

Various Filters and Techniques for:

Serial Data Analysis

Part 2, General Introduction

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¹\$Header: d:/Binder4/sda2/RCS/Sda2Intr.tex,v 1.4 2008-06-10 09:48:07-07 Hamilton Exp Hamilton \$

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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 taken of the fact that when two pairs of wires are used for communications with a dome, that data may be transferred simultaneously in both directions. Interpreting 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 Protocol. 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 4.)

This data capture record was made using a DynaPel unit and a Spectra III. and is shown on page 4.

1.1.2 Original Data Capture Record After Processing by MSXQ (MAKESECX)

(Listing shown on page 5.)

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” command/response repeats several times.

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

1.1.3 Independent Saving of Each Direction of Data

(Listing shown on pages 6 and 6.)

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:/Binder4/sda2/RCS/Interl1.inc,v 1.3 2009-06-24 12:29:09-07 Hamilton Exp Hamilton \$

ilv0.txt

```

1 FTS capture buffer (2/12/2008 11:07:09 AM)
2 Event 1 (2/12/2008 11:05:51.949358 AM) through
3 Event 7,823 (2/12/2008 11:06:56.451268 AM)
4
5 Sd Event# Timestamp Hx
6 DTE 397 2/12/2008 11:06:18.979707 AM ff
7 DTE 398 2/12/2008 11:06:18.980746 AM 01
8 DTE 399 2/12/2008 11:06:18.981787 AM 00
9 DTE 400 2/12/2008 11:06:18.982829 AM 51
10 DTE 401 2/12/2008 11:06:18.983871 AM 00
11 DTE 402 2/12/2008 11:06:18.984827 AM 00
12 DTE 403 2/12/2008 11:06:18.985954 AM 52
13 DTE 404 2/12/2008 11:06:18.986996 AM ff
14 DTE 405 2/12/2008 11:06:18.988037 AM 01
15 DCE 406 2/12/2008 11:06:18.988433 AM ff
16 DTE 407 2/12/2008 11:06:18.989079 AM 00
17 DCE 408 2/12/2008 11:06:18.989475 AM 01
18 DTE 409 2/12/2008 11:06:18.990121 AM 53
19 DCE 410 2/12/2008 11:06:18.990515 AM 00
20 DTE 411 2/12/2008 11:06:18.991162 AM 00
21 DCE 412 2/12/2008 11:06:18.991552 AM 59
22 DTE 413 2/12/2008 11:06:18.992204 AM 00
23 DCE 414 2/12/2008 11:06:18.992592 AM 17
24 DTE 415 2/12/2008 11:06:18.993246 AM 54
25 DCE 416 2/12/2008 11:06:18.993634 AM b1
26 DCE 417 2/12/2008 11:06:18.994679 AM 22
27 DCE 418 2/12/2008 11:06:19.122701 AM ff
28 DCE 419 2/12/2008 11:06:19.123739 AM 01
29 DCE 420 2/12/2008 11:06:19.124772 AM 00
30 DCE 421 2/12/2008 11:06:19.125813 AM 5b
31 DCE 422 2/12/2008 11:06:19.126855 AM 17
32 DCE 423 2/12/2008 11:06:19.127896 AM 40
33 DCE 424 2/12/2008 11:06:19.128934 AM 43
34 DTE 425 2/12/2008 11:06:19.136372 AM ff
35 DTE 426 2/12/2008 11:06:19.137413 AM 01
36 DTE 427 2/12/2008 11:06:19.138453 AM 00
37 DTE 428 2/12/2008 11:06:19.139495 AM 55
38 DTE 429 2/12/2008 11:06:19.140537 AM 00
39 DTE 430 2/12/2008 11:06:19.141579 AM 00
40 DTE 431 2/12/2008 11:06:19.142621 AM 56
41 DCE 432 2/12/2008 11:06:19.198929 AM ff
42 DCE 433 2/12/2008 11:06:19.199969 AM 01
43 DCE 434 2/12/2008 11:06:19.201003 AM 00
44 DCE 435 2/12/2008 11:06:19.202046 AM 5d
45 DCE 436 2/12/2008 11:06:19.203088 AM 01
46 DCE 437 2/12/2008 11:06:19.204127 AM ff
47 DCE 438 2/12/2008 11:06:19.205146 AM 5e
48 DTE 439 2/12/2008 11:06:19.211162 AM ff
49 DTE 440 2/12/2008 11:06:19.212036 AM 01
50 DTE 441 2/12/2008 11:06:19.213244 AM 00
51 DTE 442 2/12/2008 11:06:19.214287 AM 25
52 DTE 443 2/12/2008 11:06:19.215161 AM 00
53 DTE 444 2/12/2008 11:06:19.216370 AM 01
54 DTE 445 2/12/2008 11:06:19.217413 AM 27
55 DCE 446 2/12/2008 11:06:19.219101 AM ff
56 DCE 447 2/12/2008 11:06:19.220145 AM 01
57 DCE 448 2/12/2008 11:06:19.221180 AM 00
58 DCE 449 2/12/2008 11:06:19.222222 AM 27
59 DTE 450 2/12/2008 11:06:19.228036 AM ff
60 DTE 451 2/12/2008 11:06:19.229078 AM 01
61 DTE 452 2/12/2008 11:06:19.230119 AM 00
62 DTE 453 2/12/2008 11:06:19.231162 AM 00
63 DTE 454 2/12/2008 11:06:19.232204 AM 00
64 DTE 455 2/12/2008 11:06:19.233245 AM 00
65 DTE 456 2/12/2008 11:06:19.234287 AM 01
66 DCE 457 2/12/2008 11:06:19.300225 AM ff
67 DCE 458 2/12/2008 11:06:19.301262 AM 01
68 DCE 459 2/12/2008 11:06:19.302300 AM 00
69 DCE 460 2/12/2008 11:06:19.303341 AM 01
70 DTE 461 2/12/2008 11:06:19.309079 AM ff
71 DTE 462 2/12/2008 11:06:19.310119 AM 01
72 DTE 463 2/12/2008 11:06:19.311162 AM 00
73 DTE 464 2/12/2008 11:06:19.312045 AM 51
74 DTE 465 2/12/2008 11:06:19.313245 AM 00
75 DTE 466 2/12/2008 11:06:19.314287 AM 00
76 DTE 467 2/12/2008 11:06:19.315303 AM 52
77 DTE 468 2/12/2008 11:06:19.316371 AM ff
78 DTE 469 2/12/2008 11:06:19.317413 AM 01
79 DCE 470 2/12/2008 11:06:19.317905 AM ff
80 DTE 471 2/12/2008 11:06:19.318453 AM 00
81 DTE 472 2/12/2008 11:06:19.318939 AM 01
82 DTE 473 2/12/2008 11:06:19.319496 AM 53
83 DCE 474 2/12/2008 11:06:19.319980 AM 00
84 DTE 475 2/12/2008 11:06:19.320537 AM 00
85 DCE 476 2/12/2008 11:06:19.321022 AM 59
86 DTE 477 2/12/2008 11:06:19.321579 AM 00
87 DCE 478 2/12/2008 11:06:19.322065 AM 17
88 DTE 479 2/12/2008 11:06:19.322621 AM 54
89 DCE 480 2/12/2008 11:06:19.323101 AM b1
90 DCE 481 2/12/2008 11:06:19.324142 AM 22
91 DCE 482 2/12/2008 11:06:19.325192 AM ff
92 DCE 483 2/12/2008 11:06:19.326226 AM 01

