

```
1
2  /*
3
4  Monitor program for 6809 Microprocessor Kit 2017
5  written by Wichit Sirichote, wichit.sirichote@gmail.com, July 2017
6  Source code was compiled with cc09 c compiler
7
8  cc09>cc09 file.c file.asm -z -c
9  cc09>as9 file.asm
10
11 */
12
13 #include startRAM.h
14
15 int i;
16 int j;
17 char n;
18 char k;
19 char u,q,o,key;
20 char x;
21 char hit, positive;
22 char flag;
23 char tick;
24 char bcc, save_bcc, bcc_error;
25
26
27 int temp,temp16;
28
29 int PC, save_PC;
30 int num,start, end, desti;
31
32 int t;
33
34 char state;
35
36 int USER_PC,USER_U,USER_X,SAVE_SP;
37 int USER_Y;
38
39 char USER_A,USER_B,USER_P,USER_DP;
40
41 int timeout;
42 char buffer[6];
43
44 char *gpio1;
45 char *port2;
46 char *port1;
47 char *port0;
48 char *dptr;
49 char *dptr2;
50
51
52 #define AS9 1
53 #include startup.h
54
55 #define ACIAPORT 0xA000
56
57 #define LCD_cwr 0x9000
58 #define LCD_dwr 0x9001
59 #define LCD_crd 0x9002
60 #define LCD_drd 0x9003
61
62 #define BUSY 0x80
63
64 #define xon 16
65 #define xoff 19
66
67 #const
68
69 char convert[16]= {0xBD,0x30,0x9B,0xBA,0x36,0xAE,0xAF,0x38,
70                  0xBF,0xBE,0x3F,0xA7,0x8D,0xB3,0x8F,0x0F};
71
72 char cold_msg[12]= {0,0,0,0,0,0,0xae,0xbf,0xbd,0xbe,0,0};
73
74
75 #code
76
```

```
77  /*   LCD driver   */
78
79  LcdReady()
80  {
81      timeout=0;
82      dptr = LCD_crd;
83
84      while((*dptr&0x80==1) && (timeout<500))
85          ++timeout;
86  }
87
88  clr_screen()
89  {
90      LcdReady();
91      dptr = LCD_cwr;
92      *dptr=0x01;
93  }
94
95
96  goto_xy(x,y)
97  int x, y;
98  {
99      LcdReady();
100     dptr = LCD_cwr;
101     switch(y)
102     {
103     case 0: *dptr=0x80+x; break;
104     case 1: *dptr=0xC0+x; break;
105     case 2: *dptr=0x94+x; break;
106     case 3: *dptr=0xd4+x; break;
107     }
108 }
109
110
111 InitLcd()
112 {
113     LcdReady();
114     dptr = LCD_cwr;
115     *dptr=0x38;
116     LcdReady();
117     dptr = LCD_cwr;
118     *dptr=0x0c;
119     clr_screen();
120     goto_xy(0,0);
121     delay_ms(100);
122 }
123
124
125 PutLCD(str)
126
127 char *str;
128 {
129     char i;
130     for (i=0; str[i] != '\0'; i++)
131     {
132         LcdReady();
133         dptr = LCD_dwr;
134         *dptr=str[i];
135     }
136
137
138 }
139
140 putch_lcd(ch)
141 char ch;
142
143 {
144     LcdReady();
145     dptr= LCD_dwr;
146     *dptr=ch;
147 }
148
149
150
151
152 /* return internal code hex keys and function keys */
```

```
153
154 key_code(n)
155 char n;
156 {
157     char d;
158     if(n == 0x16) return 0;
159     if(n == 0x21) return 1;
160     if(n == 0x1b) return 2;
161     if(n == 0x15) return 3;
162     if(n == 0x1c) return 4;
163     if(n == 0x20) return 5;
164     if(n == 0x1a) return 6;
165     if(n == 0x14) return 7;
166     if(n == 0x22) return 8;
167     if(n == 0x1f) return 9;
168     if(n == 0x19) return 0xa;
169     if(n == 0x13) return 0xb;
170     if(n == 3) return 0xc;
171     if(n == 0x1e) return 0xd;
172     if(n == 0x18) return 0xe;
173     if(n == 0x12) return 0xf;
174
175     if(n == 0xc) return 0x10;
176     if(n == 0xd) return 0x11;
177     if(n == 0xe) return 0x12;
178     if(n == 0xf) return 0x13;
179
180     if(n == 6) return 0x14;
181     if(n == 7) return 0x15;
182     if(n == 8) return 0x16;
183     if(n == 9) return 0x17;
184
185     if(n == 0) return 0x18;
186     if(n == 1) return 0x19;
187     if(n == 2) return 0x1a;
188     if(n == 0x24) return 0x1b;
189
190     if(n == 0x23) return 0x1c;
191     if(n == 0x1d) return 0x1d;
192     if(n == 0x17) return 0x1e;
193     if(n == 0x10) return 0x1f;
194
195
196
197
198
199 }
200
201 delay_num1()
202 {
203     temp=0;
204     temp=0;
205 }
206
207 delay_ms(w)
208 int w;
209 {
210     for( n = 0; n < w; n++)
211         continue;
212 }
213
214
215 /* scan display and keyboard one cycle, return internal code if key pressed */
216
217 scan()
218 {
219     char key_pressed;
220
221     k = 1;
222     u = 0;
223     key = -1;
224     q = 0;
225
226     for(i=0; i<6; i++)
227     {
228         *port1 = ~k;
```

```
229
230     *port2 = buffer[i];
231
232     if(buffer[i] != 0x30 && buffer[i] != 0x38 && buffer[i] != 0x70) delay_ms(2);
233     else delay_num1();
234
235     *port2 = 0;
236
237     delay_ms(1);
238
239     o= *port0;
240
241     for(n=0; n<6; n++)
242     {
243         if((o&1)==0)
244             {key=q;
245
246             /*      *gpio1=key;      */
247
248             }
249
250         else q++;
251         o = o >> 1;
252     }
253
254     k = k << 1;
255 }
256
257     o = *port0;
258
259     if((o&0x40)==0) key=0x24;
260
261     key_pressed=key;
262
263     return key_pressed;
264 }
265
266
267
268 dot_address()
269 {
270     buffer[0]=buffer[0]&~0x40;
271     buffer[1]=buffer[1]&~0x40;
272
273
274     buffer[2]=buffer[2]|0x40;
275     buffer[3]=buffer[3]|0x40;
276     buffer[4]=buffer[4]|0x40;
277     buffer[5]=buffer[5]|0x40;
278 }
279
280
281
282 dot_data()
283 {
284
285     buffer[0]=buffer[0]|0x40;
286     buffer[1]=buffer[1]|0x40;
287
288     buffer[2]=buffer[2]&~0x40;
289     buffer[3]=buffer[3]&~0x40;
290     buffer[4]=buffer[4]&~0x40;
291     buffer[5]=buffer[5]&~0x40;
292 }
293 }
294
295 hex4(h)
296 int h;
297 {
298     temp16 = h;
299     buffer[2]= convert[temp16&0xf];
300     temp16>>=4;
301     buffer[3]= convert[temp16&0xf];
302     temp16>>=4;
303     buffer[4]=convert[temp16&0xf];
304     temp16>>=4;
```

```
305     buffer[5]=convert[temp16&0xf];
306 }
307
308
309 address_display()
310 {
311
312     temp16 = PC;
313
314     hex4(temp16);
315
316
317 }
318
319 data_display()
320 {
321     dptr =PC;
322
323     n = *dptr;
324
325     buffer[0]= convert[n&0xf];
326     n = n>>4;
327     buffer[1]=convert[n&0xf];
328     dot_data();
329
330 }
331
332 read_memory()
333 {
334     address_display();
335     data_display();
336 }
337
338
339 key_address()
340 {
341
342     state = 1;
343
344     read_memory();
345     dot_address();
346     hit=0;
347
348 }
349
350 key_data()
351 {
352
353     read_memory();
354     dot_data();
355     hit=0;
356     state=2;
357
358 }
359
360 key_plus()
361 {
362
363     if(state==1 || state==2)
364     {
365         PC++;
366         read_memory();
367         key_data();
368     }
369     if(state==4)
370     {
371         start=num;
372         hit =0;
373         positive=1;
374
375
376     }
377
378     if(state==5)
379     {
380
```

```
381     state=6;
382     start = num;
383     hit=0;
384     buffer[0]=0x8f; /* end cursor */
385     return;
386 }
387
388
389
390     if(state==6)
391     {
392
393         state=7;
394         end = num;
395         hit=0;
396         buffer[0]=0xb3; /* destination cursor */
397
398         if(end <= start) print_error();
399     }
400 }
401 }
402 }
403
404
405
406 key_minus()
407 {
408     if(state==1 | state ==2)
409     {
410         PC--;
411         read_memory();
412         key_data();
413     }
414
415     if(state==4)
416     {
417         start=num;
418         hit =0;
419         positive=0;
420     }
421 }
422
423 data_hex()
424 {
425
426     dptr = PC;
427     x = *dptr;
428     if(hit==0) x=0;
429     {
430         hit =1;
431         x = x << 4;
432         x = x|key;
433
434         *dptr = x;
435
436         read_memory();
437
438         dot_data();
439     }
440 }
441
442 key_PC()
443 {
444     PC=save_PC;
445     key_data();
446 }
447
448 hex_address()
449 {
450     if(hit==0) PC=0;
451     {
452         hit=1;
453
454         PC<<=4;
455         PC |= key;
456         read_memory();
```

```
457     dot_address();
458 }
459 }
460
461 print_error()
462 {
463
464     buffer[5]= 0x8f;
465     buffer[4]= 3;
466     buffer[3]=3;
467     buffer[2]=0;
468     buffer[1]=0;
469     buffer[0]=0;
470     state=0;
471 }
472
473
474 key_go(){
475
476     if(state==1 || state==2)
477     {
478 #asm
479     STS SAVE_SP
480     LDU USER_U
481
482     LDD PC
483     PSHS D
484
485     LDA USER_P
486     TFR A,CC
487     LDA USER_DP
488     TFR A,DP
489
490     LDX USER_X
491     LDY USER_Y
492     LDB USER_B
493     LDA USER_A
494     RTS
495
496 #endasm
497     }
498
499     if(state==4)
500     {
501
502         desti = num;
503
504         if(positive==0) start= start-desti;
505         else start = start+desti;
506
507         hex4(start);
508         hit=0;
509     }
510 }
511
512 if(state==7)
513 {
514     desti = num;
515     temp = end-start;
516     dptr = start;
517     dptr2 = desti;
518
519     for(i=0; i<temp; i++)
520     {
521         *(dptr2+i)=*(dptr+i);
522     }
523     PC = desti;
524     read_memory();
525     dot_data();
526     state=2;
527
528
529
530 }
531
532
```

```
533 }
534
535
536 key_reg()
537 {
538     buffer[7]=0;
539     buffer[6]=0;
540     buffer[5]= 0x03;
541     buffer[4]= 0x8F;
542     buffer[3]= 0xad;
543     buffer[2]=0;
544     buffer[1]=0;
545     buffer[0]=0;
546
547     state = 3;    /* register display state = 3 with hex key */
548
549 }
550
551
552 acca()
553 {
554     n = USER_A;
555
556     buffer[2]= convert[n&0xf];
557     n = n>>4;
558     buffer[3]=convert[n&0xf];
559     buffer[4]=0;
560     buffer[5]=0;
561     buffer[1]=0;
562     buffer[0]=0x3f;
563 }
564
565
566 accb()
567 {
568     n = USER_B;
569
570     buffer[2]= convert[n&0xf];
571     n = n>>4;
572     buffer[3]=convert[n&0xf];
573     buffer[4]=0;
574     buffer[5]=0;
575     buffer[1]=0;
576     buffer[0]=0xa7;
577 }
578
579
580 ab()
581 {
582     n = USER_B;
583
584     buffer[2]= convert[n&0xf];
585     n = n>>4;
586     buffer[3]=convert[n&0xf];
587
588     n = USER_A;
589     buffer[4]= convert[n&0xf];
590     n = n>>4;
591     buffer[5]=convert[n&0xf];
592
593     buffer[1]=0x3f;
594     buffer[0]=0xa7;
595 }
596
597
598
599 reg_x()
600 {
601     temp16 = USER_X;
602
603     hex4(temp16);
604
605     buffer[1] = 0;
606     buffer[0] = 0x13;
607
608
```



```
609 }
610
611 reg_y()
612 {
613     temp16 = USER_Y;
614     hex4(temp16);
615
616
617     buffer[1] = 0;
618     buffer[0] = 0xb6;
619
620 }
621
622 reg_u()
623 {
624     temp16 = USER_U;
625     hex4(temp16);
626
627
628     buffer[1] = 0;
629     buffer[0] = 0xb5;
630
631 }
632
633 reg_s()
634 {
635
636     temp16 = SAVE_SP;
637     hex4(temp16);
638
639
640     buffer[1] = 0;
641     buffer[0] = 0xae;
642 }
643
644 reg_dp()
645 {
646     n = USER_DP;
647
648     buffer[2]= convert[n&0xf];
649     n = n>>4;
650     buffer[3]=convert[n&0xf];
651     buffer[4]=0;
652     buffer[5]=0;
653     buffer[1]=0xb3;
654     buffer[0]=0x1F;
655 }
656
657
658 low_cc()
659 {
660     n = USER_P;
661     if(n&1) buffer[2]=0x30; else buffer[2]=0xbd;
662     if(n&2) buffer[3]=0x30; else buffer[3]=0xbd;
663     if(n&4) buffer[4]=0x30; else buffer[4]=0xbd;
664     if(n&8) buffer[5]=0x30; else buffer[5]=0xbd;
665
666     buffer[1]=0x8d;
667     buffer[0]=0x85;
668 }
669
670 hi_cc()
671 {
672     n = USER_P;
673     if(n&0x10) buffer[2]=0x30; else buffer[2]=0xbd;
674     if(n&0x20) buffer[3]=0x30; else buffer[3]=0xbd;
675     if(n&0x40) buffer[4]=0x30; else buffer[4]=0xbd;
676     if(n&0x80) buffer[5]=0x30; else buffer[5]=0xbd;
677
678     buffer[1]=0x8d;
679     buffer[0]=0x37;
680
681 }
682
683
684
```

```
685 reg_display()
686 {
687
688     switch(key)
689     {
690         case 0: acca(); break;
691         case 1: accb(); break;
692         case 2: ab(); break;
693         case 6: reg_x(); break;
694         case 7: reg_y(); break;
695         case 9: reg_u(); break;
696         case 10: reg_s(); break;
697         case 8: reg_dp(); break;
698         case 5: low_cc(); break;
699         case 4: hi_cc(); break;
700     }
701 }
702
703 /* insert byte and shift 512 bytes down */
704
705 insert()
706 {
707     if(state==1 || state==2)
708     {
709         dptr=PC;
710         for(j=512; j>0; j--)
711         {
712             *(dptr+j)=*(dptr+j-1);
713         }
714         *(dptr+1)=0; /* insert next byte */
715         PC++;
716         read_memory();
717         state=2;
718     }
719 }
720
721 /* delete current byte and shift 512 bytes up */
722
723 cut_byte()
724 {
725     if(state==1 || state==2)
726     {
727
728         dptr=PC;
729         for(j=0; j<512; j++)
730         {
731             *(dptr+j)=*(dptr+j+1);
732         }
733         read_memory();
734         state=2;
735     }
736 }
737
738 key_test()
739 {
740     /* clear I bit to enable irq */
741     #asm
742     andcc #$ef
743     #endasm
744     t=0;
745     buffer[0]=0;buffer[1]=0;
746
747     while(1)
748     {
749
750         while(tick<100)
751             scan();
752         tick=0;
753         hex4(t);
754         *gpiol = t;
755         t++;
756     }
757 }
758
759 }
760
```

```
761 }
762
763 clear_buffer()
764 {
765     for(i=0; i<6; i++)
766         *(buffer+i)=0;
767 }
768
769 key_cal()
770 {
771     state = 4;
772
773     clear_buffer();
774     buffer[2]= 0xbd;
775     start=0;
776     desti=0;
777     /*buffer[1] = 0x8d;
778     buffer[0] = 0x85;
779     */
780     hit = 0;
781 }
782
783
784
785
786 enter_num()
787 {
788     if(hit==0) num=0;
789     {
790         hit=1;
791
792         num<=4;
793         num |= key;
794         hex4(num);
795     }
796 }
797
798
799 key_copy()
800 {
801     state=5;
802     hit=0;
803     clear_buffer();
804     buffer[2]= 0xbd;
805
806     buffer[0]=0xae;
807     buffer[1]=0;
808 }
809
810
811
812
813 key_exe()
814 {
815
816     if(flag==0) beep();
817
818
819     if( key>15)
820     {
821
822     switch(key)
823     {
824     case 0x13: key_address(); break;
825     case 0x12: key_data(); break;
826     case 0x17: key_plus(); break;
827     case 0x16: key_minus(); break;
828     case 0x10: key_PC(); break;
829     case 0x1b: key_go(); break;
830     case 0x11: key_reg(); break;
831     case 0x18: insert(); break;
832     case 0x19: cut_byte(); break;
833     case 0x15: flag = flag^1; break;
834     case 0x1a: key_test(); break;
835     case 0x1d: key_cal(); break;
836     case 0x1c: key_copy(); break;
```

```
837     case 0x1e: key_dump(); break;
838     case 0x1f: key_load(); break;
839
840     /* case 0x14: key_user(); break; available for user key */
841     }
842 }
843 }
844
845 else
846 {
847
848     switch(state)
849     {
850     case 1: hex_address(); break;
851     case 2: data_hex(); break;
852     case 3: reg_display(); break;
853     case 4: enter_num(); break;
854     case 5: enter_num(); break;
855     case 6: enter_num(); break;
856     case 7: enter_num(); break;
857     }
858 }
859 }
860 }
861 }
862 }
863 }
864
865 delay_beep()
866 {
867     for(j=0; j<2; j++)
868         continue;
869 }
870
871
872 beep()
873 {
874     char x;
875
876     *port2=0;
877
878     for(x=0; x<60; x++)
879     {
880         *port1 = ~0x80;
881         delay_beep();
882         *port1 = 0xff;
883         delay_beep();
884     }
885 }
886 }
887
888
889
890
891
892
893 scan1()
894 {
895     while( scan() != -1)
896         continue;
897     delay_ms(3);
898
899     while(scan() == -1)
900         continue;
901     delay_ms(3);
902
903     key = scan();
904
905     key = key_code(key);
906
907     key_exe();
908
909
910
911 }
912
```

```
913
914 /* ACIA with 4.9152MHz CPU XTAL, bit rate is 19200, 8n1 */
915
916 initacia()
917 {
918     char dummy, *acia, reset, baudrate;
919     acia = ACIAPORT;
920     baudrate = 0x16;
921     reset = 3;
922     *(acia) = reset;
923     *(acia) = baudrate;
924     dummy = *(acia+1); /*clear RBR*/
925 }
926
927 putchar(ch)
928 char ch;
929 {
930     char *acia;
931     acia = ACIAPORT;
932     while( (*(acia) & 0x02) == 0) /* wait on TDRE */
933         continue;
934     *(acia+1) = ch;
935 }
936
937
938 puts(s)
939 char *s;
940 {
941     while( *s ) {
942         putchar(*s);
943         s++;
944     }
945 }
946
947
948 getchar()
949 {
950     char ch;
951     char *acia;
952
953     acia=ACIAPORT;
954     while((*acia&1)==0)
955         continue;
956
957     ch = *(acia+1); /*read 0xA001*/
958
959     return ch;
960 }
961
962 newline()
963 {
964     putchar(0x0a);
965     putchar(0x0d);
966 }
967
968 send_hex(n)
969 char n;
970 {
971     k = n>>4;
972     k = k&0xf;
973
974     if (k>9) putchar(k+0x37); else putchar(k+0x30);
975     k= n&0xf;
976     if (k>9) putchar(k+0x37); else putchar(k+0x30);
977 }
978
979 send_word_hex(n)
980 int n;
981 {
982     templ6 = n>>8;
983     k = templ6&0xff;
984     send_hex(k);
985     k = n&0xff;
986     send_hex(k);
987 }
988
```

```
989
990
991 key_dump()
992 {
993     int j,p;
994
995     dptr = PC;
996
997     for(j=0; j<16; j++)
998     {
999         newline();
1000         send_word_hex(dptr);
1001         putchar(':');
1002         for(p=0; p<16; p++)
1003         {
1004
1005             send_hex(*(dptr+p));
1006             putchar(0x20);
1007         }
1008
1009         putchar(0x20);
1010
1011         for (p=0; p<16; p++)
1012         {
1013             q=(dptr+p);
1014             if(q >= 0x20 && q < 0x80) putchar(q);
1015             else putchar('.');
1016
1017         }
1018
1019         dptr+=16;
1020     }
1021     newline();
1022     PC = dptr;
1023     key_address();
1024 }
1025
1026 nibble2hex(c)
1027 char c;
1028 {
1029     char n;
1030     if(c<0x40) return (c-0x30);
1031     else return (c-0x37);
1032 }
1033
1034 gethex()
1035 {
1036     char a,b;
1037
1038     a = getchar();
1039     b = getchar();
1040     a = nibble2hex(a)<<4;
1041     b = nibble2hex(b);
1042     a = a|b;
1043     bcc = bcc+a; /* compute check sum */
1044
1045     return (a);
1046 }
1047
1048 get16bitaddress()
1049 {
1050     int load_address;
1051
1052     load_address =0;
1053
1054     load_address |= gethex();
1055     load_address <<=8;
1056     load_address |= gethex();
1057
1058     return load_address;
1059 }
1060
1061 read_record1()
1062 {
```

```
1065
1066     char x;
1067     char byte_count;
1068
1069     int address16bit;
1070
1071     bcc =0;
1072
1073     byte_count = gethex()-3; /* only data record */
1074
1075     address16bit = get16bitaddress();
1076
1077     dptr = address16bit;
1078     for(x=0; x<byte_count; x++)
1079     {
1080         *(dptr+x) = gethex();
1081     }
1082
1083     bcc = ~bcc; /* one's complement */
1084     *gpio1=bcc; /* loading indicator */
1085
1086     save_bcc= bcc;
1087
1088     if(save_bcc != gethex()) bcc_error=1;
1089 }
1090
1091 get_s_record()
1092 {
1093     end =0;
1094     bcc_error=0;
1095
1096
1097
1098
1099     while(end==0)
1100     {
1101
1102
1103     while(getchar() != 'S')
1104         continue;
1105
1106         switch(getchar()) /* get record type */
1107         {
1108             case '0': end=0; break;
1109             case '1': read_record1(); break;
1110             case '8': end=1; break;
1111             case '9': end=1; break;
1112         }
1113     }
1114
1115     newline();
1116     if(bcc_error) puts("check sum errors!");
1117     else puts("0 error...");
1118
1119     key_data();
1120 }
1121
1122 key_load()
1123 {
1124     newline();
1125     puts("Load Motorola s-record");
1126
1127     get_s_record(); /* accept only S1 record */
1128 }
1129 }
1130
1131
1132
1133
1134 initreg()
1135 {
1136     PC = 0x200;
1137     save_PC = 0x200;
1138     USER_U = 0x7F00;
1139     #asm
1140     TFR CC,A
```

```
1141     STA USER_P
1142     #endasm
1143
1144     gpio1 = 0x8000;
1145     port2 = 0x8003;
1146     port1 = 0x8002;
1147     port0 = 0x8001;
1148
1149 }
1150
1151
1152 main()
1153 {
1154     initreg();
1155
1156     *gpio1=0;
1157     *port2=0;
1158     *port1=0xff;
1159
1160     flag=0;
1161
1162     initacia();
1163
1164     newline();
1165     puts("6809 MICROPROCESSOR KIT 2017");
1166
1167     InitLcd();
1168     InitLcd();
1169
1170     PutLCD("6809 MICROPROCESSOR");
1171     goto_xy(0,1);
1172     PutLCD("32kB RAM UART LCD");
1173
1174     buffer[5]= convert[6];
1175     buffer[4]= convert[8];
1176     buffer[3]= convert[0];
1177     buffer[2]= convert[9];
1178     buffer[1]=0;
1179     buffer[0]=0;
1180
1181
1182     while(1)
1183     {
1184         scan1();
1185     }
1186
1187 }
1188
1189
1190
1191
1192
1193
1194
1195
```



```
1 #asm
2     ORG $7000
3 #endasm
4
```

```
1  /* startup code modified for 6809 Microprocessor kit 2017 by Wichit Sirichote */
2
3  #ifdef AS9
4  #asm
5
6  ADR1:  RMB 2
7  ADR2:  RMB 2
8  ADR3:  RMB 1
9  ADR31: RMB 3
10
11
12
13     ORG  $ffff
14     FDB  $c000
15
16     org $fff8
17 *   fdb irq_serv
18     fdb $7ff0      use ram vector
19
20     org $fffc
21     fdb $7ff3      nmi vector
22
23     org $fff6
24     fdb $7ff6      firq vector
25
26     org $fffa
27     fdb swi_serv
28
29     ORG  $c000
30     lds  #$7ff0
31
32     lda  #$7e      store jmp instruction
33     sta  $7ff0      irq vector
34     ldx  #irq_serv
35     stx  $7ff1
36
37     lda  #$3b      store rti instruction
38     sta  $7ff3      must be modified when testing
39     sta  $7ff6      with ram vector
40
41     ldx  #0
42     stx  $7ff4
43     stx  $7ff7
44
45
46     jmp  main
47
48 irq_serv
49
50     inc  tick
51     rti
52
53 swi_serv
54
55     PULS A
56     STA  USER_P
57     PULS A
58     STA  USER_A
59     PULS A
60     STA  USER_B
61     PULS A
62     STA  USER_DP
63     PULS X
64     STX  USER_X
65     PULS X
66     STX  USER_Y
67     PULS X
68     STX  USER_U
69     PULS X
70     STX  USER_PC
71     stx  save_PC
72     LDS  SAVE_SP
73     JSR  key_PC
74     rts
75
76
```

```
77 *
78 * 16 bit division
79 *
80 *
81 * D=X/D
82 *
83 ccdiv: CLR ADR31
84 STX ADR1
85 STD ADR2
86 ccd1: BGT ccd2
87 COM ADR31
88 COMA
89 COMB
90 ADDD #1
91 STD ADR2
92 ccd2: LDD ADR1
93 CMPD #0
94 BGT ccd3
95 COM ADR31
96 COMA
97 COMB
98 ADDD #1
99 STD ADR1
100 ccd3: LDA #16
101 STA ADR3
102 CLRA
103 CLRB
104 DIVD:
105 ASL ADR1+1
106 ROL ADR1
107 ROLB
108 ROLA
109 CMPD ADR2
110 BLO NOSUB
111 SUBD ADR2
112 INC ADR1+1
113 NOSUB: DEC ADR3
114 BNE DIVD
115 TFR D,X
116 LDD ADR1
117 TST ADR31
118 BEQ ccd4
119 COMA
120 COMB
121 ADDD #1
122 ccd4: RTS
123
124 *
125 * 16 bit multiplication
126 *
127
128 ccmult: STX ADR1
129 STD ADR2
130 CLR ADR3
131 CLR ADR3+1
132 LDA ADR1+1
133 LDB ADR2+1
134 MUL
135 STD ADR3+2
136 LDA ADR1
137 LDB ADR2+1
138 MUL
139 ADDD ADR3+1
140 STD ADR3+1
141 LDA ADR1+1
142 LDB ADR2
143 MUL
144 ADDD ADR3+1
145 STD ADR3+1
146 BCC NOCARRY
147 INC ADR3
148 NOCARRY: LDA ADR1
149 LDB ADR2
150 MUL
151 ADDD ADR3
152 TFR D,X
```

```
153   LDD ADR3+2
154   RTS
155
156
157  *
158  *   switch statement
159  *
160  * D = switch value
161  * S = switch table
162  *   FDB addr1, value1
163  *   FDB addr2, value2
164  *   ...
165  *   FDB 0
166  *   [JMP DEFAULT]
167  *   continuation
168  *
169  ccswitch: PULS X get stack adr
170  SWLOOP: LDY ,X++ get address
171           CMPY #0 if 0
172           BEQ SWEND then it is the default
173           CMPD ,X++ else, if it is not the switch value
174           BNE SWLOOP try next one
175           JMP ,Y else we found it
176  SWEND:  JMP ,X default exit
177
178
179  #endasm
180  #else
181  #asm
182     .globl  main
183     .globl  ccdi
184     .globl  ccmult
185     .globl  ccswitch
186
187     .area  RESET      (ABS,OVR)
188     .org   0hffffe    ; reset vector
189     .dw    0hc000
190
191     .area  RAMDATA   (REL,CON)
192
193     .area  ROMCODE   (REL,CON)
194     lds   #0h7000
195     jmp   main
196  #endasm
197  #endif
198
```

```
1 0001
2 0002 * small-c V2.3
3 0003 7000 ORG $7000
4 0004
5 0005 * .global i
6 0006 i:
7 0007 7000 RMB 2
8 0008
9 0009 * .global j
10 0010 j:
11 0011 7002 RMB 2
12 0012
13 0013 * .global n
14 0014 n:
15 0015 7004 RMB 1
16 0016
17 0017 * .global k
18 0018 k:
19 0019 7005 RMB 1
20 0020
21 0021 * .global u
22 0022 u:
23 0023 7006 RMB 1
24 0024
25 0025 * .global q
26 0026 q:
27 0027 7007 RMB 1
28 0028
29 0029 * .global o
30 0030 o:
31 0031 7008 RMB 1
32 0032
33 0033 * .global key
34 0034 key:
35 0035 7009 RMB 1
36 0036
37 0037 * .global x
38 0038 x:
39 0039 700a RMB 1
40 0040
41 0041 * .global hit
42 0042 hit:
43 0043 700b RMB 1
44 0044
45 0045 * .global positive
46 0046 positive:
47 0047 700c RMB 1
48 0048
49 0049 * .global flag
50 0050 flag:
51 0051 700d RMB 1
52 0052
53 0053 * .global tick
54 0054 tick:
55 0055 700e RMB 1
56 0056
57 0057 * .global bcc
58 0058 bcc:
59 0059 700f RMB 1
60 0060
```

```
61 0061          * .global save_bcc
62 0062          save_bcc:
63 0063 7010      RMB 1
64 0064
65 0065          * .global bcc_erro
66 0066          bcc_erro:
67 0067 7011      RMB 1
68 0068
69 0069          * .global temp
70 0070          temp:
71 0071 7012      RMB 2
72 0072
73 0073          * .global temp16
74 0074          temp16:
75 0075 7014      RMB 2
76 0076
77 0077          * .global PC
78 0078          PC:
79 0079 7016      RMB 2
80 0080
81 0081          * .global save_PC
82 0082          save_PC:
83 0083 7018      RMB 2
84 0084
85 0085          * .global num
86 0086          num:
87 0087 701a      RMB 2
88 0088
89 0089          * .global start
90 0090          start:
91 0091 701c      RMB 2
92 0092
93 0093          * .global end
94 0094          end:
95 0095 701e      RMB 2
96 0096
97 0097          * .global desti
98 0098          desti:
99 0099 7020      RMB 2
100 0100
101 0101          * .global t
102 0102          t:
103 0103 7022      RMB 2
104 0104
105 0105          * .global state
106 0106          state:
107 0107 7024      RMB 1
108 0108
109 0109          * .global USER_PC
110 0110          USER_PC:
111 0111 7025      RMB 2
112 0112
113 0113          * .global USER_U
114 0114          USER_U:
115 0115 7027      RMB 2
116 0116
117 0117          * .global USER_X
118 0118          USER_X:
119 0119 7029      RMB 2
120 0120
```

```
121 0121 * .global SAVE_SP
122 0122 SAVE_SP:
123 0123 702b RMB 2
124 0124
125 0125 * .global USER_Y
126 0126 USER_Y:
127 0127 702d RMB 2
128 0128
129 0129 * .global USER_A
130 0130 USER_A:
131 0131 702f RMB 1
132 0132
133 0133 * .global USER_B
134 0134 USER_B:
135 0135 7030 RMB 1
136 0136
137 0137 * .global USER_P
138 0138 USER_P:
139 0139 7031 RMB 1
140 0140
141 0141 * .global USER_DP
142 0142 USER_DP:
143 0143 7032 RMB 1
144 0144
145 0145 * .global timeout
146 0146 timeout:
147 0147 7033 RMB 2
148 0148
149 0149 * .global buffer
150 0150 buffer:
151 0151 7035 RMB 6
152 0152
153 0153 * .global gpiol
154 0154 gpiol:
155 0155 703b 00 00 FDB 0
156 0156
157 0157 * .global port2
158 0158 port2:
159 0159 703d 00 00 FDB 0
160 0160
161 0161 * .global port1
162 0162 port1:
163 0163 703f 00 00 FDB 0
164 0164
165 0165 * .global port0
166 0166 port0:
167 0167 7041 00 00 FDB 0
168 0168
169 0169 * .global dptr
170 0170 dptr:
171 0171 7043 00 00 FDB 0
172 0172
173 0173 * .global dptr2
174 0174 dptr2:
175 0175 7045 00 00 FDB 0
176 0176 7047 ADR1: RMB 2
177 0177 7049 ADR2: RMB 2
178 0178 704b ADR3: RMB 1
179 0179 704c ADR31: RMB 3
180 0180 fffe ORG $ffe
```

```

181 0181 fffe c0 00          FDB $c000
182 0182 fff8              org $fff8
183 0183                    *   fdb irq_serv
184 0184 fff8 7f f0        fdb $7ff0          use ram vector
185 0185 fffc              org $fffc
186 0186 fffc 7f f3        fdb $7ff3          nmi vector
187 0187 fff6              org $fff6
188 0188 fff6 7f f6        fdb $7ff6          firq vector
189 0189 fffa              org $fffa
190 0190 fffa c0 27        fdb swi_serv
191 0191 c000              ORG $c000
192 0192 c000 10 ce 7f f0  lds #$7ff0
193 0193 c004 86 7e        lda #$7e          store jmp instruction
194 0194 c006 b7 7f f0        sta $7ff0          irq vector
195 0195 c009 8e c0 23        ldx #irq_serv
196 0196 c00c bf 7f f1        stx $7ff1
197 0197 c00f 86 3b        lda #$3b          store rti instruction
198 0198 c011 b7 7f f3        sta $7ff3          must be modified when te
199 0199 c014 b7 7f f6        sta $7ff6          with ram vector
200 0200 c017 8e 00 00        ldx #0
201 0201 c01a bf 7f f4        stx $7ff4
202 0202 c01d bf 7f f7        stx $7ff7
203 0203 c020 7e e7 47        jmp main
204 0204                    irq_serv
205 0205 c023 7c 70 0e        inc tick
206 0206 c026 3b            rti
207 0207                    swi_serv
208 0208 c027 35 02          PULS A
209 0209 c029 b7 70 31          STA USER_P
210 0210 c02c 35 02          PULS A
211 0211 c02e b7 70 2f          STA USER_A
212 0212 c031 35 02          PULS A
213 0213 c033 b7 70 30          STA USER_B
214 0214 c036 35 02          PULS A
215 0215 c038 b7 70 32          STA USER_DP
216 0216 c03b 35 10          PULS X
217 0217 c03d bf 70 29          STX USER_X
218 0218 c040 35 10          PULS X
219 0219 c042 bf 70 2d          STX USER_Y
220 0220 c045 35 10          PULS X
221 0221 c047 bf 70 27          STX USER_U
222 0222 c04a 35 10          PULS X
223 0223 c04c bf 70 25          STX USER_PC
224 0224 c04f bf 70 18          stx save_PC
225 0225 c052 10 fe 70 2b        LDS SAVE_SP
226 0226 c056 bd d0 6d          JSR key_PC
227 0227 c059 39            rts
228 0228                    *
229 0229                    * 16 bit division
230 0230                    *
231 0231                    *
232 0232                    * D=X/D
233 0233                    *
234 0234 c05a 7f 70 4c        ccdiv: CLR ADR31
235 0235 c05d bf 70 47          STX ADR1
236 0236 c060 fd 70 49          STD ADR2
237 0237 c063 2e 0b          ccd1: BGT ccd2
238 0238 c065 73 70 4c        COM ADR31
239 0239 c068 43            COMA
240 0240 c069 53            COMB

