

CDP1802 Microprocessor Kit Technical Documents

1. Monitor program source code
2. How compile the source code
3. Monitor program list file

```

1  /*
2      Monitor source code for CDP1802 Microprocessor Kit 2018
3      (C) 2018 by Wichit Sirichote
4      Xtal frequency 3.6864MHz, 32kB RAM, 28kB ROM, 4 kB memory mapped I/O
5      ROM 0-6FFF,
6      I/O 7000-7FFF
7      RAM 8000-FFFF, FE00-FFFF are for system monitor
8
9      compiling the source code with lcc.bat
10
11     c:\lcc42\examples\blink\lcc mon1806v1.c -o mon1806v1.hex
12
13     July 13, 2025 modify for cdp1806, adjust display brightness
14
15
16 */
17
18 // prototype declaration
19
20 void key_dump();
21 void pstr(char *s);
22 void read_record1();
23
24
25 volatile unsigned char *gpio1 = (unsigned char*) 0x7000;
26 volatile unsigned char *segment = (unsigned char*) 0x7102;
27 volatile unsigned char *digit = (unsigned char*) 0x7101;
28 volatile unsigned char *port0 = (unsigned char*) 0x7100;
29 volatile unsigned char *port1 = (unsigned char*) 0x7101;
30 volatile unsigned char *port2 = (unsigned char*) 0x7102;
31
32 volatile unsigned char *uart_buffer = (unsigned char*) 0x7300;
33 volatile unsigned char *uart_line_status = (unsigned char*) 0x7305;
34 volatile unsigned char *uart_fifo = (unsigned char*) 0x7302;
35 volatile unsigned char *uart_lcr = (unsigned char*) 0x7303;
36 volatile unsigned char *uart_divisor_lsb = (unsigned char*) 0x7300;
37 volatile unsigned char *uart_divisor_msb = (unsigned char*) 0x7301;
38 volatile unsigned char *uart_scr = (unsigned char*) 0x7307;
39
40 volatile unsigned char *LCD_cwr = (unsigned char*) 0x7200;
41 volatile unsigned char *LCD_dwr = (unsigned char*) 0x7201;
42 volatile unsigned char *LCD_crd = (unsigned char*) 0x7202;
43 volatile unsigned char *LCD_drd = (unsigned char*) 0x7203;
44
45 volatile unsigned char *tick = (unsigned char*) 0xffff;
46
47 #define BUSY 0x80
48
49
50
51 char convert[16]= {0xBD,0x30,0x9B,0xBA,0x36,0xAE,0xAF,0x38,0xBF,0xBE,0x3F,0xA7,0x8D,(
52
53 char text1[]={"\r\n\n\n\nCDP1802 MICROPROCESSOR KIT 2018"};
54 char text2[]={ "CDP1802 KIT-----"};
55 char text3[]={ "32k RAM 9600UART"};
56 char text4[]={ "\r\nLoad Intel Hex file..(set 1ms delay, character & line)"};
57 char text5[]={ "\r\nBye check sum error!"};
58 char text6[]={ "\r\n0 error..."};
59
60
61
62
63
64
65

```

```

66
67
68
69 //----- utility subroutines -----
70 // user delay subroutine will be loaded into RAM at location F000
71 // to use it, load register with F001, the set it to be program counter
72 char user_delay[]={0xD0,0xF8,0x64,0xA6,0xF8,00,0xA7,0x27,0x87,0x3A,07,0x26,0x86,0x3A,
73
74 // interrupt service routine @ F020
75 char interrupt_test[]={0xF8,0xF0,0xB1,0xF8,0x38,0xA1,0xF8,0x70,0xB4,0xF8,00,0xA4,0xF8,
76 0xFF,0xB6,0xF8,0xFF,0xA6,0xE0,0x70,0x00,0x30,0x35,0x70,0x22,0x78,0x06,0xFC,01,0x56,0;
77 0x0A,0x3A,0x46,0x56,0x15,0x85,0x54,0xC4,0x30,0x37};
78
79
80
81
82
83 char n,c,t,hit;
84
85
86 int i,j,k;
87 int temp;
88 unsigned int warm;
89
90 char flag;
91
92
93 char bcc, save_bcc, bcc_error, record_type;
94
95
96 char o,q,key;
97 char key_pressed;
98 char buffer[6];
99
100 int temp,temp16,timeout;
101 int num, start, end, desti;
102
103
104 unsigned int PC, save_PC;
105
106 char state,x,hit;
107
108 char *dptr;
109 char *dptr2;
110
111 char user_d, user_df, user_xp;
112 int user_r3,user_r4,user_r5,user_r6,user_r7,user_r8,user_r9,user_r10;
113 int user_r11,user_r12,user_r13,user_r14,user_r15;
114
115
116
117
118 void delay_num1()
119 {
120     temp=0;
121     temp=0;
122 }
123
124 void delay_ms(unsigned int w)
125 {
126     unsigned int n;
127     for( n = 0; n < w; n++)
128         ;
129 }
130

```

```
131
132 void blink_q()
133 {
134     asm(" seq \n");
135     delay_ms(100);
136     asm(" req \n");
137     delay_ms(2000);
138
139     asm(" seq \n");
140     delay_ms(100);
141     asm(" req \n");
142     delay_ms(2000);
143 }
144
145 char scan(){
146     k = 1;
147
148     key = 0xff;
149     q = 0;
150
151     for(i=0; i<6; i++)
152     {
153         *digit = ~k;
154
155         *segment = buffer[i];
156
157         if(buffer[i] != 0x30 && buffer[i] != 0x38 && buffer[i] != 0x70) delay_ms(6);
158         else delay_num1();
159
160         *segment = 0;
161
162         // delay_ms(1);
163
164         o= *port0;
165
166         for(n=0; n<6; n++)
167         {
168             if((o&1)==0)
169             {key=q;
170
171
172
173
174             }
175
176             else q++;
177             o = o >> 1;
178         }
179
180         k = k << 1;
181     }
182
183     key_pressed=key;
184
185     // *gpio1=key;
186
187
188     return key_pressed;
189 }
190
191
192 void dot_address()
193 {
194     buffer[0]=buffer[0]&~0x40;
195 }
```

```
196     buffer[1]=buffer[1]&~0x40;
197
198
199     buffer[2]=buffer[2]|0x40;
200     buffer[3]=buffer[3]|0x40;
201     buffer[4]=buffer[4]|0x40;
202     buffer[5]=buffer[5]|0x40;
203
204 }
205
206
207 void dot_data()
208 {
209
210     buffer[0]=buffer[0]|0x40;
211     buffer[1]=buffer[1]|0x40;
212
213     buffer[2]=buffer[2]&~0x40;
214     buffer[3]=buffer[3]&~0x40;
215     buffer[4]=buffer[4]&~0x40;
216     buffer[5]=buffer[5]&~0x40;
217
218 }
219
220 void hex4(int h)
221 {
222     temp16 = h;
223     buffer[2]= convert[temp16&0xf];
224     temp16>>=4;
225     buffer[3]= convert[temp16&0xf];
226     temp16>>=4;
227     buffer[4]=convert[temp16&0xf];
228     temp16>>=4;
229     buffer[5]=convert[temp16&0xf];
230 }
231
232
233 void address_display()
234 {
235
236     temp16 = PC;
237
238     hex4(temp16);
239
240 }
241
242 void data_display()
243 {
244     dptr = (char *)PC;
245
246     n = *dptr;
247
248     buffer[0]= convert[n&0xf];
249     n = n>>4;
250     buffer[1]=convert[n&0xf];
251 }
252
253 void read_memory()
254 {
255     address_display();
256     data_display();
257 }
258
259
260 void key_address()
```

```
261 {
262
263
264     state = 1;
265
266     read_memory();
267
268
269     dot_address();
270     hit=0;
271
272
273
274
275 }
276
277 void key_data()
278 {
279
280     read_memory();
281     dot_data();
282     hit=0;
283     state=2;
284
285 }
286
287 void key_plus()
288 {
289
290     if(state==1 || state==2)
291     {
292         PC++;
293         read_memory();
294         key_data();
295     }
296
297     if(state==5)
298     {
299         state=6;
300         start = num;
301         hit=0;
302         buffer[0]=0x8f; /* end cursor */
303         return;
304     }
305
306
307     if(state==6)
308     {
309         state=7;
310         end = num;
311         hit=0;
312         buffer[0]=0xb3; /* destination cursor */
313
314         // if(end <= start) print_error();
315
316
317
318
319     }
320
321
322
323 }
324
325 void key_minus()
```

```
326 {
327     if(state==1 | state ==2)
328     {
329         PC--;
330         read_memory();
331         key_data();
332     }
333 }
334
335 void data_hex()
336 {
337
338     dptr = (char *)PC;
339     x = *dptr;
340     if(hit==0) x=0;
341     {
342         hit =1;
343         x = x << 4;
344         x = x|key;
345
346         *dptr = x;
347
348         read_memory();
349
350         dot_data();
351     }
352 }
353
354 void key_PC()
355 {
356     PC=save_PC;
357     key_data();
358 }
359
360 void hex_address()
361 {
362     if(hit==0) PC=0;
363     {
364         hit=1;
365
366         PC<<=4;
367         PC |= key;
368         read_memory();
369         dot_address();
370     }
371 }
372
373 /* insert byte and shift 512 bytes down */
374
375 void insert()
376 {
377     if(state==1 || state==2)
378     {
379         dptr=(char *)PC;
380         for(j=512; j>0; j--)
381         {
382             *(dptr+j)=*(dptr+j-1);
383         }
384         *(dptr+1)=0; /* insert next byte */
385         PC++;
386         read_memory();
387         state=2;
388     }
389 }
390 }
```

```
391
392
393  /* delete current byte and shift 512 bytes up */
394
395 void cut_byte()
396 {
397     if(state==1 || state==2)
398     {
399         dptr=(char *)PC;
400         for(j=0; j<512; j++)
401         {
402             *(dptr+j)=*(dptr+j+1);
403         }
404         read_memory();
405         state=2;
406     }
407 }
408
409 void key_go(){
410
411     if(state==1 || state==2)
412     {
413
414         asm("ldAD r5,_PC \n"
415             "        ldn r5 \n"
416             "        phi  r0 \n"
417             "        inc r5 \n"
418             "        ldn r5 \n"
419             "        plo r0 \n"
420             "        sep r0\n"
421             );
422
423     }
424
425     if(state==7)
426     {
427         desti = num;
428         temp = end-start;
429         dptr = (char *)start;
430         dptr2 = (char *) desti;
431
432         for(i=0; i<temp; i++)
433         {
434             *(dptr2+i)=*(dptr+i);
435         }
436         PC = desti;
437         read_memory();
438         dot_data();
439         state=2;
440
441
442
443
444     }
445 }
446
447 }
448
449 void key_test()
450 {
451
452     PC = 0xf020;  // test 10ms timer SW1 selects 10ms
453
454     state = 1;
455 }
```



```
456     key_go();
457
458
459 }
460
461 void key_load()
462 {
463     pstr(text4);
464     read_record1();
465
466     if(bcc_error) pstr(text5);
467     else pstr(text6);
468
469     PC = 0x8000;
470     key_data();
471
472
473
474
475 }
476
477 void key_reg()
478 {
479     buffer[5]= 0x03;
480     buffer[4]= 0x8F;
481     buffer[3]= 0xad;
482     buffer[2]=0;
483     buffer[1]=0;
484     buffer[0]=0;
485
486     state = 3;    /* register display state = 3 with hex key */
487
488 }
489
490
491 void reg_d()
492 {
493
494     n = user_d;
495
496     buffer[2]= convert[n&0xf];
497     n = n>>4;
498     buffer[3]=convert[n&0xf];
499     buffer[4]=0;
500     buffer[5]=0;
501     buffer[1]=0;
502     buffer[0]=0xb3;    // reg d
503 }
504
505 void reg_df()
506 {
507
508     n = user_df;    // DF = 0 or 1
509
510     buffer[2]= 0;
511     buffer[3]=convert[n&0xf];
512     buffer[4]=0;
513     buffer[5]=0;
514     buffer[1]=0xb3;    // flag DF
515     buffer[0]=0x0f;    //
516 }
517
518 void reg_xp()
519 {
520
```

```
521     n = user_xp; // xp
522
523
524     buffer[2]= convert[n&0xf];
525     n = n>>4;
526
527     buffer[3]=convert[n&0xf];
528     buffer[4]=0;
529     buffer[5]=0;
530     buffer[1]=0x13; // XP
531     buffer[0]=0x1F; //
532 }
533
534 void reg_r3()
535 {
536
537     hex4(user_r3);
538
539     buffer[1]=0x03;
540     buffer[0]=0xba;
541 }
542
543 void reg_r4()
544 {
545
546     hex4(user_r4); //
547
548     buffer[1]=0x03; //
549     buffer[0]=0x36;
550 }
551
552 void reg_r5()
553 {
554
555     hex4(user_r5); //
556
557     buffer[1]=0x03; //
558     buffer[0]=0xae;
559 }
560
561 void reg_r6()
562 {
563
564     hex4(user_r6); //
565
566     buffer[1]=0x03; //
567     buffer[0]=0xaf;
568 }
569
570 void reg_r7()
571 {
572
573     hex4(user_r7); //
574
575     buffer[1]=0x03; //
576     buffer[0]=0x38;
577 }
578
579 void reg_r8()
580 {
581
582     hex4(user_r8); //
583
584     buffer[1]=0x03; //
585     buffer[0]=0xbf;
```

```
586     }
587     void reg_r9()
588     {
589
590         hex4(user_r9); //
591
592         buffer[1]=0x03; //
593         buffer[0]=0xbe;
594     }
595     void reg_r10()
596     {
597
598         hex4(user_r10); //
599
600         buffer[1]=0x03; //
601         buffer[0]=0x3f;
602     }
603     void reg_r11()
604     {
605
606         hex4(user_r11); //
607
608         buffer[1]=0x03; //
609         buffer[0]=0xa7;
610     }
611     void reg_r12()
612     {
613
614         hex4(user_r12); //
615
616         buffer[1]=0x03; //
617         buffer[0]=0x8d;
618     }
619     void reg_r13()
620     {
621
622         hex4(user_r13); //
623
624         buffer[1]=0x03; //
625         buffer[0]=0xb3;
626     }
627
628     void reg_r14()
629     {
630
631         hex4(user_r14); //
632
633         buffer[1]=0x03; //
634         buffer[0]=0x8f;
635     }
636
637     void reg_r15()
638     {
639
640         hex4(user_r15); //
641
642         buffer[1]=0x03; //
643         buffer[0]=0x0f;
644     }
645
646
647
648
649     void reg_display()
650     {
```

```
651
652     switch(key)
653     {
654         case 0: reg_d(); break;
655         //case 1: reg_df(); break; // future work
656         //case 2: reg_xp(); break;
657         case 3: reg_r3(); break;
658         case 4: reg_r4(); break;
659         case 5: reg_r5(); break;
660         case 6: reg_r6(); break;
661         case 7: reg_r7(); break;
662         case 8: reg_r8(); break;
663         case 9: reg_r9(); break;
664         case 10: reg_r10(); break;
665         case 11: reg_r11(); break;
666         case 12: reg_r12(); break;
667         case 13: reg_r13(); break;
668         case 14: reg_r14(); break;
669         case 15: reg_r15(); break;
670     }
671 }
672
673
674
675 void enter_num()
676 {
677     if(hit==0) num=0;
678     {
679         hit=1;
680
681         num<=4;
682         num |= key;
683         hex4(num);
684     }
685 }
686
687
688 void clear_buffer()
689 {
690     for(i=0; i<6; i++)
691         *(buffer+i)=0;
692 }
693
694
695 void key_copy()
696 {
697
698     state=5;
699     hit=0;
700     clear_buffer();
701     buffer[2]= 0xbd;
702
703     buffer[0]=0xae;
704     buffer[1]=0;
705
706
707 }
708
709
710
711
712
713
714 /* return internal code hex keys and function keys */
715
```

```
716 char key_code(char n)
717 {
718     char d;
719     if(n == 0x10) return 0;
720     if(n == 0x21) return 1;
721     if(n == 0x1b) return 2;
722     if(n == 0x15) return 3;
723     if(n == 0x16) return 4;
724     if(n == 0x20) return 5;
725     if(n == 0x1a) return 6;
726     if(n == 0x14) return 7;
727     if(n == 0x1c) return 8;
728     if(n == 0x1f) return 9;
729     if(n == 0x19) return 0xa;
730     if(n == 0x13) return 0xb;
731     if(n == 0x22) return 0xc;
732     if(n == 0x1e) return 0xd;
733     if(n == 0x18) return 0xe;
734     if(n == 0x12) return 0xf;
735
736     if(n == 0xc) return 0x10; // pc
737     if(n == 0xd) return 0x11; // reg
738     if(n == 0xe) return 0x12; // data
739     if(n == 0xf) return 0x13; // address
740
741     if(n == 6) return 0x14;
742     if(n == 7) return 0x15; // MUTE
743     if(n == 8) return 0x16; // -
744     if(n == 9) return 0x17; // +
745
746     if(n == 0) return 0x18; // load
747     if(n == 1) return 0x19; // insert
748     if(n == 2) return 0x1a; // delete
749     if(n == 3) return 0x1b; // go
750
751     if(n == 0x13) return 0x1c;
752     if(n == 0x1d) return 0x1d; // test
753     if(n == 0x17) return 0x1e; // dump
754     if(n == 0x00) return 0x1f;
755     if(n == 0x23) return 0x20; // copy
756
757     return 0xff;
758 }
759
760
761 void delay_beep()
762 {
763     for(j=0; j<2; j++)
764         continue;
765     //j=0;
766     //j=0;
767     //j=0;
768     //j=0;
769     //j=0;
770     //j=0;
771 }
772
773 void beep()
774 {
775
776     *port2=0;
777
778     for(x=0; x<50; x++)
779     {
780
```

```
781     *port1 = (char) ~0x80;
782     delay_beep();
783     *port1 = 0xff;
784     delay_beep();
785 }
786
787 }
788
789 void key_mute()
790 {
791     flag ^=1;
792 }
793
794 void key_qled()
795 {
796
797     while(1)
798     {
799         asm(" seq \n");
800         delay_ms(500);
801         asm(" req \n");
802
803
804
805         delay_ms(30000);
806     }
807 }
808
809
810 void key_exe()
811 {
812
813     if(flag==0) beep();
814
815     if( key>15)
816     {
817         if(key==0x13) key_address();
818         if(key==0x12) key_data();
819         if(key==0x17) key_plus();
820         if (key==0x16) key_minus();
821         if (key==0x10) key_PC();
822         if (key==0x1b) key_go();
823         if (key==0x11) key_reg();
824         if (key==0x19) insert();
825         if (key==0x1a) cut_byte();
826         if (key==0x1e) key_dump();
827         if (key==0x1d) key_test();
828         if (key==0x18) key_load();
829         if (key==0x20) key_copy();
830         if (key==0x15) key_mute();
831         if (key==0x14) key_qled();
832
833
834     }
835
836     else
837     {
838         switch(state)
839         {
840
841             case 1: hex_address(); break;
842             case 2: data_hex(); break;
843             case 3: reg_display(); break;
844             case 5: enter_num(); break;
845             case 6: enter_num(); break;
```

```
846     case 7: enter_num(); break;
847     }
848
849 }
850
851 }
852
853 void scan1(){
854     while(scan() != 0xff)
855     ;
856     delay_ms(10);
857
858     while(scan() == 0xff)
859     ;
860     delay_ms(5);
861
862     key = scan();
863
864     key = key_code(key);
865
866     // *gpio1=key;    // debug
867
868     if((key>=0) && (key <0x30)) key_exe();
869 }
870
871 //----- UART -----
872
873
874 void init_8250()
875 {
876     *uart_lcr = 0x83;
877     *uart_divisor_lsb = 24; // computed for 3.6864MHz
878     *uart_divisor_msb = 0;
879     *uart_fifo = 7;
880     *uart_lcr = 3;
881
882
883 }
884
885 void cout(char n)
886 {
887     while((*uart_line_status & 0x20)==0)
888     ;
889     *uart_buffer=n;
890 }
891
892 char cin()
893 {
894     while((*uart_line_status & 1)==0)
895     ;
896     c = *uart_buffer;
897
898     return c;
899 }
900
901 void pstr(char *s)
902 {
903     while( *s )
904     {
905         cout(*s);
906         s++;
907     }
908 }
909
910 void test_uart()
```

```
911 {
912     for(c=0x20; c<0x80; c++)
913         cout(c);
914 }
915
916 void newline()
917 {
918     cout(0x0a);
919     cout(0x0d);
920 }
921
922 void send_hex(char n)
923 {
924     k = n>>4;
925     k = k&0xf;
926
927     if (k>9) cout(k+0x37); else cout(k+0x30);
928     k= n&0xf;
929     if (k>9) cout(k+0x37); else cout(k+0x30);
930 }
931
932 void send_word_hex(int n)
933 {
934     temp16 = n>>8;
935     k = temp16&0xff;
936     send_hex(k);
937     k = n&0xff;
938     send_hex(k);
939 }
940
941
942
943 void key_dump()
944 {
945     int j,p;
946
947     if(state==1 || state==2)
948     {
949         dptr = (char *)PC;
950
951         for(j=0; j<16; j++)
952         {
953             newline();
954             send_word_hex(PC);
955             cout(':');
956             for(p=0; p<16; p++)
957             {
958                 send_hex(*(dptr+p));
959                 cout(0x20);
960             }
961
962             cout(0x20);
963
964             for (p=0; p<16; p++)
965             {
966                 q=*(dptr+p);
967                 if(q >= 0x20 && q < 0x80) cout(q);
968                 else cout('.');
969             }
970
971         }
972     }
973 }
974
975
```



```
976         dptr+=16;
977     PC+=16;
978     }
979     newline();
980     // PC = dptr;
981     key_address();
982
983 }
984 }
985
986 char nibble2hex(char c)
987 {
988     char n;
989     if(c<0x40) return (c-0x30);
990     else return (c-0x37);
991 }
992
993 char gethex()
994 {
995     char a,b;
996
997     a = cin();
998     b = cin();
999
1000
1001     a = nibble2hex(a)<<4;
1002     b = nibble2hex(b);
1003     a = a|b;
1004     bcc = bcc+a; /* compute check sum */
1005
1006     *gpio1 =a; // loading indicator
1007
1008     return (a);
1009 }
1010
1011 int get16bitaddress()
1012 {
1013     unsigned int load_address;
1014
1015     load_address =0;
1016
1017     load_address |= gethex();
1018     load_address <=<8;
1019     load_address |= gethex();
1020
1021     return load_address;
1022 }
1023
1024
1025 // read Intel hex record
1026 // :20 0000 00 71F8FFB2F8F0A2F800B3F814A37BD37AD3300DD0F864A6F800A727873A1A2686EB
1027
1028 void read_record1()
1029 {
1030
1031     char x;
1032     char byte_count;
1033
1034     int address16bit;
1035
1036     bcc_error=0;
1037
1038     do{
1039
1040
```

```
1041     bcc =0;
1042
1043     while(cin() != ':')
1044     ;
1045
1046     byte_count = gethex(); /* only data record */
1047
1048     dptr = (char *) get16bitaddress();
1049
1050
1051     record_type= gethex();
1052
1053     // now read byte
1054
1055     for(x=0; x<byte_count; x++)
1056     {
1057         *(dptr+x) = gethex();
1058     }
1059
1060     // bcc = gethex();
1061     // bcc = ~bcc; /* one's complement */
1062     // bcc+= bcc; // two's complement
1063
1064     *gpio1=bcc; /* loading indicator */
1065
1066
1067     // save_bcc= bcc;
1068
1069     // if(save_bcc != gethex()) bcc_error=1;
1070
1071     }
1072
1073     while(record_type==0);
1074
1075
1076 }
1077
1078
1079 //-----
1080
1081
1082
1083 //----- LCD drivers -----
1084
1085
1086 /* LCD driver */
1087
1088 void LcdReady()
1089 {
1090     timeout=0;
1091
1092     while((*LCD_crd&0x80)==1) && (timeout<5))
1093         ++timeout;
1094 }
1095
1096 void clr_screen()
1097 {
1098     LcdReady();
1099     *LCD_cwr=0x01;
1100 }
1101
1102
1103 void goto_xy(int x, int y)
1104 {
1105     LcdReady();
```

```
1106
1107     switch(y)
1108     {
1109     case 0: *LCD_cwr=0x80+x; break;
1110     case 1: *LCD_cwr=0xC0+x; break;
1111     case 2: *LCD_cwr=0x94+x; break;
1112     case 3: *LCD_cwr=0xd4+x; break;
1113     }
1114 }
1115
1116
1117 void InitLcd()
1118 {
1119     LcdReady();
1120     *LCD_cwr=0x38;
1121     LcdReady();
1122     *LCD_cwr=0x0c;
1123     clr_screen();
1124     goto_xy(0,0);
1125     delay_ms(100);
1126 }
1127
1128
1129 void PutLCD(char *str)
1130 {
1131     char i;
1132     for (i=0; str[i] != '\0'; i++)
1133     {
1134         LcdReady();
1135         *LCD_dwr=str[i];
1136     }
1137
1138
1139 }
1140
1141 void putch_lcd(char ch)
1142 {
1143     LcdReady();
1144     *LCD_dwr=ch;
1145 }
1146
1147 // BLANK AREA !!
1148
1149 //----- end of LCD drivers -----
1150
1151 // put this code started at 2756h for using with programming book rev.1.0
1152
1153 void service_break()
1154 {
1155
1156     asm(
1157         " org 2756h \n"
1158         " plo r2      ; save D first \n"
1159         " ldAD r1, _USER_D \n"
1160         " glo r2 \n"
1161         " str r1 \n"
1162
1163         " ldAD r1, _USER_R3 \n"
1164         " ghi r3 \n"
1165         " str r1 \n"
1166         " inc r1 \n"
1167         " glo r3 \n"
1168         " str r1 \n"
1169
1170         " ldAD r1, _USER_R4\n"
```

```
1171      " ghi r4 \n"
1172      " str r1 \n"
1173      " inc r1 \n"
1174      " glo r4 \n"
1175      " str r1 \n"
1176
1177      " ldAD r1, _USER_R5\n"
1178      " ghi r5 \n"
1179      " str r1 \n"
1180      " inc r1 \n"
1181      " glo r5 \n"
1182      " str r1 \n"
1183
1184      " ldAD r1, _USER_R6\n"
1185      " ghi r6 \n"
1186      " str r1 \n"
1187      " inc r1 \n"
1188      " glo r6 \n"
1189      " str r1 \n"
1190
1191      " ldAD r1, _USER_R7\n"
1192      " ghi r7 \n"
1193      " str r1 \n"
1194      " inc r1 \n"
1195      " glo r7 \n"
1196      " str r1 \n"
1197
1198      " ldAD r1, _USER_R8\n"
1199      " ghi r8 \n"
1200      " str r1 \n"
1201      " inc r1 \n"
1202      " glo r8 \n"
1203      " str r1 \n"
1204
1205      " ldAD r1, _USER_R9\n"
1206      " ghi r9 \n"
1207      " str r1 \n"
1208      " inc r1 \n"
1209      " glo r9 \n"
1210      " str r1 \n"
1211
1212      " ldAD r1, _USER_R10\n"
1213      " ghi r10 \n"
1214      " str r1 \n"
1215      " inc r1 \n"
1216      " glo r10 \n"
1217      " str r1 \n"
1218
1219      " ldAD r1, _USER_R11\n"
1220      " ghi r11 \n"
1221      " str r1 \n"
1222      " inc r1 \n"
1223      " glo r11 \n"
1224      " str r1 \n"
1225
1226      " ldAD r1, _USER_R12\n"
1227      " ghi r12 \n"
1228      " str r1 \n"
1229      " inc r1 \n"
1230      " glo r12 \n"
1231      " str r1 \n"
1232
1233      " ldAD r1, _USER_R13\n"
1234      " ghi r13 \n"
1235      " str r1 \n"
```

```
1236         " inc r1 \n"
1237         " glo r13 \n"
1238         " str r1 \n"
1239
1240         " ldAD r1, _USER_R14\n"
1241         " ghi r14 \n"
1242         " str r1 \n"
1243         " inc r1 \n"
1244         " glo r14 \n"
1245         " str r1 \n"
1246
1247         " ldAD r1, _USER_R15\n"
1248         " ghi r15 \n"
1249         " str r1 \n"
1250         " inc r1 \n"
1251         " glo r15 \n"
1252         " str r1 \n"
1253
1254         " lbr 0      ; return to system monitor\n"
1255     );
1256 }
1257
1258 void load_user_subroutines()
1259 {
1260     PC = 0xf000;
1261     dptr = (char *) PC;
1262     for (i=0; i<17 ;i++ )
1263     {
1264         *(dptr+i) = user_delay[i];
1265     }
1266     PC = 0xf020;
1267     dptr = (char *) PC;
1268     for (i=0; i<sizeof(interrupt_test) ;i++ )
1269     {
1270         *(dptr+i) = interrupt_test[i];
1271     }
1272 }
1273
1274 void main()
1275 {
1276     *segment = 0;
1277     *digit = 0xff;
1278     *gpio1 = 0;
1279     *tick=0;
1280     state =0;
1281     init_8250();
1282     InitLcd();
1283     if(warm != 0xaaaa)
1284     {
1285         1300
```

```
1301     flag =0;
1302     warm = 0xaaaa;blink_q();
1303 }
1304
1305
1306
1307
1308
1309     PC = 0x8000;
1310     save_PC = 0x8000;
1311
1312 // asm(" ldAD r1,9000h \n");    // load interrupt vector at 9000h
1313
1314
1315     load_user_subroutines();
1316
1317     dptr= (char *) PC;
1318
1319     // test_uart();
1320
1321     PutLCD(text2);
1322     goto_xy(0,1);
1323     PutLCD(text3);
1324
1325     pstr(text1);
1326
1327
1328
1329     buffer[0]=0;
1330     buffer[1]=0;
1331
1332 //buffer[2]=convert[2]; // or CDP1806 convert[6]
1333 //buffer[3]=convert[0];
1334 //buffer[4]=convert[8];
1335 //buffer[5]=convert[1];
1336
1337     buffer[2]=0x9B; //convert[2]; // or CDP1806 convert[6]
1338
1339     buffer[3]=0xbd; //convert[0];
1340     buffer[4]=0xbf; //convert[8];
1341     buffer[5]=0x30; //convert[1];
1342
1343     while(1){
1344
1345         scan1();
1346     }
1347 }
1348
1349 void setRAM()
1350 {
1351     asm("ROM_END1: EQU $\n");
1352     asm("    org 0fe00h\n"); // space for monitor variables
1353 }
1354
1355
1356
1357
1358
```

```
1  Compile the source code to asm file
2
3  -----
4  C:\lcc42\examples\blink>lcc mon1806v1.c -S mon1806v1.asm
5
6  C:\lcc42\examples\blink>..\..\bin\lcc mon1806v1.c -S mon1806v1.asm
7  mon1806v1.c:
8  And St. Judy's Compiler FLOATS Across your code...
9  mon1806v1.asm:
10
11  -----
12
13  Generate LIST file using asw assembler
14
15  -----
16  C:\lcc42\examples\blink>asw -cpu 1802 -i c:\lcc42\include -L mon1806v1.asm
17  macro assembler 1.42 Beta [Bld 87]
18  (i386-unknown-win32)
19  (C) 1992,2013 Alfred Arnold
20  Motorola MPC821 Additions (C) 2012 Marcin Cieslak
21  68RS08-Generator (C) 2006 Andreas Bolsch
22  Mitsubishi M16C-Generator also (C) 1999 RMS
23  XILINX KCPSM(Picoblaze)-Generator (C) 2003 Andreas Wassatsch
24  TMS320C2x-Generator (C) 1994/96 Thomas Sailer
25  TMS320C5x-Generator (C) 1995/96 Thomas Sailer
26
27  assembling mon1806v1.asm
28  PASS 1←[K
29  lcc1802ProloFL.inc(835)←[K
30  lcc1802Epilofl.inc(506)←[K
31  IO1802.inc(51)←[K
32  mon1806v1.asm(2595)←[K
33  PASS 2←[K
34  lcc1802ProloFL.inc(835)←[K
35  lcc1802Epilofl.inc(506)←[K
36  IO1802.inc(51)←[K
37  mon1806v1.asm(2595)←[K
38
39  0.27 seconds assembly time←[K
40
41      3987 lines source file←[K
42      15614 lines incl. macro expansions←[K
43      2 passes←[K
44      0 errors←[K
45      0 warnings←[K
46
47  C:\lcc42\examples\blink>
48
49  -----
50
51  Compile the c source code into object code
52
53  -----
54  C:\lcc42\examples\blink>lcc mon1806v1.c -o mon1806v1.hex
55
56  C:\lcc42\examples\blink>..\..\bin\lcc mon1806v1.c -o mon1806v1.hex
57  And St. Judy's Compiler FLOATS Across your code...
58  P2HEX/C V1.42 Beta [Bld 87]
59  (C) 1992,2013 Alfred Arnold
60  C:\DOCUME~1\homePapa\LOCALS~1\Temp\lcc8522.p==>>mon1806v1.hex (11574 Bytes)
61
62  C:\lcc42\examples\blink>
63
64  -----
```

```
1      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 1 - 7/16/2025 13:30:08
2
3
4      1/      0 :      ; generated by lcc-xr18fl $Version: 4.0 - XR:
5      2/      0 :
6      3/      0 : =2H      SP:equ 2 ;stack pointer
7      4/      0 : =EH      memAddr: equ14
8      5/      0 : =6H      retAddr: equ6
9      6/      0 : =FH      retVal:equ 15
10     7/      0 : =CH      regArg1: equ12
11     8/      0 : =DH      regArg2: equ13
12     (1) 830/ 0 :      listing on
13     (1) 831/ 0 :
14     (1) 832/ 0 :      segment code
15     (1) 833/ 0 :
16     (1) 834/ 0 : C0 2A BB      lbr lcc1802Init
17     (1) 835/ 3 :
18     11/     3 :      listing on
19     12/     3 :      _gpio1:
20     13/     3 : 70 00      dw 28672
21     14/     5 :      _segment:
22     15/     5 : 71 02      dw 28930
23     16/     7 :      _digit:
24     17/     7 : 71 01      dw 28929
25     18/     9 :      _port0:
26     19/     9 : 71 00      dw 28928
27     20/     B :      _port1:
28     21/     B : 71 01      dw 28929
29     22/     D :      _port2:
30     23/     D : 71 02      dw 28930
31     24/     F :      _uart_buffer:
32     25/     F : 73 00      dw 29440
33     26/    11 :      _uart_line_status:
34     27/    11 : 73 05      dw 29445
35     28/    13 :      _uart_fifo:
36     29/    13 : 73 02      dw 29442
37     30/    15 :      _uart_lcr:
38     31/    15 : 73 03      dw 29443
39     32/    17 :      _uart_divisor_lsb:
40     33/    17 : 73 00      dw 29440
41     34/    19 :      _uart_divisor_msb:
42     35/    19 : 73 01      dw 29441
43     36/    1B :      _uart_scr:
44     37/    1B : 73 07      dw 29447
45     38/    1D :      _LCD_cwr:
46     39/    1D : 72 00      dw 29184
47     40/    1F :      _LCD_dwr:
48     41/    1F : 72 01      dw 29185
49     42/    21 :      _LCD_crd:
50     43/    21 : 72 02      dw 29186
51     44/    23 :      _LCD_drd:
52     45/    23 : 72 03      dw 29187
53     46/    25 :      _tick:
54     47/    25 : FF FF      dw 65535
55     48/    27 :      _convert:
56     49/    27 : BD      db 189
57     50/    28 : 30      db 48
58     51/    29 : 9B      db 155
59     52/    2A : BA      db 186
60     53/    2B : 36      db 54
61     54/    2C : AE      db 174
62     55/    2D : AF      db 175
63     56/    2E : 38      db 56
64
64
```