```

```

93 DCE 484 2/12/2008 11:06:19.327261 AM 00
94 DCE 485 2/12/2008 11:06:19.328301 AM 5b
95 DCE 486 2/12/2008 11:06:19.329344 AM 17
96 DCE 487 2/12/2008 11:06:19.330384 AM 40
97 DCE 488 2/12/2008 11:06:19.331420 AM 43
98 DTE 489 2/12/2008 11:06:19.338870 AM ff
99 DTE 490 2/12/2008 11:06:19.339912 AM 01
100 DTE 491 2/12/2008 11:06:19.340953 AM 00
101 DTE 492 2/12/2008 11:06:19.341995 AM 55
102 DTE 493 2/12/2008 11:06:19.343036 AM 00
103 DTE 494 2/12/2008 11:06:19.344079 AM 00
104 DTE 495 2/12/2008 11:06:19.345120 AM 56
105 DCE 496 2/12/2008 11:06:19.400790 AM ff
106 DCE 497 2/12/2008 11:06:19.401831 AM 01
107 DCE 498 2/12/2008 11:06:19.402872 AM 00
108 DCE 499 2/12/2008 11:06:19.403906 AM 5d
109 DCE 500 2/12/2008 11:06:19.404948 AM 01
110 DCE 501 2/12/2008 11:06:19.406025 AM ff
111 DCE 502 2/12/2008 11:06:19.407032 AM 5e
112 DTE 503 2/12/2008 11:06:19.413246 AM ff
113 DTE 504 2/12/2008 11:06:19.414703 AM 01
114 DTE 505 2/12/2008 11:06:19.415745 AM 00
115 DTE 506 2/12/2008 11:06:19.416788 AM 2a
116 DTE 507 2/12/2008 11:06:19.417829 AM 40
117 DTE 508 2/12/2008 11:06:19.418870 AM 3f
118 DTE 509 2/12/2008 11:06:19.419912 AM aa
119 DTE 510 2/12/2008 11:06:19.420954 AM ff
120 DCE 511 2/12/2008 11:06:19.421589 AM ff
121 DTE 512 2/12/2008 11:06:19.421996 AM 01
122 DCE 513 2/12/2008 11:06:19.422630 AM 01
123 DTE 514 2/12/2008 11:06:19.423036 AM 00
124 DCE 515 2/12/2008 11:06:19.423667 AM 00
125 DTE 516 2/12/2008 11:06:19.424077 AM 55
126 DCE 517 2/12/2008 11:06:19.424709 AM aa
127 DTE 518 2/12/2008 11:06:19.425120 AM 00
128 DTE 519 2/12/2008 11:06:19.426162 AM 00
129 DTE 520 2/12/2008 11:06:19.427204 AM 56
130 DCE 521 2/12/2008 11:06:19.631777 AM ff
131 DCE 522 2/12/2008 11:06:19.632813 AM 01
132 DCE 523 2/12/2008 11:06:19.633856 AM 00
133 DCE 524 2/12/2008 11:06:19.634890 AM 5d
134 DCE 525 2/12/2008 11:06:19.635766 AM 02
135 DCE 526 2/12/2008 11:06:19.636975 AM 05
136 DCE 527 2/12/2008 11:06:19.638009 AM 65
137 DTE 528 2/12/2008 11:06:19.645435 AM ff
138 DTE 529 2/12/2008 11:06:19.646891 AM 01
139 DTE 530 2/12/2008 11:06:19.647933 AM 00
140 DTE 531 2/12/2008 11:06:19.648975 AM 2a
141 DTE 532 2/12/2008 11:06:19.650016 AM 40
142 DTE 533 2/12/2008 11:06:19.651057 AM 3f
143 DTE 534 2/12/2008 11:06:19.652100 AM aa
144 DTE 535 2/12/2008 11:06:19.653141 AM ff
145 DTE 536 2/12/2008 11:06:19.654183 AM 01
146 DTE 537 2/12/2008 11:06:19.655225 AM 00
147 DTE 538 2/12/2008 11:06:19.656265 AM 51
148 DTE 539 2/12/2008 11:06:19.657308 AM 00
149 DTE 540 2/12/2008 11:06:19.658350 AM 00
150 DTE 541 2/12/2008 11:06:19.659391 AM 52
151 DCE 542 2/12/2008 11:06:19.666400 AM ff
152 DCE 543 2/12/2008 11:06:19.667442 AM 01
153 DCE 544 2/12/2008 11:06:19.668483 AM 00
154 DCE 545 2/12/2008 11:06:19.669525 AM aa
155 DCE 546 2/12/2008 11:06:19.670561 AM ff
156 DCE 547 2/12/2008 11:06:19.671602 AM 01
157 DCE 548 2/12/2008 11:06:19.672643 AM 00
158 DCE 549 2/12/2008 11:06:19.673686 AM 59
159 DCE 550 2/12/2008 11:06:19.674720 AM 21
160 DCE 551 2/12/2008 11:06:19.675773 AM 36
161 DCE 552 2/12/2008 11:06:19.676806 AM b1
162 DTE 553 2/12/2008 11:06:19.768359 AM ff
163 DTE 554 2/12/2008 11:06:19.769808 AM 01
164 DTE 555 2/12/2008 11:06:19.770850 AM 00
165 DTE 556 2/12/2008 11:06:19.771891 AM 2a
166 DTE 557 2/12/2008 11:06:19.772933 AM 31
167 DTE 558 2/12/2008 11:06:19.773975 AM 3f
168 DTE 559 2/12/2008 11:06:19.775017 AM 9b
169 DTE 560 2/12/2008 11:06:19.775965 AM ff
170 DCE 561 2/12/2008 11:06:19.776330 AM ff
171 DTE 562 2/12/2008 11:06:19.777098 AM 01
172 DCE 563 2/12/2008 11:06:19.777378 AM 01
173 DTE 564 2/12/2008 11:06:19.778140 AM 00
174 DCE 565 2/12/2008 11:06:19.778421 AM 00
175 DTE 566 2/12/2008 11:06:19.779040 AM 53
176 DCE 567 2/12/2008 11:06:19.779454 AM 9b
177 DTE 568 2/12/2008 11:06:19.780224 AM 00
178 DTE 569 2/12/2008 11:06:19.781266 AM 00
179 DTE 570 2/12/2008 11:06:19.782308 AM 54
180 DCE 571 2/12/2008 11:06:19.784649 AM ff
181 DCE 572 2/12/2008 11:06:19.785691 AM 01
182 DCE 573 2/12/2008 11:06:19.786565 AM 00
183 DCE 574 2/12/2008 11:06:19.787767 AM 5b
184 DCE 575 2/12/2008 11:06:19.788809 AM 12
185 DCE 576 2/12/2008 11:06:19.789851 AM 00
186 DCE 577 2/12/2008 11:06:19.790893 AM 6e

