```
>>>>>>>>          ALPHA SECTION ENTRIES                                        <<<<<<<<<
000000
000000            ******************************************************************
000000            *                                                                *
000000            *     ENTRIES                                                    *
000000            *                                                                *
000000            ******************************************************************
000000                      ENT   ALFAL.          ;SELE ALPHA ALL MODE
000000                      ENT   ALPHA.          ;SELECT ALPHA MODE
000000                      ENT   ALPHA           SELECT ALPHA OR ALPHA ALL
000000                      ENT   BLK&SC          ;BLANK TO EOL & SCROLL
000000                      ENT   BLKLIN          ;BLANK TO EOL
000000                      ENT   BOTMR?          ;CHK IF CURS AT
000000            *                               ;1 LN BELOW SCREEN
000000                      ENT   BYTCR!
000000                      ENT   BYTCR$
000000                      ENT   BYTCR#
000000                      ENT   BYTCRT          ;SET CURSOR ADDRESS
000000                      ENT   CHKSTS          ;WAIT TILL CRTC READY
000000                      ENT   CLEAR.          ;CLEAR ALPHA SECTION
000000                      ENT   CLREOL          ;CLEAR TO EOL WITHOUT
000000            *                               ;MOVING CURSOR
000000                      ENT   COLUMN          ;GET COLUMN ADDR
000000                      ENT   CNTRTR          ;COUNT RETRACE CYCLE
000000                      ENT   CRTBLK          ;INITIALIZE ALPHA
000000                      ENT   CRTINT          ;CRT POWER ON INIT
000000                      ENT   CRTPOF          ;CRT POWER OFF
000000                      ENT   CRTPUP          ;CRT POWER UP
000000                      ENT   CRTWPO          ;WIPE OUT CRT
000000                      ENT   CRTUNW          ;UNWIPE CRT
000000                      ENT   CURS            ;SPIT CURSOR
000000                      ENT   DECUR2          ;REMOVE TWO CURSORS
000000                      ENT   DNCUR.          ;DN CURS WITHIN PAGE
000000                      ENT   DNCURS          ;DOWN CURSOR
000000                      ENT   EOJ1
000000                      ENT   EOJ2
000000                      ENT   ENDSR
000000                      ENT   GRAPH.          ;SELE GRAPHICS MODE
000000                      ENT   GRAFA.          ;SELE GRAPH ALL MODE
000000                      ENT   GRAPH+          ;SELE GRAPH W/O UNWIPE
000000                      ENT   GRAPH           SELECT GRAPH OR GRAPH ALL
000000                      ENT   HLFLIN          ;OUTPUT A BLOCK OF
000000            *                               ;DATA TO CRT
000000                      ENT   HMCURS          ;HOME CURSOR
000000            *         ENT   INCHR-          ;READ 1 CHAR FROM CRT
000000                      ENT   INCHR           ;NONINTERRUPTABLY
000000            *                               ;READ 1 CHAR FROM CRT
000000                      ENT   KEYLA.          ;KEY LABEL RUN TIME
000000                      ENT   L7
000000                      ENT   LINE1?          ;CHK IF CURS ON LN 1
000000                      ENT   LTCUR.          ;LT CURS WITHIN PAGE
000000                      ENT   LTCURS          ;LEFT CURSOR
000000                      ENT   MOD             ;DOES MOD FUNCTION
000000                      ENT   MODADR          ;ADDRESS WRAP AROUND
```

>>>>>>> ALPHA SECTION ENTRIES <<<<<<<<

```
 52 000000                    ENT   MOVCRS      ;MOVE CURSOR
 53 000000                    ENT   OUTCH1      ;OUTPUT 1 CHAR
 54 000000              *                       ;WITHOUT SCROLLING
 55 000000                    ENT   OUTCHR      ;OUTPUT 1 CHAR WITH
 56 000000              *                       ;SCROLLING
 57 000000                    ENT   OUTST+      ;OUTPUT A STRING
 58 000000                    ENT   OUTS++      ;FOR ASSEMBLER ROM
 59 000000              *                       ;WITHOUT SPIT CURSOR
 60 000000                    ENT   OUTSTR      ;OUTPUT A STRING AND
 61 000000              *                       ;SPIT CURSOR
 62 000000                    ENT   PAGES.
 63 000000                    ENT   PAGES3
 64 000000                    ENT   RETRA1      ;WAIT TILL LEADING
 65 000000                    ENT   RSTART      RESTART KEYBOARD SCANNER
 66 000000              *                       ;EDGE OF RETRACE
 67 000000                    ENT   RETRHI      ;WAIT TILL RETRACE
 68 000000                    ENT   RTCUR.      ;RT CURS WITHIN PAGE
 69 000000                    ENT   RTCURS      ;RIGHT CURSOR
 70 000000                    ENT   SAD1        SET START ADDR
 71 000000                    ENT   SCR???      ;CHECK AND DO SCROLL
 72 000000                    ENT   SCRBLK      ;BLANK LINE & SCROLL
 73 000000                    ENT   SCRDN       ;SCROLL DOWN 1 LINE
 74 000000                    ENT   SCRUP       ;SCROLL UP 1 LINE
 75 000000                    ENT   TAB.         TAB FUNCTION
 76 000000                    ENT   UPCUR.      ;UP CURS WITHIN PAGE
 77 000000                    ENT   UPCURS      ;UP CURSOR
 78 000000
```

```
>>>>>>>        EXTERNALS                                                          <<<<<<<<<
     000000
     000000                    *************************************************************
     000000                    *                                                           *
     000000                    *     EXTERNALS                                             *
     000000                    *                                                           *
     000000                    *************************************************************
     000000                              EXT   BLANKS
     000000                              EXT   CLEDM2
     000000                              EXT   CONFLT
     000000                              EXT   CONBIN
     000000                              EXT   GRINI+
     000000                              EXT   GRINIT
     000000                              EXT   INSRT
     000000                              EXT   INTMUL
     000000                              EXT   MOV40
     000000                              EXT   R1.
     000000                              EXT   REM10
     000000                              EXT   RESFIL
     000000                              EXT   RCMJSB
     000000                              EXT   TRAFIC
     000000                              EXT   WARN
     000000                              EXT   XGA1
     000000
```

```
ARMA 03/14/81 ================================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GENKHY   9/11/1981 10:44 AM  PG  4
================================================================================
>>>>>>>        ALPHA SECTION SYMBOLS                                        <<<<<<<
  1  000000              ********************************************************
101  000000              *
102  000000              *     CONSTANTS                                        *
102  000000              *                                                      *
102  000000              ********************************************************
103  000000              LNGTH    EQU  80D          ;CRT LINE LENGTH
104  000000              GBASE    EQU  4320D        ;GRAPHICS BASE ADDR
105  000000              RIGHT    EQU  1            ;DISPLACEMENT FOR CURSOR
106  000000              *                           RIGHT = 1
107  000000              LEFT     EQU  177777       ;-1
108  000000              UP       EQU  177660       ;-80
109  000000              DOWN     EQU  120          ;80
110  000000              CR       EQU  15           ;CARRIAGE RETURN
111  000000              PWROFF   EQU  6            ;CRT POWER OFF MASK
112  000000              PWRUP    EQU  373          ;CRT POWER UP MASK
113  000000              UNWIPE   EQU  371          ;CRT UPWIPE MASK
114  000000              WPOT     EQU  2            ;WIPE OUT MASK
115  000000              WPOTG    EQU  202          ;WIPE OUT IN GRAPH
116  000000              ALFA     EQU  177          ;CRT ALPHA MODE MASK
     000000              ALFALL   EQU  100          ;CRT ALPHA ALL MASK
118  000000              GRAF     EQU  200          ;CRT GRAPH MASK
119  000000              LGNDL    EQU  240          ;LEGEND LENGTH
120  000000
```

```
>>>>>>>        CRT INITIALIZATION                                    <<<<<<<<
  122 000000                *****************************************************
  122 000000                *                                                   *
  123 000000                *     CRT POWER ON INITIALIZATION                   *
  123 000000                *                                                   *
  123 000000                *****************************************************
  124 000000                CRTINT  BSZ   0
  125 000000 316 176 000            JSB   =CRTWPO       WIPE OUT CRT
  126 000003
  127 000003                CRTIN-  BSS   0
  128 000003 316 012 000            JSB   =CRTIN+       INIT ALPHA & GRAPH
  129 000006 316 162 000            JSB   =CRTUNW       UNWIPE CRT
  130 000011 236                    RTN
  131 000012
  132 000012                CRTIN+  BSS   0
  133 000012 130 251 340            LDM   R30,=340,20   INIT ALPHA SIZE
  133 000015 020
  134 000016 263 344 211            STMD  R30,=ASIZE
  135 000021 316 036 002            JSB   =RETRHI       WAIT TILL RETRACE
  136 000024 130 250 202            LDB   R30,=WPOTG    GET GRAPH & WIPE OUT
  137 000027 131 260 302            LDBD  R31,=CRTSTS   GET CRT STATUS
  138 000032 377
  138 000033 317 277                ANM   R31,=277      OFF "ALL" BIT
  139 000035 030 224                ORB   R31,R30       SET GRAPH & WIPE OUT
  140 000037 262 302 377            STBD  R31,=CRTSTS   TELL CRT CONTROLLER
  141 000042 316 377 377            JSB   =ROMJSB       INIT GRAPH
  142 000045 377 377                DEF   GRINIT
  143 000047 001                    OCT   1
  144 000050                *                           FALL THROUGH
  145 000050                *****************************************************
  145 000050                *                                                   *
  146 000050                *     INITIALIZE ALPHA                              *
  146 000050                *                                                   *
  146 000050                *****************************************************
  147 000050                CRTBLK  BSZ   0
  148 000050 134 223                CLM   R34           ;RESET ADDR POINTER
  149 000052 136 261 344            LDMD  R36,=ASIZE    ;GET SIZE OF ALPHA
  149 000055 211
  150 000056                CRTBL+  BSZ   0
  151 000056 316 176 000            JSB   =CRTWPO       ;WIPE OUT CRT
  152 000061 260 302 377            LDBD  R#,=CRTSTS    ;SWITCH TO ALPHA
  153 000064 317 177 000            ANM   R#,=ALFA
  154 000067 262 302 377            STBD  R#,=CRTSTS
  155 000072 222                    CLB   R#
  156 000073 262 347 212            STBD  R#,=CURSON    RESET CURSON FLAG
  157 000076 316 006 002            JSB   =CHKSTS       ;WAIT TILL CRTC NOT BUSY
  158 000101 316 125 003            JSB   =SAD1         ;RESET SCANNING ADDR
  159 000104 316 206 003            JSB   =BYTCRT       ;RESET CURSOR ADDR
  160 000107 132 250 015            LDB   R32,=CR
  161 000112
  162 000112                *****************************************************
  162 000112                *                                                   *
  163 000112                *     FILL A BLOCK OF CRT MEMORY WITH A DATA        *
  163 000112                *     NOTE: NO CURSOR MOVEMENT                      *
```

```
ARMA 03/14/81=================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GENKHY   9/11/1981 10:44 AM  PG  6
=================================================================
>>>>>>>        CRT INITIALIZATION                                  <<<<<<<<
  1  000112                 *
165  000112                 *       ENTRY:
167  000112                 *         R32=DATA BYTE                          *
168  000112                 *         R36-37=COUNT                           *
168  000112                 *                                                *
168  000112                 ************************************************
169  000112                 L7        BSZ   0
