Various Filters and Techniques for:

Serial Data Analysis

Part 2

General Use Filters

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Contents

[1] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/SDA2.tex,v 1.16 2011-07-08 12:22:44-07 Hamilton Exp Hamilton $`

List of Tables

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1 Common problems

1.1 Working with Interleaved DCE/DTE Data

Note

There has been an effort to upgrade the various filters listed here. Those filters that have been upgraded have had a "Q" appended to their name if there was room or had the last character of their name changed to a "Q" if appending a letter would violate the 8.3 naming convention.

In this set of documentation the old and new names may appear depending on the software update schedule. (And any documentation errors that may occur!)

Sometimes advantage is take of the fact that when two pairs of wires are used for communications with a dome, that data may be transfered simultaneously in both directions. Interperting a data capture when this happens is difficult (actually it just gets confusing). The following example will show, step by step, how a sample of interleaved commands/replies may be "cleaned up" for D Protcol. A similar process may be used with other protocols by replacing the FixD routines with the proper equivalent for the other protocol.

Data was at a baud rate of 9600, 1 start bit, 8 data bits and 1 stop bit, with no parity. This the edited, for length, data. At 9600 baud each byte has a duration of about 0.001042 second.

DTE is the DynaPel unit, DCE is the Spectra III.

1.1.1 Original Data Capture Record

(Listing shown on page 6.)

This data capture record was made using a DyanPel unit and a Spectra III. and is shown on page 6.

1.1.2 Original Data Capture Record After Processing by MSxq (MakeSecX)

(Listing shown on page 7.)

Note that the data starts out with something being sent out and then something returning. However around lines 16/18, one byte goes in one direction and the direction, almost immediately, another byte goes the opposite direction. This pattern of "normal" command/response and "interleaved" comand/response repeats several times.

Looking at lines 100 and 102, you should note that the DTE byte is comming in at the same time that the preceeding DCE byte was also comming in. This event set repeats several times.

1.1.3 Independent Saving of Each Direction of Data

(Listing shown on pages 8 and 8.)

The next two listings show the result of extracting just the DTE and DCE utilizing the GetDte and GetDce filters. Up to this point, the actual protocol being processed is unimportant. I.e. there has been no protocol specific processing on the data done yet.

[2] $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Interl.inc,v 1.4 2011-07-08 11:43:38-07 Hamilton Exp Hamilton $

ilv0.txt

```
FTS capture buffer (2/12/2008 11:07:09 AM)
Event 1 (2/12/2008 11:05:51.949358 AM) through
Event 7,823 (2/12/2008 11:06:56.451268 AM)

Sd  Event# Timestamp                  Hx
DTE    397 2/12/2008 11:06:18.979707 AM ff
DTE    398 2/12/2008 11:06:18.980746 AM 01
DTE    399 2/12/2008 11:06:18.981787 AM 00
DTE    400 2/12/2008 11:06:18.982829 AM 51
DTE    401 2/12/2008 11:06:18.983871 AM 00
DTE    402 2/12/2008 11:06:18.984827 AM 00
DTE    403 2/12/2008 11:06:18.985954 AM 52
DTE    404 2/12/2008 11:06:18.986996 AM ff
DTE    405 2/12/2008 11:06:18.988037 AM 01
DCE    406 2/12/2008 11:06:18.988433 AM ff
DTE    407 2/12/2008 11:06:18.989079 AM 00
DCE    408 2/12/2008 11:06:18.989475 AM 01
DTE    409 2/12/2008 11:06:18.990121 AM 53
DCE    410 2/12/2008 11:06:18.990515 AM 00
DTE    411 2/12/2008 11:06:18.991162 AM 00
DCE    412 2/12/2008 11:06:18.991552 AM 59
DTE    413 2/12/2008 11:06:18.992204 AM 00
DCE    414 2/12/2008 11:06:18.992592 AM 17
DTE    415 2/12/2008 11:06:18.993246 AM 54
DCE    416 2/12/2008 11:06:18.993634 AM b1
DCE    417 2/12/2008 11:06:18.994679 AM 22
DCE    418 2/12/2008 11:06:19.122701 AM ff
DCE    419 2/12/2008 11:06:19.123739 AM 01
DCE    420 2/12/2008 11:06:19.124772 AM 00
DCE    421 2/12/2008 11:06:19.125813 AM 5b
DCE    422 2/12/2008 11:06:19.126855 AM 17
DCE    423 2/12/2008 11:06:19.127896 AM d0
DCE    424 2/12/2008 11:06:19.128934 AM 43
DTE    425 2/12/2008 11:06:19.136372 AM ff
DTE    426 2/12/2008 11:06:19.137413 AM 01
DTE    427 2/12/2008 11:06:19.138453 AM 00
DTE    428 2/12/2008 11:06:19.139495 AM 55
DTE    429 2/12/2008 11:06:19.140537 AM 00
DTE    430 2/12/2008 11:06:19.141579 AM 00
DTE    431 2/12/2008 11:06:19.142621 AM 56
DCE    432 2/12/2008 11:06:19.198929 AM ff
DCE    433 2/12/2008 11:06:19.199969 AM 01
DCE    434 2/12/2008 11:06:19.201003 AM 00
DCE    435 2/12/2008 11:06:19.202046 AM 5d
DCE    436 2/12/2008 11:06:19.203088 AM 01
DCE    437 2/12/2008 11:06:19.204127 AM ff
DCE    438 2/12/2008 11:06:19.205146 AM 5e
DTE    439 2/12/2008 11:06:19.211162 AM ff
DTE    440 2/12/2008 11:06:19.212036 AM 01
DTE    441 2/12/2008 11:06:19.213244 AM 00
DTE    442 2/12/2008 11:06:19.214287 AM 25
DTE    443 2/12/2008 11:06:19.215161 AM 00
DTE    444 2/12/2008 11:06:19.216370 AM 01
DTE    445 2/12/2008 11:06:19.217413 AM 27
DCE    446 2/12/2008 11:06:19.219101 AM ff
DCE    447 2/12/2008 11:06:19.220145 AM 01
DCE    448 2/12/2008 11:06:19.221180 AM 00
DCE    449 2/12/2008 11:06:19.222222 AM 27
DTE    450 2/12/2008 11:06:19.228036 AM ff
DTE    451 2/12/2008 11:06:19.229078 AM 01
DTE    452 2/12/2008 11:06:19.230119 AM 00
DTE    453 2/12/2008 11:06:19.231162 AM 00
DTE    454 2/12/2008 11:06:19.232204 AM 00
DTE    455 2/12/2008 11:06:19.233245 AM 00
DTE    456 2/12/2008 11:06:19.234287 AM 01
DCE    457 2/12/2008 11:06:19.300225 AM ff
DCE    458 2/12/2008 11:06:19.301262 AM 01
DCE    459 2/12/2008 11:06:19.302300 AM 00
DCE    460 2/12/2008 11:06:19.303341 AM 01
DTE    461 2/12/2008 11:06:19.309079 AM ff
DTE    462 2/12/2008 11:06:19.310119 AM 01
DTE    463 2/12/2008 11:06:19.311162 AM 00
DTE    464 2/12/2008 11:06:19.312045 AM 51
DTE    465 2/12/2008 11:06:19.313245 AM 00
DTE    466 2/12/2008 11:06:19.314287 AM 00
DTE    467 2/12/2008 11:06:19.315303 AM 52
DTE    468 2/12/2008 11:06:19.316371 AM ff
DTE    469 2/12/2008 11:06:19.317413 AM 01
DCE    470 2/12/2008 11:06:19.317905 AM ff
DTE    471 2/12/2008 11:06:19.318453 AM 00
DCE    472 2/12/2008 11:06:19.318939 AM 01
DTE    473 2/12/2008 11:06:19.319496 AM 53
DCE    474 2/12/2008 11:06:19.319980 AM 00
DTE    475 2/12/2008 11:06:19.320537 AM 00
DCE    476 2/12/2008 11:06:19.321022 AM 59
DTE    477 2/12/2008 11:06:19.321579 AM 00
DCE    478 2/12/2008 11:06:19.322065 AM 17
DTE    479 2/12/2008 11:06:19.322621 AM 54
DCE    480 2/12/2008 11:06:19.323101 AM b1
DCE    481 2/12/2008 11:06:19.324142 AM 22
DCE    482 2/12/2008 11:06:19.325192 AM ff
DCE    483 2/12/2008 11:06:19.326226 AM 01
DCE    484 2/12/2008 11:06:19.327261 AM 00
DCE    485 2/12/2008 11:06:19.328301 AM 5b
DCE    486 2/12/2008 11:06:19.329344 AM 17
DCE    487 2/12/2008 11:06:19.330384 AM d0
DCE    488 2/12/2008 11:06:19.331420 AM 43
DTE    489 2/12/2008 11:06:19.338870 AM ff
DTE    490 2/12/2008 11:06:19.339912 AM 01
DTE    491 2/12/2008 11:06:19.340953 AM 00
DTE    492 2/12/2008 11:06:19.341995 AM 55
DTE    493 2/12/2008 11:06:19.343036 AM 00
DTE    494 2/12/2008 11:06:19.344079 AM 00
DTE    495 2/12/2008 11:06:19.345120 AM 56
DCE    496 2/12/2008 11:06:19.400790 AM ff
DCE    497 2/12/2008 11:06:19.401831 AM 01
DCE    498 2/12/2008 11:06:19.402872 AM 00
DCE    499 2/12/2008 11:06:19.403906 AM 5d
DCE    500 2/12/2008 11:06:19.404948 AM 01
DCE    501 2/12/2008 11:06:19.406025 AM ff
DCE    502 2/12/2008 11:06:19.407032 AM 5e
DTE    503 2/12/2008 11:06:19.413246 AM ff
DTE    504 2/12/2008 11:06:19.414703 AM 01
DTE    505 2/12/2008 11:06:19.415745 AM 00
DTE    506 2/12/2008 11:06:19.416788 AM 2a
DTE    507 2/12/2008 11:06:19.417829 AM 40
DTE    508 2/12/2008 11:06:19.418870 AM 3f
DTE    509 2/12/2008 11:06:19.419912 AM aa
DTE    510 2/12/2008 11:06:19.420954 AM ff
DCE    511 2/12/2008 11:06:19.421589 AM ff
DTE    512 2/12/2008 11:06:19.421996 AM 01
DCE    513 2/12/2008 11:06:19.422630 AM 01
DTE    514 2/12/2008 11:06:19.423036 AM 00
DCE    515 2/12/2008 11:06:19.423667 AM 00
DTE    516 2/12/2008 11:06:19.424077 AM 55
DCE    517 2/12/2008 11:06:19.424709 AM aa
DTE    518 2/12/2008 11:06:19.425120 AM 00
DTE    519 2/12/2008 11:06:19.426162 AM 00
DTE    520 2/12/2008 11:06:19.427204 AM 56
DCE    521 2/12/2008 11:06:19.631777 AM ff
DCE    522 2/12/2008 11:06:19.632813 AM 01
DCE    523 2/12/2008 11:06:19.633856 AM 00
DCE    524 2/12/2008 11:06:19.634890 AM 5d
DCE    525 2/12/2008 11:06:19.635766 AM 02
DCE    526 2/12/2008 11:06:19.636975 AM 05
DCE    527 2/12/2008 11:06:19.638009 AM 65
DTE    528 2/12/2008 11:06:19.645435 AM ff
DTE    529 2/12/2008 11:06:19.646891 AM 01
DTE    530 2/12/2008 11:06:19.647933 AM 00
DTE    531 2/12/2008 11:06:19.648975 AM 2a
DTE    532 2/12/2008 11:06:19.650016 AM 40
DTE    533 2/12/2008 11:06:19.651057 AM 3f
DTE    534 2/12/2008 11:06:19.652100 AM aa
DTE    535 2/12/2008 11:06:19.653141 AM ff
DTE    536 2/12/2008 11:06:19.654183 AM 01
DTE    537 2/12/2008 11:06:19.655225 AM 00
DTE    538 2/12/2008 11:06:19.656265 AM 51
DTE    539 2/12/2008 11:06:19.657308 AM 00
DTE    540 2/12/2008 11:06:19.658350 AM 00
DTE    541 2/12/2008 11:06:19.659391 AM 52
DCE    542 2/12/2008 11:06:19.666400 AM ff
DCE    543 2/12/2008 11:06:19.667442 AM 01
DCE    544 2/12/2008 11:06:19.668483 AM 00
DCE    545 2/12/2008 11:06:19.669525 AM aa
DCE    546 2/12/2008 11:06:19.670561 AM ff
DCE    547 2/12/2008 11:06:19.671602 AM 01
DCE    548 2/12/2008 11:06:19.672643 AM 00
DCE    549 2/12/2008 11:06:19.673686 AM 59
DCE    550 2/12/2008 11:06:19.674720 AM 21
DCE    551 2/12/2008 11:06:19.675773 AM 36
DCE    552 2/12/2008 11:06:19.676806 AM b1
DTE    553 2/12/2008 11:06:19.768359 AM ff
DTE    554 2/12/2008 11:06:19.769808 AM 01
DTE    555 2/12/2008 11:06:19.770850 AM 00
DTE    556 2/12/2008 11:06:19.771891 AM 2a
DTE    557 2/12/2008 11:06:19.772933 AM 31
DTE    558 2/12/2008 11:06:19.773975 AM 3f
DTE    559 2/12/2008 11:06:19.775017 AM 9b
DTE    560 2/12/2008 11:06:19.775965 AM ff
DCE    561 2/12/2008 11:06:19.776330 AM ff
DTE    562 2/12/2008 11:06:19.777098 AM 01
DCE    563 2/12/2008 11:06:19.777378 AM 01
DTE    564 2/12/2008 11:06:19.778140 AM 00
DCE    565 2/12/2008 11:06:19.778421 AM 00
DTE    566 2/12/2008 11:06:19.779040 AM 53
DCE    567 2/12/2008 11:06:19.779454 AM 9b
DTE    568 2/12/2008 11:06:19.780224 AM 00
DTE    569 2/12/2008 11:06:19.781266 AM 00
DTE    570 2/12/2008 11:06:19.782308 AM 54
DCE    571 2/12/2008 11:06:19.784649 AM ff
DCE    572 2/12/2008 11:06:19.785691 AM 01
DCE    573 2/12/2008 11:06:19.786565 AM 00
DCE    574 2/12/2008 11:06:19.787767 AM 5b
DCE    575 2/12/2008 11:06:19.788809 AM 12
DCE    576 2/12/2008 11:06:19.789851 AM 00
DCE    577 2/12/2008 11:06:19.790893 AM 6e
```

ilv0.out

```
    1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
    2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Ilv0.out,v 1.1 2008-03-10
09:33:40-08 Hamilton Exp Hamilton $
    3  FTS capture buffer (2/12/2008 11:07:09 AM)
    4  Event 1 (2/12/2008 11:05:51.949358 AM) through
    5  Event 7,823 (2/12/2008 11:06:56.451268 AM)
    6
    7
    8       1,       1:  DTE        1      0.000000  0.000000 ff
    9       1,       2:  DTE        2      0.001039  0.001039 01
   10       1,       3:  DTE        3      0.002080  0.001041 00
   11       1,       4:  DTE        4      0.003122  0.001042 51
   12       1,       5:  DTE        5      0.004164  0.001042 00
   13       1,       6:  DTE        6      0.005120  0.000956 00
   14       1,       7:  DTE        7      0.006247  0.001127 52
   15       1,       8:  DTE        8      0.007289  0.001042 ff
   16       1,       9:  DTE        9      0.008330  0.001041 01
   17
   18       2,       1: DCE        10      0.008726  0.000396 ff
   19
   20       2,      10:  DTE       11      0.009372  0.000396 00
   21
   22       3,       2: DCE        12      0.009768  0.000396 01
   23
   24       3,      11:  DTE       13      0.010414  0.000646 53
   25
   26       4,       3: DCE        14      0.010808  0.000394 00
   27
   28       4,      12:  DTE       15      0.011455  0.000394 00
   29
   30       5,       4: DCE        16      0.011845  0.000394 59
   31
   32       5,      13:  DTE       17      0.012497  0.000652 00
   33
   34       6,       5: DCE        18      0.012885  0.000388 17
   35
   36       6,      14:  DTE       19      0.013539  0.000388 54
   37
   38       7,       6: DCE        20      0.013927  0.000388 b1
   39       7,       7: DCE        21      0.014972  0.000388 22
   40       7,       8: DCE        22      0.142994  0.000388 ff
   41       7,       9: DCE        23      0.144032  0.000388 01
   42       7,      10: DCE        24      0.145065  0.000388 00
   43       7,      11: DCE        25      0.146106  0.000388 5b
   44       7,      12: DCE        26      0.147148  0.000388 17
   45       7,      13: DCE        27      0.148189  0.000388 d0
   46       7,      14: DCE        28      0.149227  0.000388 43
   47
   48       7,      15:  DTE       29      0.156665  0.007438 ff
   49       7,      16:  DTE       30      0.157706  0.001041 01
   50       7,      17:  DTE       31      0.158746  0.001040 00
   51       7,      18:  DTE       32      0.159788  0.001042 55
   52       7,      19:  DTE       33      0.160830  0.001042 00
   53       7,      20:  DTE       34      0.161872  0.001042 00
   54       7,      21:  DTE       35      0.162914  0.001042 56
   55
   56       8,      15: DCE        36      0.219222  0.056308 ff
   57       8,      16: DCE        37      0.220262  0.001040 01
   58       8,      17: DCE        38      0.221296  0.001034 00
   59       8,      18: DCE        39      0.222339  0.001043 5d
   60       8,      19: DCE        40      0.223381  0.001042 01
   61       8,      20: DCE        41      0.224420  0.001039 ff
   62       8,      21: DCE        42      0.225439  0.001019 5e
   63
   64       8,      22:  DTE       43      0.231455  0.001019 ff
   65       8,      23:  DTE       44      0.232329  0.000874 01
   66       8,      24:  DTE       45      0.233537  0.001208 00
   67       8,      25:  DTE       46      0.234580  0.001043 25
   68       8,      26:  DTE       47      0.235454  0.000874 00
   69       8,      27:  DTE       48      0.236663  0.001209 01
   70       8,      28:  DTE       49      0.237706  0.001043 27
   71
   72       9,      22: DCE        50      0.239394  0.001688 ff
   73       9,      23: DCE        51      0.240438  0.001044 01
   74       9,      24: DCE        52      0.241473  0.001035 00
   75       9,      25: DCE        53      0.242515  0.001042 27
   76
   77       9,      29:  DTE       54      0.248329  0.001042 ff
   78       9,      30:  DTE       55      0.249371  0.001042 01
   79       9,      31:  DTE       56      0.250412  0.001041 00
   80       9,      32:  DTE       57      0.251455  0.001043 00
   81       9,      33:  DTE       58      0.252497  0.001042 00
   82       9,      34:  DTE       59      0.253538  0.001041 00
   83       9,      35:  DTE       60      0.254580  0.001042 01
   84
   85      10,      26: DCE        61      0.320518  0.065938 ff
   86      10,      27: DCE        62      0.321555  0.001037 01
   87      10,      28: DCE        63      0.322593  0.001038 00
   88      10,      29: DCE        64      0.323634  0.001041 01
   89
   90      10,      36:  DTE       65      0.329372  0.001041 ff
   91      10,      37:  DTE       66      0.330412  0.001040 01
   92      10,      38:  DTE       67      0.331455  0.001043 00
   93      10,      39:  DTE       68      0.332338  0.000883 51
   94      10,      40:  DTE       69      0.333538  0.001200 00
   95      10,      41:  DTE       70      0.334580  0.001042 00
   96      10,      42:  DTE       71      0.335596  0.001016 52
   97      10,      43:  DTE       72      0.336664  0.001068 ff
   98      10,      44:  DTE       73      0.337706  0.001042 01
   99
  100      11,      30: DCE        74      0.338198  0.000492 ff
  101
  102      11,      45:  DTE       75      0.338746  0.000492 00
  103
  104      12,      31: DCE        76      0.339232  0.000492 01
  105
  106      12,      46:  DTE       77      0.339789  0.000557 53
  107
  108      13,      32: DCE        78      0.340273  0.000484 00
  109
  110      13,      47:  DTE       79      0.340830  0.000484 00
  111
  112      14,      33: DCE        80      0.341315  0.000484 59
  113
  114      14,      48:  DTE       81      0.341872  0.000557 00
  115
  116      15,      34: DCE        82      0.342358  0.000486 17
  117
  118      15,      49:  DTE       83      0.342914  0.000486 54
  119
  120      16,      35: DCE        84      0.343394  0.000486 b1
  121      16,      36: DCE        85      0.344435  0.000486 22
  122      16,      37: DCE        86      0.345485  0.000486 ff
  123      16,      38: DCE        87      0.346519  0.000486 01
  124      16,      39: DCE        88      0.347554  0.000486 00
  125      16,      40: DCE        89      0.348594  0.000486 5b
  126      16,      41: DCE        90      0.349637  0.000486 17
  127      16,      42: DCE        91      0.350677  0.000486 d0
  128      16,      43: DCE        92      0.351713  0.000486 43
  129
  130      16,      50:  DTE       93      0.359163  0.007450 ff
  131      16,      51:  DTE       94      0.360205  0.001042 01
  132      16,      52:  DTE       95      0.361246  0.001041 00
  133      16,      53:  DTE       96      0.362288  0.001042 55
  134      16,      54:  DTE       97      0.363329  0.001041 00
  135      16,      55:  DTE       98      0.364372  0.001043 00
  136      16,      56:  DTE       99      0.365413  0.001041 56
  137
  138      17,      44: DCE       100      0.421083  0.055670 ff
  139      17,      45: DCE       101      0.422124  0.001041 01
  140      17,      46: DCE       102      0.423165  0.001041 00
  141      17,      47: DCE       103      0.424199  0.001034 5d
  142      17,      48: DCE       104      0.425241  0.001042 01
  143      17,      49: DCE       105      0.426318  0.001077 ff
  144      17,      50: DCE       106      0.427325  0.001007 5e
  145
  146      17,      57:  DTE      107      0.433539  0.001007 ff
  147      17,      58:  DTE      108      0.434996  0.001457 01
  148      17,      59:  DTE      109      0.436038  0.001042 00
  149      17,      60:  DTE      110      0.437081  0.001043 2a
  150      17,      61:  DTE      111      0.438122  0.001041 40
  151      17,      62:  DTE      112      0.439163  0.001041 3f
  152      17,      63:  DTE      113      0.440205  0.001042 aa
  153      17,      64:  DTE      114      0.441247  0.001042 ff
  154
  155      18,      51: DCE       115      0.441882  0.000635 ff
  156
  157      18,      65:  DTE      116      0.442289  0.000635 01
  158
  159      19,      52: DCE       117      0.442923  0.000635 01
  160
  161      19,      66:  DTE      118      0.443329  0.000406 00
  162
  163      20,      53: DCE       119      0.443960  0.000631 00
  164
  165      20,      67:  DTE      120      0.444370  0.000631 55
  166
  167      21,      54: DCE       121      0.445002  0.000631 aa
  168
  169      21,      68:  DTE      122      0.445413  0.000411 00
  170      21,      69:  DTE      123      0.446455  0.001042 00
  171      21,      70:  DTE      124      0.447497  0.001042 56
  172
  173      22,      55: DCE       125      0.652070  0.204573 ff
  174      22,      56: DCE       126      0.653106  0.001036 01
  175      22,      57: DCE       127      0.654149  0.001043 00
  176      22,      58: DCE       128      0.655183  0.001034 5d
  177      22,      59: DCE       129      0.656059  0.000876 02
  178      22,      60: DCE       130      0.657268  0.001209 05
  179      22,      61: DCE       131      0.658302  0.001034 65
  180
  181      22,      71:  DTE      132      0.665728  0.001034 ff
  182      22,      72:  DTE      133      0.667184  0.001456 01
  183      22,      73:  DTE      134      0.668226  0.001042 00
  184      22,      74:  DTE      135      0.669268  0.001042 2a
  185      22,      75:  DTE      136      0.670309  0.001041 40
  186      22,      76:  DTE      137      0.671350  0.001041 3f
```

```
  187     22,     77:  DTE     138     0.672393  0.001043 aa
  188     22,     78:  DTE     139     0.673434  0.001041 ff
  189     22,     79:  DTE     140     0.674476  0.001042 01
  190     22,     80:  DTE     141     0.675518  0.001042 00
  191     22,     81:  DTE     142     0.676558  0.001040 51
  192     22,     82:  DTE     143     0.677601  0.001043 00
  193     22,     83:  DTE     144     0.678643  0.001042 00
  194     22,     84:  DTE     145     0.679684  0.001041 52
  195
  196     23,     62: DCE      146     0.686693  0.007009 ff
  197     23,     63: DCE      147     0.687735  0.001042 01
  198     23,     64: DCE      148     0.688776  0.001041 00
  199     23,     65: DCE      149     0.689818  0.001042 aa
  200     23,     66: DCE      150     0.690854  0.001036 ff
  201     23,     67: DCE      151     0.691895  0.001041 01
  202     23,     68: DCE      152     0.692936  0.001041 00
  203     23,     69: DCE      153     0.693979  0.001043 59
  204     23,     70: DCE      154     0.695013  0.001034 21
  205     23,     71: DCE      155     0.696066  0.001053 36
  206     23,     72: DCE      156     0.697099  0.001033 b1
  207
  208     23,     85:  DTE     157     0.788652  0.001033 ff
  209     23,     86:  DTE     158     0.790101  0.001449 01
  210     23,     87:  DTE     159     0.791143  0.001042 00
  211     23,     88:  DTE     160     0.792184  0.001041 2a
  212     23,     89:  DTE     161     0.793226  0.001042 31
  213     23,     90:  DTE     162     0.794268  0.001042 3f
  214     23,     91:  DTE     163     0.795310  0.001042 9b
  215     23,     92:  DTE     164     0.796258  0.000948 ff
  216
  217     24,     73: DCE      165     0.796623  0.000365 ff
  218
  219     24,     93:  DTE     166     0.797391  0.000365 01
  220
  221     25,     74: DCE      167     0.797671  0.000365 01
  222
  223     25,     94:  DTE     168     0.798433  0.000762 00
  224
  225     26,     75: DCE      169     0.798714  0.000281 00
  226
  227     26,     95:  DTE     170     0.799333  0.000281 53
  228
  229     27,     76: DCE      171     0.799747  0.000281 9b
  230
  231     27,     96:  DTE     172     0.800517  0.000770 00
  232     27,     97:  DTE     173     0.801559  0.001042 00
  233     27,     98:  DTE     174     0.802601  0.001042 54
  234
  235     28,     77: DCE      175     0.804942  0.002341 ff
  236     28,     78: DCE      176     0.805984  0.001042 01
  237     28,     79: DCE      177     0.806858  0.000874 00
  238     28,     80: DCE      178     0.808060  0.001202 5b
  239     28,     81: DCE      179     0.809102  0.001042 12
  240     28,     82: DCE      180     0.810144  0.001042 00
  241     28,     83: DCE      181     0.811186  0.001042 6e
  242
  243  There were a total of 181 bytes transferred
  244
  245  There were a total of 83 DCE bytes transferred
  246  The first DCE byte came in at 0.008726 seconds from the start of data
collection
  247  The last DCE byte was at 0.811186 seconds from the start of data collection
  248
  249  There were a total of 98 DTE bytes transferred
  250  The first DTE byte came in at 0.000000 seconds from the start of data
collection
  251  The last DTE byte was at 0.802601 seconds from the start of data collection
  252
```