```

ilv0.out

```

1 $ Id: MakeSecx.1,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/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 0.0142994 0.000388 ff
41 7, 9: DCE 23 0.0144032 0.000388 01
42 7, 10: DCE 24 0.0145065 0.000388 00
43 7, 11: DCE 25 0.0146106 0.000388 5b
44 7, 12: DCE 26 0.0147148 0.000388 17
45 7, 13: DCE 27 0.0148189 0.000388 d0
46 7, 14: DCE 28 0.0149227 0.000388 43
47
48 7, 15: DTE 29 0.0156665 0.007438 ff
49 7, 16: DTE 30 0.0157706 0.001041 01
50 7, 17: DTE 31 0.0158746 0.001040 00
51 7, 18: DTE 32 0.0159788 0.001042 55
52 7, 19: DTE 33 0.0160830 0.001042 00
53 7, 20: DTE 34 0.0161872 0.001042 00
54 7, 21: DTE 35 0.0162914 0.001042 56
55
56 8, 15: DCE 36 0.0219222 0.056308 ff
57 8, 16: DCE 37 0.0220262 0.001040 01
58 8, 17: DCE 38 0.0221296 0.001034 00
59 8, 18: DCE 39 0.0222339 0.001043 5d
60 8, 19: DCE 40 0.0223381 0.001042 01
61 8, 20: DCE 41 0.0224420 0.001039 ff
62 8, 21: DCE 42 0.0225439 0.001019 5e
63
64 8, 22: DTE 43 0.0231455 0.001019 ff
65 8, 23: DTE 44 0.0232329 0.000874 01
66 8, 24: DTE 45 0.0233537 0.001208 00
67 8, 25: DTE 46 0.0234580 0.001043 25
68 8, 26: DTE 47 0.0235454 0.000874 00
69 8, 27: DTE 48 0.0236663 0.001209 01
70 8, 28: DTE 49 0.0237706 0.001043 27
71
72 9, 22: DCE 50 0.0239394 0.001688 ff
73 9, 23: DCE 51 0.0240438 0.001044 01
74 9, 24: DCE 52 0.0241473 0.001035 00
75 9, 25: DCE 53 0.0242515 0.001042 27
76
77 9, 29: DTE 54 0.0248329 0.001042 ff
78 9, 30: DTE 55 0.0249371 0.001042 01
79 9, 31: DTE 56 0.0250412 0.001041 00
80 9, 32: DTE 57 0.0251455 0.001043 00
81 9, 33: DTE 58 0.0252497 0.001042 00
82 9, 34: DTE 59 0.0253538 0.001041 00
83 9, 35: DTE 60 0.0254580 0.001042 01
84
85 10, 26: DCE 61 0.0320518 0.065938 ff
86 10, 27: DCE 62 0.0321555 0.001037 01
87 10, 28: DCE 63 0.0322593 0.001038 00
88 10, 29: DCE 64 0.0323634 0.001041 01
89
90 10, 36: DTE 65 0.0329372 0.001041 ff
91 10, 37: DTE 66 0.0330412 0.001040 01

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92 10, 38: DTE 67 0.0331455 0.001043 00
93 10, 39: DTE 68 0.0332338 0.000883 51
94 10, 40: DTE 69 0.0333538 0.001200 00
95 10, 41: DTE 70 0.0334580 0.001042 00
96 10, 42: DTE 71 0.0335596 0.001016 52
97 10, 43: DTE 72 0.0336664 0.001068 ff
98 10, 44: DTE 73 0.0337706 0.001042 01
99
100 11, 30: DCE 74 0.0338198 0.000492 ff
101
102 11, 45: DTE 75 0.0338746 0.000492 00
103
104 12, 31: DCE 76 0.0339232 0.000492 01
105
106 12, 46: DTE 77 0.0339789 0.000557 53
107
108 13, 32: DCE 78 0.0340273 0.000484 00
109
110 13, 47: DTE 79 0.0340830 0.000484 00
111
112 14, 33: DCE 80 0.0341315 0.000484 59
113
114 14, 48: DTE 81 0.0341872 0.000557 00
115
116 15, 34: DCE 82 0.0342358 0.000486 17
117
118 15, 49: DTE 83 0.0342914 0.000486 54
119
120 16, 35: DCE 84 0.0343394 0.000486 b1
121 16, 36: DCE 85 0.0344435 0.000486 22
122 16, 37: DCE 86 0.0345485 0.000486 ff
123 16, 38: DCE 87 0.0346519 0.000486 01
124 16, 39: DCE 88 0.0347554 0.000486 00
125 16, 40: DCE 89 0.0348594 0.000486 5b
126 16, 41: DCE 90 0.0349637 0.000486 17
127 16, 42: DCE 91 0.0350677 0.000486 d0
128 16, 43: DCE 92 0.0351713 0.000486 43
129
130 16, 50: DTE 93 0.0359163 0.007450 ff
131 16, 51: DTE 94 0.0360205 0.001042 01
132 16, 52: DTE 95 0.0361246 0.001041 00
133 16, 53: DTE 96 0.0362288 0.001042 55
134 16, 54: DTE 97 0.0363329 0.001041 00
135 16, 55: DTE 98 0.0364372 0.001043 00
136 16, 56: DTE 99 0.0365413 0.001041 56
137
138 17, 44: DCE 100 0.0421083 0.055670 ff
139 17, 45: DCE 101 0.0422124 0.001041 01
140 17, 46: DCE 102 0.0423165 0.001041 00
141 17, 47: DCE 103 0.0424199 0.001034 5d
142 17, 48: DCE 104 0.0425241 0.001042 01
143 17, 49: DCE 105 0.0426318 0.001077 ff
144 17, 50: DCE 106 0.0427325 0.001007 5e
145
146 17, 57: DTE 107 0.0433539 0.001007 ff
147 17, 58: DTE 108 0.0434996 0.001457 01
148 17, 59: DTE 109 0.0436038 0.001042 00
149 17, 60: DTE 110 0.0437081 0.001043 2a
150 17, 61: DTE 111 0.0438122 0.001041 40
151 17, 62: DTE 112 0.0439163 0.001041 3f
152 17, 63: DTE 113 0.0440205 0.001042 aa
153 17, 64: DTE 114 0.0441247 0.001042 ff
154
155 18, 51: DCE 115 0.0441882 0.000635 ff
156
157 18, 65: DTE 116 0.0442289 0.000635 01
158
159 19, 52: DCE 117 0.0442923 0.000635 01
160
161 19, 66: DTE 118 0.0443329 0.000406 00
162
163 20, 53: DCE 119 0.0443960 0.000631 00
164
165 20, 67: DTE 120 0.0444370 0.000631 55
166
167 21, 54: DCE 121 0.0445002 0.000631 aa
168
169 21, 68: DTE 122 0.0445413 0.000411 00
170 21, 69: DTE 123 0.0446455 0.001042 00
171 21, 70: DTE 124 0.0447497 0.001042 56
172
173 22, 55: DCE 125 0.0652070 0.204573 ff
174 22, 56: DCE 126 0.0653106 0.001036 01
175 22, 57: DCE 127 0.0654149 0.001043 00
176 22, 58: DCE 128 0.0655183 0.001034 5d
177 22, 59: DCE 129 0.0656059 0.000876 02
178 22, 60: DCE 130 0.0657268 0.001209 05
179 22, 61: DCE 131 0.0658302 0.001034 65
180
181 22, 71: DTE 132 0.0665728 0.001034 ff
182 22, 72: DTE 133 0.0667184 0.001456 01
183 22, 73: DTE 134 0.0668226 0.001042 00
184 22, 74: DTE 135 0.0669268 0.001042 2a
185 22, 75: DTE 136 0.0670309 0.001041 40
186 22, 76: DTE 137 0.0671350 0.001041 3f