170  000112 316 006 002               JSB   =CHKSTS        ;WAIT TILL CRTC NOT BUSY
171  000115 132 262 303               STBD  R32,=CRTDAT    ;OUTPUT DATA
171  000120 377
172  000121 136 213                   DCM   R36            ;DECREMENT COUNT
173  000123 366 365                   JNZ   L7             ;REPEAT TILL DONE
174  000125 236                       RTN
175  000126                 ************************************************
175  000126                 *                                                *
176  000126                 *     RESTORE CURSOR ADDRESS                     *
176  000126                 *                                                *
176  000126                 ************************************************
177  000126
     000126                 BYTCR$    BSS   0
179  000126 134                       DRP   34
180  000127                 BYTCR#    BSS   0
181  000127 261 206 200               LDMD  R#,=CRTBYT     GET CURSOR ADDR
182  000132 316 206 003               JSB   =BYTCRT        TELL CRT
183  000135 236                       RTN
```

```
KARMA 03/14/81 ================================================================================
 ITEM     LOC    OBJECT CODE  SRC=CCC     OBJ=GE%KHY    9/11/1981 10:44 AM  PG  7
================================================================================
>>>>>>        CRT POWER UP/OFF                                              <<<<<<<<
    000136                  ********************************************************
185 000136                  *                                                      *
186 000136                  *     CRT POWER OFF                                    *
186 000136                  *                                                      *
186 000136                  ********************************************************
187 000136                  CRTPOF  BSZ   0
188 000136 130 250 006              LDB   R30,=PWROFF  ;GET POWER OFF MASK
189 000141 360 036                  JMP   WP010        ;GOTO ISSUE COMMAND
190 000143                  ********************************************************
190 000143                  *                                                      *
191 000143                  *     CRT POWER UP                                     *
191 000143                  *                                                      *
191 000143                  ********************************************************
192 000143                  CRTPUP  BSZ   0
193 000143 131 260 302              LDBD  R31,=CRTSTS  ;GET STATUS
193 000146 377
194 000147 317 373                  ANM   R31,=PWRUP   ;AND TO POWER UP
195 000151 262 302 377              STBD  R31,=CRTSTS  ;TELL CRTC
196 000154 130 250 003              LDB   R30,=3       ;GET COUNT
    000157 316 047 002              JSB   =CNTRTR      ;WAIT 3 CYCLES
198 000162                  *--FALL THROUGH--*
```

```
>>>>>>        CRT UNWIPE/WIPEOUT                                    <<<<<<<<
000162                  ********************************************************
000162                  *
000162                  *     CRT UNWIPE ROUTINE                                *
000162                  *                                                       *
000162                  ********************************************************
000162                  CRTUNW  BSZ   0
000162 316 036 002              JSB   =RETRHI       WAIT TILL RETRACE
000165                          ORP   !31
000165 260 302 377              LDBD  R31,=CRTSTS   ;GET STATUS
000170 317 371                  ANM   R31,=UNWIPE   ;MASK OFF WPOT BIT
000172                  SCOM    BSS   0
000172 262 302 377              STBD  R#,=CRTSTS    ;TELL CRT CONTROLLER
000175 236              WRTN    RTN
000176                  ********************************************************
000176                  *                                                       *
000176                  *     CRT WIPE OUT ROUTINE                              *
000176                  *                                                       *
000176                  ********************************************************
000176                  CRTWPO  BSZ   0
000176 130 250 002              LDB   R30,=WPOT     ;GET WIPE OUT MASK
000201                  WPO10   BSZ   0
000201 230                      BIN
000202 316 036 002              JSB   =RETRHI       ;WAIT FOR RETRACE TIME
000205 260 302 377              LDBD  R#,=CRTSTS    ;R31
000210 030 224                  ORB   R#,R30        ;OR IN WPOT BIT
000212 360 356                  JMP   SCOM
```

```
<ARMA 03/14/81=================================================================
 ITEM    LOC   OBJECT CODE  SRC=CCC    OBJ=GE%KHY   9/11/1981 10:44 AM  PG  9
================================================================================
>>>>>>        CRT MODE SELECTION                                      <<<<<<<<
    000214              *****************************************************
221 000214              *                                                   *
222 000214              *     SELECT ALPHA MODE                             *
222 000214              *                                                   *
222 000214              *****************************************************
223 000214 241                  OCT  241            ;PRIMARY ATTRIBUTE
224 000215              ALPHA.  BSZ  0
225 000215 230                  BIN
226 000216 130 260 302          LDBD R30,=CRTSTS    GET CRT STATUS
226 000221 377
227 000222 204                  LLB  R30            ALPHA/GRAPH ALL ?
228 000223 200                  ELB  R30
229 000224 202                  ERB  R30
230 000225 364 023              JNG  ALPHA1         JIF YES
231 000227 372 344              JNC  WRTN           JIF ALREADY ALPHA
232 000231 316 176 000          JSB  =CRTWPO        WIPE OUT CRT
233 000234 131 260 302          LDBD R31,=CRTSTS    GET CRT STATUS
233 000237 377
234 000240 317 177              ANM  R31,=177       FORCE TO ALPHA
    000242 262 302 377          STBD R31,=CRTSTS    TELL CRT
235 000245 316 126 000          JSB  =BYTCR$        RESTORE CURSOR ADDR
237 000250 360 310      CRTJMP  JMP  CRTUNW         UNWIPE CRT
238 000252
239 000252              ALPHA1  BSS  0
240 000252 132 006 344          PUBD R32,+R6        SAVE R32
241 000255 316 003 000          JSB  =CRTIN-        REINIT SYSTEM
    000260 316 232 003          JSB  =CURS          SPIT CURSOR
    000263 132 006 342          POBD R32,-R6        RESTORE R32
244 000266 236                  RTN
245 000267
246 000267              *****************************************************
246 000267              *                                                   *
247 000267              *    SELECT ALPHA ALL MODE                          *
247 000267              *                                                   *
247 000267              *****************************************************
248 000267 241                  OCT  241            ;PRIMARY ATTRIBUTE
249 000270              ALFAL.  BSZ  0
250 000270 230                  BIN
    000271 130 260 302          LDBD R30,=CRTSTS    GET CRT STATUS
251 000274 377
252 000275 204                  LLB  R30            GRAPH/GRAPH ALL ?
253 000276 200                  ELB  R30
254 000277 202                  ERB  R30
255 000300 373 002              JCY  ALFAL1         JIF YES
256 000302 364 271              JNG  WRTN           JIF ALREADY ALPHA ALL
257 000304
258 000304              ALFAL1  BSS  0
259 000304 316 176 000          JSB  =CRTWPO        WIPE OUT CRT
260 000307 130 250 100          LDB  R30,=100       FORM "ALL" MASK
261 000312 131 260 302          LDBD R31,=CRTSTS    GET CRT STATUS
261 000315 377
262 000316 317 177              ANM  R31,=177       OFF GRAPH BIT
    000320 630 224              ORB  R31,R30        ON "ALL" BIT
```

```
>>>>>>>         CRT MODE SELECTION                                          <<<<<<<<
264 000322 262 302 377          STBD R31,=CRTSTS  TELL CRT
265 000325 136 251 300          LDM  R36,=300,77  SET ALPHA SIZE
265 000330 077
266 000331 263 344 211          STMD R36,=ASIZE
267 000334 316 050 000          JSB  =CRTBLK      INIT ALPHA
268 000337                ALF1  BSS  0
269 000337 316 232 003          JSB  =CURS        SPIT CURSOR
270 000342 360 304       CRTJ2  JMP  CRTJMP
271 000344
272 000344                *****************************************************
272 000344                *                                                   *
273 000344                *     SELECT ALFHA OR ALPHA ALL                     *
273 000344                *                                                   *
273 000344                *****************************************************
274 000344
275 000344               ALFHA  BSS  0
276 000344 230                  BIN
277 000345 130 260 302          LDBD R30,=CRTSTS  ALREADY ALFHA ?
278 000350 377
278 000351 365 006              JPS  ALRTN        JIF YES
279 000353 204                  LLB  R30          GRAPH ALL ?
280 000354 220                  TSB  R30
281 000355 365 236              JPS  ALPHA.       JIF NOT
282 000357               NOOP   BSS  0            IGNORE MODE SWITCH
283 000357                      DRP  !30
284 000357 006 343              POMD R30,-R6      IGNORE IT & TRASH ONE RTN
285 000361 236           ALRTN  RTN
286 000362
287 000362                *****************************************************
287 000362                *                                                   *
288 000362                *     SELECT GRAPH OR GRAPH ALL                     *
288 000362                *                                                   *
288 000362                *****************************************************
289 000362
290 000362               GRAPH  BSS  0
291 000362 230                  BIN
292 000363 130 260 302          LDBD R30,=CRTSTS  ALREADY GRAPH/GRAPH ALL
293 000366 377
293 000367 364 370              JNG  ALRTN        JIF YES
294 000371 204                  LLB  R30          IS IT ALPHA ALL ?
295 000372 220                  TSB  R30
296 000373 364 362              JNG  NOOP         JIF YES
297 000375                *                       FALL THROUGH 241 TO GRAPH.
298 000375
299 000375                *****************************************************
299 000375                *                                                   *
300 000375                *     SELECT GRAPHICS MODE                          *
300 000375                *                                                   *
300 000375                *****************************************************
301 000375 241                  OCT  241          ;PRIMARY ATTRIBUTE
302 000376               GRAPH. BSZ  0
303 000376 230                  BIN
304 000377 130 260 302          LDBD R30,=CRTSTS  GET CRT STATUS
```

```
ARMA 03/14/81=================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GENKHY   9/11/1981 10:44 AM  PG 11
================================================================================
>>>>>>        CRT MODE SELECTION                                      <<<<<<<<
    000402 377
305 000403 204                  LLB  R30          ALPHA/GRAPH ALL ?
306 000404 200                  ELB  R30
307 000405 202                  ERB  R30
308 000406 364 007              JNG  GRAPH1       JIF YES
309 000410 373 347              JCY  ALRTN        JIF ALREADY GRAPH
310 000412              GCOM    BSS  0
311 000412 316 126 001          JSB  =GRAPH+      SWITCH TO GRAPH
312 000415 360 323              JMP  CRTJ2        UNWIPE CRT
313 000417
314 000417              GRAPH1  BSS  0
315 000417 316 012 000          JSB  =CRTIN+      REINIT CRT
316 000422 316 232 003          JSB  =CURS        PUT OUT A CURSOR
317 000425 360 363              JMP  GCOM
318 000427
319 000427              ********************************************************
319 000427              *                                                      *
320 000427              *     SELECT GRAPH ALL MODE                            *
320 000427              *                                                      *
    000427              ********************************************************
321 000427
322 000427 241                  OCT  241          PRIMARY ATTRIBUTE
323 000430
324 000430              GRAFA.  BSS  0
325 000430 230                  BIN
326 000431 130 260 302          LDBD R30,=CRTSTS  GET CRT STATUS
    000434 377
327 000435 204                  LLB  R30          ALPHA/ALPHA ALL ?