64
64 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 2 - 7/16/2025 13:30:08
65
66
67 57/ 2F : BF db 191
68 58/ 30 : BE db 190
69 59/ 31 : 3F db 63
70 60/ 32 : A7 db 167
71 61/ 33 : 8D db 141
72 62/ 34 : B3 db 179
73 63/ 35 : 8F db 143
74 64/ 36 : 0F db 15
75 65/ 37 : _text1:
76 66/ 37 : 0D db 13
77 67/ 38 : 0A db 10
78 68/ 39 : 0A db 10
79 69/ 3A : 0A db 10
80 70/ 3B : 0A db 10
81 71/ 3C : 43 db 67
82 72/ 3D : 44 db 68
83 73/ 3E : 50 db 80
84 74/ 3F : 31 db 49
85 75/ 40 : 38 db 56
86 76/ 41 : 30 db 48
87 77/ 42 : 32 db 50
88 78/ 43 : 20 db 32
89 79/ 44 : 4D db 77
90 80/ 45 : 49 db 73
91 81/ 46 : 43 db 67
92 82/ 47 : 52 db 82
93 83/ 48 : 4F db 79
94 84/ 49 : 50 db 80
95 85/ 4A : 52 db 82
96 86/ 4B : 4F db 79
97 87/ 4C : 43 db 67
98 88/ 4D : 45 db 69
99 89/ 4E : 53 db 83
100 90/ 4F : 53 db 83
101 91/ 50 : 4F db 79
102 92/ 51 : 52 db 82
103 93/ 52 : 20 db 32
104 94/ 53 : 4B db 75
105 95/ 54 : 49 db 73
106 96/ 55 : 54 db 84
107 97/ 56 : 20 db 32
108 98/ 57 : 32 db 50
109 99/ 58 : 30 db 48
110 100/ 59 : 31 db 49
111 101/ 5A : 38 db 56
112 102/ 5B : 00 db 0
113 103/ 5C : _text2:
114 104/ 5C : 43 db 67
115 105/ 5D : 44 db 68
116 106/ 5E : 50 db 80
117 107/ 5F : 31 db 49
118 108/ 60 : 38 db 56
119 109/ 61 : 30 db 48
120 110/ 62 : 32 db 50
121 111/ 63 : 20 db 32
122 112/ 64 : 4B db 75
123 113/ 65 : 49 db 73
124 114/ 66 : 54 db 84
125 115/ 67 : 2D db 45
126 116/ 68 : 2D db 45
127

127
127 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 3 - 7/16/2025 13:30:08
128
129
130 117/ 69 : 2D db 45
131 118/ 6A : 2D db 45
132 119/ 6B : 2D db 45
133 120/ 6C : 00 db 0
134 121/ 6D : _text3:
135 122/ 6D : 33 db 51
136 123/ 6E : 32 db 50
137 124/ 6F : 6B db 107
138 125/ 70 : 20 db 32
139 126/ 71 : 52 db 82
140 127/ 72 : 41 db 65
141 128/ 73 : 4D db 77
142 129/ 74 : 20 db 32
143 130/ 75 : 39 db 57
144 131/ 76 : 36 db 54
145 132/ 77 : 30 db 48
146 133/ 78 : 30 db 48
147 134/ 79 : 55 db 85
148 135/ 7A : 41 db 65
149 136/ 7B : 52 db 82
150 137/ 7C : 54 db 84
151 138/ 7D : 00 db 0
152 139/ 7E : _text4:
153 140/ 7E : 0D db 13
154 141/ 7F : 0A db 10
155 142/ 80 : 4C db 76
156 143/ 81 : 6F db 111
157 144/ 82 : 61 db 97
158 145/ 83 : 64 db 100
159 146/ 84 : 20 db 32
160 147/ 85 : 49 db 73
161 148/ 86 : 6E db 110
162 149/ 87 : 74 db 116
163 150/ 88 : 65 db 101
164 151/ 89 : 6C db 108
165 152/ 8A : 20 db 32
166 153/ 8B : 48 db 72
167 154/ 8C : 65 db 101
168 155/ 8D : 78 db 120
169 156/ 8E : 20 db 32
170 157/ 8F : 66 db 102
171 158/ 90 : 69 db 105
172 159/ 91 : 6C db 108
173 160/ 92 : 65 db 101
174 161/ 93 : 2E db 46
175 162/ 94 : 2E db 46
176 163/ 95 : 28 db 40
177 164/ 96 : 73 db 115
178 165/ 97 : 65 db 101
179 166/ 98 : 74 db 116
180 167/ 99 : 20 db 32
181 168/ 9A : 31 db 49
182 169/ 9B : 6D db 109
183 170/ 9C : 73 db 115
184 171/ 9D : 20 db 32
185 172/ 9E : 64 db 100
186 173/ 9F : 65 db 101
187 174/ A0 : 6C db 108
188 175/ A1 : 61 db 97
189 176/ A2 : 79 db 121
190