```

187	22,	77: DTE	138	0.672393	0.001043 aa	21	7,	21: DTE	35	0.162914	0.001042 56
188	22,	78: DTE	139	0.673434	0.001041 ff	22	8,	22: DTE	43	0.231455	0.001019 ff
189	22,	79: DTE	140	0.674476	0.001042 01	23	8,	23: DTE	44	0.232329	0.000874 01
190	22,	80: DTE	141	0.675518	0.001042 00	24	8,	24: DTE	45	0.233537	0.001208 00
191	22,	81: DTE	142	0.676558	0.001040 51	25	8,	25: DTE	46	0.234580	0.001043 25
192	22,	82: DTE	143	0.677601	0.001043 00	26	8,	26: DTE	47	0.235454	0.000874 00
193	22,	83: DTE	144	0.678643	0.001042 00	27	8,	27: DTE	48	0.236663	0.001209 01
194	22,	84: DTE	145	0.679684	0.001041 52	28	8,	28: DTE	49	0.237706	0.001043 27
195						29	9,	29: DTE	54	0.248329	0.001042 ff
196	23,	62: DCE	146	0.686693	0.007009 ff	30	9,	30: DTE	55	0.249371	0.001042 01
197	23,	63: DCE	147	0.687735	0.001042 01	31	9,	31: DTE	56	0.250412	0.001041 00
198	23,	64: DCE	148	0.688776	0.001041 00	32	9,	32: DTE	57	0.251455	0.001043 00
199	23,	65: DCE	149	0.689818	0.001042 aa	33	9,	33: DTE	58	0.252497	0.001042 00
200	23,	66: DCE	150	0.690854	0.001036 ff	34	9,	34: DTE	59	0.253538	0.001041 00
201	23,	67: DCE	151	0.691895	0.001041 01	35	9,	35: DTE	60	0.254580	0.001042 01
202	23,	68: DCE	152	0.692936	0.001041 00	36	10,	36: DTE	65	0.329372	0.001041 ff
203	23,	69: DCE	153	0.693979	0.001043 59	37	10,	37: DTE	66	0.330412	0.001040 01
204	23,	70: DCE	154	0.695013	0.001034 21	38	10,	38: DTE	67	0.331455	0.001043 00
205	23,	71: DCE	155	0.696066	0.001053 36	39	10,	39: DTE	68	0.332338	0.000883 51
206	23,	72: DCE	156	0.697099	0.001033 b1	40	10,	40: DTE	69	0.333538	0.001200 00
207						41	10,	41: DTE	70	0.334580	0.001042 00
208	23,	85: DTE	157	0.788652	0.001033 ff	42	10,	42: DTE	71	0.335596	0.001016 52
209	23,	86: DTE	158	0.790101	0.001449 01	43	10,	43: DTE	72	0.336664	0.001068 72
210	23,	87: DTE	159	0.791143	0.001042 00	44	10,	44: DTE	73	0.337706	0.001042 01
211	23,	88: DTE	160	0.792184	0.001041 2a	45	11,	45: DTE	75	0.338746	0.000492 00
212	23,	89: DTE	161	0.793226	0.001042 31	46	12,	46: DTE	77	0.339789	0.000557 53
213	23,	90: DTE	162	0.794268	0.001042 3f	47	13,	47: DTE	79	0.340830	0.000484 00
214	23,	91: DTE	163	0.795310	0.001042 9b	48	14,	48: DTE	81	0.341872	0.000557 00
215	23,	92: DTE	164	0.796258	0.000948 ff	49	15,	49: DTE	83	0.342914	0.000486 54
216						50	16,	50: DTE	93	0.359163	0.007450 ff
217	24,	73: DCE	165	0.796623	0.000365 ff	51	16,	51: DTE	94	0.360205	0.001042 01
218						52	16,	52: DTE	95	0.361246	0.001041 00
219	24,	93: DTE	166	0.797391	0.000365 01	53	16,	53: DTE	96	0.362288	0.001042 55
220						54	16,	54: DTE	97	0.363329	0.001041 00
221	25,	74: DCE	167	0.797671	0.000365 01	55	16,	55: DTE	98	0.364372	0.001043 00
222						56	16,	56: DTE	99	0.365413	0.001041 56
223	25,	94: DTE	168	0.798433	0.000762 00	57	17,	57: DTE	107	0.433539	0.001007 ff
224						58	17,	58: DTE	108	0.434996	0.001457 01
225	26,	75: DCE	169	0.798714	0.000281 00	59	17,	59: DTE	109	0.436038	0.001042 00
226						60	17,	60: DTE	110	0.437081	0.001043 2a
227	26,	95: DTE	170	0.799333	0.000281 53	61	17,	61: DTE	111	0.438122	0.001041 40
228						62	17,	62: DTE	112	0.439163	0.001041 3f
229	27,	76: DCE	171	0.799747	0.000281 9b	63	17,	63: DTE	113	0.440205	0.001042 aa
230						64	17,	64: DTE	114	0.441247	0.001042 ff
231	27,	96: DTE	172	0.800517	0.000770 00	65	18,	65: DTE	116	0.442289	0.000635 01
232	27,	97: DTE	173	0.801559	0.001042 00	66	19,	66: DTE	118	0.443329	0.000406 00
233	27,	98: DTE	174	0.802601	0.001042 54	67	20,	67: DTE	120	0.444370	0.000631 55
234						68	21,	68: DTE	122	0.445413	0.000411 00
235	28,	77: DCE	175	0.804942	0.002341 ff	69	21,	69: DTE	123	0.446455	0.001042 00
236	28,	78: DCE	176	0.805984	0.001042 01	70	21,	70: DTE	124	0.447497	0.001042 56
237	28,	79: DCE	177	0.806858	0.000874 00	71	22,	71: DTE	132	0.665728	0.001034 ff
238	28,	80: DCE	178	0.808060	0.001202 5b	72	22,	72: DTE	133	0.667184	0.001456 01
239	28,	81: DCE	179	0.809102	0.001042 12	73	22,	73: DTE	134	0.668226	0.001042 00
240	28,	82: DCE	180	0.810144	0.001042 00	74	22,	74: DTE	135	0.669268	0.001042 2a
241	28,	83: DCE	181	0.811186	0.001042 6e	75	22,	75: DTE	136	0.670309	0.001041 40
242						76	22,	76: DTE	137	0.671350	0.001041 3f
243	There were a total of 181 bytes transferred					77	22,	77: DTE	138	0.672393	0.001043 aa
244						78	22,	78: DTE	139	0.673434	0.001041 ff
245	There were a total of 83 DCE bytes transferred					79	22,	79: DTE	140	0.674476	0.001042 01
246	The first DCE byte came in at 0.008726 seconds from the start of data collection					80	22,	80: DTE	141	0.675518	0.001042 00
247	The last DCE byte was at 0.811186 seconds from the start of data collection					81	22,	81: DTE	142	0.676558	0.001040 51
248						82	22,	82: DTE	143	0.677601	0.001043 00
249	There were a total of 98 DTE bytes transferred					83	22,	83: DTE	144	0.678643	0.001042 00
250	The first DTE byte came in at 0.000000 seconds from the start of data collection					84	22,	84: DTE	145	0.679684	0.001041 52
251	The last DTE byte was at 0.802601 seconds from the start of data collection					85	23,	85: DTE	157	0.788652	0.001033 ff
252						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.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