ilv0.dte

```
    1       1,       1:  DTE       1     0.000000  0.000000 ff
    2       1,       2:  DTE       2     0.001039  0.001039 01
    3       1,       3:  DTE       3     0.002080  0.001041 00
    4       1,       4:  DTE       4     0.003122  0.001042 51
    5       1,       5:  DTE       5     0.004164  0.001042 00
    6       1,       6:  DTE       6     0.005120  0.000956 00
    7       1,       7:  DTE       7     0.006247  0.001127 52
    8       1,       8:  DTE       8     0.007289  0.001042 ff
    9       1,       9:  DTE       9     0.008330  0.001041 01
   10       2,      10:  DTE      11     0.009372  0.000396 00
   11       3,      11:  DTE      13     0.010414  0.000646 53
   12       4,      12:  DTE      15     0.011455  0.000394 00
   13       5,      13:  DTE      17     0.012497  0.000652 00
   14       6,      14:  DTE      19     0.013539  0.000388 54
   15       7,      15:  DTE      29     0.156665  0.007438 ff
   16       7,      16:  DTE      30     0.157706  0.001041 01
   17       7,      17:  DTE      31     0.158746  0.001040 00
   18       7,      18:  DTE      32     0.159788  0.001042 55
   19       7,      19:  DTE      33     0.160830  0.001042 00
   20       7,      20:  DTE      34     0.161872  0.001042 00
   21       7,      21:  DTE      35     0.162914  0.001042 56
   22       8,      22:  DTE      43     0.231455  0.001019 ff
   23       8,      23:  DTE      44     0.232329  0.000874 01
   24       8,      24:  DTE      45     0.233537  0.001208 00
   25       8,      25:  DTE      46     0.234580  0.001043 25
   26       8,      26:  DTE      47     0.235454  0.000874 00
   27       8,      27:  DTE      48     0.236663  0.001209 01
   28       8,      28:  DTE      49     0.237706  0.001043 27
   29       9,      29:  DTE      54     0.248329  0.001042 ff
   30       9,      30:  DTE      55     0.249371  0.001042 01
   31       9,      31:  DTE      56     0.250412  0.001041 00
   32       9,      32:  DTE      57     0.251455  0.001043 00
   33       9,      33:  DTE      58     0.252497  0.001042 00
   34       9,      34:  DTE      59     0.253538  0.001041 00
   35       9,      35:  DTE      60     0.254580  0.001042 01
   36      10,      36:  DTE      65     0.329372  0.001041 ff
   37      10,      37:  DTE      66     0.330412  0.001040 01
   38      10,      38:  DTE      67     0.331455  0.001043 00
   39      10,      39:  DTE      68     0.332338  0.000883 51
   40      10,      40:  DTE      69     0.333538  0.001200 00
   41      10,      41:  DTE      70     0.334580  0.001042 00
   42      10,      42:  DTE      71     0.335596  0.001016 52
   43      10,      43:  DTE      72     0.336664  0.001068 ff
   44      10,      44:  DTE      73     0.337706  0.001042 01
   45      11,      45:  DTE      75     0.338746  0.000492 00
   46      12,      46:  DTE      77     0.339789  0.000557 53
   47      13,      47:  DTE      79     0.340830  0.000484 00
   48      14,      48:  DTE      81     0.341872  0.000557 00
   49      15,      49:  DTE      83     0.342914  0.000486 54
   50      16,      50:  DTE      93     0.359163  0.007450 ff
   51      16,      51:  DTE      94     0.360205  0.001042 01
   52      16,      52:  DTE      95     0.361246  0.001041 00
   53      16,      53:  DTE      96     0.362288  0.001042 55
   54      16,      54:  DTE      97     0.363329  0.001041 00
   55      16,      55:  DTE      98     0.364372  0.001043 00
   56      16,      56:  DTE      99     0.365413  0.001041 56
   57      17,      57:  DTE     107     0.433539  0.001007 ff
   58      17,      58:  DTE     108     0.434996  0.001457 01
   59      17,      59:  DTE     109     0.436038  0.001042 00
   60      17,      60:  DTE     110     0.437081  0.001043 2a
   61      17,      61:  DTE     111     0.438122  0.001041 40
   62      17,      62:  DTE     112     0.439163  0.001041 3f
   63      17,      63:  DTE     113     0.440205  0.001042 aa
   64      17,      64:  DTE     114     0.441247  0.001042 ff
   65      18,      65:  DTE     116     0.442289  0.000635 01
   66      19,      66:  DTE     118     0.443329  0.000406 00
   67      20,      67:  DTE     120     0.444370  0.000631 55
   68      21,      68:  DTE     122     0.445413  0.000411 00
   69      21,      69:  DTE     123     0.446455  0.001042 00
   70      21,      70:  DTE     124     0.447497  0.001042 56
   71      22,      71:  DTE     132     0.665728  0.001034 ff
   72      22,      72:  DTE     133     0.667184  0.001456 01
   73      22,      73:  DTE     134     0.668226  0.001042 00
   74      22,      74:  DTE     135     0.669268  0.001042 2a
   75      22,      75:  DTE     136     0.670309  0.001041 40
   76      22,      76:  DTE     137     0.671350  0.001041 3f
   77      22,      77:  DTE     138     0.672393  0.001043 aa
   78      22,      78:  DTE     139     0.673434  0.001041 ff
   79      22,      79:  DTE     140     0.674476  0.001042 01
   80      22,      80:  DTE     141     0.675518  0.001042 00
   81      22,      81:  DTE     142     0.676558  0.001040 51
   82      22,      82:  DTE     143     0.677601  0.001043 00
   83      22,      83:  DTE     144     0.678643  0.001042 00
   84      22,      84:  DTE     145     0.679684  0.001041 52
   85      23,      85:  DTE     157     0.788652  0.001033 ff
   86      23,      86:  DTE     158     0.790101  0.001449 01
   87      23,      87:  DTE     159     0.791143  0.001042 00
   88      23,      88:  DTE     160     0.792184  0.001041 2a
   89      23,      89:  DTE     161     0.793226  0.001042 31
   90      23,      90:  DTE     162     0.794268  0.001042 3f
   91      23,      91:  DTE     163     0.795310  0.001042 9b
   92      23,      92:  DTE     164     0.796258  0.000948 ff
   93      24,      93:  DTE     166     0.797391  0.000365 01
   94      25,      94:  DTE     168     0.798433  0.000762 00
   95      26,      95:  DTE     170     0.799333  0.000281 53
   96      27,      96:  DTE     172     0.800517  0.000770 00
   97      27,      97:  DTE     173     0.801559  0.001042 00
   98      27,      98:  DTE     174     0.802601  0.001042 54
   99
```

ilv0.dce

```
    1       2,       1: DCE       10     0.008726  0.000396 ff
    2       3,       2: DCE       12     0.009768  0.000396 01
    3       4,       3: DCE       14     0.010808  0.000394 00
    4       5,       4: DCE       16     0.011845  0.000394 59
    5       6,       5: DCE       18     0.012885  0.000388 17
    6       7,       6: DCE       20     0.013927  0.000388 b1
    7       7,       7: DCE       21     0.014972  0.000388 22
    8       7,       8: DCE       22     0.142994  0.000388 ff
    9       7,       9: DCE       23     0.144032  0.000388 01
```

```
10      7,      10: DCE       24      0.145065  0.000388 00
11      7,      11: DCE       25      0.146106  0.000388 5b
12      7,      12: DCE       26      0.147148  0.000388 17
13      7,      13: DCE       27      0.148189  0.000388 d0
14      7,      14: DCE       28      0.149227  0.000388 43
15      8,      15: DCE       36      0.219222  0.056308 ff
16      8,      16: DCE       37      0.220262  0.001040 01
17      8,      17: DCE       38      0.221296  0.001034 00
18      8,      18: DCE       39      0.222339  0.001043 5d
19      8,      19: DCE       40      0.223381  0.001042 01
20      8,      20: DCE       41      0.224420  0.001039 ff
21      8,      21: DCE       42      0.225439  0.001019 5e
22      9,      22: DCE       50      0.239394  0.001688 ff
23      9,      23: DCE       51      0.240438  0.001044 01
24      9,      24: DCE       52      0.241473  0.001035 00
25      9,      25: DCE       53      0.242515  0.001042 27
26     10,      26: DCE       61      0.320518  0.065938 ff
27     10,      27: DCE       62      0.321555  0.001037 01
28     10,      28: DCE       63      0.322593  0.001038 00
29     10,      29: DCE       64      0.323634  0.001041 01
30     11,      30: DCE       74      0.338198  0.000492 ff
31     12,      31: DCE       76      0.339232  0.000492 01
32     13,      32: DCE       78      0.340273  0.000484 00
33     14,      33: DCE       80      0.341315  0.000484 59
34     15,      34: DCE       82      0.342358  0.000486 17
35     16,      35: DCE       84      0.343394  0.000486 b1
36     16,      36: DCE       85      0.344435  0.000486 22
37     16,      37: DCE       86      0.345485  0.000486 ff
38     16,      38: DCE       87      0.346519  0.000486 01
39     16,      39: DCE       88      0.347554  0.000486 00
40     16,      40: DCE       89      0.348594  0.000486 5b
41     16,      41: DCE       90      0.349637  0.000486 17
42     16,      42: DCE       91      0.350677  0.000486 d0
43     16,      43: DCE       92      0.351713  0.000486 43
44     17,      44: DCE      100      0.421083  0.055670 ff
45     17,      45: DCE      101      0.422124  0.001041 01
46     17,      46: DCE      102      0.423165  0.001041 00
47     17,      47: DCE      103      0.424199  0.001034 5d
48     17,      48: DCE      104      0.425241  0.001042 01
49     17,      49: DCE      105      0.426318  0.001077 ff
50     17,      50: DCE      106      0.427325  0.001007 5e
51     18,      51: DCE      115      0.441882  0.000635 ff
52     19,      52: DCE      117      0.442923  0.000635 01
53     20,      53: DCE      119      0.443960  0.000631 00
54     21,      54: DCE      121      0.445002  0.000631 aa
55     22,      55: DCE      125      0.652070  0.204573 ff
56     22,      56: DCE      126      0.653106  0.001036 01
57     22,      57: DCE      127      0.654149  0.001043 00
58     22,      58: DCE      128      0.655183  0.001034 5d
59     22,      59: DCE      129      0.656059  0.000876 02
60     22,      60: DCE      130      0.657268  0.001209 05
61     22,      61: DCE      131      0.658302  0.001034 65
62     23,      62: DCE      146      0.686693  0.007009 ff
63     23,      63: DCE      147      0.687735  0.001042 01
64     23,      64: DCE      148      0.688776  0.001041 00
65     23,      65: DCE      149      0.689818  0.001042 aa
66     23,      66: DCE      150      0.690854  0.001036 ff
67     23,      67: DCE      151      0.691895  0.001041 01
68     23,      68: DCE      152      0.692936  0.001041 00
69     23,      69: DCE      153      0.693979  0.001043 59
70     23,      70: DCE      154      0.695013  0.001034 21
71     23,      71: DCE      155      0.696066  0.001053 36
72     23,      72: DCE      156      0.697099  0.001033 b1
73     24,      73: DCE      165      0.796623  0.000365 ff
74     25,      74: DCE      167      0.797671  0.000365 01
75     26,      75: DCE      169      0.798714  0.000281 00
76     27,      76: DCE      171      0.799747  0.000281 9b
77     28,      77: DCE      175      0.804942  0.002341 ff
78     28,      78: DCE      176      0.805984  0.001042 01
79     28,      79: DCE      177      0.806858  0.000874 00
80     28,      80: DCE      178      0.808060  0.001202 5b
81     28,      81: DCE      179      0.809102  0.001042 12
82     28,      82: DCE      180      0.810144  0.001042 00
83     28,      83: DCE      181      0.811186  0.001042 6e
84
```

1.1.4 Protocol Specific Processing

When the file has been processed to get all of one type communications in each file, a protocol specific filter must be run to format the data into a single line in the file. Here the routine used is FIXD which breaks files into records based on D Protocol's sync character of `0xFF`. When `0xFF` appears inside a message as data or as the checksum, FIXD does not break the command down correctly, but makes "short" commands/replies. These "problems" must be corrected manually. (In this example the `ilv0.fc` required manual processing to fix the two places where `0xFF` turned up in the "wrong" places.)

ilv0.ft

```
 1      1,      1:  DTE       1      0.000000  0.000000 ff 01 00 51 00 00 52
 2      1,      8:  DTE       8      0.007289  0.001042 ff 01 00 53 00 00 54
 3      7,     15:  DTE      29      0.156665  0.007438 ff 01 00 55 00 00 56
 4      8,     22:  DTE      43      0.231455  0.001019 ff 01 00 25 00 01 27
 5      9,     29:  DTE      54      0.248329  0.001042 ff 01 00 00 00 00 01
 6     10,     36:  DTE      65      0.329372  0.001041 ff 01 00 51 00 00 52
 7     10,     43:  DTE      72      0.336664  0.001068 ff 01 00 53 00 00 54
 8     16,     50:  DTE      93      0.359163  0.007450 ff 01 00 55 00 00 56
 9     17,     57:  DTE     107      0.433539  0.001007 ff 01 00 2a 40 3f aa
10     17,     64:  DTE     114      0.441247  0.001042 ff 01 00 55 00 00 56
11     22,     71:  DTE     132      0.665728  0.001034 ff 01 00 2a 40 3f aa
12     22,     78:  DTE     139      0.673434  0.001041 ff 01 00 51 00 00 52
13     23,     85:  DTE     157      0.788652  0.001033 ff 01 00 2a 31 3f 9b
14     23,     92:  DTE     164      0.796258  0.000948 ff 01 00 53 00 00 54
```

ilv0.fc

```
 1      2,      1: DCE       10      0.008726  0.000396 ff 01 00 59 17 b1 22
 2      7,      8: DCE       22      0.142994  0.000388 ff 01 00 5b 17 d0 43
 3      8,     15: DCE       36      0.219222  0.056308 ff 01 00 5d 01 ff 5e
 4      9,     22: DCE       50      0.239394  0.001688 ff 01 00 27
 5     10,     26: DCE       61      0.320518  0.065938 ff 01 00 01
 6     11,     30: DCE       74      0.338198  0.000492 ff 01 00 59 17 b1 22
 7     16,     37: DCE       86      0.345485  0.000486 ff 01 00 5b 17 d0 43
 8     17,     44: DCE      100      0.421083  0.055670 ff 01 00 5d 01 ff 5e
 9     18,     51: DCE      115      0.441882  0.000635 ff 01 00 aa
10     22,     55: DCE      125      0.652070  0.204573 ff 01 00 5d 02 05 65
11     23,     62: DCE      146      0.686693  0.007009 ff 01 00 aa
12     23,     66: DCE      150      0.690854  0.001036 ff 01 00 59 21 36 b1
13     24,     73: DCE      165      0.796623  0.000365 ff 01 00 9b
14     28,     77: DCE      175      0.804942  0.002341 ff 01 00 5b 12 00 6e
```

1.1.5 Recombining the Two Sources of Data

When the protocol specific filters have attempted to generate valid commans, the two files are concantenated together to generate a ".CAT", or other convenient file extension, file, which generates this file. This process is not protocol specific.

```
copy ilv0.ft+ilv0.fc ilv0.cat
```

ilv0.cat

```
 1      1,      1:  DTE       1      0.000000  0.000000 ff 01 00 51 00 00 52
 2      1,      8:  DTE       8      0.007289  0.001042 ff 01 00 53 00 00 54
 3      7,     15:  DTE      29      0.156665  0.007438 ff 01 00 55 00 00 56
 4      8,     22:  DTE      43      0.231455  0.001019 ff 01 00 25 00 01 27
 5      9,     29:  DTE      54      0.248329  0.001042 ff 01 00 00 00 00 01
```

```
 6      10,      36:  DTE       65      0.329372  0.001041 ff 01 00 51 00 00 52
 7      10,      43:  DTE       72      0.336664  0.001068 ff 01 00 53 00 00 54
 8      16,      50:  DTE       93      0.359163  0.007450 ff 01 00 55 00 00 56
 9      17,      57:  DTE      107      0.433539  0.001007 ff 01 00 2a 40 3f aa
10      17,      64:  DTE      114      0.441247  0.001042 ff 01 00 55 00 00 56
11      22,      71:  DTE      132      0.665728  0.001034 ff 01 00 2a 40 3f aa
12      22,      78:  DTE      139      0.673434  0.001041 ff 01 00 51 00 00 52
13      23,      85:  DTE      157      0.788652  0.001033 ff 01 00 2a 31 3f 9b
14      23,      92:  DTE      164      0.796258  0.000948 ff 01 00 53 00 00 54
15       2,       1: DCE        10      0.008726  0.000396 ff 01 00 59 17 b1 22
16       7,       8: DCE        22      0.142994  0.000388 ff 01 00 5b 17 d0 43
17       8,      15: DCE        36      0.219222  0.056308 ff 01 00 5d 01 ff 5e
18       9,      22: DCE        50      0.239394  0.001688 ff 01 00 27
19      10,      26: DCE        61      0.320518  0.065938 ff 01 00 01
20      11,      30: DCE        74      0.338198  0.000492 ff 01 00 59 17 b1 22
21      16,      37: DCE        86      0.345485  0.000486 ff 01 00 5b 17 d0 43
22      17,      44: DCE       100      0.421083  0.055670 ff 01 00 5d 01 ff 5e
23      18,      51: DCE       115      0.441882  0.000635 ff 01 00 aa
24      22,      55: DCE       125      0.652070  0.204573 ff 01 00 5d 02 05 65
25      23,      62: DCE       146      0.686693  0.007009 ff 01 00 aa
26      23,      66: DCE       150      0.690854  0.001036 ff 01 00 59 21 36 b1
27      24,      73: DCE       165      0.796623  0.000365 ff 01 00 9b
28      28,      77: DCE       175      0.804942  0.002341 ff 01 00 5b 12 00 6e
```

