Various Filters and Techniques for:

Serial Data Analysis

Part 2, Kalatel Protocol

11 July 2008

Eric Hamilton

Contents

[1] `$Header: d:/Binder4/sda2/RCS/Sda2Kala.tex,v 1.3 2008-06-10 09:20:54-07 Hamilton Exp Hamilton $`

This page intentionally left blank

1 Filters for use with Kalatel's Protocols

The Kalatel protocol is difficult to work with due to it being a "busy" protocol. What this means is that it is always sending something. When something of interest is happening, the "null" command is changed into something that is different and then the system goes back to sending three byte "nulls".

1.1 BAT file for Kalatel Processing

```
makesecs %1.txt %1.out
fixk6    %1.out %1.k6
fixk2    %1.k6  %1.k2
```

[2] $Header: d:/Binder4/sda2/RCS/Kala.inc,v 1.4 2008-06-10 09:20:48-07 Hamilton Exp Hamilton $

1.1.1 KKsamp.1 Test File

```
  1  FTS capture buffer (1/30/2007 2:18:35 PM)
  2  Event 1 (1/30/2007 2:07:00.273534 PM) through
  3  Event 292,026 (1/30/2007 2:18:09.462153 PM)
  4
  5  Sd  Event# Timestamp                  Hx
  6  DTE      1 1/30/2007 2:07:00.273534 PM 00
  7  DTE      2 1/30/2007 2:07:00.275829 PM 00
  8  DTE      3 1/30/2007 2:07:00.278120 PM 80
  9  DTE      4 1/30/2007 2:07:00.280411 PM 00
 10  DTE      5 1/30/2007 2:07:00.282702 PM 00
 11  DTE      6 1/30/2007 2:07:00.284995 PM 80
 12  DTE      7 1/30/2007 2:07:00.287286 PM 00
 13  DTE      8 1/30/2007 2:07:00.289577 PM 00
 14  DTE      9 1/30/2007 2:07:00.291865 PM 80
 15  DTE     10 1/30/2007 2:07:00.294291 PM 00
 16  DTE     11 1/30/2007 2:07:00.296582 PM 00
 17  DTE     12 1/30/2007 2:07:00.298874 PM 80
 18  DTE     13 1/30/2007 2:07:00.301175 PM 00
 19  DTE     14 1/30/2007 2:07:00.303457 PM 00
 20  DTE     15 1/30/2007 2:07:00.305748 PM 80
 21  DTE     16 1/30/2007 2:07:00.308039 PM 00
 22  DTE     17 1/30/2007 2:07:00.310331 PM 00
 23  DTE     18 1/30/2007 2:07:00.312623 PM 80
 24  DTE     19 1/30/2007 2:07:00.314903 PM 00
 25  DTE     20 1/30/2007 2:07:00.317193 PM 00
 26  DTE     21 1/30/2007 2:07:00.319486 PM 80
 27  DTE     22 1/30/2007 2:07:00.321776 PM 00
 28  DTE     23 1/30/2007 2:07:00.324069 PM 00
 29  DTE     24 1/30/2007 2:07:00.326359 PM 80
 30  DTE     25 1/30/2007 2:07:00.328652 PM 00
 31  DTE     26 1/30/2007 2:07:00.330944 PM 00
 32  DTE     27 1/30/2007 2:07:00.333235 PM 80
 33  DTE     28 1/30/2007 2:07:00.335527 PM 00
 34  DTE     29 1/30/2007 2:07:00.337818 PM 00
 35  DTE     30 1/30/2007 2:07:00.340110 PM 80
