

HEX File Snipping Instructions

PL 6/13/2017

Summary:

This guide will show how to remove unnecessary “blank” space in a hex file. This is useful when you want to keep the hex file as small as possible.

Why would you need this:

When a product has a bootloader and some “sketch code”, we will read back the entire flash space and use this as our “combined” HEX file for programming in production. Often times, this also includes a lot of blank space in the HEX file (between the sketch code and the bootloader).

1. Read the entire flash space of your IC. ATMEGA328s should come in at 91KB.
2. Open HEX file in a text editor. Here, I use Programmer Notepad.
3. Scroll up and down in the HEX file and notice the three sections:

I. “good stuff” up top. (Sketch code).

Programmer's Notepad - [Arduino_Pro_Mini_5V_Co...]

File Edit Search View Tools Window Help

Plain Text

Arduino_Pro_Mini_5V_Combined_4_24_12.hex

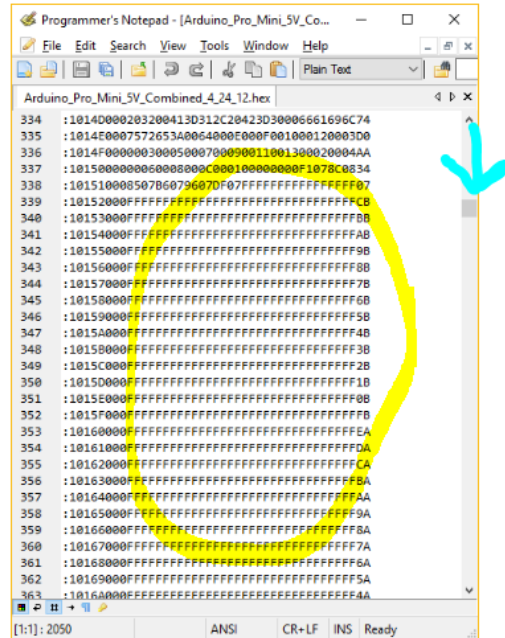
```

1 |10000000C9462000C948A000C948A000C948A0070
2 |100010000C948A000C948A000C948A000C948A0038
3 |100020000C948A000C948A000C948A000C948A0028
4 |100030000C948A000C948A000C948A000C948A0018
5 |100040000C94F4020C948A000C94C000C940C940705E0
6 |100050000C948A000C948A000C948A000C948A000F8
7 |100060000C948A000C948A000000000000240207700
8 |100070002A000000000000250020200000000000DE
9 |10008000230020002900040404040404040402020DA
10|1000900002020202020303030303030303020408102007
11|1000A00040308102040810204081020408102000812
12|1000E00000070002100000304060000000000000B9
13|1000C0000000700611241FBCFEFD0E0EBFC00002F
14|1000D000611E0A0081EB0E0EFEE00C2005900002F2F
15|1000B0000A233B107D9F712E0BA23B1E001C01D923B
16|1000F000A232B107E17F10E0BCAED0E0AC02297CF
17|10010000FE010E945207C23CD107C9F70E94AC0E69
18|100110000C9456070C940000FF920F931F93CF93F8
19|100120000DF938C01F62EC0000E00E015C008D20610E08A
20|100130000E94180469E170E0080E0905000E943C0B6
21|100140008F2D060E00E94180469E170E080E090E081
22|100150000E943C032196C017D0744F3091F91CF1915
23|10016000E1F910F91F90080569100017091101011E
24|10017000882777F0D8950820E94C30385E10E9497
25|10018000D0039093305180933081C8294140C397F2
26|1001900030F081E090E090936901809368010895C8
27|1001A000EF922F920F931F93CF930F938091020101
28|1001B00060E00E9418048091040161E00E9418042C
29|1001C00060910081791010182777F0D895982F3B
30|1001D0000F943C0381E94D008009A74F8899175