190
190 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 4 - 7/16/2025 13:30:08
191
192
193 177/ A3 : 2C db 44
194 178/ A4 : 20 db 32
195 179/ A5 : 63 db 99
196 180/ A6 : 68 db 104
197 181/ A7 : 61 db 97
198 182/ A8 : 72 db 114
199 183/ A9 : 61 db 97
200 184/ AA : 63 db 99
201 185/ AB : 74 db 116
202 186/ AC : 65 db 101
203 187/ AD : 72 db 114
204 188/ AE : 20 db 32
205 189/ AF : 26 db 38
206 190/ B0 : 20 db 32
207 191/ B1 : 6C db 108
208 192/ B2 : 69 db 105
209 193/ B3 : 6E db 110
210 194/ B4 : 65 db 101
211 195/ B5 : 29 db 41
212 196/ B6 : 00 db 0
213 197/ B7 : _text5:
214 198/ B7 : 0D db 13
215 199/ B8 : 0A db 10
216 200/ B9 : 42 db 66
217 201/ BA : 79 db 121
218 202/ BB : 65 db 101
219 203/ BC : 20 db 32
220 204/ BD : 63 db 99
221 205/ BE : 68 db 104
222 206/ BF : 65 db 101
223 207/ C0 : 63 db 99
224 208/ C1 : 6B db 107
225 209/ C2 : 20 db 32
226 210/ C3 : 73 db 115
227 211/ C4 : 75 db 117
228 212/ C5 : 6D db 109
229 213/ C6 : 20 db 32
230 214/ C7 : 65 db 101
231 215/ C8 : 72 db 114
232 216/ C9 : 72 db 114
233 217/ CA : 6F db 111
234 218/ CB : 72 db 114
235 219/ CC : 21 db 33
236 220/ CD : 00 db 0
237 221/ CE : _text6:
238 222/ CE : 0D db 13
239 223/ CF : 0A db 10
240 224/ D0 : 30 db 48
241 225/ D1 : 20 db 32
242 226/ D2 : 65 db 101
243 227/ D3 : 72 db 114
244 228/ D4 : 72 db 114
245 229/ D5 : 6F db 111
246 230/ D6 : 72 db 114
247 231/ D7 : 2E db 46
248 232/ D8 : 2E db 46
249 233/ D9 : 2E db 46
250 234/ DA : 00 db 0
251 235/ DB : _user_delay:
252 236/ DB : D0 db 208
253

```
253
253      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 5 - 7/16/2025 13:30:08
254
255
256      237/      DC : F8      db 248
257      238/      DD : 64      db 100
258      239/      DE : A6      db 166
259      240/      DF : F8      db 248
260      241/      E0 : 00      db 0
261      242/      E1 : A7      db 167
262      243/      E2 : 27      db 39
263      244/      E3 : 87      db 135
264      245/      E4 : 3A      db 58
265      246/      E5 : 07      db 7
266      247/      E6 : 26      db 38
267      248/      E7 : 86      db 134
268      249/      E8 : 3A      db 58
269      250/      E9 : 04      db 4
270      251/      EA : 30      db 48
271      252/      EB : 00      db 0
272      253/      EC :      _interrupt_test:
273      254/      EC : F8      db 248
274      255/      ED : F0      db 240
275      256/      EE : B1      db 177
276      257/      EF : F8      db 248
277      258/      F0 : 38      db 56
278      259/      F1 : A1      db 161
279      260/      F2 : F8      db 248
280      261/      F3 : 70      db 112
281      262/      F4 : B4      db 180
282      263/      F5 : F8      db 248
283      264/      F6 : 00      db 0
284      265/      F7 : A4      db 164
285      266/      F8 : F8      db 248
286      267/      F9 : FF      db 255
287      268/      FA : B6      db 182
288      269/      FB : F8      db 248
289      270/      FC : FF      db 255
290      271/      FD : A6      db 166
291      272/      FE : E0      db 224
292      273/      FF : 70      db 112
293      274/      100 : 00      db 0
294      275/      101 : 30      db 48
295      276/      102 : 35      db 53
296      277/      103 : 70      db 112
297      278/      104 : 22      db 34
298      279/      105 : 78      db 120
299      280/      106 : 06      db 6
300      281/      107 : FC      db 252
301      282/      108 : 01      db 1
302      283/      109 : 56      db 86
303      284/      10A : FB      db 251
304      285/      10B : 0A      db 10
305      286/      10C : 3A      db 58
306      287/      10D : 46      db 70
307      288/      10E : 56      db 86
308      289/      10F : 15      db 21
309      290/      110 : 85      db 133
310      291/      111 : 54      db 84
311      292/      112 : C4      db 196
312      293/      113 : 30      db 48
313      294/      114 : 37      db 55
314      295/      115 :      _delay_num1:
315      296/      115 : (MACRO) ld2z R11
316
```

```

316
316    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 6 - 7/16/2025 13:30:08
317
318
319    297/    119 : (MACRO)          st2 R11,'D',(_temp),0; ASGNI2(addr,reg)*;
320    298/    124 : (MACRO)          st2 R11,'D',(_temp),0; ASGNI2(addr,reg)*;
321    299/    12F :                  L1:
322    300/    12F : (MACRO)          Cretn
323    301/    130 :
324    302/    130 :                  _delay_ms:
325    303/    130 : (MACRO)          reserve 0; save room for local variables
326    304/    130 : (MACRO)          pushr r7
327    305/    135 : (MACRO)          reserve 0; save room for outgoing arguments
328    306/    135 : (MACRO)          ld2z R7
329    307/    139 : C0 01 3D        lbr L6
330    308/    13C :                  L3:
331    309/    13C :                  L4:
332    310/    13C : (MACRO)          incm R7,1
333    311/    13D :                  L6:
334    312/    13D : (MACRO)          jcU2 r7,r12,lbnf,L3; LT=lbnf i.e. subtract B
335    313/    14A :                  L2:
336    314/    14A : (MACRO)          release 0; release room for outgoing argumen
337    315/    14A : (MACRO)          popr r7
338    316/    14E : (MACRO)          release 0; release room for local variables
339    317/    14E : (MACRO)          Cretn
340    318/    14F :
341    319/    14F :                  _blink_q:
342    320/    14F : (MACRO)          reserve 4
343    321/    153 : 7B              seq
344    322/    154 : (MACRO)          ldaD R12,100; reg:acon
345    323/    15A : (MACRO)          Ccall _delay_ms
346    324/    15D : 7A              req
347    325/    15E : (MACRO)          ldaD R12,2000; reg:acon
348    326/    164 : (MACRO)          Ccall _delay_ms
349    327/    167 : 7B              seq
350    328/    168 : (MACRO)          ldaD R12,100; reg:acon
351    329/    16E : (MACRO)          Ccall _delay_ms
352    330/    171 : 7A              req
353    331/    172 : (MACRO)          ldaD R12,2000; reg:acon
354    332/    178 : (MACRO)          Ccall _delay_ms
355    333/    17B :                  L7:
356    334/    17B : (MACRO)          release 4
357    335/    17F : (MACRO)          Cretn
358    336/    180 :
359    337/    180 :                  _scan:
360    338/    180 : (MACRO)          reserve 4
361    339/    184 : (MACRO)          ldaD R11,1; reg:acon
362    340/    18A : (MACRO)          st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
363    341/    195 : (MACRO)          ldaD R11,255; reg:acon
364    342/    19B : (MACRO)          st1 R11,'D',(_key),0; ASGNU1
365    343/    1A3 : (MACRO)          ldaD R11,0; reg:acon
366    344/    1A9 : (MACRO)          st1 R11,'D',(_q),0; ASGNU1
367    345/    1B1 : (MACRO)          ld2z R11
368    346/    1B5 : (MACRO)          st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
369    347/    1C0 :                  L13:
370    348/    1C0 : (MACRO)          ld2 R11,'D',(_digit),0;reg:  INDIRP2(addr)
371    349/    1CA : (MACRO)          ld2 R10,'D',(_k),0 ;reg:INDIRI2(addr)
372    350/    1D4 : (MACRO)          alu2I R10,R10,-1,xri,xri; was?cpy2 R10,R10+x
373    351/    1DC : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
374    352/    1DE : (MACRO)          ld2 R11,'D',(_segment),0;reg:  INDIRP2(addr)
375    353/    1E8 : (MACRO)          ld2 R10,'D',(_i),0 ;reg:INDIRI2(addr)
376    354/    1F2 : (MACRO)          ld1 R10,'0',R10,(_buffer)
377    355/    1FC : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
378    356/    1FE : (MACRO)          ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
379

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379
379    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 7 - 7/16/2025 13:30:08
380
381
382    357/      208 : (MACRO)          ld1 R11,'0',R11,(_buffer)
383    358/      212 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
384    359/      215 : (MACRO)          jeqU2I r11,48,L17;EQI2(reg,con)
385    360/      221 : (MACRO)          jeqU2I r11,56,L17;EQI2(reg,con)
386    361/      22D : (MACRO)          jeqU2I r11,112,L17;EQI2(reg,con)
387    362/      239 : (MACRO)          ldaD R12,6; reg:acon
388    363/      23F : (MACRO)          Ccall _delay_ms
389    364/      242 : C0 02 48          lbr L18
390    365/      245 :                  L17:
391    366/      245 : (MACRO)          Ccall _delay_num1
392    367/      248 :                  L18:
393    368/      248 : (MACRO)          ld2 R11,'D',(_segment),0;reg: INDIRP2(addr)
394    369/      252 : (MACRO)          ldaD R10,0; reg:acon
395    370/      258 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
396    371/      25A : (MACRO)          ld2 R11,'D',(_port0),0;reg: INDIRP2(addr)
397    372/      264 : (MACRO)          ldn1 R11,R11;reg: INDIRU1(indaddr)
398    373/      266 : (MACRO)          st1 R11,'D',(_o),0; ASGNU1
399    374/      26E : (MACRO)          ldaD R11,0; reg:acon
400    375/      274 : (MACRO)          st1 R11,'D',(_n),0; ASGNU1
401    376/      27C : C0 02 F0          lbr L22
402    377/      27F :                  L19:
403    378/      27F : (MACRO)          ld1 R11,'D',(_o),0
404    379/      287 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
405    380/      28A : (MACRO)          alu2I R11,R11,1,ani,ani
406    381/      292 :                  ;removed ? cpy2 R11,R11
407    382/      292 : (MACRO)          jnzU2 r11,L23; NE 0
408    383/      29A : (MACRO)          ldaD R11,_q; reg:acon
409    384/      2A0 : (MACRO)          ldn1 R11,R11;reg: INDIRU1(indaddr)
410    385/      2A2 : (MACRO)          st1 R11,'D',(_key),0; ASGNU1
411    386/      2AA : C0 02 C1          lbr L24
412    387/      2AD :                  L23:
413    388/      2AD : (MACRO)          ldaD R11,_q; reg:acon
414    389/      2B3 : (MACRO)          ld1 R10,'D',(_q),0
415    390/      2BB : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
416    391/      2BE : (MACRO)          incm R10,1
417    392/      2BF : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
418    393/      2C1 :                  L24:
419    394/      2C1 : (MACRO)          ldaD R11,_o; reg:acon
420    395/      2C7 : (MACRO)          ld1 R10,'D',(_o),0
421    396/      2CF : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
422    397/      2D2 : (MACRO)          shrI2I R10,1
423    398/      2DA : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
424    399/      2DC :                  L20:
425    400/      2DC : (MACRO)          ldaD R11,_n; reg:acon
426    401/      2E2 : (MACRO)          ld1 R10,'D',(_n),0
427    402/      2EA : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
428    403/      2ED : (MACRO)          incm R10,1
429    404/      2EE : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
430    405/      2F0 :                  L22:
431    406/      2F0 : (MACRO)          ld1 R11,'D',(_n),0
432    407/      2F8 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
433    408/      2FB : (MACRO)          jcI2I r11,6,lnbf,L19 ;LT=lnbf i.e. subtract
434    409/      30C : (MACRO)          ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
435    410/      316 : (MACRO)          shl2I R11,1
436    411/      31C : (MACRO)          st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
437    412/      327 :                  L14:
438    413/      327 : (MACRO)          ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
439    414/      331 : (MACRO)          incm R11,1
440    415/      332 : (MACRO)          st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
441    416/      33D : (MACRO)          ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
442

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442
443 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 8 - 7/16/2025 13:30:08
444
445 417/ 347 : (MACRO) jci2I r11,6,lbnf,L13 ;LT=lbnf i.e. subtract
446 418/ 358 : (MACRO) ldaD R11,_key_pressed; reg:acon
447 419/ 35E : (MACRO) ldaD R10,_key; reg:acon
448 420/ 364 : (MACRO) ldn1 R10,R10;reg: INDIRU1(indaddr)
449 421/ 366 : (MACRO) str1 R10,R11; ASGNU1(indaddr,reg)
450 422/ 368 : (MACRO) ld1 R15,'D',(_key_pressed),0
451 423/ 370 : (MACRO) zExt R15 ;CVUI2: widen unsigned char to sign
452 424/ 373 : L12:
453 425/ 373 : (MACRO) release 4
454 426/ 377 : (MACRO) Cretn
455 427/ 378 :
456 428/ 378 : _dot_address:
457 429/ 378 : (MACRO) ldaD R11,_buffer; reg:acon
458 430/ 37E : (MACRO) ldaD R10,-65; reg:acon
459 431/ 384 : (MACRO) ld1 R9,'D',(_buffer),0
460 432/ 38C : (MACRO) zExt R9 ;CVUI2: widen unsigned char to signe
461 433/ 38F : (MACRO) alu2 R9,R9,R10,and,and
462 434/ 39B : (MACRO) str1 R9,R11; ASGNU1(indaddr,reg)
463 435/ 39D : (MACRO) ld1 R11,'D',(_buffer+1),0
464 436/ 3A5 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
465 437/ 3A8 : (MACRO) alu2 R11,R11,R10,and,and
466 438/ 3B4 : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
467 439/ 3BC : (MACRO) ld1 R11,'D',(_buffer+2),0
468 440/ 3C4 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
469 441/ 3C7 : (MACRO) alu2I R11,R11,64,ori,ori ;removed copy
470 442/ 3CF : (MACRO) st1 R11,'D',(_buffer+2),0; ASGNU1
471 443/ 3D7 : (MACRO) ld1 R11,'D',(_buffer+3),0
472 444/ 3DF : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
473 445/ 3E2 : (MACRO) alu2I R11,R11,64,ori,ori ;removed copy
474 446/ 3EA : (MACRO) st1 R11,'D',(_buffer+3),0; ASGNU1
475 447/ 3F2 : (MACRO) ld1 R11,'D',(_buffer+4),0
476 448/ 3FA : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
477 449/ 3FD : (MACRO) alu2I R11,R11,64,ori,ori ;removed copy
478 450/ 405 : (MACRO) st1 R11,'D',(_buffer+4),0; ASGNU1
479 451/ 40D : (MACRO) ld1 R11,'D',(_buffer+5),0
480 452/ 415 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
481 453/ 418 : (MACRO) alu2I R11,R11,64,ori,ori ;removed copy
482 454/ 420 : (MACRO) st1 R11,'D',(_buffer+5),0; ASGNU1
483 455/ 428 : L25:
484 456/ 428 : (MACRO) Cretn
485 457/ 429 :
486 458/ 429 : _dot_data:
487 459/ 429 : (MACRO) ldaD R11,_buffer; reg:acon
488 460/ 42F : (MACRO) ldaD R10,64; reg:acon
489 461/ 435 : (MACRO) ld1 R9,'D',(_buffer),0
490 462/ 43D : (MACRO) zExt R9 ;CVUI2: widen unsigned char to signe
491 463/ 440 : (MACRO) alu2 R9,R9,R10,or,or
492 464/ 44C : (MACRO) str1 R9,R11; ASGNU1(indaddr,reg)
493 465/ 44E : (MACRO) ld1 R11,'D',(_buffer+1),0
494 466/ 456 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
495 467/ 459 : (MACRO) alu2 R11,R11,R10,or,or
496 468/ 465 : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
497 469/ 46D : (MACRO) ld1 R11,'D',(_buffer+2),0
498 470/ 475 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
499 471/ 478 : (MACRO) alu2I R11,R11,-65,ani,ani
500 472/ 480 : ;removed ? cpy2 R11,R11
501 473/ 480 : (MACRO) st1 R11,'D',(_buffer+2),0; ASGNU1
502 474/ 488 : (MACRO) ld1 R11,'D',(_buffer+3),0
503 475/ 490 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
504 476/ 493 : (MACRO) alu2I R11,R11,-65,ani,ani
505
```

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505
506 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 9 - 7/16/2025 13:30:08
507
508 477/ 49B : ;removed ? cpy2 R11,R11
509 478/ 49B : (MACRO) st1 R11,'D',(_buffer+3),0; ASGNU1
510 479/ 4A3 : (MACRO) ld1 R11,'D',(_buffer+4),0
511 480/ 4AB : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
512 481/ 4AE : (MACRO) alu2I R11,R11,-65,ani,ani
513 482/ 4B6 : ;removed ? cpy2 R11,R11
514 483/ 4B6 : (MACRO) st1 R11,'D',(_buffer+4),0; ASGNU1
515 484/ 4BE : (MACRO) ld1 R11,'D',(_buffer+5),0
516 485/ 4C6 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
517 486/ 4C9 : (MACRO) alu2I R11,R11,-65,ani,ani
518 487/ 4D1 : ;removed ? cpy2 R11,R11
519 488/ 4D1 : (MACRO) st1 R11,'D',(_buffer+5),0; ASGNU1
520 489/ 4D9 : L36:
521 490/ 4D9 : (MACRO) Cretn
522 491/ 4DA :
523 492/ 4DA : _hex4:
524 493/ 4DA : (MACRO) st2 R12,'D',(_temp16),0; ASGNI2(addr,reg)*;
525 494/ 4E5 : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
526 495/ 4EF : (MACRO) alu2I R11,R11,15,ani,ani
527 496/ 4F7 : ;removed ? cpy2 R11,R11
528 497/ 4F7 : (MACRO) ld1 R11,'0',R11,(_convert)
529 498/ 501 : (MACRO) st1 R11,'D',(_buffer+2),0; ASGNU1
530 499/ 509 : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
531 500/ 513 : (MACRO) shrI2I R11,4
532 501/ 533 : (MACRO) st2 R11,'D',(_temp16),0; ASGNI2(addr,reg)*;
533 502/ 53E : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
534 503/ 548 : (MACRO) alu2I R11,R11,15,ani,ani
535 504/ 550 : ;removed ? cpy2 R11,R11
536 505/ 550 : (MACRO) ld1 R11,'0',R11,(_convert)
537 506/ 55A : (MACRO) st1 R11,'D',(_buffer+3),0; ASGNU1
538 507/ 562 : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
539 508/ 56C : (MACRO) shrI2I R11,4
540 509/ 58C : (MACRO) st2 R11,'D',(_temp16),0; ASGNI2(addr,reg)*;
541 510/ 597 : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
542 511/ 5A1 : (MACRO) alu2I R11,R11,15,ani,ani
543 512/ 5A9 : ;removed ? cpy2 R11,R11
544 513/ 5A9 : (MACRO) ld1 R11,'0',R11,(_convert)
545 514/ 5B3 : (MACRO) st1 R11,'D',(_buffer+4),0; ASGNU1
546 515/ 5BB : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
547 516/ 5C5 : (MACRO) shrI2I R11,4
548 517/ 5E5 : (MACRO) st2 R11,'D',(_temp16),0; ASGNI2(addr,reg)*;
549 518/ 5F0 : (MACRO) ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
550 519/ 5FA : (MACRO) alu2I R11,R11,15,ani,ani
551 520/ 602 : ;removed ? cpy2 R11,R11
552 521/ 602 : (MACRO) ld1 R11,'0',R11,(_convert)
553 522/ 60C : (MACRO) st1 R11,'D',(_buffer+5),0; ASGNU1
554 523/ 614 : L47:
555 524/ 614 : (MACRO) Cretn
556 525/ 615 :
557 526/ 615 : _address_display:
558 527/ 615 : (MACRO) reserve 4
559 528/ 619 : (MACRO) ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
560 529/ 623 : (MACRO) st2 R11,'D',(_temp16),0; ASGNI2(addr,LOADI2(
561 530/ 62E : (MACRO) ld2 R12,'D',(_temp16),0 ;reg:INDIRI2(addr)
562 531/ 638 : (MACRO) Ccall _hex4
563 532/ 63B : L52:
564 533/ 63B : (MACRO) release 4
565 534/ 63F : (MACRO) Cretn
566 535/ 640 :
567 536/ 640 : _data_display:
568
```



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568
568      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 10 - 7/16/2025 13:30:08
569
570
571      537/      640 : (MACRO)      reserve 2
572      538/      642 : (MACRO)      ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
573      539/      64C : (MACRO)      st2 R11,'D',(_dptr),0; ASGNP2
574      540/      657 : (MACRO)      ldaD R11,_n; reg:acon
575      541/      65D : (MACRO)      st2 R11,'0',sp,(-4+4); ASGNP2
576      542/      66A : (MACRO)      ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
577      543/      674 : (MACRO)      ldn1 R10,R10;reg: INDIRU1(indaddr)
578      544/      676 : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
579      545/      678 : (MACRO)      ld1 R10,'D',(_n),0
580      546/      680 : (MACRO)      zExt R10 ;CVUI2: widen unsigned char to sign
581      547/      683 : (MACRO)      ldaD R9,15; reg:acon
582      548/      689 : (MACRO)      ldaD R8,_convert; reg:acon
583      549/      68F : (MACRO)      alu2 R11,R10,R9,and,and
584      550/      69B : (MACRO)      alu2 R11,R11,R8,add,adc
585      551/      6A7 : (MACRO)      ldn1 R11,R11;reg: INDIRU1(indaddr)
586      552/      6A9 : (MACRO)      st1 R11,'D',(_buffer),0; ASGNU1
587      553/      6B1 : (MACRO)      cpy2 R11,R10
588      554/      6B5 : (MACRO)      shrI2I R11,4
589      555/      6D5 : (MACRO)      ld2 R10,'0',sp,(-4+4);reg: INDIRP2(addr)
590      556/      6E1 : (MACRO)      str1 R11,R10; ASGNU1(indaddr,reg)
591      557/      6E3 : (MACRO)      ld1 R11,'D',(_n),0
592      558/      6EB : (MACRO)      zExt R11 ;CVUI2: widen unsigned char to sign
593      559/      6EE : (MACRO)      alu2 R11,R11,R9,and,and
594      560/      6FA : (MACRO)      alu2 R11,R11,R8,add,adc
595      561/      706 : (MACRO)      ldn1 R11,R11;reg: INDIRU1(indaddr)
596      562/      708 : (MACRO)      st1 R11,'D',(_buffer+1),0; ASGNU1
597      563/      710 :      L53:
598      564/      710 : (MACRO)      release 2
599      565/      712 : (MACRO)      Cretn
600      566/      713 :
601      567/      713 :      _read_memory:
602      568/      713 : (MACRO)      reserve 4
603      569/      717 : (MACRO)      Ccall _address_display
604      570/      71A : (MACRO)      Ccall _data_display
605      571/      71D :      L55:
606      572/      71D : (MACRO)      release 4
607      573/      721 : (MACRO)      Cretn
608      574/      722 :
609      575/      722 :      _key_address:
610      576/      722 : (MACRO)      reserve 4
611      577/      726 : (MACRO)      ldaD R11,1; reg:acon
612      578/      72C : (MACRO)      st1 R11,'D',(_state),0; ASGNU1
613      579/      734 : (MACRO)      Ccall _read_memory
614      580/      737 : (MACRO)      Ccall _dot_address
615      581/      73A : (MACRO)      ldaD R11,0; reg:acon
616      582/      740 : (MACRO)      st1 R11,'D',(_hit),0; ASGNU1
617      583/      748 :      L56:
618      584/      748 : (MACRO)      release 4
619      585/      74C : (MACRO)      Cretn
620      586/      74D :
621      587/      74D :      _key_data:
622      588/      74D : (MACRO)      reserve 4
623      589/      751 : (MACRO)      Ccall _read_memory
624      590/      754 : (MACRO)      Ccall _dot_data
625      591/      757 : (MACRO)      ldaD R11,0; reg:acon
626      592/      75D : (MACRO)      st1 R11,'D',(_hit),0; ASGNU1
627      593/      765 : (MACRO)      ldaD R11,2; reg:acon
628      594/      76B : (MACRO)      st1 R11,'D',(_state),0; ASGNU1
629      595/      773 :      L57:
630      596/      773 : (MACRO)      release 4
631
```

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631
631    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 11 - 7/16/2025 13:30:08
632
633
634    597/      777 : (MACRO)          Cretn
635    598/      778 :
636    599/      778 :          _key_plus:
637    600/      778 : (MACRO)          reserve 4
638    601/      77C : (MACRO)          ld1 R11,'D',(_state),0
639    602/      784 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
640    603/      787 : (MACRO)          jeqU2I r11,1,L61;EQI2(reg,con)
641    604/      793 : (MACRO)          jneU2I r11,2,L59; NE
642    605/      79F :          L61:
643    606/      79F : (MACRO)          ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
644    607/      7A9 : (MACRO)          incm R11,1
645    608/      7AA : (MACRO)          st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
646    609/      7B5 : (MACRO)          Ccall _read_memory
647    610/      7B8 : (MACRO)          Ccall _key_data
648    611/      7BB :          L59:
649    612/      7BB : (MACRO)          ld1 R11,'D',(_state),0
650    613/      7C3 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
651    614/      7C6 : (MACRO)          jneU2I r11,5,L62; NE
652    615/      7D2 : (MACRO)          ldaD R11,6; reg:acon
653    616/      7D8 : (MACRO)          st1 R11,'D',(_state),0; ASGNU1
654    617/      7E0 : (MACRO)          ld2 R11,'D',(_num),0 ;reg:INDIRI2(addr)
655    618/      7EA : (MACRO)          st2 R11,'D',(_start),0; ASGNI2(addr,reg)*;
656    619/      7F5 : (MACRO)          ldaD R11,0; reg:acon
657    620/      7FB : (MACRO)          st1 R11,'D',(_hit),0; ASGNU1
658    621/      803 : (MACRO)          ldaD R11,143; reg:acon
659    622/      809 : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
660    623/      811 : C0 08 6A          lbr L58
661    624/      814 :          L62:
662    625/      814 : (MACRO)          ld1 R11,'D',(_state),0
663    626/      81C : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
664    627/      81F : (MACRO)          jneU2I r11,6,L64; NE
665    628/      82B : (MACRO)          ldaD R11,7; reg:acon
666    629/      831 : (MACRO)          st1 R11,'D',(_state),0; ASGNU1
667    630/      839 : (MACRO)          ld2 R11,'D',(_num),0 ;reg:INDIRI2(addr)
668    631/      843 : (MACRO)          st2 R11,'D',(_end),0; ASGNI2(addr,reg)*;
669    632/      84E : (MACRO)          ldaD R11,0; reg:acon
670    633/      854 : (MACRO)          st1 R11,'D',(_hit),0; ASGNU1
671    634/      85C : (MACRO)          ldaD R11,179; reg:acon
672    635/      862 : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
673    636/      86A :          L64:
674    637/      86A :          L58:
675    638/      86A : (MACRO)          release 4
676    639/      86E : (MACRO)          Cretn
677    640/      86F :
678    641/      86F :          _key_minus:
679    642/      86F : (MACRO)          reserve 0; save room for local variables
680    643/      86F : (MACRO)          pushr r1
681    644/      874 : (MACRO)          pushr r7
682    645/      879 : (MACRO)          reserve 4; save room for outgoing arguments
683    646/      87D : (MACRO)          ld1 R11,'D',(_state),0
684    647/      885 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
685    648/      888 : (MACRO)          jneU2I r11,1,L71; NE
686    649/      894 : (MACRO)          ldaD R7,1; reg:acon
687    650/      89A : C0 08 A1          lbr L72
688    651/      89D :          L71:
689    652/      89D : (MACRO)          ld2z R7
690    653/      8A1 :          L72:
691    654/      8A1 : (MACRO)          ld1 R11,'D',(_state),0
692    655/      8A9 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
693    656/      8AC : (MACRO)          jneU2I r11,2,L73; NE
694