```



```

241 0241 c06a c3 00 01      ADDD #1
242 0242 c06d fd 70 49      STD ADR2
243 0243 c070 fc 70 47      ccd2: LDD ADR1
244 0244 c073 10 83 00 00   CMPD #0
245 0245 c077 2e 0b         BGT ccd3
246 0246 c079 73 70 4c     COM ADR31
247 0247 c07c 43           COMA
248 0248 c07d 53           COMB
249 0249 c07e c3 00 01      ADDD #1
250 0250 c081 fd 70 47      STD ADR1
251 0251 c084 86 10         ccd3: LDA #16
252 0252 c086 b7 70 4b     STA ADR3
253 0253 c089 4f           CLRA
254 0254 c08a 5f           CLRB
255 0255                    DIVD:
256 0256 c08b 78 70 48     ASL ADR1+1
257 0257 c08e 79 70 47     ROL ADR1
258 0258 c091 59           ROLB
259 0259 c092 49           ROLA
260 0260 c093 10 b3 70 49   CMPD ADR2
261 0261 c097 25 06         BLO NOSUB
262 0262 c099 b3 70 49     SUBD ADR2
263 0263 c09c 7c 70 48     INC ADR1+1
264 0264 c09f 7a 70 4b     NOSUB: DEC ADR3
265 0265 c0a2 26 e7         BNE DIVD
266 0266 c0a4 1f 01         TFR D,X
267 0267 c0a6 fc 70 47     LDD ADR1
268 0268 c0a9 7d 70 4c     TST ADR31
269 0269 c0ac 27 05         BEQ ccd4
270 0270 c0ae 43           COMA
271 0271 c0af 53           COMB
272 0272 c0b0 c3 00 01      ADDD #1
273 0273 c0b3 39           ccd4: RTS
274 0274                    *
275 0275                    * 16 bit multiplication
276 0276                    *
277 0277 c0b4 bf 70 47     ccmult: STX ADR1
278 0278 c0b7 fd 70 49     STD ADR2
279 0279 c0ba 7f 70 4b     CLR ADR3
280 0280 c0bd 7f 70 4c     CLR ADR3+1
281 0281 c0c0 b6 70 48     LDA ADR1+1
282 0282 c0c3 f6 70 4a     LDB ADR2+1
283 0283 c0c6 3d           MUL
284 0284 c0c7 fd 70 4d     STD ADR3+2
285 0285 c0ca b6 70 47     LDA ADR1
286 0286 c0cd f6 70 4a     LDB ADR2+1
287 0287 c0d0 3d           MUL
288 0288 c0d1 f3 70 4c     ADDD ADR3+1
289 0289 c0d4 fd 70 4c     STD ADR3+1
290 0290 c0d7 b6 70 48     LDA ADR1+1
291 0291 c0da f6 70 49     LDB ADR2
292 0292 c0dd 3d           MUL
293 0293 c0de f3 70 4c     ADDD ADR3+1
294 0294 c0e1 fd 70 4c     STD ADR3+1
295 0295 c0e4 24 03         BCC NOCARRY
296 0296 c0e6 7c 70 4b     INC ADR3
297 0297 c0e9 b6 70 47     NOCARRY: LDA ADR1
298 0298 c0ec f6 70 49     LDB ADR2
299 0299 c0ef 3d           MUL
300 0300 c0f0 f3 70 4b     ADDD ADR3

```

```

301 0301 c0f3 1f 01          TFR D,X
302 0302 c0f5 fc 70 4d      LDD ADR3+2
303 0303 c0f8 39          RTS
304 0304                    *
305 0305                    *  switch statement
306 0306                    *
307 0307                    *  D = switch value
308 0308                    *  S = switch table
309 0309                    *    FDB addr1, value1
310 0310                    *    FDB addr2, value2
311 0311                    *    ...
312 0312                    *    FDB 0
313 0313                    *    [JMP DEFAULT]
314 0314                    *    continuation
315 0315                    *
316 0316 c0f9 35 10          ccswitch: PULS X get stack adr
317 0317 c0fb 10 ae 81      SWLOOP: LDY ,X++ get address
318 0318 c0fe 10 8c 00 00          CMPY #0 if 0
319 0319 c102 27 07          BEQ SWEND then it is the default
320 0320 c104 10 a3 81      CMPD ,X++ else, if it is not the sw
321 0321 c107 26 f2          BNE SWLOOP try next one
322 0322 c109 6e a4          JMP ,Y else we found it
323 0323 c10b 6e 84      SWEND: JMP ,X default exit
324 0324
325 0325                    *  .area  CONST  (REL,CON)
326 0326
327 0327                    *  .global convert
328 0328                    convert:
329 0329 c10d bd 30 9b ba 36 ae      FCB 189,48,155,186,54,174,175,56,191,190
330      af 38 bf be
331 0330 c117 3f a7 8d b3 8f 0f      FCB 63,167,141,179,143,15
332 0331
333 0332                    *  .global cold_msg
334 0333                    cold_msg:
335 0334 c11d 00 00 00 00 00 00      FCB 0,0,0,0,0,0,174,191,189,190
336      ae bf bd be
337 0335 c127 00 00          FCB 0,0
338 0336
339 0337                    *  .area  ROMCODE  (REL,CON)
340 0338
341 0339                    *  .module LcdReady
342 0340
343 0341                    *  .global LcdReady
344 0342                    LcdReady:
345 0343 c129 cc 00 00          ldd #0
346 0344 c12c fd 70 33          std timeout
347 0345 c12f cc 90 02          ldd #-28670
348 0346 c132 fd 70 43          std dptr
349 0347                    cc2:
350 0348 c135 fc 70 43          ldd dptr
351 0349 c138 34 06          pshs d
352 0350 c13a e6 f1          ldb [,s++]
353 0351 c13c 1d          sex
354 0352 c13d 34 06          pshs d
355 0353 c13f cc 00 80          ldd #128
356 0354 c142 34 06          pshs d
357 0355 c144 cc 00 01          ldd #1
358 0356 c147 10 a3 e1          cmpd ,s++
359 0357 c14a 27 05          beq *+7
360 0358 c14c cc 00 00          ldd #0

```

```

361 0359 c14f 20 03          bra  *+5
362 0360 c151 cc 00 01      ldd  #1
363 0361 c154 a4 e0        anda ,s+
364 0362 c156 e4 e0        andb ,s+
365 0363 c158 10 83 00 00  cmpd #0
366 0364 c15c 10 27 00 20  lbeq cc4 ;_ instruction flagged for non c
367 0365 c160 fc 70 33      ldd  timeout
368 0366 c163 34 06        pshs d
369 0367 c165 cc 01 f4      ldd  #500
370 0368 c168 10 a3 e1      cmpd ,s++
371 0369 c16b 2e 05        bgt  *+7
372 0370 c16d cc 00 00      ldd  #0
373 0371 c170 20 03          bra  *+5
374 0372 c172 cc 00 01      ldd  #1
375 0373 c175 10 83 00 00  cmpd #0
376 0374 c179 10 27 00 03  lbeq cc4 ;_ instruction flagged for non c
377 0375 c17d cc 00 01      ldd  #1
378 0376                    cc4:
379 0377 c180 10 83 00 00  cmpd #0
380 0378 c184 10 27 00 0c  lbeq cc3
381 0379 c188 fc 70 33      ldd  timeout
382 0380 c18b c3 00 01      addd #1
383 0381 c18e fd 70 33      std  timeout
384 0382 c191 7e c1 35      jmp  cc2
385 0383                    cc3:
386 0384 c194 39            rts
387 0385
388 0386                    * .global clr_scre
389 0387                    clr_scre:
390 0388 c195 bd c1 29      jsr  LcdReady
391 0389 c198 cc 90 00      ldd  #-28672
392 0390 c19b fd 70 43      std  dptr
393 0391 c19e fc 70 43      ldd  dptr
394 0392 c1a1 34 06        pshs d
395 0393 c1a3 cc 00 01      ldd  #1
396 0394 c1a6 e7 f1        stb  [,s++]
397 0395 c1a8 39            rts
398 0396
399 0397                    * .global goto_xy
400 0398                    goto_xy:
401 0399 c1a9 bd c1 29      jsr  LcdReady
402 0400 c1ac cc 90 00      ldd  #-28672
403 0401 c1af fd 70 43      std  dptr
404 0402 c1b2 31 62        leay 2,s
405 0403 c1b4 1f 20        tfr  y,d
406 0404 c1b6 34 06        pshs d
407 0405 c1b8 ec f1        ldd  [,s++]
408 0406 c1ba 7e c2 24      jmp  cc7
409 0407                    cc8:
410 0408 c1bd fc 70 43      ldd  dptr
411 0409 c1c0 34 06        pshs d
412 0410 c1c2 cc 00 80      ldd  #128
413 0411 c1c5 34 06        pshs d
414 0412 c1c7 31 68        leay 8,s
415 0413 c1c9 1f 20        tfr  y,d
416 0414 c1cb 34 06        pshs d
417 0415 c1cd ec f1        ldd  [,s++]
418 0416 c1cf e3 e1        addd ,s++
419 0417 c1d1 e7 f1        stb  [,s++]
420 0418 c1d3 7e c2 39      jmp  cc6

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421 0419
422 0420 c1d6 fc 70 43
423 0421 c1d9 34 06
424 0422 c1db cc 00 c0
425 0423 c1de 34 06
426 0424 c1e0 31 68
427 0425 c1e2 1f 20
428 0426 c1e4 34 06
429 0427 c1e6 ec f1
430 0428 c1e8 e3 e1
431 0429 c1ea e7 f1
432 0430 c1ec 7e c2 39
433 0431
434 0432 c1ef fc 70 43
435 0433 c1f2 34 06
436 0434 c1f4 cc 00 94
437 0435 c1f7 34 06
438 0436 c1f9 31 68
439 0437 c1fb 1f 20
440 0438 c1fd 34 06
441 0439 c1ff ec f1
442 0440 c201 e3 e1
443 0441 c203 e7 f1
444 0442 c205 7e c2 39
445 0443
446 0444 c208 fc 70 43
447 0445 c20b 34 06
448 0446 c20d cc 00 d4
449 0447 c210 34 06
450 0448 c212 31 68
451 0449 c214 1f 20
452 0450 c216 34 06
453 0451 c218 ec f1
454 0452 c21a e3 e1
455 0453 c21c e7 f1
456 0454 c21e 7e c2 39
457 0455 c221 7e c2 39
458 0456
459 0457 c224 bd c0 f9
460 0458 c227 c1 bd 00 00
461 0459 c22b c1 d6 00 01
462 0460 c22f c1 ef 00 02
463 0461 c233 c2 08 00 03
464 0462 c237 00 00
465 0463
466 0464 c239 39
467 0465
468 0466
469 0467
470 0468 c23a bd c1 29
471 0469 c23d cc 90 00
472 0470 c240 fd 70 43
473 0471 c243 fc 70 43
474 0472 c246 34 06
475 0473 c248 cc 00 38
476 0474 c24b e7 f1
477 0475 c24d bd c1 29
478 0476 c250 cc 90 00
479 0477 c253 fd 70 43
480 0478 c256 fc 70 43

cc9:
  ldd dptr
  pshs d
  ldd #192
  pshs d
  leay 8,s
  tfr y,d
  pshs d
  ldd [,s++]
  addd ,s++
  stb [,s++]
  jmp cc6

cc10:
  ldd dptr
  pshs d
  ldd #148
  pshs d
  leay 8,s
  tfr y,d
  pshs d
  ldd [,s++]
  addd ,s++
  stb [,s++]
  jmp cc6

cc11:
  ldd dptr
  pshs d
  ldd #212
  pshs d
  leay 8,s
  tfr y,d
  pshs d
  ldd [,s++]
  addd ,s++
  stb [,s++]
  jmp cc6
  jmp cc6

cc7:
  jsr ccswitch
  FDB cc8,0
  FDB cc9,1
  FDB cc10,2
  FDB cc11,3
  FDB 0

cc6:
  rts

* .global InitLcd
InitLcd:
  jsr LcdReady
  ldd #-28672
  std dptr
  ldd dptr
  pshs d
  ldd #56
  stb [,s++]
  jsr LcdReady
  ldd #-28672
  std dptr
  ldd dptr

```

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481 0479 c259 34 06      pshs d
482 0480 c25b cc 00 0c   ldd #12
483 0481 c25e e7 f1     stb [,s++]
484 0482 c260 bd c1 95   jsr clr_scre
485 0483 c263 cc 00 00   ldd #0
486 0484 c266 34 06     pshs d
487 0485 c268 cc 00 00   ldd #0
488 0486 c26b 34 06     pshs d
489 0487 c26d bd c1 a9   jsr goto_xy
490 0488 c270 32 64     leas 4,s
491 0489 c272 cc 00 64   ldd #100
492 0490 c275 34 06     pshs d
493 0491 c277 bd c8 53   jsr delay_ms
494 0492 c27a 32 62     leas 2,s
495 0493 c27c 39        rts
496 0494
497 0495                * .global PutLCD
498 0496                PutLCD:
499 0497 c27d 32 7f     leas -1,s
500 0498 c27f 31 e4     leay 0,s
501 0499 c281 1f 20     tfr y,d
502 0500 c283 34 06     pshs d
503 0501 c285 cc 00 00   ldd #0
504 0502 c288 e7 f1     stb [,s++]
505 0503                cc14:
506 0504 c28a 31 63     leay 3,s
507 0505 c28c 1f 20     tfr y,d
508 0506 c28e 34 06     pshs d
509 0507 c290 ec f1     ldd [,s++]
510 0508 c292 34 06     pshs d
511 0509 c294 31 62     leay 2,s
512 0510 c296 1f 20     tfr y,d
513 0511 c298 34 06     pshs d
514 0512 c29a e6 f1     ldb [,s++]
515 0513 c29c 1d        sex
516 0514 c29d e3 e1     addd ,s++
517 0515 c29f 34 06     pshs d
518 0516 c2a1 e6 f1     ldb [,s++]
519 0517 c2a3 1d        sex
520 0518 c2a4 34 06     pshs d
521 0519 c2a6 cc 00 00   ldd #0
522 0520 c2a9 10 a3 e1   cmpd ,s++
523 0521 c2ac 26 05     bne *+7
524 0522 c2ae cc 00 00   ldd #0
525 0523 c2b1 20 03     bra *+5
526 0524 c2b3 cc 00 01   ldd #1
527 0525 c2b6 10 83 00 00  cmpd #0
528 0526 c2ba 10 27 00 46  lbeq cc13
529 0527 c2be 7e c2 d7   jmp cc15
530 0528                cc12:
531 0529 c2c1 31 e4     leay 0,s
532 0530 c2c3 1f 20     tfr y,d
533 0531 c2c5 34 06     pshs d
534 0532 c2c7 34 06     pshs d
535 0533 c2c9 e6 f1     ldb [,s++]
536 0534 c2cb 1d        sex
537 0535 c2cc c3 00 01   addd #1
538 0536 c2cf e7 f1     stb [,s++]
539 0537 c2d1 83 00 01   subd #1
540 0538 c2d4 7e c2 8a   jmp cc14

```

```
541 0539                                cc15:
542 0540 c2d7 bd c1 29                    jsr LcdReady
543 0541 c2da cc 90 01                    ldd #-28671
544 0542 c2dd fd 70 43                    std dptr
545 0543 c2e0 fc 70 43                    ldd dptr
546 0544 c2e3 34 06                        pshs d
547 0545 c2e5 31 65                        leay 5,s
548 0546 c2e7 1f 20                        tfr y,d
549 0547 c2e9 34 06                        pshs d
550 0548 c2eb ec f1                        ldd [,s++]
551 0549 c2ed 34 06                        pshs d
552 0550 c2ef 31 64                        leay 4,s
553 0551 c2f1 1f 20                        tfr y,d
554 0552 c2f3 34 06                        pshs d
555 0553 c2f5 e6 f1                        ldb [,s++]
556 0554 c2f7 1d                            sex
557 0555 c2f8 e3 e1                        addd ,s++
558 0556 c2fa 34 06                        pshs d
559 0557 c2fc e6 f1                        ldb [,s++]
560 0558 c2fe 1d                            sex
561 0559 c2ff e7 f1                        stb [,s++]
562 0560 c301 7e c2 c1                    jmp cc12
563 0561                                cc13:
564 0562 c304 32 61                        leas 1,s
565 0563 c306 39                            rts
566 0564
567 0565                                * .global patch_lc
568 0566                                patch_lc:
569 0567 c307 bd c1 29                    jsr LcdReady
570 0568 c30a cc 90 01                    ldd #-28671
571 0569 c30d fd 70 43                    std dptr
572 0570 c310 fc 70 43                    ldd dptr
573 0571 c313 34 06                        pshs d
574 0572 c315 31 65                        leay 5,s
575 0573 c317 1f 20                        tfr y,d
576 0574 c319 34 06                        pshs d
577 0575 c31b e6 f1                        ldb [,s++]
578 0576 c31d 1d                            sex
579 0577 c31e e7 f1                        stb [,s++]
580 0578 c320 39                            rts
581 0579
582 0580                                * .global key_code
583 0581                                key_code:
584 0582 c321 32 7f                        leas -1,s
585 0583 c323 31 64                        leay 4,s
586 0584 c325 1f 20                        tfr y,d
587 0585 c327 34 06                        pshs d
588 0586 c329 e6 f1                        ldb [,s++]
589 0587 c32b 1d                            sex
590 0588 c32c 34 06                        pshs d
591 0589 c32e cc 00 16                    ldd #22
592 0590 c331 10 a3 e1                    cmpd ,s++
593 0591 c334 27 05                        beq *+7
594 0592 c336 cc 00 00                    ldd #0
595 0593 c339 20 03                        bra *+5
596 0594 c33b cc 00 01                    ldd #1
597 0595 c33e 10 83 00 00                cmpd #0
598 0596 c342 10 27 00 06                lbeq cc16
599 0597 c346 cc 00 00                    ldd #0
600 0598 c349 32 61                        leas 1,s
```

```
601 0599 c34b 39          rts
602 0600                cc16:
603 0601 c34c 31 64      leay 4,s
604 0602 c34e 1f 20      tfr y,d
605 0603 c350 34 06      pshs d
606 0604 c352 e6 f1      ldb [,s++]
607 0605 c354 1d          sex
608 0606 c355 34 06      pshs d
609 0607 c357 cc 00 21    ldd #33
610 0608 c35a 10 a3 e1    cmpd ,s++
611 0609 c35d 27 05      beq *+7
612 0610 c35f cc 00 00    ldd #0
613 0611 c362 20 03      bra *+5
614 0612 c364 cc 00 01    ldd #1
615 0613 c367 10 83 00 00  cmpd #0
616 0614 c36b 10 27 00 06  lbeq cc17
617 0615 c36f cc 00 01    ldd #1
618 0616 c372 32 61      leas 1,s
619 0617 c374 39          rts
620 0618                cc17:
621 0619 c375 31 64      leay 4,s
622 0620 c377 1f 20      tfr y,d
623 0621 c379 34 06      pshs d
624 0622 c37b e6 f1      ldb [,s++]
625 0623 c37d 1d          sex
626 0624 c37e 34 06      pshs d
627 0625 c380 cc 00 1b    ldd #27
628 0626 c383 10 a3 e1    cmpd ,s++
629 0627 c386 27 05      beq *+7
630 0628 c388 cc 00 00    ldd #0
631 0629 c38b 20 03      bra *+5
632 0630 c38d cc 00 01    ldd #1
633 0631 c390 10 83 00 00  cmpd #0
634 0632 c394 10 27 00 06  lbeq cc18
635 0633 c398 cc 00 02    ldd #2
636 0634 c39b 32 61      leas 1,s
637 0635 c39d 39          rts
638 0636                cc18:
639 0637 c39e 31 64      leay 4,s
640 0638 c3a0 1f 20      tfr y,d
641 0639 c3a2 34 06      pshs d
642 0640 c3a4 e6 f1      ldb [,s++]
643 0641 c3a6 1d          sex
644 0642 c3a7 34 06      pshs d
645 0643 c3a9 cc 00 15    ldd #21
646 0644 c3ac 10 a3 e1    cmpd ,s++
647 0645 c3af 27 05      beq *+7
648 0646 c3b1 cc 00 00    ldd #0
649 0647 c3b4 20 03      bra *+5
650 0648 c3b6 cc 00 01    ldd #1
651 0649 c3b9 10 83 00 00  cmpd #0
652 0650 c3bd 10 27 00 06  lbeq cc19
653 0651 c3c1 cc 00 03    ldd #3
654 0652 c3c4 32 61      leas 1,s
655 0653 c3c6 39          rts
656 0654                cc19:
657 0655 c3c7 31 64      leay 4,s
658 0656 c3c9 1f 20      tfr y,d
659 0657 c3cb 34 06      pshs d
660 0658 c3cd e6 f1      ldb [,s++]
```



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661 0659 c3cf 1d          sex
662 0660 c3d0 34 06      pshs d
663 0661 c3d2 cc 00 1c   ldd #28
664 0662 c3d5 10 a3 e1   cmpd ,s++
665 0663 c3d8 27 05      beq  *+7
666 0664 c3da cc 00 00   ldd #0
667 0665 c3dd 20 03      bra  *+5
668 0666 c3df cc 00 01   ldd #1
669 0667 c3e2 10 83 00 00 cmpd #0
670 0668 c3e6 10 27 00 06 lbeq cc20
671 0669 c3ea cc 00 04   ldd #4
672 0670 c3ed 32 61      leas 1,s
673 0671 c3ef 39         rts
674 0672                  cc20:
675 0673 c3f0 31 64      leay 4,s
676 0674 c3f2 1f 20      tfr  y,d
677 0675 c3f4 34 06      pshs d
678 0676 c3f6 e6 f1      ldb  [,s++]
679 0677 c3f8 1d          sex
680 0678 c3f9 34 06      pshs d
681 0679 c3fb cc 00 20   ldd #32
682 0680 c3fe 10 a3 e1   cmpd ,s++
683 0681 c401 27 05      beq  *+7
684 0682 c403 cc 00 00   ldd #0
685 0683 c406 20 03      bra  *+5
686 0684 c408 cc 00 01   ldd #1
687 0685 c40b 10 83 00 00 cmpd #0
688 0686 c40f 10 27 00 06 lbeq cc21
689 0687 c413 cc 00 05   ldd #5
690 0688 c416 32 61      leas 1,s
691 0689 c418 39         rts
692 0690                  cc21:
693 0691 c419 31 64      leay 4,s
694 0692 c41b 1f 20      tfr  y,d
695 0693 c41d 34 06      pshs d
696 0694 c41f e6 f1      ldb  [,s++]
697 0695 c421 1d          sex
698 0696 c422 34 06      pshs d
699 0697 c424 cc 00 1a   ldd #26
700 0698 c427 10 a3 e1   cmpd ,s++
701 0699 c42a 27 05      beq  *+7
702 0700 c42c cc 00 00   ldd #0
703 0701 c42f 20 03      bra  *+5
704 0702 c431 cc 00 01   ldd #1
705 0703 c434 10 83 00 00 cmpd #0
706 0704 c438 10 27 00 06 lbeq cc22
707 0705 c43c cc 00 06   ldd #6
708 0706 c43f 32 61      leas 1,s
709 0707 c441 39         rts
710 0708                  cc22:
711 0709 c442 31 64      leay 4,s
712 0710 c444 1f 20      tfr  y,d
713 0711 c446 34 06      pshs d
714 0712 c448 e6 f1      ldb  [,s++]
715 0713 c44a 1d          sex
716 0714 c44b 34 06      pshs d
717 0715 c44d cc 00 14   ldd #20
718 0716 c450 10 a3 e1   cmpd ,s++
719 0717 c453 27 05      beq  *+7
720 0718 c455 cc 00 00   ldd #0

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```

721 0719 c458 20 03          bra  *+5
722 0720 c45a cc 00 01      ldd  #1
723 0721 c45d 10 83 00 00  cmpd #0
724 0722 c461 10 27 00 06  lbeq cc23
725 0723 c465 cc 00 07      ldd  #7
726 0724 c468 32 61        leas 1,s
727 0725 c46a 39           rts
728 0726                    cc23:
729 0727 c46b 31 64        leay 4,s
730 0728 c46d 1f 20        tfr  y,d
731 0729 c46f 34 06        pshs d
732 0730 c471 e6 f1        ldb  [,s++]
733 0731 c473 1d           sex
734 0732 c474 34 06        pshs d
735 0733 c476 cc 00 22      ldd  #34
736 0734 c479 10 a3 e1      cmpd ,s++
737 0735 c47c 27 05        beq  *+7
738 0736 c47e cc 00 00      ldd  #0
739 0737 c481 20 03          bra  *+5
740 0738 c483 cc 00 01      ldd  #1
741 0739 c486 10 83 00 00  cmpd #0
742 0740 c48a 10 27 00 06  lbeq cc24
743 0741 c48e cc 00 08      ldd  #8
744 0742 c491 32 61        leas 1,s
745 0743 c493 39           rts
746 0744                    cc24:
747 0745 c494 31 64        leay 4,s
748 0746 c496 1f 20        tfr  y,d
749 0747 c498 34 06        pshs d
750 0748 c49a e6 f1        ldb  [,s++]
751 0749 c49c 1d           sex
752 0750 c49d 34 06        pshs d
753 0751 c49f cc 00 1f      ldd  #31
754 0752 c4a2 10 a3 e1      cmpd ,s++
755 0753 c4a5 27 05        beq  *+7
756 0754 c4a7 cc 00 00      ldd  #0
757 0755 c4aa 20 03          bra  *+5
758 0756 c4ac cc 00 01      ldd  #1
759 0757 c4af 10 83 00 00  cmpd #0
760 0758 c4b3 10 27 00 06  lbeq cc25
761 0759 c4b7 cc 00 09      ldd  #9
762 0760 c4ba 32 61        leas 1,s
763 0761 c4bc 39           rts
764 0762                    cc25:
765 0763 c4bd 31 64        leay 4,s
766 0764 c4bf 1f 20        tfr  y,d
767 0765 c4c1 34 06        pshs d
768 0766 c4c3 e6 f1        ldb  [,s++]
769 0767 c4c5 1d           sex
770 0768 c4c6 34 06        pshs d
771 0769 c4c8 cc 00 19      ldd  #25
772 0770 c4cb 10 a3 e1      cmpd ,s++
773 0771 c4ce 27 05        beq  *+7
774 0772 c4d0 cc 00 00      ldd  #0
775 0773 c4d3 20 03          bra  *+5
776 0774 c4d5 cc 00 01      ldd  #1
777 0775 c4d8 10 83 00 00  cmpd #0
778 0776 c4dc 10 27 00 06  lbeq cc26
779 0777 c4e0 cc 00 0a      ldd  #10
780 0778 c4e3 32 61        leas 1,s

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```
781 0779 c4e5 39          rts
782 0780                  cc26:
783 0781 c4e6 31 64      leay 4,s
784 0782 c4e8 1f 20      tfr  y,d
785 0783 c4ea 34 06      pshs d
786 0784 c4ec e6 f1      ldb  [,s++]
787 0785 c4ee 1d          sex
788 0786 c4ef 34 06      pshs d
789 0787 c4f1 cc 00 13    ldd  #19
790 0788 c4f4 10 a3 e1    cmpd ,s++
791 0789 c4f7 27 05      beq  *+7
792 0790 c4f9 cc 00 00    ldd  #0
793 0791 c4fc 20 03      bra  *+5
794 0792 c4fe cc 00 01    ldd  #1
795 0793 c501 10 83 00 00  cmpd #0
796 0794 c505 10 27 00 06  lbeq cc27
797 0795 c509 cc 00 0b    ldd  #11
798 0796 c50c 32 61      leas 1,s
799 0797 c50e 39          rts
800 0798                  cc27:
801 0799 c50f 31 64      leay 4,s
802 0800 c511 1f 20      tfr  y,d
803 0801 c513 34 06      pshs d
804 0802 c515 e6 f1      ldb  [,s++]
805 0803 c517 1d          sex
806 0804 c518 34 06      pshs d
807 0805 c51a cc 00 03    ldd  #3
808 0806 c51d 10 a3 e1    cmpd ,s++
809 0807 c520 27 05      beq  *+7
810 0808 c522 cc 00 00    ldd  #0
811 0809 c525 20 03      bra  *+5
812 0810 c527 cc 00 01    ldd  #1
813 0811 c52a 10 83 00 00  cmpd #0
814 0812 c52e 10 27 00 06  lbeq cc28
815 0813 c532 cc 00 0c    ldd  #12
816 0814 c535 32 61      leas 1,s
817 0815 c537 39          rts
818 0816                  cc28:
819 0817 c538 31 64      leay 4,s
820 0818 c53a 1f 20      tfr  y,d
821 0819 c53c 34 06      pshs d
822 0820 c53e e6 f1      ldb  [,s++]
823 0821 c540 1d          sex
824 0822 c541 34 06      pshs d
825 0823 c543 cc 00 1e    ldd  #30
826 0824 c546 10 a3 e1    cmpd ,s++
827 0825 c549 27 05      beq  *+7
828 0826 c54b cc 00 00    ldd  #0
829 0827 c54e 20 03      bra  *+5
830 0828 c550 cc 00 01    ldd  #1
831 0829 c553 10 83 00 00  cmpd #0
832 0830 c557 10 27 00 06  lbeq cc29
833 0831 c55b cc 00 0d    ldd  #13
834 0832 c55e 32 61      leas 1,s
835 0833 c560 39          rts
836 0834                  cc29:
837 0835 c561 31 64      leay 4,s
838 0836 c563 1f 20      tfr  y,d
839 0837 c565 34 06      pshs d
840 0838 c567 e6 f1      ldb  [,s++]
```

```

841 0839 c569 1d          sex
842 0840 c56a 34 06      pshs d
843 0841 c56c cc 00 18  ldd #24
844 0842 c56f 10 a3 e1  cmpd ,s++
845 0843 c572 27 05     beq  *+7
846 0844 c574 cc 00 00  ldd #0
847 0845 c577 20 03     bra  *+5
848 0846 c579 cc 00 01  ldd #1
849 0847 c57c 10 83 00 00  cmpd #0
850 0848 c580 10 27 00 06  lbeq cc30
851 0849 c584 cc 00 0e   ldd #14
852 0850 c587 32 61     leas 1,s
853 0851 c589 39        rts
854 0852                cc30:
855 0853 c58a 31 64      leay 4,s
856 0854 c58c 1f 20      tfr  y,d
857 0855 c58e 34 06      pshs d
858 0856 c590 e6 f1      ldb  [,s++]
859 0857 c592 1d          sex
860 0858 c593 34 06      pshs d
861 0859 c595 cc 00 12  ldd #18
862 0860 c598 10 a3 e1  cmpd ,s++
863 0861 c59b 27 05     beq  *+7
864 0862 c59d cc 00 00  ldd #0
865 0863 c5a0 20 03     bra  *+5
866 0864 c5a2 cc 00 01  ldd #1
867 0865 c5a5 10 83 00 00  cmpd #0
868 0866 c5a9 10 27 00 06  lbeq cc31
869 0867 c5ad cc 00 0f   ldd #15
870 0868 c5b0 32 61     leas 1,s
871 0869 c5b2 39        rts
872 0870                cc31:
873 0871 c5b3 31 64      leay 4,s
874 0872 c5b5 1f 20      tfr  y,d
875 0873 c5b7 34 06      pshs d
876 0874 c5b9 e6 f1      ldb  [,s++]
877 0875 c5bb 1d          sex
878 0876 c5bc 34 06      pshs d
879 0877 c5be cc 00 0c   ldd #12
880 0878 c5c1 10 a3 e1  cmpd ,s++
881 0879 c5c4 27 05     beq  *+7
882 0880 c5c6 cc 00 00  ldd #0
883 0881 c5c9 20 03     bra  *+5
884 0882 c5cb cc 00 01  ldd #1
885 0883 c5ce 10 83 00 00  cmpd #0
886 0884 c5d2 10 27 00 06  lbeq cc32
887 0885 c5d6 cc 00 10  ldd #16
888 0886 c5d9 32 61     leas 1,s
889 0887 c5db 39        rts
890 0888                cc32:
891 0889 c5dc 31 64      leay 4,s
892 0890 c5de 1f 20      tfr  y,d
893 0891 c5e0 34 06      pshs d
894 0892 c5e2 e6 f1      ldb  [,s++]
895 0893 c5e4 1d          sex
896 0894 c5e5 34 06      pshs d
897 0895 c5e7 cc 00 0d   ldd #13
898 0896 c5ea 10 a3 e1  cmpd ,s++
899 0897 c5ed 27 05     beq  *+7
900 0898 c5ef cc 00 00  ldd #0