 36  DTE     31 1/30/2007 2:07:00.342401 PM 00
 37  DTE     32 1/30/2007 2:07:00.344694 PM 00
 38  DTE     33 1/30/2007 2:07:00.346984 PM 80
 39  DTE     34 1/30/2007 2:07:00.349276 PM 00
 40  DTE     35 1/30/2007 2:07:00.351435 PM 00
 41  DTE     36 1/30/2007 2:07:00.353860 PM 80
 42  DTE     37 1/30/2007 2:07:00.356151 PM 00
 43  DTE     38 1/30/2007 2:07:00.358443 PM 00
 44  DTE     39 1/30/2007 2:07:00.360734 PM 80
 45  DTE     40 1/30/2007 2:07:00.363026 PM 00
 46  DTE     41 1/30/2007 2:07:00.365319 PM 00
 47  DTE     42 1/30/2007 2:07:00.367611 PM 80
 48  DTE     43 1/30/2007 2:07:00.369903 PM 00
 49  DTE     44 1/30/2007 2:07:00.372193 PM 00
 50  DTE     45 1/30/2007 2:07:00.374485 PM 80
 51  DTE     46 1/30/2007 2:07:00.376776 PM 00
 52  DTE     47 1/30/2007 2:07:00.379068 PM 00
 53  DTE     48 1/30/2007 2:07:00.381337 PM 80
 54  DTE     49 1/30/2007 2:07:00.383651 PM 00
 55  DTE     50 1/30/2007 2:07:00.385945 PM 00
 56  DTE     51 1/30/2007 2:07:00.388235 PM 80
 57  DTE     52 1/30/2007 2:07:00.390526 PM 00
 58  DTE     53 1/30/2007 2:07:00.392818 PM 00
 59  DTE     54 1/30/2007 2:07:00.395109 PM 80
 60  DTE     55 1/30/2007 2:07:00.397402 PM 00
 61  DTE     56 1/30/2007 2:07:00.399693 PM 00
 62  DTE     57 1/30/2007 2:07:00.401985 PM 80
 63  DTE     58 1/30/2007 2:07:00.404276 PM 00
 64  DTE     59 1/30/2007 2:07:00.406568 PM 00
 65  DTE     60 1/30/2007 2:07:00.408860 PM 80
 66  DTE     61 1/30/2007 2:07:00.411151 PM 00
 67  DTE     62 1/30/2007 2:07:00.413443 PM 00
 68  DTE     63 1/30/2007 2:07:00.415735 PM 80
 69  DTE     64 1/30/2007 2:07:00.418027 PM 00
 70  DTE     65 1/30/2007 2:07:00.420319 PM 00
 71  DTE     66 1/30/2007 2:07:00.422609 PM 80
 72  DTE     67 1/30/2007 2:07:00.424901 PM 00
 73  DTE     68 1/30/2007 2:07:00.427193 PM 00
 74  DTE     69 1/30/2007 2:07:00.429484 PM 80
 75  DTE     70 1/30/2007 2:07:00.431777 PM 00
 76  DTE     71 1/30/2007 2:07:00.434068 PM 00
 77  DTE     72 1/30/2007 2:07:00.436360 PM 80
 78  DTE     73 1/30/2007 2:07:00.438651 PM 00
 79  DTE     74 1/30/2007 2:07:00.440943 PM 00
 80  DTE     75 1/30/2007 2:07:00.443235 PM 80
 81  DTE     76 1/30/2007 2:07:00.445526 PM 00
 82  DTE     77 1/30/2007 2:07:00.447819 PM 00
 83  DTE     78 1/30/2007 2:07:00.450110 PM 80
 84  DTE     79 1/30/2007 2:07:00.452402 PM 00
 85  DTE     80 1/30/2007 2:07:00.454693 PM 00
 86  DTE     81 1/30/2007 2:07:00.456909 PM 80
 87  DTE     82 1/30/2007 2:07:00.459277 PM 00
 88  DTE     83 1/30/2007 2:07:00.461452 PM 00