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694
694      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 12 - 7/16/2025 13:30:08
695
696
697      657/      8B8 : (MACRO)          ldaD R1,1; reg:acon
698      658/      8BE : C0 08 C5        lbr L74
699      659/      8C1 :                  L73:
700      660/      8C1 : (MACRO)          ld2z R1
701      661/      8C5 :                  L74:
702      662/      8C5 : (MACRO)          alu2 R11,R7,R1,or,or
703      663/      8D1 : (MACRO)          jzU2 r11,L67; EQ 0
704      664/      8D9 : (MACRO)          ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
705      665/      8E3 : (MACRO)          decm R11,1
706      666/      8E4 : (MACRO)          st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
707      667/      8EF : (MACRO)          Ccall _read_memory
708      668/      8F2 : (MACRO)          Ccall _key_data
709      669/      8F5 :                  L67:
710      670/      8F5 :                  L66:
711      671/      8F5 : (MACRO)          release 4; release room for outgoing argumen
712      672/      8F9 : (MACRO)          popr r7
713      673/      8FD : (MACRO)          popr r1
714      674/      901 : (MACRO)          release 0; release room for local variables
715      675/      901 : (MACRO)          Cretn
716      676/      902 :
717      677/      902 :                  _data_hex:
718      678/      902 : (MACRO)          reserve 4
719      679/      906 : (MACRO)          ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
720      680/      910 : (MACRO)          st2 R11,'D',(_dptr),0; ASGNP2
721      681/      91B : (MACRO)          ld2 R11,'D',(_dptr),0;reg: INDIRP2(addr)
722      682/      925 : (MACRO)          ldn1 R11,R11;reg: INDIRU1(indaddr)
723      683/      927 : (MACRO)          st1 R11,'D',(_x),0; ASGNU1
724      684/      92F : (MACRO)          ld1 R11,'D',(_hit),0
725      685/      937 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
726      686/      93A : (MACRO)          jnzU2 r11,L76; NE 0
727      687/      942 : (MACRO)          ldaD R11,0; reg:acon
728      688/      948 : (MACRO)          st1 R11,'D',(_x),0; ASGNU1
729      689/      950 :                  L76:
730      690/      950 : (MACRO)          ldaD R11,1; reg:acon
731      691/      956 : (MACRO)          st1 R11,'D',(_hit),0; ASGNU1
732      692/      95E : (MACRO)          ldaD R11,_x; reg:acon
733      693/      964 : (MACRO)          ld1 R10,'D',(_x),0
734      694/      96C : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
735      695/      96F : (MACRO)          shl2I R10,4
736      696/      987 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
737      697/      989 : (MACRO)          ld1 R10,'D',(_x),0
738      698/      991 : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
739      699/      994 : (MACRO)          ld1 R9,'D',(_key),0
740      700/      99C : (MACRO)          zExt R9 ;CVUI2: widen unsigned char to signe
741      701/      99F : (MACRO)          alu2 R10,R10,R9,or,or
742      702/      9AB : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
743      703/      9AD : (MACRO)          ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
744      704/      9B7 : (MACRO)          ldn1 R11,R11;reg: INDIRU1(indaddr)
745      705/      9B9 : (MACRO)          str1 R11,R10; ASGNU1(indaddr,reg)
746      706/      9BB : (MACRO)          Ccall _read_memory
747      707/      9BE : (MACRO)          Ccall _dot_data
748      708/      9C1 :                  L75:
749      709/      9C1 : (MACRO)          release 4
750      710/      9C5 : (MACRO)          Cretn
751      711/      9C6 :
752      712/      9C6 :                  _key_PC:
753      713/      9C6 : (MACRO)          reserve 4
754      714/      9CA : (MACRO)          ld2 R11,'D',(_save_PC),0; reg:INDIRU2(addr)
755      715/      9D4 : (MACRO)          st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
756      716/      9DF : (MACRO)          Ccall _key_data
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757
757      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 13 - 7/16/2025 13:30:08
758
759
760      717/      9E2 :                               L78:
761      718/      9E2 : (MACRO)                       release 4
762      719/      9E6 : (MACRO)                       Cretn
763      720/      9E7 :
764      721/      9E7 :                               _hex_address:
765      722/      9E7 : (MACRO)                       reserve 4
766      723/      9EB : (MACRO)                       ld1 R11,'D',(_hit),0
767      724/      9F3 : (MACRO)                       zExt R11 ;CVUI2: widen unsigned char to sign
768      725/      9F6 : (MACRO)                       jnzU2 r11,L80; NE 0
769      726/      9FE : (MACRO)                       ld2z R11
770      727/      A02 : (MACRO)                       st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
771      728/      A0D :                               L80:
772      729/      A0D : (MACRO)                       ldaD R11,1; reg:acon
773      730/      A13 : (MACRO)                       st1 R11,'D',(_hit),0; ASGNU1
774      731/      A1B : (MACRO)                       ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
775      732/      A25 : (MACRO)                       shl2I R11,4
776      733/      A3D : (MACRO)                       st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
777      734/      A48 : (MACRO)                       ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
778      735/      A52 : (MACRO)                       ld1 R10,'D',(_key),0
779      736/      A5A : (MACRO)                       zExt R10 ;CVUI2: widen unsigned char to sign
780      737/      A5D : (MACRO)                       alu2 R11,R11,R10,or,or
781      738/      A69 : (MACRO)                       st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
782      739/      A74 : (MACRO)                       Ccall _read_memory
783      740/      A77 : (MACRO)                       Ccall _dot_address
784      741/      A7A :                               L79:
785      742/      A7A : (MACRO)                       release 4
786      743/      A7E : (MACRO)                       Cretn
787      744/      A7F :
788      745/      A7F :                               _insert:
789      746/      A7F : (MACRO)                       reserve 4
790      747/      A83 : (MACRO)                       ld1 R11,'D',(_state),0
791      748/      A8B : (MACRO)                       zExt R11 ;CVUI2: widen unsigned char to sign
792      749/      A8E : (MACRO)                       jeqU2I r11,1,L85;EQI2(reg,con)
793      750/      A9A : (MACRO)                       jneU2I r11,2,L83; NE
794      751/      AA6 :                               L85:
795      752/      AA6 : (MACRO)                       ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
796      753/      AB0 : (MACRO)                       st2 R11,'D',(_dptr),0; ASGNP2
797      754/      ABB : (MACRO)                       ldaD R11,512; reg:acon
798      755/      AC1 : (MACRO)                       st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
799      756/      ACC :                               L86:
800      757/      ACC : (MACRO)                       ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
801      758/      AD6 : (MACRO)                       ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
802      759/      AE0 : (MACRO)                       alu2 R11,R11,R10,add,adc
803      760/      AEC : (MACRO)                       ld1 R10,'0',R11,(-1)
804      761/      AF6 : (MACRO)                       str1 R10,R11; ASGNU1(indaddr,reg)
805      762/      AF8 :                               L87:
806      763/      AF8 : (MACRO)                       ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
807      764/      B02 : (MACRO)                       decm R11,1
808      765/      B03 : (MACRO)                       st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
809      766/      B0E : (MACRO)                       ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
810      767/      B18 : (MACRO)                       jnI2I r11,0,lbnf,L86; GT reverse the subtra
811      768/      B29 : (MACRO)                       ld2 R11,'D',(_dptr),0;reg: INDIRP2(addr)
812      769/      B33 : (MACRO)                       ldaD R10,0; reg:acon
813      770/      B39 : (MACRO)                       st1 R10,'0',R11,(1); ASGNU1
814      771/      B43 : (MACRO)                       ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
815      772/      B4D : (MACRO)                       incm R11,1
816      773/      B4E : (MACRO)                       st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
817      774/      B59 : (MACRO)                       Ccall _read_memory
818      775/      B5C : (MACRO)                       ldaD R11,2; reg:acon
819      776/      B62 : (MACRO)                       st1 R11,'D',(_state),0; ASGNU1
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820
820    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 14 - 7/16/2025 13:30:08
821
822
823    777/      B6A :                      L83:
824    778/      B6A :                      L82:
825    779/      B6A : (MACRO)              release 4
826    780/      B6E : (MACRO)              Cretn
827    781/      B6F :
828    782/      B6F :                      _cut_byte:
829    783/      B6F : (MACRO)              reserve 4
830    784/      B73 : (MACRO)              ld1 R11,'D',(_state),0
831    785/      B7B : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
832    786/      B7E : (MACRO)              jeqU2I r11,1,L93;EQI2(reg,con)
833    787/      B8A : (MACRO)              jneU2I r11,2,L91; NE
834    788/      B96 :                      L93:
835    789/      B96 : (MACRO)              ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
836    790/      BA0 : (MACRO)              st2 R11,'D',(_dptr),0; ASGNP2
837    791/      BAB : (MACRO)              ld2z R11
838    792/      BAF : (MACRO)              st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
839    793/      BBA :                      L94:
840    794/      BBA : (MACRO)              ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
841    795/      BC4 : (MACRO)              ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
842    796/      BCE : (MACRO)              alu2 R11,R11,R10,add,adc
843    797/      BDA : (MACRO)              cpy2 R10,R11
844    798/      BDE : (MACRO)              incm R10,1
845    799/      BDF : (MACRO)              ldn1 R10,R10;reg: INDIRU1(indaddr)
846    800/      BE1 : (MACRO)              str1 R10,R11; ASGNU1(indaddr,reg)
847    801/      BE3 :                      L95:
848    802/      BE3 : (MACRO)              ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
849    803/      BED : (MACRO)              incm R11,1
850    804/      BEE : (MACRO)              st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
851    805/      BF9 : (MACRO)              ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
852    806/      C03 : (MACRO)              jcI2I r11,512,lbmf,L94 ;LT=lbmf i.e. subtra
853    807/      C14 : (MACRO)              Ccall _read_memory
854    808/      C17 : (MACRO)              ldaD R11,2; reg:acon
855    809/      C1D : (MACRO)              st1 R11,'D',(_state),0; ASGNU1
856    810/      C25 :                      L91:
857    811/      C25 :                      L90:
858    812/      C25 : (MACRO)              release 4
859    813/      C29 : (MACRO)              Cretn
860    814/      C2A :
861    815/      C2A :                      _key_go:
862    816/      C2A : (MACRO)              reserve 4
863    817/      C2E : (MACRO)              ld1 R11,'D',(_state),0
864    818/      C36 : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
865    819/      C39 : (MACRO)              jeqU2I r11,1,L101;EQI2(reg,con)
866    820/      C45 : (MACRO)              jneU2I r11,2,L99; NE
867    821/      C51 :                      L101:
868    822/      C51 : (MACRO)              ldAD r5,_PC
869    823/      C57 : 05                      ldn r5
870    824/      C58 : B0                      phi r0
871    825/      C59 : 15                      inc r5
872    826/      C5A : 05                      ldn r5
873    827/      C5B : A0                      plo r0
874    828/      C5C : D0                      sep r0
875    829/      C5D :                      L99:
876    830/      C5D : (MACRO)              ld1 R11,'D',(_state),0
877    831/      C65 : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
878    832/      C68 : (MACRO)              jneU2I r11,7,L103; NE
879    833/      C74 : (MACRO)              ld2 R11,'D',(_num),0 ;reg:INDIRI2(addr)
880    834/      C7E : (MACRO)              st2 R11,'D',(_desti),0; ASGNI2(addr,reg)*;
881    835/      C89 : (MACRO)              ld2 R11,'D',(_start),0 ;reg:INDIRI2(addr)
882    836/      C93 : (MACRO)              ld2 R10,'D',(_end),0 ;reg:INDIRI2(addr)
883

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883
884 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 15 - 7/16/2025 13:30:08
885
886      837/      C9D : (MACRO)      alu2 R10,R10,R11,sm,smb
887      838/      CA9 : (MACRO)      st2 R10,'D',(_temp),0; ASGNI2(addr,reg)*;
888      839/      CB4 : (MACRO)      st2 R11,'D',(_dptr),0; ASGNP2
889      840/      CBF : (MACRO)      ld2 R11,'D',(_desti),0;reg:INDIRI2(addr)
890      841/      CC9 : (MACRO)      st2 R11,'D',(_dptr2),0; ASGNP2
891      842/      CD4 : (MACRO)      ld2z R11
892      843/      CD8 : (MACRO)      st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
893      844/      CE3 : C0 0D 36      lbr L108
894      845/      CE6 :      L105:
895      846/      CE6 : (MACRO)      ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
896      847/      CF0 : (MACRO)      ld2 R10,'D',(_dptr2),0;reg: INDIRP2(addr)
897      848/      CFA : (MACRO)      alu2 R10,R11,R10,add,adc
898      849/      D06 : (MACRO)      ld2 R9,'D',(_dptr),0;reg: INDIRP2(addr)
899      850/      D10 : (MACRO)      alu2 R11,R11,R9,add,adc
900      851/      D1C : (MACRO)      ldn1 R11,R11;reg: INDIRU1(indaddr)
901      852/      D1E : (MACRO)      str1 R11,R10; ASGNU1(indaddr,reg)
902      853/      D20 :      L106:
903      854/      D20 : (MACRO)      ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
904      855/      D2A : (MACRO)      incm R11,1
905      856/      D2B : (MACRO)      st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
906      857/      D36 :      L108:
907      858/      D36 : (MACRO)      ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
908      859/      D40 : (MACRO)      ld2 R10,'D',(_temp),0;reg:INDIRI2(addr)
909      860/      D4A : (MACRO)      jcI2 r11,r10,lnbf,L105; LT=lnbf i.e. subtrac
910      861/      D5E : (MACRO)      ld2 R11,'D',(_desti),0;reg:INDIRI2(addr)
911      862/      D68 : (MACRO)      st2 R11,'D',(_PC),0; ASGNU2(addr,LOADU2(reg))
912      863/      D73 : (MACRO)      Ccall _read_memory
913      864/      D76 : (MACRO)      Ccall _dot_data
914      865/      D79 : (MACRO)      ldaD R11,2; reg:acon
915      866/      D7F : (MACRO)      st1 R11,'D',(_state),0; ASGNU1
916      867/      D87 :      L103:
917      868/      D87 :      L98:
918      869/      D87 : (MACRO)      release 4
919      870/      D8B : (MACRO)      Cretn
920      871/      D8C :
921      872/      D8C :      _key_test:
922      873/      D8C : (MACRO)      reserve 4
923      874/      D90 : (MACRO)      ldaD R11,0xf020; reg:acon
924      875/      D96 : (MACRO)      st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
925      876/      DA1 : (MACRO)      ldaD R11,1; reg:acon
926      877/      DA7 : (MACRO)      st1 R11,'D',(_state),0; ASGNU1
927      878/      DAF : (MACRO)      Ccall _key_go
928      879/      DB2 :      L109:
929      880/      DB2 : (MACRO)      release 4
930      881/      DB6 : (MACRO)      Cretn
931      882/      DB7 :
932      883/      DB7 :      _key_load:
933      884/      DB7 : (MACRO)      reserve 4
934      885/      DBB : (MACRO)      ldaD R12,_text4; reg:acon
935      886/      DC1 : (MACRO)      Ccall _pstr
936      887/      DC4 : (MACRO)      Ccall _read_record1
937      888/      DC7 : (MACRO)      ld1 R11,'D',(_bcc_error),0
938      889/      DCF : (MACRO)      zExt R11;CVUI2: widen unsigned char to sign
939      890/      DD2 : (MACRO)      jzU2 r11,L111; EQ 0
940      891/      DDA : (MACRO)      ldaD R12,_text5; reg:acon
941      892/      DE0 : (MACRO)      Ccall _pstr
942      893/      DE3 : C0 0D EF      lbr L112
943      894/      DE6 :      L111:
944      895/      DE6 : (MACRO)      ldaD R12,_text6; reg:acon
945      896/      DEC : (MACRO)      Ccall _pstr
946

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946
947 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 16 - 7/16/2025 13:30:08
948
949      897/      DEF :                      L112:
950      898/      DEF : (MACRO)              ldaD R11,0x8000; reg:acon
951      899/      DF5 : (MACRO)              st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
952      900/      E00 : (MACRO)              Ccall _key_data
953      901/      E03 :                      L110:
954      902/      E03 : (MACRO)              release 4
955      903/      E07 : (MACRO)              Cretn
956      904/      E08 :
957      905/      E08 :                      _key_reg:
958      906/      E08 : (MACRO)              ldaD R11,3; reg:acon
959      907/      E0E : (MACRO)              st1 R11,'D',(_buffer+5),0; ASGNU1
960      908/      E16 : (MACRO)              ldaD R11,143; reg:acon
961      909/      E1C : (MACRO)              st1 R11,'D',(_buffer+4),0; ASGNU1
962      910/      E24 : (MACRO)              ldaD R11,173; reg:acon
963      911/      E2A : (MACRO)              st1 R11,'D',(_buffer+3),0; ASGNU1
964      912/      E32 : (MACRO)              ldaD R11,0; reg:acon
965      913/      E38 : (MACRO)              st1 R11,'D',(_buffer+2),0; ASGNU1
966      914/      E40 : (MACRO)              ldaD R11,0; reg:acon
967      915/      E46 : (MACRO)              st1 R11,'D',(_buffer+1),0; ASGNU1
968      916/      E4E : (MACRO)              ldaD R11,0; reg:acon
969      917/      E54 : (MACRO)              st1 R11,'D',(_buffer),0; ASGNU1
970      918/      E5C : (MACRO)              ldaD R11,3; reg:acon
971      919/      E62 : (MACRO)              st1 R11,'D',(_state),0; ASGNU1
972      920/      E6A :                      L113:
973      921/      E6A : (MACRO)              Cretn
974      922/      E6B :
975      923/      E6B :                      _reg_d:
976      924/      E6B : (MACRO)              ldaD R11,_n; reg:acon
977      925/      E71 : (MACRO)              ldaD R10,_user_d; reg:acon
978      926/      E77 : (MACRO)              ldn1 R10,R10;reg: INDIRU1(indaddr)
979      927/      E79 : (MACRO)              str1 R10,R11; ASGNU1(indaddr,reg)
980      928/      E7B : (MACRO)              ld1 R11,'D',(_n),0
981      929/      E83 : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
982      930/      E86 : (MACRO)              alu2I R11,R11,15,ani,ani
983      931/      E8E :                      ;removed ? cpy2 R11,R11
984      932/      E8E : (MACRO)              ld1 R11,'0',R11,(_convert)
985      933/      E98 : (MACRO)              st1 R11,'D',(_buffer+2),0; ASGNU1
986      934/      EA0 : (MACRO)              ldaD R11,_n; reg:acon
987      935/      EA6 : (MACRO)              ld1 R10,'D',(_n),0
988      936/      EAE : (MACRO)              zExt R10 ;CVUI2: widen unsigned char to sign
989      937/      EB1 : (MACRO)              shrI2I R10,4
990      938/      ED1 : (MACRO)              str1 R10,R11; ASGNU1(indaddr,reg)
991      939/      ED3 : (MACRO)              ld1 R11,'D',(_n),0
992      940/      EDB : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
993      941/      EDE : (MACRO)              alu2I R11,R11,15,ani,ani
994      942/      EE6 :                      ;removed ? cpy2 R11,R11
995      943/      EE6 : (MACRO)              ld1 R11,'0',R11,(_convert)
996      944/      EF0 : (MACRO)              st1 R11,'D',(_buffer+3),0; ASGNU1
997      945/      EF8 : (MACRO)              ldaD R11,0; reg:acon
998      946/      EFE : (MACRO)              st1 R11,'D',(_buffer+4),0; ASGNU1
999      947/      F06 : (MACRO)              ldaD R11,0; reg:acon
1000     948/      F0C : (MACRO)              st1 R11,'D',(_buffer+5),0; ASGNU1
1001     949/      F14 : (MACRO)              ldaD R11,0; reg:acon
1002     950/      F1A : (MACRO)              st1 R11,'D',(_buffer+1),0; ASGNU1
1003     951/      F22 : (MACRO)              ldaD R11,179; reg:acon
1004     952/      F28 : (MACRO)              st1 R11,'D',(_buffer),0; ASGNU1
1005     953/      F30 :                      L119:
1006     954/      F30 : (MACRO)              Cretn
1007     955/      F31 :
1008     956/      F31 :                      _reg_df:
1009
```

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1009
1009      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 17 - 7/16/2025 13:30:08
1010
1011
1012      957/      F31 : (MACRO)          ldaD R11,_user_df; reg:acon
1013      958/      F37 : (MACRO)          ldn1 R11,R11;reg: INDIRU1(indaddr)
1014      959/      F39 : (MACRO)          st1 R11,'D',(_n),0; ASGNU1
1015      960/      F41 : (MACRO)          ldaD R11,0; reg:acon
1016      961/      F47 : (MACRO)          st1 R11,'D',(_buffer+2),0; ASGNU1
1017      962/      F4F : (MACRO)          ld1 R11,'D',(_n),0
1018      963/      F57 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1019      964/      F5A : (MACRO)          alu2I R11,R11,15,ani,ani
1020      965/      F62 :                  ;removed ? cpy2 R11,R11
1021      966/      F62 : (MACRO)          ld1 R11,'0',R11,(_convert)
1022      967/      F6C : (MACRO)          st1 R11,'D',(_buffer+3),0; ASGNU1
1023      968/      F74 : (MACRO)          ldaD R11,0; reg:acon
1024      969/      F7A : (MACRO)          st1 R11,'D',(_buffer+4),0; ASGNU1
1025      970/      F82 : (MACRO)          ldaD R11,0; reg:acon
1026      971/      F88 : (MACRO)          st1 R11,'D',(_buffer+5),0; ASGNU1
1027      972/      F90 : (MACRO)          ldaD R11,179; reg:acon
1028      973/      F96 : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
1029      974/      F9E : (MACRO)          ldaD R11,15; reg:acon
1030      975/      FA4 : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
1031      976/      FAC :                  L125:
1032      977/      FAC : (MACRO)          Cretn
1033      978/      FAD :
1034      979/      FAD :                  _reg_xp:
1035      980/      FAD : (MACRO)          ldaD R11,_n; reg:acon
1036      981/      FB3 : (MACRO)          ldaD R10,_user_xp; reg:acon
1037      982/      FB9 : (MACRO)          ldn1 R10,R10;reg: INDIRU1(indaddr)
1038      983/      FBB : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1039      984/      FBD : (MACRO)          ld1 R11,'D',(_n),0
1040      985/      FC5 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1041      986/      FC8 : (MACRO)          alu2I R11,R11,15,ani,ani
1042      987/      FD0 :                  ;removed ? cpy2 R11,R11
1043      988/      FD0 : (MACRO)          ld1 R11,'0',R11,(_convert)
1044      989/      FDA : (MACRO)          st1 R11,'D',(_buffer+2),0; ASGNU1
1045      990/      FE2 : (MACRO)          ldaD R11,_n; reg:acon
1046      991/      FE8 : (MACRO)          ld1 R10,'D',(_n),0
1047      992/      FF0 : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
1048      993/      FF3 : (MACRO)          shrI2I R10,4
1049      994/      1013 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1050      995/      1015 : (MACRO)          ld1 R11,'D',(_n),0
1051      996/      101D : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1052      997/      1020 : (MACRO)          alu2I R11,R11,15,ani,ani
1053      998/      1028 :                  ;removed ? cpy2 R11,R11
1054      999/      1028 : (MACRO)          ld1 R11,'0',R11,(_convert)
1055      1000/      1032 : (MACRO)          st1 R11,'D',(_buffer+3),0; ASGNU1
1056      1001/      103A : (MACRO)          ldaD R11,0; reg:acon
1057      1002/      1040 : (MACRO)          st1 R11,'D',(_buffer+4),0; ASGNU1
1058      1003/      1048 : (MACRO)          ldaD R11,0; reg:acon
1059      1004/      104E : (MACRO)          st1 R11,'D',(_buffer+5),0; ASGNU1
1060      1005/      1056 : (MACRO)          ldaD R11,19; reg:acon
1061      1006/      105C : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
1062      1007/      1064 : (MACRO)          ldaD R11,31; reg:acon
1063      1008/      106A : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
1064      1009/      1072 :                  L131:
1065      1010/      1072 : (MACRO)          Cretn
1066      1011/      1073 :
1067      1012/      1073 :
1068      1013/      1073 : (MACRO)          _reg_r3:
1069      1014/      1077 : (MACRO)          reserve 4
1070      1015/      1081 : (MACRO)          ld2 R12,'D',(_user_r3),0 ;reg:INDIRI2(addr)
1071      1016/      1084 : (MACRO)          Ccall _hex4
1072      1016/      1084 : (MACRO)          ldaD R11,3; reg:acon
```