```

```

901 0899 c5f2 20 03          bra  *+5
902 0900 c5f4 cc 00 01      ldd  #1
903 0901 c5f7 10 83 00 00  cmpd #0
904 0902 c5fb 10 27 00 06  lbeq cc33
905 0903 c5ff cc 00 11      ldd  #17
906 0904 c602 32 61          leas 1,s
907 0905 c604 39            rts
908 0906                    cc33:
909 0907 c605 31 64          leay 4,s
910 0908 c607 1f 20          tfr  y,d
911 0909 c609 34 06          pshs d
912 0910 c60b e6 f1          ldb  [,s++]
913 0911 c60d 1d            sex
914 0912 c60e 34 06          pshs d
915 0913 c610 cc 00 0e      ldd  #14
916 0914 c613 10 a3 e1      cmpd ,s++
917 0915 c616 27 05          beq  *+7
918 0916 c618 cc 00 00      ldd  #0
919 0917 c61b 20 03          bra  *+5
920 0918 c61d cc 00 01      ldd  #1
921 0919 c620 10 83 00 00  cmpd #0
922 0920 c624 10 27 00 06  lbeq cc34
923 0921 c628 cc 00 12      ldd  #18
924 0922 c62b 32 61          leas 1,s
925 0923 c62d 39            rts
926 0924                    cc34:
927 0925 c62e 31 64          leay 4,s
928 0926 c630 1f 20          tfr  y,d
929 0927 c632 34 06          pshs d
930 0928 c634 e6 f1          ldb  [,s++]
931 0929 c636 1d            sex
932 0930 c637 34 06          pshs d
933 0931 c639 cc 00 0f      ldd  #15
934 0932 c63c 10 a3 e1      cmpd ,s++
935 0933 c63f 27 05          beq  *+7
936 0934 c641 cc 00 00      ldd  #0
937 0935 c644 20 03          bra  *+5
938 0936 c646 cc 00 01      ldd  #1
939 0937 c649 10 83 00 00  cmpd #0
940 0938 c64d 10 27 00 06  lbeq cc35
941 0939 c651 cc 00 13      ldd  #19
942 0940 c654 32 61          leas 1,s
943 0941 c656 39            rts
944 0942                    cc35:
945 0943 c657 31 64          leay 4,s
946 0944 c659 1f 20          tfr  y,d
947 0945 c65b 34 06          pshs d
948 0946 c65d e6 f1          ldb  [,s++]
949 0947 c65f 1d            sex
950 0948 c660 34 06          pshs d
951 0949 c662 cc 00 06      ldd  #6
952 0950 c665 10 a3 e1      cmpd ,s++
953 0951 c668 27 05          beq  *+7
954 0952 c66a cc 00 00      ldd  #0
955 0953 c66d 20 03          bra  *+5
956 0954 c66f cc 00 01      ldd  #1
957 0955 c672 10 83 00 00  cmpd #0
958 0956 c676 10 27 00 06  lbeq cc36
959 0957 c67a cc 00 14      ldd  #20
960 0958 c67d 32 61          leas 1,s

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961 0959 c67f 39          rts
962 0960                cc36:
963 0961 c680 31 64      leay 4,s
964 0962 c682 1f 20      tfr  y,d
965 0963 c684 34 06      pshs d
966 0964 c686 e6 f1      ldb  [,s++]
967 0965 c688 1d          sex
968 0966 c689 34 06      pshs d
969 0967 c68b cc 00 07    ldd  #7
970 0968 c68e 10 a3 e1    cmpd ,s++
971 0969 c691 27 05      beq  *+7
972 0970 c693 cc 00 00    ldd  #0
973 0971 c696 20 03      bra  *+5
974 0972 c698 cc 00 01    ldd  #1
975 0973 c69b 10 83 00 00  cmpd #0
976 0974 c69f 10 27 00 06  lbeq cc37
977 0975 c6a3 cc 00 15    ldd  #21
978 0976 c6a6 32 61      leas 1,s
979 0977 c6a8 39          rts
980 0978                cc37:
981 0979 c6a9 31 64      leay 4,s
982 0980 c6ab 1f 20      tfr  y,d
983 0981 c6ad 34 06      pshs d
984 0982 c6af e6 f1      ldb  [,s++]
985 0983 c6b1 1d          sex
986 0984 c6b2 34 06      pshs d
987 0985 c6b4 cc 00 08    ldd  #8
988 0986 c6b7 10 a3 e1    cmpd ,s++
989 0987 c6ba 27 05      beq  *+7
990 0988 c6bc cc 00 00    ldd  #0
991 0989 c6bf 20 03      bra  *+5
992 0990 c6c1 cc 00 01    ldd  #1
993 0991 c6c4 10 83 00 00  cmpd #0
994 0992 c6c8 10 27 00 06  lbeq cc38
995 0993 c6cc cc 00 16    ldd  #22
996 0994 c6cf 32 61      leas 1,s
997 0995 c6d1 39          rts
998 0996                cc38:
999 0997 c6d2 31 64      leay 4,s
1000 0998 c6d4 1f 20      tfr  y,d
1001 0999 c6d6 34 06      pshs d
1002 1000 c6d8 e6 f1      ldb  [,s++]
1003 1001 c6da 1d          sex
1004 1002 c6db 34 06      pshs d
1005 1003 c6dd cc 00 09    ldd  #9
1006 1004 c6e0 10 a3 e1    cmpd ,s++
1007 1005 c6e3 27 05      beq  *+7
1008 1006 c6e5 cc 00 00    ldd  #0
1009 1007 c6e8 20 03      bra  *+5
1010 1008 c6ea cc 00 01    ldd  #1
1011 1009 c6ed 10 83 00 00  cmpd #0
1012 1010 c6f1 10 27 00 06  lbeq cc39
1013 1011 c6f5 cc 00 17    ldd  #23
1014 1012 c6f8 32 61      leas 1,s
1015 1013 c6fa 39          rts
1016 1014                cc39:
1017 1015 c6fb 31 64      leay 4,s
1018 1016 c6fd 1f 20      tfr  y,d
1019 1017 c6ff 34 06      pshs d
1020 1018 c701 e6 f1      ldb  [,s++]
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1021 1019 c703 1d          sex
1022 1020 c704 34 06     pshs d
1023 1021 c706 cc 00 00  ldd #0
1024 1022 c709 10 a3 e1  cmpd ,s++
1025 1023 c70c 27 05     beq  *+7
1026 1024 c70e cc 00 00  ldd #0
1027 1025 c711 20 03     bra  *+5
1028 1026 c713 cc 00 01  ldd #1
1029 1027 c716 10 83 00 00  cmpd #0
1030 1028 c71a 10 27 00 06  lbeq cc40
1031 1029 c71e cc 00 18  ldd #24
1032 1030 c721 32 61     leas 1,s
1033 1031 c723 39        rts
1034 1032                cc40:
1035 1033 c724 31 64     leay 4,s
1036 1034 c726 1f 20     tfr  y,d
1037 1035 c728 34 06     pshs d
1038 1036 c72a e6 f1     ldb  [,s++]
1039 1037 c72c 1d        sex
1040 1038 c72d 34 06     pshs d
1041 1039 c72f cc 00 01  ldd #1
1042 1040 c732 10 a3 e1  cmpd ,s++
1043 1041 c735 27 05     beq  *+7
1044 1042 c737 cc 00 00  ldd #0
1045 1043 c73a 20 03     bra  *+5
1046 1044 c73c cc 00 01  ldd #1
1047 1045 c73f 10 83 00 00  cmpd #0
1048 1046 c743 10 27 00 06  lbeq cc41
1049 1047 c747 cc 00 19  ldd #25
1050 1048 c74a 32 61     leas 1,s
1051 1049 c74c 39        rts
1052 1050                cc41:
1053 1051 c74d 31 64     leay 4,s
1054 1052 c74f 1f 20     tfr  y,d
1055 1053 c751 34 06     pshs d
1056 1054 c753 e6 f1     ldb  [,s++]
1057 1055 c755 1d        sex
1058 1056 c756 34 06     pshs d
1059 1057 c758 cc 00 02  ldd #2
1060 1058 c75b 10 a3 e1  cmpd ,s++
1061 1059 c75e 27 05     beq  *+7
1062 1060 c760 cc 00 00  ldd #0
1063 1061 c763 20 03     bra  *+5
1064 1062 c765 cc 00 01  ldd #1
1065 1063 c768 10 83 00 00  cmpd #0
1066 1064 c76c 10 27 00 06  lbeq cc42
1067 1065 c770 cc 00 1a  ldd #26
1068 1066 c773 32 61     leas 1,s
1069 1067 c775 39        rts
1070 1068                cc42:
1071 1069 c776 31 64     leay 4,s
1072 1070 c778 1f 20     tfr  y,d
1073 1071 c77a 34 06     pshs d
1074 1072 c77c e6 f1     ldb  [,s++]
1075 1073 c77e 1d        sex
1076 1074 c77f 34 06     pshs d
1077 1075 c781 cc 00 24  ldd #36
1078 1076 c784 10 a3 e1  cmpd ,s++
1079 1077 c787 27 05     beq  *+7
1080 1078 c789 cc 00 00  ldd #0

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1081 1079 c78c 20 03          bra  *+5
1082 1080 c78e cc 00 01      ldd  #1
1083 1081 c791 10 83 00 00   cmpd #0
1084 1082 c795 10 27 00 06   lbeq cc43
1085 1083 c799 cc 00 1b      ldd  #27
1086 1084 c79c 32 61        leas 1,s
1087 1085 c79e 39           rts
1088 1086                    cc43:
1089 1087 c79f 31 64        leay 4,s
1090 1088 c7a1 1f 20        tfr  y,d
1091 1089 c7a3 34 06        pshs d
1092 1090 c7a5 e6 f1        ldb  [,s++]
1093 1091 c7a7 1d           sex
1094 1092 c7a8 34 06        pshs d
1095 1093 c7aa cc 00 23      ldd  #35
1096 1094 c7ad 10 a3 e1      cmpd ,s++
1097 1095 c7b0 27 05        beq  *+7
1098 1096 c7b2 cc 00 00      ldd  #0
1099 1097 c7b5 20 03        bra  *+5
1100 1098 c7b7 cc 00 01      ldd  #1
1101 1099 c7ba 10 83 00 00   cmpd #0
1102 1100 c7be 10 27 00 06   lbeq cc44
1103 1101 c7c2 cc 00 1c      ldd  #28
1104 1102 c7c5 32 61        leas 1,s
1105 1103 c7c7 39           rts
1106 1104                    cc44:
1107 1105 c7c8 31 64        leay 4,s
1108 1106 c7ca 1f 20        tfr  y,d
1109 1107 c7cc 34 06        pshs d
1110 1108 c7ce e6 f1        ldb  [,s++]
1111 1109 c7d0 1d           sex
1112 1110 c7d1 34 06        pshs d
1113 1111 c7d3 cc 00 1d      ldd  #29
1114 1112 c7d6 10 a3 e1      cmpd ,s++
1115 1113 c7d9 27 05        beq  *+7
1116 1114 c7db cc 00 00      ldd  #0
1117 1115 c7de 20 03        bra  *+5
1118 1116 c7e0 cc 00 01      ldd  #1
1119 1117 c7e3 10 83 00 00   cmpd #0
1120 1118 c7e7 10 27 00 06   lbeq cc45
1121 1119 c7eb cc 00 1d      ldd  #29
1122 1120 c7ee 32 61        leas 1,s
1123 1121 c7f0 39           rts
1124 1122                    cc45:
1125 1123 c7f1 31 64        leay 4,s
1126 1124 c7f3 1f 20        tfr  y,d
1127 1125 c7f5 34 06        pshs d
1128 1126 c7f7 e6 f1        ldb  [,s++]
1129 1127 c7f9 1d           sex
1130 1128 c7fa 34 06        pshs d
1131 1129 c7fc cc 00 17      ldd  #23
1132 1130 c7ff 10 a3 e1      cmpd ,s++
1133 1131 c802 27 05        beq  *+7
1134 1132 c804 cc 00 00      ldd  #0
1135 1133 c807 20 03        bra  *+5
1136 1134 c809 cc 00 01      ldd  #1
1137 1135 c80c 10 83 00 00   cmpd #0
1138 1136 c810 10 27 00 06   lbeq cc46
1139 1137 c814 cc 00 1e      ldd  #30
1140 1138 c817 32 61        leas 1,s
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1141 1139 c819 39          rts
1142 1140                cc46:
1143 1141 c81a 31 64      leay 4,s
1144 1142 c81c 1f 20      tfr  y,d
1145 1143 c81e 34 06      pshs d
1146 1144 c820 e6 f1      ldb  [,s++]
1147 1145 c822 1d          sex
1148 1146 c823 34 06      pshs d
1149 1147 c825 cc 00 10    ldd  #16
1150 1148 c828 10 a3 e1    cmpd ,s++
1151 1149 c82b 27 05      beq  *+7
1152 1150 c82d cc 00 00    ldd  #0
1153 1151 c830 20 03      bra  *+5
1154 1152 c832 cc 00 01    ldd  #1
1155 1153 c835 10 83 00 00 cmpd #0
1156 1154 c839 10 27 00 06 lbeq cc47
1157 1155 c83d cc 00 1f    ldd  #31
1158 1156 c840 32 61      leas 1,s
1159 1157 c842 39          rts
1160 1158                cc47:
1161 1159 c843 32 61      leas 1,s
1162 1160 c845 39          rts
1163 1161
1164 1162                * .global delay_nu
1165 1163                delay_nu:
1166 1164 c846 cc 00 00      ldd  #0
1167 1165 c849 fd 70 12      std  temp
1168 1166 c84c cc 00 00      ldd  #0
1169 1167 c84f fd 70 12      std  temp
1170 1168 c852 39          rts
1171 1169
1172 1170                * .global delay_ms
1173 1171                delay_ms:
1174 1172 c853 cc 00 00      ldd  #0
1175 1173 c856 f7 70 04      stb  n
1176 1174                cc50:
1177 1175 c859 f6 70 04      ldb  n
1178 1176 c85c 1d          sex
1179 1177 c85d 34 06      pshs d
1180 1178 c85f 31 64      leay 4,s
1181 1179 c861 1f 20      tfr  y,d
1182 1180 c863 34 06      pshs d
1183 1181 c865 ec f1      ldd  [,s++]
1184 1182 c867 10 a3 e1    cmpd ,s++
1185 1183 c86a 2e 05      bgt  *+7
1186 1184 c86c cc 00 00    ldd  #0
1187 1185 c86f 20 03      bra  *+5
1188 1186 c871 cc 00 01    ldd  #1
1189 1187 c874 10 83 00 00 cmpd #0
1190 1188 c878 10 27 00 19 lbeq cc49
1191 1189 c87c 7e c8 8f    jmp  cc51
1192 1190                cc48:
1193 1191 c87f f6 70 04      ldb  n
1194 1192 c882 1d          sex
1195 1193 c883 c3 00 01      addd #1
1196 1194 c886 f7 70 04      stb  n
1197 1195 c889 83 00 01      subd #1
1198 1196 c88c 7e c8 59    jmp  cc50
1199 1197                cc51:
1200 1198 c88f 7e c8 7f    jmp  cc48

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1201 1199 c892 7e c8 7f      jmp cc48
1202 1200                    cc49:
1203 1201 c895 39            rts
1204 1202
1205 1203                    * .global scan
1206 1204                    scan:
1207 1205 c896 32 7f        leas -1,s
1208 1206 c898 cc 00 01      ldd #1
1209 1207 c89b f7 70 05     stb k
1210 1208 c89e cc 00 00      ldd #0
1211 1209 c8a1 f7 70 06     stb u
1212 1210 c8a4 cc 00 01      ldd #1
1213 1211 c8a7 43            coma
1214 1212 c8a8 53            comb
1215 1213 c8a9 c3 00 01      addd #1
1216 1214 c8ac f7 70 09     stb key
1217 1215 c8af cc 00 00      ldd #0
1218 1216 c8b2 f7 70 07     stb q
1219 1217 c8b5 cc 00 00      ldd #0
1220 1218 c8b8 fd 70 00     std i
1221 1219                    cc54:
1222 1220 c8bb fc 70 00      ldd i
1223 1221 c8be 34 06         pshs d
1224 1222 c8c0 cc 00 06      ldd #6
1225 1223 c8c3 10 a3 e1     cmpd ,s++
1226 1224 c8c6 2e 05         bgt *+7
1227 1225 c8c8 cc 00 00      ldd #0
1228 1226 c8cb 20 03         bra *+5
1229 1227 c8cd cc 00 01      ldd #1
1230 1228 c8d0 10 83 00 00  cmpd #0
1231 1229 c8d4 10 27 01 9e  lbeq cc53
1232 1230 c8d8 7e c8 ea     jmp cc55
1233 1231                    cc52:
1234 1232 c8db fc 70 00      ldd i
1235 1233 c8de c3 00 01      addd #1
1236 1234 c8e1 fd 70 00      std i
1237 1235 c8e4 83 00 01      subd #1
1238 1236 c8e7 7e c8 bb     jmp cc54
1239 1237                    cc55:
1240 1238 c8ea fc 70 3f     ldd port1
1241 1239 c8ed 34 06         pshs d
1242 1240 c8ef f6 70 05     ldb k
1243 1241 c8f2 1d           sex
1244 1242 c8f3 43           coma
1245 1243 c8f4 53           comb
1246 1244 c8f5 e7 f1        stb [,s++]
1247 1245 c8f7 fc 70 3d     ldd port2
1248 1246 c8fa 34 06         pshs d
1249 1247 c8fc cc 70 35     ldd #buffer
1250 1248 c8ff 34 06         pshs d
1251 1249 c901 fc 70 00     ldd i
1252 1250 c904 e3 e1        addd ,s++
1253 1251 c906 34 06         pshs d
1254 1252 c908 e6 f1        ldb [,s++]
1255 1253 c90a 1d           sex
1256 1254 c90b e7 f1        stb [,s++]
1257 1255 c90d cc 70 35     ldd #buffer
1258 1256 c910 34 06         pshs d
1259 1257 c912 fc 70 00     ldd i
1260 1258 c915 e3 e1        addd ,s++
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1261 1259 c917 34 06      pshs d
1262 1260 c919 e6 f1      ldb [,s++]
1263 1261 c91b 1d         sex
1264 1262 c91c 34 06      pshs d
1265 1263 c91e cc 00 30   ldd #48
1266 1264 c921 10 a3 e1   cmpd ,s++
1267 1265 c924 26 05     bne  *+7
1268 1266 c926 cc 00 00   ldd #0
1269 1267 c929 20 03     bra  *+5
1270 1268 c92b cc 00 01   ldd #1
1271 1269 c92e 10 83 00 00 cmpd #0
1272 1270 c932 10 27 00 2c lbeq cc57 ;_ instruction flagged for non
1273 1271 c936 cc 70 35   ldd #buffer
1274 1272 c939 34 06      pshs d
1275 1273 c93b fc 70 00   ldd i
1276 1274 c93e e3 e1     addd ,s++
1277 1275 c940 34 06      pshs d
1278 1276 c942 e6 f1      ldb [,s++]
1279 1277 c944 1d         sex
1280 1278 c945 34 06      pshs d
1281 1279 c947 cc 00 38   ldd #56
1282 1280 c94a 10 a3 e1   cmpd ,s++
1283 1281 c94d 26 05     bne  *+7
1284 1282 c94f cc 00 00   ldd #0
1285 1283 c952 20 03     bra  *+5
1286 1284 c954 cc 00 01   ldd #1
1287 1285 c957 10 83 00 00 cmpd #0
1288 1286 c95b 10 27 00 03 lbeq cc57 ;_ instruction flagged for non
1289 1287 c95f cc 00 01   ldd #1
1290 1288                  cc57:
1291 1289 c962 10 83 00 00 cmpd #0
1292 1290 c966 10 27 00 2c lbeq cc58 ;_ instruction flagged for non
1293 1291 c96a cc 70 35   ldd #buffer
1294 1292 c96d 34 06      pshs d
1295 1293 c96f fc 70 00   ldd i
1296 1294 c972 e3 e1     addd ,s++
1297 1295 c974 34 06      pshs d
1298 1296 c976 e6 f1      ldb [,s++]
1299 1297 c978 1d         sex
1300 1298 c979 34 06      pshs d
1301 1299 c97b cc 00 70   ldd #112
1302 1300 c97e 10 a3 e1   cmpd ,s++
1303 1301 c981 26 05     bne  *+7
1304 1302 c983 cc 00 00   ldd #0
1305 1303 c986 20 03     bra  *+5
1306 1304 c988 cc 00 01   ldd #1
1307 1305 c98b 10 83 00 00 cmpd #0
1308 1306 c98f 10 27 00 03 lbeq cc58 ;_ instruction flagged for non
1309 1307 c993 cc 00 01   ldd #1
1310 1308                  cc58:
1311 1309 c996 10 83 00 00 cmpd #0
1312 1310 c99a 10 27 00 0d lbeq cc56
1313 1311 c99e cc 00 02   ldd #2
1314 1312 c9a1 34 06      pshs d
1315 1313 c9a3 bd c8 53   jsr delay_ms
1316 1314 c9a6 32 62     leas 2,s
1317 1315 c9a8 7e c9 ae   jmp cc59
1318 1316                  cc56:
1319 1317 c9ab bd c8 46   jsr delay_nu
1320 1318                  cc59:

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1321 1319 c9ae fc 70 3d      ldd port2
1322 1320 c9b1 34 06      pshs d
1323 1321 c9b3 cc 00 00      ldd #0
1324 1322 c9b6 e7 f1      stb [,s++]
1325 1323 c9b8 cc 00 01      ldd #1
1326 1324 c9bb 34 06      pshs d
1327 1325 c9bd bd c8 53      jsr delay_ms
1328 1326 c9c0 32 62      leas 2,s
1329 1327 c9c2 fc 70 41      ldd port0
1330 1328 c9c5 34 06      pshs d
1331 1329 c9c7 e6 f1      ldb [,s++]
1332 1330 c9c9 1d          sex
1333 1331 c9ca f7 70 08      stb o
1334 1332 c9cd cc 00 00      ldd #0
1335 1333 c9d0 f7 70 04      stb n
1336 1334          cc62:
1337 1335 c9d3 f6 70 04      ldb n
1338 1336 c9d6 1d          sex
1339 1337 c9d7 34 06      pshs d
1340 1338 c9d9 cc 00 06      ldd #6
1341 1339 c9dc 10 a3 e1      cmpd ,s++
1342 1340 c9df 2e 05      bgt *+7
1343 1341 c9e1 cc 00 00      ldd #0
1344 1342 c9e4 20 03      bra *+5
1345 1343 c9e6 cc 00 01      ldd #1
1346 1344 c9e9 10 83 00 00      cmpd #0
1347 1345 c9ed 10 27 00 6b      lbeq cc61
1348 1346 c9f1 7e ca 04      jmp cc63
1349 1347          cc60:
1350 1348 c9f4 f6 70 04      ldb n
1351 1349 c9f7 1d          sex
1352 1350 c9f8 c3 00 01      addd #1
1353 1351 c9fb f7 70 04      stb n
1354 1352 c9fe 83 00 01      subd #1
1355 1353 ca01 7e c9 d3      jmp cc62
1356 1354          cc63:
1357 1355 ca04 f6 70 08      ldb o
1358 1356 ca07 1d          sex
1359 1357 ca08 34 06      pshs d
1360 1358 ca0a cc 00 01      ldd #1
1361 1359 ca0d a4 e0      anda ,s+
1362 1360 ca0f e4 e0      andb ,s+
1363 1361 ca11 34 06      pshs d
1364 1362 ca13 cc 00 00      ldd #0
1365 1363 ca16 10 a3 e1      cmpd ,s++
1366 1364 ca19 27 05      beq *+7
1367 1365 ca1b cc 00 00      ldd #0
1368 1366 ca1e 20 03      bra *+5
1369 1367 ca20 cc 00 01      ldd #1
1370 1368 ca23 10 83 00 00      cmpd #0
1371 1369 ca27 10 27 00 0a      lbeq cc64
1372 1370 ca2b f6 70 07      ldb q
1373 1371 ca2e 1d          sex
1374 1372 ca2f f7 70 09      stb key
1375 1373 ca32 7e ca 42      jmp cc65
1376 1374          cc64:
1377 1375 ca35 f6 70 07      ldb q
1378 1376 ca38 1d          sex
1379 1377 ca39 c3 00 01      addd #1
1380 1378 ca3c f7 70 07      stb q

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1381 1379 ca3f 83 00 01      subd #1
1382 1380                    cc65:
1383 1381 ca42 f6 70 08      ldb o
1384 1382 ca45 1d           sex
1385 1383 ca46 34 06      pshs d
1386 1384 ca48 cc 00 01      ldd #1
1387 1385 ca4b 5a           decb
1388 1386 ca4c 2d 06      blt  *+8
1389 1387 ca4e 64 e4      lsr ,s
1390 1388 ca50 66 61      ror 1,s
1391 1389 ca52 20 f7      bra *-7
1392 1390 ca54 35 06      puls d
1393 1391 ca56 f7 70 08      stb o
1394 1392 ca59 7e c9 f4      jmp cc60
1395 1393                    cc61:
1396 1394 ca5c f6 70 05      ldb k
1397 1395 ca5f 1d           sex
1398 1396 ca60 34 06      pshs d
1399 1397 ca62 cc 00 01      ldd #1
1400 1398 ca65 5a           decb
1401 1399 ca66 2d 06      blt  *+8
1402 1400 ca68 68 61      asl 1,s
1403 1401 ca6a 69 e4      rol ,s
1404 1402 ca6c 20 f7      bra *-7
1405 1403 ca6e 35 06      puls d
1406 1404 ca70 f7 70 05      stb k
1407 1405 ca73 7e c8 db      jmp cc52
1408 1406                    cc53:
1409 1407 ca76 fc 70 41      ldd port0
1410 1408 ca79 34 06      pshs d
1411 1409 ca7b e6 f1      ldb [,s++]
1412 1410 ca7d 1d           sex
1413 1411 ca7e f7 70 08      stb o
1414 1412 ca81 f6 70 08      ldb o
1415 1413 ca84 1d           sex
1416 1414 ca85 34 06      pshs d
1417 1415 ca87 cc 00 40      ldd #64
1418 1416 ca8a a4 e0      anda ,s+
1419 1417 ca8c e4 e0      andb ,s+
1420 1418 ca8e 34 06      pshs d
1421 1419 ca90 cc 00 00      ldd #0
1422 1420 ca93 10 a3 e1      cmpd ,s++
1423 1421 ca96 27 05      beq  *+7
1424 1422 ca98 cc 00 00      ldd #0
1425 1423 ca9b 20 03      bra  *+5
1426 1424 ca9d cc 00 01      ldd #1
1427 1425 caa0 10 83 00 00      cmpd #0
1428 1426 caa4 10 27 00 06      lbeq cc66
1429 1427 caa8 cc 00 24      ldd #36
1430 1428 caab f7 70 09      stb key
1431 1429                    cc66:
1432 1430 caae 31 e4      leay 0,s
1433 1431 cab0 1f 20      tfr y,d
1434 1432 cab2 34 06      pshs d
1435 1433 cab4 f6 70 09      ldb key
1436 1434 cab7 1d           sex
1437 1435 cab8 e7 f1      stb [,s++]
1438 1436 caba 31 e4      leay 0,s
1439 1437 cabc 1f 20      tfr y,d
1440 1438 cabe 34 06      pshs d

```

```

1441 1439 cac0 e6 f1      ldb  [,s++]
1442 1440 cac2 1d        sex
1443 1441 cac3 32 61     leas 1,s
1444 1442 cac5 39        rts
1445 1443
1446 1444                * .global dot_addr
1447 1445                dot_addr:
1448 1446 cac6 cc 70 35  ldd  #buffer
1449 1447 cac9 34 06     pshs d
1450 1448 cacb cc 00 00  ldd  #0
1451 1449 cace e3 e1     addd ,s++
1452 1450 cad0 34 06     pshs d
1453 1451 cad2 cc 70 35  ldd  #buffer
1454 1452 cad5 34 06     pshs d
1455 1453 cad7 cc 00 00  ldd  #0
1456 1454 cada e3 e1     addd ,s++
1457 1455 cadc 34 06     pshs d
1458 1456 cade e6 f1     ldb  [,s++]
1459 1457 cae0 1d        sex
1460 1458 cae1 34 06     pshs d
1461 1459 cae3 cc 00 40  ldd  #64
1462 1460 cae6 43        coma
1463 1461 cae7 53        comb
1464 1462 cae8 a4 e0     anda ,s+
1465 1463 caea e4 e0     andb ,s+
1466 1464 caec e7 f1     stb  [,s++]
1467 1465 caee cc 70 35  ldd  #buffer
1468 1466 caf1 34 06     pshs d
1469 1467 caf3 cc 00 01  ldd  #1
1470 1468 caf6 e3 e1     addd ,s++
1471 1469 caf8 34 06     pshs d
1472 1470 cafa cc 70 35  ldd  #buffer
1473 1471 cafd 34 06     pshs d
1474 1472 caff cc 00 01  ldd  #1
1475 1473 cb02 e3 e1     addd ,s++
1476 1474 cb04 34 06     pshs d
1477 1475 cb06 e6 f1     ldb  [,s++]
1478 1476 cb08 1d        sex
1479 1477 cb09 34 06     pshs d
1480 1478 cb0b cc 00 40  ldd  #64
1481 1479 cb0e 43        coma
1482 1480 cb0f 53        comb
1483 1481 cb10 a4 e0     anda ,s+
1484 1482 cb12 e4 e0     andb ,s+
1485 1483 cb14 e7 f1     stb  [,s++]
1486 1484 cb16 cc 70 35  ldd  #buffer
1487 1485 cb19 34 06     pshs d
1488 1486 cb1b cc 00 02  ldd  #2
1489 1487 cb1e e3 e1     addd ,s++
1490 1488 cb20 34 06     pshs d
1491 1489 cb22 cc 70 35  ldd  #buffer
1492 1490 cb25 34 06     pshs d
1493 1491 cb27 cc 00 02  ldd  #2
1494 1492 cb2a e3 e1     addd ,s++
1495 1493 cb2c 34 06     pshs d
1496 1494 cb2e e6 f1     ldb  [,s++]
1497 1495 cb30 1d        sex
1498 1496 cb31 34 06     pshs d
1499 1497 cb33 cc 00 40  ldd  #64
1500 1498 cb36 aa e0     ora  ,s+

```

```
1501 1499 cb38 ea e0 orb ,s+
1502 1500 cb3a e7 f1 stb [,s++]
1503 1501 cb3c cc 70 35 ldd #buffer
1504 1502 cb3f 34 06 pshs d
1505 1503 cb41 cc 00 03 ldd #3
1506 1504 cb44 e3 e1 addd ,s++
1507 1505 cb46 34 06 pshs d
1508 1506 cb48 cc 70 35 ldd #buffer
1509 1507 cb4b 34 06 pshs d
1510 1508 cb4d cc 00 03 ldd #3
1511 1509 cb50 e3 e1 addd ,s++
1512 1510 cb52 34 06 pshs d
1513 1511 cb54 e6 f1 ldb [,s++]
1514 1512 cb56 1d sex
1515 1513 cb57 34 06 pshs d
1516 1514 cb59 cc 00 40 ldd #64
1517 1515 cb5c aa e0 ora ,s+
1518 1516 cb5e ea e0 orb ,s+
1519 1517 cb60 e7 f1 stb [,s++]
1520 1518 cb62 cc 70 35 ldd #buffer
1521 1519 cb65 34 06 pshs d
1522 1520 cb67 cc 00 04 ldd #4
1523 1521 cb6a e3 e1 addd ,s++
1524 1522 cb6c 34 06 pshs d
1525 1523 cb6e cc 70 35 ldd #buffer
1526 1524 cb71 34 06 pshs d
1527 1525 cb73 cc 00 04 ldd #4
1528 1526 cb76 e3 e1 addd ,s++
1529 1527 cb78 34 06 pshs d
1530 1528 cb7a e6 f1 ldb [,s++]
1531 1529 cb7c 1d sex
1532 1530 cb7d 34 06 pshs d
1533 1531 cb7f cc 00 40 ldd #64
1534 1532 cb82 aa e0 ora ,s+
1535 1533 cb84 ea e0 orb ,s+
1536 1534 cb86 e7 f1 stb [,s++]
1537 1535 cb88 cc 70 35 ldd #buffer
1538 1536 cb8b 34 06 pshs d
1539 1537 cb8d cc 00 05 ldd #5
1540 1538 cb90 e3 e1 addd ,s++
1541 1539 cb92 34 06 pshs d
1542 1540 cb94 cc 70 35 ldd #buffer
1543 1541 cb97 34 06 pshs d
1544 1542 cb99 cc 00 05 ldd #5
1545 1543 cb9c e3 e1 addd ,s++
1546 1544 cb9e 34 06 pshs d
1547 1545 cba0 e6 f1 ldb [,s++]
1548 1546 cba2 1d sex
1549 1547 cba3 34 06 pshs d
1550 1548 cba5 cc 00 40 ldd #64
1551 1549 cba8 aa e0 ora ,s+
1552 1550 cbaa ea e0 orb ,s+
1553 1551 cbac e7 f1 stb [,s++]
1554 1552 cbae 39 rts
1555 1553
1556 1554 * .global dot_data
1557 1555 dot_data:
1558 1556 cbaf cc 70 35 ldd #buffer
1559 1557 cbb2 34 06 pshs d
1560 1558 cbb4 cc 00 00 ldd #0
```

```
1561 1559 cbb7 e3 e1      addd ,s++
1562 1560 cbb9 34 06      pshs d
1563 1561 cbbb cc 70 35  ldd #buffer
1564 1562 cbbe 34 06      pshs d
1565 1563 cbc0 cc 00 00  ldd #0
1566 1564 cbc3 e3 e1      addd ,s++
1567 1565 cbc5 34 06      pshs d
1568 1566 cbc7 e6 f1      ldb [,s++]
1569 1567 cbc9 1d          sex
1570 1568 cbca 34 06      pshs d
1571 1569 cbcc cc 00 40  ldd #64
1572 1570 cbcf aa e0      ora ,s+
1573 1571 cbd1 ea e0      orb ,s+
1574 1572 cbd3 e7 f1      stb [,s++]
1575 1573 cbd5 cc 70 35  ldd #buffer
1576 1574 cbd8 34 06      pshs d
1577 1575 cbda cc 00 01  ldd #1
1578 1576 cbdd e3 e1      addd ,s++
1579 1577 cbdf 34 06      pshs d
1580 1578 cbe1 cc 70 35  ldd #buffer
1581 1579 cbe4 34 06      pshs d
1582 1580 cbe6 cc 00 01  ldd #1
1583 1581 cbe9 e3 e1      addd ,s++
1584 1582 cbeb 34 06      pshs d
1585 1583 cbed e6 f1      ldb [,s++]
1586 1584 cbef 1d          sex
1587 1585 cbf0 34 06      pshs d
1588 1586 cbf2 cc 00 40  ldd #64
1589 1587 cbf5 aa e0      ora ,s+
1590 1588 cbf7 ea e0      orb ,s+
1591 1589 cbf9 e7 f1      stb [,s++]
1592 1590 cbfb cc 70 35  ldd #buffer
1593 1591 cbfe 34 06      pshs d
1594 1592 cc00 cc 00 02  ldd #2
1595 1593 cc03 e3 e1      addd ,s++
1596 1594 cc05 34 06      pshs d
1597 1595 cc07 cc 70 35  ldd #buffer
1598 1596 cc0a 34 06      pshs d
1599 1597 cc0c cc 00 02  ldd #2
1600 1598 cc0f e3 e1      addd ,s++
1601 1599 cc11 34 06      pshs d
1602 1600 cc13 e6 f1      ldb [,s++]
1603 1601 cc15 1d          sex
1604 1602 cc16 34 06      pshs d
1605 1603 cc18 cc 00 40  ldd #64
1606 1604 cc1b 43          coma
1607 1605 cc1c 53          comb
1608 1606 cc1d a4 e0      anda ,s+
1609 1607 cc1f e4 e0      andb ,s+
1610 1608 cc21 e7 f1      stb [,s++]
1611 1609 cc23 cc 70 35  ldd #buffer
1612 1610 cc26 34 06      pshs d
1613 1611 cc28 cc 00 03  ldd #3
1614 1612 cc2b e3 e1      addd ,s++
1615 1613 cc2d 34 06      pshs d
1616 1614 cc2f cc 70 35  ldd #buffer
1617 1615 cc32 34 06      pshs d
1618 1616 cc34 cc 00 03  ldd #3
1619 1617 cc37 e3 e1      addd ,s++
1620 1618 cc39 34 06      pshs d
```



```
1621 1619 cc3b e6 f1      ldb  [,s++]
1622 1620 cc3d 1d        sex
1623 1621 cc3e 34 06     pshs d
1624 1622 cc40 cc 00 40  ldd  #64
1625 1623 cc43 43        coma
1626 1624 cc44 53        comb
1627 1625 cc45 a4 e0     anda ,s+
1628 1626 cc47 e4 e0     andb ,s+
1629 1627 cc49 e7 f1     stb  [,s++]
1630 1628 cc4b cc 70 35  ldd  #buffer
1631 1629 cc4e 34 06     pshs d
1632 1630 cc50 cc 00 04  ldd  #4
1633 1631 cc53 e3 e1     addd ,s++
1634 1632 cc55 34 06     pshs d
1635 1633 cc57 cc 70 35  ldd  #buffer
1636 1634 cc5a 34 06     pshs d
1637 1635 cc5c cc 00 04  ldd  #4
1638 1636 cc5f e3 e1     addd ,s++
1639 1637 cc61 34 06     pshs d
1640 1638 cc63 e6 f1     ldb  [,s++]
1641 1639 cc65 1d        sex
1642 1640 cc66 34 06     pshs d
1643 1641 cc68 cc 00 40  ldd  #64
1644 1642 cc6b 43        coma
1645 1643 cc6c 53        comb
1646 1644 cc6d a4 e0     anda ,s+
1647 1645 cc6f e4 e0     andb ,s+
1648 1646 cc71 e7 f1     stb  [,s++]
1649 1647 cc73 cc 70 35  ldd  #buffer
1650 1648 cc76 34 06     pshs d
1651 1649 cc78 cc 00 05  ldd  #5
1652 1650 cc7b e3 e1     addd ,s++
1653 1651 cc7d 34 06     pshs d
1654 1652 cc7f cc 70 35  ldd  #buffer
1655 1653 cc82 34 06     pshs d
1656 1654 cc84 cc 00 05  ldd  #5
1657 1655 cc87 e3 e1     addd ,s++
1658 1656 cc89 34 06     pshs d
1659 1657 cc8b e6 f1     ldb  [,s++]
1660 1658 cc8d 1d        sex
1661 1659 cc8e 34 06     pshs d
1662 1660 cc90 cc 00 40  ldd  #64
1663 1661 cc93 43        coma
1664 1662 cc94 53        comb
1665 1663 cc95 a4 e0     anda ,s+
1666 1664 cc97 e4 e0     andb ,s+
1667 1665 cc99 e7 f1     stb  [,s++]
1668 1666 cc9b 39        rts
1669 1667
1670 1668                * .global hex4
1671 1669                hex4:
1672 1670 cc9c 31 62      leay 2,s
1673 1671 cc9e 1f 20      tfr  y,d
1674 1672 cca0 34 06     pshs d
1675 1673 cca2 ec f1     ldd  [,s++]
1676 1674 cca4 fd 70 14  std  temp16
1677 1675 cca7 cc 70 35  ldd  #buffer
1678 1676 ccaa 34 06     pshs d
1679 1677 ccac cc 00 02  ldd  #2
1680 1678 ccac e3 e1     addd ,s++
```



```
1681 1679 ccb1 34 06      pshs d
1682 1680 ccb3 cc c1 0d      ldd #convert
1683 1681 ccb6 34 06      pshs d
1684 1682 ccb8 fc 70 14      ldd temp16
1685 1683 ccbb 34 06      pshs d
1686 1684 ccbd cc 00 0f      ldd #15
1687 1685 ccc0 a4 e0      anda ,s+
1688 1686 ccc2 e4 e0      andb ,s+
1689 1687 ccc4 e3 e1      addd ,s++
1690 1688 ccc6 34 06      pshs d
1691 1689 ccc8 e6 f1      ldb [,s++]
1692 1690 ccca 1d          sex
1693 1691 cccb e7 f1      stb [,s++]
1694 1692 cccd cc 70 14      ldd #temp16
1695 1693 ccd0 34 06      pshs d
1696 1694 ccd2 cc 00 04      ldd #4
1697 1695 ccd5 ae f4      ldx [,s]
1698 1696 ccd7 34 10      pshs x
1699 1697 ccd9 5a          decb
1700 1698 ccda 2d 06      blt  *+8
1701 1699 ccdc 64 e4      lsr  ,s
1702 1700 ccde 66 61      ror  1,s
1703 1701 cce0 20 f7      bra  *-7
1704 1702 cce2 35 06      puls d
1705 1703 cce4 fd 70 14      std  temp16
1706 1704 cce7 cc 70 35      ldd #buffer
1707 1705 ccea 34 06      pshs d
1708 1706 ccec cc 00 03      ldd #3
1709 1707 ccef e3 e1      addd ,s++
1710 1708 ccf1 34 06      pshs d
1711 1709 ccf3 cc c1 0d      ldd #convert
1712 1710 ccf6 34 06      pshs d
1713 1711 ccf8 fc 70 14      ldd temp16
1714 1712 ccfb 34 06      pshs d
1715 1713 ccfd cc 00 0f      ldd #15
1716 1714 cd00 a4 e0      anda ,s+
1717 1715 cd02 e4 e0      andb ,s+
1718 1716 cd04 e3 e1      addd ,s++
1719 1717 cd06 34 06      pshs d
1720 1718 cd08 e6 f1      ldb [,s++]
1721 1719 cd0a 1d          sex
1722 1720 cd0b e7 f1      stb [,s++]
1723 1721 cd0d cc 70 14      ldd #temp16
1724 1722 cd10 34 06      pshs d
1725 1723 cd12 cc 00 04      ldd #4
1726 1724 cd15 ae f4      ldx [,s]
1727 1725 cd17 34 10      pshs x
1728 1726 cd19 5a          decb
1729 1727 cd1a 2d 06      blt  *+8
1730 1728 cd1c 64 e4      lsr  ,s
1731 1729 cd1e 66 61      ror  1,s
1732 1730 cd20 20 f7      bra  *-7
1733 1731 cd22 35 06      puls d
1734 1732 cd24 fd 70 14      std  temp16
1735 1733 cd27 cc 70 35      ldd #buffer
1736 1734 cd2a 34 06      pshs d
1737 1735 cd2c cc 00 04      ldd #4
1738 1736 cd2f e3 e1      addd ,s++
1739 1737 cd31 34 06      pshs d
1740 1738 cd33 cc c1 0d      ldd #convert
```

```

1741 1739 cd36 34 06      pshs d
1742 1740 cd38 fc 70 14  ldd temp16
1743 1741 cd3b 34 06      pshs d
1744 1742 cd3d cc 00 0f  ldd #15
1745 1743 cd40 a4 e0      anda ,s+
1746 1744 cd42 e4 e0      andb ,s+
1747 1745 cd44 e3 e1      addd ,s++
1748 1746 cd46 34 06      pshs d
1749 1747 cd48 e6 f1      ldb [,s++]
1750 1748 cd4a 1d          sex
1751 1749 cd4b e7 f1      stb [,s++]
1752 1750 cd4d cc 70 14  ldd #temp16
1753 1751 cd50 34 06      pshs d
1754 1752 cd52 cc 00 04  ldd #4
1755 1753 cd55 ae f4      ldx [,s]
1756 1754 cd57 34 10      pshs x
1757 1755 cd59 5a          decb
1758 1756 cd5a 2d 06      blt *+8
1759 1757 cd5c 64 e4      lsr ,s
1760 1758 cd5e 66 61      ror 1,s
1761 1759 cd60 20 f7      bra *-7
1762 1760 cd62 35 06      puls d
1763 1761 cd64 fd 70 14  std temp16
1764 1762 cd67 cc 70 35  ldd #buffer
1765 1763 cd6a 34 06      pshs d
1766 1764 cd6c cc 00 05  ldd #5
1767 1765 cd6f e3 e1      addd ,s++
1768 1766 cd71 34 06      pshs d
1769 1767 cd73 cc c1 0d  ldd #convert
1770 1768 cd76 34 06      pshs d
1771 1769 cd78 fc 70 14  ldd temp16
1772 1770 cd7b 34 06      pshs d
1773 1771 cd7d cc 00 0f  ldd #15
1774 1772 cd80 a4 e0      anda ,s+
1775 1773 cd82 e4 e0      andb ,s+
1776 1774 cd84 e3 e1      addd ,s++
1777 1775 cd86 34 06      pshs d
1778 1776 cd88 e6 f1      ldb [,s++]
1779 1777 cd8a 1d          sex
1780 1778 cd8b e7 f1      stb [,s++]
1781 1779 cd8d 32 66      leas 6,s
1782 1780 cd8f 39          rts
1783 1781
1784 1782      * .global address_
1785 1783      address_:
1786 1784 cd90 fc 70 16  ldd PC
1787 1785 cd93 fd 70 14  std temp16
1788 1786 cd96 fc 70 14  ldd temp16
1789 1787 cd99 34 06      pshs d
1790 1788 cd9b bd cc 9c  jsr hex4
1791 1789 cd9e 32 62      leas 2,s
1792 1790 cda0 39          rts
1793 1791
1794 1792      * .global data_dis
1795 1793      data_dis:
1796 1794 cda1 fc 70 16  ldd PC
1797 1795 cda4 fd 70 43  std dptr
1798 1796 cda7 fc 70 43  ldd dptr
1799 1797 cdaa 34 06      pshs d
1800 1798 cdac e6 f1      ldb [,s++]