1.1.6 Getting the two Data Sources back in Proper Sequence

The results of concatenateing the two data sources together and now sorted based on the original time of data acquisition. This process in not protocol specific. This is done using the following command:

```
sort -k31,44 ilv0.cat -oilv0.srt
```

ilv0.srt

```
 1       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 51 00 00 52
 2       1,       8:  DTE        8      0.007289  0.001042 ff 01 00 53 00 00 54
 3       2,       1: DCE        10      0.008726  0.000396 ff 01 00 59 17 b1 22
 4       7,       8: DCE        22      0.142994  0.000388 ff 01 00 5b 17 d0 43
 5       7,      15:  DTE       29      0.156665  0.007438 ff 01 00 55 00 00 56
 6       8,      15: DCE        36      0.219222  0.056308 ff 01 00 5d 01 ff 5e
 7       8,      22:  DTE       43      0.231455  0.001019 ff 01 00 25 00 01 27
 8       9,      22: DCE        50      0.239394  0.001688 ff 01 00 27
 9       9,      29:  DTE       54      0.248329  0.001042 ff 01 00 00 00 00 01
10      10,      26: DCE        61      0.320518  0.065938 ff 01 00 01
11      10,      36:  DTE       65      0.329372  0.001041 ff 01 00 51 00 00 52
12      10,      43:  DTE       72      0.336664  0.001068 ff 01 00 53 00 00 54
13      11,      30: DCE        74      0.338198  0.000492 ff 01 00 59 17 b1 22
14      16,      37: DCE        86      0.345485  0.000486 ff 01 00 5b 17 d0 43
15      16,      50:  DTE       93      0.359163  0.007450 ff 01 00 55 00 00 56
16      17,      44: DCE       100      0.421083  0.055670 ff 01 00 5d 01 ff 5e
17      17,      57:  DTE      107      0.433539  0.001007 ff 01 00 2a 40 3f aa
18      17,      64:  DTE      114      0.441247  0.001042 ff 01 00 55 00 00 56
19      18,      51: DCE       115      0.441882  0.000635 ff 01 00 aa
20      22,      55: DCE       125      0.652070  0.204573 ff 01 00 5d 02 05 65
21      22,      71:  DTE      132      0.665728  0.001034 ff 01 00 2a 40 3f aa
22      22,      78:  DTE      139      0.673434  0.001041 ff 01 00 51 00 00 52
23      23,      62: DCE       146      0.686693  0.007009 ff 01 00 aa
24      23,      66: DCE       150      0.690854  0.001036 ff 01 00 59 21 36 b1
25      23,      85:  DTE      157      0.788652  0.001033 ff 01 00 2a 31 3f 9b
26      23,      92:  DTE      164      0.796258  0.000948 ff 01 00 53 00 00 54
27      24,      73: DCE       165      0.796623  0.000365 ff 01 00 9b
28      28,      77: DCE       175      0.804942  0.002341 ff 01 00 5b 12 00 6e
```

1.1.7 Final Non-Protocol Specific Processing

When the files are again in proper time order, put the header lines and trailer lines back around the data by using the following command. (The original header/tail lines were saved in a previous step.) This step is necessary to ensure that the data file is properly annotated with the original data of acquision and because EasyD (or EasyD1) require the expected header to be present.

```
copy ilv0.hed+ilv0.srt+ilv0.tal ilv0.dat
```

1.1.8 Last Processing Step

Using the proper protocol specific processor, interpert the results just obtaind, getting:

ilv0.ez

```
$ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Ilv0.ez,v 1.1 2008-03-10 09:33:17-08 Hamilton Exp Hamilton $
FTS capture buffer (2/12/2008 11:07:09 AM)
Event 1 (2/12/2008 11:05:51.949358 AM) through
Event 7,823 (2/12/2008 11:06:56.451268 AM)

     1,       1:  DTE        1      0.000000  0.000000 ff 01 00 51 00 00 52:                    0    0:
                                                 ---> Return the absolute pan position

     1,       8:  DTE        8      0.007289  0.001042 ff 01 00 53 00 00 54:                    0    0:
                                                 ---> Return the absolute tilt position

     2,       1: DCE        10      0.008726  0.000396 ff 01 00 59 17 b1 22:                   23  177:
                                                 ---> Query pan resp: 60.65

     7,       8: DCE        22      0.142994  0.000388 ff 01 00 5b 17 d0 43:                   23  208:
                                                 ---> Query tilt resp: 60.96

     7,      15:  DTE       29      0.156665  0.007438 ff 01 00 55 00 00 56:                    0    0:
                                                 ---> Return the zoom position

     8,      15: DCE        36      0.219222  0.056308 ff 01 00 5d 01 ff 5e:                    1  255:
                                                 ---> Query zoom resp: 5.11

     8,      22:  DTE       43      0.231455  0.001019 ff 01 00 25 00 01 27:                    0    1:
                                                 ---> Set zoom speed

     9,      22: DCE        50      0.239394  0.001688 ff 01 00 27
     9,      29:  DTE       54      0.248329  0.001042 ff 01 00 00 00 00 01: ........ .......    0    0:
                                                 ---> Motion command

    10,      26: DCE        61      0.320518  0.065938 ff 01 00 01
    10,      36:  DTE       65      0.329372  0.001041 ff 01 00 51 00 00 52:                    0    0:
                                                 ---> Return the absolute pan position

    10,      43:  DTE       72      0.336664  0.001068 ff 01 00 53 00 00 54:                    0    0:
                                                 ---> Return the absolute tilt position

    11,      30: DCE        74      0.338198  0.000492 ff 01 00 59 17 b1 22:                   23  177:
                                                 ---> Query pan resp: 60.65

    16,      37: DCE        86      0.345485  0.000486 ff 01 00 5b 17 d0 43:                   23  208:
                                                 ---> Query tilt resp: 60.96

    16,      50:  DTE       93      0.359163  0.007450 ff 01 00 55 00 00 56:                    0    0:
                                                 ---> Return the zoom position

    17,      44: DCE       100      0.421083  0.055670 ff 01 00 5d 01 ff 5e:                    1  255:
                                                 ---> Query zoom resp: 5.11

    17,      57:  DTE      107      0.433539  0.001007 ff 01 00 2a 40 3f aa: ........ ..T.U.R   64   63:
```

```
52                                              ---> Motion command
53
54      17,      64:  DTE      114      0.441247  0.001042 ff 01 00 55 00 00 56:                    0    0:
55                                              ---> Return the zoom position
56
57      18,      51: DCE       115      0.441882  0.000635 ff 01 00 aa
58      22,      55: DCE       125      0.652070  0.204573 ff 01 00 5d 02 05 65:                    2    5:
59                                              ---> Query zoom resp: 5.17
60
61      22,      71:  DTE      132      0.665728  0.001034 ff 01 00 2a 40 3f aa: ........ ..T.U.R   64   63:
62                                              ---> Motion command
63
64      22,      78:  DTE      139      0.673434  0.001041 ff 01 00 51 00 00 52:                    0    0:
65                                              ---> Return the absolute pan position
66
67      23,      62: DCE       146      0.686693  0.007009 ff 01 00 aa
68      23,      66: DCE       150      0.690854  0.001036 ff 01 00 59 21 36 b1:                   33   54:
69                                              ---> Query pan resp: 85.02
70
71      23,      85:  DTE      157      0.788652  0.001033 ff 01 00 2a 31 3f 9b: ........ ..T.U.R   49   63:
72                                              ---> Motion command
73
74      23,      92:  DTE      164      0.796258  0.000948 ff 01 00 53 00 00 54:                    0    0:
75                                              ---> Return the absolute tilt position
76
77      24,      73: DCE       165      0.796623  0.000365 ff 01 00 9b
78      28,      77: DCE       175      0.804942  0.002341 ff 01 00 5b 12 00 6e:                   18    0:
79                                              ---> Query tilt resp: 46.08
80
81
82  There were a total of 181 bytes transferred
83
84  There were a total of 83 DCE bytes transferred
85  The first DCE byte came in at 0.008726 seconds from the start of data collection
86  The last DCE byte was at 0.811186 seconds from the start of data collection
87
88  There were a total of 98 DTE bytes transferred
89  The first DTE byte came in at 0.000000 seconds from the start of data collection
90  The last DTE byte was at 0.802601 seconds from the start of data collection
91
```

1.1.9 Typical `.BAT` file to do all of these steps

This is a typical `.BAT` file to do these setps automatically. The only step that it does not perform is to "clean up" phaseing errors with FixD processing. That, when it is important, is a manual effort. Note that intermediate results are deleated as the `.BAT` file progresses.

kkk.bat

```
1  @echo off
2  rem $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Kkk.bat,v 1.6 2008-03-10 09:50:11-08 Hamilton Exp Hamilton $
3  rem makesecx original\%1.txt %1.out
4  makesecx %1.txt %1.out
5  head -6  %1.out > %1.hed
6  tail -11 %1.out > %1.tal
7  getdte   %1.out %1.dte
8  fixd     %1.dte %1.ft
9  del      %1.dte
10 getdce   %1.out %1.dce
11 fixd     %1.dce %1.fc
12 del      %1.dce
13 copy     %1.ft+%1.fc %1.cat
14 del      %1.ft
15 del      %1.fc
16 sort -k31,44 %1.cat -o%1.srt
17 del      %1.cat
```

```
18  copy     %1.hed+%1.srt+%1.tal %1.dat
19  del      %1.hed
20  del      %1.srt
21  del      %1.tal
22  easyd    %1.dat %1.ez
23  rem call l   %1.ez
24  easyd1   %1.dat %1.ez1
25  call l   %1.ez1
26  del      %1.dat
```

1.2 Fixing Getting DCE/DTE Backwards During Data Collection

Some times post processing steps require that data going into a dome or data coming out of a dome have an expected data source ID. The two data source IDs utilized by the FTS software are `DTE` (which stands for **D**ata **T**erminal **E**quipment) and `DCE` (**D**ata **C**ommunication **E**quipment). If the two pairs are inadvertently "swapped" two identical routines have been written to fix this problem. The two routines are called Dte2Dce and Dce2Dte. Both of the routines search a given file and change all occurances of `DTE` to `DCE` or `DCE` to `DTE`. The reason that there are two identical filters with different names is that I thought that I probably would have problems remembering the correct name when I needed it.

Typical using sequence of Dte2Dce:

```
dte2dce fromfile tempfile
del     fromfile
ren     tempfile fromfile
```

Obviously, if either filter is run on the same file twice, or any even number of times, the resulting file is identical to the original file. (Except for the time stamp which gets automatically updated on each write.)

[3] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/DceDteX.inc,v 1.2 2009-06-24 12:28:55-07 Hamilton Exp Hamilton $`

2 Filters Used in Processing Communications Captures

For this set of files the first 20 lines of the indicated file is reproduced. In some cases, this is too short a sample length to provide useful information about the complexities of the data. In other cases the whole file is less than 20 lines long. So be it.

The file names are those that are in the `.BAT` script files used to generate them. The "raw" source file was named "`tt.txt`" and all the other files were generated using the same starting file, or deraviations from it.

All of the examples in "General Use Filters" (Section 2.3, page 21) and "D Protocol Specific Filters" (Section 4, page 28) used the same input test file. The first 300 lines of the sample test file (`tt.txt`) are shown following the batch files.

Note

Some routines that depend on the **exact** format of a file processed by MakeSecs, may not function correctly with a file processed by MakeSecx.

The camera must have an address of D Protocol 1, for most of these filters to operate correctly.

2.1 "Standard" Unix type filters used

Several Unix type filters are used in processing communications line captures. Each of these uses the Unix convention of reading and input file and writing an output file. The command line syntax is always: `<programname>␣<infile>␣<outfile>`.

In the following short descriptions that follow note the use of the "blanks" (␣) as delimeters.

1. ELNit: is used to stick line numbers at the start of each line. The format of the line numbers is: `nnnnnnn:␣<original␣line>` where `nnnnnnn` is a `long` line counter.
2. ENBL: is used to delete blank lines from a file.
3. HEAD: is used to get the first few lines in `<infile>`. It has one optional argument which goes between HEAD and `<infile>` which is the number of lines to get. The `<linecount>` value is formatted as follows: `␣-<linecount>␣`.
4. QSORT: is used to sort the data. Following the `<outfile>` designator is an indication of the *sortkey* to use. The format of the *sortkey* is: `␣/startcolumn:columnwidth␣` which may be repeated as often as necessary. The first `<sortkey>` is the primary `<sortkey>` with priority decreasing after the first one.
5. TAIL: is used to get the last few lines in `<infile>`. It has one optional argument which goes between TAIL and `<infile>` which is the number of lines to get. The `<linecount>` value is formatted as follows: `␣-<linecount>␣`.

2.2 `.BAT` files used with General Use and D Protocol Specific test files

Typical `.BAT` files used in generating these files were:

[4] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Docs.inc,v 1.12 2011-07-08 12:54:35-07 Hamilton Exp Hamilton $`

[5] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Bats.inc,v 1.3 2011-07-08 12:44:09-07 Hamilton Exp Hamilton $`

2.2.1 Kk.bat

```
 1  makesecs %1.txt %1.out
 2  fixd     %1.out %1.fix
 3  easyd    %1.fix %1.ez
 4  deltas   %1.fix %1.dlt
```

Table 1: KK.BAT

2.2.2 Kkk.bat

```
 1  @echo off
 2  rem $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Kkk.bat,v 1.6
2008-03-10 09:50:11-08 Hamilton Exp Hamilton $
 3  rem makesecx original\%1.txt %1.out
 4  makesecx %1.txt %1.out
 5  head -6  %1.out > %1.hed
 6  tail -11 %1.out > %1.tal
 7  getdte   %1.out %1.dte
 8  fixd     %1.dte %1.ft
 9  del      %1.dte
10  getdce   %1.out %1.dce
11  fixd     %1.dce %1.fc
12  del      %1.dce
13  copy     %1.ft+%1.fc %1.cat
14  del      %1.ft
15  del      %1.fc
16  sort -k31,44 %1.cat -o%1.srt
17  del      %1.cat
18  copy     %1.hed+%1.srt+%1.tal %1.dat
19  del      %1.hed
20  del      %1.srt
21  del      %1.tal
22  easyd    %1.dat %1.ez
23  rem call l   %1.ez
24  easyd1   %1.dat %1.ez1
25  call l   %1.ez1
26  del      %1.dat
```

Table 2: KKK.BAT

2.2.3 JDCE.bat

```
 1  @echo off
 2  rem $Header: d:/Binder04.SDA/sda2/General.Use/RCS/JDce.bat,v 1.5
2008-03-05 08:48:48-08 Hamilton Exp Hamilton $
 3  echo Make two GnuPlot data files, steps are:
 4  echo MakeSex, GetDCE, FixD, GetPT, DmpShort and PTVals/PTZVals
 5  rem makesecx original\%1.txt %1.out
 6  makesecx %1.txt %1.out
 7  getdce   %1.out %1.dce
 8  rem del      %1.out
 9  fixd     %1.dce %1.fc
10  rem del      %1.dce
11  getpt    %1.fc  %1.cc
12  rem del      %1.fc
13  dmpshort %1.cc  %1.ccc
14  rem del      %1.cc
15  ptvals   %1.ccc %1.p
16  ptzvals  %1.ccc %1.pz
17  rem del      %1.ccc
18  echo The GnuPlot data files are in %1.p and/or %1.pz
```

Table 3: JDCE.BAT

2.2.4 JDTE.bat

```
 1  @echo off
 2  rem $Header: d:/Binder04.SDA/sda2/General.Use/RCS/JDte.bat,v 1.3
2008-03-05 08:48:48-08 Hamilton Exp Hamilton $
 3  echo This file builds a set of motion/query commands.
 4  echo Processing goes like this: MakeSecX, GetDTE, FixD, GetCmnds
and MakeCmnd
 5  rem makesecx original\%1.txt %1.out
 6  makesecx %1.txt %1.out
 7  getdte   %1.out %1.dte
 8  rem del      %1.out
 9  fixd     %1.dte %1.ft
10  rem del      %1.dte
11  getcmnds %1.ft  %1.get
12  rem del      %1.ft
13  makecmnd %1.get %1.d
14  rem del      %1.get
15  echo The D Protocol command file is in: %1.d
```

Table 4: JDTE.BAT

2.2.5 Kkc.bat

```
 1  @echo off
 2  rem $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Kkc.bat,v 1.1
2009-07-07 08:12:46-07 Hamilton Exp Hamilton $
 3  msq original\%1.txt %1.out
 4  fixcq   %1.out %1.cx
 5  easycq  %1.cx  %1.d
 6  easyc1q  %1.cx  %1.d1
 7  echo Results are in %1.d and %1.d1
```

Table 5: KKC.BAT This script file is unique to Coaxitron processing.