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

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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 commands, the two files are concatenated 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 concatenating the two data sources together and now sorted based on the original time of data acquisition. This process is 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 acquisition 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, interpret the results just obtained, getting:

ilv0.ez

```

1  $ Id: MakeSecx.1,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2  $Header: d:/Binder4/sda2/RCS/Ilv0.ez,v 1.1 2008-03-10 09:33:17-08 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      1,      1: DTE      1      0.000000 0.000000 ff 01 00 51 00 00 52:      0      0:
8          ---> Return the absolute pan position
9
10     1,      8: DTE      8      0.007289 0.001042 ff 01 00 53 00 00 54:      0      0:
11         ---> Return the absolute tilt position
12
13     2,      1: DCE     10      0.008726 0.000396 ff 01 00 59 17 b1 22:      23 177:
14         ---> Query pan resp: 60.65
15
16     7,      8: DCE     22      0.142994 0.000388 ff 01 00 5b 17 d0 43:      23 208:
17         ---> Query tilt resp: 60.96
18
19     7,     15: DTE     29      0.156665 0.007438 ff 01 00 55 00 00 56:      0      0:
20         ---> Return the zoom position
21
22     8,     15: DCE     36      0.219222 0.056308 ff 01 00 5d 01 ff 5e:      1 255:
23         ---> Query zoom resp: 5.11
24
25     8,     22: DTE     43      0.231455 0.001019 ff 01 00 25 00 01 27:      0      1:
26         ---> Set zoom speed
27
28     9,     22: DCE     50      0.239394 0.001688 ff 01 00 27
29     9,     29: DTE     54      0.248329 0.001042 ff 01 00 00 00 00 01: ..... 0      0:
30         ---> Motion command
31
32    10,     26: DCE     61      0.320518 0.065938 ff 01 00 01
33    10,     36: DTE     65      0.329372 0.001041 ff 01 00 51 00 00 52:      0      0:
34         ---> Return the absolute pan position
35
36    10,     43: DTE     72      0.336664 0.001068 ff 01 00 53 00 00 54:      0      0:
37         ---> Return the absolute tilt position
38
39    11,     30: DCE     74      0.338198 0.000492 ff 01 00 59 17 b1 22:      23 177:
40         ---> Query pan resp: 60.65
41
42    16,     37: DCE     86      0.345485 0.000486 ff 01 00 5b 17 d0 43:      23 208:
43         ---> Query tilt resp: 60.96
44
45    16,     50: DTE     93      0.359163 0.007450 ff 01 00 55 00 00 56:      0      0:
46         ---> Return the zoom position
47
48    17,     44: DCE    100      0.421083 0.055670 ff 01 00 5d 01 ff 5e:      1 255:
49         ---> Query zoom resp: 5.11
50
51    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 deleted as the .BAT file progresses.

kkk.bat

```

1 @echo off
2 rem $Header: d:/Binder4/sda2/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 1    %1.ez
24 easyd1   %1.dat %1.ez1
25 call 1    %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 occurrences 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:/Binder4/sda2/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 derivations from it.

All of the examples in “General Use Filters” (Section 5, page 18) and 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 one of the varieties of MSQ (MAKESECS) utilized. Each routine description indicates the version of MSQ (MAKESECS) to use in its processing.

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

3 “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 an 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 delimiters.

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. This is the older version of the sort routine. The newer one is named SORT and gradually this one’s use will be eliminated. 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.
5. SORT: is used to sort the data. Following the `<infile>` designator is an indication of the `-k<sortkey>` to use. The format of the `<sortkey>` is: `_kstartcolumn,columnwidth` which may be repeated as often as necessary. The last field is the `-o<outfile>` to use.
6. 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>_`.

⁴\$Header: d:/Binder4/sda2/RCS/Intr.inc,v 1.19 2009-06-24 12:29:09-07 Hamilton Exp Hamilton \$

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

Some of the .BAT files used in generating these files were:

4.1 Kk.bat

```

1 @echo off
2 rem $Header: d:/Binder4/sda2/RCS/Kk.bat,v 1.1 2008-02-15 11:45:25-08 Hamilton Exp Hamilton $
3 makesecs %1.txt %1.out
4 fixd %1.out %1.fix
5 dump3q %1.fix %1.d3q
6 easyd1 %1.fix %1.ez
7 easyd1 %1.d3q %1.dez
8 deltas %1.fix %1.dlt

```

4.2 Kkk.bat

```

1 @echo off
2 rem $Header: d:/Binder4/sda2/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 1 %1.ez
24 easyd1 %1.dat %1.ez1
25 call 1 %1.ez1
26 del %1.dat