```

```

1801 1799 cdae ld sex
1802 1800 cdaf f7 70 04 stb n
1803 1801 cdb2 cc 70 35 ldd #buffer
1804 1802 cdb5 34 06 pshs d
1805 1803 cdb7 cc 00 00 ldd #0
1806 1804 cdba e3 e1 addd ,s++
1807 1805 cdbc 34 06 pshs d
1808 1806 cdbe cc c1 0d ldd #convert
1809 1807 cdc1 34 06 pshs d
1810 1808 cdc3 f6 70 04 ldb n
1811 1809 cdc6 ld sex
1812 1810 cdc7 34 06 pshs d
1813 1811 cdc9 cc 00 0f ldd #15
1814 1812 cdcc a4 e0 anda ,s+
1815 1813 cdce e4 e0 andb ,s+
1816 1814 cdd0 e3 e1 addd ,s++
1817 1815 cdd2 34 06 pshs d
1818 1816 cdd4 e6 f1 ldb [,s++]
1819 1817 cdd6 ld sex
1820 1818 cdd7 e7 f1 stb [,s++]
1821 1819 cdd9 f6 70 04 ldb n
1822 1820 cddc ld sex
1823 1821 cddd 34 06 pshs d
1824 1822 cddf cc 00 04 ldd #4
1825 1823 cde2 5a decb
1826 1824 cde3 2d 06 blt *+8
1827 1825 cde5 64 e4 lsr ,s
1828 1826 cde7 66 61 ror 1,s
1829 1827 cde9 20 f7 bra *-7
1830 1828 cdeb 35 06 puls d
1831 1829 cded f7 70 04 stb n
1832 1830 cdf0 cc 70 35 ldd #buffer
1833 1831 cdf3 34 06 pshs d
1834 1832 cdf5 cc 00 01 ldd #1
1835 1833 cdf8 e3 e1 addd ,s++
1836 1834 cdfa 34 06 pshs d
1837 1835 cdfc cc c1 0d ldd #convert
1838 1836 cdff 34 06 pshs d
1839 1837 ce01 f6 70 04 ldb n
1840 1838 ce04 ld sex
1841 1839 ce05 34 06 pshs d
1842 1840 ce07 cc 00 0f ldd #15
1843 1841 ce0a a4 e0 anda ,s+
1844 1842 ce0c e4 e0 andb ,s+
1845 1843 ce0e e3 e1 addd ,s++
1846 1844 ce10 34 06 pshs d
1847 1845 ce12 e6 f1 ldb [,s++]
1848 1846 ce14 ld sex
1849 1847 ce15 e7 f1 stb [,s++]
1850 1848 ce17 bd cb af jsr dot_data
1851 1849 cela 39 rts
1852 1850
1853 1851 * .global read_mem
1854 1852 read_mem:
1855 1853 ce1b bd cd 90 jsr address_
1856 1854 ce1e bd cd a1 jsr data_dis
1857 1855 ce21 39 rts
1858 1856
1859 1857 * .global key_addr
1860 1858 key_addr:

```

```

1861 1859 ce22 cc 00 01      ldd #1
1862 1860 ce25 f7 70 24      stb state
1863 1861 ce28 bd ce 1b      jsr read_mem
1864 1862 ce2b bd ca c6      jsr dot_addr
1865 1863 ce2e cc 00 00      ldd #0
1866 1864 ce31 f7 70 0b      stb hit
1867 1865 ce34 39            rts
1868 1866
1869 1867                    * .global key_data
1870 1868                    key_data:
1871 1869 ce35 bd ce 1b      jsr read_mem
1872 1870 ce38 bd cb af      jsr dot_data
1873 1871 ce3b cc 00 00      ldd #0
1874 1872 ce3e f7 70 0b      stb hit
1875 1873 ce41 cc 00 02      ldd #2
1876 1874 ce44 f7 70 24      stb state
1877 1875 ce47 39            rts
1878 1876
1879 1877                    * .global key_plus
1880 1878                    key_plus:
1881 1879 ce48 f6 70 24      ldb state
1882 1880 ce4b 1d            sex
1883 1881 ce4c 34 06        pshs d
1884 1882 ce4e cc 00 01      ldd #1
1885 1883 ce51 10 a3 e1      cmpd ,s++
1886 1884 ce54 27 05        beq *+7
1887 1885 ce56 cc 00 00      ldd #0
1888 1886 ce59 20 03        bra *+5
1889 1887 ce5b cc 00 01      ldd #1
1890 1888 ce5e 10 83 00 00   cmpd #0
1891 1889 ce62 10 26 00 24   lbne cc68
1892 1890 ce66 f6 70 24      ldb state
1893 1891 ce69 1d            sex
1894 1892 ce6a 34 06        pshs d
1895 1893 ce6c cc 00 02      ldd #2
1896 1894 ce6f 10 a3 e1      cmpd ,s++
1897 1895 ce72 27 05        beq *+7
1898 1896 ce74 cc 00 00      ldd #0
1899 1897 ce77 20 03        bra *+5
1900 1898 ce79 cc 00 01      ldd #1
1901 1899 ce7c 10 83 00 00   cmpd #0
1902 1900 ce80 10 26 00 06   lbne cc68
1903 1901 ce84 cc 00 00      ldd #0
1904 1902 ce87 7e ce 8d      jmp cc69
1905 1903                    cc68:
1906 1904 ce8a cc 00 01      ldd #1
1907 1905                    cc69:
1908 1906 ce8d 10 83 00 00   cmpd #0
1909 1907 ce91 10 27 00 12   lbeq cc67
1910 1908 ce95 fc 70 16      ldd PC
1911 1909 ce98 c3 00 01      addd #1
1912 1910 ce9b fd 70 16      std PC
1913 1911 ce9e 83 00 01      subd #1
1914 1912 cea1 bd ce 1b      jsr read_mem
1915 1913 cea4 bd ce 35      jsr key_data
1916 1914                    cc67:
1917 1915 cea7 f6 70 24      ldb state
1918 1916 ceaa 1d            sex
1919 1917 ceab 34 06        pshs d
1920 1918 cead cc 00 04      ldd #4

```

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1921 1919 ceb0 10 a3 e1      cmpd ,s++
1922 1920 ceb3 27 05      beq  *+7
1923 1921 ceb5 cc 00 00    ldd  #0
1924 1922 ceb8 20 03      bra  *+5
1925 1923 ceba cc 00 01    ldd  #1
1926 1924 cebd 10 83 00 00  cmpd #0
1927 1925 cec1 10 27 00 12  lbeq cc70
1928 1926 cec5 fc 70 1a    ldd  num
1929 1927 cec8 fd 70 1c    std  start
1930 1928 cecb cc 00 00    ldd  #0
1931 1929 cece f7 70 0b    stb  hit
1932 1930 ced1 cc 00 01    ldd  #1
1933 1931 ced4 f7 70 0c    stb  positive
1934 1932                  cc70:
1935 1933 ced7 f6 70 24    ldb  state
1936 1934 ceda ld          sex
1937 1935 cedb 34 06      pshs d
1938 1936 cedd cc 00 05    ldd  #5
1939 1937 cee0 10 a3 e1    cmpd ,s++
1940 1938 cee3 27 05      beq  *+7
1941 1939 cee5 cc 00 00    ldd  #0
1942 1940 cee8 20 03      bra  *+5
1943 1941 ceea cc 00 01    ldd  #1
1944 1942 ceed 10 83 00 00  cmpd #0
1945 1943 cef1 10 27 00 24  lbeq cc71
1946 1944 cef5 cc 00 06    ldd  #6
1947 1945 cef8 f7 70 24    stb  state
1948 1946 cefb fc 70 1a    ldd  num
1949 1947 cefe fd 70 1c    std  start
1950 1948 cf01 cc 00 00    ldd  #0
1951 1949 cf04 f7 70 0b    stb  hit
1952 1950 cf07 cc 70 35    ldd  #buffer
1953 1951 cf0a 34 06      pshs d
1954 1952 cf0c cc 00 00    ldd  #0
1955 1953 cf0f e3 e1      addd ,s++
1956 1954 cf11 34 06      pshs d
1957 1955 cf13 cc 00 8f    ldd  #143
1958 1956 cf16 e7 f1      stb  [,s++]
1959 1957 cf18 39          rts
1960 1958                  cc71:
1961 1959 cf19 f6 70 24    ldb  state
1962 1960 cf1c ld          sex
1963 1961 cf1d 34 06      pshs d
1964 1962 cf1f cc 00 06    ldd  #6
1965 1963 cf22 10 a3 e1    cmpd ,s++
1966 1964 cf25 27 05      beq  *+7
1967 1965 cf27 cc 00 00    ldd  #0
1968 1966 cf2a 20 03      bra  *+5
1969 1967 cf2c cc 00 01    ldd  #1
1970 1968 cf2f 10 83 00 00  cmpd #0
1971 1969 cf33 10 27 00 43  lbeq cc72
1972 1970 cf37 cc 00 07    ldd  #7
1973 1971 cf3a f7 70 24    stb  state
1974 1972 cf3d fc 70 1a    ldd  num
1975 1973 cf40 fd 70 1e    std  end
1976 1974 cf43 cc 00 00    ldd  #0
1977 1975 cf46 f7 70 0b    stb  hit
1978 1976 cf49 cc 70 35    ldd  #buffer
1979 1977 cf4c 34 06      pshs d
1980 1978 cf4e cc 00 00    ldd  #0

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1981 1979 cf51 e3 e1          addd ,s++
1982 1980 cf53 34 06        pshs d
1983 1981 cf55 cc 00 b3     ldd #179
1984 1982 cf58 e7 f1        stb [,s++]
1985 1983 cf5a fc 70 1e     ldd end
1986 1984 cf5d 34 06        pshs d
1987 1985 cf5f fc 70 1c     ldd start
1988 1986 cf62 10 a3 e1     cmpd ,s++
1989 1987 cf65 2c 05        bge *+7
1990 1988 cf67 cc 00 00     ldd #0
1991 1989 cf6a 20 03        bra *+5
1992 1990 cf6c cc 00 01     ldd #1
1993 1991 cf6f 10 83 00 00  cmpd #0
1994 1992 cf73 10 27 00 03  lbeq cc73
1995 1993 cf77 bd d0 d8     jsr print_er
1996 1994                   cc73:
1997 1995                   cc72:
1998 1996 cf7a 39           rts
1999 1997
2000 1998                   * .global key_minu
2001 1999                   key_minu:
2002 2000 cf7b f6 70 24     ldb state
2003 2001 cf7e 1d           sex
2004 2002 cf7f 34 06        pshs d
2005 2003 cf81 cc 00 01     ldd #1
2006 2004 cf84 10 a3 e1     cmpd ,s++
2007 2005 cf87 27 05        beq *+7
2008 2006 cf89 cc 00 00     ldd #0
2009 2007 cf8c 20 03        bra *+5
2010 2008 cf8e cc 00 01     ldd #1
2011 2009 cf91 34 06        pshs d
2012 2010 cf93 f6 70 24     ldb state
2013 2011 cf96 1d           sex
2014 2012 cf97 34 06        pshs d
2015 2013 cf99 cc 00 02     ldd #2
2016 2014 cf9c 10 a3 e1     cmpd ,s++
2017 2015 cf9f 27 05        beq *+7
2018 2016 cfa1 cc 00 00     ldd #0
2019 2017 cfa4 20 03        bra *+5
2020 2018 cfa6 cc 00 01     ldd #1
2021 2019 cfa9 aa e0        ora ,s+
2022 2020 cfab ea e0        orb ,s+
2023 2021 cfad 10 83 00 00  cmpd #0
2024 2022 cfb1 10 27 00 12  lbeq cc74
2025 2023 cfb5 fc 70 16     ldd PC
2026 2024 cfb8 83 00 01     subd #1
2027 2025 cfbb fd 70 16     std PC
2028 2026 cfbe c3 00 01     addd #1
2029 2027 cfc1 bd ce 1b     jsr read_mem
2030 2028 cfc4 bd ce 35     jsr key_data
2031 2029                   cc74:
2032 2030 cfc7 f6 70 24     ldb state
2033 2031 cfca 1d           sex
2034 2032 cfcb 34 06        pshs d
2035 2033 cfcd cc 00 04     ldd #4
2036 2034 cfd0 10 a3 e1     cmpd ,s++
2037 2035 cfd3 27 05        beq *+7
2038 2036 cfd5 cc 00 00     ldd #0
2039 2037 cfd8 20 03        bra *+5
2040 2038 cfda cc 00 01     ldd #1

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2041 2039 cfdd 10 83 00 00      cmpd #0
2042 2040 cfe1 10 27 00 12      lbeq cc75
2043 2041 cfe5 fc 70 1a         ldd num
2044 2042 cfe8 fd 70 1c         std start
2045 2043 cfeb cc 00 00         ldd #0
2046 2044 cfee f7 70 0b         stb hit
2047 2045 cff1 cc 00 00         ldd #0
2048 2046 cff4 f7 70 0c         stb positive
2049 2047                          cc75:
2050 2048 cff7 39                rts
2051 2049
2052 2050                          * .global data_hex
2053 2051                          data_hex:
2054 2052 cff8 fc 70 16         ldd PC
2055 2053 cffb fd 70 43         std dptr
2056 2054 cffe fc 70 43         ldd dptr
2057 2055 d001 34 06           pshs d
2058 2056 d003 e6 f1           ldb [,s++]
2059 2057 d005 1d              sex
2060 2058 d006 f7 70 0a         stb x
2061 2059 d009 f6 70 0b         ldb hit
2062 2060 d00c 1d              sex
2063 2061 d00d 34 06           pshs d
2064 2062 d00f cc 00 00         ldd #0
2065 2063 d012 10 a3 e1        cmpd ,s++
2066 2064 d015 27 05           beq *+7
2067 2065 d017 cc 00 00         ldd #0
2068 2066 d01a 20 03           bra *+5
2069 2067 d01c cc 00 01        ldd #1
2070 2068 d01f 10 83 00 00     cmpd #0
2071 2069 d023 10 27 00 06     lbeq cc76
2072 2070 d027 cc 00 00         ldd #0
2073 2071 d02a f7 70 0a         stb x
2074 2072                          cc76:
2075 2073 d02d cc 00 01        ldd #1
2076 2074 d030 f7 70 0b         stb hit
2077 2075 d033 f6 70 0a         ldb x
2078 2076 d036 1d              sex
2079 2077 d037 34 06           pshs d
2080 2078 d039 cc 00 04        ldd #4
2081 2079 d03c 5a              decb
2082 2080 d03d 2d 06           blt *+8
2083 2081 d03f 68 61           asl 1,s
2084 2082 d041 69 e4           rol ,s
2085 2083 d043 20 f7           bra *-7
2086 2084 d045 35 06           puls d
2087 2085 d047 f7 70 0a         stb x
2088 2086 d04a f6 70 0a         ldb x
2089 2087 d04d 1d              sex
2090 2088 d04e 34 06           pshs d
2091 2089 d050 f6 70 09        ldb key
2092 2090 d053 1d              sex
2093 2091 d054 aa e0           ora ,s+
2094 2092 d056 ea e0           orb ,s+
2095 2093 d058 f7 70 0a         stb x
2096 2094 d05b fc 70 43        ldd dptr
2097 2095 d05e 34 06           pshs d
2098 2096 d060 f6 70 0a         ldb x
2099 2097 d063 1d              sex
2100 2098 d064 e7 f1           stb [,s++]

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2101 2099 d066 bd ce 1b      jsr read_mem
2102 2100 d069 bd cb af      jsr dot_data
2103 2101 d06c 39           rts
2104 2102
2105 2103                   * .global key_PC
2106 2104                   key_PC:
2107 2105 d06d fc 70 18      ldd save_PC
2108 2106 d070 fd 70 16      std PC
2109 2107 d073 bd ce 35      jsr key_data
2110 2108 d076 39           rts
2111 2109
2112 2110                   * .global hex_addr
2113 2111                   hex_addr:
2114 2112 d077 f6 70 0b      ldb hit
2115 2113 d07a 1d           sex
2116 2114 d07b 34 06        pshs d
2117 2115 d07d cc 00 00      ldd #0
2118 2116 d080 10 a3 e1      cmpd ,s++
2119 2117 d083 27 05        beq *+7
2120 2118 d085 cc 00 00      ldd #0
2121 2119 d088 20 03        bra *+5
2122 2120 d08a cc 00 01      ldd #1
2123 2121 d08d 10 83 00 00    cmpd #0
2124 2122 d091 10 27 00 06    lbeq cc77
2125 2123 d095 cc 00 00      ldd #0
2126 2124 d098 fd 70 16      std PC
2127 2125                   cc77:
2128 2126 d09b cc 00 01      ldd #1
2129 2127 d09e f7 70 0b      stb hit
2130 2128 d0a1 cc 70 16      ldd #PC
2131 2129 d0a4 34 06        pshs d
2132 2130 d0a6 cc 00 04      ldd #4
2133 2131 d0a9 ae f4         ldx [,s]
2134 2132 d0ab 34 10        pshs x
2135 2133 d0ad 5a           decb
2136 2134 d0ae 2d 06        blt *+8
2137 2135 d0b0 68 61        asl 1,s
2138 2136 d0b2 69 e4        rol ,s
2139 2137 d0b4 20 f7        bra *-7
2140 2138 d0b6 35 06        puls d
2141 2139 d0b8 fd 70 16      std PC
2142 2140 d0bb cc 70 16      ldd #PC
2143 2141 d0be 34 06        pshs d
2144 2142 d0c0 f6 70 09      ldb key
2145 2143 d0c3 1d           sex
2146 2144 d0c4 ae f4         ldx [,s]
2147 2145 d0c6 34 10        pshs x
2148 2146 d0c8 aa e0        ora ,s+
2149 2147 d0ca ea e0        orb ,s+
2150 2148 d0cc fd 70 16      std PC
2151 2149 d0cf bd ce 1b      jsr read_mem
2152 2150 d0d2 bd ca c6      jsr dot_addr
2153 2151 d0d5 32 64        leas 4,s
2154 2152 d0d7 39           rts
2155 2153
2156 2154                   * .global print_er
2157 2155                   print_er:
2158 2156 d0d8 cc 70 35      ldd #buffer
2159 2157 d0db 34 06        pshs d
2160 2158 d0dd cc 00 05      ldd #5

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2161 2159 d0e0 e3 e1      addd ,s++
2162 2160 d0e2 34 06     pshs d
2163 2161 d0e4 cc 00 8f  ldd #143
2164 2162 d0e7 e7 f1     stb [,s++]
2165 2163 d0e9 cc 70 35  ldd #buffer
2166 2164 d0ec 34 06     pshs d
2167 2165 d0ee cc 00 04  ldd #4
2168 2166 d0f1 e3 e1      addd ,s++
2169 2167 d0f3 34 06     pshs d
2170 2168 d0f5 cc 00 03  ldd #3
2171 2169 d0f8 e7 f1     stb [,s++]
2172 2170 d0fa cc 70 35  ldd #buffer
2173 2171 d0fd 34 06     pshs d
2174 2172 d0ff cc 00 03  ldd #3
2175 2173 d102 e3 e1      addd ,s++
2176 2174 d104 34 06     pshs d
2177 2175 d106 cc 00 03  ldd #3
2178 2176 d109 e7 f1     stb [,s++]
2179 2177 d10b cc 70 35  ldd #buffer
2180 2178 d10e 34 06     pshs d
2181 2179 d110 cc 00 02  ldd #2
2182 2180 d113 e3 e1      addd ,s++
2183 2181 d115 34 06     pshs d
2184 2182 d117 cc 00 00  ldd #0
2185 2183 d11a e7 f1     stb [,s++]
2186 2184 d11c cc 70 35  ldd #buffer
2187 2185 d11f 34 06     pshs d
2188 2186 d121 cc 00 01  ldd #1
2189 2187 d124 e3 e1      addd ,s++
2190 2188 d126 34 06     pshs d
2191 2189 d128 cc 00 00  ldd #0
2192 2190 d12b e7 f1     stb [,s++]
2193 2191 d12d cc 70 35  ldd #buffer
2194 2192 d130 34 06     pshs d
2195 2193 d132 cc 00 00  ldd #0
2196 2194 d135 e3 e1      addd ,s++
2197 2195 d137 34 06     pshs d
2198 2196 d139 cc 00 00  ldd #0
2199 2197 d13c e7 f1     stb [,s++]
2200 2198 d13e cc 00 00  ldd #0
2201 2199 d141 f7 70 24  stb state
2202 2200 d144 39         rts
2203 2201
2204 2202                * .global key_go
2205 2203                key_go:
2206 2204 d145 f6 70 24  ldb state
2207 2205 d148 1d         sex
2208 2206 d149 34 06     pshs d
2209 2207 d14b cc 00 01  ldd #1
2210 2208 d14e 10 a3 e1  cmpd ,s++
2211 2209 d151 27 05     beq *+7
2212 2210 d153 cc 00 00  ldd #0
2213 2211 d156 20 03     bra *+5
2214 2212 d158 cc 00 01  ldd #1
2215 2213 d15b 10 83 00 00  cmpd #0
2216 2214 d15f 10 26 00 24  lbne cc79
2217 2215 d163 f6 70 24  ldb state
2218 2216 d166 1d         sex
2219 2217 d167 34 06     pshs d
2220 2218 d169 cc 00 02  ldd #2

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2221 2219 d16c 10 a3 e1      cmpd ,s++
2222 2220 d16f 27 05      beq  *+7
2223 2221 d171 cc 00 00    ldd  #0
2224 2222 d174 20 03      bra  *+5
2225 2223 d176 cc 00 01    ldd  #1
2226 2224 d179 10 83 00 00  cmpd #0
2227 2225 d17d 10 26 00 06  lbne cc79
2228 2226 d181 cc 00 00    ldd  #0
2229 2227 d184 7e d1 8a    jmp  cc80
2230 2228                      cc79:
2231 2229 d187 cc 00 01    ldd  #1
2232 2230                      cc80:
2233 2231 d18a 10 83 00 00  cmpd #0
2234 2232 d18e 10 27 00 24  lbreq cc78
2235 2233 d192 10 ff 70 2b  STS  SAVE_SP
2236 2234 d196 fe 70 27    LDU  USER_U
2237 2235 d199 fc 70 16    LDD  PC
2238 2236 d19c 34 06      PSHS D
2239 2237 d19e b6 70 31    LDA  USER_P
2240 2238 d1a1 1f 8a      TFR  A,CC
2241 2239 d1a3 b6 70 32    LDA  USER_DP
2242 2240 d1a6 1f 8b      TFR  A,DP
2243 2241 d1a8 be 70 29    LDX  USER_X
2244 2242 d1ab 10 be 70 2d  LDY  USER_Y
2245 2243 d1af f6 70 30    LDB  USER_B
2246 2244 d1b2 b6 70 2f    LDA  USER_A
2247 2245 d1b5 39          RTS
2248 2246                      cc78:
2249 2247 d1b6 f6 70 24    ldb  state
2250 2248 d1b9 1d          sex
2251 2249 d1ba 34 06      pshs d
2252 2250 d1bc cc 00 04    ldd  #4
2253 2251 d1bf 10 a3 e1    cmpd ,s++
2254 2252 d1c2 27 05      beq  *+7
2255 2253 d1c4 cc 00 00    ldd  #0
2256 2254 d1c7 20 03      bra  *+5
2257 2255 d1c9 cc 00 01    ldd  #1
2258 2256 d1cc 10 83 00 00  cmpd #0
2259 2257 d1d0 10 27 00 57  lbreq cc81
2260 2258 d1d4 fc 70 1a    ldd  num
2261 2259 d1d7 fd 70 20    std  desti
2262 2260 d1da f6 70 0c    ldb  positive
2263 2261 d1dd 1d          sex
2264 2262 d1de 34 06      pshs d
2265 2263 d1e0 cc 00 00    ldd  #0
2266 2264 d1e3 10 a3 e1    cmpd ,s++
2267 2265 d1e6 27 05      beq  *+7
2268 2266 d1e8 cc 00 00    ldd  #0
2269 2267 d1eb 20 03      bra  *+5
2270 2268 d1ed cc 00 01    ldd  #1
2271 2269 d1f0 10 83 00 00  cmpd #0
2272 2270 d1f4 10 27 00 16  lbreq cc82
2273 2271 d1f8 fc 70 1c    ldd  start
2274 2272 d1fb 34 06      pshs d
2275 2273 d1fd fc 70 20    ldd  desti
2276 2274 d200 35 10      puls x
2277 2275 d202 34 06      pshs d
2278 2276 d204 1f 10      tfr  x,d
2279 2277 d206 a3 e1      subd ,s++
2280 2278 d208 fd 70 1c    std  start

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2281 2279 d20b 7e d2 1b      jmp cc83
2282 2280                    cc82:
2283 2281 d20e fc 70 1c      ldd start
2284 2282 d211 34 06        pshs d
2285 2283 d213 fc 70 20      ldd desti
2286 2284 d216 e3 e1        addd ,s++
2287 2285 d218 fd 70 1c      std start
2288 2286                    cc83:
2289 2287 d21b fc 70 1c      ldd start
2290 2288 d21e 34 06        pshs d
2291 2289 d220 bd cc 9c      jsr hex4
2292 2290 d223 32 62        leas 2,s
2293 2291 d225 cc 00 00      ldd #0
2294 2292 d228 f7 70 0b      stb hit
2295 2293                    cc81:
2296 2294 d22b f6 70 24      ldb state
2297 2295 d22e 1d           sex
2298 2296 d22f 34 06        pshs d
2299 2297 d231 cc 00 07      ldd #7
2300 2298 d234 10 a3 e1      cmpd ,s++
2301 2299 d237 27 05        beq *+7
2302 2300 d239 cc 00 00      ldd #0
2303 2301 d23c 20 03        bra *+5
2304 2302 d23e cc 00 01      ldd #1
2305 2303 d241 10 83 00 00   cmpd #0
2306 2304 d245 10 27 00 8c   lbeq cc84
2307 2305 d249 fc 70 1a      ldd num
2308 2306 d24c fd 70 20      std desti
2309 2307 d24f fc 70 1e      ldd end
2310 2308 d252 34 06        pshs d
2311 2309 d254 fc 70 1c      ldd start
2312 2310 d257 35 10        puls x
2313 2311 d259 34 06        pshs d
2314 2312 d25b 1f 10        tfr x,d
2315 2313 d25d a3 e1        subd ,s++
2316 2314 d25f fd 70 12      std temp
2317 2315 d262 fc 70 1c      ldd start
2318 2316 d265 fd 70 43      std dptr
2319 2317 d268 fc 70 20      ldd desti
2320 2318 d26b fd 70 45      std dptr2
2321 2319 d26e cc 00 00      ldd #0
2322 2320 d271 fd 70 00      std i
2323 2321                    cc87:
2324 2322 d274 fc 70 00      ldd i
2325 2323 d277 34 06        pshs d
2326 2324 d279 fc 70 12      ldd temp
2327 2325 d27c 10 a3 e1      cmpd ,s++
2328 2326 d27f 2e 05        bgt *+7
2329 2327 d281 cc 00 00      ldd #0
2330 2328 d284 20 03        bra *+5
2331 2329 d286 cc 00 01      ldd #1
2332 2330 d289 10 83 00 00   cmpd #0
2333 2331 d28d 10 27 00 32   lbeq cc86
2334 2332 d291 7e d2 a3      jmp cc88
2335 2333                    cc85:
2336 2334 d294 fc 70 00      ldd i
2337 2335 d297 c3 00 01      addd #1
2338 2336 d29a fd 70 00      std i
2339 2337 d29d 83 00 01      subd #1
2340 2338 d2a0 7e d2 74      jmp cc87

```

```
2341 2339 cc88:
2342 2340 d2a3 fc 70 45 ldd dptr2
2343 2341 d2a6 34 06 pshs d
2344 2342 d2a8 fc 70 00 ldd i
2345 2343 d2ab e3 e1 addd ,s++
2346 2344 d2ad 34 06 pshs d
2347 2345 d2af fc 70 43 ldd dptr
2348 2346 d2b2 34 06 pshs d
2349 2347 d2b4 fc 70 00 ldd i
2350 2348 d2b7 e3 e1 addd ,s++
2351 2349 d2b9 34 06 pshs d
2352 2350 d2bb e6 f1 ldb [,s++]
2353 2351 d2bd 1d sex
2354 2352 d2be e7 f1 stb [,s++]
2355 2353 d2c0 7e d2 94 jmp cc85
2356 2354 cc86:
2357 2355 d2c3 fc 70 20 ldd desti
2358 2356 d2c6 fd 70 16 std PC
2359 2357 d2c9 bd ce 1b jsr read_mem
2360 2358 d2cc bd cb af jsr dot_data
2361 2359 d2cf cc 00 02 ldd #2
2362 2360 d2d2 f7 70 24 stb state
2363 2361 cc84:
2364 2362 d2d5 39 rts
2365 2363
2366 2364 * .global key_reg
2367 2365 key_reg:
2368 2366 d2d6 cc 70 35 ldd #buffer
2369 2367 d2d9 34 06 pshs d
2370 2368 d2db cc 00 07 ldd #7
2371 2369 d2de e3 e1 addd ,s++
2372 2370 d2e0 34 06 pshs d
2373 2371 d2e2 cc 00 00 ldd #0
2374 2372 d2e5 e7 f1 stb [,s++]
2375 2373 d2e7 cc 70 35 ldd #buffer
2376 2374 d2ea 34 06 pshs d
2377 2375 d2ec cc 00 06 ldd #6
2378 2376 d2ef e3 e1 addd ,s++
2379 2377 d2f1 34 06 pshs d
2380 2378 d2f3 cc 00 00 ldd #0
2381 2379 d2f6 e7 f1 stb [,s++]
2382 2380 d2f8 cc 70 35 ldd #buffer
2383 2381 d2fb 34 06 pshs d
2384 2382 d2fd cc 00 05 ldd #5
2385 2383 d300 e3 e1 addd ,s++
2386 2384 d302 34 06 pshs d
2387 2385 d304 cc 00 03 ldd #3
2388 2386 d307 e7 f1 stb [,s++]
2389 2387 d309 cc 70 35 ldd #buffer
2390 2388 d30c 34 06 pshs d
2391 2389 d30e cc 00 04 ldd #4
2392 2390 d311 e3 e1 addd ,s++
2393 2391 d313 34 06 pshs d
2394 2392 d315 cc 00 8f ldd #143
2395 2393 d318 e7 f1 stb [,s++]
2396 2394 d31a cc 70 35 ldd #buffer
2397 2395 d31d 34 06 pshs d
2398 2396 d31f cc 00 03 ldd #3
2399 2397 d322 e3 e1 addd ,s++
2400 2398 d324 34 06 pshs d
```

```
2401 2399 d326 cc 00 ad      ldd #173
2402 2400 d329 e7 f1      stb [,s++]
2403 2401 d32b cc 70 35    ldd #buffer
2404 2402 d32e 34 06      pshs d
2405 2403 d330 cc 00 02    ldd #2
2406 2404 d333 e3 e1      addd ,s++
2407 2405 d335 34 06      pshs d
2408 2406 d337 cc 00 00    ldd #0
2409 2407 d33a e7 f1      stb [,s++]
2410 2408 d33c cc 70 35    ldd #buffer
2411 2409 d33f 34 06      pshs d
2412 2410 d341 cc 00 01    ldd #1
2413 2411 d344 e3 e1      addd ,s++
2414 2412 d346 34 06      pshs d
2415 2413 d348 cc 00 00    ldd #0
2416 2414 d34b e7 f1      stb [,s++]
2417 2415 d34d cc 70 35    ldd #buffer
2418 2416 d350 34 06      pshs d
2419 2417 d352 cc 00 00    ldd #0
2420 2418 d355 e3 e1      addd ,s++
2421 2419 d357 34 06      pshs d
2422 2420 d359 cc 00 00    ldd #0
2423 2421 d35c e7 f1      stb [,s++]
2424 2422 d35e cc 00 03    ldd #3
2425 2423 d361 f7 70 24    stb state
2426 2424 d364 39          rts
2427 2425
2428 2426                  * .global acca
2429 2427                  acca:
2430 2428 d365 f6 70 2f      ldb USER_A
2431 2429 d368 1d          sex
2432 2430 d369 f7 70 04      stb n
2433 2431 d36c cc 70 35    ldd #buffer
2434 2432 d36f 34 06      pshs d
2435 2433 d371 cc 00 02    ldd #2
2436 2434 d374 e3 e1      addd ,s++
2437 2435 d376 34 06      pshs d
2438 2436 d378 cc c1 0d    ldd #convert
2439 2437 d37b 34 06      pshs d
2440 2438 d37d f6 70 04    ldb n
2441 2439 d380 1d          sex
2442 2440 d381 34 06      pshs d
2443 2441 d383 cc 00 0f    ldd #15
2444 2442 d386 a4 e0      anda ,s+
2445 2443 d388 e4 e0      andb ,s+
2446 2444 d38a e3 e1      addd ,s++
2447 2445 d38c 34 06      pshs d
2448 2446 d38e e6 f1      ldb [,s++]
2449 2447 d390 1d          sex
2450 2448 d391 e7 f1      stb [,s++]
2451 2449 d393 f6 70 04    ldb n
2452 2450 d396 1d          sex
2453 2451 d397 34 06      pshs d
2454 2452 d399 cc 00 04    ldd #4
2455 2453 d39c 5a          decb
2456 2454 d39d 2d 06      blt *+8
2457 2455 d39f 64 e4      lsr ,s
2458 2456 d3a1 66 61      ror 1,s
2459 2457 d3a3 20 f7      bra *-7
2460 2458 d3a5 35 06      puls d
```