 89  DTE     84 1/30/2007 2:07:00.463860 PM 80
 90  DTE     85 1/30/2007 2:07:00.466151 PM 00
 91  DTE     86 1/30/2007 2:07:00.468443 PM 00
 92  DTE     87 1/30/2007 2:07:00.470735 PM 80
 93  DTE     88 1/30/2007 2:07:00.473027 PM 00
 94  DTE     89 1/30/2007 2:07:00.475318 PM 00
 95  DTE     90 1/30/2007 2:07:00.477609 PM 80
 96  DTE     91 1/30/2007 2:07:00.479902 PM 00
 97  DTE     92 1/30/2007 2:07:00.482193 PM 00
 98  DTE     93 1/30/2007 2:07:00.484485 PM 80
 99  DTE     94 1/30/2007 2:07:00.486777 PM 00
100  DTE     95 1/30/2007 2:07:00.489078 PM 00
101  DTE     96 1/30/2007 2:07:00.491367 PM 80
102  DTE     97 1/30/2007 2:07:00.493652 PM 00
103  DTE     98 1/30/2007 2:07:00.495944 PM 00
104  DTE     99 1/30/2007 2:07:00.498236 PM 80
105  DTE    100 1/30/2007 2:07:00.500527 PM 00
106  DTE    101 1/30/2007 2:07:00.502818 PM 00
107  DTE    102 1/30/2007 2:07:00.505109 PM 80
108  DTE    103 1/30/2007 2:07:00.507401 PM 00
109  DTE    104 1/30/2007 2:07:00.509693 PM 00
110  DTE    105 1/30/2007 2:07:00.511985 PM 80
111  DTE    106 1/30/2007 2:07:00.514277 PM 00
112  DTE    107 1/30/2007 2:07:00.516567 PM 00
113  DTE    108 1/30/2007 2:07:00.518860 PM 80
114  DTE    109 1/30/2007 2:07:00.521151 PM 00
115  DTE    110 1/30/2007 2:07:00.523443 PM 00
116  DTE    111 1/30/2007 2:07:00.525734 PM 80
117  DTE    112 1/30/2007 2:07:00.528026 PM 00
118  DTE    113 1/30/2007 2:07:00.530318 PM 00
119  DTE    114 1/30/2007 2:07:00.532609 PM 80
120  DTE    115 1/30/2007 2:07:00.534902 PM 00
121  DTE    116 1/30/2007 2:07:00.537193 PM 00
122  DTE    117 1/30/2007 2:07:00.539484 PM 80
123  DTE    118 1/30/2007 2:07:00.541642 PM 00
124  DTE    119 1/30/2007 2:07:00.544069 PM 00
125  DTE    120 1/30/2007 2:07:00.546360 PM 80
126  DTE    121 1/30/2007 2:07:00.548651 PM 00
127  DTE    122 1/30/2007 2:07:00.550943 PM 00
128  DTE    123 1/30/2007 2:07:00.553106 PM 80
129  DTE    124 1/30/2007 2:07:00.555532 PM 00
130  DTE    125 1/30/2007 2:07:00.557818 PM 00
131  DTE    126 1/30/2007 2:07:00.560110 PM 80
132  DTE    127 1/30/2007 2:07:00.562401 PM 00
133  DTE    128 1/30/2007 2:07:00.564681 PM 00
134  DTE    129 1/30/2007 2:07:00.566972 PM 80
135  DTE    130 1/30/2007 2:07:00.569264 PM 00
136  DTE    131 1/30/2007 2:07:00.571563 PM 00
137  DTE    132 1/30/2007 2:07:00.573716 PM 80
138  DTE    133 1/30/2007 2:07:00.576139 PM 00
139  DTE    134 1/30/2007 2:07:00.578429 PM 00
140  DTE    135 1/30/2007 2:07:00.580722 PM 80
```