2.2.6 `ttsamp.txt` Test File

```
FTS capture buffer (2/13/2008 7:38:38 AM)
Event 1 (2/12/2008 3:20:53.464983 PM) through
Event 5,500,405 (2/12/2008 7:26:11.773878 PM)

Sd  Event#  Timestamp                    Hx
DTE       1 2/12/2008 3:20:53.464983 PM ff
DTE       2 2/12/2008 3:20:53.466157 PM 01
DTE       3 2/12/2008 3:20:53.467198 PM 00
DTE       4 2/12/2008 3:20:53.468240 PM 04
DTE       5 2/12/2008 3:20:53.469280 PM 23
DTE       6 2/12/2008 3:20:53.470331 PM 00
DTE       7 2/12/2008 3:20:53.471231 PM 28
DCE       8 2/12/2008 3:20:53.472919 PM ff
DCE       9 2/12/2008 3:20:53.474024 PM 01
DCE      10 2/12/2008 3:20:53.475064 PM 00
DCE      11 2/12/2008 3:20:53.476106 PM 28
DTE      12 2/12/2008 3:20:53.484908 PM ff
DTE      13 2/12/2008 3:20:53.485947 PM 01
DTE      14 2/12/2008 3:20:53.486990 PM 00
DTE      15 2/12/2008 3:20:53.488032 PM 51
DTE      16 2/12/2008 3:20:53.488939 PM 00
DTE      17 2/12/2008 3:20:53.490116 PM 00
DTE      18 2/12/2008 3:20:53.491156 PM 52
DCE      19 2/12/2008 3:20:53.492460 PM ff
DCE      20 2/12/2008 3:20:53.493501 PM 01
DCE      21 2/12/2008 3:20:53.494543 PM 00
DCE      22 2/12/2008 3:20:53.495584 PM 59
DCE      23 2/12/2008 3:20:53.496626 PM 27
DCE      24 2/12/2008 3:20:53.497668 PM e9
DCE      25 2/12/2008 3:20:53.498709 PM 6a
DTE      26 2/12/2008 3:20:53.504802 PM ff
DTE      27 2/12/2008 3:20:53.505845 PM 01
DTE      28 2/12/2008 3:20:53.506886 PM 00
DTE      29 2/12/2008 3:20:53.507927 PM 53
DTE      30 2/12/2008 3:20:53.508969 PM 00
DTE      31 2/12/2008 3:20:53.510010 PM 00
DTE      32 2/12/2008 3:20:53.511053 PM 54
DCE      33 2/12/2008 3:20:53.512459 PM ff
DCE      34 2/12/2008 3:20:53.513502 PM 01
DCE      35 2/12/2008 3:20:53.514544 PM 00
DCE      36 2/12/2008 3:20:53.515584 PM 5b
DCE      37 2/12/2008 3:20:53.516626 PM 02
DCE      38 2/12/2008 3:20:53.517667 PM 4c
DCE      39 2/12/2008 3:20:53.518710 PM aa
DTE      40 2/12/2008 3:20:53.525011 PM ff
DTE      41 2/12/2008 3:20:53.526052 PM 01
DTE      42 2/12/2008 3:20:53.527094 PM 00
DTE      43 2/12/2008 3:20:53.528136 PM 61
DTE      44 2/12/2008 3:20:53.529044 PM 00
DTE      45 2/12/2008 3:20:53.530219 PM 00
DTE      46 2/12/2008 3:20:53.531130 PM 62
DCE      47 2/12/2008 3:20:53.532455 PM ff
DCE      48 2/12/2008 3:20:53.533494 PM 01
DCE      49 2/12/2008 3:20:53.534537 PM 00
DCE      50 2/12/2008 3:20:53.535577 PM 63
DCE      51 2/12/2008 3:20:53.536620 PM 03
DCE      52 2/12/2008 3:20:53.537663 PM 77
DCE      53 2/12/2008 3:20:53.538703 PM de
DTE      54 2/12/2008 3:20:53.585087 PM ff
DTE      55 2/12/2008 3:20:53.586261 PM 01
DTE      56 2/12/2008 3:20:53.587301 PM 00
DTE      57 2/12/2008 3:20:53.588343 PM 0a
DTE      58 2/12/2008 3:20:53.589386 PM 1c
DTE      59 2/12/2008 3:20:53.590435 PM 11
DTE      60 2/12/2008 3:20:53.591468 PM 38
DCE      61 2/12/2008 3:20:53.598802 PM ff
DCE      62 2/12/2008 3:20:53.599844 PM 01
DCE      63 2/12/2008 3:20:53.600884 PM 00
DCE      64 2/12/2008 3:20:53.601926 PM 38
DTE      65 2/12/2008 3:20:53.605010 PM ff
DTE      66 2/12/2008 3:20:53.606052 PM 01
DTE      67 2/12/2008 3:20:53.607093 PM 00
DTE      68 2/12/2008 3:20:53.608135 PM 51
DTE      69 2/12/2008 3:20:53.609183 PM 00
DTE      70 2/12/2008 3:20:53.610218 PM 00
DTE      71 2/12/2008 3:20:53.611260 PM 52
DCE      72 2/12/2008 3:20:53.614738 PM ff
DCE      73 2/12/2008 3:20:53.615780 PM 01
DCE      74 2/12/2008 3:20:53.616821 PM 00
DCE      75 2/12/2008 3:20:53.617863 PM 59
DCE      76 2/12/2008 3:20:53.618904 PM 27
DCE      77 2/12/2008 3:20:53.619946 PM a8
DCE      78 2/12/2008 3:20:53.620989 PM 29
DTE      79 2/12/2008 3:20:53.627302 PM ff
DTE      80 2/12/2008 3:20:53.628344 PM 01
DTE      81 2/12/2008 3:20:53.629385 PM 00
DTE      82 2/12/2008 3:20:53.630427 PM 53
DTE      83 2/12/2008 3:20:53.631469 PM 00
DTE      84 2/12/2008 3:20:53.632510 PM 00
DTE      85 2/12/2008 3:20:53.633552 PM 54
DCE      86 2/12/2008 3:20:53.634842 PM ff
DCE      87 2/12/2008 3:20:53.635879 PM 01
DCE      88 2/12/2008 3:20:53.636918 PM 00
DCE      89 2/12/2008 3:20:53.637960 PM 5b
DCE      90 2/12/2008 3:20:53.638973 PM 02
DCE      91 2/12/2008 3:20:53.640043 PM 3c
DCE      92 2/12/2008 3:20:53.640952 PM 9a
DTE      93 2/12/2008 3:20:53.644907 PM ff
DTE      94 2/12/2008 3:20:53.645948 PM 01
DTE      95 2/12/2008 3:20:53.646989 PM 00
DTE      96 2/12/2008 3:20:53.648032 PM 61
DTE      97 2/12/2008 3:20:53.648939 PM 00
DTE      98 2/12/2008 3:20:53.650116 PM 00
DTE      99 2/12/2008 3:20:53.651156 PM 62
DCE     100 2/12/2008 3:20:53.652543 PM ff
DCE     101 2/12/2008 3:20:53.653585 PM 01
DCE     102 2/12/2008 3:20:53.654627 PM 00
DCE     103 2/12/2008 3:20:53.655652 PM 63
DCE     104 2/12/2008 3:20:53.656711 PM 03
DCE     105 2/12/2008 3:20:53.657753 PM 77
DCE     106 2/12/2008 3:20:53.658795 PM de
DTE     107 2/12/2008 3:20:53.705093 PM ff
DTE     108 2/12/2008 3:20:53.706266 PM 01
DTE     109 2/12/2008 3:20:53.707302 PM 00
DTE     110 2/12/2008 3:20:53.708349 PM 0c
DTE     111 2/12/2008 3:20:53.709385 PM 1f
DTE     112 2/12/2008 3:20:53.710433 PM 06
DTE     113 2/12/2008 3:20:53.711468 PM 32
DCE     114 2/12/2008 3:20:53.718891 PM ff
DCE     115 2/12/2008 3:20:53.719933 PM 01
DCE     116 2/12/2008 3:20:53.720983 PM 00
DCE     117 2/12/2008 3:20:53.722016 PM 32
DTE     118 2/12/2008 3:20:53.725017 PM ff
DTE     119 2/12/2008 3:20:53.726058 PM 01
DTE     120 2/12/2008 3:20:53.727100 PM 00
DTE     121 2/12/2008 3:20:53.728141 PM 51
DTE     122 2/12/2008 3:20:53.729183 PM 00
DTE     123 2/12/2008 3:20:53.730219 PM 00
DTE     124 2/12/2008 3:20:53.731135 PM 52
DCE     125 2/12/2008 3:20:53.732642 PM ff
DCE     126 2/12/2008 3:20:53.733683 PM 01
DCE     127 2/12/2008 3:20:53.734726 PM 00
DCE     128 2/12/2008 3:20:53.735766 PM 59
DCE     129 2/12/2008 3:20:53.736808 PM 27
DCE     130 2/12/2008 3:20:53.737849 PM c7
DCE     131 2/12/2008 3:20:53.738892 PM 48
DTE     132 2/12/2008 3:20:53.744914 PM ff
DTE     133 2/12/2008 3:20:53.745954 PM 01
DTE     134 2/12/2008 3:20:53.746996 PM 00
DTE     135 2/12/2008 3:20:53.748037 PM 53
```

2.3 General Use Filters

2.3.1 DCE2DTE and DTE2DCE

DCE2DTE and DTE2DCE are used to swap communications source IDs when a data capture is made in the "wrong" set of directions. Some filters require that the dome send data as `DTE` sourced data and that the keyboard/headend send data as `DCE` sourced data. Other filters requre the reverse. When a data direction capture error is made in data collection this routine will swap the source ID codes.

These two filters are idential, but have been additionaly renamed to make remembering their names easier.

1. These filters are written in Flex.
2. These filters are suitable for use with any protocol.
3. Typical command line calling sequence:

```
dce2dte infile tempfile
del     infile
ren     tempfile infile
```

[6] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/General.inc,v 1.1 2011-07-08 12:54:58-07 Hamilton Exp Hamilton $`

2.3.2 Deltas

DELTAS is used to process files generated by MAKESECS (or MAKESECX) to get the delta time between items in the total seconds column.

1. This filter is written in Flex.
2. This filter is suitable for use with any protocol.
3. This filter requires preprocessing by MAKESECX.
4. A typical use of this filter is shown in: `kk.bat` (Section 2.2.1, page 17)
5. **Listing of: `htt.fix` a typical input file.**

```
 1  $ Id: MakeSecs.l,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.fix,v 1.6 2008-03-07 08:28:07-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7
 8       1,       1:  DTE       1     0.000000   0.000000 ff 01 00 04 23 00 28
 9       2,       1: DCE        8     0.007936   0.001688 ff 01 00 28
10       2,       8:  DTE      12     0.019925   0.001042 ff 01 00 51 00 00 52
11       3,       5: DCE       19     0.027477   0.001304 ff 01 00 59 27 e9 6a
12       3,      15:  DTE      26     0.039819   0.001041 ff 01 00 53 00 00 54
13       4,      12: DCE       33     0.047476   0.001406 ff 01 00 5b 02 4c aa
14       4,      22:  DTE      40     0.060028   0.001043 ff 01 00 61 00 00 62
15       5,      19: DCE       47     0.067472   0.001325 ff 01 00 63 03 77 de
16       5,      29:  DTE      54     0.120104   0.001040 ff 01 00 0a 1c 11 38
17       6,      26: DCE       61     0.133819   0.007334 ff 01 00 38
18       6,      36:  DTE      65     0.140027   0.001042 ff 01 00 51 00 00 52
19       7,      30: DCE       72     0.149755   0.003478 ff 01 00 59 27 a8 29
20       7,      43:  DTE      79     0.162319   0.001043 ff 01 00 53 00 00 54
```

6. **Listing of: `htt.dlt` a typical output file.**

```
 1  $ Id: MakeSecs.l,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dlt,v 1.6 2008-03-07 08:28:07-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7
 8       1,       1:  DTE       1     0.000000      0.000000 0.000000 ff 01 00 04 23 00 28
 9       2,       1: DCE        8     0.007936       0.0079360.001688 ff 01 00 28
10       2,       8:  DTE      12     0.019925       0.0119890.001042 ff 01 00 51 00 00 52
11       3,       5: DCE       19     0.027477       0.0075520.001304 ff 01 00 59 27 e9 6a
12       3,      15:  DTE      26     0.039819       0.0123420.001041 ff 01 00 53 00 00 54
13       4,      12: DCE       33     0.047476       0.0076570.001406 ff 01 00 5b 02 4c aa
14       4,      22:  DTE      40     0.060028       0.0125520.001043 ff 01 00 61 00 00 62
15       5,      19: DCE       47     0.067472       0.0074440.001325 ff 01 00 63 03 77 de
16       5,      29:  DTE      54     0.120104       0.0526320.001040 ff 01 00 0a 1c 11 38
17       6,      26: DCE       61     0.133819       0.0137150.007334 ff 01 00 38
18       6,      36:  DTE      65     0.140027       0.0062080.001042 ff 01 00 51 00 00 52
19       7,      30: DCE       72     0.149755       0.0097280.003478 ff 01 00 59 27 a8 29
20       7,      43:  DTE      79     0.162319       0.0125640.001043 ff 01 00 53 00 00 54
```

2.3.3 GetDCE

When a data capture consists of interleaved DCE/DTE records, GetDCE is used to process files that have been preprocessed by MakeSecs or MakeSecX to extract all data that comes from the DCE data source.

1. This filter is written in Flex.
2. This filter is suitable for use with any protocol.
3. This filter requires preprocessing by either MakeSecs or MakeSecX.
4. A typical use of this filter is shown in: `jdce.bat` (Section 2.2.3, page 18)
5. **Listing of: `htt.txt` a typical input file.**

```
 1  FTS capture buffer (2/13/2008 7:38:38 AM)
 2  Event 1 (2/12/2008 3:20:53.464983 PM) through
 3  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 4
 5  Sd  Event#  Timestamp                   Hx
 6  DTE       1 2/12/2008 3:20:53.464983 PM ff
 7  DTE       2 2/12/2008 3:20:53.466157 PM 01
 8  DTE       3 2/12/2008 3:20:53.467198 PM 00
 9  DTE       4 2/12/2008 3:20:53.468240 PM 04
10  DTE       5 2/12/2008 3:20:53.469280 PM 23
11  DTE       6 2/12/2008 3:20:53.470331 PM 00
12  DTE       7 2/12/2008 3:20:53.471231 PM 28
13  DCE       8 2/12/2008 3:20:53.472919 PM ff
14  DCE       9 2/12/2008 3:20:53.474024 PM 01
15  DCE      10 2/12/2008 3:20:53.475064 PM 00
16  DCE      11 2/12/2008 3:20:53.476106 PM 28
17  DTE      12 2/12/2008 3:20:53.484908 PM ff
18  DTE      13 2/12/2008 3:20:53.485947 PM 01
19  DTE      14 2/12/2008 3:20:53.486990 PM 00
20  DTE      15 2/12/2008 3:20:53.488032 PM 51
```

6. **Listing of: `htt.dce` a typical output file.**

```
 1      2,       1: DCE         8      0.007936  0.001688 ff
 2      2,       2: DCE         9      0.009041  0.001105 01
 3      2,       3: DCE        10      0.010081  0.001040 00
 4      2,       4: DCE        11      0.011123  0.001042 28
 5      3,       5: DCE        19      0.027477  0.001304 ff
 6      3,       6: DCE        20      0.028518  0.001041 01
 7      3,       7: DCE        21      0.029560  0.001042 00
 8      3,       8: DCE        22      0.030601  0.001041 59
 9      3,       9: DCE        23      0.031643  0.001042 27
10      3,      10: DCE        24      0.032685  0.001042 e9
11      3,      11: DCE        25      0.033726  0.001041 6a
12      4,      12: DCE        33      0.047476  0.001406 ff
13      4,      13: DCE        34      0.048519  0.001043 01
14      4,      14: DCE        35      0.049561  0.001042 00
15      4,      15: DCE        36      0.050601  0.001040 5b
16      4,      16: DCE        37      0.051643  0.001042 02
17      4,      17: DCE        38      0.052684  0.001041 4c
18      4,      18: DCE        39      0.053727  0.001043 aa
19      5,      19: DCE        47      0.067472  0.001325 ff
20      5,      20: DCE        48      0.068511  0.001039 01
```

2.3.4 GetDTE

When a data capture consists of interleaved DCE/DTE records, GetDTE is used to process files that have been preprocessed by MakeSecs or MakeSecX to extract all data that comes from the DTE data source.

1. This filter is written in Flex.
2. This filter is suitable for use with any protocol.
3. This filter requires preprocessing by either MakeSecs or MakeSecX.
4. A typical use of this filter is shown in: `jdte.bat` (Section 2.2.4, page 19)
5. **Listing of: `htt.txt` a typical input file.**

```
 1  FTS capture buffer (2/13/2008 7:38:38 AM)
 2  Event 1 (2/12/2008 3:20:53.464983 PM) through
 3  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 4
 5  Sd  Event#  Timestamp                   Hx
 6  DTE       1 2/12/2008 3:20:53.464983 PM ff
 7  DTE       2 2/12/2008 3:20:53.466157 PM 01
 8  DTE       3 2/12/2008 3:20:53.467198 PM 00
 9  DTE       4 2/12/2008 3:20:53.468240 PM 04
10  DTE       5 2/12/2008 3:20:53.469280 PM 23
11  DTE       6 2/12/2008 3:20:53.470331 PM 00
12  DTE       7 2/12/2008 3:20:53.471231 PM 28
13  DCE       8 2/12/2008 3:20:53.472919 PM ff
14  DCE       9 2/12/2008 3:20:53.474024 PM 01
15  DCE      10 2/12/2008 3:20:53.475064 PM 00
16  DCE      11 2/12/2008 3:20:53.476106 PM 28
17  DTE      12 2/12/2008 3:20:53.484908 PM ff
18  DTE      13 2/12/2008 3:20:53.485947 PM 01
19  DTE      14 2/12/2008 3:20:53.486990 PM 00
20  DTE      15 2/12/2008 3:20:53.488032 PM 51
```

6. **Listing of: `htt.dte` a typical output file.**

```
 1      1,       1:  DTE        1      0.000000  0.000000 ff
 2      1,       2:  DTE        2      0.001174  0.001174 01
 3      1,       3:  DTE        3      0.002215  0.001041 00
 4      1,       4:  DTE        4      0.003257  0.001042 04
 5      1,       5:  DTE        5      0.004297  0.001040 23
 6      1,       6:  DTE        6      0.005348  0.001051 00
 7      1,       7:  DTE        7      0.006248  0.000900 28
 8      2,       8:  DTE       12      0.019925  0.001042 ff
 9      2,       9:  DTE       13      0.020964  0.001039 01
10      2,      10:  DTE       14      0.022007  0.001043 00
11      2,      11:  DTE       15      0.023049  0.001042 51
12      2,      12:  DTE       16      0.023956  0.000907 00
13      2,      13:  DTE       17      0.025133  0.001177 00
14      2,      14:  DTE       18      0.026173  0.001040 52
15      3,      15:  DTE       26      0.039819  0.001041 ff
16      3,      16:  DTE       27      0.040862  0.001043 01
17      3,      17:  DTE       28      0.041903  0.001041 00
18      3,      18:  DTE       29      0.042944  0.001041 53
19      3,      19:  DTE       30      0.043986  0.001042 00
20      3,      20:  DTE       31      0.045027  0.001041 00
```

2.3.5 MakeSecs, MakeSecX and MakeSex

These three routines are the primary first processing step. They process the `.TXT` file outputs from the FTS software. In the processing they count the number of message blocks and reformat the date/time field into a "zero based" total seconds field. The primary difference between MakeSecs and MakeSecX is that MakeSecX is designed for working with longer files. To do this MakeSecX has its output fields somewhat wider than the older MakeSecs. This has resulted in some of the older filters requiring MakeSecs output files to work correctly. As time is available, all secondary processing filters will be modified to work with MakeSecX formatted outputs. MakeSex is designed to output files in MakeSecs format and to strip off "control line" information from the `.TXT` input file.

For a more complete description of what these three filters do, see Appendix A, page 53.

1. This filter is written in Flex.
2. This filter is suitable for use with any protocol.
3. Typical command line use of any of these filters is as follows:

```
makesecs infile outfile
<other processing steps>
```

4. **Listing of: `htt.txt` a typical input file.**

```
 1  FTS capture buffer (2/13/2008 7:38:38 AM)
 2  Event 1 (2/12/2008 3:20:53.464983 PM) through
 3  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 4
 5  Sd  Event#  Timestamp                  Hx
 6  DTE       1 2/12/2008 3:20:53.464983 PM ff
 7  DTE       2 2/12/2008 3:20:53.466157 PM 01
 8  DTE       3 2/12/2008 3:20:53.467198 PM 00
 9  DTE       4 2/12/2008 3:20:53.468240 PM 04
10  DTE       5 2/12/2008 3:20:53.469280 PM 23
11  DTE       6 2/12/2008 3:20:53.470331 PM 00
12  DTE       7 2/12/2008 3:20:53.471231 PM 28
13  DCE       8 2/12/2008 3:20:53.472919 PM ff
14  DCE       9 2/12/2008 3:20:53.474024 PM 01
15  DCE      10 2/12/2008 3:20:53.475064 PM 00
16  DCE      11 2/12/2008 3:20:53.476106 PM 28
17  DTE      12 2/12/2008 3:20:53.484908 PM ff
18  DTE      13 2/12/2008 3:20:53.485947 PM 01
19  DTE      14 2/12/2008 3:20:53.486990 PM 00
20  DTE      15 2/12/2008 3:20:53.488032 PM 51
```

5. **Listing of: `htt.out` a typical MakeSecX format output file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.out,v 1.10 2008-03-07 08:31:34-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7
 8       1,       1:  DTE        1      0.000000  0.000000 ff
 9       1,       2:  DTE        2      0.001174  0.001174 01
10       1,       3:  DTE        3      0.002215  0.001041 00
11       1,       4:  DTE        4      0.003257  0.001042 04
12       1,       5:  DTE        5      0.004297  0.001040 23
13       1,       6:  DTE        6      0.005348  0.001051 00
14       1,       7:  DTE        7      0.006248  0.000900 28
15
```

```
16      2,      1: DCE        8      0.007936  0.001688 ff
17      2,      2: DCE        9      0.009041  0.001105 01
18      2,      3: DCE       10      0.010081  0.001040 00
19      2,      4: DCE       11      0.011123  0.001042 28
20
```

3 Some .BAT files used with Coaxitron, D and P protocol files

All of the examples in "D Protocol Specific Filters" (Section 4, page 28) are the same ones that were used in Sda2Intr and are not reproduced here. The first 300 lines of the sample test file (`tt.txt`) are shown in Sda2Intr.

[7] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Dp.inc,v 1.10 2011-07-08 12:54:35-07 Hamilton Exp Hamilton $`

4 D Protocol Specific Filters

Note

There has been an effort to upgrade the various filters listed here. Those filters that have been upgraded have had a "Q" appended to their name if there was room or had the last character of their name changed to a "Q" if appending a letter would violate the 8.3 naming convention.

In this set of documentation the old and new names may appear depending on the software update schedule. (And any documentation errors that may occur!)

4.1 DmpShort

DmpShort is used to dump four byte replies and concatenate other short ones into full size replies. The reason that some replies are "short" is because the line building algorithum starts a new line with the "sync" byte of D Protocol. Unfortunately the sync byte (of 0xFF or 0xff) is also a valid data and checksum byte. This routine is an effort to repair the results of an over simplification of the problem.

Typical count of command lengths from a captured D Protocol file of over 300,000 replies:

Length	Count	Description	Format
2	789	Partial reply	xx
5	742	Partial reply	xx␣xx
11	116351	Motion reply	xx␣xx␣xx␣xx
14	742	Partial reply	xx␣xx␣xx␣xx␣xx
17	789	Partial reply	xx␣xx␣xx␣xx␣xx␣xx
20	299935	Full reply	xx␣xx␣xx␣xx␣xx␣xx␣xx 123456789␣1234567890

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSQ and MSXQ.)
4. A typical use of this filter is shown in: jdce.bat (Section 2.2.3, page 18)
5. **Listing of: htt.cc a typical input file.**

```
 1  ff 01 00 28
 2  ff 01 00 59 27 e9 6a
 3  ff 01 00 5b 02 4c aa
 4  ff 01 00 63 03 77 de
 5  ff 01 00 38
 6  ff 01 00 59 27 a8 29
 7  ff 01 00 5b 02 3c 9a
 8  ff 01 00 63 03 77 de
 9  ff 01 00 32
10  ff 01 00 59 27 c7 48
11  ff 01 00 5b 02 15 73
12  ff 01 00 63 03 77 de
13  ff 01 00 27
14  ff 01 00 59 27 93 14
15  ff 01 00 5b 02 11 6f
```

[8] $Header: d:/Binder04.SDA/sda2/General.Use/RCS/DProtoq.inc,v 1.2 2011-07-08 13:03:03-07 Hamilton Exp Hamilton $

```
16  ff 01 00 63 03 77 de
17  ff 01 00 27
18  ff 01 00 59 27 52 d3
19  ff 01 00 5b 02 11 6f
20  ff 01 00 63 03 77 de
```

6. **Listing of:** `htt.ccc` **a typical output file.**

```
 1  ff 01 00 59 27 e9 6a
 2  ff 01 00 5b 02 4c aa
 3  ff 01 00 63 03 77 de
 4  ff 01 00 59 27 a8 29
 5  ff 01 00 5b 02 3c 9a
 6  ff 01 00 63 03 77 de
 7  ff 01 00 59 27 c7 48
 8  ff 01 00 5b 02 15 73
 9  ff 01 00 63 03 77 de
10  ff 01 00 59 27 93 14
11  ff 01 00 5b 02 11 6f
12  ff 01 00 63 03 77 de
13  ff 01 00 59 27 52 d3
14  ff 01 00 5b 02 11 6f
15  ff 01 00 63 03 77 de
16  ff 01 00 59 27 10 91
17  ff 01 00 5b 02 11 6f
18  ff 01 00 63 03 77 de
19  ff 01 00 59 26 ce 4e
20  ff 01 00 5b 02 11 6f
```

4.2 DoD

DoD is used to take processed D Protocol command files and add notes to them that describe the D Protocol command/response on the line.

Older version of EasyD.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. Typical command line calling sequence:

```
dod infile outfile
```

5. **Listing of: `htt.dat` a typical input file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dat,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28
 8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52
 9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a
10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54
11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa
12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62
13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de
14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38
15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52
17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29
18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54
19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62
```

6. **Listing of: `htt.dod` a typical output file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dod,v 1.6 2008-03-07 08:28:12-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28
 8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52 Query Pan Position
 9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a Query Pan Response
10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54 Query Tilt Position
11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa Query Tilt Response
12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62 Query Magnification
13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de Query Magnification Response
14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38
15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52 Query Pan Position
17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29 Query Pan Response
18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54 Query Tilt Position
19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a Query Tilt Response
20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62 Query Magnification
```

4.3 DtoP

DtoP is used to process files generated for the GlassKeyboard in Direct Mode which are written for use with D Protocol. DtoP translates the direct mode D Protocol commands into P Protocol direct mode commands. The camera address must be set to D Protocol address **1**.

1. This filter is written in Flex.
2. This filter is suitable for use with D to P protocols only.
3. A typical use of this filter is:

```
dtop <fromfile> <tofile>
```

4. Print commands of the form "`:print(`" are deleted, while print commands of the form "`:print␣(`" are retained.
5. Each translated command has a print command associated with it to indicate the current step in processing.
6. All input lines that are not understood are copied to the output file unchanged.
7. **Listing of: `hdtop.txt` a typical D Protocol direct mode GlassKeyboard input file.**

```
 1  Stop
 2  # FF 01 00 00 00 00 01
 3  :print("# FF 01 00 00 00 00 01")
 4  :delay(1000)
 5  Query
 6  # FF 01 00 45 00 00 46
 7  :print("# FF 01 00 45 00 00 46")
 8  :delay(1000)
 9  Set Preset
10  :print("# FF 01 00 03 00 01 05")
11  # FF 01 00 03 00 01 05
12  :delay(1000)
13  Clear Preset
14  :print("# FF 01 00 05 00 01 07")
15  # FF 01 00 05 00 01 07
16  :delay(1000)
17  Call Preset
18  :print("# FF 01 00 07 00 01 09")
19  # FF 01 00 07 00 01 09
20  :delay(1000)
```

8. **Listing of: `hdtop.out` a typical P Protocol direct mode GlassKeyboard input file.**

```
 1  Stop
 2  # A0 01 00 00 00 00 AF 0E
 3  :print("A0 01 00 00 00 00 AF 0E")
 4  :delay(1000)
 5  Query
 6  # A0 01 00 45 00 00 AF 4B
 7  :print("A0 01 00 45 00 00 AF 4B")
 8  :delay(1000)
 9  Set Preset
10  # A0 01 00 03 00 01 AF 0C
11  :print("A0 01 00 03 00 01 AF 0C")
12  :delay(1000)
13  Clear Preset
14  # A0 01 00 05 00 01 AF 0A
```

```
15  :print("A0 01 00 05 00 01 AF 0A")
16  :delay(1000)
17  Call Preset
18  # A0 01 00 07 00 01 AF 08
19  :print("A0 01 00 07 00 01 AF 08")
20  :delay(1000)
```

4.4 Dump3Q

DUMP3Q is used to dump the "3 queries" and their responses from a file. It also dumps stop commands and their replies. This is a somewhat special routine that is used to make a file shorter and thus more manageable when not looking for the values contained in the replies. There are other replies that were not included in the test data and thus are not delted. Commands with the following op-codes are dumped: `0x00`, `0x51`, `0x53`, `0x59`, `0x5b`, `0x61` and `0x63`.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MAKESECS or MAKESECX. (Updated versions are MSQ and MSXQ.)
4. A typical use of this filter is shown in: `kk.bat` (Section 2.2.1, page 17)
5. **Listing of: `htt.dat` a typical input file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dat,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28
 8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52
 9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a
10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54
11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa
12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62
13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de
14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38
15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52
17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29
18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54
19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62
```

6. **Listing of: `htt.d3q` a typical output file.**

```
 1  $ Id: MakeSecs.l,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.d3q,v 1.6 2008-03-07 08:28:07-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7
 8       1,       1:  DTE       1     0.000000   0.000000 ff 01 00 04 23 00 28
 9       2,       1: DCE        8     0.007936   0.001688 ff 01 00 28
10       5,      29:  DTE      54     0.120104   0.001040 ff 01 00 0a 1c 11 38
11       6,      26: DCE       61     0.133819   0.007334 ff 01 00 38
12       9,      57:  DTE     107     0.240110   0.001042 ff 01 00 0c 1f 06 32
13      10,      51: DCE      114     0.253908   0.007423 ff 01 00 32
14      13,      85:  DTE     160     0.360349   0.001041 ff 01 00 04 22 00 27
15      14,      76: DCE      167     0.374728   0.008132 ff 01 00 27
16      17,     113:  DTE     213     0.480180   0.001042 ff 01 00 04 22 00 27
17      18,     101: DCE      220     0.487773   0.001349 ff 01 00 27
18      21,     141:  DTE     266     0.600174   0.001042 ff 01 00 04 22 00 27
19      22,     126: DCE      273     0.607593   0.001316 ff 01 00 27
20      25,     169:  DTE     319     0.720174   0.001042 ff 01 00 04 22 00 27
```

4.5 EasyD

EasyD is used to process files that have been preprocessed by MakeSecs or MakeSecX (Updated versions are MSq and MSXq.) and then by FixD to format the captured data into readable D Protocol messages. The primary difference between EasyD and EasyD1 is that EasyD1 puts all of its information on one line, while EasyD uses two lines followed by a blank line.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. A typical use of this filter is shown in: `kkk.bat` (Section 2.2.2, page 17)
5. **Listing of: `htt.dat` a typical input file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dat,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28
 8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52
 9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a
10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54
11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa
12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62
13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de
14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38
15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52
17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29
18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54
19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62
```

6. **Listing of: `htt.ez` a typical output file.**

```
 1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.ez,v 1.9 2008-03-07 08:31:34-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (2/13/2008 7:38:38 AM)
 4  Event 1 (2/12/2008 3:20:53.464983 PM) through
 5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
 6
 7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28: ........ .....L.  35    0:
 8                                                    ---> Motion command
 9
10       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52:                      0    0:
11                                                    ---> Return the absolute pan position
12
13       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a:                     39  233:
14                                                    ---> Query pan resp: 102.17
15
16       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54:                      0    0:
17                                                    ---> Return the absolute tilt position
18
19       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa:                      2   76:
20                                                    ---> Query tilt resp: 5.88
```

4.6 EasyD1

EasyD1 is used to process files that have been preprocessed by MakeSecs or MakeSecX (Updated versions are MSq and MSXq.) and then by FixD to format the captured data into readable single line D Protocol messages. The primary difference between EasyD and EasyD1 is that EasyD1 puts all of its information on one line, while EasyD uses two lines followed by a blank line.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. A typical use of this filter is shown in: `kkk.bat` (Section 2.2.2, page 17)
5. **Listing of: `htt.dat` a typical input file.**

```
  1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
  2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.dat,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
  3  FTS capture buffer (2/13/2008 7:38:38 AM)
  4  Event 1 (2/12/2008 3:20:53.464983 PM) through
  5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
  6
  7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28
  8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52
  9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a
 10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54
 11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa
 12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62
 13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de
 14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38
 15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
 16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52
 17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29
 18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54
 19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
 20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62
```

6. **Listing of: `htt.ez1` a typical output file.**

```
  1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
  2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.ez1,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
  3  FTS capture buffer (2/13/2008 7:38:38 AM)
  4  Event 1 (2/12/2008 3:20:53.464983 PM) through
  5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
  6
  7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28: ........ .....L.  35    0: --->
Motion command
  8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52:                     0    0: --->
Return the absolute pan position
  9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a:                    39  233: --->
Query pan resp: 102.17
 10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54:                     0    0: --->
Return the absolute tilt position
 11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa:                     2   76: --->
Query tilt resp: 5.88
 12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62:                     0    0: --->
Return the current magnification
 13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de:                     3  119: --->
Query magnification response: 8.87
 14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38: ........ ....U.R   28   17: --->
Motion command
 15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
```

```
  16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52:                    0    0: --->
Return the absolute pan position
  17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29:                   39  168: --->
Query pan resp: 101.52
  18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54:                    0    0: --->
Return the absolute tilt position
  19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a:                    2   60: --->
Query tilt resp: 5.72
  20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62:                    0    0: --->
Return the current magnification
```

4.7 FixD

FixD is used to process files that have been preprocessed by MakeSecs or MakeSecX (Updated versions are MSq and MSXq.) to format captured data into hexidecimal D Protocol messages.

There are two problem areas with this filter and those are that it breaks the byte stream into messages based on the `0xFF` character. Unfortunately, not only is `0xFF` the sync byte, but it is also valid data and a valid checksum value. The other problem is that breaking the data based on a single character, results in mixed up commands when replies "overlap" the next command.

1. This filter is written in Flex.
2. This filter is suitable for use with any protocol.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. Typical uses of this filter is shown in: `kkk.bat` (Section 2.2.2, page 17), `jdce.bat` (Section 2.2.3, page 18) and `jdte.bat` (Section 2.2.4, page 19.)
5. **Listing of: `htt.dce` a typical input file.** Note that the format of this file is identical a `.OUT` file.

```
 1      2,      1: DCE       8      0.007936  0.001688 ff
 2      2,      2: DCE       9      0.009041  0.001105 01
 3      2,      3: DCE      10      0.010081  0.001040 00
 4      2,      4: DCE      11      0.011123  0.001042 28
 5      3,      5: DCE      19      0.027477  0.001304 ff
 6      3,      6: DCE      20      0.028518  0.001041 01
 7      3,      7: DCE      21      0.029560  0.001042 00
 8      3,      8: DCE      22      0.030601  0.001041 59
 9      3,      9: DCE      23      0.031643  0.001042 27
10      3,     10: DCE      24      0.032685  0.001042 e9
11      3,     11: DCE      25      0.033726  0.001041 6a
12      4,     12: DCE      33      0.047476  0.001406 ff
13      4,     13: DCE      34      0.048519  0.001043 01
14      4,     14: DCE      35      0.049561  0.001042 00
15      4,     15: DCE      36      0.050601  0.001040 5b
16      4,     16: DCE      37      0.051643  0.001042 02
17      4,     17: DCE      38      0.052684  0.001041 4c
18      4,     18: DCE      39      0.053727  0.001043 aa
19      5,     19: DCE      47      0.067472  0.001325 ff
20      5,     20: DCE      48      0.068511  0.001039 01
```

6. **Listing of: `htt.fc` a typical output file.**

```
 1      2,      1: DCE       8      0.007936  0.001688 ff 01 00 28
 2      3,      5: DCE      19      0.027477  0.001304 ff 01 00 59 27 e9 6a
 3      4,     12: DCE      33      0.047476  0.001406 ff 01 00 5b 02 4c aa
 4      5,     19: DCE      47      0.067472  0.001325 ff 01 00 63 03 77 de
 5      6,     26: DCE      61      0.133819  0.007334 ff 01 00 38
 6      7,     30: DCE      72      0.149755  0.003478 ff 01 00 59 27 a8 29
 7      8,     37: DCE      86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
 8      9,     44: DCE     100      0.187560  0.001387 ff 01 00 63 03 77 de
 9     10,     51: DCE     114      0.253908  0.007423 ff 01 00 32
10     11,     55: DCE     125      0.267659  0.001507 ff 01 00 59 27 c7 48
11     12,     62: DCE     139      0.287443  0.001263 ff 01 00 5b 02 15 73
12     13,     69: DCE     153      0.307418  0.001268 ff 01 00 63 03 77 de
13     14,     76: DCE     167      0.374728  0.008132 ff 01 00 27
14     15,     80: DCE     178      0.387645  0.001361 ff 01 00 59 27 93 14
15     16,     87: DCE     192      0.407743  0.001489 ff 01 00 5b 02 11 6f
16     17,     94: DCE     206      0.427431  0.001148 ff 01 00 63 03 77 de
17     18,    101: DCE     220      0.487773  0.001349 ff 01 00 27
18     19,    105: DCE     231      0.507602  0.001470 ff 01 00 59 27 52 d3
19     20,    112: DCE     245      0.527559  0.001398 ff 01 00 5b 02 11 6f
20     21,    119: DCE     259      0.547453  0.001263 ff 01 00 63 03 77 de
```

4.8 GetCmnds

GetCmnds is used to get all the commands from files that have been processed with MakeSex, GetDte (Updated versions are MSq and MSXq.) and FixD1.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. A typical use of this filter is shown in: `jdte.bat` (Section 2.2.4, page 19)
5. **Listing of: `htt.ft` a typical input file.**

```
 1      1,      1:  DTE       1      0.000000  0.000000 ff 01 00 04 23 00 28
 2      2,      8:  DTE      12      0.019925  0.001042 ff 01 00 51 00 00 52
 3      3,     15:  DTE      26      0.039819  0.001041 ff 01 00 53 00 00 54
 4      4,     22:  DTE      40      0.060028  0.001043 ff 01 00 61 00 00 62
 5      5,     29:  DTE      54      0.120104  0.001040 ff 01 00 0a 1c 11 38
 6      6,     36:  DTE      65      0.140027  0.001042 ff 01 00 51 00 00 52
 7      7,     43:  DTE      79      0.162319  0.001043 ff 01 00 53 00 00 54
 8      8,     50:  DTE      93      0.179924  0.000909 ff 01 00 61 00 00 62
 9      9,     57:  DTE     107      0.240110  0.001042 ff 01 00 0c 1f 06 32
10     10,     64:  DTE     118      0.260034  0.001033 ff 01 00 51 00 00 52
11     11,     71:  DTE     132      0.279931  0.001043 ff 01 00 53 00 00 54
12     12,     78:  DTE     146      0.300034  0.001042 ff 01 00 61 00 00 62
13     13,     85:  DTE     160      0.360349  0.001041 ff 01 00 04 22 00 27
14     14,     92:  DTE     171      0.380034  0.001044 ff 01 00 51 00 00 52
15     15,     99:  DTE     185      0.400138  0.001034 ff 01 00 53 00 00 54
16     16,    106:  DTE     199      0.420034  0.001041 ff 01 00 61 00 00 62
17     17,    113:  DTE     213      0.480180  0.001042 ff 01 00 04 22 00 27
18     18,    120:  DTE     224      0.499966  0.001040 ff 01 00 51 00 00 52
19     19,    127:  DTE     238      0.520068  0.001042 ff 01 00 53 00 00 54
20     20,    134:  DTE     252      0.539965  0.001041 ff 01 00 61 00 00 62
```

6. **Listing of: `htt.get` a typical output file.**

```
 1  ff 01 00 04 23 00 28
 2  ff 01 00 51 00 00 52
 3  ff 01 00 53 00 00 54
 4  ff 01 00 61 00 00 62
 5  ff 01 00 0a 1c 11 38
 6  ff 01 00 51 00 00 52
 7  ff 01 00 53 00 00 54
 8  ff 01 00 61 00 00 62
 9  ff 01 00 0c 1f 06 32
10  ff 01 00 51 00 00 52
11  ff 01 00 53 00 00 54
12  ff 01 00 61 00 00 62
13  ff 01 00 04 22 00 27
14  ff 01 00 51 00 00 52
15  ff 01 00 53 00 00 54
16  ff 01 00 61 00 00 62
17  ff 01 00 04 22 00 27
18  ff 01 00 51 00 00 52
19  ff 01 00 53 00 00 54
20  ff 01 00 61 00 00 62
```

4.9 GetPlace

GetPlace is used to extract all pan/tilt readouts from a file. It uses data from op-codes `0x59` and `0x5B`.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. Typical command line calling sequence:

```
getplace infile outfile
```

5. **Listing of: `htt.ez1` a typical input file.**

```
  1  $ Id: MakeSecx.l,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
  2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Htt.ez1,v 1.6 2008-03-07 08:28:09-08 Hamilton Exp Hamilton $
  3  FTS capture buffer (2/13/2008 7:38:38 AM)
  4  Event 1 (2/12/2008 3:20:53.464983 PM) through
  5  Event 5,500,405 (2/12/2008 7:26:11.773878 PM)
  6
  7       1,       1:  DTE        1      0.000000  0.000000 ff 01 00 04 23 00 28: ........ .....L.  35    0: --->
Motion command
  8       2,       8:  DTE       12      0.019925  0.001042 ff 01 00 51 00 00 52:                      0    0: --->
Return the absolute pan position
  9       3,       5: DCE        19      0.027477  0.001304 ff 01 00 59 27 e9 6a:                     39  233: --->
Query pan resp: 102.17
 10       3,      15:  DTE       26      0.039819  0.001041 ff 01 00 53 00 00 54:                      0    0: --->
Return the absolute tilt position
 11       4,      12: DCE        33      0.047476  0.001406 ff 01 00 5b 02 4c aa:                      2   76: --->
Query tilt resp: 5.88
 12       4,      22:  DTE       40      0.060028  0.001043 ff 01 00 61 00 00 62:                      0    0: --->
Return the current magnification
 13       5,      19: DCE        47      0.067472  0.001325 ff 01 00 63 03 77 de:                      3  119: --->
Query magnification response: 8.87
 14       5,      29:  DTE       54      0.120104  0.001040 ff 01 00 0a 1c 11 38: ........ ....U.R   28   17: --->
Motion command
 15       6,      26: DCE        61      0.133819  0.007334 ff 01 00 38
 16       6,      36:  DTE       65      0.140027  0.001042 ff 01 00 51 00 00 52:                      0    0: --->
Return the absolute pan position
 17       7,      30: DCE        72      0.149755  0.003478 ff 01 00 59 27 a8 29:                     39  168: --->
Query pan resp: 101.52
 18       7,      43:  DTE       79      0.162319  0.001043 ff 01 00 53 00 00 54:                      0    0: --->
Return the absolute tilt position
 19       8,      37: DCE        86      0.169859  0.001290 ff 01 00 5b 02 3c 9a:                      2   60: --->
Query tilt resp: 5.72
 20       8,      50:  DTE       93      0.179924  0.000909 ff 01 00 61 00 00 62:                      0    0: --->
Return the current magnification
```

6. **Listing of: `htt.plc` a typical output file.**

```
  1  Pan  : 102.17
  2  Tilt : 5.88
  3  Pan  : 101.52
  4  Tilt : 5.72
  5  Pan  : 101.83
  6  Tilt : 5.33
  7  Pan  : 101.31
  8  Tilt : 5.29
  9  Pan  : 100.66
 10  Tilt : 5.29
 11  Pan  : 100.00
```

```
12  Tilt : 5.29
13  Pan  : 99.34
14  Tilt : 5.29
15  Pan  : 98.75
16  Tilt : 5.70
17  Pan  : 104.16
18  Tilt : 10.27
19  Pan  : 119.31
20  Tilt : 13.71
```

4.10 GetPT

GetPT is used to get pan/tilt information from a capture file that has been processed by MakeSecX, (Updated versions are MSQ and MSXQ.) GetDce and FixD.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSQ and MSXQ.)
4. A typical use of this filter is shown in: `jdce.bat` (Section 2.2.3, page 18)
5. **Listing of: `htt.fc` a typical input file.**

```
 1      2,       1: DCE        8      0.007936  0.001688 ff 01 00 28
 2      3,       5: DCE       19      0.027477  0.001304 ff 01 00 59 27 e9 6a
 3      4,      12: DCE       33      0.047476  0.001406 ff 01 00 5b 02 4c aa
 4      5,      19: DCE       47      0.067472  0.001325 ff 01 00 63 03 77 de
 5      6,      26: DCE       61      0.133819  0.007334 ff 01 00 38
 6      7,      30: DCE       72      0.149755  0.003478 ff 01 00 59 27 a8 29
 7      8,      37: DCE       86      0.169859  0.001290 ff 01 00 5b 02 3c 9a
 8      9,      44: DCE      100      0.187560  0.001387 ff 01 00 63 03 77 de
 9     10,      51: DCE      114      0.253908  0.007423 ff 01 00 32
10     11,      55: DCE      125      0.267659  0.001507 ff 01 00 59 27 c7 48
11     12,      62: DCE      139      0.287443  0.001263 ff 01 00 5b 02 15 73
12     13,      69: DCE      153      0.307418  0.001268 ff 01 00 63 03 77 de
13     14,      76: DCE      167      0.374728  0.008132 ff 01 00 27
14     15,      80: DCE      178      0.387645  0.001361 ff 01 00 59 27 93 14
15     16,      87: DCE      192      0.407743  0.001489 ff 01 00 5b 02 11 6f
16     17,      94: DCE      206      0.427431  0.001148 ff 01 00 63 03 77 de
17     18,     101: DCE      220      0.487773  0.001349 ff 01 00 27
18     19,     105: DCE      231      0.507602  0.001470 ff 01 00 59 27 52 d3
19     20,     112: DCE      245      0.527559  0.001398 ff 01 00 5b 02 11 6f
20     21,     119: DCE      259      0.547453  0.001263 ff 01 00 63 03 77 de
```

6. **Listing of: `htt.cc` a typical output file.**

```
 1  ff 01 00 28
 2  ff 01 00 59 27 e9 6a
 3  ff 01 00 5b 02 4c aa
 4  ff 01 00 63 03 77 de
 5  ff 01 00 38
 6  ff 01 00 59 27 a8 29
 7  ff 01 00 5b 02 3c 9a
 8  ff 01 00 63 03 77 de
 9  ff 01 00 32
10  ff 01 00 59 27 c7 48
11  ff 01 00 5b 02 15 73
12  ff 01 00 63 03 77 de
13  ff 01 00 27
14  ff 01 00 59 27 93 14
15  ff 01 00 5b 02 11 6f
16  ff 01 00 63 03 77 de
17  ff 01 00 27
18  ff 01 00 59 27 52 d3
19  ff 01 00 5b 02 11 6f
20  ff 01 00 63 03 77 de
```

4.11 MakeCmnd

MakeCmnd is used to process 7 byte D Protocol commands into a format usable by the GlassKeyboard. It also adds delays where needed. Following each op-code `0x61` a delay of 50 ms command is added, and after each "stop" command a delay of 100 ms is added.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. A typical use of this filter is shown in: `jdte.bat` (Section 2.2.4, page 19)
5. **Listing of: `htt.get` a typical input file.**