```

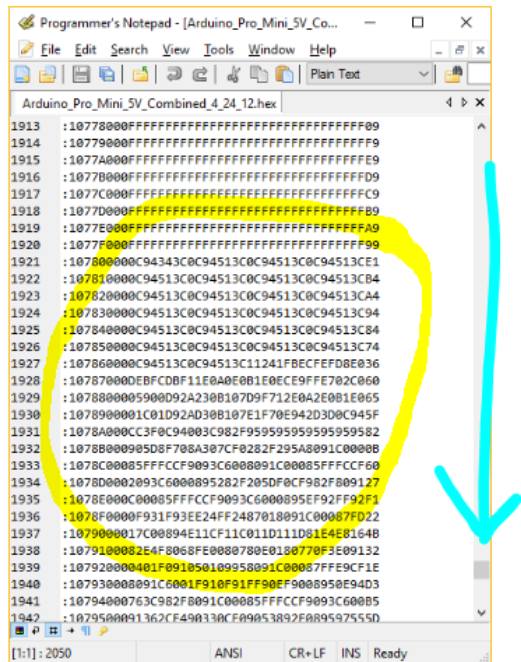
11:1 | 2050 | ANSI | CR+LF | F8 | IN | Ready

II. Blank writes in the middle.
(all “FFFFFFFFFFFF....”)



```
334 : 101400002032004130312C2042303000661696C74
335 : 1014E0007572653A0064000E00F001000120003D0
336 : 1014F0000030005000700090010001300020004AA
337 : 101500000000000000C000100000000F1078C0854
338 : 10151000507B00796070F07FFFFFFFFFFFFFFFFF07
339 : 10152000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
340 : 10153000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
341 : 10154000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
342 : 10155000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
343 : 10156000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
344 : 10157000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
345 : 10158000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
346 : 10159000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
347 : 1015A000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
348 : 1015B000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
349 : 1015C000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
350 : 1015D000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
351 : 1015E000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
352 : 1015F000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
353 : 10160000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
354 : 10161000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
355 : 10162000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
356 : 10163000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
357 : 10164000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
358 : 10165000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
359 : 10166000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
360 : 10167000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
361 : 10168000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
362 : 10169000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
363 : 1016A000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0B
```

III. “good stuff at bottom. (bootloader).”



```
1913 : 10778000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1914 : 10779000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1915 : 1077A000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1916 : 1077B000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1917 : 1077C000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1918 : 1077D000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1919 : 1077E000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1920 : 1077F000FFFFFFFFFFFFFFFFFFFFFFFFFFFFF09
1921 : 10780000C94343C0C94513C0C94513C0C94513CE1
1922 : 10781000C94513C0C94513C0C94513C0C94513CB4
1923 : 10782000C94513C0C94513C0C94513C0C94513CA4
1924 : 10783000C94513C0C94513C0C94513C0C94513C94
1925 : 10784000C94513C0C94513C0C94513C0C94513C84
1926 : 10785000C94513C0C94513C0C94513C0C94513C74
1927 : 10786000C94513C0C94513C11241FBECFEFD0E036
1928 : 10787000DEBFCDBF11E0A0E0B1E0CE9FFE702C060
1929 : 107880005900D92A230B107D9F712E0A2E0B1E065
1930 : 1078900001C01D92A0B107E1F70E942D30C945F
1931 : 1078A000C3F0C94003C982F9595959595959582
1932 : 1078B000095D8F708A307CF0282F295A8091C0000B
1933 : 1078C0005FFFCFF9093C6000091C0005FFFCFF60
1934 : 1078D0002093C6000095282F205D0CF982F809127
1935 : 1078E000C0005FFFCFF9093C6000095F92FF92F1
1936 : 1078F0000F931F93EE24FF2487018091C00067F022
1937 : 1079000017C00894E11CF11C011D011D01E4E81648
1938 : 107910002E4F8068FE0000780E0180770F3E09132
1939 : 107920000401F091050109958091C00007FFE9CF1E
1940 : 107930000091C0001F910F91FF90EF9008950E94D3
1941 : 10794000763C982F8091C0005FFFCFF9093C6000B
1942 : 1079500091362CF400330CF80053892F8095955D
```

Programmer's Notepad - [Arduino_Pro_Mini_5V_Co...]