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1072
1072    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 18 - 7/16/2025 13:30:08
1073
1074
1075    1017/    108A : (MACRO)                st1 R11,'D',(_buffer+1),0; ASGNU1
1076    1018/    1092 : (MACRO)                ldaD R11,186; reg:acon
1077    1019/    1098 : (MACRO)                st1 R11,'D',(_buffer),0; ASGNU1
1078    1020/    10A0 :                        L137:
1079    1021/    10A0 : (MACRO)                release 4
1080    1022/    10A4 : (MACRO)                Cretn
1081    1023/    10A5 :
1082    1024/    10A5 :                        _reg_r4:
1083    1025/    10A5 : (MACRO)                reserve 4
1084    1026/    10A9 : (MACRO)                ld2 R12,'D',(_user_r4),0 ;reg:INDIRI2(addr)
1085    1027/    10B3 : (MACRO)                Ccall _hex4
1086    1028/    10B6 : (MACRO)                ldaD R11,3; reg:acon
1087    1029/    10BC : (MACRO)                st1 R11,'D',(_buffer+1),0; ASGNU1
1088    1030/    10C4 : (MACRO)                ldaD R11,54; reg:acon
1089    1031/    10CA : (MACRO)                st1 R11,'D',(_buffer),0; ASGNU1
1090    1032/    10D2 :                        L139:
1091    1033/    10D2 : (MACRO)                release 4
1092    1034/    10D6 : (MACRO)                Cretn
1093    1035/    10D7 :
1094    1036/    10D7 :                        _reg_r5:
1095    1037/    10D7 : (MACRO)                reserve 4
1096    1038/    10DB : (MACRO)                ld2 R12,'D',(_user_r5),0 ;reg:INDIRI2(addr)
1097    1039/    10E5 : (MACRO)                Ccall _hex4
1098    1040/    10E8 : (MACRO)                ldaD R11,3; reg:acon
1099    1041/    10EE : (MACRO)                st1 R11,'D',(_buffer+1),0; ASGNU1
1100    1042/    10F6 : (MACRO)                ldaD R11,174; reg:acon
1101    1043/    10FC : (MACRO)                st1 R11,'D',(_buffer),0; ASGNU1
1102    1044/    1104 :                        L141:
1103    1045/    1104 : (MACRO)                release 4
1104    1046/    1108 : (MACRO)                Cretn
1105    1047/    1109 :
1106    1048/    1109 :                        _reg_r6:
1107    1049/    1109 : (MACRO)                reserve 4
1108    1050/    110D : (MACRO)                ld2 R12,'D',(_user_r6),0 ;reg:INDIRI2(addr)
1109    1051/    1117 : (MACRO)                Ccall _hex4
1110    1052/    111A : (MACRO)                ldaD R11,3; reg:acon
1111    1053/    1120 : (MACRO)                st1 R11,'D',(_buffer+1),0; ASGNU1
1112    1054/    1128 : (MACRO)                ldaD R11,175; reg:acon
1113    1055/    112E : (MACRO)                st1 R11,'D',(_buffer),0; ASGNU1
1114    1056/    1136 :                        L143:
1115    1057/    1136 : (MACRO)                release 4
1116    1058/    113A : (MACRO)                Cretn
1117    1059/    113B :
1118    1060/    113B :                        _reg_r7:
1119    1061/    113B : (MACRO)                reserve 4
1120    1062/    113F : (MACRO)                ld2 R12,'D',(_user_r7),0 ;reg:INDIRI2(addr)
1121    1063/    1149 : (MACRO)                Ccall _hex4
1122    1064/    114C : (MACRO)                ldaD R11,3; reg:acon
1123    1065/    1152 : (MACRO)                st1 R11,'D',(_buffer+1),0; ASGNU1
1124    1066/    115A : (MACRO)                ldaD R11,56; reg:acon
1125    1067/    1160 : (MACRO)                st1 R11,'D',(_buffer),0; ASGNU1
1126    1068/    1168 :                        L145:
1127    1069/    1168 : (MACRO)                release 4
1128    1070/    116C : (MACRO)                Cretn
1129    1071/    116D :
1130    1072/    116D :                        _reg_r8:
1131    1073/    116D : (MACRO)                reserve 4
1132    1074/    1171 : (MACRO)                ld2 R12,'D',(_user_r8),0 ;reg:INDIRI2(addr)
1133    1075/    117B : (MACRO)                Ccall _hex4
1134    1076/    117E : (MACRO)                ldaD R11,3; reg:acon
1135
```

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1135
1136 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 19 - 7/16/2025 13:30:08
1137
1138 1077/ 1184 : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
1139 1078/ 118C : (MACRO) ldaD R11,191; reg:acon
1140 1079/ 1192 : (MACRO) st1 R11,'D',(_buffer),0; ASGNU1
1141 1080/ 119A : L147:
1142 1081/ 119A : (MACRO) release 4
1143 1082/ 119E : (MACRO) Cretn
1144 1083/ 119F :
1145 1084/ 119F : _reg_r9:
1146 1085/ 119F : (MACRO) reserve 4
1147 1086/ 11A3 : (MACRO) ld2 R12,'D',(_user_r9),0 ;reg:INDIRI2(addr)
1148 1087/ 11AD : (MACRO) Ccall _hex4
1149 1088/ 11B0 : (MACRO) ldaD R11,3; reg:acon
1150 1089/ 11B6 : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
1151 1090/ 11BE : (MACRO) ldaD R11,190; reg:acon
1152 1091/ 11C4 : (MACRO) st1 R11,'D',(_buffer),0; ASGNU1
1153 1092/ 11CC : L149:
1154 1093/ 11CC : (MACRO) release 4
1155 1094/ 11D0 : (MACRO) Cretn
1156 1095/ 11D1 :
1157 1096/ 11D1 : _reg_r10:
1158 1097/ 11D1 : (MACRO) reserve 4
1159 1098/ 11D5 : (MACRO) ld2 R12,'D',(_user_r10),0 ;reg:INDIRI2(addr)
1160 1099/ 11DF : (MACRO) Ccall _hex4
1161 1100/ 11E2 : (MACRO) ldaD R11,3; reg:acon
1162 1101/ 11E8 : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
1163 1102/ 11F0 : (MACRO) ldaD R11,63; reg:acon
1164 1103/ 11F6 : (MACRO) st1 R11,'D',(_buffer),0; ASGNU1
1165 1104/ 11FE : L151:
1166 1105/ 11FE : (MACRO) release 4
1167 1106/ 1202 : (MACRO) Cretn
1168 1107/ 1203 :
1169 1108/ 1203 : _reg_r11:
1170 1109/ 1203 : (MACRO) reserve 4
1171 1110/ 1207 : (MACRO) ld2 R12,'D',(_user_r11),0 ;reg:INDIRI2(addr)
1172 1111/ 1211 : (MACRO) Ccall _hex4
1173 1112/ 1214 : (MACRO) ldaD R11,3; reg:acon
1174 1113/ 121A : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
1175 1114/ 1222 : (MACRO) ldaD R11,167; reg:acon
1176 1115/ 1228 : (MACRO) st1 R11,'D',(_buffer),0; ASGNU1
1177 1116/ 1230 : L153:
1178 1117/ 1230 : (MACRO) release 4
1179 1118/ 1234 : (MACRO) Cretn
1180 1119/ 1235 :
1181 1120/ 1235 : _reg_r12:
1182 1121/ 1235 : (MACRO) reserve 4
1183 1122/ 1239 : (MACRO) ld2 R12,'D',(_user_r12),0 ;reg:INDIRI2(addr)
1184 1123/ 1243 : (MACRO) Ccall _hex4
1185 1124/ 1246 : (MACRO) ldaD R11,3; reg:acon
1186 1125/ 124C : (MACRO) st1 R11,'D',(_buffer+1),0; ASGNU1
1187 1126/ 1254 : (MACRO) ldaD R11,141; reg:acon
1188 1127/ 125A : (MACRO) st1 R11,'D',(_buffer),0; ASGNU1
1189 1128/ 1262 : L155:
1190 1129/ 1262 : (MACRO) release 4
1191 1130/ 1266 : (MACRO) Cretn
1192 1131/ 1267 :
1193 1132/ 1267 : _reg_r13:
1194 1133/ 1267 : (MACRO) reserve 4
1195 1134/ 126B : (MACRO) ld2 R12,'D',(_user_r13),0 ;reg:INDIRI2(addr)
1196 1135/ 1275 : (MACRO) Ccall _hex4
1197 1136/ 1278 : (MACRO) ldaD R11,3; reg:acon
1198
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1198
1198      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 20 - 7/16/2025 13:30:08
1199
1200
1201      1137/      127E : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
1202      1138/      1286 : (MACRO)          ldaD R11,179; reg:acon
1203      1139/      128C : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
1204      1140/      1294 :                  L157:
1205      1141/      1294 : (MACRO)          release 4
1206      1142/      1298 : (MACRO)          Cretn
1207      1143/      1299 :
1208      1144/      1299 :                  _reg_r14:
1209      1145/      1299 : (MACRO)          reserve 4
1210      1146/      129D : (MACRO)          ld2 R12,'D',(_user_r14),0 ;reg:INDIRI2(addr)
1211      1147/      12A7 : (MACRO)          Ccall _hex4
1212      1148/      12AA : (MACRO)          ldaD R11,3; reg:acon
1213      1149/      12B0 : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
1214      1150/      12B8 : (MACRO)          ldaD R11,143; reg:acon
1215      1151/      12BE : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
1216      1152/      12C6 :                  L159:
1217      1153/      12C6 : (MACRO)          release 4
1218      1154/      12CA : (MACRO)          Cretn
1219      1155/      12CB :
1220      1156/      12CB :                  _reg_r15:
1221      1157/      12CB : (MACRO)          reserve 4
1222      1158/      12CF : (MACRO)          ld2 R12,'D',(_user_r15),0 ;reg:INDIRI2(addr)
1223      1159/      12D9 : (MACRO)          Ccall _hex4
1224      1160/      12DC : (MACRO)          ldaD R11,3; reg:acon
1225      1161/      12E2 : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
1226      1162/      12EA : (MACRO)          ldaD R11,15; reg:acon
1227      1163/      12F0 : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
1228      1164/      12F8 :                  L161:
1229      1165/      12F8 : (MACRO)          release 4
1230      1166/      12FC : (MACRO)          Cretn
1231      1167/      12FD :
1232      1168/      12FD :                  _reg_display:
1233      1169/      12FD : (MACRO)          reserve 0; save room for local variables
1234      1170/      12FD : (MACRO)          pushr r7
1235      1171/      1302 : (MACRO)          reserve 4; save room for outgoing arguments
1236      1172/      1306 : (MACRO)          ld1 R7,'D',(_key),0
1237      1173/      130E : (MACRO)          zExt R7 ;CVUI2: widen unsigned char to signe
1238      1174/      1311 : (MACRO)          jcI2I r7,0,lbnf,L164 ;LT=lbnf i.e. subtract
1239      1175/      1322 : (MACRO)          jnI2I r7,15,lbnf,L164; GT reverse the subtr
1240      1176/      1333 : (MACRO)          cpy2 R11,R7
1241      1177/      1337 : (MACRO)          shl2I R11,1
1242      1178/      133D : (MACRO)          ld2 R11,'0',R11,(L181);reg: INDIRP2(addr)
1243      1179/      1349 : (MACRO)          jumpv r11; JUMPV(reg)
1244      1180/      1353 :                  L181:
1245      1181/      1353 : 13 73          dw L167
1246      1182/      1355 : 13 C4          dw L164
1247      1183/      1357 : 13 C4          dw L164
1248      1184/      1359 : 13 79          dw L168
1249      1185/      135B : 13 7F          dw L169
1250      1186/      135D : 13 85          dw L170
1251      1187/      135F : 13 8B          dw L171
1252      1188/      1361 : 13 91          dw L172
1253      1189/      1363 : 13 97          dw L173
1254      1190/      1365 : 13 9D          dw L174
1255      1191/      1367 : 13 A3          dw L175
1256      1192/      1369 : 13 A9          dw L176
1257      1193/      136B : 13 AF          dw L177
1258      1194/      136D : 13 B5          dw L178
1259      1195/      136F : 13 BB          dw L179
1260      1196/      1371 : 13 C1          dw L180
1261

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1261
1261      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 21 - 7/16/2025 13:30:08
1262
1263
1264      1197/      1373 :                               L167:
1265      1198/      1373 : (MACRO)                        Ccall _reg_d
1266      1199/      1376 : C0 13 C4                        lbr L165
1267      1200/      1379 :                               L168:
1268      1201/      1379 : (MACRO)                        Ccall _reg_r3
1269      1202/      137C : C0 13 C4                        lbr L165
1270      1203/      137F :                               L169:
1271      1204/      137F : (MACRO)                        Ccall _reg_r4
1272      1205/      1382 : C0 13 C4                        lbr L165
1273      1206/      1385 :                               L170:
1274      1207/      1385 : (MACRO)                        Ccall _reg_r5
1275      1208/      1388 : C0 13 C4                        lbr L165
1276      1209/      138B :                               L171:
1277      1210/      138B : (MACRO)                        Ccall _reg_r6
1278      1211/      138E : C0 13 C4                        lbr L165
1279      1212/      1391 :                               L172:
1280      1213/      1391 : (MACRO)                        Ccall _reg_r7
1281      1214/      1394 : C0 13 C4                        lbr L165
1282      1215/      1397 :                               L173:
1283      1216/      1397 : (MACRO)                        Ccall _reg_r8
1284      1217/      139A : C0 13 C4                        lbr L165
1285      1218/      139D :                               L174:
1286      1219/      139D : (MACRO)                        Ccall _reg_r9
1287      1220/      13A0 : C0 13 C4                        lbr L165
1288      1221/      13A3 :                               L175:
1289      1222/      13A3 : (MACRO)                        Ccall _reg_r10
1290      1223/      13A6 : C0 13 C4                        lbr L165
1291      1224/      13A9 :                               L176:
1292      1225/      13A9 : (MACRO)                        Ccall _reg_r11
1293      1226/      13AC : C0 13 C4                        lbr L165
1294      1227/      13AF :                               L177:
1295      1228/      13AF : (MACRO)                        Ccall _reg_r12
1296      1229/      13B2 : C0 13 C4                        lbr L165
1297      1230/      13B5 :                               L178:
1298      1231/      13B5 : (MACRO)                        Ccall _reg_r13
1299      1232/      13B8 : C0 13 C4                        lbr L165
1300      1233/      13BB :                               L179:
1301      1234/      13BB : (MACRO)                        Ccall _reg_r14
1302      1235/      13BE : C0 13 C4                        lbr L165
1303      1236/      13C1 :                               L180:
1304      1237/      13C1 : (MACRO)                        Ccall _reg_r15
1305      1238/      13C4 :                               L164:
1306      1239/      13C4 :                               L165:
1307      1240/      13C4 :                               L163:
1308      1241/      13C4 : (MACRO)                        release 4; release room for outgoing argumen
1309      1242/      13C8 : (MACRO)                        popr r7
1310      1243/      13CC : (MACRO)                        release 0; release room for local variables
1311      1244/      13CC : (MACRO)                        Cretn
1312      1245/      13CD :
1313      1246/      13CD :                               _enter_num:
1314      1247/      13CD : (MACRO)                        reserve 4
1315      1248/      13D1 : (MACRO)                        ld1 R11,'D',(_hit),0
1316      1249/      13D9 : (MACRO)                        zExt R11 ;CVUI2: widen unsigned char to sign
1317      1250/      13DC : (MACRO)                        jnzU2 r11,L183; NE 0
1318      1251/      13E4 : (MACRO)                        ld2z R11
1319      1252/      13E8 : (MACRO)                        st2 R11,'D',(_num),0; ASGNI2(addr,reg)*;
1320      1253/      13F3 :                               L183:
1321      1254/      13F3 : (MACRO)                        ldaD R11,1; reg:acon
1322      1255/      13F9 : (MACRO)                        st1 R11,'D',(_hit),0; ASGNU1
1323      1256/      1401 : (MACRO)                        ld2 R11,'D',(_num),0 ;reg:INDIRI2(addr)
1324

```

1324
1324 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 22 - 7/16/2025 13:30:08
1325
1326
1327 1257/ 140B : (MACRO) shl2I R11,4
1328 1258/ 1423 : (MACRO) st2 R11,'D',(_num),0; ASGNI2(addr,reg)*;
1329 1259/ 142E : (MACRO) ld2 R11,'D',(_num),0 ;reg:INDIRI2(addr)
1330 1260/ 1438 : (MACRO) ld1 R10,'D',(_key),0
1331 1261/ 1440 : (MACRO) zExt R10 ;CVUI2: widen unsigned char to sign
1332 1262/ 1443 : (MACRO) alu2 R11,R11,R10,or,or
1333 1263/ 144F : (MACRO) st2 R11,'D',(_num),0; ASGNI2(addr,reg)*;
1334 1264/ 145A : (MACRO) ld2 R12,'D',(_num),0 ;reg:INDIRI2(addr)
1335 1265/ 1464 : (MACRO) Ccall _hex4
1336 1266/ 1467 : L182:
1337 1267/ 1467 : (MACRO) release 4
1338 1268/ 146B : (MACRO) Cretn
1339 1269/ 146C :
1340 1270/ 146C :
1341 1271/ 146C : (MACRO) _clear_buffer:
1342 1272/ 1470 : (MACRO) ld2z R11
1343 1273/ 147B : L186:
1344 1274/ 147B : (MACRO) ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
1345 1275/ 1485 : (MACRO) ldaD R10,0; reg:acon
1346 1276/ 148B : (MACRO) st1 R10,'0',R11,(_buffer); ASGNI1
1347 1277/ 1495 : L187:
1348 1278/ 1495 : (MACRO) ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
1349 1279/ 149F : (MACRO) incm R11,1
1350 1280/ 14A0 : (MACRO) st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
1351 1281/ 14AB : (MACRO) ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
1352 1282/ 14B5 : (MACRO) jcI2I r11,6,lbnf,L186 ;LT=lbnf i.e. subtrac
1353 1283/ 14C6 : L185:
1354 1284/ 14C6 : (MACRO) Cretn
1355 1285/ 14C7 :
1356 1286/ 14C7 :
1357 1287/ 14C7 : (MACRO) _key_copy:
1358 1288/ 14CB : (MACRO) reserve 4
1359 1289/ 14D1 : (MACRO) ldaD R11,5; reg:acon
1360 1290/ 14D9 : (MACRO) st1 R11,'D',(_state),0; ASGNI1
1361 1291/ 14DF : (MACRO) ldaD R11,0; reg:acon
1362 1292/ 14E7 : (MACRO) st1 R11,'D',(_hit),0; ASGNI1
1363 1293/ 14EA : (MACRO) Ccall _clear_buffer
1364 1294/ 14F0 : (MACRO) ldaD R11,189; reg:acon
1365 1295/ 14F8 : (MACRO) st1 R11,'D',(_buffer+2),0; ASGNI1
1366 1296/ 14FE : (MACRO) ldaD R11,174; reg:acon
1367 1297/ 1506 : (MACRO) st1 R11,'D',(_buffer),0; ASGNI1
1368 1298/ 150C : (MACRO) ldaD R11,0; reg:acon
1369 1299/ 1514 : st1 R11,'D',(_buffer+1),0; ASGNI1
1370 1300/ 1514 : (MACRO) L190:
1371 1301/ 1518 : (MACRO) release 4
1372 1302/ 1519 : Cretn
1373 1303/ 1519 :
1374 1304/ 1519 : (MACRO) _key_code:
1375 1305/ 151B : (MACRO) cpy1 R11,R12
1376 1306/ 151E : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1377 1307/ 152A : (MACRO) jneU2I r11,16,L194; NE
1378 1308/ 152E : C0 18 6F ld2z R15
1379 1309/ 1531 : lbr L193
1380 1310/ 1531 : (MACRO) L194:
1381 1311/ 1533 : (MACRO) cpy1 R11,R12
1382 1312/ 1536 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1383 1313/ 1542 : (MACRO) jneU2I r11,33,L196; NE
1384 1314/ 1548 : C0 18 6F ldaD R15,1; reg:acon
1385 1315/ 154B : lbr L193
1386 1316/ 154B : (MACRO) L196:
1387 cpy1 R11,R12