328 000436 200                  ELB  R30
329 000437 202                  ERB  R30
330 000440 372 002              JNC  GRAFA1       JIF YES
331 000442 364 112              JNG  GRTN         JIF ALREADY GRAPH ALL
332 000444
333 000444              GRAFA1  BSS  0
334 000444 316 176 000          JSB  =CRTWPO      WIPE OUT CRT
335 000447 130 250 300          LDB  R30,=300     GRAPH ALL MASK
336 000452 131 260 302          LDBD R31,=CRTSTS  GET CRT STATUS
336 000455 377
    000456 030 224              ORB  R31,R30      SET GRAPH ALL
338 000460 262 302 377          STBD R31,=CRTSTS  TELL CRT
339 000463 136 251 240          LDM  R36,=240,120 GRAPH SIZE
339 000466 120
340 000467 263 342 211          STMD R36,=GSIZE   FOR GRAPH ALL
341 000472 251 104 000          LDM  R36,=68D,0   SET GRAPH LINE SIZE
342 000475 263 340 211          STMD R36,=GLINE   68 BYTES PER LINE
343 000500 124 251 377          LDM  R24,=XGA1    LIMIT FOR GRAPH ALL
343 000503 377
344 000504 126 251 300          LDM  R26,=XM1
344 000507 211
345 000510 316 377 377          JSB  =ROMJSB
346 000513 377 377              DEF  MOV40
347 000515 001                  OCT  1
  1 000516 316 377 377          JSB  =ROMJSB      INIT GRAPH ALL
```

```
>>>>>>        CRT MODE SELECTION                                    <<<<<<<<
349 000521 377 377              DEF  GRINI+
350 000523 001                  OCT  1
351 000524 360 214              JMP  CRTJ2          UNWIPE CRT
352 000526
353 000526              GRAPH+  BSZ  0
354 000526 130 006 345          PUMD R30,+R6        SAVE REGISTERS
355 000531 260 302 377          LDBD R30,=CRTSTS    ;GET CRT STATUS
356 000534 364 020              JNG  GRTN           ;IF ALREADY GRAPH
357 000536              *                           ;THEN RTN, ELSE
358 000536 316 176 000          JSB  =CRTWPO        ;WIPE OUT CRT
359 000541                      ORP  !31
360 000541 250 202              LDB  R31,=WPOTG     ;GET MASK
361 000543 130 260 302          LDBD R30,=CRTSTS    ;GET CRT STATUS
361 000546 377
362 000547 031 224              ORB  R30,R31        ;SET GRAPHICS
363 000551 262 302 377          STBD R30,=CRTSTS    ;TELL CRT CONTROLLER
364 000554 006 343              POMD R30,-R6        RESTORE REGISTERS
365 000556 236          GRTN    RTN
366 000557
367 000557
368 000557
```

```
>>>>>>        PAGE SIZE                                                              <<<<<<<<<
    000557
371 000557
371 000557                     ***************************************************************
372 000557                     *                                                             *
372 000557                     *     PAGE SIZE RUN TIME ROUTINE                              *
372 000557                     *                                                             *
373 000557                     ***************************************************************
374 000557 241                          OCT   241              PRIMARY ATTRIBUTE
375 000560
376 000560                     PAGES.   BSZ   0
377 000560 316 377 377                  JSB   =ONEB            FETCH # OF LINES
378 000563 230                          BIN
379 000564 311 020 000                  CMM   R#,=16D,0        16 LINES ?
380 000567 367 012                      JZR   PAGES1           JIF YES
381 000571 311 030 000                  CMM   R#,=24D,0        24 LINES ?
382 000574 367 107                      JZR   PAGES2           JIF YES
383 000576 316 377 377                  JSB   =WARN            GIVE THE GUY A WARNING
384 000601 131                          OCT   89D
385 000602 236                          RTN
3   000603
387 000603                     PAGES1   BSS   0
388 000603 316 176 000                  JSB   =CRTWPO          WIPE OUT CRT
389 000606 134 261 206                  LDMD  R34,=CRTBYT      GET CURSOR ADDR
389 000611 200
390 000612 325 210 200                  SBMD  R34,=CRTRAM      DISTANCE FROM SAD
391 000615 365 003                      JPS   PGS2.1           JIF NO NEED TO ADJ
  2 000617 323 344 211                  ADMD  R34,=ASIZE       ADJ BY ALPHA SIZE
  3 000622
394 000622                     PGS2.1   BSS   0
395 000622 311 000 005                  CMM   R#,=0,5          DISTANCE > 16 LINES ?
396 000625 372 021                      JNC   PGS2.3           JIF NO
397 000627 261 210 200                  LDMD  R#,=CRTRAM       GET SAD
398 000632 313 200 002                  ADM   R#,=200,2        THROW AWAY TOP 8 LINES
399 000635 321 344 211                  CMMD  R#,=ASIZE        NEED ADJUST ?
400 000640 372 003                      JNC   PGS2.2           JIF NO
401 000642 325 344 211                  SBMD  R#,=ASIZE        ADJUST
402 000645                     PGS2.2   BSS   0
 03 000645 316 125 003                  JSB   =SAD1            SET NEW SAD
    000650
405 000650                     PGS2.3   BSS   0
406 000650 316 036 002                  JSB   =RETRHI          WAIT TILL RETRACE
407 000653 316 025 002                  JSB   =RETRLO          FALLING EDGE OF RETRACE
408 000656 131 260 302                  LDBD  R31,=CRTSTS      SET TO 16 LINES/PAGE
408 000661 377
409 000662 317 367                      ANM   R31,=367
410 000664 262 302 377                  STBD  R31,=CRTSTS      TELL CRT
411 000667 175 251 017                  LDM   R75,=17,252,12
411 000672 252 012
412 000674 263 101 202                  STMD  R75,=CRTLST      SET CRT LIST COUNT
413 000677 176 251 020                  LDM   R76,=16D,0       SET TO 16 LINES
413 000702 000
414 000703 360 041                      JMP   PAGES4
  5 000705
```

```
>>>>>>        PAGE SIZE                                          <<<<<<<<<
416 000705                  PAGES2  BSS  0
417 000705 316 176 000              JSB  =CRTWPO       WIPE OUT CRT
418 000710 316 036 002              JSB  =RETRHI
419 000713 316 025 002              JSB  =RETRLO       FALLING EDGE OF RETRACE
420 000716 130 250 010              LDB  R30,=10       24 LINE/PAGE MASK
421 000721 131 260 302              LDBD R31,=CRTSTS   GET CRT STATUS
421 000724 377
422 000725 030 224                  ORB  R31,R30       SET TO 24 LINE/PAGE
423 000727 262 302 377              STBD R31,=CRTSTS   TELL CRT
424 000732 175 251 027              LDM  R75,=27,252,12
424 000735 252 012
425 000737 263 101 202              STMD R75,=CRTLST   SET CRT LIST COUNT
426 000742 176 251 030              LDM  R76,=24D,0
426 000745 000
427 000746                  PAGES4  BSS  0
428 000746 316 016 002              JSB  =RETRA1       WAIT ONE CYCLE
429 000751 316 162 000              JSB  =CRTUNW       UNWIPE CRT
430 000754
431 000754                  PAGES3  BSS  0
    000754 166 251 120              LDM  R66,=LNGTH    GET LINE LENGTH
432 000757 000
433 000760 316 377 377              JSB  =INTMUL       * #-OF-LINES
434 000763 136 054 241              LDM  R36,R54       GET LOW ORDER 2 BYTES
435 000766 263 227 210              STMD R35,=PGSIZE   SAVE IT
436 000771 315 120 000              SBM  R36,=LNGTH    LESS ONE LINE
437 000774 263 231 210              STMD R36,=LLN-1    SAVE IT
438 000777 315 120 000              SBM  R36,=LNGTH    LESS ONE MORE LINE
439 001002 263 233 210              STMD R36,=LLN-2    SAVE IT
440 001005 236                      RTN
441 001006
```

```
>>>>>>>        CRT STATUS CHECK                                        <<<<<<<
    001006                  ********************************************************
443 001006                  *                                                      *
444 001006                  *     WAIT UNTIL CRT CONTROLLER NOT BUSY               *
444 001006                  *                                                      *
444 001006                  ********************************************************
445 001006                  CHKSTS  BSZ   0
446 001006 230                      BIN
447 001007 130                      ORP   30
448 001010 260 302 377 L90          LDBD  R#,=CRTSTS    ;GET CRT STATUS
449 001013 362 373                  JOD   L90           ;WAIT TILL CRTC NOT BUSY
450 001015 236                      RTN
451 001016                  ********************************************************
451 001016                  *                                                      *
452 001016                  *     CHECK RETRACE STATUS                             *
452 001016                  *                                                      *
452 001016                  ********************************************************
453 001016                  RETRA1  BSZ   0
454 001016 316 025 002              JSB   =RETRLO       WAIT TILL RETR LOW
455 001021 316 036 002              JSB   =RETRHI       WAIT TILL RETR HIGH
    001024 236                      RTN
457 001025
458 001025                  RETRLO  BSS   0
459 001025 131                      ORP   31
460 001026 260 302 377 RETRA-       LDBD  R#,=CRTSTS    ;GET STATUS BYTE
461 001031 317 020                  ANM   R#,=20        ;GET RETRACE BIT
462 001033 366 371                  JNZ   RETRA-        ;WAIT TILL DISP TIME
463 001035 236                      RTN
464 001036
465 001036                  RETRHI  BSZ   0
466 001036 131                      ORP   31
467 001037 260 302 377 RETRH+       LDBD  R#,=CRTSTS    ;GET STATUS BYTE
468 001042 317 020                  ANM   R#,=20        ;GET RETRACE BIT
469 001044 367 371                  JZR   RETRH+        ;WAIT TILL RETR TIME
470 001046 236                      RTN
471 001047                  ********************************************************
471 001047                  *                                                      *
472 001047                  *     COUNT RETRACE CYCLES                             *
473 001047                  *                                                      *
474 001047                  *       ENTRY:                                         *
    001047                  *         R30= 1-BYTE COUNT                            *
475 001047                  *                                                      *
475 001047                  ********************************************************
476 001047                  CNTRTR  BSZ   0
477 001047 316 016 002              JSB   =RETRA1       ;COUNT RETRACE ONCE
478 001052 130 212                  DCB   R30           ;DECREMENT COUNTER
479 001054 366 371                  JNZ   CNTRTR        ;REPEAT TILL DONE
480 001056 236                      RTN
```

```
>>>>>>>          ADDR WRAP AROUND                                                    <<<<<<<<
481  001057                  ****************************************************************
482  001057                  *                                                              *
483  001057                  *     ADDR WRAP AROUND FOR ALPHA SECTION                       *
484  001057                  *                                                              *
485  001057                  *       ENTRY:                                                 *
486  001057                  *         R34-35=UPDATED CURSOR ADDR                           *
487  001057                  *         R24-25=DISPLACEMENT OF LAST MOVEMENT                 *
488  001057                  *         CRTBYT=OLD CURSOR ADDR                               *
489  001057                  *                                                              *
490  001057                  *       RETURN:                                                *
491  001057                  *         R34-35=WRAPPED AROUND ADDR                           *
491  001057                  *                                                              *
491  001057                  ****************************************************************
492  001057
493  001057                  MODADR  BSZ  0
494  001057 176 261 344              LDMD R76,=ASIZE     ;GET SIZE OF ALPHA
494  001062 211
495  001063 124 221                  TSM  R24            ;CHECK DIRECTIONCTION
496  001065                  *                           ;OF LAST MOVEMENT
497  001065 134                      ORP  34
498  001066 076                      ARP  76
499  001067 364 013                  JNG  MODA-          ;JIF MOVE UP
500  001071 321 206 200              CMMD R34,=CRTBYT    ;COMP WITH OLD ADDR
501  001074 373 002                  JCY  MODA+1         ;IF GE, THEN MORE TEST,ELSE
502  001076 305              MODA+   SBM  R#,R#          ;WRAP AROUND
503  001077 236                      RTN
504  001100 301              MODA+1  CMM  R#,R#          ;BEYOND ALPHA SECTION?