File Edit Search View Tools Window Help

Plan Text

Arduino_Pro_Mini_5V_Combined_4_24_12.hex

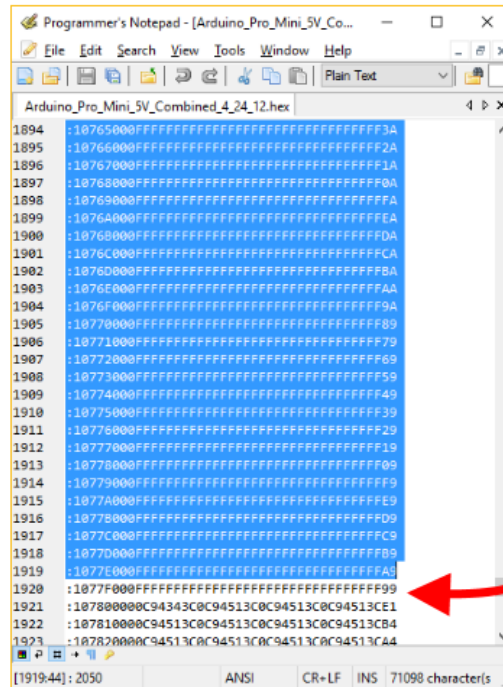
```

324 :10143000f308E408F508661F771F881F991F1A9D07
325 :1014400069F760957995809599599599591A8D001
326 :10145000CF010895A1EBB81B51E107C0AA1F8B1F8
327 :10146000A617870710F6A1BB708881F91F5A9538
328 :10147000A9F78095995958C01C0D10895E50FF1F4
329 :101480009590F491E82D0994F894FCF767265668
330 :10149000206757473696465206C9D6D974730070
331 :1014A0007672656620696E73696465206C9D6D922
332 :1014B0007473005061727420831004133082C20421
333 :1014C0003D31004144433283A0B3A085061727479
334 :1014D000203200413D312C28423D0060661696C74
335 :1014E0007572653A0064A00E00F0F10001200030
336 :1014F000003000500070009011001300020044A
337 :101500000060008000C00100000000FF1078C834
338 :10151000850786079607D0F070000000FFFFF07
339 :10152000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFC
340 :10153000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB8
341 :10154000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB8
342 :10155000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB9
343 :10156000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB8
344 :10157000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB7
345 :10158000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB6
346 :10159000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB5
347 :1015A000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB4
348 :1015B000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB3
349 :1015C000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB2
350 :1015D000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB1
351 :1015E000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB0
352 :1015F000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFBF
353 :10160000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFBA

```

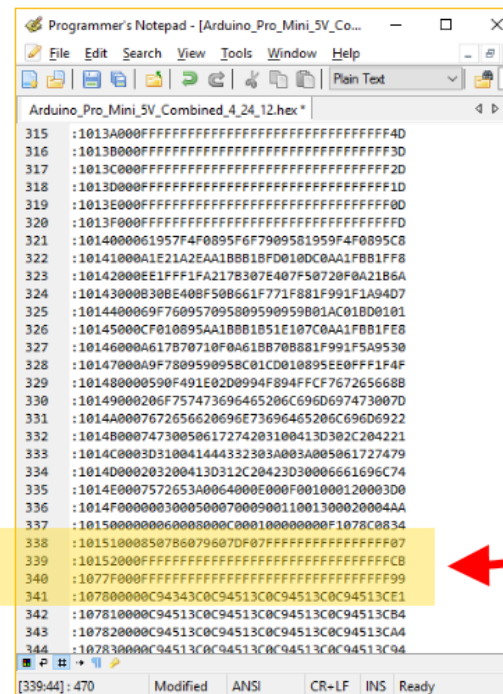
[361-44]: 2050 ANS1 9R0+LF INS 988 character(s) s