```
 1  ff 01 00 04 23 00 28
 2  ff 01 00 51 00 00 52
 3  ff 01 00 53 00 00 54
 4  ff 01 00 61 00 00 62
 5  ff 01 00 0a 1c 11 38
 6  ff 01 00 51 00 00 52
 7  ff 01 00 53 00 00 54
 8  ff 01 00 61 00 00 62
 9  ff 01 00 0c 1f 06 32
10  ff 01 00 51 00 00 52
11  ff 01 00 53 00 00 54
12  ff 01 00 61 00 00 62
13  ff 01 00 04 22 00 27
14  ff 01 00 51 00 00 52
15  ff 01 00 53 00 00 54
16  ff 01 00 61 00 00 62
17  ff 01 00 04 22 00 27
18  ff 01 00 51 00 00 52
19  ff 01 00 53 00 00 54
20  ff 01 00 61 00 00 62
```

6. **Listing of: `htt.d` a typical output file.**

```
 1  :SET_BAUD(9600)
 2  :SET_DELTA(10)
 3  # FF 01 00 07 00 22 2A
 4  :delay(2000)
 5  # FF 01 00 07 00 21 29
 6  :delay(2000)
 7
 8  # ff 01 00 04 23 00 28
 9  # ff 01 00 51 00 00 52
10  # ff 01 00 53 00 00 54
11  # ff 01 00 61 00 00 62
12  :delay(50)
13  # ff 01 00 0a 1c 11 38
14  # ff 01 00 51 00 00 52
15  # ff 01 00 53 00 00 54
16  # ff 01 00 61 00 00 62
17  :delay(50)
18  # ff 01 00 0c 1f 06 32
19  # ff 01 00 51 00 00 52
20  # ff 01 00 53 00 00 54
```

4.12 PTVals

PTVals is used to process a D Protocol capture file that has been processed by MakeSecX, GetDce, (Updated versions are MSq and MSXq.) FixD, GetPT and DmpShort to generate pan/tilt values for GnuPlot to process into a scatter plot. (All of the above processing is done by Jdce.bat.) Uses op-codes `0x59` and `0x5B`.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MakeSecs or MakeSecX. (Updated versions are MSq and MSXq.)
4. A typical use of this filter is shown in: `jdce.bat` (Section 2.2.3, page 18)
5. **Listing of: `htt.ccc` a typical input file.**

```
 1  ff 01 00 59 27 e9 6a
 2  ff 01 00 5b 02 4c aa
 3  ff 01 00 63 03 77 de
 4  ff 01 00 59 27 a8 29
 5  ff 01 00 5b 02 3c 9a
 6  ff 01 00 63 03 77 de
 7  ff 01 00 59 27 c7 48
 8  ff 01 00 5b 02 15 73
 9  ff 01 00 63 03 77 de
10  ff 01 00 59 27 93 14
11  ff 01 00 5b 02 11 6f
12  ff 01 00 63 03 77 de
13  ff 01 00 59 27 52 d3
14  ff 01 00 5b 02 11 6f
15  ff 01 00 63 03 77 de
16  ff 01 00 59 27 10 91
17  ff 01 00 5b 02 11 6f
18  ff 01 00 63 03 77 de
19  ff 01 00 59 26 ce 4e
20  ff 01 00 5b 02 11 6f
```

6. **Listing of: `htt.p` a typical output file.**

```
 1  102.17  -5.88 # 1
 2  101.52  -5.72 # 2
 3  101.83  -5.33 # 3
 4  101.31  -5.29 # 4
 5  100.66  -5.29 # 5
 6  100.00  -5.29 # 6
 7   99.34  -5.29 # 7
 8   98.75  -5.70 # 8
 9  104.16 -10.27 # 9
10  119.31 -13.71 # 10
11  132.38 -12.79 # 11
12  135.63 -13.12 # 12
13  130.19 -14.29 # 13
14  117.73 -10.05 # 14
15  106.75  -5.17 # 15
16   98.06  -5.92 # 16
17   94.52  -7.02 # 17
18   94.35  -5.39 # 18
19   94.72  -5.29 # 19
20   94.68  -5.29 # 20
```

4.13 PTZVals

PTZVALS is used to process a D Protocol capture file that has been processed by MAKESECX, GETDCE, (Updated versions are MSQ and MSXQ.) FIXD, GETPT and DMPSHORT to generate pan/tilt/zoom values for GNUPLOT to process. (All of the above processing is done by JDCE.BAT.) Uses op-codes `0x59`, `0x5B` and `0x63`.

1. This filter is written in Flex.
2. This filter is suitable for use with D Protocol only.
3. This filter requires preprocessing by either MAKESECS or MAKESECX. (Updated versions are MSQ and MSXQ.)
4. A typical use of this filter is shown in: `jdce.bat` (Section 2.2.3, page 18)
5. **Listing of: `htt.ccc` a typical input file.**

```
 1  ff 01 00 59 27 e9 6a
 2  ff 01 00 5b 02 4c aa
 3  ff 01 00 63 03 77 de
 4  ff 01 00 59 27 a8 29
 5  ff 01 00 5b 02 3c 9a
 6  ff 01 00 63 03 77 de
 7  ff 01 00 59 27 c7 48
 8  ff 01 00 5b 02 15 73
 9  ff 01 00 63 03 77 de
10  ff 01 00 59 27 93 14
11  ff 01 00 5b 02 11 6f
12  ff 01 00 63 03 77 de
13  ff 01 00 59 27 52 d3
14  ff 01 00 5b 02 11 6f
15  ff 01 00 63 03 77 de
16  ff 01 00 59 27 10 91
17  ff 01 00 5b 02 11 6f
18  ff 01 00 63 03 77 de
19  ff 01 00 59 26 ce 4e
20  ff 01 00 5b 02 11 6f
```

6. **Listing of: `htt.pz` a typical output file.**

```
 1  102.17  -5.88   8.87 # 1
 2  101.52  -5.72   8.87 # 2
 3  101.83  -5.33   8.87 # 3
 4  101.31  -5.29   8.87 # 4
 5  100.66  -5.29   8.87 # 5
 6  100.00  -5.29   8.87 # 6
 7   99.34  -5.29   8.87 # 7
 8   98.75  -5.70   8.87 # 8
 9  104.16 -10.27   8.87 # 9
10  119.31 -13.71   9.03 # 10
11  132.38 -12.79   9.03 # 11
12  135.63 -13.12   9.54 # 12
13  130.19 -14.29  10.45 # 13
14  117.73 -10.05  10.45 # 14
15  106.75  -5.17  11.75 # 15
16   98.06  -5.92  11.75 # 16
17   94.52  -7.02  11.75 # 17
18   94.35  -5.39  11.75 # 18
19   94.72  -5.29  11.75 # 19
20   94.68  -5.29  11.75 # 20
```

5 P Protocol Specific Filters

5.1 FixP

FixP is used to process a P Protocol capture file that has been processed by MakeSecs (Updated version is MSq.) to generate a more easily understood output file.

1. This filter is written in Flex.
2. This filter is suitable for use with P Protocol commands only.
3. This filter requires its input data to have been preprocess by either MakeSecs. (Updated version is MSq.)
4. A typical use of this filter is:

```
FixP <infile> <outfile>
```

5. **Listing of: `hpproto.txt` a typical input file.**

```
 1  DCE     10 3/26/2008 6:28:57.013791 AM a0
 2  DCE     11 3/26/2008 6:28:57.014886 AM 01
 3  DCE     12 3/26/2008 6:28:57.015933 AM 00
 4  DCE     13 3/26/2008 6:28:57.016969 AM 45
 5  DCE     14 3/26/2008 6:28:57.018016 AM 00
 6  DCE     15 3/26/2008 6:28:57.019052 AM 00
 7  DCE     16 3/26/2008 6:28:57.020101 AM af
 8  DCE     17 3/26/2008 6:28:57.021141 AM 4b
 9  DTE     18 3/26/2008 6:28:57.022336 AM a2
10  DCE     19 3/26/2008 6:28:58.167141 AM a0
11  DCE     20 3/26/2008 6:28:58.168186 AM 01
12  DCE     21 3/26/2008 6:28:58.169219 AM 01
13  DCE     22 3/26/2008 6:28:58.170269 AM 45
14  DCE     23 3/26/2008 6:28:58.171303 AM 00
15  DCE     24 3/26/2008 6:28:58.172351 AM 00
16  DCE     25 3/26/2008 6:28:58.173393 AM af
17  DCE     26 3/26/2008 6:28:58.174430 AM 4a
18  DTE     27 3/26/2008 6:28:58.175603 AM a2
19  DCE     28 3/26/2008 6:28:59.318479 AM a0
```

6. **Listing of: `hfixp.p` a typical output file.**

```
 1       2,       9: DCE      10     1.155474   0.001046 a0 01 00 45 00 00 af 4b
 2       2,       2:  DTE     18     1.164019   0.001195 a2
 3
 4       3,      17: DCE      19     2.308824   1.144805 a0 01 01 45 00 00 af 4a
 5       3,       3:  DTE     27     2.317286   0.001037 a2
 6
 7       4,      25: DCE      28     3.460162   0.001037 a0 01 00 73 00 00 af 7d
 8       4,       4:  DTE     36     3.468679   0.001303 a2
 9
10       5,      33: DCE      37     4.611440   1.142761 a0 01 02 73 00 00 af 7f
11       5,       5:  DTE     45     4.619972   0.001042 a2
12
13       6,      41: DCE      46     5.764811   0.001042 a0 01 02 73 00 00 af 7f
14       6,       6:  DTE     54     5.773233   0.001123 a2
15
16       7,      49: DCE      55     6.916156   1.142923 a0 01 00 01 00 00 af 0f
17       7,       7:  DTE     63     6.924633   0.001036 a2
18
19       8,      57: DCE      64     8.067465   0.001036 a0 01 01 01 00 00 af 0e
20       8,       8:  DTE     72     8.075920   0.001129 a2
```

[9] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/PProt.inc,v 1.2 2011-07-08 13:03:05-07 Hamilton Exp Hamilton $`

6 Coaxitron Protocol Specific Filters

A special compile option for the Esprit software has been implemented that mildly reformats Coaxitron commands and send them out the RS-422 interface. The reformatting consists of:

1. Placing the Coaxitron type code as the first byte. In D Protocol the first byte is always `0xFF` and this is replaced as follows:

   1.1 `0xFE` for 32 bit Coaxitron.

   1.2 `0xFD` for 16 bit Coaxitron.

   1.3 `0xFC` for 15 bit Coaxitron.

   Note: That this byte is not transmitted by the Coaxitron system, but is used internally by the Esprit software in decoding and processing Coaxitron commands.

2. Putting the device address in the second byte position.

   Note this byte is not send in Coaxitron, but is put here to help in generating a Psuedo-D Protocol command.

3. Bytes 2, 3, 4 and 5 are the Coaxitron command after minor reformatting by the Esprit software for decoding.

4. The last byte is a generated checksum of the preceeding bytes using D Protocol checksum rules.

   Note this byte is not send in Coaxitron, but is put here to help in generating a Psuedo-D Protocol command.

This process results in having a fake D Protocol command that can utilize many of the D Protocol filters with little or no changes.

All of the following examples use this test file as input:
Listing of: `test1.out` a typical input file.

```
 1  # FTS capture buffer (7/2/2009 2:01:47 PM)
 2  # Event 1 (7/2/2009 1:58:26.668275 PM) through
 3  # Event 14,392 (7/2/2009 2:01:31.422970 PM)
 4
 5       1,        1: DCE      1     0.000000   0.000000 fe
 6       1,        2: DCE      2     0.001050   0.001050 01
 7       1,        3: DCE      3     0.002092   0.001042 00
 8       1,        4: DCE      4     0.003132   0.001040 00
 9       1,        5: DCE      5     0.004176   0.001044 00
10       1,        6: DCE      6     0.005218   0.001042 00
11       1,        7: DCE      7     0.006259   0.001041 01
12       1,        8: DCE      8     0.104179   0.097920 fe
13       1,        9: DCE      9     0.105216   0.001037 01
14       1,       10: DCE     10     0.106258   0.001042 00
15       1,       11: DCE     11     0.107300   0.001042 00
16       1,       12: DCE     12     0.108342   0.001042 00
17       1,       13: DCE     13     0.109384   0.001042 00
18       1,       14: DCE     14     0.110258   0.000874 01
19       1,       15: DCE     15     0.111884   0.001626 fe
20       1,       16: DCE     16     0.112926   0.001042 01
21       1,       17: DCE     17     0.113967   0.001041 00
22       1,       18: DCE     18     0.115008   0.001041 00
```

[10] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/CoaxProt.inc,v 1.1 2011-07-08 12:44:35-07 Hamilton Exp Hamilton $`

```
23      1,      19: DCE     19      0.116050   0.001042 00
24      1,      20: DCE     20      0.117091   0.001041 00
25      1,      21: DCE     21      0.118133   0.001042 01
26      1,      22: DCE     22      0.119175   0.001042 fe
27      1,      23: DCE     23      0.120169   0.000994 01
28      1,      24: DCE     24      0.121260   0.001091 00
29      1,      25: DCE     25      0.122300   0.001040 00
30      1,      26: DCE     26      0.123341   0.001041 00
```

6.1 EasyCq

EasyCq is used to process files that have been preprocessed by MSq or MSXq and then by FixDC to format the captured data into readable Psuedo D Protocol messages. The primary difference between EasyCq and EasyC1q is that EasyC1q puts all of its information on one line, while EasyCq uses two lines followed by a blank line. (This filter is based on EasyDq.l.)

1. This filter is written in Flex.
2. This filter is suitable for use with Coaxitron Protocol only.
3. This filter requires preprocessing by either MSq or MSXq.
4. A typical use of this filter is shown in: `kkc.bat` (Section 2.2.5, page 19)
5. **Listing of: `test1.d` a typical output file.**

```
 1  # FTS capture buffer (7/2/2009 2:01:47 PM)
 2  # Event 1 (7/2/2009 1:58:26.668275 PM) through
 3  # Event 14,392 (7/2/2009 2:01:31.422970 PM)
 4
 5       1,        1: DCE      1     0.000000   0.000000 fe 01 00 00 00 00 01: ........ .......   0    0:
 6                                                   ---> 32 bit Coaxitron: Motion command
 7
 8       1,        8: DCE      8     0.104179   0.097920 fe 01 00 00 00 00 01: ........ .......   0    0:
 9                                                   ---> 32 bit Coaxitron: Motion command
10
11       1,       15: DCE     15     0.111884   0.001626 fe 01 00 00 00 00 01: ........ .......   0    0:
12                                                   ---> 32 bit Coaxitron: Motion command
13
14       1,       22: DCE     22     0.119175   0.001042 fe 01 00 00 00 00 01: ........ .......   0    0:
15                                                   ---> 32 bit Coaxitron: Motion command
16
17       1,       29: DCE     29     0.126467   0.001043 fe 01 00 00 00 00 01: ........ .......   0    0:
18                                                   ---> 32 bit Coaxitron: Motion command
19
20       1,       36: DCE     36     0.133757   0.001041 fe 01 00 00 00 00 01: ........ .......   0    0:
21                                                   ---> 32 bit Coaxitron: Motion command
22
23       1,       43: DCE     43     0.143863   0.003846 fe 01 00 00 00 00 01: ........ .......   0    0:
24                                                   ---> 32 bit Coaxitron: Motion command
25
26       1,       50: DCE     50     0.151928   0.001805 fe 01 00 00 00 00 01: ........ .......   0    0:
27                                                   ---> 32 bit Coaxitron: Motion command
28
29       1,       57: DCE     57     0.159487   0.001138 fe 01 00 00 00 00 01: ........ .......   0    0:
30                                                   ---> 32 bit Coaxitron: Motion command
```

6.2 EasyC1q

EasyC1q is used to process files that have been preprocessed by MSq or MSXq and then by FixCq to format the captured data into readable single line D Protocol messages. The primary difference between EasyCq and EasyC1q is that EasyC1q puts all of its information on one line, while EasyCq uses two lines followed by a blank line. (This filter is based on EasyD1q.l.)

1. This filter is written in Flex.
2. This filter is suitable for use with Coaxitron Protocol only.
3. This filter requires preprocessing by either MSq or MSXq.
4. A typical use of this filter is shown in: `kkc.bat` (Section 2.2.5, page 19)
5. **Listing of: `test1.d1` a typical output file.**

```
  1  # FTS capture buffer (7/2/2009 2:01:47 PM)
  2  # Event 1 (7/2/2009 1:58:26.668275 PM) through
  3  # Event 14,392 (7/2/2009 2:01:31.422970 PM)
  4
  5       1,        1: DCE      1     0.000000   0.000000 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
  6       1,        8: DCE      8     0.104179   0.097920 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
  7       1,       15: DCE     15     0.111884   0.001626 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
  8       1,       22: DCE     22     0.119175   0.001042 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
  9       1,       29: DCE     29     0.126467   0.001043 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 10       1,       36: DCE     36     0.133757   0.001041 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 11       1,       43: DCE     43     0.143863   0.003846 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 12       1,       50: DCE     50     0.151928   0.001805 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 13       1,       57: DCE     57     0.159487   0.001138 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 14       1,       64: DCE     64     0.171781   0.006045 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 15       1,       71: DCE     71     0.191779   0.013749 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 16       1,       78: DCE     78     0.211884   0.013855 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 17       1,       85: DCE     85     0.232717   0.014584 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 18       1,       92: DCE     92     0.252822   0.013856 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 19       1,       99: DCE     99     0.272925   0.013856 fe 01 00 00 00 00 01: ........ .......   0    0: ---> 32 bit
Coaxitron: Motion stop
 20       1,      106: DCE    106     0.369178   0.090003 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 21       1,      113: DCE    113     0.409905   0.034481 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 22       1,      120: DCE    120     0.417821   0.001667 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 23       1,      127: DCE    127     0.426257   0.002186 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 24       1,      134: DCE    134     0.437925   0.005418 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 25       1,      141: DCE    141     0.446467   0.001979 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 26       1,      148: DCE    148     0.454383   0.001666 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 27       1,      155: DCE    155     0.462925   0.002266 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
```

```
 28       1,      162: DCE    162     0.470672   0.001498 fe 01 00 02 05 00 08: ........ ......R   5    0: ---> 32 bit
Coaxitron: Motion command
 29       1,      169: DCE    169     0.482924   0.005937 fe 01 00 02 09 00 0c: ........ ......R   9    0: ---> 32 bit
Coaxitron: Motion command
 30       1,      176: DCE    176     0.490702   0.001527 fe 01 00 02 09 00 0c: ........ ......R   9    0: ---> 32 bit
Coaxitron: Motion command
```

6.3 FixCq

FixCq is used to process files that have been preprocessed by MSq or MSXq to format captured data into hexidecimal Psuedo D Protocol messages. (This filter is based on FixCq.l.)

There are two problem areas with this filter and those are that it breaks the byte stream into messages based on the `0xFC`, `0xFD` or `0xFE` character. Unfortunately, not only are `0xFC`, `0xFD` and `0xFE` the type ID bytes, but they is also valid data and a valid checksum value. The other problem is that breaking the data based on a single character, results in mixed up commands when replies "overlap" the next command.

1. This filter is written in Flex.
2. This filter is suitable for use with Coaxitron Protocol.
3. This filter requires preprocessing by either MSq or MSXq.
4. Typical uses of this filter is shown in: `kkc.bat` (Section 2.2.5, page 19).
5. **Listing of: `test1.cx` a typical output file.**