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1387
1387    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 23 - 7/16/2025 13:30:08
1388
1389
1390    1317/    154D : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1391    1318/    1550 : (MACRO)                jneU2I r11,27,L198; NE
1392    1319/    155C : (MACRO)                ldaD R15,2; reg:acon
1393    1320/    1562 : C0 18 6F                lbr L193
1394    1321/    1565 :
1395    1322/    1565 : (MACRO)                L198:
1396    1323/    1567 : (MACRO)                cpy1 R11,R12
1397    1324/    156A : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1398    1325/    1576 : (MACRO)                jneU2I r11,21,L200; NE
1399    1326/    157C : C0 18 6F                ldaD R15,3; reg:acon
1400    1327/    157F :                        lbr L193
1401    1328/    157F : (MACRO)                L200:
1402    1329/    1581 : (MACRO)                cpy1 R11,R12
1403    1330/    1584 : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1404    1331/    1590 : (MACRO)                jneU2I r11,22,L202; NE
1405    1332/    1596 : C0 18 6F                ldaD R15,4; reg:acon
1406    1333/    1599 :                        lbr L193
1407    1334/    1599 : (MACRO)                L202:
1408    1335/    159B : (MACRO)                cpy1 R11,R12
1409    1336/    159E : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1410    1337/    15AA : (MACRO)                jneU2I r11,32,L204; NE
1411    1338/    15B0 : C0 18 6F                ldaD R15,5; reg:acon
1412    1339/    15B3 :                        lbr L193
1413    1340/    15B3 : (MACRO)                L204:
1414    1341/    15B5 : (MACRO)                cpy1 R11,R12
1415    1342/    15B8 : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1416    1343/    15C4 : (MACRO)                jneU2I r11,26,L206; NE
1417    1344/    15CA : C0 18 6F                ldaD R15,6; reg:acon
1418    1345/    15CD :                        lbr L193
1419    1346/    15CD : (MACRO)                L206:
1420    1347/    15CF : (MACRO)                cpy1 R11,R12
1421    1348/    15D2 : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1422    1349/    15DE : (MACRO)                jneU2I r11,20,L208; NE
1423    1350/    15E4 : C0 18 6F                ldaD R15,7; reg:acon
1424    1351/    15E7 :                        lbr L193
1425    1352/    15E7 : (MACRO)                L208:
1426    1353/    15E9 : (MACRO)                cpy1 R11,R12
1427    1354/    15EC : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1428    1355/    15F8 : (MACRO)                jneU2I r11,28,L210; NE
1429    1356/    15FE : C0 18 6F                ldaD R15,8; reg:acon
1430    1357/    1601 :                        lbr L193
1431    1358/    1601 : (MACRO)                L210:
1432    1359/    1603 : (MACRO)                cpy1 R11,R12
1433    1360/    1606 : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1434    1361/    1612 : (MACRO)                jneU2I r11,31,L212; NE
1435    1362/    1618 : C0 18 6F                ldaD R15,9; reg:acon
1436    1363/    161B :                        lbr L193
1437    1364/    161B : (MACRO)                L212:
1438    1365/    161D : (MACRO)                cpy1 R11,R12
1439    1366/    1620 : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1440    1367/    162C : (MACRO)                jneU2I r11,25,L214; NE
1441    1368/    1632 : C0 18 6F                ldaD R15,10; reg:acon
1442    1369/    1635 :                        lbr L193
1443    1370/    1635 : (MACRO)                L214:
1444    1371/    1637 : (MACRO)                cpy1 R11,R12
1445    1372/    163A : (MACRO)                zExt 11 ;CVUI2(reg): widen unsigned char to
1446    1373/    1646 : (MACRO)                jneU2I r11,19,L216; NE
1447    1374/    164C : C0 18 6F                ldaD R15,11; reg:acon
1448    1375/    164F :                        lbr L193
1449    1376/    164F : (MACRO)                L216:
1450                                cpy1 R11,R12
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1450
1450 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 24 - 7/16/2025 13:30:08
1451
1452
1453 1377/ 1651 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1454 1378/ 1654 : (MACRO) jneU2I r11,34,L218; NE
1455 1379/ 1660 : (MACRO) ldaD R15,12; reg:acon
1456 1380/ 1666 : C0 18 6F lbr L193
1457 1381/ 1669 : L218:
1458 1382/ 1669 : (MACRO) cpy1 R11,R12
1459 1383/ 166B : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1460 1384/ 166E : (MACRO) jneU2I r11,30,L220; NE
1461 1385/ 167A : (MACRO) ldaD R15,13; reg:acon
1462 1386/ 1680 : C0 18 6F lbr L193
1463 1387/ 1683 : L220:
1464 1388/ 1683 : (MACRO) cpy1 R11,R12
1465 1389/ 1685 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1466 1390/ 1688 : (MACRO) jneU2I r11,24,L222; NE
1467 1391/ 1694 : (MACRO) ldaD R15,14; reg:acon
1468 1392/ 169A : C0 18 6F lbr L193
1469 1393/ 169D : L222:
1470 1394/ 169D : (MACRO) cpy1 R11,R12
1471 1395/ 169F : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1472 1396/ 16A2 : (MACRO) jneU2I r11,18,L224; NE
1473 1397/ 16AE : (MACRO) ldaD R15,15; reg:acon
1474 1398/ 16B4 : C0 18 6F lbr L193
1475 1399/ 16B7 : L224:
1476 1400/ 16B7 : (MACRO) cpy1 R11,R12
1477 1401/ 16B9 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1478 1402/ 16BC : (MACRO) jneU2I r11,12,L226; NE
1479 1403/ 16C8 : (MACRO) ldaD R15,16; reg:acon
1480 1404/ 16CE : C0 18 6F lbr L193
1481 1405/ 16D1 : L226:
1482 1406/ 16D1 : (MACRO) cpy1 R11,R12
1483 1407/ 16D3 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1484 1408/ 16D6 : (MACRO) jneU2I r11,13,L228; NE
1485 1409/ 16E2 : (MACRO) ldaD R15,17; reg:acon
1486 1410/ 16E8 : C0 18 6F lbr L193
1487 1411/ 16EB : L228:
1488 1412/ 16EB : (MACRO) cpy1 R11,R12
1489 1413/ 16ED : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1490 1414/ 16F0 : (MACRO) jneU2I r11,14,L230; NE
1491 1415/ 16FC : (MACRO) ldaD R15,18; reg:acon
1492 1416/ 1702 : C0 18 6F lbr L193
1493 1417/ 1705 : L230:
1494 1418/ 1705 : (MACRO) cpy1 R11,R12
1495 1419/ 1707 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1496 1420/ 170A : (MACRO) jneU2I r11,15,L232; NE
1497 1421/ 1716 : (MACRO) ldaD R15,19; reg:acon
1498 1422/ 171C : C0 18 6F lbr L193
1499 1423/ 171F : L232:
1500 1424/ 171F : (MACRO) cpy1 R11,R12
1501 1425/ 1721 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1502 1426/ 1724 : (MACRO) jneU2I r11,6,L234; NE
1503 1427/ 1730 : (MACRO) ldaD R15,20; reg:acon
1504 1428/ 1736 : C0 18 6F lbr L193
1505 1429/ 1739 : L234:
1506 1430/ 1739 : (MACRO) cpy1 R11,R12
1507 1431/ 173B : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1508 1432/ 173E : (MACRO) jneU2I r11,7,L236; NE
1509 1433/ 174A : (MACRO) ldaD R15,21; reg:acon
1510 1434/ 1750 : C0 18 6F lbr L193
1511 1435/ 1753 : L236:
1512 1436/ 1753 : (MACRO) cpy1 R11,R12
1513

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1513
1513 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 25 - 7/16/2025 13:30:08
1514
1515
1516 1437/ 1755 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1517 1438/ 1758 : (MACRO) jneU2I r11,8,L238; NE
1518 1439/ 1764 : (MACRO) ldaD R15,22; reg:acon
1519 1440/ 176A : C0 18 6F lbr L193
1520 1441/ 176D : L238:
1521 1442/ 176D : (MACRO) cpy1 R11,R12
1522 1443/ 176F : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1523 1444/ 1772 : (MACRO) jneU2I r11,9,L240; NE
1524 1445/ 177E : (MACRO) ldaD R15,23; reg:acon
1525 1446/ 1784 : C0 18 6F lbr L193
1526 1447/ 1787 : L240:
1527 1448/ 1787 : (MACRO) cpy1 R11,R12
1528 1449/ 1789 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1529 1450/ 178C : (MACRO) jnzU2 r11,L242; NE 0
1530 1451/ 1794 : (MACRO) ldaD R15,24; reg:acon
1531 1452/ 179A : C0 18 6F lbr L193
1532 1453/ 179D : L242:
1533 1454/ 179D : (MACRO) cpy1 R11,R12
1534 1455/ 179F : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1535 1456/ 17A2 : (MACRO) jneU2I r11,1,L244; NE
1536 1457/ 17AE : (MACRO) ldaD R15,25; reg:acon
1537 1458/ 17B4 : C0 18 6F lbr L193
1538 1459/ 17B7 : L244:
1539 1460/ 17B7 : (MACRO) cpy1 R11,R12
1540 1461/ 17B9 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1541 1462/ 17BC : (MACRO) jneU2I r11,2,L246; NE
1542 1463/ 17C8 : (MACRO) ldaD R15,26; reg:acon
1543 1464/ 17CE : C0 18 6F lbr L193
1544 1465/ 17D1 : L246:
1545 1466/ 17D1 : (MACRO) cpy1 R11,R12
1546 1467/ 17D3 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1547 1468/ 17D6 : (MACRO) jneU2I r11,3,L248; NE
1548 1469/ 17E2 : (MACRO) ldaD R15,27; reg:acon
1549 1470/ 17E8 : C0 18 6F lbr L193
1550 1471/ 17EB : L248:
1551 1472/ 17EB : (MACRO) cpy1 R11,R12
1552 1473/ 17ED : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1553 1474/ 17F0 : (MACRO) jneU2I r11,19,L250; NE
1554 1475/ 17FC : (MACRO) ldaD R15,28; reg:acon
1555 1476/ 1802 : C0 18 6F lbr L193
1556 1477/ 1805 : L250:
1557 1478/ 1805 : (MACRO) cpy1 R11,R12
1558 1479/ 1807 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1559 1480/ 180A : (MACRO) jneU2I r11,29,L252; NE
1560 1481/ 1816 : (MACRO) ldaD R15,29; reg:acon
1561 1482/ 181C : C0 18 6F lbr L193
1562 1483/ 181F : L252:
1563 1484/ 181F : (MACRO) cpy1 R11,R12
1564 1485/ 1821 : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1565 1486/ 1824 : (MACRO) jneU2I r11,23,L254; NE
1566 1487/ 1830 : (MACRO) ldaD R15,30; reg:acon
1567 1488/ 1836 : C0 18 6F lbr L193
1568 1489/ 1839 : L254:
1569 1490/ 1839 : (MACRO) cpy1 R11,R12
1570 1491/ 183B : (MACRO) zExt 11 ;CVUI2(reg): widen unsigned char to
1571 1492/ 183E : (MACRO) jnzU2 r11,L256; NE 0
1572 1493/ 1846 : (MACRO) ldaD R15,31; reg:acon
1573 1494/ 184C : C0 18 6F lbr L193
1574 1495/ 184F : L256:
1575 1496/ 184F : (MACRO) cpy1 R11,R12
1576
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1576
1577 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 26 - 7/16/2025 13:30:08
1578
1579      1497/      1851 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
1580      1498/      1854 : (MACRO)          jneU2I r11,35,L258; NE
1581      1499/      1860 : (MACRO)          ldaD R15,32; reg:acon
1582      1500/      1866 : C0 18 6F          lbr L193
1583      1501/      1869 :                  L258:
1584      1502/      1869 : (MACRO)          ldaD R15,255; reg:acon
1585      1503/      186F :                  L193:
1586      1504/      186F : (MACRO)          Cretn
1587      1505/      1870 :
1588      1506/      1870 :          _delay_beep:
1589      1507/      1870 : (MACRO)          ld2z R11
1590      1508/      1874 : (MACRO)          st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
1591      1509/      187F :                  L262:
1592      1510/      187F : (MACRO)          ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
1593      1511/      1889 : (MACRO)          incm R11,1
1594      1512/      188A : (MACRO)          st2 R11,'D',(_j),0; ASGNI2(addr,reg)*;
1595      1513/      1895 : (MACRO)          ld2 R11,'D',(_j),0 ;reg:INDIRI2(addr)
1596      1514/      189F : (MACRO)          jcI2I r11,2,lbnf,L262 ;LT=lbnf i.e. subtrac
1597      1515/      18B0 :                  L260:
1598      1516/      18B0 : (MACRO)          Cretn
1599      1517/      18B1 :
1600      1518/      18B1 :          _beep:
1601      1519/      18B1 : (MACRO)          reserve 4
1602      1520/      18B5 : (MACRO)          ld2 R11,'D',(_port2),0;reg: INDIRP2(addr)
1603      1521/      18BF : (MACRO)          ldaD R10,0; reg:acon
1604      1522/      18C5 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1605      1523/      18C7 : (MACRO)          ldaD R11,0; reg:acon
1606      1524/      18CD : (MACRO)          st1 R11,'D',(_x),0; ASGNU1
1607      1525/      18D5 : C0 19 16          lbr L269
1608      1526/      18D8 :                  L266:
1609      1527/      18D8 : (MACRO)          ld2 R11,'D',(_port1),0;reg: INDIRP2(addr)
1610      1528/      18E2 : (MACRO)          ldaD R10,-129; reg:acon
1611      1529/      18E8 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1612      1530/      18EA : (MACRO)          Ccall _delay_beep
1613      1531/      18ED : (MACRO)          ld2 R11,'D',(_port1),0;reg: INDIRP2(addr)
1614      1532/      18F7 : (MACRO)          ldaD R10,255; reg:acon
1615      1533/      18FD : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1616      1534/      18FF : (MACRO)          Ccall _delay_beep
1617      1535/      1902 :                  L267:
1618      1536/      1902 : (MACRO)          ldaD R11,_x; reg:acon
1619      1537/      1908 : (MACRO)          ld1 R10,'D',(_x),0
1620      1538/      1910 : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
1621      1539/      1913 : (MACRO)          incm R10,1
1622      1540/      1914 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1623      1541/      1916 :                  L269:
1624      1542/      1916 : (MACRO)          ld1 R11,'D',(_x),0
1625      1543/      191E : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1626      1544/      1921 : (MACRO)          jcI2I r11,50,lbnf,L266 ;LT=lbnf i.e. subtra
1627      1545/      1932 :                  L265:
1628      1546/      1932 : (MACRO)          release 4
1629      1547/      1936 : (MACRO)          Cretn
1630      1548/      1937 :
1631      1549/      1937 :          _key_mute:
1632      1550/      1937 : (MACRO)          ldaD R11,_flag; reg:acon
1633      1551/      193D : (MACRO)          ld1 R10,'D',(_flag),0
1634      1552/      1945 : (MACRO)          zExt R10 ;CVUI2: widen unsigned char to sign
1635      1553/      1948 : (MACRO)          alu2I R10,R10,1,xri,xri ;removed copy
1636      1554/      1950 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1637      1555/      1952 :                  L270:
1638      1556/      1952 : (MACRO)          Cretn
1639

```

```
1639
1639    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 27 - 7/16/2025 13:30:08
1640
1641
1642    1557/    1953 :
1643    1558/    1953 :
1644    1559/    1953 : (MACRO)
1645    1560/    1957 : C0 19 6E
1646    1561/    195A :
1647    1562/    195A : 7B
1648    1563/    195B : (MACRO)
1649    1564/    1961 : (MACRO)
1650    1565/    1964 : 7A
1651    1566/    1965 : (MACRO)
1652    1567/    196B : (MACRO)
1653    1568/    196E :
1654    1569/    196E : C0 19 5A
1655    1570/    1971 :
1656    1571/    1971 : (MACRO)
1657    1572/    1975 : (MACRO)
1658    1573/    1976 :
1659    1574/    1976 :
1660    1575/    1976 : (MACRO)
1661    1576/    1976 : (MACRO)
1662    1577/    197B : (MACRO)
1663    1578/    197F : (MACRO)
1664    1579/    1987 : (MACRO)
1665    1580/    198A : (MACRO)
1666    1581/    1992 : (MACRO)
1667    1582/    1995 :
1668    1583/    1995 : (MACRO)
1669    1584/    199D : (MACRO)
1670    1585/    19A0 : (MACRO)
1671    1586/    19B1 : (MACRO)
1672    1587/    19B9 : (MACRO)
1673    1588/    19BC : (MACRO)
1674    1589/    19C8 : (MACRO)
1675    1590/    19CB :
1676    1591/    19CB : (MACRO)
1677    1592/    19D3 : (MACRO)
1678    1593/    19D6 : (MACRO)
1679    1594/    19E2 : (MACRO)
1680    1595/    19E5 :
1681    1596/    19E5 : (MACRO)
1682    1597/    19ED : (MACRO)
1683    1598/    19F0 : (MACRO)
1684    1599/    19FC : (MACRO)
1685    1600/    19FF :
1686    1601/    19FF : (MACRO)
1687    1602/    1A07 : (MACRO)
1688    1603/    1A0A : (MACRO)
1689    1604/    1A16 : (MACRO)
1690    1605/    1A19 :
1691    1606/    1A19 : (MACRO)
1692    1607/    1A21 : (MACRO)
1693    1608/    1A24 : (MACRO)
1694    1609/    1A30 : (MACRO)
1695    1610/    1A33 :
1696    1611/    1A33 : (MACRO)
1697    1612/    1A3B : (MACRO)
1698    1613/    1A3E : (MACRO)
1699    1614/    1A4A : (MACRO)
1700    1615/    1A4D :
1701    1616/    1A4D : (MACRO)
1702

_key_qled:
reserve 4
lbr L273
L272:
seq
ldaD R12,500; reg:acon
Ccall _delay_ms
req
ldaD R12,30000; reg:acon
Ccall _delay_ms
L273:
lbr L272
L271:
release 4
Cretn