```

4.3 JDCE.bat

```

1 @echo off
2 rem $Header: d:/Binder4/sda2/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

```

4.4 JDTE.bat

```
1 @echo off
2 rem $Header: d:/Binder4/sda2/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
```

4.4.1 ttsamp.1 Test 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

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
21	DTE	16 2/12/2008 3:20:53.488939 PM	00
22	DTE	17 2/12/2008 3:20:53.490116 PM	00
23	DTE	18 2/12/2008 3:20:53.491156 PM	52
24	DCE	19 2/12/2008 3:20:53.492460 PM	ff
25	DCE	20 2/12/2008 3:20:53.493501 PM	01
26	DCE	21 2/12/2008 3:20:53.494543 PM	00
27	DCE	22 2/12/2008 3:20:53.495584 PM	59
28	DCE	23 2/12/2008 3:20:53.496626 PM	27
29	DCE	24 2/12/2008 3:20:53.497668 PM	e9
30	DCE	25 2/12/2008 3:20:53.498709 PM	6a
31	DTE	26 2/12/2008 3:20:53.504802 PM	ff
32	DTE	27 2/12/2008 3:20:53.505845 PM	01
33	DTE	28 2/12/2008 3:20:53.506886 PM	00
34	DTE	29 2/12/2008 3:20:53.507927 PM	53
35	DTE	30 2/12/2008 3:20:53.508969 PM	00
36	DTE	31 2/12/2008 3:20:53.510010 PM	00
37	DTE	32 2/12/2008 3:20:53.511053 PM	54
38	DCE	33 2/12/2008 3:20:53.512459 PM	ff
39	DCE	34 2/12/2008 3:20:53.513502 PM	01
40	DCE	35 2/12/2008 3:20:53.514544 PM	00
41	DCE	36 2/12/2008 3:20:53.515584 PM	5b
42	DCE	37 2/12/2008 3:20:53.516626 PM	02
43	DCE	38 2/12/2008 3:20:53.517667 PM	4c
44	DCE	39 2/12/2008 3:20:53.518710 PM	aa
45	DTE	40 2/12/2008 3:20:53.525011 PM	ff
46	DTE	41 2/12/2008 3:20:53.526052 PM	01
47	DTE	42 2/12/2008 3:20:53.527094 PM	00
48	DTE	43 2/12/2008 3:20:53.528136 PM	61
49	DTE	44 2/12/2008 3:20:53.529044 PM	00
50	DTE	45 2/12/2008 3:20:53.530219 PM	00
51	DTE	46 2/12/2008 3:20:53.531130 PM	62
52	DCE	47 2/12/2008 3:20:53.532455 PM	ff
53	DCE	48 2/12/2008 3:20:53.533494 PM	01
54	DCE	49 2/12/2008 3:20:53.534537 PM	00
55	DCE	50 2/12/2008 3:20:53.535577 PM	63
56	DCE	51 2/12/2008 3:20:53.536620 PM	03
57	DCE	52 2/12/2008 3:20:53.537663 PM	77
58	DCE	53 2/12/2008 3:20:53.538703 PM	de
59	DTE	54 2/12/2008 3:20:53.585087 PM	ff
60	DTE	55 2/12/2008 3:20:53.586261 PM	01
61	DTE	56 2/12/2008 3:20:53.587301 PM	00
62	DTE	57 2/12/2008 3:20:53.588343 PM	0a
63	DTE	58 2/12/2008 3:20:53.589386 PM	1c
64	DTE	59 2/12/2008 3:20:53.590435 PM	11
65	DTE	60 2/12/2008 3:20:53.591468 PM	38
66	DCE	61 2/12/2008 3:20:53.598802 PM	ff
67	DCE	62 2/12/2008 3:20:53.599844 PM	01
68	DCE	63 2/12/2008 3:20:53.600884 PM	00
69	DCE	64 2/12/2008 3:20:53.601926 PM	38
70	DTE	65 2/12/2008 3:20:53.605010 PM	ff

71	DTE	66 2/12/2008 3:20:53.606052 PM	01
72	DTE	67 2/12/2008 3:20:53.607093 PM	00
73	DTE	68 2/12/2008 3:20:53.608135 PM	51
74	DTE	69 2/12/2008 3:20:53.609183 PM	00
75	DTE	70 2/12/2008 3:20:53.610218 PM	00
76	DTE	71 2/12/2008 3:20:53.611260 PM	52
77	DCE	72 2/12/2008 3:20:53.614738 PM	ff
78	DCE	73 2/12/2008 3:20:53.615780 PM	01
79	DCE	74 2/12/2008 3:20:53.616821 PM	00
80	DCE	75 2/12/2008 3:20:53.617863 PM	59
81	DCE	76 2/12/2008 3:20:53.618904 PM	27
82	DCE	77 2/12/2008 3:20:53.619946 PM	a8
83	DCE	78 2/12/2008 3:20:53.620989 PM	29
84	DTE	79 2/12/2008 3:20:53.627302 PM	ff
85	DTE	80 2/12/2008 3:20:53.628344 PM	01
86	DTE	81 2/12/2008 3:20:53.629385 PM	00
87	DTE	82 2/12/2008 3:20:53.630427 PM	53
88	DTE	83 2/12/2008 3:20:53.631469 PM	00
89	DTE	84 2/12/2008 3:20:53.632510 PM	00
90	DTE	85 2/12/2008 3:20:53.633552 PM	54
91	DCE	86 2/12/2008 3:20:53.634842 PM	ff
92	DCE	87 2/12/2008 3:20:53.635879 PM	01
93	DCE	88 2/12/2008 3:20:53.636918 PM	00
94	DCE	89 2/12/2008 3:20:53.637960 PM	5b
95	DCE	90 2/12/2008 3:20:53.638973 PM	02
96	DCE	91 2/12/2008 3:20:53.640043 PM	3c
97	DCE	92 2/12/2008 3:20:53.640952 PM	9a
98	DTE	93 2/12/2008 3:20:53.644907 PM	ff
99	DTE	94 2/12/2008 3:20:53.645948 PM	01
100	DTE	95 2/12/2008 3:20:53.646989 PM	00
101	DTE	96 2/12/2008 3:20:53.648032 PM	61
102	DTE	97 2/12/2008 3:20:53.648939 PM	00
103	DTE	98 2/12/2008 3:20:53.650116 PM	00
104	DTE	99 2/12/2008 3:20:53.651156 PM	62
105	DCE	100 2/12/2008 3:20:53.652543 PM	ff
106	DCE	101 2/12/2008 3:20:53.653585 PM	01
107	DCE	102 2/12/2008 3:20:53.654627 PM	00
108	DCE	103 2/12/2008 3:20:53.655652 PM	63
109	DCE	104 2/12/2008 3:20:53.656711 PM	03
110	DCE	105 2/12/2008 3:20:53.657753 PM	77
111	DCE	106 2/12/2008 3:20:53.658795 PM	de
112	DTE	107 2/12/2008 3:20:53.705093 PM	ff
113	DTE	108 2/12/2008 3:20:53.706266 PM	01
114	DTE	109 2/12/2008 3:20:53.707302 PM	00
115	DTE	110 2/12/2008 3:20:53.708349 PM	0c
116	DTE	111 2/12/2008 3:20:53.709385 PM	1f
117	DTE	112 2/12/2008 3:20:53.710433 PM	06
118	DTE	113 2/12/2008 3:20:53.711468 PM	32
119	DCE	114 2/12/2008 3:20:53.718891 PM	ff
120	DCE	115 2/12/2008 3:20:53.719933 PM	01
121	DCE	116 2/12/2008 3:20:53.720983 PM	00
122	DCE	117 2/12/2008 3:20:53.722016 PM	32
123	DTE	118 2/12/2008 3:20:53.725017 PM	ff
124	DTE	119 2/12/2008 3:20:53.726058 PM	01
125	DTE	120 2/12/2008 3:20:53.727100 PM	00
126	DTE	121 2/12/2008 3:20:53.728141 PM	51
127	DTE	122 2/12/2008 3:20:53.729183 PM	00
128	DTE	123 2/12/2008 3:20:53.730219 PM	00
129	DTE	124 2/12/2008 3:20:53.731135 PM	52
130	DCE	125 2/12/2008 3:20:53.732642 PM	ff
131	DCE	126 2/12/2008 3:20:53.733683 PM	01
132	DCE	127 2/12/2008 3:20:53.734726 PM	00
133	DCE	128 2/12/2008 3:20:53.735766 PM	59
134	DCE	129 2/12/2008 3:20:53.736808 PM	27
135	DCE	130 2/12/2008 3:20:53.737849 PM	c7
136	DCE	131 2/12/2008 3:20:53.738892 PM	48
137	DTE	132 2/12/2008 3:20:53.744914 PM	ff
138	DTE	133 2/12/2008 3:20:53.745954 PM	01
139	DTE	134 2/12/2008 3:20:53.746996 PM	00
140	DTE	135 2/12/2008 3:20:53.748037 PM	53