```
2461 2459 d3a7 f7 70 04      stb  n
2462 2460 d3aa cc 70 35      ldd  #buffer
2463 2461 d3ad 34 06      pshs d
2464 2462 d3af cc 00 03      ldd  #3
2465 2463 d3b2 e3 e1      addd ,s++
2466 2464 d3b4 34 06      pshs d
2467 2465 d3b6 cc c1 0d      ldd  #convert
2468 2466 d3b9 34 06      pshs d
2469 2467 d3bb f6 70 04      ldb  n
2470 2468 d3be 1d          sex
2471 2469 d3bf 34 06      pshs d
2472 2470 d3c1 cc 00 0f      ldd  #15
2473 2471 d3c4 a4 e0      anda ,s+
2474 2472 d3c6 e4 e0      andb ,s+
2475 2473 d3c8 e3 e1      addd ,s++
2476 2474 d3ca 34 06      pshs d
2477 2475 d3cc e6 f1      ldb  [,s++]
2478 2476 d3ce 1d          sex
2479 2477 d3cf e7 f1      stb  [,s++]
2480 2478 d3d1 cc 70 35      ldd  #buffer
2481 2479 d3d4 34 06      pshs d
2482 2480 d3d6 cc 00 04      ldd  #4
2483 2481 d3d9 e3 e1      addd ,s++
2484 2482 d3db 34 06      pshs d
2485 2483 d3dd cc 00 00      ldd  #0
2486 2484 d3e0 e7 f1      stb  [,s++]
2487 2485 d3e2 cc 70 35      ldd  #buffer
2488 2486 d3e5 34 06      pshs d
2489 2487 d3e7 cc 00 05      ldd  #5
2490 2488 d3ea e3 e1      addd ,s++
2491 2489 d3ec 34 06      pshs d
2492 2490 d3ee cc 00 00      ldd  #0
2493 2491 d3f1 e7 f1      stb  [,s++]
2494 2492 d3f3 cc 70 35      ldd  #buffer
2495 2493 d3f6 34 06      pshs d
2496 2494 d3f8 cc 00 01      ldd  #1
2497 2495 d3fb e3 e1      addd ,s++
2498 2496 d3fd 34 06      pshs d
2499 2497 d3ff cc 00 00      ldd  #0
2500 2498 d402 e7 f1      stb  [,s++]
2501 2499 d404 cc 70 35      ldd  #buffer
2502 2500 d407 34 06      pshs d
2503 2501 d409 cc 00 00      ldd  #0
2504 2502 d40c e3 e1      addd ,s++
2505 2503 d40e 34 06      pshs d
2506 2504 d410 cc 00 3f      ldd  #63
2507 2505 d413 e7 f1      stb  [,s++]
2508 2506 d415 39          rts
2509 2507
2510 2508                * .global accb
2511 2509                accb:
2512 2510 d416 f6 70 30      ldb  USER_B
2513 2511 d419 1d          sex
2514 2512 d41a f7 70 04      stb  n
2515 2513 d41d cc 70 35      ldd  #buffer
2516 2514 d420 34 06      pshs d
2517 2515 d422 cc 00 02      ldd  #2
2518 2516 d425 e3 e1      addd ,s++
2519 2517 d427 34 06      pshs d
2520 2518 d429 cc c1 0d      ldd  #convert
```

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2521 2519 d42c 34 06      pshs d
2522 2520 d42e f6 70 04      ldb n
2523 2521 d431 1d          sex
2524 2522 d432 34 06      pshs d
2525 2523 d434 cc 00 0f      ldd #15
2526 2524 d437 a4 e0      anda ,s+
2527 2525 d439 e4 e0      andb ,s+
2528 2526 d43b e3 e1      addd ,s++
2529 2527 d43d 34 06      pshs d
2530 2528 d43f e6 f1      ldb [,s++]
2531 2529 d441 1d          sex
2532 2530 d442 e7 f1      stb [,s++]
2533 2531 d444 f6 70 04      ldb n
2534 2532 d447 1d          sex
2535 2533 d448 34 06      pshs d
2536 2534 d44a cc 00 04      ldd #4
2537 2535 d44d 5a          decb
2538 2536 d44e 2d 06      blt  *+8
2539 2537 d450 64 e4      lsr ,s
2540 2538 d452 66 61      ror 1,s
2541 2539 d454 20 f7      bra *-7
2542 2540 d456 35 06      puls d
2543 2541 d458 f7 70 04      stb n
2544 2542 d45b cc 70 35      ldd #buffer
2545 2543 d45e 34 06      pshs d
2546 2544 d460 cc 00 03      ldd #3
2547 2545 d463 e3 e1      addd ,s++
2548 2546 d465 34 06      pshs d
2549 2547 d467 cc c1 0d      ldd #convert
2550 2548 d46a 34 06      pshs d
2551 2549 d46c f6 70 04      ldb n
2552 2550 d46f 1d          sex
2553 2551 d470 34 06      pshs d
2554 2552 d472 cc 00 0f      ldd #15
2555 2553 d475 a4 e0      anda ,s+
2556 2554 d477 e4 e0      andb ,s+
2557 2555 d479 e3 e1      addd ,s++
2558 2556 d47b 34 06      pshs d
2559 2557 d47d e6 f1      ldb [,s++]
2560 2558 d47f 1d          sex
2561 2559 d480 e7 f1      stb [,s++]
2562 2560 d482 cc 70 35      ldd #buffer
2563 2561 d485 34 06      pshs d
2564 2562 d487 cc 00 04      ldd #4
2565 2563 d48a e3 e1      addd ,s++
2566 2564 d48c 34 06      pshs d
2567 2565 d48e cc 00 00      ldd #0
2568 2566 d491 e7 f1      stb [,s++]
2569 2567 d493 cc 70 35      ldd #buffer
2570 2568 d496 34 06      pshs d
2571 2569 d498 cc 00 05      ldd #5
2572 2570 d49b e3 e1      addd ,s++
2573 2571 d49d 34 06      pshs d
2574 2572 d49f cc 00 00      ldd #0
2575 2573 d4a2 e7 f1      stb [,s++]
2576 2574 d4a4 cc 70 35      ldd #buffer
2577 2575 d4a7 34 06      pshs d
2578 2576 d4a9 cc 00 01      ldd #1
2579 2577 d4ac e3 e1      addd ,s++
2580 2578 d4ae 34 06      pshs d
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2581 2579 d4b0 cc 00 00      ldd #0
2582 2580 d4b3 e7 f1      stb [,s++]
2583 2581 d4b5 cc 70 35    ldd #buffer
2584 2582 d4b8 34 06      pshs d
2585 2583 d4ba cc 00 00    ldd #0
2586 2584 d4bd e3 e1      addd ,s++
2587 2585 d4bf 34 06      pshs d
2588 2586 d4c1 cc 00 a7    ldd #167
2589 2587 d4c4 e7 f1      stb [,s++]
2590 2588 d4c6 39          rts
2591 2589
2592 2590                  * .global ab
2593 2591                  ab:
2594 2592 d4c7 f6 70 30    ldb USER_B
2595 2593 d4ca 1d          sex
2596 2594 d4cb f7 70 04    stb n
2597 2595 d4ce cc 70 35    ldd #buffer
2598 2596 d4d1 34 06      pshs d
2599 2597 d4d3 cc 00 02    ldd #2
2600 2598 d4d6 e3 e1      addd ,s++
2601 2599 d4d8 34 06      pshs d
2602 2600 d4da cc c1 0d    ldd #convert
2603 2601 d4dd 34 06      pshs d
2604 2602 d4df f6 70 04    ldb n
2605 2603 d4e2 1d          sex
2606 2604 d4e3 34 06      pshs d
2607 2605 d4e5 cc 00 0f    ldd #15
2608 2606 d4e8 a4 e0      anda ,s+
2609 2607 d4ea e4 e0      andb ,s+
2610 2608 d4ec e3 e1      addd ,s++
2611 2609 d4ee 34 06      pshs d
2612 2610 d4f0 e6 f1      ldb [,s++]
2613 2611 d4f2 1d          sex
2614 2612 d4f3 e7 f1      stb [,s++]
2615 2613 d4f5 f6 70 04    ldb n
2616 2614 d4f8 1d          sex
2617 2615 d4f9 34 06      pshs d
2618 2616 d4fb cc 00 04    ldd #4
2619 2617 d4fe 5a          decb
2620 2618 d4ff 2d 06      blt *+8
2621 2619 d501 64 e4      lsr ,s
2622 2620 d503 66 61      ror 1,s
2623 2621 d505 20 f7      bra *-7
2624 2622 d507 35 06      puls d
2625 2623 d509 f7 70 04    stb n
2626 2624 d50c cc 70 35    ldd #buffer
2627 2625 d50f 34 06      pshs d
2628 2626 d511 cc 00 03    ldd #3
2629 2627 d514 e3 e1      addd ,s++
2630 2628 d516 34 06      pshs d
2631 2629 d518 cc c1 0d    ldd #convert
2632 2630 d51b 34 06      pshs d
2633 2631 d51d f6 70 04    ldb n
2634 2632 d520 1d          sex
2635 2633 d521 34 06      pshs d
2636 2634 d523 cc 00 0f    ldd #15
2637 2635 d526 a4 e0      anda ,s+
2638 2636 d528 e4 e0      andb ,s+
2639 2637 d52a e3 e1      addd ,s++
2640 2638 d52c 34 06      pshs d

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```
2641 2639 d52e e6 f1      ldb  [,s++]
2642 2640 d530 1d        sex
2643 2641 d531 e7 f1      stb  [,s++]
2644 2642 d533 f6 70 2f   ldb  USER_A
2645 2643 d536 1d        sex
2646 2644 d537 f7 70 04   stb  n
2647 2645 d53a cc 70 35   ldd  #buffer
2648 2646 d53d 34 06     pshs d
2649 2647 d53f cc 00 04   ldd  #4
2650 2648 d542 e3 e1     addd ,s++
2651 2649 d544 34 06     pshs d
2652 2650 d546 cc c1 0d   ldd  #convert
2653 2651 d549 34 06     pshs d
2654 2652 d54b f6 70 04   ldb  n
2655 2653 d54e 1d        sex
2656 2654 d54f 34 06     pshs d
2657 2655 d551 cc 00 0f   ldd  #15
2658 2656 d554 a4 e0     anda ,s+
2659 2657 d556 e4 e0     andb ,s+
2660 2658 d558 e3 e1     addd ,s++
2661 2659 d55a 34 06     pshs d
2662 2660 d55c e6 f1      ldb  [,s++]
2663 2661 d55e 1d        sex
2664 2662 d55f e7 f1      stb  [,s++]
2665 2663 d561 f6 70 04   ldb  n
2666 2664 d564 1d        sex
2667 2665 d565 34 06     pshs d
2668 2666 d567 cc 00 04   ldd  #4
2669 2667 d56a 5a        decb
2670 2668 d56b 2d 06     blt  *+8
2671 2669 d56d 64 e4     lsr  ,s
2672 2670 d56f 66 61     ror  1,s
2673 2671 d571 20 f7     bra  *-7
2674 2672 d573 35 06     puls d
2675 2673 d575 f7 70 04   stb  n
2676 2674 d578 cc 70 35   ldd  #buffer
2677 2675 d57b 34 06     pshs d
2678 2676 d57d cc 00 05   ldd  #5
2679 2677 d580 e3 e1     addd ,s++
2680 2678 d582 34 06     pshs d
2681 2679 d584 cc c1 0d   ldd  #convert
2682 2680 d587 34 06     pshs d
2683 2681 d589 f6 70 04   ldb  n
2684 2682 d58c 1d        sex
2685 2683 d58d 34 06     pshs d
2686 2684 d58f cc 00 0f   ldd  #15
2687 2685 d592 a4 e0     anda ,s+
2688 2686 d594 e4 e0     andb ,s+
2689 2687 d596 e3 e1     addd ,s++
2690 2688 d598 34 06     pshs d
2691 2689 d59a e6 f1      ldb  [,s++]
2692 2690 d59c 1d        sex
2693 2691 d59d e7 f1      stb  [,s++]
2694 2692 d59f cc 70 35   ldd  #buffer
2695 2693 d5a2 34 06     pshs d
2696 2694 d5a4 cc 00 01   ldd  #1
2697 2695 d5a7 e3 e1     addd ,s++
2698 2696 d5a9 34 06     pshs d
2699 2697 d5ab cc 00 3f   ldd  #63
2700 2698 d5ae e7 f1      stb  [,s++]
```

```
2701 2699 d5b0 cc 70 35      ldd #buffer
2702 2700 d5b3 34 06      pshs d
2703 2701 d5b5 cc 00 00      ldd #0
2704 2702 d5b8 e3 e1      addd ,s++
2705 2703 d5ba 34 06      pshs d
2706 2704 d5bc cc 00 a7      ldd #167
2707 2705 d5bf e7 f1      stb [,s++]
2708 2706 d5c1 39          rts
2709 2707
2710 2708                  * .global reg_x
2711 2709                  reg_x:
2712 2710 d5c2 fc 70 29      ldd USER_X
2713 2711 d5c5 fd 70 14      std temp16
2714 2712 d5c8 fc 70 14      ldd temp16
2715 2713 d5cb 34 06      pshs d
2716 2714 d5cd bd cc 9c      jsr hex4
2717 2715 d5d0 32 62      leas 2,s
2718 2716 d5d2 cc 70 35      ldd #buffer
2719 2717 d5d5 34 06      pshs d
2720 2718 d5d7 cc 00 01      ldd #1
2721 2719 d5da e3 e1      addd ,s++
2722 2720 d5dc 34 06      pshs d
2723 2721 d5de cc 00 00      ldd #0
2724 2722 d5e1 e7 f1      stb [,s++]
2725 2723 d5e3 cc 70 35      ldd #buffer
2726 2724 d5e6 34 06      pshs d
2727 2725 d5e8 cc 00 00      ldd #0
2728 2726 d5eb e3 e1      addd ,s++
2729 2727 d5ed 34 06      pshs d
2730 2728 d5ef cc 00 13      ldd #19
2731 2729 d5f2 e7 f1      stb [,s++]
2732 2730 d5f4 39          rts
2733 2731
2734 2732                  * .global reg_y
2735 2733                  reg_y:
2736 2734 d5f5 fc 70 2d      ldd USER_Y
2737 2735 d5f8 fd 70 14      std temp16
2738 2736 d5fb fc 70 14      ldd temp16
2739 2737 d5fe 34 06      pshs d
2740 2738 d600 bd cc 9c      jsr hex4
2741 2739 d603 32 62      leas 2,s
2742 2740 d605 cc 70 35      ldd #buffer
2743 2741 d608 34 06      pshs d
2744 2742 d60a cc 00 01      ldd #1
2745 2743 d60d e3 e1      addd ,s++
2746 2744 d60f 34 06      pshs d
2747 2745 d611 cc 00 00      ldd #0
2748 2746 d614 e7 f1      stb [,s++]
2749 2747 d616 cc 70 35      ldd #buffer
2750 2748 d619 34 06      pshs d
2751 2749 d61b cc 00 00      ldd #0
2752 2750 d61e e3 e1      addd ,s++
2753 2751 d620 34 06      pshs d
2754 2752 d622 cc 00 b6      ldd #182
2755 2753 d625 e7 f1      stb [,s++]
2756 2754 d627 39          rts
2757 2755
2758 2756                  * .global reg_u
2759 2757                  reg_u:
2760 2758 d628 fc 70 27      ldd USER_U
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2761 2759 d62b fd 70 14      std  temp16
2762 2760 d62e fc 70 14      ldd  temp16
2763 2761 d631 34 06      pshs d
2764 2762 d633 bd cc 9c      jsr  hex4
2765 2763 d636 32 62      leas 2,s
2766 2764 d638 cc 70 35      ldd  #buffer
2767 2765 d63b 34 06      pshs d
2768 2766 d63d cc 00 01      ldd  #1
2769 2767 d640 e3 e1      addd ,s++
2770 2768 d642 34 06      pshs d
2771 2769 d644 cc 00 00      ldd  #0
2772 2770 d647 e7 f1      stb  [,s++]
2773 2771 d649 cc 70 35      ldd  #buffer
2774 2772 d64c 34 06      pshs d
2775 2773 d64e cc 00 00      ldd  #0
2776 2774 d651 e3 e1      addd ,s++
2777 2775 d653 34 06      pshs d
2778 2776 d655 cc 00 b5      ldd  #181
2779 2777 d658 e7 f1      stb  [,s++]
2780 2778 d65a 39          rts
2781 2779
2782 2780                  * .global reg_s
2783 2781                  reg_s:
2784 2782 d65b fc 70 2b      ldd  SAVE_SP
2785 2783 d65e fd 70 14      std  temp16
2786 2784 d661 fc 70 14      ldd  temp16
2787 2785 d664 34 06      pshs d
2788 2786 d666 bd cc 9c      jsr  hex4
2789 2787 d669 32 62      leas 2,s
2790 2788 d66b cc 70 35      ldd  #buffer
2791 2789 d66e 34 06      pshs d
2792 2790 d670 cc 00 01      ldd  #1
2793 2791 d673 e3 e1      addd ,s++
2794 2792 d675 34 06      pshs d
2795 2793 d677 cc 00 00      ldd  #0
2796 2794 d67a e7 f1      stb  [,s++]
2797 2795 d67c cc 70 35      ldd  #buffer
2798 2796 d67f 34 06      pshs d
2799 2797 d681 cc 00 00      ldd  #0
2800 2798 d684 e3 e1      addd ,s++
2801 2799 d686 34 06      pshs d
2802 2800 d688 cc 00 ae      ldd  #174
2803 2801 d68b e7 f1      stb  [,s++]
2804 2802 d68d 39          rts
2805 2803
2806 2804                  * .global reg_dp
2807 2805                  reg_dp:
2808 2806 d68e f6 70 32      ldb  USER_DP
2809 2807 d691 1d          sex
2810 2808 d692 f7 70 04      stb  n
2811 2809 d695 cc 70 35      ldd  #buffer
2812 2810 d698 34 06      pshs d
2813 2811 d69a cc 00 02      ldd  #2
2814 2812 d69d e3 e1      addd ,s++
2815 2813 d69f 34 06      pshs d
2816 2814 d6a1 cc c1 0d      ldd  #convert
2817 2815 d6a4 34 06      pshs d
2818 2816 d6a6 f6 70 04      ldb  n
2819 2817 d6a9 1d          sex
2820 2818 d6aa 34 06      pshs d

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2821 2819 d6ac cc 00 0f      ldd #15
2822 2820 d6af a4 e0      anda ,s+
2823 2821 d6b1 e4 e0      andb ,s+
2824 2822 d6b3 e3 e1      addd ,s++
2825 2823 d6b5 34 06      pshs d
2826 2824 d6b7 e6 f1      ldb [,s++]
2827 2825 d6b9 1d          sex
2828 2826 d6ba e7 f1      stb [,s++]
2829 2827 d6bc f6 70 04    ldb n
2830 2828 d6bf 1d          sex
2831 2829 d6c0 34 06      pshs d
2832 2830 d6c2 cc 00 04    ldd #4
2833 2831 d6c5 5a          decb
2834 2832 d6c6 2d 06      blt  *+8
2835 2833 d6c8 64 e4      lsr  ,s
2836 2834 d6ca 66 61      ror  1,s
2837 2835 d6cc 20 f7      bra  *-7
2838 2836 d6ce 35 06      puls d
2839 2837 d6d0 f7 70 04    stb n
2840 2838 d6d3 cc 70 35    ldd #buffer
2841 2839 d6d6 34 06      pshs d
2842 2840 d6d8 cc 00 03    ldd #3
2843 2841 d6db e3 e1      addd ,s++
2844 2842 d6dd 34 06      pshs d
2845 2843 d6df cc c1 0d    ldd #convert
2846 2844 d6e2 34 06      pshs d
2847 2845 d6e4 f6 70 04    ldb n
2848 2846 d6e7 1d          sex
2849 2847 d6e8 34 06      pshs d
2850 2848 d6ea cc 00 0f    ldd #15
2851 2849 d6ed a4 e0      anda ,s+
2852 2850 d6ef e4 e0      andb ,s+
2853 2851 d6f1 e3 e1      addd ,s++
2854 2852 d6f3 34 06      pshs d
2855 2853 d6f5 e6 f1      ldb [,s++]
2856 2854 d6f7 1d          sex
2857 2855 d6f8 e7 f1      stb [,s++]
2858 2856 d6fa cc 70 35    ldd #buffer
2859 2857 d6fd 34 06      pshs d
2860 2858 d6ff cc 00 04    ldd #4
2861 2859 d702 e3 e1      addd ,s++
2862 2860 d704 34 06      pshs d
2863 2861 d706 cc 00 00    ldd #0
2864 2862 d709 e7 f1      stb [,s++]
2865 2863 d70b cc 70 35    ldd #buffer
2866 2864 d70e 34 06      pshs d
2867 2865 d710 cc 00 05    ldd #5
2868 2866 d713 e3 e1      addd ,s++
2869 2867 d715 34 06      pshs d
2870 2868 d717 cc 00 00    ldd #0
2871 2869 d71a e7 f1      stb [,s++]
2872 2870 d71c cc 70 35    ldd #buffer
2873 2871 d71f 34 06      pshs d
2874 2872 d721 cc 00 01    ldd #1
2875 2873 d724 e3 e1      addd ,s++
2876 2874 d726 34 06      pshs d
2877 2875 d728 cc 00 b3    ldd #179
2878 2876 d72b e7 f1      stb [,s++]
2879 2877 d72d cc 70 35    ldd #buffer
2880 2878 d730 34 06      pshs d
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2881 2879 d732 cc 00 00      ldd #0
2882 2880 d735 e3 e1      addd ,s++
2883 2881 d737 34 06      pshs d
2884 2882 d739 cc 00 1f      ldd #31
2885 2883 d73c e7 f1      stb [,s++]
2886 2884 d73e 39          rts
2887 2885
2888 2886                  * .global low_cc
2889 2887                  low_cc:
2890 2888 d73f f6 70 31      ldb USER_P
2891 2889 d742 1d          sex
2892 2890 d743 f7 70 04      stb n
2893 2891 d746 f6 70 04      ldb n
2894 2892 d749 1d          sex
2895 2893 d74a 34 06      pshs d
2896 2894 d74c cc 00 01      ldd #1
2897 2895 d74f a4 e0      anda ,s+
2898 2896 d751 e4 e0      andb ,s+
2899 2897 d753 10 83 00 00    cmpd #0
2900 2898 d757 10 27 00 14    lbeq cc89
2901 2899 d75b cc 70 35      ldd #buffer
2902 2900 d75e 34 06      pshs d
2903 2901 d760 cc 00 02      ldd #2
2904 2902 d763 e3 e1      addd ,s++
2905 2903 d765 34 06      pshs d
2906 2904 d767 cc 00 30      ldd #48
2907 2905 d76a e7 f1      stb [,s++]
2908 2906 d76c 7e d7 80      jmp cc90
2909 2907                  cc89:
2910 2908 d76f cc 70 35      ldd #buffer
2911 2909 d772 34 06      pshs d
2912 2910 d774 cc 00 02      ldd #2
2913 2911 d777 e3 e1      addd ,s++
2914 2912 d779 34 06      pshs d
2915 2913 d77b cc 00 bd      ldd #189
2916 2914 d77e e7 f1      stb [,s++]
2917 2915                  cc90:
2918 2916 d780 f6 70 04      ldb n
2919 2917 d783 1d          sex
2920 2918 d784 34 06      pshs d
2921 2919 d786 cc 00 02      ldd #2
2922 2920 d789 a4 e0      anda ,s+
2923 2921 d78b e4 e0      andb ,s+
2924 2922 d78d 10 83 00 00    cmpd #0
2925 2923 d791 10 27 00 14    lbeq cc91
2926 2924 d795 cc 70 35      ldd #buffer
2927 2925 d798 34 06      pshs d
2928 2926 d79a cc 00 03      ldd #3
2929 2927 d79d e3 e1      addd ,s++
2930 2928 d79f 34 06      pshs d
2931 2929 d7a1 cc 00 30      ldd #48
2932 2930 d7a4 e7 f1      stb [,s++]
2933 2931 d7a6 7e d7 ba      jmp cc92
2934 2932                  cc91:
2935 2933 d7a9 cc 70 35      ldd #buffer
2936 2934 d7ac 34 06      pshs d
2937 2935 d7ae cc 00 03      ldd #3
2938 2936 d7b1 e3 e1      addd ,s++
2939 2937 d7b3 34 06      pshs d
2940 2938 d7b5 cc 00 bd      ldd #189

```

```
2941 2939 d7b8 e7 f1          stb  [,s++]
2942 2940                    cc92:
2943 2941 d7ba f6 70 04        ldb  n
2944 2942 d7bd 1d             sex
2945 2943 d7be 34 06        pshs d
2946 2944 d7c0 cc 00 04      ldd  #4
2947 2945 d7c3 a4 e0        anda ,s+
2948 2946 d7c5 e4 e0        andb ,s+
2949 2947 d7c7 10 83 00 00  cmpd #0
2950 2948 d7cb 10 27 00 14    lbeq cc93
2951 2949 d7cf cc 70 35      ldd  #buffer
2952 2950 d7d2 34 06        pshs d
2953 2951 d7d4 cc 00 04      ldd  #4
2954 2952 d7d7 e3 e1        addd ,s++
2955 2953 d7d9 34 06        pshs d
2956 2954 d7db cc 00 30      ldd  #48
2957 2955 d7de e7 f1          stb  [,s++]
2958 2956 d7e0 7e d7 f4      jmp  cc94
2959 2957                    cc93:
2960 2958 d7e3 cc 70 35      ldd  #buffer
2961 2959 d7e6 34 06        pshs d
2962 2960 d7e8 cc 00 04      ldd  #4
2963 2961 d7eb e3 e1        addd ,s++
2964 2962 d7ed 34 06        pshs d
2965 2963 d7ef cc 00 bd      ldd  #189
2966 2964 d7f2 e7 f1          stb  [,s++]
2967 2965                    cc94:
2968 2966 d7f4 f6 70 04        ldb  n
2969 2967 d7f7 1d             sex
2970 2968 d7f8 34 06        pshs d
2971 2969 d7fa cc 00 08      ldd  #8
2972 2970 d7fd a4 e0        anda ,s+
2973 2971 d7ff e4 e0        andb ,s+
2974 2972 d801 10 83 00 00    cmpd #0
2975 2973 d805 10 27 00 14    lbeq cc95
2976 2974 d809 cc 70 35      ldd  #buffer
2977 2975 d80c 34 06        pshs d
2978 2976 d80e cc 00 05      ldd  #5
2979 2977 d811 e3 e1        addd ,s++
2980 2978 d813 34 06        pshs d
2981 2979 d815 cc 00 30      ldd  #48
2982 2980 d818 e7 f1          stb  [,s++]
2983 2981 d81a 7e d8 2e      jmp  cc96
2984 2982                    cc95:
2985 2983 d81d cc 70 35      ldd  #buffer
2986 2984 d820 34 06        pshs d
2987 2985 d822 cc 00 05      ldd  #5
2988 2986 d825 e3 e1        addd ,s++
2989 2987 d827 34 06        pshs d
2990 2988 d829 cc 00 bd      ldd  #189
2991 2989 d82c e7 f1          stb  [,s++]
2992 2990                    cc96:
2993 2991 d82e cc 70 35      ldd  #buffer
2994 2992 d831 34 06        pshs d
2995 2993 d833 cc 00 01      ldd  #1
2996 2994 d836 e3 e1        addd ,s++
2997 2995 d838 34 06        pshs d
2998 2996 d83a cc 00 8d      ldd  #141
2999 2997 d83d e7 f1          stb  [,s++]
3000 2998 d83f cc 70 35      ldd  #buffer
```

```

3001 2999 d842 34 06          pshs d
3002 3000 d844 cc 00 00      ldd #0
3003 3001 d847 e3 e1        addd ,s++
3004 3002 d849 34 06        pshs d
3005 3003 d84b cc 00 85      ldd #133
3006 3004 d84e e7 f1        stb [,s++]
3007 3005 d850 39           rts
3008 3006
3009 3007                   * .global hi_cc
3010 3008                   hi_cc:
3011 3009 d851 f6 70 31      ldb USER_P
3012 3010 d854 1d           sex
3013 3011 d855 f7 70 04      stb n
3014 3012 d858 f6 70 04      ldb n
3015 3013 d85b 1d           sex
3016 3014 d85c 34 06        pshs d
3017 3015 d85e cc 00 10      ldd #16
3018 3016 d861 a4 e0        anda ,s+
3019 3017 d863 e4 e0        andb ,s+
3020 3018 d865 10 83 00 00   cmpd #0
3021 3019 d869 10 27 00 14   lbeq cc97
3022 3020 d86d cc 70 35      ldd #buffer
3023 3021 d870 34 06        pshs d
3024 3022 d872 cc 00 02      ldd #2
3025 3023 d875 e3 e1        addd ,s++
3026 3024 d877 34 06        pshs d
3027 3025 d879 cc 00 30      ldd #48
3028 3026 d87c e7 f1        stb [,s++]
3029 3027 d87e 7e d8 92      jmp cc98
3030 3028                   cc97:
3031 3029 d881 cc 70 35      ldd #buffer
3032 3030 d884 34 06        pshs d
3033 3031 d886 cc 00 02      ldd #2
3034 3032 d889 e3 e1        addd ,s++
3035 3033 d88b 34 06        pshs d
3036 3034 d88d cc 00 bd      ldd #189
3037 3035 d890 e7 f1        stb [,s++]
3038 3036                   cc98:
3039 3037 d892 f6 70 04      ldb n
3040 3038 d895 1d           sex
3041 3039 d896 34 06        pshs d
3042 3040 d898 cc 00 20      ldd #32
3043 3041 d89b a4 e0        anda ,s+
3044 3042 d89d e4 e0        andb ,s+
3045 3043 d89f 10 83 00 00   cmpd #0
3046 3044 d8a3 10 27 00 14   lbeq cc99
3047 3045 d8a7 cc 70 35      ldd #buffer
3048 3046 d8aa 34 06        pshs d
3049 3047 d8ac cc 00 03      ldd #3
3050 3048 d8af e3 e1        addd ,s++
3051 3049 d8b1 34 06        pshs d
3052 3050 d8b3 cc 00 30      ldd #48
3053 3051 d8b6 e7 f1        stb [,s++]
3054 3052 d8b8 7e d8 cc      jmp cc100
3055 3053                   cc99:
3056 3054 d8bb cc 70 35      ldd #buffer
3057 3055 d8be 34 06        pshs d
3058 3056 d8c0 cc 00 03      ldd #3
3059 3057 d8c3 e3 e1        addd ,s++
3060 3058 d8c5 34 06        pshs d

```



```
3061 3059 d8c7 cc 00 bd      ldd #189
3062 3060 d8ca e7 f1      stb [,s++]
3063 3061                    cc100:
3064 3062 d8cc f6 70 04    ldb n
3065 3063 d8cf 1d          sex
3066 3064 d8d0 34 06      pshs d
3067 3065 d8d2 cc 00 40    ldd #64
3068 3066 d8d5 a4 e0      anda ,s+
3069 3067 d8d7 e4 e0      andb ,s+
3070 3068 d8d9 10 83 00 00  cmpd #0
3071 3069 d8dd 10 27 00 14  lbeq cc101
3072 3070 d8e1 cc 70 35    ldd #buffer
3073 3071 d8e4 34 06      pshs d
3074 3072 d8e6 cc 00 04    ldd #4
3075 3073 d8e9 e3 e1      addd ,s++
3076 3074 d8eb 34 06      pshs d
3077 3075 d8ed cc 00 30    ldd #48
3078 3076 d8f0 e7 f1      stb [,s++]
3079 3077 d8f2 7e d9 06    jmp cc102
3080 3078                    cc101:
3081 3079 d8f5 cc 70 35    ldd #buffer
3082 3080 d8f8 34 06      pshs d
3083 3081 d8fa cc 00 04    ldd #4
3084 3082 d8fd e3 e1      addd ,s++
3085 3083 d8ff 34 06      pshs d
3086 3084 d901 cc 00 bd      ldd #189
3087 3085 d904 e7 f1      stb [,s++]
3088 3086                    cc102:
3089 3087 d906 f6 70 04    ldb n
3090 3088 d909 1d          sex
3091 3089 d90a 34 06      pshs d
3092 3090 d90c cc 00 80    ldd #128
3093 3091 d90f a4 e0      anda ,s+
3094 3092 d911 e4 e0      andb ,s+
3095 3093 d913 10 83 00 00  cmpd #0
3096 3094 d917 10 27 00 14  lbeq cc103
3097 3095 d91b cc 70 35    ldd #buffer
3098 3096 d91e 34 06      pshs d
3099 3097 d920 cc 00 05    ldd #5
3100 3098 d923 e3 e1      addd ,s++
3101 3099 d925 34 06      pshs d
3102 3100 d927 cc 00 30    ldd #48
3103 3101 d92a e7 f1      stb [,s++]
3104 3102 d92c 7e d9 40    jmp cc104
3105 3103                    cc103:
3106 3104 d92f cc 70 35    ldd #buffer
3107 3105 d932 34 06      pshs d
3108 3106 d934 cc 00 05    ldd #5
3109 3107 d937 e3 e1      addd ,s++
3110 3108 d939 34 06      pshs d
3111 3109 d93b cc 00 bd      ldd #189
3112 3110 d93e e7 f1      stb [,s++]
3113 3111                    cc104:
3114 3112 d940 cc 70 35    ldd #buffer
3115 3113 d943 34 06      pshs d
3116 3114 d945 cc 00 01    ldd #1
3117 3115 d948 e3 e1      addd ,s++
3118 3116 d94a 34 06      pshs d
3119 3117 d94c cc 00 8d    ldd #141
3120 3118 d94f e7 f1      stb [,s++]
```



```
3121 3119 d951 cc 70 35      ldd #buffer
3122 3120 d954 34 06      pshs d
3123 3121 d956 cc 00 00      ldd #0
3124 3122 d959 e3 e1      addd ,s++
3125 3123 d95b 34 06      pshs d
3126 3124 d95d cc 00 37      ldd #55
3127 3125 d960 e7 f1      stb [,s++]
3128 3126 d962 39          rts
3129 3127
3130 3128                  * .global reg_disp
3131 3129                  reg_disp:
3132 3130 d963 f6 70 09      ldb key
3133 3131 d966 1d          sex
3134 3132 d967 7e d9 a9      jmp cc107
3135 3133                  cc108:
3136 3134 d96a bd d3 65      jsr acca
3137 3135 d96d 7e d9 d6      jmp cc106
3138 3136                  cc109:
3139 3137 d970 bd d4 16      jsr accb
3140 3138 d973 7e d9 d6      jmp cc106
3141 3139                  cc110:
3142 3140 d976 bd d4 c7      jsr ab
3143 3141 d979 7e d9 d6      jmp cc106
3144 3142                  cc111:
3145 3143 d97c bd d5 c2      jsr reg_x
3146 3144 d97f 7e d9 d6      jmp cc106
3147 3145                  cc112:
3148 3146 d982 bd d5 f5      jsr reg_y
3149 3147 d985 7e d9 d6      jmp cc106
3150 3148                  cc113:
3151 3149 d988 bd d6 28      jsr reg_u
3152 3150 d98b 7e d9 d6      jmp cc106
3153 3151                  cc114:
3154 3152 d98e bd d6 5b      jsr reg_s
3155 3153 d991 7e d9 d6      jmp cc106
3156 3154                  cc115:
3157 3155 d994 bd d6 8e      jsr reg_dp
3158 3156 d997 7e d9 d6      jmp cc106
3159 3157                  cc116:
3160 3158 d99a bd d7 3f      jsr low_cc
3161 3159 d99d 7e d9 d6      jmp cc106
3162 3160                  cc117:
3163 3161 d9a0 bd d8 51      jsr hi_cc
3164 3162 d9a3 7e d9 d6      jmp cc106
3165 3163 d9a6 7e d9 d6      jmp cc106
3166 3164                  cc107:
3167 3165 d9a9 bd c0 f9      jsr ccswitch
3168 3166 d9ac d9 6a 00 00      FDB cc108,0
3169 3167 d9b0 d9 70 00 01      FDB cc109,1
3170 3168 d9b4 d9 76 00 02      FDB cc110,2
3171 3169 d9b8 d9 7c 00 06      FDB cc111,6
3172 3170 d9bc d9 82 00 07      FDB cc112,7
3173 3171 d9c0 d9 88 00 09      FDB cc113,9
3174 3172 d9c4 d9 8e 00 0a      FDB cc114,10
3175 3173 d9c8 d9 94 00 08      FDB cc115,8
3176 3174 d9cc d9 9a 00 05      FDB cc116,5
3177 3175 d9d0 d9 a0 00 04      FDB cc117,4
3178 3176 d9d4 00 00          FDB 0
3179 3177                  cc106:
3180 3178 d9d6 39          rts
```

```

3181 3179
3182 3180 * .global insert
3183 3181 insert:
3184 3182 d9d7 f6 70 24 ldb state
3185 3183 d9da 1d sex
3186 3184 d9db 34 06 pshs d
3187 3185 d9dd cc 00 01 ldd #1
3188 3186 d9e0 10 a3 e1 cmpd ,s++
3189 3187 d9e3 27 05 beq *+7
3190 3188 d9e5 cc 00 00 ldd #0
3191 3189 d9e8 20 03 bra *+5
3192 3190 d9ea cc 00 01 ldd #1
3193 3191 d9ed 10 83 00 00 cmpd #0
3194 3192 d9f1 10 26 00 24 lbne cc119
3195 3193 d9f5 f6 70 24 ldb state
3196 3194 d9f8 1d sex
3197 3195 d9f9 34 06 pshs d
3198 3196 d9fb cc 00 02 ldd #2
3199 3197 d9fe 10 a3 e1 cmpd ,s++
3200 3198 da01 27 05 beq *+7
3201 3199 da03 cc 00 00 ldd #0
3202 3200 da06 20 03 bra *+5
3203 3201 da08 cc 00 01 ldd #1
3204 3202 da0b 10 83 00 00 cmpd #0
3205 3203 da0f 10 26 00 06 lbne cc119
3206 3204 da13 cc 00 00 ldd #0
3207 3205 da16 7e da 1c jmp cc120
3208 3206 cc119:
3209 3207 da19 cc 00 01 ldd #1
3210 3208 cc120:
3211 3209 da1c 10 83 00 00 cmpd #0
3212 3210 da20 10 27 00 8e lbeq cc118
3213 3211 da24 fc 70 16 ldd PC
3214 3212 da27 fd 70 43 std dptr
3215 3213 da2a cc 02 00 ldd #512
3216 3214 da2d fd 70 02 std j
3217 3215 cc123:
3218 3216 da30 fc 70 02 ldd j
3219 3217 da33 34 06 pshs d
3220 3218 da35 cc 00 00 ldd #0
3221 3219 da38 10 a3 e1 cmpd ,s++
3222 3220 da3b 2d 05 blt *+7
3223 3221 da3d cc 00 00 ldd #0
3224 3222 da40 20 03 bra *+5
3225 3223 da42 cc 00 01 ldd #1
3226 3224 da45 10 83 00 00 cmpd #0
3227 3225 da49 10 27 00 3f lbeq cc122
3228 3226 da4d 7e da 5f jmp cc124
3229 3227 cc121:
3230 3228 da50 fc 70 02 ldd j
3231 3229 da53 83 00 01 subd #1
3232 3230 da56 fd 70 02 std j
3233 3231 da59 c3 00 01 addd #1
3234 3232 da5c 7e da 30 jmp cc123
3235 3233 cc124:
3236 3234 da5f fc 70 43 ldd dptr
3237 3235 da62 34 06 pshs d
3238 3236 da64 fc 70 02 ldd j
3239 3237 da67 e3 e1 addd ,s++
3240 3238 da69 34 06 pshs d