505  001101 373 373                  JCY  MODA+          ;IF YES, THEN WRAP AROUND
506  001103 236                      RTN                 ;ELSE RETURN
507  001104                  MODA-   BSZ  0
508  001104                          DRP  !34
509  001104                          ARP  !76
510  001104 321 206 200              CMMD R34,=CRTBYT    ;COMP WITH OLD ADDR
511  001107 372 001                  JNC  MODRTN         ;IF LT, THEN RTN, ELSE
512  001111 303                      ADM  R34,R76        ;WRAP AROUND
513  001112 236              MODRTN  RTN
514  001113
```

```
>>>>>>>        CRT PAGE BOUNDARY CHECK                                <<<<<<<<
   001113                ********************************************************************
516 001113                *                                                                  *
517 001113                *     CHECK IF CURSOR IS ON 1ST LINE                               *
518 001113                *                                                                  *
519 001113                *       ENTRY:                                                     *
520 001113                *         R34-35=CURRENT CURSOR ADDR                               *
521 001113                *                                                                  *
522 001113                *       RETURN:                                                    *
523 001113                *         Z=0 IF NOT ON 1ST LINE                                   *
524 001113                *         Z=1 IF ON 1ST LINE                                       *
524 001113                *                                                                  *
524 001113                ********************************************************************
525 001113                LINE1?  BSZ   0
526 001113 124 261 210            LDMD R24,=CRTRAM   ;LOAD START ADDR
526 001116 200
527 001117 367 005                JZR   LINE1+       ;JIF SAD=0
528 001121 134 024 301            CMM   R34,R24      ;COMP CURS ADR WITH SAD
529 001124 372 013                JNC   LRTN         ;RTN IF < START ADDR
530 001126 124 313 120 LINE1+     ADM   R24,=LNGTH    ;SET TO END OF 1ST LN+1
   001131 000
531 001132 134 024 301            CMM   R34,R24      ;COMP AGAIN
532 001135 373 002                JCY   LRTN         ;RTN IF >= EOL+1
533 001137 124 223                CLM   R24          ;CLEAR FLAG
534 001141 124 221          LRTN  TSM   R24          ;SET FLAG
535 001143 236                    RTN
536 001144                ********************************************************************
   001144                *                                                                  *
   001144                *     CHECK IF CURSOR IS AT ONE LINE BELOW                         *
538 001144                *     THE SCREEN                                                   *
539 001144                *                                                                  *
540 001144                *       ENTRY:                                                     *
541 001144                *         R34-35=CURSOR ADDR                                       *
542 001144                *                                                                  *
543 001144                *       RETURN:                                                    *
544 001144                *         Z=0 IF NO                                                *
545 001144                *         Z=1 IF YES                                               *
545 001144                *                                                                  *
545 001144                ********************************************************************
   001144                BOTMR?  BSZ   0
547 001144 124 261 227            LDMD R24,=PGSIZE   ;BACK UP ONE SCREEN
547 001147 210
548 001150 215                    TCM   R24
549 001151 134 024 303            ADM   R34,R24
550 001154 316 057 002            JSB   =MODADR      ;WRAP AROUND
551 001157 260 332                JMP   LINE1?       ;IS IT ON LINE 1?
```

```
>>>>>           KEY LABEL ROUTINE                                          <<<<<<<<
552 001161                      ***************************************************
553 001161                      *
554 001161                      *     KEY LABEL RUN TIME ROUTINE                  *
554 001161                      *                                                 *
554 001161                      ***************************************************
555 001161 241                          OCT  241           ;PRIMARY ATTRIBUTE
556 001162                      KEYLA.  BSZ  0
557 001162 230                          BIN
558 001163                      *       STB  R32,R66       ;SAVE CHAR
559 001163 316 344 000                  JSB  =ALPHA        ;SWITCH TO ALPHA
560 001166 316 271 002                  JSB  =DECUR2       ;REMOVE CURSORS
561 001171 124 261 233                  LDMD R24,=LLN-2    ;MOVE DOWN #OFLINES - 2
561 001174 210
562 001175 134 261 210                  LDMD R34,=CRTRAM   ;GET START ADDR
562 001200 200
563 001201 263 206 200                  STMD R34,=CRTBYT   ;SETUP FOR MOVCRS
564 001204 316 173 003                  JSB  =MOVCRS       ;MOVE TO KEY LABEL SECTION
565 001207 166 310 140                  CMB  R66,=140      ;SHIFTED KEYLABEL?
566 001212 126                          DRP  26
567 001213 366 005                      JNZ  KEYLAR        ;JIF NO
568 001215 251 005 203                  LDM  R#,=LEGCAL    ;GET LEGEND (CALC-MODE)
569 001220 360 003                      JMP  KEYCOM
570 001222 251 145 202 KEYLAR   LDM  R#,=LEGEND    ;GET LEGEND (RUN-MODE)
571 001225 136 250 240 KEYCOM   LDB  R36,=LGNDL    ;GET LEGEND LENGTH
572 001230
573 001230                      LOOP4   BSZ  0
574 001230 132 026 340                  POBD R32,+R26      ;FETCH ONE BYTE
575 001233 316 332 003                  JSB  =OUTCH1       ;OUTPUT TO CRT
576 001236 136 212                      DCB  R36           ;DECREMENT COUNT
577 001240 366 366                      JNZ  LOOP4
578 001242 316 063 003                  JSB  =HMCURS       ;HOME CURSOR
579 001245 316 232 003                  JSB  =CURS         ;SPIT CURSOR
580 001250 236                          RTN
581 001251                      ***************************************************
581 001251                      *                                                 *
582 001251                      *     CLEAR TO END OF LINE WITHOUT MOVING CURSOR  *
582 001251                      *                                                 *
582 001251                      ***************************************************
583 001251                      CLREOL  BSZ  0
584 001251 166 261 206                  LDMD R66,=CRTBYT   ;SAVE CURRENT LOCATION
584 001254 200
585 001255 006 345                      PUMD R66,+R6
586 001257 316 367 003                  JSB  =BLKLIN       ;BLANK TO EOL
587 001262 166 006 343 EOL1     POMD R66,-R6       ;RESTORE CURSOR ADDR
588 001265 316 206 003                  JSB  =BYTCRT       ;TELL CONTROLLER
589 001270 236          CLRTN   RTN
590 001271
591 001271                      ***************************************************
591 001271                      *                                                 *
592 001271                      *     REMOVE TWO CURSORS FROM SCREEN              *
592 001271                      *                                                 *
592 001271                      ***************************************************
593 001271                      DECUR2  BSZ  0
```

```
>>>>>>        KEY LABEL ROUTINE                                    <<<<<<<<
    001271 130 260 302          LDBD R30,=CRTSTS  ;GET CRT STATUS
    001274 377
595 001275 764 064              JNG  DECUR0       ;IF GRAF THEN RTN
596 001277 260 347 212          LDBD R30,=CURSON  CURSOR ALREADY OFF ?
597 001302 367 057              JZR  DECUR0       JIF YES
598 001304 222                  CLB  R30          TURN OFF FLAG
599 001305 262 347 212          STBD R30,=CURSON
600 001310              CMPCUR  BSS  0
601 001310 316 064 004          JSB  =INCHR       GET CURRENT CHAR
602 001313 033 242              STB  R#,R33       SAVE IT
603 001315 316 025 003          JSB  =LTCUR.      GET PREVIOUS CHAR
604 001320 316 064 004          JSB  =INCHR
605 001323 130 251 200          LDM  R30,=200,200 GET MASK
605 001326 200
606 001327 132 030 227          XRM  R32,R30      TURN OFF BOTH CURSORS
607 001332 316 205 003          JSB  =BYTCR!      CURS LOC FROM LTCUR.
608 001335 316 036 002          JSB  =RETRHI      FOR A CLEAN IMAGE
609 001340 260 122 200          LDBD R#,=EDMOD2   INSERT MODE ?
610 001343 367 004              JZR  DECUR1       JIF NOT
    001345 132 262 303          STBD R32,=CRTDAT  OUTPUT 1ST CHAR
611 001350 377
612 001351              DECUR1  BSS  0
613 001351 316 053 003          JSB  =RTCUR.      MOVE TO CURR CURS LOC
614 001354 133 262 303          STBD R33,=CRTDAT
614 001357 377
615 001360 316 126 000          JSB  =BYTCR$      RESTORE CURR CURS LOC
616 001363 236          DECUR0  RTN
    001364
```

```
>>>>        CURSOR MOVING KEYS                                  <<<<<<<<
619 001364                  ********************************************************
619 001364                  *                                                      *
620 001364                  *     MOVE CURSOR UP,DOWN,LEFT,OR RIGHT ONE POSITION   *
621 001364                  *     WITH ADDR WRAPPING AROUND THE SCREEN             *
622 001364                  *     OR HOME CURSOR                                   *
622 001364                  *                                                      *
622 001364                  ********************************************************
623 001364                  UPCUR.  BSS  0
624 001364 134 261 206              LDMD R34,=CRTBYT  ;GET OLD CURS ADDR
624 001367 200
625 001370 316 113 002              JSB  =LINE1?      ;IS IT ON LINE 1?