```
 1  # FTS capture buffer (7/2/2009 2:01:47 PM)
 2  # Event 1 (7/2/2009 1:58:26.668275 PM) through
 3  # Event 14,392 (7/2/2009 2:01:31.422970 PM)
 4
 5       1,        1: DCE      1     0.000000   0.000000 fe 01 00 00 00 00 01
 6       1,        8: DCE      8     0.104179   0.097920 fe 01 00 00 00 00 01
 7       1,       15: DCE     15     0.111884   0.001626 fe 01 00 00 00 00 01
 8       1,       22: DCE     22     0.119175   0.001042 fe 01 00 00 00 00 01
 9       1,       29: DCE     29     0.126467   0.001043 fe 01 00 00 00 00 01
10       1,       36: DCE     36     0.133757   0.001041 fe 01 00 00 00 00 01
11       1,       43: DCE     43     0.143863   0.003846 fe 01 00 00 00 00 01
12       1,       50: DCE     50     0.151928   0.001805 fe 01 00 00 00 00 01
13       1,       57: DCE     57     0.159487   0.001138 fe 01 00 00 00 00 01
14       1,       64: DCE     64     0.171781   0.006045 fe 01 00 00 00 00 01
15       1,       71: DCE     71     0.191779   0.013749 fe 01 00 00 00 00 01
16       1,       78: DCE     78     0.211884   0.013855 fe 01 00 00 00 00 01
17       1,       85: DCE     85     0.232717   0.014584 fe 01 00 00 00 00 01
18       1,       92: DCE     92     0.252822   0.013856 fe 01 00 00 00 00 01
19       1,       99: DCE     99     0.272925   0.013856 fe 01 00 00 00 00 01
20       1,      106: DCE    106     0.369178   0.090003 fe 01 00 02 05 00 08
21       1,      113: DCE    113     0.409905   0.034481 fe 01 00 02 05 00 08
22       1,      120: DCE    120     0.417821   0.001667 fe 01 00 02 05 00 08
23       1,      127: DCE    127     0.426257   0.002186 fe 01 00 02 05 00 08
24       1,      134: DCE    134     0.437925   0.005418 fe 01 00 02 05 00 08
25       1,      141: DCE    141     0.446467   0.001979 fe 01 00 02 05 00 08
26       1,      148: DCE    148     0.454383   0.001666 fe 01 00 02 05 00 08
27       1,      155: DCE    155     0.462925   0.002266 fe 01 00 02 05 00 08
28       1,      162: DCE    162     0.470672   0.001498 fe 01 00 02 05 00 08
29       1,      169: DCE    169     0.482924   0.005937 fe 01 00 02 09 00 0c
30       1,      176: DCE    176     0.490702   0.001527 fe 01 00 02 09 00 0c
```

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A MakeSecs.l Series of Filters

Serial data captured with the SerialTest Async program has to be "processed" before it is in a format that allows easy understanding of what is there. The flex filters MSQ and MSXQ[12] are used to do the first step of getting rid of some unused data and converting the time into a total seconds field.

A.1 Raw Data Capture File Formats

The SerialTest Async program converts its captured data into an ASCII file. The order and some of the format of the output file is selected via parameters in the "`Export Events`" menu choice. For normal collection of data the following fields were chosen as shown below:

Format 1:

`DCE␣␣␣␣␣␣1␣3/5/2007␣11:20:07.423927␣AM␣ff`

or

Format 2:

`DTE␣␣␣␣␣15␣3/28/2007␣12:11:11.333635␣PM␣20␣␣␣1␣␣␣0␣␣␣0␣␣␣1␣␣␣0␣␣␣1`

1. `DTE␣`: This is the source of the data. It is either `DTE` (Data Terminal Equipment) or `DCE` (Data Communication Equipment). Both of these are old terms and have little to do with collecting data when the data has to be converted from RS-422 levels to RS-232 as the two values may be easily interchanged. It is important to remember that once an assignment is made to not change it for the duration of testing.

2. `␣␣␣␣␣1␣`: This is the event number assigned by the data capture software. On "long" data captures, this number may be wider than shown here.

3. `3/5/2007␣`: This is the date that the capture was performed on. The date and time are selected as one item, thus it is necessary to get the date if the time field is wanted. This format is variable and has been observed to have the following formats with `M` = Month, `D` = Day and `Y` = Year:

   3.1 `M/D/YYYY`

   3.2 `M/DD/YYYY`

   3.3 `MM/D/YYYY`

   3.4 `MM/DD/YYYY`

4. `11:20:07.423927␣`: This is the time of data capture. It has the following formats with `H` = Hours, `M` = Minutes, `S` = full Seconds and `s` = parts of a second:

   4.1 `H:MM:SS.ssssss`

   4.2 `HH:MM:SS.ssssss`

5. `AM␣`: This indicates which half of the day the data was captured during. It has the following formats:

[11] `$Header: d:/Binder04.SDA/sda2/General.Use/RCS/MakeSecs.inc,v 1.12 2009-06-24 11:08:26-07 Hamilton Exp Hamilton $`

[12] The older files MakeSecs, MakeSex, MakeSex and MoldFmt were replaced as part of a filter upgrade project.

5.1 `A`

5.2 `AM`

5.3 `P`

5.4 `PM`

`ff`: This is the hexadecimal value that was captured. Hex bytes are represented by lower case letters.

6. `␣␣␣1␣␣␣0␣␣␣0␣␣␣1␣␣␣0␣␣␣1`: Format 2 only. These flags are used to indicate the status of the various control lines that are used in RS-232 only.

   The order of the flags is:

   6.1 `RTS`: Request To Send

   6.2 `CTS`: Clear To Send

   6.3 `DSR`: Data Set Ready

   6.4 `DTR`: Data Terminal Ready

   6.5 `CD`: Carrier Detect

   6.6 `RI`: Ring Indicator

A.2 Sample Raw Data File, Format 1

```
 1  FTS capture buffer (3/5/2007 11:21:58 AM)
 2  Event 1 (3/5/2007 11:20:07.423927 AM) through
 3  Event 1,045 (3/5/2007 11:21:34.000061 AM)
 4
 5  Sd  Event# Timestamp                  Hx
 6  DCE      1 3/5/2007 11:20:07.423927 AM ff
 7  DCE      2 3/5/2007 11:20:07.424963 AM 01
 8  DCE      3 3/5/2007 11:20:07.426006 AM 00
 9  DCE      4 3/5/2007 11:20:07.427048 AM 02
10  DCE      5 3/5/2007 11:20:07.428088 AM 19
11  DCE      6 3/5/2007 11:20:07.429131 AM 2b
12  DCE      7 3/5/2007 11:20:07.430172 AM 47
13  DTE      8 3/5/2007 11:20:07.432111 AM ff
14  DTE      9 3/5/2007 11:20:07.433146 AM 01
15  DTE     10 3/5/2007 11:20:07.434187 AM 00
16  DTE     11 3/5/2007 11:20:07.435229 AM 47
17  DCE     12 3/5/2007 11:20:07.504208 AM ff
18  DCE     13 3/5/2007 11:20:07.505300 AM 01
19  DCE     14 3/5/2007 11:20:07.506292 AM 00
20  DCE     15 3/5/2007 11:20:07.507334 AM 02
21  DCE     16 3/5/2007 11:20:07.508375 AM 40
22  DCE     17 3/5/2007 11:20:07.509417 AM 2b
23  DCE     18 3/5/2007 11:20:07.510459 AM 6e
24  DTE     19 3/5/2007 11:20:07.511772 AM ff
25  DTE     20 3/5/2007 11:20:07.512813 AM 01
26  DTE     21 3/5/2007 11:20:07.513849 AM 00
27  DTE     22 3/5/2007 11:20:07.514892 AM 6e
28  DCE     23 3/5/2007 11:20:08.392612 AM ff
29  DCE     24 3/5/2007 11:20:08.393648 AM 01
30  DCE     25 3/5/2007 11:20:08.394699 AM 00
31  DCE     26 3/5/2007 11:20:08.395730 AM 02
32  DCE     27 3/5/2007 11:20:08.396773 AM 40
33  DCE     28 3/5/2007 11:20:08.397807 AM 2b
34  DCE     29 3/5/2007 11:20:08.398849 AM 6e
35  DTE     30 3/5/2007 11:20:08.400033 AM ff
36  DTE     31 3/5/2007 11:20:08.401068 AM 01
37  DTE     32 3/5/2007 11:20:08.402111 AM 00
38  DTE     33 3/5/2007 11:20:08.403152 AM 6e
39  DCE     34 3/5/2007 11:20:09.397115 AM ff
40  DCE     35 3/5/2007 11:20:09.398154 AM 01
41  DCE     36 3/5/2007 11:20:09.399195 AM 00
42  DCE     37 3/5/2007 11:20:09.400237 AM 02
43  DCE     38 3/5/2007 11:20:09.401278 AM 40
44  DCE     39 3/5/2007 11:20:09.402320 AM 2b
45  DCE     40 3/5/2007 11:20:09.403361 AM 6e
46  DTE     41 3/5/2007 11:20:09.404871 AM ff
47  DTE     42 3/5/2007 11:20:09.405912 AM 01
48  DTE     43 3/5/2007 11:20:09.406953 AM 00
49  DTE     44 3/5/2007 11:20:09.407995 AM 6e
50  DCE     45 3/5/2007 11:20:10.401725 AM ff
51  DCE     46 3/5/2007 11:20:10.402761 AM 01
52  DCE     47 3/5/2007 11:20:10.403804 AM 00
53  DCE     48 3/5/2007 11:20:10.404846 AM 02
54  DCE     49 3/5/2007 11:20:10.405886 AM 40
55  DCE     50 3/5/2007 11:20:10.406929 AM 2b
56  DCE     51 3/5/2007 11:20:10.407971 AM 6e
```

A.2.1 Output from MSQ (MAKESECS)

MSQ (MAKESECS) processes the raw capture file and does the following to it.

1. MSQ (MAKESECS) inserts a control field for RCS/Visual SourceSafe to use. This is the first line of the output.
2. Then the next three lines are saved. This is the original header that SerialTest Async placed in the file as a very brief overview of what the file is about.
3. The SerialTest Async column header is deleted.
   3.1 In Format 1 data the header was:

   `Sd␣␣Event#␣Timestamp␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣Hx`

   3.2 In Format 2 data the header was:

   `Sd␣␣Event#␣Timestamp␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣Hx␣RTS␣CTS␣DSR␣DTR␣␣CD␣␣RI`

4. Then the captured data is reformatted as follows:

   `␣␣␣␣␣2,␣␣␣␣␣␣␣8:␣DCE␣␣␣␣␣␣12␣␣␣␣␣0.080281␣␣␣0.068979␣ff`

   4.1 `␣␣␣␣␣2,`: Indicates that this is the second message group from its source. Source will be either `DTE` or `DCE`.

   4.2 `␣␣␣␣␣␣␣8:`: Indicates that this is the 8^{th} overall byte from its source. Either `DCE` or `DCE`.

   4.3 `␣DCE␣␣`: Indicates that this message/byte comes from the `DTE` data source. All `␣␣DTE␣` flags are offset by one byte to make them slightly different from the `␣DCE␣␣` flags

   4.4 `␣␣␣␣12`: This is the input event number provided by the data capture software.

   4.5 `␣␣␣␣␣0.080281`: Total seconds of the day relative to the start of this data capture. This is converted from hours, minutes, seconds and AM/PM information. However end of day rollover, end of month rollover and end of year rollover are not properly processed. I.e. don't expect good results if the capture is through midnight local time.

   4.6 `␣␣␣0.068979`: Time from the preceding byte from this source. In this case `0.068979` is the time from the preceeding message.

   Inter byte times for various baud rates (all of these end up with repeating 3's or 6's):

   4.6.1. 1200 = .0083333 sec
   4.6.2. 2400 = .0041666 sec
   4.6.3. 4800 = .0020833 sec
   4.6.4. 9600 = .0010416 sec
   4.6.5. 19200 = .00042083 sec

   4.7 `␣ff`: The data byte in hexadecimal. This field is copied directly from the capture file.

5. After processing all of the input data some overall statistics are output. These self explanatory statistics message are:

   5.1 `There were a total of 51 bytes transferred`

5.2 `There were a total of 35 DCE bytes transferred`

5.3 `The first DCE byte came in at 0.000000 seconds from the start of data collection`

5.4 `The last DCE byte was at 2.984044 seconds from the start of data collection`

5.5 `There were a total of 16 DTE bytes transferred`

5.6 `The first DTE byte came in at 0.008184 seconds from the start of data collection`

5.7 `The last DTE byte was at 1.984068 seconds from the start of data collection`

6. From time to time various changes in the exact format will be made at the whim of anyone using the program.

A.2.2 Raw output of the MSQ (MAKESECS) program for Format 1 data

```
 1  $ Id: MakeSecs.l,v 1.8 2006-05-01 08:31:47-07 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Start1.dat,v 1.3 2008-02-15 12:51:44-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (3/5/2007 11:21:58 AM)
 4  Event 1 (3/5/2007 11:20:07.423927 AM) through
 5  Event 1,045 (3/5/2007 11:21:34.000061 AM)
 6
 7       1,       1: DCE       1     0.000000   0.000000 ff
 8       1,       2: DCE       2     0.001036   0.001036 01
 9       1,       3: DCE       3     0.002079   0.001043 00
10       1,       4: DCE       4     0.003121   0.001042 02
11       1,       5: DCE       5     0.004161   0.001040 19
12       1,       6: DCE       6     0.005204   0.001043 2b
13       1,       7: DCE       7     0.006245   0.001041 47
14
15       1,       1:  DTE      8     0.008184   0.001041 ff
16       1,       2:  DTE      9     0.009219   0.001035 01
17       1,       3:  DTE     10     0.010260   0.001041 00
18       1,       4:  DTE     11     0.011302   0.001042 47
19
20       2,       8: DCE      12     0.080281   0.068979 ff
21       2,       9: DCE      13     0.081373   0.001092 01
22       2,      10: DCE      14     0.082365   0.000992 00
23       2,      11: DCE      15     0.083407   0.001042 02
24       2,      12: DCE      16     0.084448   0.001041 40
25       2,      13: DCE      17     0.085490   0.001042 2b
26       2,      14: DCE      18     0.086532   0.001042 6e
27
28       2,       5:  DTE     19     0.087845   0.001042 ff
29       2,       6:  DTE     20     0.088886   0.001041 01
30       2,       7:  DTE     21     0.089922   0.001036 00
31       2,       8:  DTE     22     0.090965   0.001043 6e
32
33       3,      15: DCE      23     0.968685   0.877720 ff
34       3,      16: DCE      24     0.969721   0.001036 01
35       3,      17: DCE      25     0.970772   0.001051 00
36       3,      18: DCE      26     0.971803   0.001031 02
37       3,      19: DCE      27     0.972846   0.001043 40
38       3,      20: DCE      28     0.973880   0.001034 2b
39       3,      21: DCE      29     0.974922   0.001042 6e
40
41       3,       9:  DTE     30     0.976106   0.001042 ff
42       3,      10:  DTE     31     0.977141   0.001035 01
43       3,      11:  DTE     32     0.978184   0.001043 00
44       3,      12:  DTE     33     0.979225   0.001041 6e
45
46       4,      22: DCE      34     1.973188   0.993963 ff
47       4,      23: DCE      35     1.974227   0.001039 01
48       4,      24: DCE      36     1.975268   0.001041 00
49       4,      25: DCE      37     1.976310   0.001042 02
50       4,      26: DCE      38     1.977351   0.001041 40
51       4,      27: DCE      39     1.978393   0.001042 2b
52       4,      28: DCE      40     1.979434   0.001041 6e
53
54       4,      13:  DTE     41     1.980944   0.001041 ff
55       4,      14:  DTE     42     1.981985   0.001041 01
56       4,      15:  DTE     43     1.983026   0.001041 00
57       4,      16:  DTE     44     1.984068   0.001042 6e
58
59       5,      29: DCE      45     2.977798   0.993730 ff
60       5,      30: DCE      46     2.978834   0.001036 01
61       5,      31: DCE      47     2.979877   0.001043 00
62       5,      32: DCE      48     2.980919   0.001042 02
63       5,      33: DCE      49     2.981959   0.001040 40
64       5,      34: DCE      50     2.983002   0.001043 2b
65       5,      35: DCE      51     2.984044   0.001042 6e
66
67  There were a total of       51 bytes transferred
68
69  There were a total of       35 DCE bytes transferred
70  The first DCE byte came in at 0.000000 seconds from the start of data collection
```

```
71  The last DCE byte was at 2.984044 seconds from the start of data collection
72
73  There were a total of       16 DTE bytes transferred
74  The first DTE byte came in at 0.008184 seconds from the start of data collection
75  The last DTE byte was at 1.984068 seconds from the start of data collection
```

A.2.3 Raw output of the MSXQ (MAKESECX) program for Format 1 data

The output from MSXQ (MAKESECX) is identical to that from MSQ (MAKESECS) with the following format changes:

The captured data is formatted as follows:

␣␣␣␣␣2,␣␣␣␣␣␣␣8:␣DCE␣␣␣␣␣␣␣␣␣12␣␣␣␣␣␣␣0.080281␣␣␣0.068979␣ff

1. No Change for this field. ␣␣␣␣␣2,: Indicates that this is the second message group from its source. Source will be either DTE or DCE.
2. No Change for this field. ␣␣␣␣␣␣␣8:: Indicates that this is the 8^{th} overall byte from its source. Either DCE or DCE.
3. No Change for this field. ␣DCE␣␣␣: Indicates that this message/byte comes from the DTE data source. All ␣␣␣DTE␣␣ flags are offset by one byte to make them slightly different from the ␣DCE␣␣␣ flags
4. This field has been made wider. It is now ␣␣␣␣␣␣12 (8 bytes wide) instead of the former ␣␣␣␣12 (6 bytes): This is the input event number provided by the data capture software. This changes was required due to larger capture files.
5. This field has been made wider. It is now ␣␣␣␣␣␣0.080281 (15 bytes wide) instead of the former ␣␣␣␣␣0.080281 (13 bytes): Total seconds of the day relative to the start of this data capture. This is converted from hours, minutes, seconds and AM/PM information. However end of day rollover, end of month rollover and end of year rollover are not properly processed. I.e. don't expect good results if the capture is through midnight local time. This was change required due to larger capture files.
6. No Change for this field. ␣␣␣0.068979: Time from the preceding byte from this source. In this case 0.068979 is the time from the preceeding message.
7. No Change for this field. ␣ff: The data byte in hexadecimal. This field is copied directly from the capture file.

```
 1  $ Id: MakeSex.l,v 1.2 2008-02-15 08:42:31-08 Hamilton Exp Hamilton $
 2  $Header: d:/Binder04.SDA/sda2/General.Use/RCS/Start1x.dat,v 1.1 2008-02-15 12:31:16-08 Hamilton Exp Hamilton $
 3  FTS capture buffer (3/5/2007 11:21:58 AM)
 4  Event 1 (3/5/2007 11:20:07.423927 AM) through
 5  Event 1,045 (3/5/2007 11:21:34.000061 AM)
 6
 7       1,       1: DCE         1      0.000000  0.000000 ff
 8       1,       2: DCE         2      0.001036  0.001036 01
 9       1,       3: DCE         3      0.002079  0.001043 00
10       1,       4: DCE         4      0.003121  0.001042 02
11       1,       5: DCE         5      0.004161  0.001040 19
12       1,       6: DCE         6      0.005204  0.001043 2b
13       1,       7: DCE         7      0.006245  0.001041 47
14
15       1,       1:  DTE        8      0.008184  0.001041 ff
16       1,       2:  DTE        9      0.009219  0.001035 01
17       1,       3:  DTE       10      0.010260  0.001041 00
18       1,       4:  DTE       11      0.011302  0.001042 47
19
20       2,       8: DCE        12      0.080281  0.068979 ff
21       2,       9: DCE        13      0.081373  0.001092 01
22       2,      10: DCE        14      0.082365  0.000992 00
23       2,      11: DCE        15      0.083407  0.001042 02
24       2,      12: DCE        16      0.084448  0.001041 40
25       2,      13: DCE        17      0.085490  0.001042 2b
26       2,      14: DCE        18      0.086532  0.001042 6e
```

```
27
28       2,       5:  DTE       19      0.087845  0.001042 ff
29       2,       6:  DTE       20      0.088886  0.001041 01
30       2,       7:  DTE       21      0.089922  0.001036 00
31       2,       8:  DTE       22      0.090965  0.001043 6e
32
33       3,      15: DCE        23      0.968685  0.877720 ff
34       3,      16: DCE        24      0.969721  0.001036 01
35       3,      17: DCE        25      0.970772  0.001051 00
36       3,      18: DCE        26      0.971803  0.001031 02
37       3,      19: DCE        27      0.972846  0.001043 40
38       3,      20: DCE        28      0.973880  0.001034 2b
39       3,      21: DCE        29      0.974922  0.001042 6e
40
41       3,       9:  DTE       30      0.976106  0.001042 ff
42       3,      10:  DTE       31      0.977141  0.001035 01
43       3,      11:  DTE       32      0.978184  0.001043 00
44       3,      12:  DTE       33      0.979225  0.001041 6e
45
46       4,      22: DCE        34      1.973188  0.993963 ff
47       4,      23: DCE        35      1.974227  0.001039 01
48       4,      24: DCE        36      1.975268  0.001041 00
49       4,      25: DCE        37      1.976310  0.001042 02
50       4,      26: DCE        38      1.977351  0.001041 40
51       4,      27: DCE        39      1.978393  0.001042 2b
52       4,      28: DCE        40      1.979434  0.001041 6e
53
54       4,      13:  DTE       41      1.980944  0.001041 ff
55       4,      14:  DTE       42      1.981985  0.001041 01
56       4,      15:  DTE       43      1.983026  0.001041 00
57       4,      16:  DTE       44      1.984068  0.001042 6e
58
59       5,      29: DCE        45      2.977798  0.993730 ff
60       5,      30: DCE        46      2.978834  0.001036 01
61       5,      31: DCE        47      2.979877  0.001043 00
62       5,      32: DCE        48      2.980919  0.001042 02
63       5,      33: DCE        49      2.981959  0.001040 40
64       5,      34: DCE        50      2.983002  0.001043 2b
65       5,      35: DCE        51      2.984044  0.001042 6e
66
67  There were a total of 51 bytes transferred
68
69  There were a total of 35 DCE bytes transferred
70  The first DCE byte came in at 0.000000 seconds from the start of data collection
71  The last DCE byte was at 2.984044 seconds from the start of data collection
72
73  There were a total of 16 DTE bytes transferred
74  The first DTE byte came in at 0.008184 seconds from the start of data collection
75  The last DTE byte was at 1.984068 seconds from the start of data collection
```

A.3 Final Processing of a MSQ (MAKESECS) Processed Capture File

The output of MSQ (MAKESECS) is then taken, and using an editor, has each message formatted to fit on one line and then that line usually has a textual description of what it is appended.