5 General Use Filters

5.1 Dce2Dteq and Dte2Dceq

DCE2DTEQ (DCE2DTE) and DTE2DCEQ (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 require 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 identical, but have been additionally 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
```

5.2 Deltasq

DELTASQ (DELTAS) is used to process files generated by MSQ (MAKESECS) (or MSXQ (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 MSXQ (MAKESECX).
4. A typical use of this filter is shown in: `kk.bat` (Section 4.1, page 15)
5. **Listing of: `htt.fix` a typical input file.**

```

1 $ Id: MakeSecs.1,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/RCS/Http.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.1,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/RCS/Http.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      0.007936 0.001688 ff 01 00 28
10 2,      8: DTE     12      0.019925      0.011989 0.001042 ff 01 00 51 00 00 52
11 3,      5: DCE     19      0.027477      0.007552 0.001304 ff 01 00 59 27 e9 6a
12 3,     15: DTE     26      0.039819      0.012342 0.001041 ff 01 00 53 00 00 54
13 4,     12: DCE     33      0.047476      0.007657 0.001406 ff 01 00 5b 02 4c aa
14 4,     22: DTE     40      0.060028      0.012552 0.001043 ff 01 00 61 00 00 62
15 5,     19: DCE     47      0.067472      0.007444 0.001325 ff 01 00 63 03 77 de
16 5,     29: DTE     54      0.120104      0.052632 0.001040 ff 01 00 0a 1c 11 38
17 6,     26: DCE     61      0.133819      0.013715 0.007334 ff 01 00 38
18 6,     36: DTE     65      0.140027      0.006208 0.001042 ff 01 00 51 00 00 52
19 7,     30: DCE     72      0.149755      0.009728 0.003478 ff 01 00 59 27 a8 29
20 7,     43: DTE     79      0.162319      0.012564 0.001043 ff 01 00 53 00 00 54

```

5.3 GetDceq

When a data capture consists of interleaved DCE/DTE records, GETDCEQ (GETDCE) is used to process files that have been preprocessed by MSQ (MAKESECS) or MSXQ (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 MSQ (MAKESECS) or MSXQ (MAKESECX).
4. A typical use of this filter is shown in: `jdce.bat` (Section 4.3, page 15)
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

```

5.4 GetDcetq

GETDCETQ (GETDCETM) is used to process files that have been preprocessed by MSQ (MAKESECS) to extract all delta times come 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 MSQ (MAKESECS) only.
4. A typical use of this filter is:

```
getdcetm <infile> <outfile>
```

5. Listing of: timetest.txt a typical input file.

```

1  $ Id: MakeSecs.1,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2  $Header: d:/Binder4/sda2/RCS/TimeTest.txt,v 1.1 2008-03-25 07:40:09-08 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
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

```

6. Listing of: hdcetim.out a typical output file.

```

1      0.001688
2      0.001105
3      0.001040
4      0.001042
5      0.001304
6      0.001041
7      0.001042
8      0.001041
9      0.001042
10     0.001042
11     0.001041
12     0.001406
13     0.001043
14     0.001042
15     0.001040
16     0.001042
17     0.001041
18     0.001043
19     0.001325
20     0.001039

```

5.5 GetDteq

When a data capture consists of interleaved DCE/DTE records, GETDTEQ (GETDTE) is used to process files that have been preprocessed by MSQ (MAKESECS) or MSXQ (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 MSQ (MAKESECS) or MSXQ (MAKESECX).
4. A typical use of this filter is shown in: `jdte.bat` (Section 4.4, page 16)
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

```

5.6 GetDtetq

GETDTETQ (GETDTETM) is used to process files that have been preprocessed by MSQ (MAKESECS) to extract all delta times come 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 MSQ (MAKESECS) only.
4. A typical use of this filter is:

```
getdcetm <infile> <outfile>
```

5. Listing of: timetest.txt a typical input file.

```

1  $ Id: MakeSecs.1,v 1.11 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2  $Header: d:/Binder4/sda2/RCS/TimeTest.txt,v 1.1 2008-03-25 07:40:09-08 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
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

```

6. Listing of: hdtetim.out a typical output file.

```

1  0.000000
2  0.001174
3  0.001041
4  0.001042
5  0.001040
6  0.001051
7  0.000900
8  0.001042
9  0.001039
10 0.001043
11 0.001042
12 0.000907
13 0.001177
14 0.001040
15 0.001041
16 0.001043
17 0.001041
18 0.001041
19 0.001042
20 0.001041

```

5.7 MSQ (MAKESECS) Family

These 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 the different versions of MSQ (MAKESECS) are:

1. **MOLDFMT**: When communications line captures were originally made, they did not have an “Event #” column. This is the basic, oldest, version of MSQ (MAKESECS) which is designed to work when missing the “Event #” column. Its output is slightly different from other versions, and thus the filters that follow it have to be specially written for the different format. (This version is obsolete.)
2. **MSQ (MAKESECS)**: This is the first upgrade to the original MSQ (MAKESECS) filter which knows about the “Event #” column.
3. **MAKESEX**: This version is used when the state of the data control lines is inadvertently captured. It is otherwise similar to MOLDFMT. (This version is obsolete.)
4. **MSXQ (MAKESEX)**: This is the newest version of MSXQ (MAKESECS) and differs in the size of its output columns. When working on the DynaPel problem, the data capture files were so large that the count fields had to be increased in size. Newer filters **must** use the output of this version of MSQ (MAKESECS) for their preprocessing.

For a more complete description of what these three filters do, see Appendix A, page 27.

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:

```
makesecx 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 MSXQ (MAKESECX) format output file.

```

1 $ Id: MakeSecx.1,v 1.3 2008-02-20 08:06:33-08 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/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

```

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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 MSXQ⁶ 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_13/5/2007_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:

⁵\$Header: d:/Binder4/sda2/RCS/MakeSecs.inc,v 1.12 2009-06-24 11:08:26-07 Hamilton Exp Hamilton \$

⁶The 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. `uuu1uuu0uuu0uuu1uuu0uuu1`: 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 8th 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 preceding 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:/Binder4/sda2/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:DCE120.0802810.068979ff

```

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 8th 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:/Binder4/sda2/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.