626 001373 366 010                  JNZ  UPCUR-       ;IF NO,GO TO UPCURS
627 001375 124 261 231              LDMD R24,=LLN-1   ;ELSE GO DOWN #OFLINES - 1
627 001400 210
628 001401 316 173 003              JSB  =MOVCRS
629 001404 236                      RTN
630 001405                  UPCUR-  BSS  0
631 001405 316 145 003              JSB  =UPCURS
632 001410 236                      RTN
633 001411
634 001411                  DNCUR.  BSS  0
635 001411 316 153 003              JSB  =DNCURS      ;MOVE CURSOR DOWN 1 LINE
636 001414 316 144 002              JSB  =BOTMR?      ;IS IT 1 LINE BELOW THE SCREEN
637 001417 366 003                  JNZ  DNRTN        ;IF NO,THEN RETURN
638 001421 316 205 003              JSB  =BYTCR!      ;ELSE WRAP AROUND TO 1ST LINE
639 001424 236              DNRTN   RTN
640 001425
641 001425                  LTCUR.  BSZ  0
642 001425 134 261 206              LDMD R34,=CRTBYT  ;GET OLD CURSOR ADDR
642 001430 200
643 001431 321 210 200              CMMD R34,=CRTRAM  ;COMP WITH STARTING ADDR
644 001434 366 011                  JNZ  LTCUR-       ;IF NOT EQ, THEN MOVE LEFT
645 001436 124 261 227              LDMD R24,=PGSIZE  ;ELSE GO DOWN PGSZ-1 POSITIONS
645 001441 210
646 001442 213                      DCM  R24
647 001443 316 173 003              JSB  =MOVCRS
648 001446 236                      RTN
649 001447                  LTCUR-  BSS  0
    001447 316 161 003              JSB  =LTCURS
651 001452 236              RTRTN   RTN
652 001453
653 001453                  RTCUR.  BSZ  0
654 001453 316 167 003              JSB  =RTCURS      ;MOVE CURSOR RIGHT
655 001456 316 144 002              JSB  =BOTMR?      ;IS IT BELOW THE SCREEN
656 001461 366 367                  JNZ  RTRTN        ;IF NOT THEN RTN
657 001463                  *                         FALL THROUGH
658 001463
659 001463                  ********************************************************
659 001463                  *                                                      *
660 001463                  *     HOME CURSOR                                      *
660 001463                  *                                                      *
660 001463                  ********************************************************
661 001463                  HMCURS  BSZ  0
```

```
ARMA 03/14/81 ================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GEXKHY   9/11/1981 10:44 AM  PG 21
================================================================================
>>>>        CURSOR MOVING KEYS                                          <<<<<<<<<
  1 001463 134 261 210          LDMD R34,=CRTRAM  ;GET START ADDR
  2 001466 200
  3 001467 316 205 003          JSB  =BYTCR!      ;SEND TO CRT
  4 001472 236                  RTN
  5 001473
```

```
ARMA 03/14/81=========================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC     OBJ=GENKHY   9/11/1981 10:44 AM  PG 22
=========================================================================
>>>>>>        SCROLL VERTICALLY                                        <<<<<<<
      001473                *************************************************
667   001473                *                                                   *
663   001473                *     SCROLL DOWN ONE LINE                          *
663   001473                *                                                   *
663   001473                *************************************************
669   001473                SCRDN   BSZ   0
670   001473 316 145 003            JSB   =UPCURS       ;MOVE CURSOR UP 1 LINE
671   001476
672   001476                *************************************************
672   001476                *                                                   *
673   001476                *     START SCROLLING                               *
674   001476                *                                                   *
675   001476                *       ENTRY:                                      *
676   001476                *         R24-25=DISPLACEMENT                       *
676   001476                *                                                   *
676   001476                *************************************************
677   001476                ENTSCR  BSZ   0
678   001476 134 261 206            LDMD  R34,=CRTBYT
678   001501 200
      001502 006 345                PUMD  R34,+R5       ;SAVE BYTE ADDR
680   001504 261 210 200            LDMD  R34,=CRTRAM   ;GET START ADDR
681   001507 263 206 200            STMD  R34,=CRTBYT   ;SET FOR WRAP AROUND
682   001512 024 303                ADM   R34,R24       ;UPDATE IT
683   001514 316 057 002            JSB   =MODADR       ;WRAP AROUND
684   001517 176 006 343            POMD  R76,-R5       ;RESTORE BYTE ADDR
685   001522 263 206 200            STMD  R76,=CRTBYT
686   001525                *                           FALL THROUGH
687   001525
683   001525                *************************************************
683   001525                *                                                   *
689   001525                *     CHANGE START ADDR                             *
690   001525                *                                                   *
691   001525                *       ENTRY:                                      *
692   001525                *         R34-35=NEW START ADDR                     *
692   001525                *                                                   *
692   001525                *************************************************
693   001525                SAD1    BSZ   0
694   001525 316 036 002            JSB   =RETRHI       ;WAIT TILL RETRACE TIME
      001530 134 263 300 SAD2       STMD  R34,=CRTSAD   ;TELL CRT CONTROLLER
695   001533 377
696   001534 263 210 200            STMD  R34,=CRTRAM   ;SAVE A COPY IN MEMORY
697   001537 236                ERTN    RTN
698   001540                *************************************************
698   001540                *                                                   *
699   001540                *     SCROLL UP ONE LINE                            *
699   001540                *                                                   *
699   001540                *************************************************
709   001540                SCRUP   BSZ   0
701   001540 316 153 003            JSB   =DNCURS       ;MOVE CURSOR DOWN 1 LINE
702   001543 360 331                JMP   ENTSCR
703   001545
```

```
>>>>>>          CRT CURSOR MOVEMENT                                    <<<<<<<<
    001545                 ************************************************
705 001545                 *                                              *
706 001545                 *     MOVE CURSOR UP,DOWN,LEFT,OR RIGHT ONE POSITION
706 001545                 *                                              *
706 001545                 ************************************************
707 001545                 UPCURS  BSZ  0
708 001545 124 251 260             LDM  R24,=UP
708 001550 377
709 001551 360 020                 JMP  MOVCRS
710 001553                 DNCURS  BSZ  0
711 001553 124 251 120             LDM  R24,=DOWN
711 001556 000
712 001557 360 012                 JMP  MOVCRS
713 001561                 LTCURS  BSZ  0
714 001561 124 251 377             LDM  R24,=377,377
714 001564 377
715 001565 360 004                 JMP  MOVCRS
716 001567
717 001567                 RTCURS  BSZ  0
    001567 124 251 001             LDM  R24,=RIGHT
718 001572 000
719 001573                 MOVCRS  BSZ  0
720 001573 230                     BIN
721 001574 134 261 206             LDMD R34,=CRTBYT
721 001577 200
722 001600 024 303                 ADM  R34,R24
723 001602 316 057 002             JSB  =MODADR
724 001605                 BYTCR1  BSZ  0
725 001605 134                     DRP  34
726 001606                 BYTCRT  BSZ  0
727 001606 263 206 200             STMD R#,=CRTBYT
728 001611 232                     SAD
729 001612 316 006 002             JSB  =CHKSTS
730 001615 237                     PAD
731 001616 263 301 377             STMD R#,=CRTBAD
732 001621 236             CRTN    RTN
```

```
>>>>>>       OUTPUT TO CRT ROUTINES                                              <<<<<<<<
    001622                     ***********************************************************
734 001622                     *
735 001622                     *     OUTPUT A STRING TO CRT AND SPIT OUT A CURSOR        *
736 001622                     *                                                         *
737 001622                     *       ENTRY:                                            *
738 001622                     *         R36-37=COUNT                                    *
739 001622                     *         R26-27=POINTER TO THE STRING                    *
739 001622                     *                                                         *
739 001622                     ***********************************************************
740 001622                     OUTSTR   BSZ  0
741 001622 102 222                      CLB  R2            RESET CURSON FLAG
742 001624 262 347 212                  STBD R2,=CURSON
743 001627 316 256 003                  JSB  =OUTST+       ;OUTPUT THE STRING
744 001632
745 001632                     ***********************************************************
745 001632                     *                                                         *
746 001632                     *     SPIT OUT A CURSOR AT CURRENT CURSOR ADDR            *
746 001632                     *                                                         *
746 001632                     ***********************************************************
    001632                     CURS     BSZ  0
74  001632 130 260 302                  LDBD R30,=CRTSTS   ;GET CRT STATUS
748 001635 377
749 001636 364 015                      JNG  CURSED        ;IF GRAF, DONT DO IT
750 001640 260 347 212                  LDBD R30,=CURSON   CURSOR ALREADY ON ?
751 001643 366 010                      JNZ  CURSED        JIF YES
752 001645 316 310 002                  JSB  =CMPCUR       ;COMPLEMENT CURSOR
753 001650 250 001                      LDB  R#,=1         SET CURSON FLAG
754 001652 262 347 212                  STBD R#,=CURSON
755 001655 236                 CURSED   RTN                ;DONE
756 001656
757 001656                     ***********************************************************
757 001656                     *                                                         *
758 001656                     *     OUTPUT A STRING WITH BLANK FILLING TO               *
759 001656                     *     THE END OF LINE                                     *
760 001656                     *                                                         *
761 001656                     *       ENTRY:                                            *
762 001656                     *         R36-37=COUNT                                    *
763 001656                     *         R26-27=POINTER TO THE STRING                    *
    001656                     *                                                         *
7   001656                     ***********************************************************
764 001656                     OUTST+   BSZ  0
765 001656 316 312 003                  JSB  =HLFLIN       ;OUTPUT THE STRING
766 001661 316 010 004         OUTS++   JSB  =COLUMN       ;GET COLUMN ADDR
767 001664 367 003                      JZR  SCR???        ;JIF NO NEED TO
768 001666                     *                           ;FILL BLANKS
769 001666                     BLK&SC   BSZ  0
770 001666 316 367 003                  JSB  =BLKLIN       ;BLANK TO EOL
771 001671                     SCR???   BSZ  0             ;UPGRADE COMPATABLE
772 001671                     SCROL?   BSZ  0
773 001671 316 144 002                  JSB  =BOTMR?       ;GET OFF THE SCREEN
774 001674 366 013                      JNZ  L12           ;IF NOT THEN RTN, ELSE
775 001676                     SCRBLK   BSZ  0
776 001676 316 367 003                  JSB  =BLKLIN       ;OUTPUT A BLANK LINE
```

```
>>>>>>        OUTPUT TO CRT ROUTINES                                  <<<<<<<<
001701 316 145 003          JSB   =UPCURS       ;MOVE CURSOR TO THE
001704                      *                   ;BEGINING OF LINE
001704 124 215              TCM   R24           ;CHANGE DIRECTION
001706 316 076 003          JSB   =ENTSCR       ;ENTER SCROLL
001711 236                  L12   RTN
001712                      ********************************************************
001712                      *                                                      *
001712                      *     OUTPUT A BLOCK OF DATA TO CRT                    *
001712                      *                                                      *
001712                      *       ENTRY:                                         *
001712                      *         R36-37=COUNT                                 *
001712                      *         R26-27=POINTER TO THE BLOCK                  *
001712                      *                                                      *
001712                      ********************************************************
001712                      BLFLIN  BSZ   0
001712 230                          BIN
001713 136 221                      TSM   R36           ;CHECK IF ZERO LNGTH
001715 367 012                      JZR   ZEROLN        ;IF YES THEN RTN
001717 132 026 340          LOOP3   POBD  R32,+R26      ;ELSE FETCH DATA
001722 316 345 003                  JSB   =OUTCHR       ;OUTPUT IT
001725 136 213                      DCM   R36           ;DECREMENT COUNT
001727 266 366                      JNZ   LOOP3         ;REPEAT TILL DONE
001731 236                  ZEROLN  RTN
001732                      ********************************************************
001732                      *                                                      *
001732                      *     OUTPUT ONE BYTE TO CRT AND MOVE CURSOR RIGHT     *
001732                      *                                                      *
001732                      *       ENTRY:                                         *
001732                      *         R32=DATA BYTE                                *
001732                      *                                                      *
001732                      ********************************************************
001732                      OUTCH1  BSZ   0
001732 316 344 000                  JSB   =ALPHA        ;SWITCH TO ALPHA
001735 316 126 000                  JSB   =BYTCR$       SEND CURSOR ADDR
001740 316 357 003                  JSB   =OUTBYT       ;SEND DATA TO CRT
001743 360 222                      JMP   RTCURS        ;MOVE CURSOR
001745
001745                      ********************************************************
001745                      *                                                      *
001745                      *     OUTPUT 1 CHAR, MOVE CURS, AND SCROLL IF NECESSARY *
001745                      *                                                      *
001745                      *       ENTRY:                                         *
001745                      *         R32=DATA BYTE                                *
001745                      *                                                      *
001745                      ********************************************************
001745                      OUTCHR  BSZ   0
001745 316 332 003                  JSB   =OUTCH1       ;OUTPUT TO CRT
001750 102 222                      CLB   R2            RESET CURSON FLAG
001752 262 347 212                  STBD  R2,=CURSON
001755 360 312                      JMP   SCROL?        ;CHECK IF NEED SCROLL
001757
001757                      OUTBYT  BSS   0
001757 316 006 002                  JSB   =CHKSTS       ;WAIT TILL CRT READY
```

```
CARMA 03/14/81=========================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GENKHY   9/11/1981 10:44 AM  PG 26
=========================================================================
>>>>>>       OUTPUT TO CRT ROUTINES                                    <<<<<<<<<
 321  001762               *       LDB  R31,=177     VERSION 0
 322  001762               *       XPB  R31,R32      VERSION 0
 323  001762               *       STBD R31,=CRTDAT  VERSION 0
 324  001762               *       OPP  32           VERSION 0
 325  001762 132 262 303           STBD R32,=CRTDAT  ;OUTPUT ONE BYTE
 325  001765 377
 326  001766 236                   RTN
 327  001767
 328  001767
```

```
ARMA 03/14/81 ================================================================
 ITEM    LOC    OBJECT CODE   SRC=CCC     OBJ=GENKHY   9/11/1981 10:44 AM  PG 27
================================================================================
>>>>        FILL TO THE END OF LINE WITH CR                          <<<<<<<<
    0 001767                 ********************************************************
  830 001767                 *                                                      *
  831 001767                 *     FILL FROM CURRENT CURSOR ADDR TO THE END         *
  832 001767                 *     OF LINE WITH CARRIAGE RETURN                     *
  832 001767                 *                                                      *
  832 001767                 ********************************************************
  833 001767                 BLKLIN  BSZ   0
  834 001767 230                     BIN
  835 001770 316 010 004             JSB   =COLUMN        ;GET COLUMN ADDR
  836 001773 132 250 015             LDB   R32,=CR        ;GET FILLING CHAR
  837 001776 316 332 003 L8          JSB   =OUTCH1        ;OUTPUT 1 BYTE
  838 002001 166 210                 ICB   R66            ;INC COLUMN ADDR
  839 002003 310 120                 CMB   R66,=LNGTH     ;DONE?