_key_exe:
reserve 0; save room for local variables
pushr r7
reserve 4; save room for outgoing arguments
ld1 R11,'D',(_flag),0
zExt R11 ;CVUI2: widen unsigned char to sign
jnzU2 r11,L278; NE 0
Ccall _beep
L278:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jnI2I r11,15,lbdf,L280 ;LEI2 15 11 L280; LE
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,19,L282; NE
Ccall _key_address
L282:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,18,L284; NE
Ccall _key_data
L284:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,23,L286; NE
Ccall _key_plus
L286:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,22,L288; NE
Ccall _key_minus
L288:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,16,L290; NE
Ccall _key_PC
L290:
ld1 R11,'D',(_key),0
zExt R11 ;CVUI2: widen unsigned char to sign
jneU2I r11,27,L292; NE
Ccall _key_go
L292:
ld1 R11,'D',(_key),0
```

1702
1702 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 28 - 7/16/2025 13:30:08
1703
1704
1705 1617/ 1A55 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1706 1618/ 1A58 : (MACRO) jneU2I r11,17,L294; NE
1707 1619/ 1A64 : (MACRO) Ccall _key_reg
1708 1620/ 1A67 : L294:
1709 1621/ 1A67 : (MACRO) ld1 R11,'D',(_key),0
1710 1622/ 1A6F : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1711 1623/ 1A72 : (MACRO) jneU2I r11,25,L296; NE
1712 1624/ 1A7E : (MACRO) Ccall _insert
1713 1625/ 1A81 : L296:
1714 1626/ 1A81 : (MACRO) ld1 R11,'D',(_key),0
1715 1627/ 1A89 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1716 1628/ 1A8C : (MACRO) jneU2I r11,26,L298; NE
1717 1629/ 1A98 : (MACRO) Ccall _cut_byte
1718 1630/ 1A9B : L298:
1719 1631/ 1A9B : (MACRO) ld1 R11,'D',(_key),0
1720 1632/ 1AA3 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1721 1633/ 1AA6 : (MACRO) jneU2I r11,30,L300; NE
1722 1634/ 1AB2 : (MACRO) Ccall _key_dump
1723 1635/ 1AB5 : L300:
1724 1636/ 1AB5 : (MACRO) ld1 R11,'D',(_key),0
1725 1637/ 1ABD : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1726 1638/ 1AC0 : (MACRO) jneU2I r11,29,L302; NE
1727 1639/ 1ACC : (MACRO) Ccall _key_test
1728 1640/ 1ACF : L302:
1729 1641/ 1ACF : (MACRO) ld1 R11,'D',(_key),0
1730 1642/ 1AD7 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1731 1643/ 1ADA : (MACRO) jneU2I r11,24,L304; NE
1732 1644/ 1AE6 : (MACRO) Ccall _key_load
1733 1645/ 1AE9 : L304:
1734 1646/ 1AE9 : (MACRO) ld1 R11,'D',(_key),0
1735 1647/ 1AF1 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1736 1648/ 1AF4 : (MACRO) jneU2I r11,32,L306; NE
1737 1649/ 1B00 : (MACRO) Ccall _key_copy
1738 1650/ 1B03 : L306:
1739 1651/ 1B03 : (MACRO) ld1 R11,'D',(_key),0
1740 1652/ 1B0B : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1741 1653/ 1B0E : (MACRO) jneU2I r11,21,L308; NE
1742 1654/ 1B1A : (MACRO) Ccall _key_mute
1743 1655/ 1B1D : L308:
1744 1656/ 1B1D : (MACRO) ld1 R11,'D',(_key),0
1745 1657/ 1B25 : (MACRO) zExt R11 ;CVUI2: widen unsigned char to sign
1746 1658/ 1B28 : (MACRO) jneU2I r11,20,L281; NE
1747 1659/ 1B34 : (MACRO) Ccall _key_qled
1748 1660/ 1B37 : C0 1B BF lbr L281
1749 1661/ 1B3A : L280:
1750 1662/ 1B3A : (MACRO) ld1 R7,'D',(_state),0
1751 1663/ 1B42 : (MACRO) zExt R7 ;CVUI2: widen unsigned char to signe
1752 1664/ 1B45 : (MACRO) ldaD R11,1; reg:acon
1753 1665/ 1B4B : (MACRO) jcI2 r7,r11,lbnf,L312; LT=lbnf i.e. subtract
1754 1666/ 1B5F : (MACRO) jnI2I r7,7,lbnf,L312; GT reverse the subtra
1755 1667/ 1B70 : (MACRO) cpy2 R11,R7
1756 1668/ 1B74 : (MACRO) shl2I R11,1
1757 1669/ 1B7A : (MACRO) ld2 R11,'0',R11,(L321-2);reg: INDIRP2(addr)
1758 1670/ 1B86 : (MACRO) jumpv r11; JUMPV(reg)
1759 1671/ 1B90 : L321:
1760 1672/ 1B90 : 1B 9E dw L315
1761 1673/ 1B92 : 1B A4 dw L316
1762 1674/ 1B94 : 1B AA dw L317
1763 1675/ 1B96 : 1B BF dw L312
1764 1676/ 1B98 : 1B B0 dw L318
1765

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1765
1765      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 29 - 7/16/2025 13:30:08
1766
1767
1768      1677/      1B9A : 1B B6                dw L319
1769      1678/      1B9C : 1B BC                dw L320
1770      1679/      1B9E :                      L315:
1771      1680/      1B9E : (MACRO)              Ccall _hex_address
1772      1681/      1BA1 : C0 1B BF              lbr L313
1773      1682/      1BA4 :                      L316:
1774      1683/      1BA4 : (MACRO)              Ccall _data_hex
1775      1684/      1BA7 : C0 1B BF              lbr L313
1776      1685/      1BAA :                      L317:
1777      1686/      1BAA : (MACRO)              Ccall _reg_display
1778      1687/      1BAD : C0 1B BF              lbr L313
1779      1688/      1BB0 :                      L318:
1780      1689/      1BB0 : (MACRO)              Ccall _enter_num
1781      1690/      1BB3 : C0 1B BF              lbr L313
1782      1691/      1BB6 :                      L319:
1783      1692/      1BB6 : (MACRO)              Ccall _enter_num
1784      1693/      1BB9 : C0 1B BF              lbr L313
1785      1694/      1BBC :                      L320:
1786      1695/      1BBC : (MACRO)              Ccall _enter_num
1787      1696/      1BBF :                      L312:
1788      1697/      1BBF :                      L313:
1789      1698/      1BBF :                      L281:
1790      1699/      1BBF :                      L277:
1791      1700/      1BBF : (MACRO)              release 4; release room for outgoing argumen
1792      1701/      1BC3 : (MACRO)              popr r7
1793      1702/      1BC7 : (MACRO)              release 0; release room for local variables
1794      1703/      1BC7 : (MACRO)              Cretn
1795      1704/      1BC8 :
1796      1705/      1BC8 :                      _scan1:
1797      1706/      1BC8 : (MACRO)              reserve 6
1798      1707/      1BCE :                      L324:
1799      1708/      1BCE :                      L325:
1800      1709/      1BCE : (MACRO)              Ccall _scan
1801      1710/      1BD1 : (MACRO)              cpy2 R11,R15 ;LOADI2(reg)*
1802      1711/      1BD5 : (MACRO)              zExt 11 ;CVUI2(reg): widen unsigned char to
1803      1712/      1BD8 : (MACRO)              jneU2I r11,255,L324; NE
1804      1713/      1BE4 : (MACRO)              ldaD R12,10; reg:acon
1805      1714/      1BEA : (MACRO)              Ccall _delay_ms
1806      1715/      1BED :                      L327:
1807      1716/      1BED :                      L328:
1808      1717/      1BED : (MACRO)              Ccall _scan
1809      1718/      1BF0 : (MACRO)              cpy2 R11,R15 ;LOADI2(reg)*
1810      1719/      1BF4 : (MACRO)              zExt 11 ;CVUI2(reg): widen unsigned char to
1811      1720/      1BF7 : (MACRO)              jeqU2I r11,255,L327;EQI2(reg,con)
1812      1721/      1C03 : (MACRO)              ldaD R12,5; reg:acon
1813      1722/      1C09 : (MACRO)              Ccall _delay_ms
1814      1723/      1C0C : (MACRO)              Ccall _scan
1815      1724/      1C0F : (MACRO)              cpy2 R11,R15 ;LOADI2(reg)*
1816      1725/      1C13 : (MACRO)              st1 R11,'D',(_key),0; ASGNU1
1817      1726/      1C1B : (MACRO)              ldaD R11,_key; reg:acon
1818      1727/      1C21 : (MACRO)              st2 R11,'0',sp,(-4+8); ASGNP2
1819      1728/      1C2E : (MACRO)              ld1 R12,'D',(_key),0
1820      1729/      1C36 : (MACRO)              zExt R12 ;CVUI2: widen unsigned char to sign
1821      1730/      1C39 : (MACRO)              Ccall _key_code
1822      1731/      1C3C : (MACRO)              cpy2 R11,R15 ;LOADI2(reg)*
1823      1732/      1C40 : (MACRO)              ld2 R10,'0',sp,(-4+8);reg: INDIRP2(addr)
1824      1733/      1C4C : (MACRO)              str1 R11,R10; ASGNU1(indaddr,reg)
1825      1734/      1C4E : (MACRO)              ld1 R11,'D',(_key),0
1826      1735/      1C56 : (MACRO)              zExt R11 ;CVUI2: widen unsigned char to sign
1827      1736/      1C59 : (MACRO)              jcI2I r11,0,lbnf,L330 ;LT=lbnf i.e. subtrac
1828

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1828
1828      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 30 - 7/16/2025 13:30:08
1829
1830
1831      1737/      1C6A : (MACRO)          jcI2I r11,48,lbdf,L330; GE is flipped test f
1832      1738/      1C7B : (MACRO)          Ccall _key_exe
1833      1739/      1C7E :                  L330:
1834      1740/      1C7E :                  L323:
1835      1741/      1C7E : (MACRO)          release 6
1836      1742/      1C84 : (MACRO)          Cretn
1837      1743/      1C85 :
1838      1744/      1C85 :                  _init_8250:
1839      1745/      1C85 : (MACRO)          ld2 R11,'D',(_uart_lcr),0;reg:  INDIRP2(addr
1840      1746/      1C8F : (MACRO)          ldaD R10,131; reg:acon
1841      1747/      1C95 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1842      1748/      1C97 : (MACRO)          ld2 R11,'D',(_uart_divisor_lsb),0;reg:  INDI
1843      1749/      1CA1 : (MACRO)          ldaD R10,24; reg:acon
1844      1750/      1CA7 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1845      1751/      1CA9 : (MACRO)          ld2 R11,'D',(_uart_divisor_msb),0;reg:  INDI
1846      1752/      1CB3 : (MACRO)          ldaD R10,0; reg:acon
1847      1753/      1CB9 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1848      1754/      1CBB : (MACRO)          ld2 R11,'D',(_uart_fifo),0;reg:  INDIRP2(addr
1849      1755/      1CC5 : (MACRO)          ldaD R10,7; reg:acon
1850      1756/      1CCB : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1851      1757/      1CCD : (MACRO)          ld2 R11,'D',(_uart_lcr),0;reg:  INDIRP2(addr
1852      1758/      1CD7 : (MACRO)          ldaD R10,3; reg:acon
1853      1759/      1CDD : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1854      1760/      1CDF :                  L332:
1855      1761/      1CDF : (MACRO)          Cretn
1856      1762/      1CE0 :
1857      1763/      1CE0 :
1858      1764/      1CE0 :
1859      1765/      1CE0 :
1860      1766/      1CE0 : (MACRO)          ld2 R11,'D',(_uart_line_status),0;reg:  INDI
1861      1767/      1CEA : (MACRO)          ld1 R11,'0',R11,0
1862      1768/      1CF4 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1863      1769/      1CF7 : (MACRO)          alu2I R11,R11,32,ani,ani
1864      1770/      1CFF :                  ;removed ? cpy2 R11,R11
1865      1771/      1CFF : (MACRO)          jzU2 r11,L334; EQ 0
1866      1772/      1D07 : (MACRO)          ld2 R11,'D',(_uart_buffer),0;reg:  INDIRP2(a
1867      1773/      1D11 : (MACRO)          str1 R12,R11; ASGNU1(indaddr,reg)
1868      1774/      1D13 :                  L333:
1869      1775/      1D13 : (MACRO)          Cretn
1870      1776/      1D14 :
1871      1777/      1D14 :
1872      1778/      1D14 :
1873      1779/      1D14 :
1874      1780/      1D14 : (MACRO)          ld2 R11,'D',(_uart_line_status),0;reg:  INDI
1875      1781/      1D1E : (MACRO)          ld1 R11,'0',R11,0
1876      1782/      1D28 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
1877      1783/      1D2B : (MACRO)          alu2I R11,R11,1,ani,ani
1878      1784/      1D33 :                  ;removed ? cpy2 R11,R11
1879      1785/      1D33 : (MACRO)          jzU2 r11,L338; EQ 0
1880      1786/      1D3B : (MACRO)          ldaD R11,_c; reg:acon
1881      1787/      1D41 : (MACRO)          ld2 R10,'D',(_uart_buffer),0;reg:  INDIRP2(a
1882      1788/      1D4B : (MACRO)          ldn1 R10,R10;reg:  INDIRU1(indaddr)
1883      1789/      1D4D : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
1884      1790/      1D4F : (MACRO)          ld1 R15,'D',(_c),0
1885      1791/      1D57 : (MACRO)          zExt R15 ;CVUI2: widen unsigned char to sign
1886      1792/      1D5A :                  L337:
1887      1793/      1D5A : (MACRO)          Cretn
1888      1794/      1D5B :
1889      1795/      1D5B :
1890      1796/      1D5B : (MACRO)          _pstr:
1891      1796/      1D5B : (MACRO)          reserve 0; save room for local variables

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1891
1891    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 31 - 7/16/2025 13:30:08
1892
1893
1894    1797/    1D5B : (MACRO)                pushr r7
1895    1798/    1D60 : (MACRO)                reserve 4; save room for outgoing arguments
1896    1799/    1D64 : (MACRO)                cpy2 r7,r12; function(2055) 1
1897    1800/    1D68 : C0 1D 7C                lbr L343
1898    1801/    1D6B :                        L342:
1899    1802/    1D6B : (MACRO)                ld1 R12,'0',R7,0
1900    1803/    1D75 : (MACRO)                zExt R12 ;CVUI2: widen unsigned char to sign
1901    1804/    1D78 : (MACRO)                Ccall _cout
1902    1805/    1D7B : (MACRO)                incm R7,1
1903    1806/    1D7C :                        L343:
1904    1807/    1D7C : (MACRO)                ld1 R11,'0',R7,0
1905    1808/    1D86 : (MACRO)                zExt R11 ;CVUI2: widen unsigned char to sign
1906    1809/    1D89 : (MACRO)                jnzU2 r11,L342; NE 0
1907    1810/    1D91 :                        L341:
1908    1811/    1D91 : (MACRO)                release 4; release room for outgoing argumen
1909    1812/    1D95 : (MACRO)                popr r7
1910    1813/    1D99 : (MACRO)                release 0; release room for local variables
1911    1814/    1D99 : (MACRO)                Cretn
1912    1815/    1D9A :
1913    1816/    1D9A :                        _test_uart:
1914    1817/    1D9A : (MACRO)                reserve 4
1915    1818/    1D9E : (MACRO)                ldaD R11,32; reg:acon
1916    1819/    1DA4 : (MACRO)                st1 R11,'D',(_c),0; ASGNU1
1917    1820/    1DAC : C0 1D D1                lbr L349
1918    1821/    1DAF :                        L346:
1919    1822/    1DAF : (MACRO)                ld1 R12,'D',(_c),0
1920    1823/    1DB7 : (MACRO)                zExt R12 ;CVUI2: widen unsigned char to sign
1921    1824/    1DBA : (MACRO)                Ccall _cout
1922    1825/    1DBD :                        L347:
1923    1826/    1DBD : (MACRO)                ldaD R11,_c; reg:acon
1924    1827/    1DC3 : (MACRO)                ld1 R10,'D',(_c),0
1925    1828/    1DCB : (MACRO)                zExt R10 ;CVUI2: widen unsigned char to sign
1926    1829/    1DCE : (MACRO)                incm R10,1
1927    1830/    1DCF : (MACRO)                str1 R10,R11; ASGNU1(indaddr,reg)
1928    1831/    1DD1 :                        L349:
1929    1832/    1DD1 : (MACRO)                ld1 R11,'D',(_c),0
1930    1833/    1DD9 : (MACRO)                zExt R11 ;CVUI2: widen unsigned char to sign
1931    1834/    1DDC : (MACRO)                jcI2I r11,128,lbnf,L346 ;LT=lbnf i.e. subtr
1932    1835/    1DED :                        L345:
1933    1836/    1DED : (MACRO)                release 4
1934    1837/    1DF1 : (MACRO)                Cretn
1935    1838/    1DF2 :
1936    1839/    1DF2 :                        _newline:
1937    1840/    1DF2 : (MACRO)                reserve 4
1938    1841/    1DF6 : (MACRO)                ldaD R12,10; reg:acon
1939    1842/    1DFC : (MACRO)                Ccall _cout
1940    1843/    1DFF : (MACRO)                ldaD R12,13; reg:acon
1941    1844/    1E05 : (MACRO)                Ccall _cout
1942    1845/    1E08 :                        L350:
1943    1846/    1E08 : (MACRO)                release 4
1944    1847/    1E0C : (MACRO)                Cretn
1945    1848/    1E0D :
1946    1849/    1E0D :                        _send_hex:
1947    1850/    1E0D : (MACRO)                reserve 4
1948    1851/    1E11 : (MACRO)                st2 r12,'0',sp,(6); flag1
1949    1852/    1E1E : (MACRO)                ld2 R11,'0',sp,(0+6) ;reg:INDIRI2(addr)
1950    1853/    1E2A : (MACRO)                st1 R11,'0',sp,(0+6); ASGNU1
1951    1854/    1E34 : (MACRO)                ld1 R11,'0',sp,(0+6)
1952    1855/    1E3E : (MACRO)                zExt R11 ;CVUI2: widen unsigned char to sign
1953    1856/    1E41 : (MACRO)                shrI2I R11,4
1954

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1954
1954    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 32 - 7/16/2025 13:30:08
1955
1956
1957    1857/    1E61 : (MACRO)                st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
1958    1858/    1E6C : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1959    1859/    1E76 : (MACRO)                alu2I R11,R11,15,ani,ani
1960    1860/    1E7E :                        ;removed ? cpy2 R11,R11
1961    1861/    1E7E : (MACRO)                st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
1962    1862/    1E89 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1963    1863/    1E93 : (MACRO)                jnI2I r11,9,lbdf,L352 ;LEI2 9 11 L352; LE is
1964    1864/    1EA4 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1965    1865/    1EAE : (MACRO)                ldA2 R11,'0',R11,(55); reg:addr
1966    1866/    1EB6 : (MACRO)                cpy1 R12,R11
1967    1867/    1EB8 : (MACRO)                zExt 12 ;CVUI2(reg): widen unsigned char to
1968    1868/    1EBB : (MACRO)                Ccall _cout
1969    1869/    1EBE : C0 1E DB                lbr L353
1970    1870/    1EC1 :                        L352:
1971    1871/    1EC1 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1972    1872/    1ECB : (MACRO)                ldA2 R11,'0',R11,(48); reg:addr
1973    1873/    1ED3 : (MACRO)                cpy1 R12,R11
1974    1874/    1ED5 : (MACRO)                zExt 12 ;CVUI2(reg): widen unsigned char to
1975    1875/    1ED8 : (MACRO)                Ccall _cout
1976    1876/    1EDB :                        L353:
1977    1877/    1EDB : (MACRO)                ld1 R11,'0',sp,(0+6)
1978    1878/    1EE5 : (MACRO)                zExt R11 ;CVUI2: widen unsigned char to sign
1979    1879/    1EE8 : (MACRO)                alu2I R11,R11,15,ani,ani
1980    1880/    1EF0 :                        ;removed ? cpy2 R11,R11
1981    1881/    1EF0 : (MACRO)                st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
1982    1882/    1EFB : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1983    1883/    1F05 : (MACRO)                jnI2I r11,9,lbdf,L354 ;LEI2 9 11 L354; LE is
1984    1884/    1F16 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1985    1885/    1F20 : (MACRO)                ldA2 R11,'0',R11,(55); reg:addr
1986    1886/    1F28 : (MACRO)                cpy1 R12,R11
1987    1887/    1F2A : (MACRO)                zExt 12 ;CVUI2(reg): widen unsigned char to
1988    1888/    1F2D : (MACRO)                Ccall _cout
1989    1889/    1F30 : C0 1F 4D                lbr L355
1990    1890/    1F33 :                        L354:
1991    1891/    1F33 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
1992    1892/    1F3D : (MACRO)                ldA2 R11,'0',R11,(48); reg:addr
1993    1893/    1F45 : (MACRO)                cpy1 R12,R11
1994    1894/    1F47 : (MACRO)                zExt 12 ;CVUI2(reg): widen unsigned char to
1995    1895/    1F4A : (MACRO)                Ccall _cout
1996    1896/    1F4D :                        L355:
1997    1897/    1F4D :                        L351:
1998    1898/    1F4D : (MACRO)                release 4
1999    1899/    1F51 : (MACRO)                Cretn
2000    1900/    1F52 :
2001    1901/    1F52 :                        _send_word_hex:
2002    1902/    1F52 : (MACRO)                reserve 4
2003    1903/    1F56 : (MACRO)                st2 r12,'0',sp,(6); flag1
2004    1904/    1F63 : (MACRO)                ld2 R11,'0',sp,(0+6) ;reg:INDIRI2(addr)
2005    1905/    1F6F : (MACRO)                shrI2I R11,8
2006    1906/    1FAF : (MACRO)                st2 R11,'D',(_temp16),0; ASGNI2(addr,reg)*;
2007    1907/    1FBA : (MACRO)                ld2 R11,'D',(_temp16),0 ;reg:INDIRI2(addr)
2008    1908/    1FC4 : (MACRO)                alu2I R11,R11,255,ani,ani
2009    1909/    1FCC :                        ;removed ? cpy2 R11,R11
2010    1910/    1FCC : (MACRO)                st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
2011    1911/    1FD7 : (MACRO)                ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
2012    1912/    1FE1 : (MACRO)                cpy1 R12,R11
2013    1913/    1FE3 : (MACRO)                zExt 12 ;CVUI2(reg): widen unsigned char to
2014    1914/    1FE6 : (MACRO)                Ccall _send_hex
2015    1915/    1FE9 : (MACRO)                ld2 R11,'0',sp,(0+6) ;reg:INDIRI2(addr)
2016    1916/    1FF5 : (MACRO)                alu2I R11,R11,255,ani,ani
2017

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2017
2017    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 33 - 7/16/2025 13:30:08
2018
2019
2020    1917/    1FFD :                                ;removed ? cpy2 R11,R11
2021    1918/    1FFD : (MACRO)                        st2 R11,'D',(_k),0; ASGNI2(addr,reg)*;
2022    1919/    2008 : (MACRO)                        ld2 R11,'D',(_k),0 ;reg:INDIRI2(addr)
2023    1920/    2012 : (MACRO)                        cpy1 R12,R11
2024    1921/    2014 : (MACRO)                        zExt 12 ;CVUI2(reg): widen unsigned char to
2025    1922/    2017 : (MACRO)                        Ccall _send_hex
2026    1923/    201A :                                L356:
2027    1924/    201A : (MACRO)                        release 4
2028    1925/    201E : (MACRO)                        Cretn
2029    1926/    201F :
2030    1927/    201F :                                _key_dump:
2031    1928/    201F : (MACRO)                        reserve 0; save room for local variables
2032    1929/    201F : (MACRO)                        pushr r1
2033    1930/    2024 : (MACRO)                        pushr r7
2034    1931/    2029 : (MACRO)                        reserve 4; save room for outgoing arguments
2035    1932/    202D : (MACRO)                        ld1 R11,'D',(_state),0
2036    1933/    2035 : (MACRO)                        zExt R11 ;CVUI2: widen unsigned char to sign
2037    1934/    2038 : (MACRO)                        jeqU2I r11,1,L360;EQI2(reg,con)
2038    1935/    2044 : (MACRO)                        jneU2I r11,2,L358; NE
2039    1936/    2050 :                                L360:
2040    1937/    2050 : (MACRO)                        ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2041    1938/    205A : (MACRO)                        st2 R11,'D',(_dptr),0; ASGNP2
2042    1939/    2065 : (MACRO)                        ld2z R1
2043    1940/    2069 :                                L361:
2044    1941/    2069 : (MACRO)                        Ccall _newline
2045    1942/    206C : (MACRO)                        ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2046    1943/    2076 : (MACRO)                        cpy2 R12,R11 ;LOADI2(reg)*
2047    1944/    207A : (MACRO)                        Ccall _send_word_hex
2048    1945/    207D : (MACRO)                        ldaD R12,58; reg:acon
2049    1946/    2083 : (MACRO)                        Ccall _cout
2050    1947/    2086 : (MACRO)                        ld2z R7
2051    1948/    208A :                                L365:
2052    1949/    208A : (MACRO)                        ld2 R11,'D',(_dptr),0;reg: INDIRP2(addr)
2053    1950/    2094 : (MACRO)                        alu2 R11,R7,R11,add,adc
2054    1951/    20A0 : (MACRO)                        ld1 R12,'0',R11,0
2055    1952/    20AA : (MACRO)                        zExt R12 ;CVUI2: widen unsigned char to sign
2056    1953/    20AD : (MACRO)                        Ccall _send_hex
2057    1954/    20B0 : (MACRO)                        ldaD R12,32; reg:acon
2058    1955/    20B6 : (MACRO)                        Ccall _cout
2059    1956/    20B9 :                                L366:
2060    1957/    20B9 : (MACRO)                        incm R7,1
2061    1958/    20BA : (MACRO)                        jcI2I r7,16,lbnf,L365 ;LT=lbnf i.e. subtrac
2062    1959/    20CB : (MACRO)                        ldaD R12,32; reg:acon
2063    1960/    20D1 : (MACRO)                        Ccall _cout
2064    1961/    20D4 : (MACRO)                        ld2z R7
2065    1962/    20D8 :                                L369:
2066    1963/    20D8 : (MACRO)                        ld2 R11,'D',(_dptr),0;reg: INDIRP2(addr)
2067    1964/    20E2 : (MACRO)                        alu2 R11,R7,R11,add,adc
2068    1965/    20EE : (MACRO)                        ldn1 R11,R11;reg: INDIRU1(indaddr)