```

```

3241 3239 da6b fc 70 43      ldd  dptr
3242 3240 da6e 34 06      pshs d
3243 3241 da70 fc 70 02      ldd  j
3244 3242 da73 e3 e1      addd ,s++
3245 3243 da75 34 06      pshs d
3246 3244 da77 cc 00 01      ldd  #1
3247 3245 da7a 35 10      puls x
3248 3246 da7c 34 06      pshs d
3249 3247 da7e 1f 10      tfr  x,d
3250 3248 da80 a3 e1      subd ,s++
3251 3249 da82 34 06      pshs d
3252 3250 da84 e6 f1      ldb  [,s++]
3253 3251 da86 1d          sex
3254 3252 da87 e7 f1      stb  [,s++]
3255 3253 da89 7e da 50      jmp  cc121
3256 3254                  cc122:
3257 3255 da8c fc 70 43      ldd  dptr
3258 3256 da8f 34 06      pshs d
3259 3257 da91 cc 00 01      ldd  #1
3260 3258 da94 e3 e1      addd ,s++
3261 3259 da96 34 06      pshs d
3262 3260 da98 cc 00 00      ldd  #0
3263 3261 da9b e7 f1      stb  [,s++]
3264 3262 da9d fc 70 16      ldd  PC
3265 3263 daa0 c3 00 01      addd #1
3266 3264 daa3 fd 70 16      std  PC
3267 3265 daa6 83 00 01      subd #1
3268 3266 daa9 bd ce 1b      jsr  read_mem
3269 3267 daac cc 00 02      ldd  #2
3270 3268 daaf f7 70 24      stb  state
3271 3269                  cc118:
3272 3270 dab2 39          rts
3273 3271
3274 3272                  * .global cut_byte
3275 3273                  cut_byte:
3276 3274 dab3 f6 70 24      ldb  state
3277 3275 dab6 1d          sex
3278 3276 dab7 34 06      pshs d
3279 3277 dab9 cc 00 01      ldd  #1
3280 3278 dab0 10 a3 e1      cmpd ,s++
3281 3279 dabf 27 05      beq  *+7
3282 3280 dac1 cc 00 00      ldd  #0
3283 3281 dac4 20 03      bra  *+5
3284 3282 dac6 cc 00 01      ldd  #1
3285 3283 dac9 10 83 00 00      cmpd #0
3286 3284 dacd 10 26 00 24      lbne cc126
3287 3285 dad1 f6 70 24      ldb  state
3288 3286 dad4 1d          sex
3289 3287 dad5 34 06      pshs d
3290 3288 dad7 cc 00 02      ldd  #2
3291 3289 dada 10 a3 e1      cmpd ,s++
3292 3290 dadd 27 05      beq  *+7
3293 3291 dadf cc 00 00      ldd  #0
3294 3292 dae2 20 03      bra  *+5
3295 3293 dae4 cc 00 01      ldd  #1
3296 3294 dae7 10 83 00 00      cmpd #0
3297 3295 daeb 10 26 00 06      lbne cc126
3298 3296 daef cc 00 00      ldd  #0
3299 3297 daf2 7e da f8      jmp  cc127
3300 3298                  cc126:

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```

3301 3299 daf5 cc 00 01      ldd #1
3302 3300                    cc127:
3303 3301 daf8 10 83 00 00    cmpd #0
3304 3302 dafc 10 27 00 6b    lbeq cc125
3305 3303 db00 fc 70 16      ldd PC
3306 3304 db03 fd 70 43      std dptr
3307 3305 db06 cc 00 00      ldd #0
3308 3306 db09 fd 70 02      std j
3309 3307                    cc130:
3310 3308 db0c fc 70 02      ldd j
3311 3309 db0f 34 06         pshs d
3312 3310 db11 cc 02 00      ldd #512
3313 3311 db14 10 a3 e1      cmpd ,s++
3314 3312 db17 2e 05         bgt *+7
3315 3313 db19 cc 00 00      ldd #0
3316 3314 db1c 20 03         bra *+5
3317 3315 db1e cc 00 01      ldd #1
3318 3316 db21 10 83 00 00    cmpd #0
3319 3317 db25 10 27 00 39    lbeq cc129
3320 3318 db29 7e db 3b      jmp cc131
3321 3319                    cc128:
3322 3320 db2c fc 70 02      ldd j
3323 3321 db2f c3 00 01      addd #1
3324 3322 db32 fd 70 02      std j
3325 3323 db35 83 00 01      subd #1
3326 3324 db38 7e db 0c      jmp cc130
3327 3325                    cc131:
3328 3326 db3b fc 70 43      ldd dptr
3329 3327 db3e 34 06         pshs d
3330 3328 db40 fc 70 02      ldd j
3331 3329 db43 e3 e1         addd ,s++
3332 3330 db45 34 06         pshs d
3333 3331 db47 fc 70 43      ldd dptr
3334 3332 db4a 34 06         pshs d
3335 3333 db4c fc 70 02      ldd j
3336 3334 db4f e3 e1         addd ,s++
3337 3335 db51 34 06         pshs d
3338 3336 db53 cc 00 01      ldd #1
3339 3337 db56 e3 e1         addd ,s++
3340 3338 db58 34 06         pshs d
3341 3339 db5a e6 f1         ldb [,s++]
3342 3340 db5c 1d             sex
3343 3341 db5d e7 f1         stb [,s++]
3344 3342 db5f 7e db 2c      jmp cc128
3345 3343                    cc129:
3346 3344 db62 bd ce 1b      jsr read_mem
3347 3345 db65 cc 00 02      ldd #2
3348 3346 db68 f7 70 24      stb state
3349 3347                    cc125:
3350 3348 db6b 39           rts
3351 3349
3352 3350                    * .global key_test
3353 3351                    key_test:
3354 3352 db6c 1c ef         andcc #$ef
3355 3353 db6e cc 00 00      ldd #0
3356 3354 db71 fd 70 22      std t
3357 3355 db74 cc 70 35      ldd #buffer
3358 3356 db77 34 06         pshs d
3359 3357 db79 cc 00 00      ldd #0
3360 3358 db7c e3 e1         addd ,s++

```

```

3361 3359 db7e 34 06          pshs d
3362 3360 db80 cc 00 00      ldd #0
3363 3361 db83 e7 f1        stb [,s++]
3364 3362 db85 cc 70 35      ldd #buffer
3365 3363 db88 34 06          pshs d
3366 3364 db8a cc 00 01      ldd #1
3367 3365 db8d e3 e1        addd ,s++
3368 3366 db8f 34 06          pshs d
3369 3367 db91 cc 00 00      ldd #0
3370 3368 db94 e7 f1        stb [,s++]
3371 3369                      cc132:
3372 3370 db96 cc 00 01      ldd #1
3373 3371 db99 10 83 00 00    cmpd #0
3374 3372 db9d 10 27 00 4d    lbeq cc133
3375 3373                      cc134:
3376 3374 dba1 f6 70 0e      ldb tick
3377 3375 dba4 1d            sex
3378 3376 dba5 34 06          pshs d
3379 3377 dba7 cc 00 64      ldd #100
3380 3378 dbaa 10 a3 e1      cmpd ,s++
3381 3379 dbad 2e 05          bgt *+7
3382 3380 dbaf cc 00 00      ldd #0
3383 3381 dbb2 20 03          bra *+5
3384 3382 dbb4 cc 00 01      ldd #1
3385 3383 dbb7 10 83 00 00    cmpd #0
3386 3384 dbbb 10 27 00 06    lbeq cc135
3387 3385 dbbf bd c8 96      jsr scan
3388 3386 dbc2 7e db a1      jmp cc134
3389 3387                      cc135:
3390 3388 dbc5 cc 00 00      ldd #0
3391 3389 dbc8 f7 70 0e      stb tick
3392 3390 dbcb fc 70 22      ldd t
3393 3391 dbce 34 06          pshs d
3394 3392 dbd0 bd cc 9c      jsr hex4
3395 3393 dbd3 32 62          leas 2,s
3396 3394 dbd5 fc 70 3b      ldd gpiol
3397 3395 dbd8 34 06          pshs d
3398 3396 dbda fc 70 22      ldd t
3399 3397 dbdd e7 f1        stb [,s++]
3400 3398 dbdf fc 70 22      ldd t
3401 3399 dbe2 c3 00 01      addd #1
3402 3400 dbe5 fd 70 22      std t
3403 3401 dbe8 83 00 01      subd #1
3404 3402 dbeb 7e db 96      jmp cc132
3405 3403                      cc133:
3406 3404 dbee 39            rts
3407 3405
3408 3406                      * .global clear_bu
3409 3407                      clear_bu:
3410 3408 dbef cc 00 00      ldd #0
3411 3409 dbf2 fd 70 00      std i
3412 3410                      cc138:
3413 3411 dbf5 fc 70 00      ldd i
3414 3412 dbf8 34 06          pshs d
3415 3413 dbfa cc 00 06      ldd #6
3416 3414 dbfd 10 a3 e1      cmpd ,s++
3417 3415 dc00 2e 05          bgt *+7
3418 3416 dc02 cc 00 00      ldd #0
3419 3417 dc05 20 03          bra *+5
3420 3418 dc07 cc 00 01      ldd #1

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```

3421 3419 dc0a 10 83 00 00      cmpd #0
3422 3420 dc0e 10 27 00 26      lbeq cc137
3423 3421 dc12 7e dc 24        jmp cc139
3424 3422                        cc136:
3425 3423 dc15 fc 70 00        ldd i
3426 3424 dc18 c3 00 01        addd #1
3427 3425 dc1b fd 70 00        std i
3428 3426 dc1e 83 00 01        subd #1
3429 3427 dc21 7e db f5        jmp cc138
3430 3428                        cc139:
3431 3429 dc24 cc 70 35        ldd #buffer
3432 3430 dc27 34 06          pshs d
3433 3431 dc29 fc 70 00        ldd i
3434 3432 dc2c e3 e1          addd ,s++
3435 3433 dc2e 34 06          pshs d
3436 3434 dc30 cc 00 00        ldd #0
3437 3435 dc33 e7 f1          stb [,s++]
3438 3436 dc35 7e dc 15        jmp cc136
3439 3437                        cc137:
3440 3438 dc38 39            rts
3441 3439
3442 3440                        * .global key_cal
3443 3441                        key_cal:
3444 3442 dc39 cc 00 04        ldd #4
3445 3443 dc3c f7 70 24        stb state
3446 3444 dc3f bd db ef        jsr clear_bu
3447 3445 dc42 cc 70 35        ldd #buffer
3448 3446 dc45 34 06          pshs d
3449 3447 dc47 cc 00 02        ldd #2
3450 3448 dc4a e3 e1          addd ,s++
3451 3449 dc4c 34 06          pshs d
3452 3450 dc4e cc 00 bd        ldd #189
3453 3451 dc51 e7 f1          stb [,s++]
3454 3452 dc53 cc 00 00        ldd #0
3455 3453 dc56 fd 70 1c        std start
3456 3454 dc59 cc 00 00        ldd #0
3457 3455 dc5c fd 70 20        std desti
3458 3456 dc5f cc 00 00        ldd #0
3459 3457 dc62 f7 70 0b        stb hit
3460 3458 dc65 39            rts
3461 3459
3462 3460                        * .global enter_nu
3463 3461                        enter_nu:
3464 3462 dc66 f6 70 0b        ldb hit
3465 3463 dc69 1d            sex
3466 3464 dc6a 34 06          pshs d
3467 3465 dc6c cc 00 00        ldd #0
3468 3466 dc6f 10 a3 e1        cmpd ,s++
3469 3467 dc72 27 05          beq *+7
3470 3468 dc74 cc 00 00        ldd #0
3471 3469 dc77 20 03          bra *+5
3472 3470 dc79 cc 00 01        ldd #1
3473 3471 dc7c 10 83 00 00      cmpd #0
3474 3472 dc80 10 27 00 06      lbeq cc140
3475 3473 dc84 cc 00 00        ldd #0
3476 3474 dc87 fd 70 1a        std num
3477 3475                        cc140:
3478 3476 dc8a cc 00 01        ldd #1
3479 3477 dc8d f7 70 0b        stb hit
3480 3478 dc90 cc 70 1a        ldd #num

```

```
3481 3479 dc93 34 06      pshs d
3482 3480 dc95 cc 00 04      ldd #4
3483 3481 dc98 ae f4      ldx [,s]
3484 3482 dc9a 34 10      pshs x
3485 3483 dc9c 5a          decb
3486 3484 dc9d 2d 06      blt  *+8
3487 3485 dc9f 68 61      asl  1,s
3488 3486 dca1 69 e4      rol  ,s
3489 3487 dca3 20 f7      bra  *-7
3490 3488 dca5 35 06      puls d
3491 3489 dca7 fd 70 1a      std  num
3492 3490 dcaa cc 70 1a      ldd  #num
3493 3491 dcad 34 06      pshs d
3494 3492 dcaf f6 70 09      ldb  key
3495 3493 dcb2 1d          sex
3496 3494 dcb3 ae f4      ldx [,s]
3497 3495 dcb5 34 10      pshs x
3498 3496 dcb7 aa e0      ora  ,s+
3499 3497 dcb9 ea e0      orb  ,s+
3500 3498 dcbb fd 70 1a      std  num
3501 3499 dcbe fc 70 1a      ldd  num
3502 3500 dcc1 34 06      pshs d
3503 3501 dcc3 bd cc 9c      jsr  hex4
3504 3502 dcc6 32 62      leas 2,s
3505 3503 dcc8 32 64      leas 4,s
3506 3504 dcca 39          rts
3507 3505
3508 3506      * .global key_copy
3509 3507      key_copy:
3510 3508 dccb cc 00 05      ldd  #5
3511 3509 dcce f7 70 24      stb  state
3512 3510 dcd1 cc 00 00      ldd  #0
3513 3511 dcd4 f7 70 0b      stb  hit
3514 3512 dcd7 bd db ef      jsr  clear_bu
3515 3513 dcda cc 70 35      ldd  #buffer
3516 3514 dcdd 34 06      pshs d
3517 3515 dcdf cc 00 02      ldd  #2
3518 3516 dce2 e3 e1      addd ,s++
3519 3517 dce4 34 06      pshs d
3520 3518 dce6 cc 00 bd      ldd  #189
3521 3519 dce9 e7 f1      stb  [,s++]
3522 3520 dceb cc 70 35      ldd  #buffer
3523 3521 dcee 34 06      pshs d
3524 3522 dcf0 cc 00 00      ldd  #0
3525 3523 dcf3 e3 e1      addd ,s++
3526 3524 dcf5 34 06      pshs d
3527 3525 dcf7 cc 00 ae      ldd  #174
3528 3526 dcfa e7 f1      stb  [,s++]
3529 3527 dcfc cc 70 35      ldd  #buffer
3530 3528 dcff 34 06      pshs d
3531 3529 dd01 cc 00 01      ldd  #1
3532 3530 dd04 e3 e1      addd ,s++
3533 3531 dd06 34 06      pshs d
3534 3532 dd08 cc 00 00      ldd  #0
3535 3533 dd0b e7 f1      stb  [,s++]
3536 3534 dd0d 39          rts
3537 3535
3538 3536      * .global key_exe
3539 3537      key_exe:
3540 3538 dd0e f6 70 0d      ldb  flag
```



```

3541 3539 dd11 1d sex
3542 3540 dd12 34 06 pshs d
3543 3541 dd14 cc 00 00 ldd #0
3544 3542 dd17 10 a3 e1 cmpd ,s++
3545 3543 dd1a 27 05 beq *+7
3546 3544 dd1c cc 00 00 ldd #0
3547 3545 dd1f 20 03 bra *+5
3548 3546 dd21 cc 00 01 ldd #1
3549 3547 dd24 10 83 00 00 cmpd #0
3550 3548 dd28 10 27 00 03 lbeq cc141
3551 3549 dd2c bd de 94 jsr beep
3552 3550 cc141:
3553 3551 dd2f f6 70 09 ldb key
3554 3552 dd32 1d sex
3555 3553 dd33 34 06 pshs d
3556 3554 dd35 cc 00 0f ldd #15
3557 3555 dd38 10 a3 e1 cmpd ,s++
3558 3556 dd3b 2d 05 blt *+7
3559 3557 dd3d cc 00 00 ldd #0
3560 3558 dd40 20 03 bra *+5
3561 3559 dd42 cc 00 01 ldd #1
3562 3560 dd45 10 83 00 00 cmpd #0
3563 3561 dd49 10 27 00 b5 lbeq cc142
3564 3562 dd4d f6 70 09 ldb key
3565 3563 dd50 1d sex
3566 3564 dd51 7e dd be jmp cc145
3567 3565 cc146:
3568 3566 dd54 bd ce 22 jsr key_addr
3569 3567 dd57 7e dd ff jmp cc144
3570 3568 cc147:
3571 3569 dd5a bd ce 35 jsr key_data
3572 3570 dd5d 7e dd ff jmp cc144
3573 3571 cc148:
3574 3572 dd60 bd ce 48 jsr key_plus
3575 3573 dd63 7e dd ff jmp cc144
3576 3574 cc149:
3577 3575 dd66 bd cf 7b jsr key_minu
3578 3576 dd69 7e dd ff jmp cc144
3579 3577 cc150:
3580 3578 dd6c bd d0 6d jsr key_PC
3581 3579 dd6f 7e dd ff jmp cc144
3582 3580 cc151:
3583 3581 dd72 bd d1 45 jsr key_go
3584 3582 dd75 7e dd ff jmp cc144
3585 3583 cc152:
3586 3584 dd78 bd d2 d6 jsr key_reg
3587 3585 dd7b 7e dd ff jmp cc144
3588 3586 cc153:
3589 3587 dd7e bd d9 d7 jsr insert
3590 3588 dd81 7e dd ff jmp cc144
3591 3589 cc154:
3592 3590 dd84 bd da b3 jsr cut_byte
3593 3591 dd87 7e dd ff jmp cc144
3594 3592 cc155:
3595 3593 dd8a f6 70 0d ldb flag
3596 3594 dd8d 1d sex
3597 3595 dd8e 34 06 pshs d
3598 3596 dd90 cc 00 01 ldd #1
3599 3597 dd93 a8 e0 eora ,s+
3600 3598 dd95 e8 e0 eorb ,s+

```



```
3601 3599 dd97 f7 70 0d      stb  flag
3602 3600 dd9a 7e dd ff      jmp  cc144
3603 3601                    cc156:
3604 3602 dd9d bd db 6c      jsr  key_test
3605 3603 dda0 7e dd ff      jmp  cc144
3606 3604                    cc157:
3607 3605 dda3 bd dc 39      jsr  key_cal
3608 3606 dda6 7e dd ff      jmp  cc144
3609 3607                    cc158:
3610 3608 dda9 bd dc cb      jsr  key_copy
3611 3609 ddac 7e dd ff      jmp  cc144
3612 3610                    cc159:
3613 3611 ddaf bd e2 33      jsr  key_dump
3614 3612 ddb2 7e dd ff      jmp  cc144
3615 3613                    cc160:
3616 3614 ddb5 bd e6 ef      jsr  key_load
3617 3615 ddb8 7e dd ff      jmp  cc144
3618 3616 ddbb 7e dd ff      jmp  cc144
3619 3617                    cc145:
3620 3618 ddbe bd c0 f9      jsr  ccswitch
3621 3619 ddc1 dd 54 00 13    FDB  cc146,19
3622 3620 ddc5 dd 5a 00 12    FDB  cc147,18
3623 3621 ddc9 dd 60 00 17    FDB  cc148,23
3624 3622 ddcd dd 66 00 16    FDB  cc149,22
3625 3623 ddd1 dd 6c 00 10    FDB  cc150,16
3626 3624 ddd5 dd 72 00 1b    FDB  cc151,27
3627 3625 ddd9 dd 78 00 11    FDB  cc152,17
3628 3626 dddd dd 7e 00 18    FDB  cc153,24
3629 3627 dde1 dd 84 00 19    FDB  cc154,25
3630 3628 dde5 dd 8a 00 15    FDB  cc155,21
3631 3629 dde9 dd 9d 00 1a    FDB  cc156,26
3632 3630 dded dd a3 00 1d    FDB  cc157,29
3633 3631 ddf1 dd a9 00 1c    FDB  cc158,28
3634 3632 ddf5 dd af 00 1e    FDB  cc159,30
3635 3633 ddf9 dd b5 00 1f    FDB  cc160,31
3636 3634 ddfd 00 00          FDB  0
3637 3635                    cc144:
3638 3636 ddff 7e de 57      jmp  cc161
3639 3637                    cc142:
3640 3638 de02 f6 70 24      ldb  state
3641 3639 de05 1d            sex
3642 3640 de06 7e de 36      jmp  cc164
3643 3641                    cc165:
3644 3642 de09 bd d0 77      jsr  hex_addr
3645 3643 de0c 7e de 57      jmp  cc163
3646 3644                    cc166:
3647 3645 de0f bd cf f8      jsr  data_hex
3648 3646 de12 7e de 57      jmp  cc163
3649 3647                    cc167:
3650 3648 de15 bd d9 63      jsr  reg_disp
3651 3649 de18 7e de 57      jmp  cc163
3652 3650                    cc168:
3653 3651 de1b bd dc 66      jsr  enter_nu
3654 3652 de1e 7e de 57      jmp  cc163
3655 3653                    cc169:
3656 3654 de21 bd dc 66      jsr  enter_nu
3657 3655 de24 7e de 57      jmp  cc163
3658 3656                    cc170:
3659 3657 de27 bd dc 66      jsr  enter_nu
3660 3658 de2a 7e de 57      jmp  cc163
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3661 3659 cc171:
3662 3660 de2d bd dc 66 jsr enter_nu
3663 3661 de30 7e de 57 jmp cc163
3664 3662 de33 7e de 57 jmp cc163
3665 3663 cc164:
3666 3664 de36 bd c0 f9 jsr ccswitch
3667 3665 de39 de 09 00 01 FDB cc165,1
3668 3666 de3d de 0f 00 02 FDB cc166,2
3669 3667 de41 de 15 00 03 FDB cc167,3
3670 3668 de45 de 1b 00 04 FDB cc168,4
3671 3669 de49 de 21 00 05 FDB cc169,5
3672 3670 de4d de 27 00 06 FDB cc170,6
3673 3671 de51 de 2d 00 07 FDB cc171,7
3674 3672 de55 00 00 FDB 0
3675 3673 cc163:
3676 3674 cc161:
3677 3675 de57 39 rts
3678 3676
3679 3677 * .global delay_be
3680 3678 delay_be:
3681 3679 de58 cc 00 00 ldd #0
3682 3680 de5b fd 70 02 std j
3683 3681 cc174:
3684 3682 de5e fc 70 02 ldd j
3685 3683 de61 34 06 pshs d
3686 3684 de63 cc 00 02 ldd #2
3687 3685 de66 10 a3 e1 cmpd ,s++
3688 3686 de69 2e 05 bgt *+7
3689 3687 de6b cc 00 00 ldd #0
3690 3688 de6e 20 03 bra *+5
3691 3689 de70 cc 00 01 ldd #1
3692 3690 de73 10 83 00 00 cmpd #0
3693 3691 de77 10 27 00 18 lbeq cc173
3694 3692 de7b 7e de 8d jmp cc175
3695 3693 cc172:
3696 3694 de7e fc 70 02 ldd j
3697 3695 de81 c3 00 01 addd #1
3698 3696 de84 fd 70 02 std j
3699 3697 de87 83 00 01 subd #1
3700 3698 de8a 7e de 5e jmp cc174
3701 3699 cc175:
3702 3700 de8d 7e de 7e jmp cc172
3703 3701 de90 7e de 7e jmp cc172
3704 3702 cc173:
3705 3703 de93 39 rts
3706 3704
3707 3705 * .global beep
3708 3706 beep:
3709 3707 de94 32 7f leas -1,s
3710 3708 de96 fc 70 3d ldd port2
3711 3709 de99 34 06 pshs d
3712 3710 de9b cc 00 00 ldd #0
3713 3711 de9e e7 f1 stb [,s++]
3714 3712 dea0 31 e4 leay 0,s
3715 3713 dea2 1f 20 tfr y,d
3716 3714 dea4 34 06 pshs d
3717 3715 dea6 cc 00 00 ldd #0
3718 3716 dea9 e7 f1 stb [,s++]
3719 3717 cc178:
3720 3718 deab 31 e4 leay 0,s

```

```

3721 3719 dead 1f 20          tfr  y,d
3722 3720 deaf 34 06          pshs d
3723 3721 deb1 e6 f1          ldb  [,s++]
3724 3722 deb3 1d              sex
3725 3723 deb4 34 06          pshs d
3726 3724 deb6 cc 00 3c       ldd  #60
3727 3725 deb9 10 a3 e1       cmpd ,s++
3728 3726 debc 2e 05          bgt  *+7
3729 3727 debe cc 00 00       ldd  #0
3730 3728 dec1 20 03          bra  *+5
3731 3729 dec3 cc 00 01       ldd  #1
3732 3730 dec6 10 83 00 00     cmpd #0
3733 3731 deca 10 27 00 38     lbeq cc177
3734 3732 dece 7e de e7       jmp  cc179
3735 3733                      cc176:
3736 3734 ded1 31 e4          leay 0,s
3737 3735 ded3 1f 20          tfr  y,d
3738 3736 ded5 34 06          pshs d
3739 3737 ded7 34 06          pshs d
3740 3738 ded9 e6 f1          ldb  [,s++]
3741 3739 dedb 1d              sex
3742 3740 dedc c3 00 01       addd #1
3743 3741 dedf e7 f1          stb  [,s++]
3744 3742 dee1 83 00 01       subd #1
3745 3743 dee4 7e de ab       jmp  cc178
3746 3744                      cc179:
3747 3745 dee7 fc 70 3f       ldd  port1
3748 3746 deea 34 06          pshs d
3749 3747 deec cc 00 80       ldd  #128
3750 3748 deef 43             coma
3751 3749 def0 53             comb
3752 3750 def1 e7 f1          stb  [,s++]
3753 3751 def3 bd de 58       jsr  delay_be
3754 3752 def6 fc 70 3f       ldd  port1
3755 3753 def9 34 06          pshs d
3756 3754 defb cc 00 ff       ldd  #255
3757 3755 defe e7 f1          stb  [,s++]
3758 3756 df00 bd de 58       jsr  delay_be
3759 3757 df03 7e de d1       jmp  cc176
3760 3758                      cc177:
3761 3759 df06 32 61          leas 1,s
3762 3760 df08 39             rts
3763 3761
3764 3762                      * .global scan1
3765 3763                      scan1:
3766 3764                      cc180:
3767 3765 df09 bd c8 96       jsr  scan
3768 3766 df0c 34 06          pshs d
3769 3767 df0e cc 00 01       ldd  #1
3770 3768 df11 43             coma
3771 3769 df12 53             comb
3772 3770 df13 c3 00 01       addd #1
3773 3771 df16 10 a3 e1       cmpd ,s++
3774 3772 df19 26 05          bne  *+7
3775 3773 df1b cc 00 00       ldd  #0
3776 3774 df1e 20 03          bra  *+5
3777 3775 df20 cc 00 01       ldd  #1
3778 3776 df23 10 83 00 00     cmpd #0
3779 3777 df27 10 27 00 06     lbeq cc181
3780 3778 df2b 7e df 09       jmp  cc180

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3781 3779 df2e 7e df 09      jmp cc180
3782 3780                    cc181:
3783 3781 df31 cc 00 03      ldd #3
3784 3782 df34 34 06      pshs d
3785 3783 df36 bd c8 53      jsr delay_ms
3786 3784 df39 32 62      leas 2,s
3787 3785                    cc182:
3788 3786 df3b bd c8 96      jsr scan
3789 3787 df3e 34 06      pshs d
3790 3788 df40 cc 00 01      ldd #1
3791 3789 df43 43          coma
3792 3790 df44 53          comb
3793 3791 df45 c3 00 01      addd #1
3794 3792 df48 10 a3 e1      cmpd ,s++
3795 3793 df4b 27 05      beq *+7
3796 3794 df4d cc 00 00      ldd #0
3797 3795 df50 20 03      bra *+5
3798 3796 df52 cc 00 01      ldd #1
3799 3797 df55 10 83 00 00    cmpd #0
3800 3798 df59 10 27 00 06    lbeq cc183
3801 3799 df5d 7e df 3b      jmp cc182
3802 3800 df60 7e df 3b      jmp cc182
3803 3801                    cc183:
3804 3802 df63 cc 00 03      ldd #3
3805 3803 df66 34 06      pshs d
3806 3804 df68 bd c8 53      jsr delay_ms
3807 3805 df6b 32 62      leas 2,s
3808 3806 df6d bd c8 96      jsr scan
3809 3807 df70 f7 70 09      stb key
3810 3808 df73 f6 70 09      ldb key
3811 3809 df76 1d          sex
3812 3810 df77 34 06      pshs d
3813 3811 df79 bd c3 21      jsr key_code
3814 3812 df7c 32 62      leas 2,s
3815 3813 df7e f7 70 09      stb key
3816 3814 df81 bd dd 0e      jsr key_exe
3817 3815 df84 39          rts
3818 3816
3819 3817                    * .global initacia
3820 3818                    initacia:
3821 3819 df85 32 7b          leas -5,s
3822 3820 df87 31 62          leay 2,s
3823 3821 df89 1f 20          tfr y,d
3824 3822 df8b 34 06      pshs d
3825 3823 df8d cc a0 00      ldd #-24576
3826 3824 df90 ed f1          std [,s++]
3827 3825 df92 31 e4          leay 0,s
3828 3826 df94 1f 20          tfr y,d
3829 3827 df96 34 06      pshs d
3830 3828 df98 cc 00 16      ldd #22
3831 3829 df9b e7 f1          stb [,s++]
3832 3830 df9d 31 61          leay 1,s
3833 3831 df9f 1f 20          tfr y,d
3834 3832 dfa1 34 06      pshs d
3835 3833 dfa3 cc 00 03      ldd #3
3836 3834 dfa6 e7 f1          stb [,s++]
3837 3835 dfa8 31 62          leay 2,s
3838 3836 dfaa 1f 20          tfr y,d
3839 3837 dfac 34 06      pshs d
3840 3838 dfae ec f1          ldd [,s++]

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```

3841 3839 dfb0 34 06      pshs d
3842 3840 dfb2 31 63      leay 3,s
3843 3841 dfb4 1f 20      tfr y,d
3844 3842 dfb6 34 06      pshs d
3845 3843 dfb8 e6 f1      ldb [,s++]
3846 3844 dfba 1d          sex
3847 3845 dfbb e7 f1      stb [,s++]
3848 3846 dfbd 31 62      leay 2,s
3849 3847 dfbf 1f 20      tfr y,d
3850 3848 dfc1 34 06      pshs d
3851 3849 dfc3 ec f1      ldd [,s++]
3852 3850 dfc5 34 06      pshs d
3853 3851 dfc7 31 62      leay 2,s
3854 3852 dfc9 1f 20      tfr y,d
3855 3853 dfcb 34 06      pshs d
3856 3854 dfcd e6 f1      ldb [,s++]
3857 3855 dfcf 1d          sex
3858 3856 dfd0 e7 f1      stb [,s++]
3859 3857 dfd2 31 64      leay 4,s
3860 3858 dfd4 1f 20      tfr y,d
3861 3859 dfd6 34 06      pshs d
3862 3860 dfd8 31 64      leay 4,s
3863 3861 dfda 1f 20      tfr y,d
3864 3862 dfdc 34 06      pshs d
3865 3863 dfde ec f1      ldd [,s++]
3866 3864 dfe0 34 06      pshs d
3867 3865 dfe2 cc 00 01    ldd #1
3868 3866 dfe5 e3 e1      addd ,s++
3869 3867 dfe7 34 06      pshs d
3870 3868 dfe9 e6 f1      ldb [,s++]
3871 3869 dfef 1d          sex
3872 3870 dfec e7 f1      stb [,s++]
3873 3871 dfef 32 65      leas 5,s
3874 3872 dff0 39          rts
3875 3873
3876 3874                * .global putchar
3877 3875                putchar:
3878 3876 dff1 32 7e      leas -2,s
3879 3877 dff3 31 e4      leay 0,s
3880 3878 dff5 1f 20      tfr y,d
3881 3879 dff7 34 06      pshs d
3882 3880 dff9 cc a0 00    ldd #-24576
3883 3881 dffc ed f1      std [,s++]
3884 3882                cc184:
3885 3883 dffe 31 e4      leay 0,s
3886 3884 e000 1f 20      tfr y,d
3887 3885 e002 34 06      pshs d
3888 3886 e004 ec f1      ldd [,s++]
3889 3887 e006 34 06      pshs d
3890 3888 e008 e6 f1      ldb [,s++]
3891 3889 e00a 1d          sex
3892 3890 e00b 34 06      pshs d
3893 3891 e00d cc 00 02    ldd #2
3894 3892 e010 a4 e0      anda ,s+
3895 3893 e012 e4 e0      andb ,s+
3896 3894 e014 34 06      pshs d
3897 3895 e016 cc 00 00    ldd #0
3898 3896 e019 10 a3 e1    cmpd ,s++
3899 3897 e01c 27 05      beq *+7
3900 3898 e01e cc 00 00    ldd #0