  840 002005 766 367                 JNZ   L8             ;IF NOT, LOOP BACK
  841 002007 236                     RTN                  ;ELSE RETURN
  842 002010                 ********************************************************
  842 002010                 *                                                      *
  843 002010                 *     CALCULATE COLUMN # (0->LNGTH-1)                  *
      002010                 *                                                      *
  844 002010                 *       RETURN:                                        *
  845 002010                 *         .R66-67=COLUMN #                             *
  846 002010                 *                                                      *
  846 002010                 ********************************************************
  847 002010                 COLUMN  BSZ   0
  848 002010 176 251 120             LDM   R76,=LNGTH     ;GET LINE LENGTH
  848 002013 000
    8 002014 166 261 206             LDMD  R66,=CRTBYT    ;GET CURSOR ADDR
    9 002017 200
  850 002020                 *-- FALL THROUGH --
  851 002020
  852 002020                 ********************************************************
  852 002020                 *                                                      *
  853 002020                 *     DOES MOD FUNCTION                                *
  854 002020                 *                                                      *
  855 002020                 *       ENTRY:                                         *
  856 002020                 *         R66-67=X                                     *
  857 002020                 *         R76-77=Y                                     *
      002020                 *         DRP=66                                       *
      002020                 *                                                      *
  860 002020                 *       RETURN:                                        *
  861 002020                 *         R66-67=X MOD Y                               *
  861 002020                 *                                                      *
  861 002020                 ********************************************************
  862 002020                 MOD     BSZ   0
  863 002020 076                     ARP   76
  864 002021 305             MOD1    SBM   R#,R#          ;REPEAT SUBTRACTION
  865 002022 373 375                 JCY   MOD1           ;
  866 002024 303                     ADM   R#,R#          ;RESTORE THE VALUE
  867 002025 236                     RTN
```

```
>>>>>>          CLEAR RUN TIME ROUTINE                                <<<<<<<<
                *************************************************************
                *
                *     CLEAR RUN TIME ROUTINE                                  *
                *                                                             *
                *************************************************************
002026 241                      OCT   241           ;PRIMARY ATTRIBUTE
002027                  CLEAR.  BSZ   0
002027 316 344 000              JSB   =ALPHA        SWITCH TO ALPHA MODE
002032                  CLEAR1  BSS   0
002032 316 377 377              JSB   =CLEDM2       RESET TO REPLACE
002035 136 261 227              LDMD  R36,=PGSIZE   ;GET PAGE SIZE
002040 210
002041 316 010 004              JSB   =COLUMN       ;GET COLUMN ADDR
002044 134 261 206              LDMD  R34,=CRTBYT   ;GET CURSOR ADDR
002047 200
002050 066 305                  SBM   R34,R66       ;BACK TO BEGINOFLINE
002052 316 056 000              JSB   =CRTBLK       ;CLEAR 1 PAGE
002055 316 063 003              JSB   =HMCURS       HOME CURSOR
002060 316 337 000              JSB   =ALF1         ;UNWIPE CRT
002063 236              CLEAR2  RTN
002064
```

```
>>>>>        INPUT ONE CHAR FROM CRT                                    <<<<<<<<
  5 002064                *****************************************************
886 002064                *                                                   *
887 002064                *     INPUT ONE CHARACTER FROM CURRENT CURSOR       *
888 002064                *     POSITION TO R32                               *
889 002064                *                                                   *
890 002064                *       RETURN:                                     *
891 002064                *         R32=CHAR FROM CRT                         *
892 002064                *INCHR-   BSZ  0                                     *
892 002064                *                                                   *
892 002064                *****************************************************
893 002064                INCHR    BSZ  0
894 002064 !32                     ORP  32
895 002065 316 010 002             JSB  =L90          ;WAIT TILL CONTROLLER READY
896 002070                NOTWPG   BSZ  0
897 002070                         ORP  !32
898 002070 210                     ICB  R32           ;SET READ DATA
899 002071 262 302 377             STBD R32,=CRTSTS   ;TELL CONTROLLER
900 002074                LOOP2    BSZ  0
901 002074                         ORP  !32
902 002074 260 302 377             LDBD R32,=CRTSTS   ;R32
903 002077 362 373                 JOD  LOOP2         ;WAIT TILL DATA RDY
904 002101 260 303 377             LDBD R32,=CRTDAT   ;FETCH DATA
905 002104 236             ARTN    RTN
906 002105                *****************************************************
906 002105                *                                                   *
906 002105                *                                                   *
  } 002105                *****************************************************
```

>>>>>> ENTRIES AND EXTERNALS <<<<<<<<

```
908 002105                      ENT CLKSR0
909 002105                      ENT CLKSR1
910 002105                      ENT CLKSR2
911 002105                      ENT CLKSR3
912 002105                      ENT COUNTK
913 002105                      ENT FLIP.
914 002105                      ENT KEYSRV
915 002105                      ENT TIMRDY
916 002105                      ENT TIMWST
917 002105                *     EXTERNALS
918 002105                      EXT ADD20
919 002105                      EXT ADDROI
920 002105                      EXT CKLOOP
921 002105                      EXT CLRBIT
922 002105                      EXT CONINT
923 002105                      EXT DIV10
924 002105                      EXT DIV20
925 002105                      EXT ERROR
926 002105                      EXT DOCUR.
927 002105                      EXT FASTBS
928 002105                      EXT GETRDY
929 002105                      EXT I#PU45
930 002105                      EXT MPY30
931 002105                      EXT ONEB
932 002105                      EXT ONEI
933 002105                      EXT ONER
934 002105                      EXT RESET.
935 002105                      EXT RONF
936 002105                      EXT SEP15
937 002105                      EXT SEP20
938 002105                      EXT SUB10
939 002105                      EXT TWOR
```

```
ARMA 03/14/81 ================================================================
ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GEXKHY   9/11/1981 10:44 AM  PG 31
================================================================
>>>>>        KEYBOARD SERVICE ROUTINE                          <<<<<<<<<
    002105 232           KEYSRV SAD
+2  002106 316 277 207          JSB =KYIDLE          KEYBOARD INTERCEPT??
943 002111 132 262 001          STBD R32,=GINTDS
943 002114 377
944 002115 006 345              PUMD 32,+6           PUSH R32 TO STACK
945 002117 260 003 377          LDBD 32,=KEYCOD
946 002122 230                  BIN
947 002123 310 213              CMB R32,=213         RESET KEY?
948 002125 266 021              JNZ NORSET           JIF NO
949 002127 106 251 070 RSTART   LDM R6,=STACK        RELOAD R6
949 002132 204
950 002133 316 377 377          JSB =RESET.          EXECUTE RESET
951 002136 130 250 001          LDB R30,=1
952 002141 262 003 377          STBD R30,=KEYCOD     RESTART SCANNER
953 002144 104 251 377          GTO DOCUR.           GOTO THE EXEC LOOP
953 002147 377
954 002150 133 260 162 NORSET   LDBD 33,=SVCWRD      GET SVC WORD
954 002153 200
    002154 132                  DRP 32
    002155 362 011              JOD HAVE1            ALREADY HAVE A KEY
957 002157 133 210              ICB 33
958 002161 262 162 200          STBD 33,=SVCWRD
959 002164 132 262 142          STBD 32,=KEYHIT
959 002167 202
960 002170 250 020      HAVE1   LDB R#,=20      BIT 4 IN 17
961 002172 117 032 224          ORB 17,32       SET SERVICE REQUEST
    002175 316 335 004          JSB =EOJ1            RESET COUNTER
    002200 250 001              LDB R#,=1
964 002202 262 003 377          STBD R#,=KEYCOD      AND RESTART SCANNER
965 002205                  * HAVE1 ON LDB32=20 INSURES NO
966 002205                  *  KEYBOARD LOCKUP IF SOME TURKEY MESSES UP R17
967 002205 006 343              PUMD R#,-6           R#=R32
968 002207 104 251 151          GTO  ENDSR           END SERVICE
968 002212 005
969 002213
970 002213                  *
971 002213                  *
    002213 230              COUNTK BIN
    002214 131 260 153          LDBD 31,=KEYCNT      COUNTER
973 002217 200
974 002220 130 260 002 LOOPKE   LDBD 30,=KEYSTS
974 002223 377
975 002224 206                  LRB 30               LOOK FOR KEY STILL DOWN
976 002225 263 100              JEV EOJ2             NOPE,GET OUT
977 002227 260 302 377          LDBD 30,=CRTSTS
978 002232 206                  LRB 30
979 002233 206                  LRB 30
980 002234 206                  LRB 30
981 002235 206                  LRB 30
982 002236 363 360              JEV LOOPKE           WAIT FOR RETRACE HIGH
983 002240 260 002 377 LOOPK2   LDBD R#,=KEYSTS      EXIT FOR KEYUP
984 002243 206                  LRB R#
    002244 363 061              JEV EOJ2
```

```
ARNA 03/14/81=================================================================
ITEM    LOC   OBJECT CODE  SRC=CCC    OBJ=GENKHY   9/11/1981 10:44 AM  PG 32
=================================================================
>>>>>       KEYBOARD SERVICE ROUTINE                              <<<<<<<<
 986 002246 260 302 377        LDBD R#,=CRTSTS     WAIT FOR RETRACE LOW
 987 002251 206                LRS R#
 988 002252 206                LRS R#
 989 002253 206                LRS R#
 990 002254 206                LRS R#
 991 002255 362 361            JOD LOOPK2
 992 002257 131 212            DCB 31              REPEAT KEY?