```
$ Id: MakeSecs.l,v 1.8 2006-05-01 08:31:47-07 Hamilton Exp Hamilton $
$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Start2.dat,v 1.2 2007-03-29 08:42:09-08 Hamilton Exp Hamilton $
FTS capture buffer (3/5/2007 11:21:58 AM)
Event 1 (3/5/2007 11:20:07.423927 AM) through
Event 1,045 (3/5/2007 11:21:34.000061 AM)

     1,       1: DCE       1     0.000000   0.000000 ff 01 00 02 19 2b 47
     1,       1:  DTE      8     0.008184   0.001041 ff 01 00 47

     2,       8: DCE      12     0.080281   0.068979 ff 01 00 02 40 2b 6e
     2,       5:  DTE     19     0.087845   0.001042 ff 01 00 6e

     3,      15: DCE      23     0.968685   0.877720 ff 01 00 02 40 2b 6e
     3,       9:  DTE     30     0.976106   0.001042 ff 01 00 6e

     4,      22: DCE      34     1.973188   0.993963 ff 01 00 02 40 2b 6e
     4,      13:  DTE     41     1.980944   0.001041 ff 01 00 6e

     5,      29: DCE      45     2.977798   0.993730 ff 01 00 02 40 2b 6e

There were a total of       51 bytes transferred

There were a total of       35 DCE bytes transferred
The first DCE byte came in at 0.000000 seconds from the start of data collection
The last DCE byte was at 2.984044 seconds from the start of data collection

There were a total of       16 DTE bytes transferred
The first DTE byte came in at 0.008184 seconds from the start of data collection
The last DTE byte was at 1.984068 seconds from the start of data collection

```

A.4 Raw Format 2 data

```
FTS capture buffer (3/28/2007 12:12:10 PM)
Event 1 (3/28/2007 12:11:11.326347 PM) through
Event 48,007 (3/28/2007 12:11:55.977731 PM)

Sd  Event# Timestamp                    Hx RTS CTS DSR DTR  CD  RI
DTE      1 3/28/2007 12:11:11.326347 PM 25   1   0   0   1   0   1
DTE      2 3/28/2007 12:11:11.326866 PM 21   1   0   0   1   0   1
DTE      3 3/28/2007 12:11:11.327387 PM 50   1   0   0   1   0   1
DTE      4 3/28/2007 12:11:11.327906 PM 53   1   0   0   1   0   1
DTE      5 3/28/2007 12:11:11.328426 PM 2d   1   0   0   1   0   1
DTE      6 3/28/2007 12:11:11.328948 PM 41   1   0   0   1   0   1
DTE      7 3/28/2007 12:11:11.329468 PM 64   1   0   0   1   0   1
DTE      8 3/28/2007 12:11:11.329989 PM 6f   1   0   0   1   0   1
DTE      9 3/28/2007 12:11:11.330419 PM 62   1   0   0   1   0   1
DTE     10 3/28/2007 12:11:11.331032 PM 65   1   0   0   1   0   1
DTE     11 3/28/2007 12:11:11.331552 PM 2d   1   0   0   1   0   1
DTE     12 3/28/2007 12:11:11.332074 PM 32   1   0   0   1   0   1
DTE     13 3/28/2007 12:11:11.332594 PM 2e   1   0   0   1   0   1
DTE     14 3/28/2007 12:11:11.333116 PM 30   1   0   0   1   0   1
DTE     15 3/28/2007 12:11:11.333635 PM 20   1   0   0   1   0   1
```

A.4.1 Output of MSq (MakeSecs) with Format 2 data

```
$ Id: MakeSecs.l,v 1.8 2006-05-01 08:31:47-07 Hamilton Exp Hamilton $
$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Start3cs.dat,v 1.1 2007-03-29 08:42:53-08 Hamilton Exp Hamilton $
FTS capture buffer (3/28/2007 12:12:10 PM)
Event 1 (3/28/2007 12:11:11.326347 PM) through
Event 48,007 (3/28/2007 12:11:55.977731 PM)


      1,       1:  DTE      1     0.000000   0.000000 25   1   0   0   1   0   1
      1,       2:  DTE      2     0.000519   0.000519 21   1   0   0   1   0   1
      1,       3:  DTE      3     0.001040   0.000521 50   1   0   0   1   0   1
      1,       4:  DTE      4     0.001559   0.000519 53   1   0   0   1   0   1
      1,       5:  DTE      5     0.002079   0.000520 2d   1   0   0   1   0   1
      1,       6:  DTE      6     0.002601   0.000522 41   1   0   0   1   0   1
      1,       7:  DTE      7     0.003121   0.000520 64   1   0   0   1   0   1
      1,       8:  DTE      8     0.003642   0.000521 6f   1   0   0   1   0   1
      1,       9:  DTE      9     0.004072   0.000430 62   1   0   0   1   0   1
      1,      10:  DTE     10     0.004685   0.000613 65   1   0   0   1   0   1
      1,      11:  DTE     11     0.005205   0.000520 2d   1   0   0   1   0   1
      1,      12:  DTE     12     0.005727   0.000522 32   1   0   0   1   0   1
      1,      13:  DTE     13     0.006247   0.000520 2e   1   0   0   1   0   1
      1,      14:  DTE     14     0.006769   0.000522 30   1   0   0   1   0   1
      1,      15:  DTE     15     0.007288   0.000519 20   1   0   0   1   0   1

There were a total of       15 bytes transferred

There were a total of        0 DCE bytes transferred
The first DCE byte came in at 0.000000 seconds from the start of data collection
The last DCE byte was at 0.000000 seconds from the start of data collection

There were a total of       15 DTE bytes transferred
The first DTE byte came in at 0.000000 seconds from the start of data collection
The last DTE byte was at 0.007288 seconds from the start of data collection

```

A.4.2 Output of MSq (MakeSex) with Format 2 data

```
$ Id: MakeSex.l,v 1.1 2007-03-29 07:13:33-08 Hamilton Exp Hamilton $
$Header: d:/Binder04.SDA/sda2/General.Use/RCS/Start3x.dat,v 1.1 2007-03-29 08:42:57-08 Hamilton Exp Hamilton $
FTS capture buffer (3/28/2007 12:12:10 PM)
Event 1 (3/28/2007 12:11:11.326347 PM) through
Event 48,007 (3/28/2007 12:11:55.977731 PM)

      1,       1:  DTE      1     0.000000   0.000000  25
      1,       2:  DTE      2     0.000519   0.000519  21
      1,       3:  DTE      3     0.001040   0.000521  50
      1,       4:  DTE      4     0.001559   0.000519  53
      1,       5:  DTE      5     0.002079   0.000520  2d
      1,       6:  DTE      6     0.002601   0.000522  41
      1,       7:  DTE      7     0.003121   0.000520  64
      1,       8:  DTE      8     0.003642   0.000521  6f
      1,       9:  DTE      9     0.004072   0.000430  62
      1,      10:  DTE     10     0.004685   0.000613  65
      1,      11:  DTE     11     0.005205   0.000520  2d
      1,      12:  DTE     12     0.005727   0.000522  32
      1,      13:  DTE     13     0.006247   0.000520  2e
      1,      14:  DTE     14     0.006769   0.000522  30
      1,      15:  DTE     15     0.007288   0.000519  20

There were a total of       15 bytes transferred

There were a total of        0 DCE bytes transferred
The first DCE byte came in at 0.000000 seconds from the start of data collection
The last DCE byte was at 0.000000 seconds from the start of data collection

There were a total of       15 DTE bytes transferred
The first DTE byte came in at 0.000000 seconds from the start of data collection
The last DTE byte was at 0.007288 seconds from the start of data collection

```

B Typical old format FTE files

This is a collection of older format FTE files as they were produced. They are HEAD and TAIL extractions of many older capture files from examining Hitachi camera protocol. They come from:

```
1  D:\Binder08.Hitachi\CamCheck\original
```

Note that the columns are not in the same locations and that the locations change by time of day, day of month, etc.

B.1 Old format HEAD extractions

```
head -10 *.txt > head.txt
```

```
 1  ==> 01feb04d.txt <==
 2  FTS capture buffer (2/4/2010 2:38:34 PM)
 3  Event 1 (2/4/2010 2:36:59.476151 PM) through
 4  Event 660 (2/4/2010 2:38:18.506383 PM)
 5
 6  Sd  Event# Timestamp                  Hx
 7  DCE      1 2/4/2010 2:36:59.476151 PM 3a
 8  DCE      2 2/4/2010 2:36:59.478439 PM 52
 9  DTE      3 2/4/2010 2:36:59.480276 PM 3a
10  DCE      4 2/4/2010 2:36:59.480731 PM 46
11  DCE      5 2/4/2010 2:36:59.483022 PM 37
12  123456789 123456789 123456789 123456789 12
13
14
15  ==> 09aug06a.txt <==
16  FTS capture buffer (8/6/2009 10:55:49 AM)
17  Event 1 (8/6/2009 10:44:08.808428 AM) through
18  Event 7,275 (8/6/2009 10:46:30.494148 AM)
19
20  Sd  Event# Timestamp                   Hx
21  DTE      1 8/6/2009 10:44:08.808428 AM ff
22  DTE      2 8/6/2009 10:44:08.812584 AM 01
23  DTE      3 8/6/2009 10:44:08.816724 AM 00
24  DTE      4 8/6/2009 10:44:08.820890 AM 00
25  DTE      5 8/6/2009 10:44:08.825030 AM 00
26  123456789 123456789 123456789 123456789 12
27
28
29  ==> 09mar03b.txt <==
30  FTS capture buffer (3/3/2009 1:10:38 PM)
31  Event 1 (3/3/2009 12:30:54.127785 PM) through
32  Event 135,177 (3/3/2009 12:54:52.294552 PM)
33
```

[13] $Header: d:/Binder04.SDA/sda2/General.Use/RCS/OldFormat.inc,v 1.1 2011-07-08 12:05:22-07 Hamilton Exp Hamilton $

```
34  Sd  Event# Timestamp                  Hx
35  DCE      1 3/3/2009 12:30:54.127785 P
36  DCE      2 3/3/2009 12:30:54.127796 P 00
37  DTE      3 3/3/2009 12:30:54.128786 P
38  DTE      4 3/3/2009 12:30:54.128797 P 00
39  DCE      5 3/3/2009 12:30:58.299425 P 01
40  123456789 123456789 123456789 123456789 12
41
42
```

B.2 Old format TAIL extractions

In general the format of a data capture file is consistant its full length. However note what happens at the end of large data capture files.

```
tail -5 *.txt > dynapel.txt
```

```
1  DCE 4778463 2/13/2008 2:40:28.089865 PM 00
2  DCE 4778464 2/13/2008 2:40:28.090915 PM 63
3  DCE 4778465 2/13/2008 2:40:28.091948 PM 06
4  DCE 4778466 2/13/2008 2:40:28.092991 PM 42
5  DCE 4778467 2/13/2008 2:40:28.094033 PM ac
6  12346789 12346789 12346789 12346789 12346789
```

C "Q" filters in SDA2

C.1 Internal Help File Program Descriptions from SDA2

Documentation about the tools that live in this directory:

Note

1. There has been an effort to upgrade the various filters listed here. Those filters that have been upgraded have had a "Q" appended to their name if there was room or had the last character of their name changed to a "Q" if appending a letter would violate the 8.3 naming convention.

   In this set of documentation the old and new names may appear depending on the software update schedule. (And any documentation errors that may occur!)

2. Minor updating was done to this file in July 2011.

1. DLE2T

   ```
   $ Header: d:/Binder4/sda2/RCS/dle2t.l,v 1.1 2009-05-05 11:14:01-07 Hamilton Exp Hamilton $
   DLE2T is used to process files generated by MS to get the delta between
   dCe to dTe items in the total seconds column. The data may have been
   processed by FixD.l first if desired. It may not have been processed with
   MSX first.
   ```

2. DLT2E

   ```
   $ Header: d:/Binder4/sda2/RCS/dlt2e.l,v 1.1 2009-05-05 11:13:52-07 Hamilton Exp Hamilton $
   DLT2E is used to process files generated by MS to get the delta between
   dTe to dCe items in the total seconds column. The data may have been
   processed by FixD.l first if desired. It may not have been processed with
   MSX first.
   ```

3. GetPlace

   ```
   $ Header: d:/Binder4/sda2/RCS/GetPlacq.l,v 1.1 2008-09-16 09:39:56-07 Hamilton Exp Hamilton $
   GetPlace is used to extract all pan/tilt readouts from a file.
   ```

4. GetSpeed

   ```
   $ Header: d:/Binder4/sda2/RCS/GetSpeeq.l,v 1.1 2008-09-16 09:44:14-07 Hamilton Exp Hamilton $
   GetSpeed is used to extract all lines from a file with the words ' Pan
   Speed' in them. (Note the leading blank.)
   ```

5. IdIt

   ```
   $ Header: d:/Binder4/sda2/RCS/IdItq.l,v 1.1 2008-09-16 09:56:26-07 Hamilton Exp Hamilton $
   IdIt is used to get the device ID and breakdown standard commands. It
   only pays attention to DCE type data. I.e. All DTE data is thrown away.

   Decoding data comes from the Vicon publication 'RS-422 Receiver
   Communications Protocol' Part Number 8015-5812-02-00 Rev 404 with
   copright dates of 1994, 2003.
   ```

6. IdStatus

[14] $Header: d:/Binder04.SDA/sda2/General.Use/RCS/DocSda2.inc,v 1.1 2011-07-08 12:05:14-07 Hamilton Exp Hamilton $

```
$ Header: d:/Binder4/sda2/RCS/IdStatuq.l,v 1.1 2008-09-16 10:05:30-07 Hamilton Exp Hamilton $
IdStatus is used to get the device status from camera responses.
```

7. JustSped

```
$ Header: d:/Binder4/sda2/RCS/JustSpeq.l,v 1.1 2008-09-16 10:15:34-07 Hamilton Exp Hamilton $
JustSped is used to extract only pan speeds from a .SPD file.
```

8. JustTime

```
$ Header: d:/Binder4/sda2/RCS/JustTimq.l,v 1.1 2008-09-16 10:17:31-07 Hamilton Exp Hamilton $
JustTime is used to extract just the times from data capture files which
have been run through jj.bat and is the .BL output of jj.bat.
```

9. MakeCmnd

```
$ Header: d:/Binder4/sda2/RCS/MakeCmnq.l,v 1.1 2008-09-16 10:20:31-07 Hamilton Exp Hamilton $
MakeCmnd is used to process 7 byte D Protocol commands into a format
usable by the GlassKeyboard. It also adds delays where needed.
```

10. MakeD

```
$ Header: d:/Binder4/sda2/RCS/MakeDq.l,v 1.1 2008-09-16 10:24:28-07 Hamilton Exp Hamilton $
MakeD, not too clear what this does. (But is preserved anyway.)
```

11. MM

```
$ Header: d:/Binder4/sda2/RCS/MMq.l,v 1.1 2008-09-16 10:28:39-07 Hamilton Exp Hamilton $
MM is an alternate version of MakeCmnd which is used to process 7 byte D
Protocol commands into a format usable by the GlassKeyboard. It also adds
delays where needed.

The difference between MM and MakeCmnd is that with this version, the
standard header for the GlassKeyboard is not generated.
```

12. NoEndF8

```
$ Header: d:/Binder4/sda2/RCS/NoEndF8q.l,v 1.1 2008-09-16 10:30:54-07 Hamilton Exp Hamilton $
NoEndF8 is used to strip off all F8 codes on the end of lines.
```

13. NoStatus

```
$ Header: d:/Binder4/sda2/RCS/NoStatuq.l,v 1.1 2008-09-16 10:32:59-07 Hamilton Exp Hamilton $
NoStatus deletes all lines in a file that have the word 'Status' in them.
```

14. OneLine

```
$ Header: d:/Binder4/sda2/RCS/OneLineq.l,v 1.1 2008-09-16 10:35:13-07 Hamilton Exp Hamilton $
OneLine is used to convert files processed with MS (originally MakeSecs)
into one line of Cohu interperted data.
```

15. PanClean

```
$ Header: d:/Binder4/sda2/RCS/PanCleaq.l,v 1.1 2008-09-16 10:37:03-07 Hamilton Exp Hamilton $
PanClean is used to get rid of invalid capture records that result from
RS-485 fooling around during line seisure, etc.
```

16. PanDump

```
$ Header: d:/Binder4/sda2/RCS/PanDumpq.l,v 1.1 2008-09-16 10:38:39-07 Hamilton Exp Hamilton $
PanDump is used to get rid of extra stuff to the left of a command, etc.
```

17. PanHtoA

```
$ Header: d:/Binder4/sda2/RCS/PanHtoAq.l,v 1.1 2008-09-16 10:42:35-07 Hamilton Exp Hamilton $
PanHtoA is used to convert Panasonic data captures from Hexidecimal to
ASCII.
```

18. PanInTrp

```
$ Header: d:/Binder4/sda2/RCS/PanIntrq.l,v 1.1 2008-09-16 10:45:29-07 Hamilton Exp Hamilton $
PanInTrp is used to interpert Panasonic commands into real words.
```

19. ProcDce

```
$ Header: d:/Binder4/sda2/RCS/ProcDECq.l,v 1.1 2008-09-16 10:52:55-07 Hamilton Exp Hamilton $
ProcDce is used to process Vicon data captures that have been first
processed by MS (oritinally MakeSecs) and then by GetDce. The result will
be first bytes of commands being followed by the rest of the command on
each line.
```

20. PTvals

```
$ Header: d:/Binder4/sda2/RCS/PtValsq.l,v 1.1 2008-09-16 10:56:11-07 Hamilton Exp Hamilton $
PTvals is used to take D Protocol capture files that have been processed
with: MSx (originally MakeSecx), GetDce, FixD, \isc{GetPT} and
\isc{DMPShort}. It then reads the output of DMPShort and generates a file
of pan/tilt values. Used with the DynaPel problem.
```

21. PTZvals

```
$ Header: d:/Binder4/sda2/RCS/PTZvalsq.l,v 1.1 2008-09-16 10:58:39-07 Hamilton Exp Hamilton $
PTZvals is used to take D Protocol capture files that have been processed
with: MSX (origianlly MakeSecx), GetDce, FixD, GetPT and DMPShort. It
then reads the output of DMPShort and generates a file of pan/tilt
values. Used with the DyanPel problem.
```

22. Rcnt

```
$ Header: d:/Binder4/sda2/RCS/Rcntq.l,v 1.1 2008-09-16 11:02:09-07 Hamilton Exp Hamilton $
Rcnt outputs the current ling number when it is different from the
preceeding line and has a 0x7e in it. It is unclear why.
```

23. TassDecd

```
$ Header: d:/Binder4/sda2/RCS/TassDECq.l,v 1.1 2008-09-16 11:10:09-07 Hamilton Exp Hamilton $
TassDecd is used to decode TASS protocol messages that have been
processed by TassFix.
```

24. TassFix

```
$ Header: d:/Binder4/sda2/RCS/TassFixq.l,v 1.1 2008-09-16 11:11:53-07 Hamilton Exp Hamilton $
TassFix is used to break down the output of Makesecs into TASS messages.
```

25. TassIntp

```
$ Header: d:/Binder4/sda2/RCS/TassIntq.l,v 1.1 2008-09-16 11:14:08-07 Hamilton Exp Hamilton $
TassIntp is used to interpert the output of TassDecd to make the output
codes somewhat more understandable.
```

26. Vicon01

```
$ Header: d:/Binder4/sda2/RCS/Vicon01q.l,v 1.1 2008-09-16 11:16:26-07 Hamilton Exp Hamilton $
Vicon01 is used to group pairs of bytes together when they occur on DCE
lines only.
```

27. VICON03

```
$ Header: d:/Binder4/sda2/RCS/Vicon02q.l,v 1.1 2008-09-16 11:25:11-07 Hamilton Exp Hamilton $
Vicon03 is used to block up groups of command bytes that start up ending
with ' xx 00\n', and xx = 08, 09, 10, 11, 20, 21, 40, 41
                          28, 29, 30, 31, 48, 49, 50, 51
                     xx must not be equal to 00
and consist of four total lines of data pairs. It is assumed that this is
the output of Vicon01x.
```

28. VICON03

```
$ Header: d:/Binder4/sda2/RCS/Vicon03q.l,v 1.1 2008-09-16 11:25:15-07 Hamilton Exp Hamilton $
Vicon03 prints out everything and groups of 46 and 23 characters. It is
unclear why.
```

29. VICON01X

```
$ Header: d:/Binder4/sda2/RCS/Vicon1xq.l,v 1.1 2008-09-16 11:19:30-07 Hamilton Exp Hamilton $
Vicon01x is used to delete all lines ending with a ' 80 01\n' poll
message. and their responses of ' 20\n'
```

D List of Effective Sections

1. Header: d:/Binder04.SDA/sda2/General.Use/RCS/Bats.inc,v
   1.3 2011-07-08 12:44:09-07 Hamilton Exp Hamilton
2. Header: d:/Binder04.SDA/sda2/General.Use/RCS/CoaxProt.inc,v
   1.1 2011-07-08 12:44:35-07 Hamilton Exp Hamilton
3. Header: d:/Binder04.SDA/sda2/General.Use/RCS/DProtoq.inc,v
   1.2 2011-07-08 13:03:03-07 Hamilton Exp Hamilton
4. Header: d:/Binder04.SDA/sda2/General.Use/RCS/DceDteX.inc,v
   1.2 2009-06-24 12:28:55-07 Hamilton Exp Hamilton
5. Header: d:/Binder04.SDA/sda2/General.Use/RCS/DocSda2.inc,v
   1.1 2011-07-08 12:05:14-07 Hamilton Exp Hamilton
6. Header: d:/Binder04.SDA/sda2/General.Use/RCS/Docs.inc,v
   1.12 2011-07-08 12:54:35-07 Hamilton Exp
   Hamilton
7. Header: d:/Binder04.SDA/sda2/General.Use/RCS/Dp.inc,v
   1.10 2011-07-08 12:54:35-07 Hamilton Exp
   Hamilton
8. Header: d:/Binder04.SDA/sda2/General.Use/RCS/General.inc,v
   1.1 2011-07-08 12:54:58-07 Hamilton Exp Hamilton
9. Header: d:/Binder04.SDA/sda2/General.Use/RCS/Interl.inc,v
   1.4 2011-07-08 11:43:38-07 Hamilton Exp Hamilton
10. Header: d:/Binder04.SDA/sda2/General.Use/RCS/MakeSecs.inc,v
    1.12 2009-06-24 11:08:26-07 Hamilton Exp
    Hamilton
11. Header: d:/Binder04.SDA/sda2/General.Use/RCS/OldFormat.inc,v
    1.1 2011-07-08 12:05:22-07 Hamilton Exp Hamilton
12. Header: d:/Binder04.SDA/sda2/General.Use/RCS/PProt.inc,v
    1.2 2011-07-08 13:03:05-07 Hamilton Exp Hamilton
13. Header: d:/Binder04.SDA/sda2/General.Use/RCS/SDA2.tex,v
    1.16 2011-07-08 12:22:44-07 Hamilton Exp
    Hamilton

[15] File was generated by FixGlo.l and refit.bat

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