```

```

3901 3899 e021 20 03          bra  *+5
3902 3900 e023 cc 00 01      ldd  #1
3903 3901 e026 10 83 00 00   cmpd #0
3904 3902 e02a 10 27 00 06   lbeq cc185
3905 3903 e02e 7e df fe      jmp  cc184
3906 3904 e031 7e df fe      jmp  cc184
3907 3905                    cc185:
3908 3906 e034 31 e4         leay 0,s
3909 3907 e036 1f 20         tfr  y,d
3910 3908 e038 34 06         pshs d
3911 3909 e03a ec f1         ldd  [,s++]
3912 3910 e03c 34 06         pshs d
3913 3911 e03e cc 00 01      ldd  #1
3914 3912 e041 e3 e1         addd ,s++
3915 3913 e043 34 06         pshs d
3916 3914 e045 31 67         leay 7,s
3917 3915 e047 1f 20         tfr  y,d
3918 3916 e049 34 06         pshs d
3919 3917 e04b e6 f1         ldb  [,s++]
3920 3918 e04d 1d           sex
3921 3919 e04e e7 f1         stb  [,s++]
3922 3920 e050 32 62         leas 2,s
3923 3921 e052 39           rts
3924 3922
3925 3923                    * .global puts
3926 3924                    puts:
3927 3925                    cc186:
3928 3926 e053 31 62         leay 2,s
3929 3927 e055 1f 20         tfr  y,d
3930 3928 e057 34 06         pshs d
3931 3929 e059 ec f1         ldd  [,s++]
3932 3930 e05b 34 06         pshs d
3933 3931 e05d e6 f1         ldb  [,s++]
3934 3932 e05f 1d           sex
3935 3933 e060 10 83 00 00   cmpd #0
3936 3934 e064 10 27 00 29   lbeq cc187
3937 3935 e068 31 62         leay 2,s
3938 3936 e06a 1f 20         tfr  y,d
3939 3937 e06c 34 06         pshs d
3940 3938 e06e ec f1         ldd  [,s++]
3941 3939 e070 34 06         pshs d
3942 3940 e072 e6 f1         ldb  [,s++]
3943 3941 e074 1d           sex
3944 3942 e075 34 06         pshs d
3945 3943 e077 bd df f1      jsr  putchar
3946 3944 e07a 32 62         leas 2,s
3947 3945 e07c 31 62         leay 2,s
3948 3946 e07e 1f 20         tfr  y,d
3949 3947 e080 34 06         pshs d
3950 3948 e082 34 06         pshs d
3951 3949 e084 ec f1         ldd  [,s++]
3952 3950 e086 c3 00 01      addd #1
3953 3951 e089 ed f1         std  [,s++]
3954 3952 e08b 83 00 01      subd #1
3955 3953 e08e 7e e0 53      jmp  cc186
3956 3954                    cc187:
3957 3955 e091 39           rts
3958 3956
3959 3957                    * .global getchar
3960 3958                    getchar:

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```

3961 3959 e092 32 7d      leas -3,s
3962 3960 e094 31 e4      leay 0,s
3963 3961 e096 1f 20      tfr y,d
3964 3962 e098 34 06      pshs d
3965 3963 e09a cc a0 00   ldd #-24576
3966 3964 e09d ed f1      std [,s++]
3967 3965
cc188:
3968 3966 e09f 31 e4      leay 0,s
3969 3967 e0a1 1f 20      tfr y,d
3970 3968 e0a3 34 06      pshs d
3971 3969 e0a5 ec f1      ldd [,s++]
3972 3970 e0a7 34 06      pshs d
3973 3971 e0a9 e6 f1      ldb [,s++]
3974 3972 e0ab 1d          sex
3975 3973 e0ac 34 06      pshs d
3976 3974 e0ae cc 00 01   ldd #1
3977 3975 e0b1 a4 e0      anda ,s+
3978 3976 e0b3 e4 e0      andb ,s+
3979 3977 e0b5 34 06      pshs d
3980 3978 e0b7 cc 00 00   ldd #0
3981 3979 e0ba 10 a3 e1   cmpd ,s++
3982 3980 e0bd 27 05      beq *+7
3983 3981 e0bf cc 00 00   ldd #0
3984 3982 e0c2 20 03      bra *+5
3985 3983 e0c4 cc 00 01   ldd #1
3986 3984 e0c7 10 83 00 00  cmpd #0
3987 3985 e0cb 10 27 00 06  lbeq cc189
3988 3986 e0cf 7e e0 9f   jmp cc188
3989 3987 e0d2 7e e0 9f   jmp cc188
3990 3988
cc189:
3991 3989 e0d5 31 62      leay 2,s
3992 3990 e0d7 1f 20      tfr y,d
3993 3991 e0d9 34 06      pshs d
3994 3992 e0db 31 62      leay 2,s
3995 3993 e0dd 1f 20      tfr y,d
3996 3994 e0df 34 06      pshs d
3997 3995 e0e1 ec f1      ldd [,s++]
3998 3996 e0e3 34 06      pshs d
3999 3997 e0e5 cc 00 01   ldd #1
4000 3998 e0e8 e3 e1      addd ,s++
4001 3999 e0ea 34 06      pshs d
4002 4000 e0ec e6 f1      ldb [,s++]
4003 4001 e0ee 1d          sex
4004 4002 e0ef e7 f1      stb [,s++]
4005 4003 e0f1 31 62      leay 2,s
4006 4004 e0f3 1f 20      tfr y,d
4007 4005 e0f5 34 06      pshs d
4008 4006 e0f7 e6 f1      ldb [,s++]
4009 4007 e0f9 1d          sex
4010 4008 e0fa 32 63      leas 3,s
4011 4009 e0fc 39          rts
4012 4010
4013 4011
* .global newline
4014 4012
newline:
4015 4013 e0fd cc 00 0a     ldd #10
4016 4014 e100 34 06     pshs d
4017 4015 e102 bd df f1   jsr putchar
4018 4016 e105 32 62     leas 2,s
4019 4017 e107 cc 00 0d   ldd #13
4020 4018 e10a 34 06     pshs d

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```
4021 4019 e10c bd df f1      jsr putchar
4022 4020 e10f 32 62      leas 2,s
4023 4021 e111 39        rts
4024 4022
4025 4023                * .global send_hex
4026 4024                send_hex:
4027 4025 e112 31 63      leay 3,s
4028 4026 e114 1f 20      tfr y,d
4029 4027 e116 34 06      pshs d
4030 4028 e118 e6 f1      ldb [,s++]
4031 4029 e11a 1d        sex
4032 4030 e11b 34 06      pshs d
4033 4031 e11d cc 00 04    ldd #4
4034 4032 e120 5a        decb
4035 4033 e121 2d 06      blt  *+8
4036 4034 e123 64 e4      lsr  ,s
4037 4035 e125 66 61      ror  1,s
4038 4036 e127 20 f7      bra  *-7
4039 4037 e129 35 06      puls d
4040 4038 e12b f7 70 05    stb k
4041 4039 e12e f6 70 05    ldb k
4042 4040 e131 1d        sex
4043 4041 e132 34 06      pshs d
4044 4042 e134 cc 00 0f    ldd #15
4045 4043 e137 a4 e0      anda ,s+
4046 4044 e139 e4 e0      andb ,s+
4047 4045 e13b f7 70 05    stb k
4048 4046 e13e f6 70 05    ldb k
4049 4047 e141 1d        sex
4050 4048 e142 34 06      pshs d
4051 4049 e144 cc 00 09    ldd #9
4052 4050 e147 10 a3 e1    cmpd ,s++
4053 4051 e14a 2d 05      blt  *+7
4054 4052 e14c cc 00 00    ldd #0
4055 4053 e14f 20 03      bra  *+5
4056 4054 e151 cc 00 01    ldd #1
4057 4055 e154 10 83 00 00  cmpd #0
4058 4056 e158 10 27 00 15  lbeq cc190
4059 4057 e15c f6 70 05    ldb k
4060 4058 e15f 1d        sex
4061 4059 e160 34 06      pshs d
4062 4060 e162 cc 00 37    ldd #55
4063 4061 e165 e3 e1      addd ,s++
4064 4062 e167 34 06      pshs d
4065 4063 e169 bd df f1      jsr putchar
4066 4064 e16c 32 62      leas 2,s
4067 4065 e16e 7e e1 83    jmp cc191
4068 4066                cc190:
4069 4067 e171 f6 70 05    ldb k
4070 4068 e174 1d        sex
4071 4069 e175 34 06      pshs d
4072 4070 e177 cc 00 30    ldd #48
4073 4071 e17a e3 e1      addd ,s++
4074 4072 e17c 34 06      pshs d
4075 4073 e17e bd df f1      jsr putchar
4076 4074 e181 32 62      leas 2,s
4077 4075                cc191:
4078 4076 e183 31 63      leay 3,s
4079 4077 e185 1f 20      tfr y,d
4080 4078 e187 34 06      pshs d
```



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4081 4079 e189 e6 f1          ldb  [,s++]
4082 4080 e18b 1d          sex
4083 4081 e18c 34 06       pshs d
4084 4082 e18e cc 00 0f   ldd  #15
4085 4083 e191 a4 e0       anda ,s+
4086 4084 e193 e4 e0       andb ,s+
4087 4085 e195 f7 70 05   stb  k
4088 4086 e198 f6 70 05   ldb  k
4089 4087 e19b 1d          sex
4090 4088 e19c 34 06       pshs d
4091 4089 e19e cc 00 09   ldd  #9
4092 4090 e1a1 10 a3 e1   cmpd ,s++
4093 4091 e1a4 2d 05       blt  *+7
4094 4092 e1a6 cc 00 00   ldd  #0
4095 4093 e1a9 20 03       bra  *+5
4096 4094 e1ab cc 00 01   ldd  #1
4097 4095 e1ae 10 83 00 00 cmpd #0
4098 4096 e1b2 10 27 00 15 lbeq cc192
4099 4097 e1b6 f6 70 05   ldb  k
4100 4098 e1b9 1d          sex
4101 4099 e1ba 34 06       pshs d
4102 4100 e1bc cc 00 37   ldd  #55
4103 4101 e1bf e3 e1       addd ,s++
4104 4102 e1c1 34 06       pshs d
4105 4103 e1c3 bd df f1   jsr putchar
4106 4104 e1c6 32 62       leas 2,s
4107 4105 e1c8 7e e1 dd   jmp  cc193
4108 4106                   cc192:
4109 4107 e1cb f6 70 05   ldb  k
4110 4108 e1ce 1d          sex
4111 4109 e1cf 34 06       pshs d
4112 4110 e1d1 cc 00 30   ldd  #48
4113 4111 e1d4 e3 e1       addd ,s++
4114 4112 e1d6 34 06       pshs d
4115 4113 e1d8 bd df f1   jsr putchar
4116 4114 e1db 32 62       leas 2,s
4117 4115                   cc193:
4118 4116 e1dd 39          rts
4119 4117
4120 4118                   * .global send_wor
4121 4119                   send_wor:
4122 4120 e1de 31 62       leay 2,s
4123 4121 e1e0 1f 20       tfr  y,d
4124 4122 e1e2 34 06       pshs d
4125 4123 e1e4 ec f1       ldd  [,s++]
4126 4124 e1e6 34 06       pshs d
4127 4125 e1e8 cc 00 08   ldd  #8
4128 4126 e1eb 5a          decb
4129 4127 e1ec 2d 06       blt  *+8
4130 4128 e1ee 64 e4       lsr  ,s
4131 4129 e1f0 66 61       ror  1,s
4132 4130 e1f2 20 f7       bra  *-7
4133 4131 e1f4 35 06       puls d
4134 4132 e1f6 fd 70 14   std  temp16
4135 4133 e1f9 fc 70 14   ldd  temp16
4136 4134 e1fc 34 06       pshs d
4137 4135 e1fe cc 00 ff   ldd  #255
4138 4136 e201 a4 e0       anda ,s+
4139 4137 e203 e4 e0       andb ,s+
4140 4138 e205 f7 70 05   stb  k
```

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4141 4139 e208 f6 70 05      ldb k
4142 4140 e20b 1d          sex
4143 4141 e20c 34 06      pshs d
4144 4142 e20e bd e1 12    jsr send_hex
4145 4143 e211 32 62      leas 2,s
4146 4144 e213 31 62      leay 2,s
4147 4145 e215 1f 20      tfr y,d
4148 4146 e217 34 06      pshs d
4149 4147 e219 ec f1      ldd [,s++]
4150 4148 e21b 34 06      pshs d
4151 4149 e21d cc 00 ff    ldd #255
4152 4150 e220 a4 e0      anda ,s+
4153 4151 e222 e4 e0      andb ,s+
4154 4152 e224 f7 70 05    stb k
4155 4153 e227 f6 70 05    ldb k
4156 4154 e22a 1d          sex
4157 4155 e22b 34 06      pshs d
4158 4156 e22d bd e1 12    jsr send_hex
4159 4157 e230 32 62      leas 2,s
4160 4158 e232 39          rts
4161 4159
4162 4160                  * .global key_dump
4163 4161                  key_dump:
4164 4162 e233 32 7c      leas -4,s
4165 4163 e235 fc 70 16    ldd PC
4166 4164 e238 fd 70 43    std dptr
4167 4165 e23b 31 62      leay 2,s
4168 4166 e23d 1f 20      tfr y,d
4169 4167 e23f 34 06      pshs d
4170 4168 e241 cc 00 00    ldd #0
4171 4169 e244 ed f1      std [,s++]
4172 4170                  cc196:
4173 4171 e246 31 62      leay 2,s
4174 4172 e248 1f 20      tfr y,d
4175 4173 e24a 34 06      pshs d
4176 4174 e24c ec f1      ldd [,s++]
4177 4175 e24e 34 06      pshs d
4178 4176 e250 cc 00 10    ldd #16
4179 4177 e253 10 a3 e1    cmpd ,s++
4180 4178 e256 2e 05      bgt *+7
4181 4179 e258 cc 00 00    ldd #0
4182 4180 e25b 20 03      bra *+5
4183 4181 e25d cc 00 01    ldd #1
4184 4182 e260 10 83 00 00  cmpd #0
4185 4183 e264 10 27 01 7a  lbeq cc195
4186 4184 e268 7e e2 80    jmp cc197
4187 4185                  cc194:
4188 4186 e26b 31 62      leay 2,s
4189 4187 e26d 1f 20      tfr y,d
4190 4188 e26f 34 06      pshs d
4191 4189 e271 34 06      pshs d
4192 4190 e273 ec f1      ldd [,s++]
4193 4191 e275 c3 00 01    addd #1
4194 4192 e278 ed f1      std [,s++]
4195 4193 e27a 83 00 01    subd #1
4196 4194 e27d 7e e2 46    jmp cc196
4197 4195                  cc197:
4198 4196 e280 bd e0 fd    jsr newline
4199 4197 e283 fc 70 43    ldd dptr
4200 4198 e286 34 06      pshs d

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4201 4199 e288 bd e1 de      jsr send_wor
4202 4200 e28b 32 62      leas 2,s
4203 4201 e28d cc 00 3a    ldd #58
4204 4202 e290 34 06      pshs d
4205 4203 e292 bd df f1    jsr putchar
4206 4204 e295 32 62      leas 2,s
4207 4205 e297 31 e4      leay 0,s
4208 4206 e299 1f 20      tfr y,d
4209 4207 e29b 34 06      pshs d
4210 4208 e29d cc 00 00    ldd #0
4211 4209 e2a0 ed f1      std [,s++]
4212 4210                  cc200:
4213 4211 e2a2 31 e4      leay 0,s
4214 4212 e2a4 1f 20      tfr y,d
4215 4213 e2a6 34 06      pshs d
4216 4214 e2a8 ec f1      ldd [,s++]
4217 4215 e2aa 34 06      pshs d
4218 4216 e2ac cc 00 10    ldd #16
4219 4217 e2af 10 a3 e1    cmpd ,s++
4220 4218 e2b2 2e 05      bgt *+7
4221 4219 e2b4 cc 00 00    ldd #0
4222 4220 e2b7 20 03      bra *+5
4223 4221 e2b9 cc 00 01    ldd #1
4224 4222 e2bc 10 83 00 00  cmpd #0
4225 4223 e2c0 10 27 00 40  lbeq cc199
4226 4224 e2c4 7e e2 dc    jmp cc201
4227 4225                  cc198:
4228 4226 e2c7 31 e4      leay 0,s
4229 4227 e2c9 1f 20      tfr y,d
4230 4228 e2cb 34 06      pshs d
4231 4229 e2cd 34 06      pshs d
4232 4230 e2cf ec f1      ldd [,s++]
4233 4231 e2d1 c3 00 01    addd #1
4234 4232 e2d4 ed f1      std [,s++]
4235 4233 e2d6 83 00 01    subd #1
4236 4234 e2d9 7e e2 a2    jmp cc200
4237 4235                  cc201:
4238 4236 e2dc fc 70 43    ldd dptr
4239 4237 e2df 34 06      pshs d
4240 4238 e2e1 31 62      leay 2,s
4241 4239 e2e3 1f 20      tfr y,d
4242 4240 e2e5 34 06      pshs d
4243 4241 e2e7 ec f1      ldd [,s++]
4244 4242 e2e9 e3 e1      addd ,s++
4245 4243 e2eb 34 06      pshs d
4246 4244 e2ed e6 f1      ldb [,s++]
4247 4245 e2ef 1d          sex
4248 4246 e2f0 34 06      pshs d
4249 4247 e2f2 bd e1 12    jsr send_hex
4250 4248 e2f5 32 62      leas 2,s
4251 4249 e2f7 cc 00 20    ldd #32
4252 4250 e2fa 34 06      pshs d
4253 4251 e2fc bd df f1    jsr putchar
4254 4252 e2ff 32 62      leas 2,s
4255 4253 e301 7e e2 c7    jmp cc198
4256 4254                  cc199:
4257 4255 e304 cc 00 20    ldd #32
4258 4256 e307 34 06      pshs d
4259 4257 e309 bd df f1    jsr putchar
4260 4258 e30c 32 62      leas 2,s

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4261 4259 e30e 31 e4          leay 0,s
4262 4260 e310 1f 20          tfr  y,d
4263 4261 e312 34 06          pshs d
4264 4262 e314 cc 00 00      ldd  #0
4265 4263 e317 ed f1          std  [,s++]
4266 4264                      cc204:
4267 4265 e319 31 e4          leay 0,s
4268 4266 e31b 1f 20          tfr  y,d
4269 4267 e31d 34 06          pshs d
4270 4268 e31f ec f1          ldd  [,s++]
4271 4269 e321 34 06          pshs d
4272 4270 e323 cc 00 10      ldd  #16
4273 4271 e326 10 a3 e1      cmpd ,s++
4274 4272 e329 2e 05          bgt  *+7
4275 4273 e32b cc 00 00      ldd  #0
4276 4274 e32e 20 03          bra  *+5
4277 4275 e330 cc 00 01      ldd  #1
4278 4276 e333 10 83 00 00   cmpd #0
4279 4277 e337 10 27 00 91   lbeq cc203
4280 4278 e33b 7e e3 53      jmp  cc205
4281 4279                      cc202:
4282 4280 e33e 31 e4          leay 0,s
4283 4281 e340 1f 20          tfr  y,d
4284 4282 e342 34 06          pshs d
4285 4283 e344 34 06          pshs d
4286 4284 e346 ec f1          ldd  [,s++]
4287 4285 e348 c3 00 01      addd #1
4288 4286 e34b ed f1          std  [,s++]
4289 4287 e34d 83 00 01      subd #1
4290 4288 e350 7e e3 19      jmp  cc204
4291 4289                      cc205:
4292 4290 e353 fc 70 43      ldd  dptr
4293 4291 e356 34 06          pshs d
4294 4292 e358 31 62          leay 2,s
4295 4293 e35a 1f 20          tfr  y,d
4296 4294 e35c 34 06          pshs d
4297 4295 e35e ec f1          ldd  [,s++]
4298 4296 e360 e3 e1          addd ,s++
4299 4297 e362 34 06          pshs d
4300 4298 e364 e6 f1          ldb  [,s++]
4301 4299 e366 1d              sex
4302 4300 e367 f7 70 07      stb  q
4303 4301 e36a f6 70 07      ldb  q
4304 4302 e36d 1d              sex
4305 4303 e36e 34 06          pshs d
4306 4304 e370 cc 00 20      ldd  #32
4307 4305 e373 10 a3 e1      cmpd ,s++
4308 4306 e376 2f 05          ble  *+7
4309 4307 e378 cc 00 00      ldd  #0
4310 4308 e37b 20 03          bra  *+5
4311 4309 e37d cc 00 01      ldd  #1
4312 4310 e380 10 83 00 00   cmpd #0
4313 4311 e384 10 27 00 21   lbeq cc207 ;_ instruction flagged for nor
4314 4312 e388 f6 70 07      ldb  q
4315 4313 e38b 1d              sex
4316 4314 e38c 34 06          pshs d
4317 4315 e38e cc 00 80      ldd  #128
4318 4316 e391 10 a3 e1      cmpd ,s++
4319 4317 e394 2e 05          bgt  *+7
4320 4318 e396 cc 00 00      ldd  #0

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4321 4319 e399 20 03          bra  *+5
4322 4320 e39b cc 00 01      ldd  #1
4323 4321 e39e 10 83 00 00  cmpd #0
4324 4322 e3a2 10 27 00 03  lbeq cc207 ;_ instruction flagged for nor
4325 4323 e3a6 cc 00 01      ldd  #1
4326 4324                    cc207:
4327 4325 e3a9 10 83 00 00  cmpd #0
4328 4326 e3ad 10 27 00 0e  lbeq cc206
4329 4327 e3b1 f6 70 07      ldb  q
4330 4328 e3b4 1d              sex
4331 4329 e3b5 34 06          pshs d
4332 4330 e3b7 bd df f1      jsr putchar
4333 4331 e3ba 32 62          leas 2,s
4334 4332 e3bc 7e e3 c9      jmp  cc208
4335 4333                    cc206:
4336 4334 e3bf cc 00 2e      ldd  #46
4337 4335 e3c2 34 06          pshs d
4338 4336 e3c4 bd df f1      jsr putchar
4339 4337 e3c7 32 62          leas 2,s
4340 4338                    cc208:
4341 4339 e3c9 7e e3 3e      jmp  cc202
4342 4340                    cc203:
4343 4341 e3cc cc 70 43      ldd  #dptr
4344 4342 e3cf 34 06          pshs d
4345 4343 e3d1 cc 00 10      ldd  #16
4346 4344 e3d4 ae f4          ldx  [,s]
4347 4345 e3d6 34 10          pshs x
4348 4346 e3d8 e3 e1          addd ,s++
4349 4347 e3da fd 70 43      std  dptr
4350 4348 e3dd 32 62          leas 2,s
4351 4349 e3df 7e e2 6b      jmp  cc194
4352 4350                    cc195:
4353 4351 e3e2 bd e0 fd      jsr newline
4354 4352 e3e5 fc 70 43      ldd  dptr
4355 4353 e3e8 fd 70 16      std  PC
4356 4354 e3eb bd ce 22      jsr key_addr
4357 4355 e3ee 32 64          leas 4,s
4358 4356 e3f0 39            rts
4359 4357
4360 4358                    * .global nibble2h
4361 4359                    nibble2h:
4362 4360 e3f1 32 7f          leas -1,s
4363 4361 e3f3 31 64          leay 4,s
4364 4362 e3f5 1f 20          tfr  y,d
4365 4363 e3f7 34 06          pshs d
4366 4364 e3f9 e6 f1          ldb  [,s++]
4367 4365 e3fb 1d              sex
4368 4366 e3fc 34 06          pshs d
4369 4367 e3fe cc 00 40      ldd  #64
4370 4368 e401 10 a3 e1      cmpd ,s++
4371 4369 e404 2e 05          bgt  *+7
4372 4370 e406 cc 00 00      ldd  #0
4373 4371 e409 20 03          bra  *+5
4374 4372 e40b cc 00 01      ldd  #1
4375 4373 e40e 10 83 00 00  cmpd #0
4376 4374 e412 10 27 00 19  lbeq cc209
4377 4375 e416 31 64          leay 4,s
4378 4376 e418 1f 20          tfr  y,d
4379 4377 e41a 34 06          pshs d
4380 4378 e41c e6 f1          ldb  [,s++]

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4381 4379 e41e 1d          sex
4382 4380 e41f 34 06     pshs d
4383 4381 e421 cc 00 30  ldd #48
4384 4382 e424 35 10     puls x
4385 4383 e426 34 06     pshs d
4386 4384 e428 1f 10     tfr x,d
4387 4385 e42a a3 e1     subd ,s++
4388 4386 e42c 32 61     leas 1,s
4389 4387 e42e 39        rts
4390 4388                cc209:
4391 4389 e42f 31 64     leay 4,s
4392 4390 e431 1f 20     tfr y,d
4393 4391 e433 34 06     pshs d
4394 4392 e435 e6 f1     ldb [,s++]
4395 4393 e437 1d        sex
4396 4394 e438 34 06     pshs d
4397 4395 e43a cc 00 37  ldd #55
4398 4396 e43d 35 10     puls x
4399 4397 e43f 34 06     pshs d
4400 4398 e441 1f 10     tfr x,d
4401 4399 e443 a3 e1     subd ,s++
4402 4400 e445 32 61     leas 1,s
4403 4401 e447 39        rts
4404 4402                cc210:
4405 4403 e448 32 61     leas 1,s
4406 4404 e44a 39        rts
4407 4405
4408 4406                * .global gethex
4409 4407                gethex:
4410 4408 e44b 32 7e     leas -2,s
4411 4409 e44d 31 61     leay 1,s
4412 4410 e44f 1f 20     tfr y,d
4413 4411 e451 34 06     pshs d
4414 4412 e453 bd e0 92  jsr getchar
4415 4413 e456 e7 f1     stb [,s++]
4416 4414 e458 31 e4     leay 0,s
4417 4415 e45a 1f 20     tfr y,d
4418 4416 e45c 34 06     pshs d
4419 4417 e45e bd e0 92  jsr getchar
4420 4418 e461 e7 f1     stb [,s++]
4421 4419 e463 31 61     leay 1,s
4422 4420 e465 1f 20     tfr y,d
4423 4421 e467 34 06     pshs d
4424 4422 e469 31 63     leay 3,s
4425 4423 e46b 1f 20     tfr y,d
4426 4424 e46d 34 06     pshs d
4427 4425 e46f e6 f1     ldb [,s++]
4428 4426 e471 1d        sex
4429 4427 e472 34 06     pshs d
4430 4428 e474 bd e3 f1  jsr nibble2h
4431 4429 e477 32 62     leas 2,s
4432 4430 e479 34 06     pshs d
4433 4431 e47b cc 00 04  ldd #4
4434 4432 e47e 5a        decb
4435 4433 e47f 2d 06     blt *+8
4436 4434 e481 68 61     asl 1,s
4437 4435 e483 69 e4     rol ,s
4438 4436 e485 20 f7     bra *-7
4439 4437 e487 35 06     puls d
4440 4438 e489 e7 f1     stb [,s++]

```

```

4441 4439 e48b 31 e4      leay 0,s
4442 4440 e48d 1f 20      tfr  y,d
4443 4441 e48f 34 06      pshs d
4444 4442 e491 31 62      leay 2,s
4445 4443 e493 1f 20      tfr  y,d
4446 4444 e495 34 06      pshs d
4447 4445 e497 e6 f1      ldb  [,s++]
4448 4446 e499 1d          sex
4449 4447 e49a 34 06      pshs d
4450 4448 e49c bd e3 f1    jsr  nibble2h
4451 4449 e49f 32 62      leas 2,s
4452 4450 e4a1 e7 f1      stb  [,s++]
4453 4451 e4a3 31 61      leay 1,s
4454 4452 e4a5 1f 20      tfr  y,d
4455 4453 e4a7 34 06      pshs d
4456 4454 e4a9 31 63      leay 3,s
4457 4455 e4ab 1f 20      tfr  y,d
4458 4456 e4ad 34 06      pshs d
4459 4457 e4af e6 f1      ldb  [,s++]
4460 4458 e4b1 1d          sex
4461 4459 e4b2 34 06      pshs d
4462 4460 e4b4 31 64      leay 4,s
4463 4461 e4b6 1f 20      tfr  y,d
4464 4462 e4b8 34 06      pshs d
4465 4463 e4ba e6 f1      ldb  [,s++]
4466 4464 e4bc 1d          sex
4467 4465 e4bd aa e0      ora  ,s+
4468 4466 e4bf ea e0      orb  ,s+
4469 4467 e4c1 e7 f1      stb  [,s++]
4470 4468 e4c3 f6 70 0f    ldb  bcc
4471 4469 e4c6 1d          sex
4472 4470 e4c7 34 06      pshs d
4473 4471 e4c9 31 63      leay 3,s
4474 4472 e4cb 1f 20      tfr  y,d
4475 4473 e4cd 34 06      pshs d
4476 4474 e4cf e6 f1      ldb  [,s++]
4477 4475 e4d1 1d          sex
4478 4476 e4d2 e3 e1      addd ,s++
4479 4477 e4d4 f7 70 0f    stb  bcc
4480 4478 e4d7 31 61      leay 1,s
4481 4479 e4d9 1f 20      tfr  y,d
4482 4480 e4db 34 06      pshs d
4483 4481 e4dd e6 f1      ldb  [,s++]
4484 4482 e4df 1d          sex
4485 4483 e4e0 32 62      leas 2,s
4486 4484 e4e2 39          rts
4487 4485
4488 4486                * .global get16bit
4489 4487                get16bit:
4490 4488 e4e3 32 7e      leas -2,s
4491 4489 e4e5 31 e4      leay 0,s
4492 4490 e4e7 1f 20      tfr  y,d
4493 4491 e4e9 34 06      pshs d
4494 4492 e4eb cc 00 00    ldd  #0
4495 4493 e4ee ed f1      std  [,s++]
4496 4494 e4f0 31 e4      leay 0,s
4497 4495 e4f2 1f 20      tfr  y,d
4498 4496 e4f4 34 06      pshs d
4499 4497 e4f6 bd e4 4b    jsr  gethex
4500 4498 e4f9 ae f4      ldx  [,s]

```



```

4501 4499 e4fb 34 10      pshs x
4502 4500 e4fd aa e0      ora  ,s+
4503 4501 e4ff ea e0      orb  ,s+
4504 4502 e501 ed f1      std  [,s++]
4505 4503 e503 31 e4      leay 0,s
4506 4504 e505 1f 20      tfr  y,d
4507 4505 e507 34 06      pshs d
4508 4506 e509 cc 00 08    ldd  #8
4509 4507 e50c ae f4      ldx  [,s]
4510 4508 e50e 34 10      pshs x
4511 4509 e510 5a          decb
4512 4510 e511 2d 06      blt  *+8
4513 4511 e513 68 61      asl  1,s
4514 4512 e515 69 e4      rol  ,s
4515 4513 e517 20 f7      bra  *-7
4516 4514 e519 35 06      puls d
4517 4515 e51b ed f1      std  [,s++]
4518 4516 e51d 31 e4      leay 0,s
4519 4517 e51f 1f 20      tfr  y,d
4520 4518 e521 34 06      pshs d
4521 4519 e523 bd e4 4b    jsr  gethex
4522 4520 e526 ae f4      ldx  [,s]
4523 4521 e528 34 10      pshs x
4524 4522 e52a aa e0      ora  ,s+
4525 4523 e52c ea e0      orb  ,s+
4526 4524 e52e ed f1      std  [,s++]
4527 4525 e530 31 e4      leay 0,s
4528 4526 e532 1f 20      tfr  y,d
4529 4527 e534 34 06      pshs d
4530 4528 e536 ec f1      ldd  [,s++]
4531 4529 e538 32 62      leas 2,s
4532 4530 e53a 39          rts
4533 4531
4534 4532                  * .global read_rec
4535 4533                  read_rec:
4536 4534 e53b 32 7c      leas -4,s
4537 4535 e53d cc 00 00    ldd  #0
4538 4536 e540 f7 70 0f    stb  bcc
4539 4537 e543 31 62      leay 2,s
4540 4538 e545 1f 20      tfr  y,d
4541 4539 e547 34 06      pshs d
4542 4540 e549 bd e4 4b    jsr  gethex
4543 4541 e54c 34 06      pshs d
4544 4542 e54e cc 00 03    ldd  #3
4545 4543 e551 35 10      puls x
4546 4544 e553 34 06      pshs d
4547 4545 e555 1f 10      tfr  x,d
4548 4546 e557 a3 e1      subd ,s++
4549 4547 e559 e7 f1      stb  [,s++]
4550 4548 e55b 31 e4      leay 0,s
4551 4549 e55d 1f 20      tfr  y,d
4552 4550 e55f 34 06      pshs d
4553 4551 e561 bd e4 e3    jsr  get16bit
4554 4552 e564 ed f1      std  [,s++]
4555 4553 e566 31 e4      leay 0,s
4556 4554 e568 1f 20      tfr  y,d
4557 4555 e56a 34 06      pshs d
4558 4556 e56c ec f1      ldd  [,s++]
4559 4557 e56e fd 70 43    std  dptr
4560 4558 e571 31 63      leay 3,s

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4561 4559 e573 1f 20          tfr  y,d
4562 4560 e575 34 06          pshs d
4563 4561 e577 cc 00 00      ldd  #0
4564 4562 e57a e7 f1          stb  [,s++]
4565 4563                      cc213:
4566 4564 e57c 31 63          leay 3,s
4567 4565 e57e 1f 20          tfr  y,d
4568 4566 e580 34 06          pshs d
4569 4567 e582 e6 f1          ldb  [,s++]
4570 4568 e584 1d              sex
4571 4569 e585 34 06          pshs d
4572 4570 e587 31 64          leay 4,s
4573 4571 e589 1f 20          tfr  y,d
4574 4572 e58b 34 06          pshs d
4575 4573 e58d e6 f1          ldb  [,s++]
4576 4574 e58f 1d              sex
4577 4575 e590 10 a3 e1      cmpd ,s++
4578 4576 e593 2e 05          bgt  *+7
4579 4577 e595 cc 00 00      ldd  #0
4580 4578 e598 20 03          bra  *+5
4581 4579 e59a cc 00 01      ldd  #1
4582 4580 e59d 10 83 00 00   cmpd #0
4583 4581 e5a1 10 27 00 33   lbeq cc212
4584 4582 e5a5 7e e5 be      jmp  cc214
4585 4583                      cc211:
4586 4584 e5a8 31 63          leay 3,s
4587 4585 e5aa 1f 20          tfr  y,d
4588 4586 e5ac 34 06          pshs d
4589 4587 e5ae 34 06          pshs d
4590 4588 e5b0 e6 f1          ldb  [,s++]
4591 4589 e5b2 1d              sex
4592 4590 e5b3 c3 00 01      addd #1
4593 4591 e5b6 e7 f1          stb  [,s++]
4594 4592 e5b8 83 00 01      subd #1
4595 4593 e5bb 7e e5 7c      jmp  cc213
4596 4594                      cc214:
4597 4595 e5be fc 70 43      ldd  dptr
4598 4596 e5c1 34 06          pshs d
4599 4597 e5c3 31 65          leay 5,s
4600 4598 e5c5 1f 20          tfr  y,d
4601 4599 e5c7 34 06          pshs d
4602 4600 e5c9 e6 f1          ldb  [,s++]
4603 4601 e5cb 1d              sex
4604 4602 e5cc e3 e1          addd ,s++
4605 4603 e5ce 34 06          pshs d
4606 4604 e5d0 bd e4 4b      jsr  gethex
4607 4605 e5d3 e7 f1          stb  [,s++]
4608 4606 e5d5 7e e5 a8      jmp  cc211
4609 4607                      cc212:
4610 4608 e5d8 f6 70 0f      ldb  bcc
4611 4609 e5db 1d              sex
4612 4610 e5dc 43              coma
4613 4611 e5dd 53              comb
4614 4612 e5de f7 70 0f      stb  bcc
4615 4613 e5e1 fc 70 3b      ldd  gpiol
4616 4614 e5e4 34 06          pshs d
4617 4615 e5e6 f6 70 0f      ldb  bcc
4618 4616 e5e9 1d              sex
4619 4617 e5ea e7 f1          stb  [,s++]
4620 4618 e5ec f6 70 0f      ldb  bcc

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4621 4619 e5ef 1d          sex
4622 4620 e5f0 f7 70 10   stb  save_bcc
4623 4621 e5f3 f6 70 10   ldb  save_bcc
4624 4622 e5f6 1d          sex
4625 4623 e5f7 34 06      pshs d
4626 4624 e5f9 bd e4 4b   jsr  gethex
4627 4625 e5fc 10 a3 e1   cmpd ,s++
4628 4626 e5ff 26 05      bne  *+7
4629 4627 e601 cc 00 00   ldd  #0
4630 4628 e604 20 03      bra  *+5
4631 4629 e606 cc 00 01   ldd  #1
4632 4630 e609 10 83 00 00  cmpd #0
4633 4631 e60d 10 27 00 06   lbeq cc215
4634 4632 e611 cc 00 01   ldd  #1
4635 4633 e614 f7 70 11   stb  bcc_erro
4636 4634                  cc215:
4637 4635 e617 32 64      leas 4,s
4638 4636 e619 39          rts
4639 4637
4640 4638                  * .global get_s_re
4641 4639                  get_s_re:
4642 4640 e61a cc 00 00   ldd  #0
4643 4641 e61d fd 70 1e   std  end
4644 4642 e620 cc 00 00   ldd  #0
4645 4643 e623 f7 70 11   stb  bcc_erro
4646 4644                  cc216:
4647 4645 e626 fc 70 1e   ldd  end
4648 4646 e629 34 06      pshs d
4649 4647 e62b cc 00 00   ldd  #0
4650 4648 e62e 10 a3 e1   cmpd ,s++
4651 4649 e631 27 05      beq  *+7
4652 4650 e633 cc 00 00   ldd  #0
4653 4651 e636 20 03      bra  *+5
4654 4652 e638 cc 00 01   ldd  #1
4655 4653 e63b 10 83 00 00  cmpd #0
4656 4654 e63f 10 27 00 65   lbeq cc217
4657 4655                  cc218:
4658 4656 e643 bd e0 92   jsr  getchar
4659 4657 e646 34 06      pshs d
4660 4658 e648 cc 00 53   ldd  #83
4661 4659 e64b 10 a3 e1   cmpd ,s++
4662 4660 e64e 26 05      bne  *+7
4663 4661 e650 cc 00 00   ldd  #0
4664 4662 e653 20 03      bra  *+5
4665 4663 e655 cc 00 01   ldd  #1
4666 4664 e658 10 83 00 00  cmpd #0
4667 4665 e65c 10 27 00 06   lbeq cc219
4668 4666 e660 7e e6 43   jmp  cc218
4669 4667 e663 7e e6 43   jmp  cc218
4670 4668                  cc219:
4671 4669 e666 bd e0 92   jsr  getchar
4672 4670 e669 7e e6 90   jmp  cc222
4673 4671                  cc223:
4674 4672 e66c cc 00 00   ldd  #0
4675 4673 e66f fd 70 1e   std  end
4676 4674 e672 7e e6 a5   jmp  cc221
4677 4675                  cc224:
4678 4676 e675 bd e5 3b   jsr  read_rec
4679 4677 e678 7e e6 a5   jmp  cc221
4680 4678                  cc225:

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4681 4679 e67b cc 00 01      ldd #1
4682 4680 e67e fd 70 1e      std end
4683 4681 e681 7e e6 a5      jmp cc221
4684 4682                    cc226:
4685 4683 e684 cc 00 01      ldd #1
4686 4684 e687 fd 70 1e      std end
4687 4685 e68a 7e e6 a5      jmp cc221
4688 4686 e68d 7e e6 a5      jmp cc221
4689 4687                    cc222:
4690 4688 e690 bd c0 f9      jsr ccswitch
4691 4689 e693 e6 6c 00 30    FDB cc223,48
4692 4690 e697 e6 75 00 31    FDB cc224,49
4693 4691 e69b e6 7b 00 38    FDB cc225,56
4694 4692 e69f e6 84 00 39    FDB cc226,57
4695 4693 e6a3 00 00          FDB 0
4696 4694                    cc221:
4697 4695 e6a5 7e e6 26      jmp cc216
4698 4696                    cc217:
4699 4697 e6a8 bd e0 fd      jsr newline
4700 4698 e6ab f6 70 11      ldb bcc_erro
4701 4699 e6ae 1d              sex
4702 4700 e6af 10 83 00 00    cmpd #0
4703 4701 e6b3 10 27 00 0d    lbeq cc227
4704 4702 e6b7 cc e6 d2      ldd #cc1+0
4705 4703 e6ba 34 06          pshs d
4706 4704 e6bc bd e0 53      jsr puts
4707 4705 e6bf 32 62          leas 2,s
4708 4706 e6c1 7e e6 ce      jmp cc228
4709 4707                    cc227:
4710 4708 e6c4 cc e6 e4      ldd #cc1+18
4711 4709 e6c7 34 06          pshs d
4712 4710 e6c9 bd e0 53      jsr puts
4713 4711 e6cc 32 62          leas 2,s
4714 4712                    cc228:
4715 4713 e6ce bd ce 35      jsr key_data
4716 4714 e6d1 39            rts
4717 4715                    cc1:
4718 4716 e6d2 63 68 65 63 6b 20 FCB 99,104,101,99,107,32,115,117,109,32
4719      73 75 6d 20
4720 4717 e6dc 65 72 72 6f 72 73 FCB 101,114,114,111,114,115,33,0,48,32
4721      21 00 30 20
4722 4718 e6e6 65 72 72 6f 72 2e FCB 101,114,114,111,114,46,46,46,0
4723      2e 2e 00
4724 4719
4725 4720                    * .global key_load
4726 4721                    key_load:
4727 4722 e6ef bd e0 fd      jsr newline
4728 4723 e6f2 cc e7 00      ldd #cc229+0
4729 4724 e6f5 34 06          pshs d
4730 4725 e6f7 bd e0 53      jsr puts
4731 4726 e6fa 32 62          leas 2,s
4732 4727 e6fc bd e6 1a      jsr get_s_re
4733 4728 e6ff 39            rts
4734 4729                    cc229:
4735 4730 e700 4c 6f 61 64 20 4d FCB 76,111,97,100,32,77,111,116,111,114
4736      6f 74 6f 72
4737 4731 e70a 6f 6c 61 20 73 2d FCB 111,108,97,32,115,45,114,101,99,111
4738      72 65 63 6f
4739 4732 e714 72 64 00          FCB 114,100,0
4740 4733