Buffer below selection.





```
Arduino_Pro_Mini_5V_Combined_4_24_12.hex
1894 :10765000FFFFFFFFFFFFFFFFFFFFFFFF3A
1895 :10766000FFFFFFFFFFFFFFFFFFFFFFFF2A
1896 :10767000FFFFFFFFFFFFFFFFFFFFFFFF1A
1897 :10768000FFFFFFFFFFFFFFFFFFFFFFFF0A
1898 :10769000FFFFFFFFFFFFFFFFFFFFFFFFFA
1899 :1076A000FFFFFFFFFFFFFFFFFFFFFFFFEA
1900 :1076B000FFFFFFFFFFFFFFFFFFFFFFFFDA
1901 :1076C000FFFFFFFFFFFFFFFFFFFFFFFFCA
1902 :1076D000FFFFFFFFFFFFFFFFFFFFFFFFBA
1903 :1076E000FFFFFFFFFFFFFFFFFFFFFFFFAA
1904 :1076F000FFFFFFFFFFFFFFFFFFFFFFFF9A
1905 :10770000FFFFFFFFFFFFFFFFFFFFFFFF89
1906 :10771000FFFFFFFFFFFFFFFFFFFFFFFF79
1907 :10772000FFFFFFFFFFFFFFFFFFFFFFFF69
1908 :10773000FFFFFFFFFFFFFFFFFFFFFFFF59
1909 :10774000FFFFFFFFFFFFFFFFFFFFFFFF49
1910 :10775000FFFFFFFFFFFFFFFFFFFFFFFF39
1911 :10776000FFFFFFFFFFFFFFFFFFFFFFFF29
1912 :10777000FFFFFFFFFFFFFFFFFFFFFFFF19
1913 :10778000FFFFFFFFFFFFFFFFFFFFFFFF09
1914 :10779000FFFFFFFFFFFFFFFFFFFFFFFFF9
1915 :1077A000FFFFFFFFFFFFFFFFFFFFFFFFE9
1916 :1077B000FFFFFFFFFFFFFFFFFFFFFFFFD9
1917 :1077C000FFFFFFFFFFFFFFFFFFFFFFFFC9
1918 :1077D000FFFFFFFFFFFFFFFFFFFFFFFFB9
1919 :1077E000FFFFFFFFFFFFFFFFFFFFFFFFA9
1920 :1077F000FFFFFFFFFFFFFFFFFFFFFFFF99
1921 :10780000C94343C0C94513C0C94513C0C94513CE1
1922 :107810000C94513C0C94513C0C94513C0C94513CB4
1923 :107820000C94513C0C94513C0C94513C0C94513CA4
```

What it looks like after deletion.



```
Arduino_Pro_Mini_5V_Combined_4_24_12.hex *
315 :1013A000FFFFFFFFFFFFFFFFFFFFFFFF4D
316 :1013B000FFFFFFFFFFFFFFFFFFFFFFFF3D
317 :1013C000FFFFFFFFFFFFFFFFFFFFFFFF2D
318 :1013D000FFFFFFFFFFFFFFFFFFFFFFFF1D
319 :1013E000FFFFFFFFFFFFFFFFFFFFFFFF0D
320 :1013F000FFFFFFFFFFFFFFFFFFFFFFFFFD
321 :1014000061957F4F0895F6F7909581959F4F0895C8
322 :10141000A1E21A2EAA18BB18FD018DC0AA1FBB1FF8
323 :10142000EE1FFF1FA2178307E407F50720F0A21B6A
324 :101430008308E408F508661F771F881F991F1A94D7
325 :1014400069F760957095809590959081AC01BD0101
326 :10145000CF010895AA188B1851E107C0AA1FBB1FE8
327 :10146000A617870710F0A618B708881F991F5A9530
328 :10147000A9F7809590958C01CD010895EE0FFF1F4F
329 :101480000590F491E02D0994F894FFCF7672656688
330 :10149000206F757473696465206C696D697473007D
331 :1014A0007672656620696E73696465206C696D6922
332 :1014B00074730050617274203100413D302C204221
333 :1014C0003D310041444332303A003A005061727479
334 :1014D000203200413D312C20423D30006661696C74
335 :1014E0007572653A0064000E00F001000120003D0
336 :1014F00000030005000700090011001300020004AA
337 :1015000000060008000C00010000000F1078C0834
338 :10151000850786079607DF07FFFFFFFFFFFFFFFFF07
339 :10152000FFFFFFFFFFFFFFFFFFFFFFFFFCB
340 :1077F000FFFFFFFFFFFFFFFFFFFFFFFF99
341 :10780000C94343C0C94513C0C94513C0C94513CE1
342 :107810000C94513C0C94513C0C94513C0C94513CB4
343 :107820000C94513C0C94513C0C94513C0C94513CA4
344 :107830000C94513C0C94513C0C94513C0C94513C94
```

5. Save new version for programming. Hell yeah! We just dropped this file size from 91KB to 21KB.

Name	Date modified	Size
 Arduino_Pro_Mini_5V_Combined_4_24_12.hex	4/24/2012 3:21 PM	91 KB
 Arduino_Pro_Mini_5V_Combined_4_24_12_SNIPPED.hex	6/13/2017 11:24 AM	21 KB

6. Verify your work. To do this properly, please follow these steps carefully and in order:
- Erase chip.
 - Program new snipped HEX file.
 - Verify against the original (aka complete) combined HEX.
 - If it verifies properly, then you are good to go. Rock on.