```

1  $ Id: MakeSecs.l,v 1.8 2006-05-01 08:31:47-07 Hamilton Exp Hamilton $
2  $Header: d:/Binder4/sda2/RCS/Start2.dat,v 1.2 2007-03-29 08:42:09-08 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 01 00 02 19 2b 47
8      1,      1: DTE      8      0.008184  0.001041 ff 01 00 47
9
10     2,      8: DCE     12      0.080281  0.068979 ff 01 00 02 40 2b 6e
11     2,      5: DTE     19      0.087845  0.001042 ff 01 00 6e
12
13     3,     15: DCE     23      0.968685  0.877720 ff 01 00 02 40 2b 6e
14     3,      9: DTE     30      0.976106  0.001042 ff 01 00 6e
15
16     4,     22: DCE     34      1.973188  0.993963 ff 01 00 02 40 2b 6e
17     4,     13: DTE     41      1.980944  0.001041 ff 01 00 6e
18
19     5,     29: DCE     45      2.977798  0.993730 ff 01 00 02 40 2b 6e
20
21  There were a total of      51 bytes transferred
22
23  There were a total of      35 DCE bytes transferred
24  The first DCE byte came in at 0.000000 seconds from the start of data collection
25  The last DCE byte was at 2.984044 seconds from the start of data collection
26
27  There were a total of      16 DTE bytes transferred
28  The first DTE byte came in at 0.008184 seconds from the start of data collection
29  The last DTE byte was at 1.984068 seconds from the start of data collection
30

```

A.4 Raw Format 2 data

```

1  FTS capture buffer (3/28/2007 12:12:10 PM)
2  Event 1 (3/28/2007 12:11:11.326347 PM) through
3  Event 48,007 (3/28/2007 12:11:55.977731 PM)
4
5  Sd  Event#  Timestamp                Hx  RTS  CTS  DSR  DTR  CD  RI
6  DTE      1  3/28/2007 12:11:11.326347 PM 25   1   0   0   1   0   1
7  DTE      2  3/28/2007 12:11:11.326866 PM 21   1   0   0   1   0   1
8  DTE      3  3/28/2007 12:11:11.327387 PM 50   1   0   0   1   0   1
9  DTE      4  3/28/2007 12:11:11.327906 PM 53   1   0   0   1   0   1
10 DTE      5  3/28/2007 12:11:11.328426 PM 2d   1   0   0   1   0   1
11 DTE      6  3/28/2007 12:11:11.328948 PM 41   1   0   0   1   0   1
12 DTE      7  3/28/2007 12:11:11.329468 PM 64   1   0   0   1   0   1
13 DTE      8  3/28/2007 12:11:11.329989 PM 6f   1   0   0   1   0   1
14 DTE      9  3/28/2007 12:11:11.330419 PM 62   1   0   0   1   0   1
15 DTE     10  3/28/2007 12:11:11.331032 PM 65   1   0   0   1   0   1
16 DTE     11  3/28/2007 12:11:11.331552 PM 2d   1   0   0   1   0   1
17 DTE     12  3/28/2007 12:11:11.332074 PM 32   1   0   0   1   0   1
18 DTE     13  3/28/2007 12:11:11.332594 PM 2e   1   0   0   1   0   1
19 DTE     14  3/28/2007 12:11:11.333116 PM 30   1   0   0   1   0   1
20 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

```

1 $ Id: MakeSecs.1,v 1.8 2006-05-01 08:31:47-07 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/RCS/Start3cs.dat,v 1.1 2007-03-29 08:42:53-08 Hamilton Exp Hamilton $
3 FTS capture buffer (3/28/2007 12:12:10 PM)
4 Event 1 (3/28/2007 12:11:11.326347 PM) through
5 Event 48,007 (3/28/2007 12:11:55.977731 PM)
6
7
8 1, 1: DTE 1 0.000000 0.000000 25 1 0 0 1 0 1
9 1, 2: DTE 2 0.000519 0.000519 21 1 0 0 1 0 1
10 1, 3: DTE 3 0.001040 0.000521 50 1 0 0 1 0 1
11 1, 4: DTE 4 0.001559 0.000519 53 1 0 0 1 0 1
12 1, 5: DTE 5 0.002079 0.000520 2d 1 0 0 1 0 1
13 1, 6: DTE 6 0.002601 0.000522 41 1 0 0 1 0 1
14 1, 7: DTE 7 0.003121 0.000520 64 1 0 0 1 0 1
15 1, 8: DTE 8 0.003642 0.000521 6f 1 0 0 1 0 1
16 1, 9: DTE 9 0.004072 0.000430 62 1 0 0 1 0 1
17 1, 10: DTE 10 0.004685 0.000613 65 1 0 0 1 0 1
18 1, 11: DTE 11 0.005205 0.000520 2d 1 0 0 1 0 1
19 1, 12: DTE 12 0.005727 0.000522 32 1 0 0 1 0 1
20 1, 13: DTE 13 0.006247 0.000520 2e 1 0 0 1 0 1
21 1, 14: DTE 14 0.006769 0.000522 30 1 0 0 1 0 1
22 1, 15: DTE 15 0.007288 0.000519 20 1 0 0 1 0 1
23
24 There were a total of 15 bytes transferred
25
26 There were a total of 0 DCE bytes transferred
27 The first DCE byte came in at 0.000000 seconds from the start of data collection
28 The last DCE byte was at 0.000000 seconds from the start of data collection
29
30 There were a total of 15 DTE bytes transferred
31 The first DTE byte came in at 0.000000 seconds from the start of data collection
32 The last DTE byte was at 0.007288 seconds from the start of data collection
33

```

A.4.2 Output of MSQ (MAKESEX) with Format 2 data

```

1 $ Id: MakeSex.1,v 1.1 2007-03-29 07:13:33-08 Hamilton Exp Hamilton $
2 $Header: d:/Binder4/sda2/RCS/Start3x.dat,v 1.1 2007-03-29 08:42:57-08 Hamilton Exp Hamilton $
3 FTS capture buffer (3/28/2007 12:12:10 PM)
4 Event 1 (3/28/2007 12:11:11.326347 PM) through
5 Event 48,007 (3/28/2007 12:11:55.977731 PM)
6
7 1, 1: DTE 1 0.000000 0.000000 25
8 1, 2: DTE 2 0.000519 0.000519 21
9 1, 3: DTE 3 0.001040 0.000521 50
10 1, 4: DTE 4 0.001559 0.000519 53
11 1, 5: DTE 5 0.002079 0.000520 2d
12 1, 6: DTE 6 0.002601 0.000522 41
13 1, 7: DTE 7 0.003121 0.000520 64
14 1, 8: DTE 8 0.003642 0.000521 6f
15 1, 9: DTE 9 0.004072 0.000430 62
16 1, 10: DTE 10 0.004685 0.000613 65
17 1, 11: DTE 11 0.005205 0.000520 2d
18 1, 12: DTE 12 0.005727 0.000522 32
19 1, 13: DTE 13 0.006247 0.000520 2e
20 1, 14: DTE 14 0.006769 0.000522 30
21 1, 15: DTE 15 0.007288 0.000519 20
22
23 There were a total of 15 bytes transferred
24
25 There were a total of 0 DCE bytes transferred
26 The first DCE byte came in at 0.000000 seconds from the start of data collection
27 The last DCE byte was at 0.000000 seconds from the start of data collection
28
29 There were a total of 15 DTE bytes transferred
30 The first DTE byte came in at 0.000000 seconds from the start of data collection
31 The last DTE byte was at 0.007288 seconds from the start of data collection
32

```

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