1.2 FixK2

FixK2 is used to delete all poll/no-data messages.

1. This filter is written in Flex.
2. This filter is suitable for use with Kalatel's Protocols only.
3. This filter requires preprocessing by MakeSecs.
4. This filter is sensitive to having DCE (for data coming from the Keyboard) and DTE (for data coming from the Dome) having data coming from the Headend/Keyboard or the Dome/Camera.
5. A sample `.BAT` file for processing Kalatel files is shown in Section 1.1, page 3.
6. **Listing of: `hkk.k6` a typical input file.**

```
 1   00 00
 2       1,       3:  DTE      3     0.004586   0.002291 80 00 00
 3       1,       6:  DTE      6     0.011461   0.002293 80 00 00
 4       1,       9:  DTE      9     0.018331   0.002288 80 00 00
 5       1,      12:  DTE     12     0.025340   0.002292 80 00 00
 6       1,      15:  DTE     15     0.032214   0.002291 80 00 00
 7       1,      18:  DTE     18     0.039089   0.002292 80 00 00
 8       1,      21:  DTE     21     0.045952   0.002293 80 00 00
 9       1,      24:  DTE     24     0.052825   0.002290 80 00 00
10       1,      27:  DTE     27     0.059701   0.002291 80 00 00
11       1,      30:  DTE     30     0.066576   0.002292 80 00 00
12       1,      33:  DTE     33     0.073450   0.002290 80 00 00
13       1,      36:  DTE     36     0.080326   0.002425 80 00 00
14       1,      39:  DTE     39     0.087200   0.002291 80 00 00
15       1,      42:  DTE     42     0.094077   0.002292 80 00 00
16       1,      45:  DTE     45     0.100951   0.002292 80 00 00
17       1,      48:  DTE     48     0.107803   0.002269 80 00 00
18       1,      51:  DTE     51     0.114701   0.002290 80 00 00
19       1,      54:  DTE     54     0.121575   0.002291 80 00 00
20       1,      57:  DTE     57     0.128451   0.002292 80 00 00
```

7. **Listing of: `hkk.k2` a typical output file.**

```
 1   00 00
 2       1,    4551:  DTE   4551    10.426697   0.002290 80 00 01 a8 1f 00
 3       1,    4581:  DTE   4581    10.495448   0.002458 80 00 01 a8 1f 00
 4       1,    4611:  DTE   4611    10.564184   0.002291 80 00 01 a8 1f 00
 5       1,    4641:  DTE   4641    10.632944   0.002300 80 00 01 a8 1f 00
 6       1,    4671:  DTE   4671    10.701684   0.002290 80 00 01 a8 1f 00
 7       1,    4701:  DTE   4701    10.770422   0.002291 80 00 01 a8 1f 00
 8       1,    4731:  DTE   4731    10.839171   0.002291 80 00 01 a8 1f 00
 9       1,    4761:  DTE   4761    10.907929   0.002299 80 00 01 a8 1f 00
10       1,    4791:  DTE   4791    10.976672   0.002348 80 00 01 a8 1f 00
11       1,    4821:  DTE   4821    11.045409   0.002291 80 00 01 a8 1f 00
12       1,    4851:  DTE   4851    11.114159   0.002293 80 00 01 a8 1f 00
13       1,    4881:  DTE   4881    11.182908   0.002292 80 00 01 a8 1f 00
14       1,    4911:  DTE   4911    11.251646   0.002293 80 00 01 a8 1f 00
15       1,    4941:  DTE   4941    11.320396   0.002293 80 00 01 a8 1f 00
16       1,    4971:  DTE   4971    11.389146   0.002293 80 00 01 a8 1f 00
17       1,    5001:  DTE   5001    11.457896   0.002292 80 00 01 a8 1f 00
18       1,    5031:  DTE   5031    11.526633   0.002376 80 00 01 a8 1f 00
19       1,    5061:  DTE   5061    11.595383   0.002292 80 00 01 a8 1f 00
20       1,    5091:  DTE   5091    11.664133   0.002290 80 00 01 a8 1f 00
```