```

```
4741 4734 * .global initreg
4742 4735 initreg:
4743 4736 e717 cc 02 00 ldd #512
4744 4737 e71a fd 70 16 std PC
4745 4738 e71d cc 02 00 ldd #512
4746 4739 e720 fd 70 18 std save_PC
4747 4740 e723 cc 7f 00 ldd #32512
4748 4741 e726 fd 70 27 std USER_U
4749 4742 e729 1f a8 TFR CC,A
4750 4743 e72b b7 70 31 STA USER_P
4751 4744 e72e cc 80 00 ldd #-32768
4752 4745 e731 fd 70 3b std gpiol
4753 4746 e734 cc 80 03 ldd #-32765
4754 4747 e737 fd 70 3d std port2
4755 4748 e73a cc 80 02 ldd #-32766
4756 4749 e73d fd 70 3f std port1
4757 4750 e740 cc 80 01 ldd #-32767
4758 4751 e743 fd 70 41 std port0
4759 4752 e746 39 rts
4760 4753
4761 4754 * .global main
4762 4755 main:
4763 4756 e747 bd e7 17 jsr initreg
4764 4757 e74a fc 70 3b ldd gpiol
4765 4758 e74d 34 06 pshs d
4766 4759 e74f cc 00 00 ldd #0
4767 4760 e752 e7 f1 stb [,s++]
4768 4761 e754 fc 70 3d ldd port2
4769 4762 e757 34 06 pshs d
4770 4763 e759 cc 00 00 ldd #0
4771 4764 e75c e7 f1 stb [,s++]
4772 4765 e75e fc 70 3f ldd port1
4773 4766 e761 34 06 pshs d
4774 4767 e763 cc 00 ff ldd #255
4775 4768 e766 e7 f1 stb [,s++]
4776 4769 e768 cc 00 00 ldd #0
4777 4770 e76b f7 70 0d stb flag
4778 4771 e76e bd df 85 jsr initacia
4779 4772 e771 bd e0 fd jsr newline
4780 4773 e774 cc e8 4f ldd #cc230+0
4781 4774 e777 34 06 pshs d
4782 4775 e779 bd e0 53 jsr puts
4783 4776 e77c 32 62 leas 2,s
4784 4777 e77e bd c2 3a jsr InitLcd
4785 4778 e781 bd c2 3a jsr InitLcd
4786 4779 e784 cc e8 6c ldd #cc230+29
4787 4780 e787 34 06 pshs d
4788 4781 e789 bd c2 7d jsr PutLCD
4789 4782 e78c 32 62 leas 2,s
4790 4783 e78e cc 00 00 ldd #0
4791 4784 e791 34 06 pshs d
4792 4785 e793 cc 00 01 ldd #1
4793 4786 e796 34 06 pshs d
4794 4787 e798 bd c1 a9 jsr goto_xy
4795 4788 e79b 32 64 leas 4,s
4796 4789 e79d cc e8 80 ldd #cc230+49
4797 4790 e7a0 34 06 pshs d
4798 4791 e7a2 bd c2 7d jsr PutLCD
4799 4792 e7a5 32 62 leas 2,s
4800 4793 e7a7 cc 70 35 ldd #buffer
```

```
4801 4794 e7aa 34 06      pshs d
4802 4795 e7ac cc 00 05      ldd #5
4803 4796 e7af e3 e1      addd ,s++
4804 4797 e7b1 34 06      pshs d
4805 4798 e7b3 cc c1 0d      ldd #convert
4806 4799 e7b6 34 06      pshs d
4807 4800 e7b8 cc 00 06      ldd #6
4808 4801 e7bb e3 e1      addd ,s++
4809 4802 e7bd 34 06      pshs d
4810 4803 e7bf e6 f1      ldb [,s++]
4811 4804 e7c1 1d          sex
4812 4805 e7c2 e7 f1      stb [,s++]
4813 4806 e7c4 cc 70 35      ldd #buffer
4814 4807 e7c7 34 06      pshs d
4815 4808 e7c9 cc 00 04      ldd #4
4816 4809 e7cc e3 e1      addd ,s++
4817 4810 e7ce 34 06      pshs d
4818 4811 e7d0 cc c1 0d      ldd #convert
4819 4812 e7d3 34 06      pshs d
4820 4813 e7d5 cc 00 08      ldd #8
4821 4814 e7d8 e3 e1      addd ,s++
4822 4815 e7da 34 06      pshs d
4823 4816 e7dc e6 f1      ldb [,s++]
4824 4817 e7de 1d          sex
4825 4818 e7df e7 f1      stb [,s++]
4826 4819 e7e1 cc 70 35      ldd #buffer
4827 4820 e7e4 34 06      pshs d
4828 4821 e7e6 cc 00 03      ldd #3
4829 4822 e7e9 e3 e1      addd ,s++
4830 4823 e7eb 34 06      pshs d
4831 4824 e7ed cc c1 0d      ldd #convert
4832 4825 e7f0 34 06      pshs d
4833 4826 e7f2 cc 00 00      ldd #0
4834 4827 e7f5 e3 e1      addd ,s++
4835 4828 e7f7 34 06      pshs d
4836 4829 e7f9 e6 f1      ldb [,s++]
4837 4830 e7fb 1d          sex
4838 4831 e7fc e7 f1      stb [,s++]
4839 4832 e7fe cc 70 35      ldd #buffer
4840 4833 e801 34 06      pshs d
4841 4834 e803 cc 00 02      ldd #2
4842 4835 e806 e3 e1      addd ,s++
4843 4836 e808 34 06      pshs d
4844 4837 e80a cc c1 0d      ldd #convert
4845 4838 e80d 34 06      pshs d
4846 4839 e80f cc 00 09      ldd #9
4847 4840 e812 e3 e1      addd ,s++
4848 4841 e814 34 06      pshs d
4849 4842 e816 e6 f1      ldb [,s++]
4850 4843 e818 1d          sex
4851 4844 e819 e7 f1      stb [,s++]
4852 4845 e81b cc 70 35      ldd #buffer
4853 4846 e81e 34 06      pshs d
4854 4847 e820 cc 00 01      ldd #1
4855 4848 e823 e3 e1      addd ,s++
4856 4849 e825 34 06      pshs d
4857 4850 e827 cc 00 00      ldd #0
4858 4851 e82a e7 f1      stb [,s++]
4859 4852 e82c cc 70 35      ldd #buffer
4860 4853 e82f 34 06      pshs d
```

```
4861 4854 e831 cc 00 00      ldd #0
4862 4855 e834 e3 e1        addd ,s++
4863 4856 e836 34 06        pshs d
4864 4857 e838 cc 00 00      ldd #0
4865 4858 e83b e7 f1        stb [,s++]
4866 4859                    cc231:
4867 4860 e83d cc 00 01        ldd #1
4868 4861 e840 10 83 00 00    cmpd #0
4869 4862 e844 10 27 00 06    lbeq cc232
4870 4863 e848 bd df 09        jsr scan1
4871 4864 e84b 7e e8 3d        jmp cc231
4872 4865                    cc232:
4873 4866 e84e 39              rts
4874 4867                    cc230:
4875 4868 e84f 36 38 30 39 20 4d  FCB 54,56,48,57,32,77,73,67,82,73
4876      49 43 52 49
4877 4869 e859 50 52 4f 43 45 53  FCB 80,82,79,67,69,83,83,79,82,32
4878      53 4f 52 20
4879 4870 e863 4b 49 54 20 32 30  FCB 75,73,84,32,50,48,49,55,0,54
4880      31 37 00 36
4881 4871 e86d 38 30 39 20 4d 49  FCB 56,48,57,32,77,73,67,82,79,80
4882      43 52 4f 50
4883 4872 e877 52 4f 43 45 53 53  FCB 82,79,67,69,83,83,79,82,0,51
4884      4f 52 00 33
4885 4873 e881 32 6b 42 20 52 41  FCB 50,107,66,32,82,65,77,32,85,65
4886      4d 20 55 41
4887 4874 e88b 52 54 20 4c 43 44  FCB 82,84,32,76,67,68,0
4888      00
4889 4875                    END
4890
```

1	ADR1	7047
2	ADR2	7049
3	ADR3	704b
4	ADR31	704c
5	DIVD	c08b
6	InitLcd	c23a
7	LcdReady	c129
8	NOCARRY	c0e9
9	NOSUB	c09f
10	PC	7016
11	PutLCD	c27d
12	SAVE_SP	702b
13	SWEND	c10b
14	SWLOOP	c0fb
15	USER_A	702f
16	USER_B	7030
17	USER_DP	7032
18	USER_P	7031
19	USER_PC	7025
20	USER_U	7027
21	USER_X	7029
22	USER_Y	702d
23	ab	d4c7
24	acca	d365
25	accb	d416
26	address_	cd90
27	bcc	700f
28	bcc_erro	7011
29	beep	de94
30	buffer	7035
31	cc1	e6d2
32	cc10	c1ef
33	cc100	d8cc
34	cc101	d8f5
35	cc102	d906
36	cc103	d92f
37	cc104	d940
38	cc106	d9d6
39	cc107	d9a9
40	cc108	d96a
41	cc109	d970
42	cc11	c208
43	cc110	d976
44	cc111	d97c
45	cc112	d982
46	cc113	d988
47	cc114	d98e
48	cc115	d994
49	cc116	d99a
50	cc117	d9a0
51	cc118	dab2
52	cc119	da19
53	cc12	c2c1
54	cc120	da1c
55	cc121	da50
56	cc122	da8c
57	cc123	da30
58	cc124	da5f
59	cc125	db6b
60	cc126	daf5

61	cc127	daf8
62	cc128	db2c
63	cc129	db62
64	cc13	c304
65	cc130	db0c
66	cc131	db3b
67	cc132	db96
68	cc133	dbee
69	cc134	dba1
70	cc135	dbc5
71	cc136	dc15
72	cc137	dc38
73	cc138	dbf5
74	cc139	dc24
75	cc14	c28a
76	cc140	dc8a
77	cc141	dd2f
78	cc142	de02
79	cc144	ddff
80	cc145	ddbe
81	cc146	dd54
82	cc147	dd5a
83	cc148	dd60
84	cc149	dd66
85	cc15	c2d7
86	cc150	dd6c
87	cc151	dd72
88	cc152	dd78
89	cc153	dd7e
90	cc154	dd84
91	cc155	dd8a
92	cc156	dd9d
93	cc157	dda3
94	cc158	dda9
95	cc159	ddaf
96	cc16	c34c
97	cc160	ddb5
98	cc161	de57
99	cc163	de57
100	cc164	de36
101	cc165	de09
102	cc166	de0f
103	cc167	de15
104	cc168	de1b
105	cc169	de21
106	cc17	c375
107	cc170	de27
108	cc171	de2d
109	cc172	de7e
110	cc173	de93
111	cc174	de5e
112	cc175	de8d
113	cc176	ded1
114	cc177	df06
115	cc178	deab
116	cc179	dee7
117	cc18	c39e
118	cc180	df09
119	cc181	df31
120	cc182	df3b

121	cc183	df63
122	cc184	df6e
123	cc185	e034
124	cc186	e053
125	cc187	e091
126	cc188	e09f
127	cc189	e0d5
128	cc19	c3c7
129	cc190	e171
130	cc191	e183
131	cc192	e1cb
132	cc193	e1dd
133	cc194	e26b
134	cc195	e3e2
135	cc196	e246
136	cc197	e280
137	cc198	e2c7
138	cc199	e304
139	cc2	c135
140	cc20	c3f0
141	cc200	e2a2
142	cc201	e2dc
143	cc202	e33e
144	cc203	e3cc
145	cc204	e319
146	cc205	e353
147	cc206	e3bf
148	cc207	e3a9
149	cc208	e3c9
150	cc209	e42f
151	cc21	c419
152	cc210	e448
153	cc211	e5a8
154	cc212	e5d8
155	cc213	e57c
156	cc214	e5be
157	cc215	e617
158	cc216	e626
159	cc217	e6a8
160	cc218	e643
161	cc219	e666
162	cc22	c442
163	cc221	e6a5
164	cc222	e690
165	cc223	e66c
166	cc224	e675
167	cc225	e67b
168	cc226	e684
169	cc227	e6c4
170	cc228	e6ce
171	cc229	e700
172	cc23	c46b
173	cc230	e84f
174	cc231	e83d
175	cc232	e84e
176	cc24	c494
177	cc25	c4bd
178	cc26	c4e6
179	cc27	c50f
180	cc28	c538

181	cc29	c561
182	cc3	c194
183	cc30	c58a
184	cc31	c5b3
185	cc32	c5dc
186	cc33	c605
187	cc34	c62e
188	cc35	c657
189	cc36	c680
190	cc37	c6a9
191	cc38	c6d2
192	cc39	c6fb
193	cc4	c180
194	cc40	c724
195	cc41	c74d
196	cc42	c776
197	cc43	c79f
198	cc44	c7c8
199	cc45	c7f1
200	cc46	c81a
201	cc47	c843
202	cc48	c87f
203	cc49	c895
204	cc50	c859
205	cc51	c88f
206	cc52	c8db
207	cc53	ca76
208	cc54	c8bb
209	cc55	c8ea
210	cc56	c9ab
211	cc57	c962
212	cc58	c996
213	cc59	c9ae
214	cc6	c239
215	cc60	c9f4
216	cc61	ca5c
217	cc62	c9d3
218	cc63	ca04
219	cc64	ca35
220	cc65	ca42
221	cc66	caae
222	cc67	cea7
223	cc68	ce8a
224	cc69	ce8d
225	cc7	c224
226	cc70	ced7
227	cc71	cf19
228	cc72	cf7a
229	cc73	cf7a
230	cc74	cf7c
231	cc75	cff7
232	cc76	d02d
233	cc77	d09b
234	cc78	d1b6
235	cc79	d187
236	cc8	clbd
237	cc80	d18a
238	cc81	d22b
239	cc82	d20e
240	cc83	d21b

241	cc84	d2d5
242	cc85	d294
243	cc86	d2c3
244	cc87	d274
245	cc88	d2a3
246	cc89	d76f
247	cc9	c1d6
248	cc90	d780
249	cc91	d7a9
250	cc92	d7ba
251	cc93	d7e3
252	cc94	d7f4
253	cc95	d81d
254	cc96	d82e
255	cc97	d881
256	cc98	d892
257	cc99	d8bb
258	ccd1	c063
259	ccd2	c070
260	ccd3	c084
261	ccd4	c0b3
262	ccdiv	c05a
263	ccmult	c0b4
264	ccswitch	c0f9
265	clear_bu	dbef
266	clr_scre	c195
267	cold_msg	c11d
268	convert	c10d
269	cut_byte	dab3
270	data_dis	cdal
271	data_hex	cff8
272	delay_be	de58
273	delay_ms	c853
274	delay_nu	c846
275	desti	7020
276	dot_addr	cac6
277	dot_data	cbaf
278	dptra	7043
279	dptra2	7045
280	end	701e
281	enter_nu	dc66
282	flag	700d
283	get16bit	e4e3
284	get_s_re	e61a
285	getchar	e092
286	gethex	e44b
287	goto_xy	cla9
288	gpiol	703b
289	hex4	cc9c
290	hex_addr	d077
291	hi_cc	d851
292	hit	700b
293	i	7000
294	initacia	df85
295	initreg	e717
296	insert	d9d7
297	irq_serv	c023
298	j	7002
299	k	7005
300	key	7009

301	key_PC	d06d
302	key_addr	ce22
303	key_cal	dc39
304	key_code	c321
305	key_copy	dccb
306	key_data	ce35
307	key_dump	e233
308	key_exe	dd0e
309	key_go	d145
310	key_load	e6ef
311	key_minu	cf7b
312	key_plus	ce48
313	key_reg	d2d6
314	key_test	db6c
315	low_cc	d73f
316	main	e747
317	n	7004
318	newline	e0fd
319	nibble2h	e3f1
320	num	701a
321	o	7008
322	port0	7041
323	port1	703f
324	port2	703d
325	positive	700c
326	print_er	d0d8
327	putch_lc	c307
328	putchar	dff1
329	puts	e053
330	q	7007
331	read_mem	ce1b
332	read_rec	e53b
333	reg_disp	d963
334	reg_dp	d68e
335	reg_s	d65b
336	reg_u	d628
337	reg_x	d5c2
338	reg_y	d5f5
339	save_PC	7018
340	save_bcc	7010
341	scan	c896
342	scanl	df09
343	send_hex	e112
344	send_wor	elde
345	start	701c
346	state	7024
347	swi_serv	c027
348	t	7022
349	temp	7012
350	templ6	7014
351	tick	700e
352	timeout	7033
353	u	7006
354	x	700a
355		
355		
355		
355		
355		
355		

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355
355  ADR1      7047 *0176 0235 0243 0250 0256 0257 0263 0267 0277 0281
356                                0285 0290 0297
357  ADR2      7049 *0177 0236 0242 0260 0262 0278 0282 0286 0291 0298
358  ADR3      704b *0178 0252 0264 0279 0280 0284 0288 0289 0293 0294
359                                0296 0300 0302
360  ADR31     704c *0179 0234 0238 0246 0268
361  DIVD      c08b *0255 0265
362  InitLcd   c23a *0467 4777 4778
363  LcdReady  c129 *0342 0388 0399 0468 0475 0540 0567
364  NOCARRY   c0e9 *0297 0295
365  NOSUB     c09f *0264 0261
366  PC        7016 *0078 1784 1794 1908 1910 2023 2025 2052 2106 2124
367                                2128 2139 2140 2148 2235 2356 3211 3262 3264 3303 4
368                                4353 4737
369  PutLCD    c27d *0496 4781 4791
370  SAVE_SP   702b *0122 0225 2233 2782
371  SWEND     c10b *0323 0319
372  SWLOOP   c0fb *0317 0321
373  USER_A    702f *0130 0211 2244 2428 2642
374  USER_B    7030 *0134 0213 2243 2510 2592
375  USER_DP   7032 *0142 0215 2239 2806
376  USER_P    7031 *0138 0209 2237 2888 3009 4743
377  USER_PC   7025 *0110 0223
378  USER_U    7027 *0114 0221 2234 2758 4741
379  USER_X    7029 *0118 0217 2241 2710
380  USER_Y    702d *0126 0219 2242 2734
381  ab        d4c7 *2591 3140
382  acca      d365 *2427 3134
383  accb      d416 *2509 3137
384  address_  cd90 *1783 1853
385  bcc        700f *0058 4468 4477 4536 4608 4612 4615 4618
386  bcc_erro  7011 *0066 4633 4643 4698
387  beep      de94 *3706 3549
388  buffer    7035 *0150 1247 1255 1271 1291 1446 1451 1465 1470 1484
389                                1489 1501 1506 1518 1523 1535 1540 1556 1561 1573 1
390                                1590 1595 1609 1614 1628 1633 1647 1652 1675 1704 1
391                                1762 1801 1830 1950 1976 2156 2163 2170 2177 2184 2
392                                2366 2373 2380 2387 2394 2401 2408 2415 2431 2460 2
393                                2485 2492 2499 2513 2542 2560 2567 2574 2581 2595 2
394                                2645 2674 2692 2699 2716 2723 2740 2747 2764 2771 2
395                                2795 2809 2838 2856 2863 2870 2877 2899 2908 2924 2
396                                2949 2958 2974 2983 2991 2998 3020 3029 3045 3054 3
397                                3079 3095 3104 3112 3119 3355 3362 3429 3445 3513 3
398                                3527 4793 4806 4819 4832 4845 4852
399  cc1       e6d2 *4715 4702 4708
400  cc10     c1ef *0431 0460
401  cc100    d8cc *3061 3052
402  cc101    d8f5 *3078 3069
403  cc102    d906 *3086 3077
404  cc103    d92f *3103 3094
405  cc104    d940 *3111 3102
406  cc106    d9d6 *3177 3135 3138 3141 3144 3147 3150 3153 3156 3159
407                                3162 3163
408  cc107    d9a9 *3164 3132
409  cc108    d96a *3133 3166
410  cc109    d970 *3136 3167
411  cc11     c208 *0443 0461
412  cc110    d976 *3139 3168
413  cc111    d97c *3142 3169

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474	cc168	de1b	*3650	3668	
475	cc169	de21	*3653	3669	
476	cc17	c375	*0618	0614	
477	cc170	de27	*3656	3670	
478	cc171	de2d	*3659	3671	
479	cc172	de7e	*3693	3700	3701
480	cc173	de93	*3702	3691	
481	cc174	de5e	*3681	3698	
482	cc175	de8d	*3699	3692	
483	cc176	ded1	*3733	3757	
484	cc177	df06	*3758	3731	
485	cc178	deab	*3717	3743	
486	cc179	dee7	*3744	3732	
487	cc18	c39e	*0636	0632	
488	cc180	df09	*3764	3778	3779
489	cc181	df31	*3780	3777	
490	cc182	df3b	*3785	3799	3800
491	cc183	df63	*3801	3798	
492	cc184	df6e	*3882	3903	3904
493	cc185	e034	*3905	3902	
494	cc186	e053	*3925	3953	
495	cc187	e091	*3954	3934	
496	cc188	e09f	*3965	3986	3987
497	cc189	e0d5	*3988	3985	
498	cc19	c3c7	*0654	0650	
499	cc190	e171	*4066	4056	
500	cc191	e183	*4075	4065	
501	cc192	e1cb	*4106	4096	
502	cc193	e1dd	*4115	4105	
503	cc194	e26b	*4185	4349	
504	cc195	e3e2	*4350	4183	
505	cc196	e246	*4170	4194	
506	cc197	e280	*4195	4184	
507	cc198	e2c7	*4225	4253	
508	cc199	e304	*4254	4223	
509	cc2	c135	*0347	0382	
510	cc20	c3f0	*0672	0668	
511	cc200	e2a2	*4210	4234	
512	cc201	e2dc	*4235	4224	
513	cc202	e33e	*4279	4339	
514	cc203	e3cc	*4340	4277	
515	cc204	e319	*4264	4288	
516	cc205	e353	*4289	4278	
517	cc206	e3bf	*4333	4326	
518	cc207	e3a9	*4324	4311	4322
519	cc208	e3c9	*4338	4332	
520	cc209	e42f	*4388	4374	
521	cc21	c419	*0690	0686	
522	cc210	e448	*4402		
523	cc211	e5a8	*4583	4606	
524	cc212	e5d8	*4607	4581	
525	cc213	e57c	*4563	4593	
526	cc214	e5be	*4594	4582	
527	cc215	e617	*4634	4631	
528	cc216	e626	*4644	4695	
529	cc217	e6a8	*4696	4654	
530	cc218	e643	*4655	4666	4667
531	cc219	e666	*4668	4665	
532	cc22	c442	*0708	0704	
533	cc221	e6a5	*4694	4674	4677 4681 4685 4686

534	cc222	e690	*4687	4670				
535	cc223	e66c	*4671	4689				
536	cc224	e675	*4675	4690				
537	cc225	e67b	*4678	4691				
538	cc226	e684	*4682	4692				
539	cc227	e6c4	*4707	4701				
540	cc228	e6ce	*4712	4706				
541	cc229	e700	*4729	4723				
542	cc23	c46b	*0726	0722				
543	cc230	e84f	*4867	4773	4779	4789		
544	cc231	e83d	*4859	4864				
545	cc232	e84e	*4865	4862				
546	cc24	c494	*0744	0740				
547	cc25	c4bd	*0762	0758				
548	cc26	c4e6	*0780	0776				
549	cc27	c50f	*0798	0794				
550	cc28	c538	*0816	0812				
551	cc29	c561	*0834	0830				
552	cc3	c194	*0383	0378				
553	cc30	c58a	*0852	0848				
554	cc31	c5b3	*0870	0866				
555	cc32	c5dc	*0888	0884				
556	cc33	c605	*0906	0902				
557	cc34	c62e	*0924	0920				
558	cc35	c657	*0942	0938				
559	cc36	c680	*0960	0956				
560	cc37	c6a9	*0978	0974				
561	cc38	c6d2	*0996	0992				
562	cc39	c6fb	*1014	1010				
563	cc4	c180	*0376	0364	0374			
564	cc40	c724	*1032	1028				
565	cc41	c74d	*1050	1046				
566	cc42	c776	*1068	1064				
567	cc43	c79f	*1086	1082				
568	cc44	c7c8	*1104	1100				
569	cc45	c7f1	*1122	1118				
570	cc46	c81a	*1140	1136				
571	cc47	c843	*1158	1154				
572	cc48	c87f	*1190	1198	1199			
573	cc49	c895	*1200	1188				
574	cc50	c859	*1174	1196				
575	cc51	c88f	*1197	1189				
576	cc52	c8db	*1231	1405				
577	cc53	ca76	*1406	1229				
578	cc54	c8bb	*1219	1236				
579	cc55	c8ea	*1237	1230				
580	cc56	c9ab	*1316	1310				
581	cc57	c962	*1288	1270	1286			
582	cc58	c996	*1308	1290	1306			
583	cc59	c9ae	*1318	1315				
584	cc6	c239	*0463	0418	0430	0442	0454	0455
585	cc60	c9f4	*1347	1392				
586	cc61	ca5c	*1393	1345				
587	cc62	c9d3	*1334	1353				
588	cc63	ca04	*1354	1346				
589	cc64	ca35	*1374	1369				
590	cc65	ca42	*1380	1373				
591	cc66	caae	*1429	1426				
592	cc67	cea7	*1914	1907				
593	cc68	ce8a	*1903	1889	1900			

654	end	701e	*0094	1973	1983	2307	4641	4645	4673	4680	4684		
655	enter_nu	dc66	*3461	3651	3654	3657	3660						
656	flag	700d	*0050	3538	3593	3599	4770						
657	get16bit	e4e3	*4487	4551									
658	get_s_re	e61a	*4639	4727									
659	getchar	e092	*3958	4412	4417	4656	4669						
660	gethex	e44b	*4407	4497	4519	4540	4604	4624					
661	goto_xy	c1a9	*0398	0487	4787								
662	gpio1	703b	*0154	3394	4613	4745	4757						
663	hex4	cc9c	*1669	1788	2289	2714	2738	2762	2786	3392	3501		
664	hex_addr	d077	*2111	3642									
665	hi_cc	d851	*3008	3161									
666	hit	700b	*0042	1864	1872	1929	1949	1975	2044	2059	2074	2112	
667				2127	2292	3457	3462	3477	3511				
668	i	7000	*0006	1218	1220	1232	1234	1249	1257	1273	1293	2320	
669				2322	2334	2336	2342	2347	3409	3411	3423	3425	3431
670	initacia	df85	*3818	4771									
671	initreg	e717	*4735	4756									
672	insert	d9d7	*3181	3587									
673	irq_serv	c023	*0204	0195									
674	j	7002	*0010	3214	3216	3228	3230	3236	3241	3306	3308	3320	
675				3322	3328	3333	3680	3682	3694	3696			
676	k	7005	*0018	1207	1240	1394	1404	4038	4039	4045	4046	4057	
677				4067	4085	4086	4097	4107	4138	4139	4152	4153	
678	key	7009	*0034	1214	1372	1428	1433	2089	2142	3130	3492	3551	
679				3562	3807	3808	3813						
680	key_PC	d06d	*2104	0226	3578								
681	key_addr	ce22	*1858	3566	4354								
682	key_cal	dc39	*3441	3605									
683	key_code	c321	*0581	3811									
684	key_copy	dccb	*3507	3608									
685	key_data	ce35	*1868	1913	2028	2107	3569	4713					
686	key_dump	e233	*4161	3611									
687	key_exe	dd0e	*3537	3814									
688	key_go	d145	*2203	3581									
689	key_load	e6ef	*4721	3614									
690	key_minu	cf7b	*1999	3575									
691	key_plus	ce48	*1878	3572									
692	key_reg	d2d6	*2365	3584									
693	key_test	db6c	*3351	3602									
694	low_cc	d73f	*2887	3158									
695	main	e747	*4755	0203									
696	n	7004	*0014	1173	1175	1191	1194	1333	1335	1348	1351	1800	
697				1808	1819	1829	1837	2430	2438	2449	2459	2467	2512 2
698				2531	2541	2549	2594	2602	2613	2623	2631	2644	2652 2
699				2673	2681	2808	2816	2827	2837	2845	2890	2891	2916 2
700				2966	3011	3012	3037	3062	3087				
701	newline	e0fd	*4012	4196	4351	4697	4722	4772					
702	nibble2h	e3f1	*4359	4428	4448								
703	num	701a	*0086	1926	1946	1972	2041	2258	2305	3474	3478	3489	
704				3490	3498	3499							
705	o	7008	*0030	1331	1355	1381	1391	1411	1412				
706	port0	7041	*0166	1327	1407	4751							
707	port1	703f	*0162	1238	3745	3752	4749	4765					
708	port2	703d	*0158	1245	1319	3708	4747	4761					
709	positive	700c	*0046	1931	2046	2260							
710	print_er	d0d8	*2155	1993									
711	putch_lc	c307	*0566										
712	putchar	dff1	*3875	3943	4015	4019	4063	4073	4103	4113	4203	4251	
713				4257	4330	4336							

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714 puts e053 *3924 4704 4710 4725 4775
715 q 7007 *0026 1216 1370 1375 1378 4300 4301 4312 4327
716 read_mem ce1b *1852 1861 1869 1912 2027 2099 2149 2357 3266 3344
717 read_rec e53b *4533 4676
718 reg_disp d963 *3129 3648
719 reg_dp d68e *2805 3155
720 reg_s d65b *2781 3152
721 reg_u d628 *2757 3149
722 reg_x d5c2 *2709 3143
723 reg_y d5f5 *2733 3146
724 save_PC 7018 *0082 0224 2105 4739
725 save_bcc 7010 *0062 4620 4621
726 scan c896 *1204 3385 3765 3786 3806
727 scanl df09 *3763 4863
728 send_hex e112 *4024 4142 4156 4247
729 send_wor elde *4119 4199
730 start 701c *0090 1927 1947 1985 2042 2271 2278 2281 2285 2287
731 2309 2315 3453
732 state 7024 *0106 1860 1874 1879 1890 1915 1933 1945 1959 1971
733 2000 2010 2030 2199 2204 2215 2247 2294 2360 2423 3
734 3193 3268 3274 3285 3346 3443 3509 3638
735 swi_serv c027 *0207 0190
736 t 7022 *0102 3354 3390 3396 3398 3400
737 temp 7012 *0070 1165 1167 2314 2324
738 templ6 7014 *0074 1674 1682 1692 1703 1711 1721 1732 1740 1750
739 1761 1769 1785 1786 2711 2712 2735 2736 2759 2760 2
740 2784 4132 4133
741 tick 700e *0054 0205 3374 3389
742 timeout 7033 *0146 0344 0365 0379 0381
743 u 7006 *0022 1209
744 x 700a *0038 2058 2071 2075 2085 2086 2093 2096
745
```