 993 002261 366 335            JNE LOOPKE          NOT YET
 994 002263 260 155 200        LDBD 31,=KRPET2      GET MINOR SPEED FROM RAM
 995 002266 262 153 200        STBD 31,=KEYCNT      REPEAT THE KEY
 996 002271 260 003 377        LDBD 31,=KEYCOD      GET KEY
 997 002274 262 142 202        STBD 31,=KEYHIT      SET FLAG WITH KEY
 998 002277 250 020            LDB 31,=20
 999 002301 117 031 224        ORS 17,31
1000 002304 262 001 377        STBD R#,=GINTDS     DISABLE INTERRUPTS
1001 002307 132 260 162        LDBD R32,=SVCWRD      AND SET KEYBOARD
1001 002312 200
1002 002313 131 250 001        LDB R31,=1             INTO SERVICE REQUEST
1003 002316 032 224            ORS R31,R32            WORD, BIT 0
1004 002320 262 162 200        STBD R31,=SVCWRD
1005 002323 262 000 377        STBD R31,=GINTEN    ENABLE INTERRUPTS
1006 002326 236                RTN
1007 002327                *
1008 002327                EOJ2    BSZ 0
1009 002327 132 250 376        LDB 32,=376
1010 002332 316 377 377        JSB =CLRBIT
1011 002335 132 260 154 EOJ1   LDBD 32,=KRPET1      RESET COUNTER
1011 002340 200
1012 002341 262 153 200        STBD 32,=KEYCNT
1013 002344 236                RTN
1014 002345
1015 002345                *
1016 002345                *******FLIP ATTRIBUTES TABLE**********
1017 002345 241                OCT 241
1018 002346 136 250 200 FLIP.  LDB R36,=200        CHANGE FLIP FLOP
1019 002351 262 002 377        STBD R36,=KEYSTS    TO KEYBOARD
1020 002354 236                RTN
1021 002355                ***************************************************
1022 002355                *
1023 002355                *THIS ROUTINE IS THE INTERRUPT ROUTINE FOR
1024 002355                *  THE SYSTEM CLOCK AND INCREMENTSTHE DATE
1025 002355                *  AND SETS TIMER 0 CLEAR AND READY TO INTERRUPT
1026 002355                *  24X60X60X100 MS FROM NOW
1027 002355 232            CLKSR0  SAD
1028 002356 140 262 001          STBD R40,=GINTDS   DISABLE INTERRUPTS
1028 002361 377
1029 002362 006 345              PUMD 40,+R6        SAVE R40.
1030 002364 150 345              PUMD 50,+R6
1031 002366 030 241              LDM R50,R30
1032 002370 006 345              PUMD R50,+R6        SAVE R30-R37
1033 002372 155 250 040          LDB 55,=40          ADDRESS AND CLR INTERRUPT ON
1034 002375 316 200 005          JSB =TIMWST
1035 002400 144 223              CLM 44             GET #MSECS PER DAY
```

```
HRMA 03/14/81=========================================================================
 ITEM    LOC    OBJECT CODE  SRC=CCC    OBJ=GENKHY    3/11/1981 10:44 AM  PG 33
=========================================================================
>>>>>        KEYBOARD SERVICE ROUTINE                                  <<<<<<<<<
     002402 146 251 100          LDM 46,=100,206     86400
1036 002405 206
1037 002406 316 210 005          JSB =TIMRDY         SET TIMER 0 WITH ONE DAY INTE
1038 002411 144 263 013          STMD R44,=CLKDAT
1038 002414 377
1039 002415 145 261 133          LDMD 45,=DATE       GET THE DATE
1039 002420 202
1040 002421 231                  BCD
1041 002422 211                  ICM R45
1042 002423 147 204              LLB R47
1043 002425 206                  LRB R47             DUMP UPPER HALF IF ANY
1044 002426 145 263 133          STMD 45,=DATE       RESTORE IT
1044 002431 202
1045 002432 150 006 343          POMD 50,-R6
1046 002435 030 243              STM R50,R30          RESTORE REGS
1047 002437 006 343              POMD 50,-R6
1048 002441 140 223              CLM R40
1049 002443 263 123 202          STMD R40,=TIME       CLEAR BASE TIME
1050 002446 343                  POMD R40,-R6        RESTORE R40
1051 002447 360 101              JMP  ENDSR           SET DRP & ENABLE INT
1052 002451                  *****************************************
1053 002451 232          CLKSR3  SAD
1054 002452 136 262 001          STBD 36,=GINTDS
1054 002455 377
1055 002456 006 345              PUMD 36,+R6
1056 002460 250 020              LDB R36,=20
1057 002462 155 344              PUBD 55,+R6
1058 002464 250 340              LDB 55,=340          REENABLE FOR TIMER3
1059 002466 360 034              JMP CLCOMN
1060 002470 232          CLKSR2  SAD
1061 002471 136 262 001          STBD 36,=GINTDS
1061 002474 377
1062 002475 006 345              PUMD 36,+R6
1063 002477 250 010              LDB R36,=10
1064 002501 155 344              PUBD 55,+R6
1065 002503 250 240              LDB 55,=240
1066 002505 360 015              JMP CLCOMN
1067 002507 232          CLKSR1  SAD
1068 002510 136 262 001          STBD 36,=GINTDS
1068 002513 377
1069 002514 006 345              PUMD 36,+R6
1070 002516 250 004              LDB  36,=4
1071 002520 155 344              PUBD 55,+R6
1072 002522 250 140              LDB 55,=140
1073 002524 137 250 020 CLCOMN   LDB 37,=20
1074 002527 117 037 224          ORB 17,37       SET SERVICE REQUEST
1075 002532 137 260 162          LDBD 37,=SVCWRD
1075 002535 200
1076 002536 036 224              ORB 37,36       SET BIT FOR CLOCK
1077 002540 262 162 200          STBD 37,=SVCWRD
1078 002543 316 200 005          JSB =TIMWST       REENABLE TIMER
1079 002546 006 342              POBD R#,-R6       RESTORE R55
1080 002550 136 343              POMD 36,-R6
```

```
 >>>>           KEYBOARD SERVICE ROUTINE                                          <<<<<<<<
1081 002552                 ENDSR    BSS  0
1082 002552 110 263 367              STMD R10,=S10         SAVE R10-11
1082 002555 206
1083 002556 006 343                  POMD R10,-R6          GET MODE + DRP
1084 002560 345                      PUMD R10,+R6          PUSH BACK
1085 002561 317 077 000              ANM  R10,=77,0        MASK OUT DRP
1086 002564 312 100                  ADB  R10,=100         MAKE A DRP INSTRUCTION
1087 002566 262 307 206              STBD R10,=RAID+1      PUT IN INST STREAM
1088 002571 261 367 206              LDMD R10,=S10         RESTORE R10-11
1089 002574 104 251 306              GTO  RAID+1           GO EXEC IN RAM
1089 002577 206
1090 002600
1091 002600 316 210 005 TIMWST   JSB =TIMRDY
1092 002603 155 262 012          STBD R55,=CLKSTS      OUTPUT STATUS
1092 002606 377
1093 002607 236                  RTN
1094 002610
1095 002610
     002610                 *THIS ROUTINE WAITS UNTIL TIMER INDICATES READY
109? 002610                 ***********************************************************
1098 002610 137 260 012 TIMRDY  LDBD R37,=CLKSTS
1098 002613 377
1099 002614 765 372              JPS TIMRDY            LOOP IF NOT READY
1100 002616 236                  RTN
1101 002617
1102 002617
```

```
>>>>>          TAB                                                  <<<<<<<<
      002617
1105  002617 020 045                 OCT  20,45
1106  002621
1107  002621                   TAB.  BSS  0
1108  002621 316 377 377             JSB  =ONER          GET PARAMETER
1109  002624 150 241                 LDM  R50,R#
1110  002626 316 377 377             JSB  =R1.           GET A 1.0
1111  002631 316 377 377             JSB  =COMFLT        DEC IT BY 1.0
1112  002634 370 006                 JEN  TAB1           JIF PARAM > 1
1113  002636 316 377 377             JSB  =WARN          ELSE ISSUE WARNING
1114  002641 066                     OCT  54D
1115  002642 140 223                 CLM  R40            DEFAULT TAB IS 1
1116  002644                   TAB1  BSS  0
1117  002644                         DRP  !40
1118  002644 012 345                 PUMD R40,+R12       SAVE PARAM - 1
1119  002646 136 223                 CLM  R36
1120  002650 270 314 203             LDBI R36=LINELN     GET LINE LENGTH
1121  002653 316 377 377             JSB =CONBIN         BINARY TO R40
1122  002656 140 012 345             PUMD R40,+R12       TO THE STACK
1123  002661 316 377 377             JSB =REM10          GET REMAINDER
1124  002664 316 377 377             JSB =ONEB           CONVERT TO BINARY
1125  002667 122 223           DOIT  CLM  R22
1126  002671 270 310 203             LDBI R22,=P.PTR
1127  002674 146 022 305             SBM  R46,R22        TAB - PRIPTR
1128  002677 365 017                 JPS  MVBLKS         JIF TAB >= CURRENT
1129  002701 303                     ADM  R46,R22        RESTORE TAB
1130  002702 006 345                 PUMD R46,+R6        AND SAVE IT
1131  002704 223                     CLM  R46
1132  002705 270 314 203             LDBI R46,=LINELN    GET LINE LEFGTH
1133  002710 022 305                 SBM  R46,R22        GET TO END OF LINE
1134  002712 316 320 005             JSB =MVBLKS         GO MOVE TO END
1135  002715 146 006 343             PUMD R46,-R6        RESTORE TAB
1136  002720 054 243           MVBLKS STM  R#,R54
1137  002722 156 223                 CLM  R56
1138  002724 316 377 377             JSB =RESFIL         reserve & blank
1139  002727 316 377 377             JSB =ROMJSB         output blanks
1140  002732 377 377                 DEF  TRAFIC
1141  002734 000                     OCT  0
1142  002735 236               DONNE RTN
1143  002736
1144  002736                          FIN
```

?DD20	177777	EXT	0	<--- NOT REFERENCED??