1.2.1 Listing of FixK2.l

```
%{
//123456789 123456789 123456789 123456789 123456789 123456789
//     1,       3:  DTE      3     0.004586   0.002291 80 00 00
//     1,       6:  DTE      6     0.011461   0.002293 80 00 00
//     1,       9:  DTE      9     0.018331   0.002288 80 00 00
//123456789 123456789 123456789 123456789 123456789 123456789
// $Header: d:/Binder4/sda2/RCS/FixK2.l,v 1.2 2008-03-05 12:54:36-08 Hamilton Exp Hamilton $
// FIXK2 is used to delete all poll/no-data messages.
#include <stdio.h>
#include <stdlib.h>
#undef yywrap

%}
%%
^.*"80 00 00"\n  ;

.|\n     ECHO;
%%
// yywrap is for End Of File processing, 1 = done
int yywrap(void)
{
        return 1;
}

main(int argc, char *argv[])
{
        fprintf(stderr,"$Id: FixK2.l,v 1.2 2008-03-05 12:54:36-08 Hamilton Exp Hamilton $\n");

        // Do we have to deal with stdin/stdout?
        // 3 = one for the program name and one each for input and output names
        if (argc == 3) {
            // Nope
            // Get over the program, etc., name
            argc--;
            argv++;
            yyin = fopen(argv[0],"r");
            if (yyin == NULL) {
                fprintf(stderr,"\aCould not open \"%s\" for reading, quitting",
                                argv[0]);
                exit(EXIT_FAILURE);
            }

            // Now get over the input file name and get to the output file name
            argc--;
            argv++;
            yyout = fopen(argv[0],"w");
            if (yyout == NULL) {
                fprintf(stderr,"\aCould not open \"%s\" for writing, quitting",
                                argv[0]);
                exit(EXIT_FAILURE);
            }
        }
        else {
            // Woops we are using std... type io
            yyin  = stdin;
            yyout = stdout;
        }

        yylex();
        exit(EXIT_SUCCESS);
}

// $Log: FixK2.l,v $
// Revision 1.2  2008-03-05 12:54:36-08  Hamilton
// Normal end of day data saving
//
// Revision 1.1  2007-06-14 13:57:32-07  Hamilton
// Initial revision
```

```
69  //
70  // Revision 1.1  2007-01-31 14:13:12-08  Hamilton
71  // Initial revision
72  //
73
```

1.3 FixK6

FixK6 is used to format Kalatel files processed by MakeSecs so that "null" commands and "real" commands are together on each line. When useful information is desired, the "null" commands have to be deleted with FixK2.

1. This filter is written in Flex.
2. This filter is suitable for use with Kalatel's Protocols only.
3. This filter requires preprocessing by MakeSecs.
4. This filter is sensitive to having DCE (for data coming from the Keyboard) and DTE (for data coming from the Dome) having data coming from the Headend/Keyboard or the Dome/Camera.
5. A sample `.BAT` file for processing Kalatel files is shown in Section 1.1, page 3.
6. **Listing of: `hkk.out` a typical input file.**

```
 1  $ Id: MakeSecs.l,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder4/sda2/RCS/Hkk.out,v 1.2 2008-03-05 14:35:11-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (1/30/2007 2:18:35 PM)
 4  Event 1 (1/30/2007 2:07:00.273534 PM) through
 5  Event 292,026 (1/30/2007 2:18:09.462153 PM)
 6
 7
 8       1,       1:  DTE      1     0.000000   0.000000 00
 9       1,       2:  DTE      2     0.002295   0.002295 00
10       1,       3:  DTE      3     0.004586   0.002291 80
11       1,       4:  DTE      4     0.006877   0.002291 00
12       1,       5:  DTE      5     0.009168   0.002291 00
13       1,       6:  DTE      6     0.011461   0.002293 80
14       1,       7:  DTE      7     0.013752   0.002291 00
15       1,       8:  DTE      8     0.016043   0.002291 00
16       1,       9:  DTE      9     0.018331   0.002288 80
17       1,      10:  DTE     10     0.020757   0.002426 00
18       1,      11:  DTE     11     0.023048   0.002291 00
19       1,      12:  DTE     12     0.025340   0.002292 80
20       1,      13:  DTE     13     0.027641   0.002301 00
```

