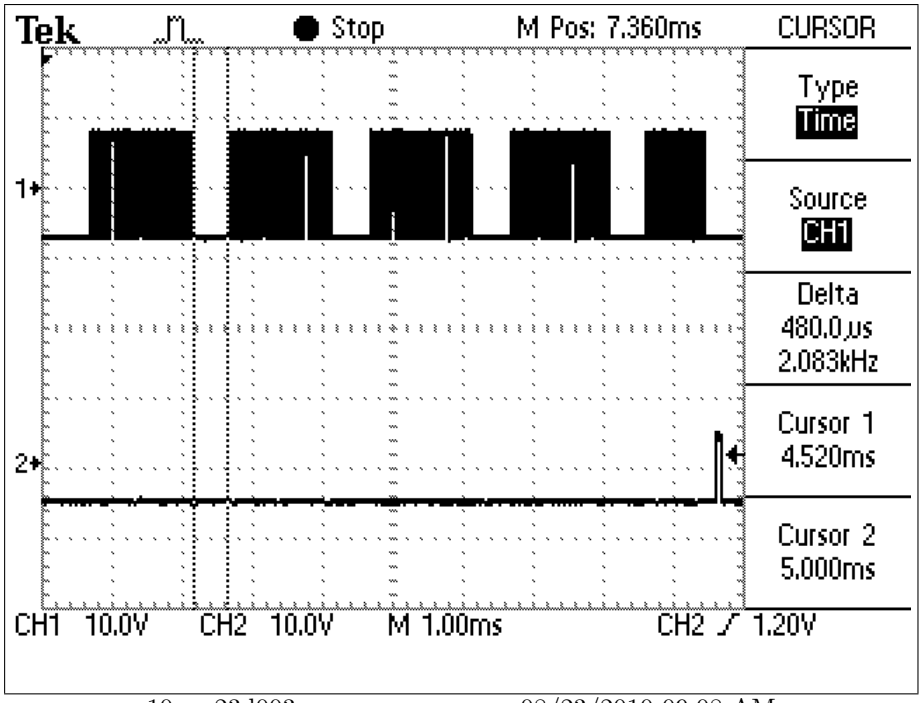

Figure 9: Adapter C First sub block gap time

2 USB⟶RS-232 Adapters Test Results

Adapters A → I were all tested with the original Downloader on at least two occasions. The results are shown below.

There was an unexpected increase of the number of USB⟶RS-232 adapters that started to work in the second testing run. I think that this might be related to having power cycled the computer in between the two test series.

Adapter	March Test Results	April Test Results
A	Did not work	Worked with no problems
B	Worked with no problems	Worked with no problems
C	PTZ OK, No Download	No PTZ, Starts Download and stops
D	Worked with no problems	Worked with no problems
E	Worked with no problems	Worked with no problems
F	Did not work	Could not access
G	Crashed the computer	Worked with no problems
H	Did not work	No PTZ, Starts Download and stops
I	Did not work	Could not access
J	—	Worked with no problems
K	—	No driver
L	—	No driver

Note

Could not access	The COM# was too high to access through the RMK software.
Crashed the computer	Computer died with a "blue screen of death".
Did not work	The RMK software could not get any results with this unit.
No Driver	Indicates that the install CD was missing and a driver could not be found to use with it.
No PTZ, Starts Download and stops	No PTZ functions, but when a download is attempted the Spectra IV goes into download mode and the RMK software hangs up.
PTZ OK, No Download	All PTZ options worked, but would not download the Spectra IV.
Worked with no problems	PTZ functions including auto-baud rate detection, parity choice and COM# selection worked.

[6] `$Header: d:/Downloader2/RCS/UsbTypes.inc,v 1.2 2010-08-23 09:18:25-07 Hamilton Exp Hamilton $`

3 USB⟶RS-232 Adapters Tested

During this effort 12 USB⟶RS-232 adapters were used. All of the adapters, and all of the "stuff" that came with them, were marked with a letter from **A** → **L**.

Adapter	Description
A	A small USB⟶RS-232 converter with an install CD. Supplied by Steve Harris. The only model number is on the package and it is "ADL-USB-D9MS".
B	A similar to **A** USB⟶RS-232 converter with an install CD. This was found in Tess's old office. The only model number is on the package and it is "SBT-USC1M".
C	A Belkin USB⟶RS-232 converter with an install CD. It was found in Tess's office. The closest to a model number comes from the CD and it is "P73754-B F5U409-CU F5U109". The other model number might be "USB/Serial Portable Adapter".
D	A MicroInnovations USB/RS-232 converter, no CD or instructions. It was found in Tess's office. According to Steve Harris, it has the best reputation for being able to download with. No obvious model number is available. Steve Harris had borrowed it from another Pelco employee.
E	An unknown USB⟶RS-232 converter with no CD or instructions. It was fond in Tess's office. There is no indicated manufacturer or model number. Steve Harris had borrowed it from another Pelco employee.
F	An IO gear 2 port USB⟶RS-232 converter with an install CD. Eric brought this in from home. It is model number"GUC2322" and is made by "IO Gear". Craig Hannen used it with communicating to some hardware from Colorado. No other of our USB⟶RS-232 converters worked with the Colorado equipment.
G	A small USB⟶RS-232 converter with an install CD. Is very similar to **A**. Eric bought it some time ago from a "CompUSA" going out of business sale. Model number is "Item # 60466".
H	This is identical to item **C** above which Eric brought from home. It has an install CD. At one point Siva used it for working with Linux and Windows on his system. He said that none of the other units worked at all.
I	A small USB⟶RS-232 converter with an install CD. It is very similar to item **A** above. Eric brought it from home for this testing. It is made by "IO Gear", the same manufacturer as item **F**. It is model number "Model GUC232A".
J	Identical to unit **A**, above. This was found in the Dome Lab inside a filing cabinet during the week of 19 May and was not used in previous testing.
K	This unit was also found in the Dome Lab during the week of 19 May and was not used in previous testing. It was made by "USI, Ultimate Solutions, Inc", `WWW.ULTSOL.COM` model "#2105-2072".
L	This is identical to unit **K** above and found at the same time.

Index