?[illegible]OI	177777	EXT	0	<--- NOT REFERENCED??
?L[illegible]	000337	LCL	1	
?LFA	000177	EQU	1	
?LFAL.	000279	ENT	1	
?LFAL1	000304	LCL	1	
?LFALL	000100	EQU	0	<--- NOT REFERENCED??
?LPHA	000344	ENT	4	
?LPHA.	000215	ENT	2	
?LPHA1	000252	LCL	1	
?LRTN	000361	LCL	3	
?RTN	002104	LCL	0	<--- NOT REFERENCED??
?SIZE	104744	G DAD	7	
?LANKS	177777	EXT	0	<--- NOT REFERENCED??
?LK&SC	001665	ENT	1	
?LKLIN	001767	ENT	4	
?OTMR?	001144	ENT	4	
?YTCR!	001605	ENT	4	
?YTCR#	000127	ENT	1	
?YTCR$	000126	ENT	4	
?[illegible]CRT	001606	ENT	4	
?[illegible]TS	001006	ENT	5	
?KLOOP	177777	EXT	0	<--- NOT REFERENCED??
?LCOMN	002524	LCL	2	
?LEAR.	002027	ENT	1	
?LEAR1	002032	LCL	0	<--- NOT REFERENCED??
?LEAR2	002063	LCL	0	<--- NOT REFERENCED??
?LEDM2	177777	EXT	1	
?LKDAT	177413	G DAD	1	
?LKSR0	002355	ENT	1	
?LKSR1	002507	ENT	1	
?LKSR2	002470	ENT	1	
?LKSR3	002451	ENT	1	
?LKSTS	177412	G DAD	2	
?LRBIT	177777	EXT	1	
?LREOL	001251	ENT	1	
?LRTN	001270	LCL	0	<--- NOT REFERENCED??
?MPCUR	001310	LCL	1	
?NTRTR	001047	ENT	3	
?O[illegible]UMN	002010	ENT	4	
?[illegible]T	177777	EXT	1	
?ONBIN	177777	EXT	1	
?ONINT	177777	EXT	0	<--- NOT REFERENCED??
?OUNTK	002213	ENT	1	
?R	000015	EQU	2	
?RTBAD	177701	G DAD	1	
?RTBL+	000056	LCL	1	
?RTBLK	000050	ENT	2	
?RTBYT	100206	G DAD	15	
?RTDAT	177703	G DAD	5	
?RTIN+	000012	LCL	2	
?RTIN-	000003	LCL	1	
?RTINT	000000	ENT	1	
?RTJ2	000342	LCL	2	

```
MARMA 03/14/81 ================================================================
SYMBOL   VALUE    TYPE    COUNT     Symbol Table        9/11/1981 10:44 AM  PG 37
================================================================================
CRTJMP   000250     LCL     1
CRTST    101101   G DAD     2
C        001621     LCL     0    <--- NOT REFERENCED??
CRTPOF   000136     ENT     1
CRTPUP   000143     ENT     1
CRTRAM   100210   G DAD     8
CRTSAD   177700   G DAD     1
CRTSTS   177702   G DAD    37
CRTUNW   000162     ENT     4
CRTWPO   000176     ENT     9
CURS     001632     ENT     5
CURSED   001655     LCL     2
CURSON   105347   G DAD     7
DATE     101133   G DAD     2
DECUR0   001363     LCL     2
DECUR1   001351     LCL     1
DECUR2   001271     ENT     2
DIV10    177777     EXT     0    <--- NOT REFERENCED??
DIV20    177777     EXT     0    <--- NOT REFERENCED??
DNCUR.   001411     ENT     1
D URS    001553     ENT     3
DN       001424     LCL     1
DOCUR.   177777     EXT     1
DOIT     002667     LCL     0    <--- NOT REFERENCED??
DONE     002735     LCL     0    <--- NOT REFERENCED??
DOWN     000120     EQU     1
EDMOD2   100122   G DAD     1
ENDSR    002552     ENT     3
E  SCR   001476     LCL     2
EOJ1     002335     ENT     2
EOJ2     002327     ENT     3
EOL1     001262     LCL     0    <--- NOT REFERENCED??
ERROR    177777     EXT     0    <--- NOT REFERENCED??
ERTN     001537     LCL     0    <--- NOT REFERENCED??
FASTBS   177777     EXT     0    <--- NOT REFERENCED??
FLIP.    002346     ENT     1
GBASE    010340     EQU     0    <--- NOT REFERENCED??
GCON     000412     LCL     1
GETRDY   177777     EXT     0    <--- NOT REFERENCED??
GINTDS   177401   G DAD     6
G  EN    177400   G DAD     1
GLINE    104740   G DAD     1
GRAF     000200     EQU     0    <--- NOT REFERENCED??
GRAFA.   000430     ENT     1
GRAFA1   000444     LCL     1
GRAPH    000362     ENT     1
GRAPH+   000526     ENT     2
GRAPH.   000376     ENT     1
GRAPH1   000417     LCL     1
GRINI+   177777     EXT     1
GRINIT   177777     EXT     1
GRTN     000556     LCL     2
GSIZE    104742   G DAD     1
HAVE1    002170     LCL     1
```

```
ALFLIN  001712     ENT   2
ATURS   001467     ENT   3
I#  45  177777     EXT   0   <--- NOT REFERENCED??
INCHR   002064     ENT   3
INSRT   177777     EXT   0   <--- NOT REFERENCED??
INTMUL  177777     EXT   1
KEYCNT  100153   G DAD   3
KEYCOD  177403   G DAD   4
KEYCOM  001225     LCL   1
KEYHIT  101142   G DAD   2
KEYLA.  001162     ENT   1
KEYLAR  001222     LCL   1
KEYSRV  002105     ENT   1
KEYSTS  177402   G DAD   3
KRPET1  100154   G DAD   1
KRPET2  100155   G DAD   1
KYIDLE  103677   G DAD   1
L12     001711     LCL   1
L7      000112     ENT   2
L8      001776     LCL   1
L90     001010     LCL   2
L.      177777     EQU   0   <--- NOT REFERENCED??
LEGCAL  101405   G DAD   1
LEGEND  101145   G DAD   1
LGNDL   000240     EQU   1
LINE1+  001126     LCL   1
LINE1?  001113     ENT   3
LINELN  101714   G DAD   2
LLN-1   104231   G DAD   2
LLN-2   104233   G DAD   2
LNGTH   000120     EQU   6
LOOP2   002074     LCL   1
LOOP3   001717     LCL   1
LOOP4   001230     LCL   1
LOOPK2  002240     LCL   1
LOOPKE  002220     LCL   2
LRTN    001141     LCL   2
LTCUR-  001447     LCL   1
LTCUR.  001425     ENT   2
LTCURS  001561     ENT   2
M       002020     ENT   1
MODY    002021     LCL   1
MODA+   001076     LCL   1
MODA+1  001100     LCL   1
MODA-   001104     LCL   1
MODADR  001057     ENT   4
MODRTN  001112     LCL   1
MOV40   177777     EXT   1
MOVCRS  001573     ENT   7
MPY30   177777     EXT   0   <--- NOT REFERENCED??
MVBLKS  002720     LCL   2
NOOP    000357     LCL   1
NORSET  002150     LCL   1
NOTWPO  002070     LCL   0   <--- NOT REFERENCED??
```

```
ZARMA 03/14/81 ================================================================
SYMBOL   VALUE    TYPE    COUNT     Symbol Table        9/11/1981 10:44 AM  PG 39
================================================================================
ONEB     177777     EXT     2
[illegible]  177777     EXT     0    <--- NOT REFERENCED??
[illegible]  177777     EXT     1
OUTBYT   001757     LCL     1
OUTCH1   001732     ENT     4
OUTCHR   001745     ENT     2
OUTS++   001661     ENT     1
OUTST+   001656     ENT     2
OUTSTR   001622     ENT     1
P.PTR    101710   G DAD     1
PAGES.   000560     ENT     1
PAGES1   000603     LCL     1
PAGES2   000705     LCL     1
PAGES3   000754     ENT     1
PAGES4   000746     LCL     1
PGS2.1   000622     LCL     1
PGS2.2   000645     LCL     1
PGS2.3   000650     LCL     1
PGSIZE   104227   G DAD     4
PWROFF   000006     EQU     1
[illegible]  000373     EQU     1
[illegible]  177777     EXT     1
RAID+1   103307   G DAD     2
REM10    177777     EXT     1
RESET.   177777     EXT     1
RESFIL   177777     EXT     1
RETRA-   001026     LCL     1
RETRA1   001016     ENT     3
[illegible]  001037     LCL     1
[illegible]  001036     ENT     9
RETRLO   001025     LCL     3
RIGHT    000001     EQU     1
ROMJSB   177777     EXT     4
RONF     177777     EXT     0    <--- NOT REFERENCED??
RSTART   002127     ENT     1
RTCUR.   001453     ENT     2
RTCURS   001567     ENT     3
RTRTN    001452     LCL     1
S10      103367   G DAD     2
[illegible]  001525     ENT     3
[illegible]  001530     LCL     0    <--- NOT REFERENCED??
SCOM     000172     LCL     1
SCR???   001671     ENT     2
SCRBLK   001676     ENT     1
SCRDN    001473     ENT     1
SCROL?   001671     LCL     1
SCRUP    001540     ENT     1
SEP15    177777     EXT     0    <--- NOT REFERENCED??
SEP20    177777     EXT     0    <--- NOT REFERENCED??
STACK    102070   G DAD     1
SUB10    177777     EXT     0    <--- NOT REFERENCED??
SVCWRD   100162   G DAD     6
TAB.     002621     ENT     1
TAB1     002644     LCL     1
```

```
ARMA 03/14/81================================================================
SYMBOL   VALUE   TYPE   COUNT    Symbol Table        9/11/1981 10:44 AM  PG 40
================================================================================
TIME     101123  G DAD    1
 DY      002610    ENT    4
TIST     002600    ENT    3
TRAFIC   177777    EXT    1
TWOR     177777    EXT    0   <--- NOT REFERENCED??
UNWIPE   000371    EQU    1
UP       177660    EQU    1
UPCUR-   001405    LCL    1
UPCUR.   001364    ENT    1
UPCURS   001545    ENT    4
VARN     177777    EXT    2
VPO10    000201    LCL    1
VPOT     000002    EQU    1
VPOTG    000202    EQU    2
WRTN     000175    LCL    2
XGA1     177777    EXT    1
XM1      104700  G DAD    1
ZEROLN   001731    LCL    1
```

CCC HAD 0 ERRORS 0 WARNINGS 234 LABELS LAST ERROR AT - 0