7. **Listing of: `hkk.k6` a typical output file.**

```
 1   00 00
 2       1,       3:  DTE      3     0.004586   0.002291 80 00 00
 3       1,       6:  DTE      6     0.011461   0.002293 80 00 00
 4       1,       9:  DTE      9     0.018331   0.002288 80 00 00
 5       1,      12:  DTE     12     0.025340   0.002292 80 00 00
 6       1,      15:  DTE     15     0.032214   0.002291 80 00 00
 7       1,      18:  DTE     18     0.039089   0.002292 80 00 00
 8       1,      21:  DTE     21     0.045952   0.002293 80 00 00
 9       1,      24:  DTE     24     0.052825   0.002290 80 00 00
10       1,      27:  DTE     27     0.059701   0.002291 80 00 00
11       1,      30:  DTE     30     0.066576   0.002292 80 00 00
12       1,      33:  DTE     33     0.073450   0.002290 80 00 00
13       1,      36:  DTE     36     0.080326   0.002425 80 00 00
14       1,      39:  DTE     39     0.087200   0.002291 80 00 00
15       1,      42:  DTE     42     0.094077   0.002292 80 00 00
16       1,      45:  DTE     45     0.100951   0.002292 80 00 00
17       1,      48:  DTE     48     0.107803   0.002269 80 00 00
18       1,      51:  DTE     51     0.114701   0.002290 80 00 00
19       1,      54:  DTE     54     0.121575   0.002291 80 00 00
20       1,      57:  DTE     57     0.128451   0.002292 80 00 00
```

1.3.1 Listing of FixK6.l

```
%{
//123456789 123456789 123456789 123456789 123456789 123456789
//     1,       3:  DTE      3     0.004586   0.002291 80
//     1,       4:  DTE      4     0.006877   0.002291 00
//     1,       5:  DTE      5     0.009168   0.002291 00
//     1,       6:  DTE      6     0.011461   0.002293 80
//     1,       7:  DTE      7     0.013752   0.002291 00
//     1,       8:  DTE      8     0.016043   0.002291 00
//     1,       9:  DTE      9     0.018331   0.002288 80
//     1,      10:  DTE     10     0.020757   0.002426 00
//     1,      11:  DTE     11     0.023048   0.002291 00
//123456789 123456789 123456789 123456789 123456789 123456789
// $Header: d:/Binder4/sda2/RCS/FixK6.l,v 1.2 2008-03-05 14:35:10-08 Hamilton Exp Hamilton $
// FIXK6 is used to group all messages together on one line.
#include <stdio.h>
#include <stdlib.h>
#undef yywrap

%}
%%
.*[0-9a-f]{2}$  {
             if ((yytext[53] == '8') &&
                 (yytext[54] == '0'))
             {
                 fprintf(yyout,"\n%s",yytext);
             }
             else
             {
                 fprintf(yyout," %c%c",yytext[53],yytext[54]);
             }
          }


.|\n     ;
%%
// yywrap is for End Of File processing, 1 = done
int yywrap(void)
{
        return 1;
}

main(int argc, char *argv[])
{
        fprintf(stderr,"$Id: FixK6.l,v 1.2 2008-03-05 14:35:10-08 Hamilton Exp Hamilton $\n");

        // Do we have to deal with stdin/stdout?
        // 3 = one for the program name and one each for input and output names
        if (argc == 3) {
            // Nope
            // Get over the program, etc., name
            argc--;
            argv++;
            yyin = fopen(argv[0],"r");
            if (yyin == NULL) {
                fprintf(stderr,"\aCould not open \"%s\" for reading, quitting",
                                argv[0]);
                exit(EXIT_FAILURE);
            }

            // Now get over the input file name and get to the output file name
            argc--;
            argv++;
            yyout = fopen(argv[0],"w");
            if (yyout == NULL) {
                fprintf(stderr,"\aCould not open \"%s\" for writing, quitting",
                                argv[0]);
                exit(EXIT_FAILURE);
            }
```

```
69          }
70          else {
71              // Woops we are using std... type io
72              yyin  = stdin;
73              yyout = stdout;
74          }
75
76          yylex();
77          exit(EXIT_SUCCESS);
78  }
79
80  // $Log: FixK6.l,v $
81  // Revision 1.2  2008-03-05 14:35:10-08  Hamilton
82  // Normal end of day data saving
83  //
84  // Revision 1.1  2008-03-05 12:38:44-08  Hamilton
85  // Initial revision
86  //
87  // Revision 1.1  2007-06-14 13:57:28-07  Hamilton
88  // Initial revision
89  //
90  // Revision 1.1  2007-01-31 14:13:00-08  Hamilton
91  // Initial revision
92  //
93
```

Index