2069    1966/    20F0 : (MACRO)                        st1 R11,'D',(_q),0; ASGNU1
2070    1967/    20F8 : (MACRO)                        ld1 R11,'D',(_q),0
2071    1968/    2100 : (MACRO)                        zExt R11 ;CVUI2: widen unsigned char to sign
2072    1969/    2103 : (MACRO)                        jcI2I r11,32,lbnf,L373 ;LT=lbnf i.e. subtra
2073    1970/    2114 : (MACRO)                        jcI2I r11,128,lbnf,L373; GE is flipped test
2074    1971/    2125 : (MACRO)                        ld1 R12,'D',(_q),0
2075    1972/    212D : (MACRO)                        zExt R12 ;CVUI2: widen unsigned char to sign
2076    1973/    2130 : (MACRO)                        Ccall _cout
2077    1974/    2133 : C0 21 3F                        lbr L374
2078    1975/    2136 :                                L373:
2079    1976/    2136 : (MACRO)                        ldaD R12,46; reg:acon
2080

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2080
2080      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 34 - 7/16/2025 13:30:08
2081
2082
2083      1977/      213C : (MACRO)          Ccall _cout
2084      1978/      213F :                  L374:
2085      1979/      213F :                  L370:
2086      1980/      213F : (MACRO)          incm R7,1
2087      1981/      2140 : (MACRO)          jcI2I r7,16,lbmf,L369 ;LT=lbmf i.e. subtrac
2088      1982/      2151 : (MACRO)          ld2 R11,'D',(_dptr),0;reg: INDIRP2(addr)
2089      1983/      215B : (MACRO)          ldA2 R11,'0',R11,(16); reg:addr
2090      1984/      2163 : (MACRO)          st2 R11,'D',(_dptr),0; ASGNP2
2091      1985/      216E : (MACRO)          ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2092      1986/      2178 : (MACRO)          ldA2 R11,'0',R11,(16); reg:addr
2093      1987/      2180 : (MACRO)          st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
2094      1988/      218B :                  L362:
2095      1989/      218B : (MACRO)          incm R1,1
2096      1990/      218C : (MACRO)          jcI2I r1,16,lbmf,L361 ;LT=lbmf i.e. subtrac
2097      1991/      219D : (MACRO)          Ccall _newline
2098      1992/      21A0 : (MACRO)          Ccall _key_address
2099      1993/      21A3 :                  L358:
2100      1994/      21A3 :                  L357:
2101      1995/      21A3 : (MACRO)          release 4; release room for outgoing argumen
2102      1996/      21A7 : (MACRO)          popr r7
2103      1997/      21AB : (MACRO)          popr r1
2104      1998/      21AF : (MACRO)          release 0; release room for local variables
2105      1999/      21AF : (MACRO)          Cretn
2106      2000/      21B0 :
2107      2001/      21B0 :                  _nibble2hex:
2108      2002/      21B0 : (MACRO)          cpy1 R11,R12
2109      2003/      21B2 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2110      2004/      21B5 : (MACRO)          jcI2I r11,64,lbdf,L376; GE is flipped test f
2111      2005/      21C6 : (MACRO)          cpy1 R11,R12
2112      2006/      21C8 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2113      2007/      21CB : (MACRO)          alu2I R11,R11,48,smi,smbi
2114      2008/      21D3 : (MACRO)          cpy1 R15,R11
2115      2009/      21D5 : (MACRO)          zExt 15 ;CVUI2(reg): widen unsigned char to
2116      2010/      21D8 : C0 21 ED          lbr L375
2117      2011/      21DB :                  L376:
2118      2012/      21DB : (MACRO)          cpy1 R11,R12
2119      2013/      21DD : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2120      2014/      21E0 : (MACRO)          alu2I R11,R11,55,smi,smbi
2121      2015/      21E8 : (MACRO)          cpy1 R15,R11
2122      2016/      21EA : (MACRO)          zExt 15 ;CVUI2(reg): widen unsigned char to
2123      2017/      21ED :                  L375:
2124      2018/      21ED : (MACRO)          Cretn
2125      2019/      21EE :
2126      2020/      21EE :                  _gethex:
2127      2021/      21EE : (MACRO)          reserve 0; save room for local variables
2128      2022/      21EE : (MACRO)          pushr r1
2129      2023/      21F3 : (MACRO)          pushr r7
2130      2024/      21F8 : (MACRO)          reserve 4; save room for outgoing arguments
2131      2025/      21FC : (MACRO)          Ccall _cin
2132      2026/      21FF : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2133      2027/      2203 : (MACRO)          cpy1 R7,R11;LOADU1(reg)
2134      2028/      2205 : (MACRO)          Ccall _cin
2135      2029/      2208 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2136      2030/      220C : (MACRO)          cpy1 R1,R11;LOADU1(reg)
2137      2031/      220E : (MACRO)          cpy1 R12,R7
2138      2032/      2210 : (MACRO)          zExt 12 ;CVUI2(reg): widen unsigned char to
2139      2033/      2213 : (MACRO)          Ccall _nibble2hex
2140      2034/      2216 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2141      2035/      221A : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2142      2036/      221D : (MACRO)          shl2I R11,4
2143

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2143
2143 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 35 - 7/16/2025 13:30:08
2144
2145
2146      2037/      2235 : (MACRO)      cpy1 R7,R11;LOADU1(reg)
2147      2038/      2237 : (MACRO)      cpy1 R12,R1
2148      2039/      2239 : (MACRO)      zExt 12 ;CVUI2(reg): widen unsigned char to
2149      2040/      223C : (MACRO)      Ccall _nibble2hex
2150      2041/      223F : (MACRO)      cpy2 R11,R15 ;LOADI2(reg)*
2151      2042/      2243 : (MACRO)      cpy1 R1,R11;LOADU1(reg)
2152      2043/      2245 : (MACRO)      cpy1 R11,R7
2153      2044/      2247 : (MACRO)      zExt 11 ;CVUI2(reg): widen unsigned char to
2154      2045/      224A : (MACRO)      cpy1 R10,R1
2155      2046/      224C : (MACRO)      zExt 10 ;CVUI2(reg): widen unsigned char to
2156      2047/      224F : (MACRO)      alu2 R11,R11,R10,or,or
2157      2048/      225B : (MACRO)      cpy1 R7,R11;LOADU1(reg)
2158      2049/      225D : (MACRO)      ldaD R11,_bcc; reg:acon
2159      2050/      2263 : (MACRO)      ld1 R10,'D',(_bcc),0
2160      2051/      226B : (MACRO)      zExt R10 ;CVUI2: widen unsigned char to sign
2161      2052/      226E : (MACRO)      cpy1 R9,R7
2162      2053/      2270 : (MACRO)      zExt 9 ;CVUI2(reg): widen unsigned char to s
2163      2054/      2273 : (MACRO)      alu2 R10,R10,R9,add,adc; ADDI2(r,r)
2164      2055/      227F : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
2165      2056/      2281 : (MACRO)      ld2 R11,'D',(_gpio1),0;reg: INDIRP2(addr)
2166      2057/      228B : (MACRO)      str1 R7,R11; ASGNU1(indaddr,reg)
2167      2058/      228D : (MACRO)      cpy1 R15,R7
2168      2059/      228F : (MACRO)      zExt 15 ;CVUI2(reg): widen unsigned char to
2169      2060/      2292 :                L378:
2170      2061/      2292 : (MACRO)      release 4; release room for outgoing argumen
2171      2062/      2296 : (MACRO)      popr r7
2172      2063/      229A : (MACRO)      popr r1
2173      2064/      229E : (MACRO)      release 0; release room for local variables
2174      2065/      229E : (MACRO)      Cretn
2175      2066/      229F :
2176      2067/      229F :                _get16bitaddress:
2177      2068/      229F : (MACRO)      reserve 0; save room for local variables
2178      2069/      229F : (MACRO)      pushr r7
2179      2070/      22A4 : (MACRO)      reserve 4; save room for outgoing arguments
2180      2071/      22A8 : (MACRO)      ld2z R7
2181      2072/      22AC : (MACRO)      Ccall _gethex
2182      2073/      22AF : (MACRO)      cpy2 R11,R15 ;LOADI2(reg)*
2183      2074/      22B3 : (MACRO)      zExt 11 ;CVUI2(reg): widen unsigned char to
2184      2075/      22B6 : (MACRO)      alu2 R7,R7,R11,or,or
2185      2076/      22C2 : (MACRO)      shl2I R7,8
2186      2077/      22F2 : (MACRO)      Ccall _gethex
2187      2078/      22F5 : (MACRO)      cpy2 R11,R15 ;LOADI2(reg)*
2188      2079/      22F9 : (MACRO)      zExt 11 ;CVUI2(reg): widen unsigned char to
2189      2080/      22FC : (MACRO)      alu2 R7,R7,R11,or,or
2190      2081/      2308 : (MACRO)      cpy2 R15,R7 ;LOADI2(reg)*
2191      2082/      230C :                L379:
2192      2083/      230C : (MACRO)      release 4; release room for outgoing argumen
2193      2084/      2310 : (MACRO)      popr r7
2194      2085/      2314 : (MACRO)      release 0; release room for local variables
2195      2086/      2314 : (MACRO)      Cretn
2196      2087/      2315 :
2197      2088/      2315 :                _read_record1:
2198      2089/      2315 : (MACRO)      reserve 0; save room for local variables
2199      2090/      2315 : (MACRO)      pushr r1
2200      2091/      231A : (MACRO)      pushr r7
2201      2092/      231F : (MACRO)      reserve 4; save room for outgoing arguments
2202      2093/      2323 : (MACRO)      ldaD R11,0; reg:acon
2203      2094/      2329 : (MACRO)      st1 R11,'D',(_bcc_error),0; ASGNU1
2204      2095/      2331 :                L381:
2205      2096/      2331 : (MACRO)      ldaD R11,0; reg:acon
2206

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2206
2206      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 36 - 7/16/2025 13:30:08
2207
2208
2209      2097/      2337 : (MACRO)          st1 R11,'D',(_bcc),0; ASGNU1
2210      2098/      233F :                  L384:
2211      2099/      233F :                  L385:
2212      2100/      233F : (MACRO)          Ccall _cin
2213      2101/      2342 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2214      2102/      2346 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2215      2103/      2349 : (MACRO)          jneU2I r11,58,L384; NE
2216      2104/      2355 : (MACRO)          Ccall _gethex
2217      2105/      2358 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2218      2106/      235C : (MACRO)          cpy1 R1,R11;LOADU1(reg)
2219      2107/      235E : (MACRO)          Ccall _get16bitaddress
2220      2108/      2361 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2221      2109/      2365 : (MACRO)          st2 R11,'D',(_dptr),0; ASGNP2
2222      2110/      2370 : (MACRO)          Ccall _gethex
2223      2111/      2373 : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2224      2112/      2377 : (MACRO)          st1 R11,'D',(_record_type),0; ASGNU1
2225      2113/      237F : (MACRO)          ldaD R7,0; reg:acon
2226      2114/      2385 : C0 23 B4          lbr L390
2227      2115/      2388 :                  L387:
2228      2116/      2388 : (MACRO)          Ccall _gethex
2229      2117/      238B : (MACRO)          cpy2 R11,R15 ;LOADI2(reg)*
2230      2118/      238F : (MACRO)          cpy1 R10,R7
2231      2119/      2391 : (MACRO)          zExt 10 ;CVUI2(reg): widen unsigned char to
2232      2120/      2394 : (MACRO)          ld2 R9,'D',(_dptr),0;reg: INDIRP2(addr)
2233      2121/      239E : (MACRO)          alu2 R10,R10,R9,add,adc
2234      2122/      23AA : (MACRO)          str1 R11,R10; ASGNU1(indaddr,reg)
2235      2123/      23AC :                  L388:
2236      2124/      23AC : (MACRO)          cpy1 R11,R7
2237      2125/      23AE : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2238      2126/      23B1 : (MACRO)          incm R11,1
2239      2127/      23B2 : (MACRO)          cpy1 R7,R11;LOADU1(reg)
2240      2128/      23B4 :                  L390:
2241      2129/      23B4 : (MACRO)          cpy1 R11,R7
2242      2130/      23B6 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2243      2131/      23B9 : (MACRO)          cpy1 R10,R1
2244      2132/      23BB : (MACRO)          zExt 10 ;CVUI2(reg): widen unsigned char to
2245      2133/      23BE : (MACRO)          jcI2 r11,r10,lbmf,L387; LT=lbmf i.e. subtrac
2246      2134/      23D2 : (MACRO)          ld2 R11,'D',(_gpio1),0;reg: INDIRP2(addr)
2247      2135/      23DC : (MACRO)          ldaD R10,_bcc; reg:acon
2248      2136/      23E2 : (MACRO)          ldn1 R10,R10;reg: INDIRU1(indaddr)
2249      2137/      23E4 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
2250      2138/      23E6 :                  L382:
2251      2139/      23E6 : (MACRO)          ld1 R11,'D',(_record_type),0
2252      2140/      23EE : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
2253      2141/      23F1 : (MACRO)          jzU2 r11,L381; EQ 0
2254      2142/      23F9 :                  L380:
2255      2143/      23F9 : (MACRO)          release 4; release room for outgoing argumen
2256      2144/      23FD : (MACRO)          popr r7
2257      2145/      2401 : (MACRO)          popr r1
2258      2146/      2405 : (MACRO)          release 0; release room for local variables
2259      2147/      2405 : (MACRO)          Cretn
2260      2148/      2406 :
2261      2149/      2406 :                  _LcdReady:
2262      2150/      2406 : (MACRO)          ld2z R11
2263      2151/      240A : (MACRO)          st2 R11,'D',(_timeout),0; ASGNI2(addr,reg)*;
2264      2152/      2415 : C0 24 2E          lbr L393
2265      2153/      2418 :                  L392:
2266      2154/      2418 : (MACRO)          ld2 R11,'D',(_timeout),0 ;reg:INDIRI2(addr)
2267      2155/      2422 : (MACRO)          incm R11,1
2268      2156/      2423 : (MACRO)          st2 R11,'D',(_timeout),0; ASGNI2(addr,reg)*;
2269

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2269
2269      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 37 - 7/16/2025 13:30:08
2270
2271
2272      2157/      242E :      L393:
2273      2158/      242E : (MACRO)      ld2 R11,'D',(_LCD_crd),0;reg: INDIRP2(addr)
2274      2159/      2438 : (MACRO)      ld1 R11,'0',R11,0
2275      2160/      2442 : (MACRO)      zExt R11 ;CVUI2: widen unsigned char to sign
2276      2161/      2445 : (MACRO)      alu2I R11,R11,128,ani,ani
2277      2162/      244D :      ;removed ? cpy2 R11,R11
2278      2163/      244D : (MACRO)      jneU2I r11,1,L395; NE
2279      2164/      2459 : (MACRO)      ld2 R11,'D',(_timeout),0 ;reg:INDIRI2(addr)
2280      2165/      2463 : (MACRO)      jcI2I r11,5,lbnf,L392 ;LT=lbnf i.e. subtrac
2281      2166/      2474 :      L395:
2282      2167/      2474 :      L391:
2283      2168/      2474 : (MACRO)      Cretn
2284      2169/      2475 :
2285      2170/      2475 :      _clr_screen:
2286      2171/      2475 : (MACRO)      reserve 4
2287      2172/      2479 : (MACRO)      Ccall _LcdReady
2288      2173/      247C : (MACRO)      ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2289      2174/      2486 : (MACRO)      ldaD R10,1; reg:acon
2290      2175/      248C : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
2291      2176/      248E :      L396:
2292      2177/      248E : (MACRO)      release 4
2293      2178/      2492 : (MACRO)      Cretn
2294      2179/      2493 :
2295      2180/      2493 :      _goto_xy:
2296      2181/      2493 : (MACRO)      reserve 4
2297      2182/      2497 : (MACRO)      st2 r12,'0',sp,(6); flag1
2298      2183/      24A4 : (MACRO)      st2 r13,'0',sp,(8); flag1
2299      2184/      24B1 : (MACRO)      Ccall _LcdReady
2300      2185/      24B4 : (MACRO)      ld2 R11,'0',sp,(2+6) ;reg:INDIRI2(addr)
2301      2186/      24C0 : (MACRO)      jcI2I r11,0,lbnf,L398 ;LT=lbnf i.e. subtrac
2302      2187/      24D1 : (MACRO)      jnI2I r11,3,lbnf,L398; GT reverse the subtr
2303      2188/      24E2 : (MACRO)      shl2I R11,1
2304      2189/      24E8 : (MACRO)      ld2 R11,'0',R11,(L404);reg: INDIRP2(addr)
2305      2190/      24F4 : (MACRO)      jumpv r11; JUMPV(reg)
2306      2191/      24FE :      L404:
2307      2192/      24FE : 25 06      dw L400
2308      2193/      2500 : 25 29      dw L401
2309      2194/      2502 : 25 4C      dw L402
2310      2195/      2504 : 25 6F      dw L403
2311      2196/      2506 :      L400:
2312      2197/      2506 : (MACRO)      ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2313      2198/      2510 : (MACRO)      ld2 R10,'0',sp,(0+6) ;reg:INDIRI2(addr)
2314      2199/      251C : (MACRO)      lda2 R10,'0',R10,(128); reg:addr
2315      2200/      2524 : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
2316      2201/      2526 : C0 25 8F      lbr L399
2317      2202/      2529 :      L401:
2318      2203/      2529 : (MACRO)      ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2319      2204/      2533 : (MACRO)      ld2 R10,'0',sp,(0+6) ;reg:INDIRI2(addr)
2320      2205/      253F : (MACRO)      lda2 R10,'0',R10,(192); reg:addr
2321      2206/      2547 : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
2322      2207/      2549 : C0 25 8F      lbr L399
2323      2208/      254C :      L402:
2324      2209/      254C : (MACRO)      ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2325      2210/      2556 : (MACRO)      ld2 R10,'0',sp,(0+6) ;reg:INDIRI2(addr)
2326      2211/      2562 : (MACRO)      lda2 R10,'0',R10,(148); reg:addr
2327      2212/      256A : (MACRO)      str1 R10,R11; ASGNU1(indaddr,reg)
2328      2213/      256C : C0 25 8F      lbr L399
2329      2214/      256F :      L403:
2330      2215/      256F : (MACRO)      ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2331      2216/      2579 : (MACRO)      ld2 R10,'0',sp,(0+6) ;reg:INDIRI2(addr)
2332

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2332
2332    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 38 - 7/16/2025 13:30:08
2333
2334
2335    2217/    2585 : (MACRO)          ldA2 R10,'0',R10,(212); reg:addr
2336    2218/    258D : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
2337    2219/    258F :                   L398:
2338    2220/    258F :                   L399:
2339    2221/    258F :                   L397:
2340    2222/    258F : (MACRO)          release 4
2341    2223/    2593 : (MACRO)          Cretn
2342    2224/    2594 :
2343    2225/    2594 :                   _InitLcd:
2344    2226/    2594 : (MACRO)          reserve 4
2345    2227/    2598 : (MACRO)          Ccall _LcdReady
2346    2228/    259B : (MACRO)          ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2347    2229/    25A5 : (MACRO)          ldaD R10,56; reg:acon
2348    2230/    25AB : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
2349    2231/    25AD : (MACRO)          Ccall _LcdReady
2350    2232/    25B0 : (MACRO)          ld2 R11,'D',(_LCD_cwr),0;reg: INDIRP2(addr)
2351    2233/    25BA : (MACRO)          ldaD R10,12; reg:acon
2352    2234/    25C0 : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
2353    2235/    25C2 : (MACRO)          Ccall _clr_screen
2354    2236/    25C5 : (MACRO)          ld2z R11
2355    2237/    25C9 : (MACRO)          cpy2 R12,R11 ;LOADI2(reg)*
2356    2238/    25CD : (MACRO)          cpy2 R13,R11 ;LOADI2(reg)*
2357    2239/    25D1 : (MACRO)          Ccall _goto_xy
2358    2240/    25D4 : (MACRO)          ldaD R12,100; reg:acon
2359    2241/    25DA : (MACRO)          Ccall _delay_ms
2360    2242/    25DD :                   L405:
2361    2243/    25DD : (MACRO)          release 4
2362    2244/    25E1 : (MACRO)          Cretn
2363    2245/    25E2 :
2364    2246/    25E2 :                   _PutLCD:
2365    2247/    25E2 : (MACRO)          reserve 0; save room for local variables
2366    2248/    25E2 : (MACRO)          pushr r1
2367    2249/    25E7 : (MACRO)          pushr r7
2368    2250/    25EC : (MACRO)          reserve 4; save room for outgoing arguments
2369    2251/    25F0 : (MACRO)          cpy2 r7,r12; function(2055) 1
2370    2252/    25F4 : (MACRO)          ldaD R1,0; reg:acon
2371    2253/    25FA : C0 26 27          lbr L410
2372    2254/    25FD :                   L407:
2373    2255/    25FD : (MACRO)          Ccall _LcdReady
2374    2256/    2600 : (MACRO)          ld2 R11,'D',(_LCD_dwr),0;reg: INDIRP2(addr)
2375    2257/    260A : (MACRO)          cpy1 R10,R1
2376    2258/    260C : (MACRO)          zExt 10 ;CVUI2(reg): widen unsigned char to
2377    2259/    260F : (MACRO)          alu2 R10,R10,R7,add,adc
2378    2260/    261B : (MACRO)          ldn1 R10,R10;reg: INDIRU1(indaddr)
2379    2261/    261D : (MACRO)          str1 R10,R11; ASGNU1(indaddr,reg)
2380    2262/    261F :                   L408:
2381    2263/    261F : (MACRO)          cpy1 R11,R1
2382    2264/    2621 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2383    2265/    2624 : (MACRO)          incm R11,1
2384    2266/    2625 : (MACRO)          cpy1 R1,R11;LOADU1(reg)
2385    2267/    2627 :                   L410:
2386    2268/    2627 : (MACRO)          cpy1 R11,R1
2387    2269/    2629 : (MACRO)          zExt 11 ;CVUI2(reg): widen unsigned char to
2388    2270/    262C : (MACRO)          alu2 R11,R11,R7,add,adc
2389    2271/    2638 : (MACRO)          ld1 R11,'0',R11,0
2390    2272/    2642 : (MACRO)          zExt R11 ;CVUI2: widen unsigned char to sign
2391    2273/    2645 : (MACRO)          jnzU2 r11,L407; NE 0
2392    2274/    264D :                   L406:
2393    2275/    264D : (MACRO)          release 4; release room for outgoing argumen
2394    2276/    2651 : (MACRO)          popr r7
2395

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2395
2395      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 39 - 7/16/2025 13:30:08
2396
2397
2398      2277/      2655 : (MACRO)      popr r1
2399      2278/      2659 : (MACRO)      release 0; release room for local variables
2400      2279/      2659 : (MACRO)      Cretn
2401      2280/      265A :
2402      2281/      265A :      _putch_lcd:
2403      2282/      265A : (MACRO)      reserve 4
2404      2283/      265E : (MACRO)      st2 r12, '0', sp, (6); flag1
2405      2284/      266B : (MACRO)      ld2 R11, '0', sp, (0+6) ;reg:INDIRI2(addr)
2406      2285/      2677 : (MACRO)      st1 R11, '0', sp, (0+6); ASGNU1
2407      2286/      2681 : (MACRO)      Ccall _LcdReady
2408      2287/      2684 : (MACRO)      ld2 R11, 'D', (_LCD_dwr), 0;reg: INDIRP2(addr)
2409      2288/      268E : (MACRO)      ld1 R10, '0', sp, (0+6)
2410      2289/      2698 : (MACRO)      str1 R10, R11; ASGNU1(indaddr, reg)
2411      2290/      269A :      L411:
2412      2291/      269A : (MACRO)      release 4
2413      2292/      269E : (MACRO)      Cretn
2414      2293/      269F :
2415      2294/      269F :      _service_break:
2416      2295/      2756 :      org 2756h
2417      2296/      2756 : A2      plo r2      ; save D first
2418      2297/      2757 : (MACRO)      ldAD r1, _USER_D
2419      2298/      275D : 82      glo r2
2420      2299/      275E : 51      str r1
2421      2300/      275F : (MACRO)      ldAD r1, _USER_R3
2422      2301/      2765 : 93      ghi r3
2423      2302/      2766 : 51      str r1
2424      2303/      2767 : 11      inc r1
2425      2304/      2768 : 83      glo r3
2426      2305/      2769 : 51      str r1
2427      2306/      276A : (MACRO)      ldAD r1, _USER_R4
2428      2307/      2770 : 94      ghi r4
2429      2308/      2771 : 51      str r1
2430      2309/      2772 : 11      inc r1
2431      2310/      2773 : 84      glo r4
2432      2311/      2774 : 51      str r1
2433      2312/      2775 : (MACRO)      ldAD r1, _USER_R5
2434      2313/      277B : 95      ghi r5
2435      2314/      277C : 51      str r1
2436      2315/      277D : 11      inc r1
2437      2316/      277E : 85      glo r5
2438      2317/      277F : 51      str r1
2439      2318/      2780 : (MACRO)      ldAD r1, _USER_R6
2440      2319/      2786 : 96      ghi r6
2441      2320/      2787 : 51      str r1
2442      2321/      2788 : 11      inc r1
2443      2322/      2789 : 86      glo r6
2444      2323/      278A : 51      str r1
2445      2324/      278B : (MACRO)      ldAD r1, _USER_R7
2446      2325/      2791 : 97      ghi r7
2447      2326/      2792 : 51      str r1
2448      2327/      2793 : 11      inc r1
2449      2328/      2794 : 87      glo r7
2450      2329/      2795 : 51      str r1
2451      2330/      2796 : (MACRO)      ldAD r1, _USER_R8
2452      2331/      279C : 98      ghi r8
2453      2332/      279D : 51      str r1
2454      2333/      279E : 11      inc r1
2455      2334/      279F : 88      glo r8
2456      2335/      27A0 : 51      str r1
2457      2336/      27A1 : (MACRO)      ldAD r1, _USER_R9
2458

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2458
2458      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 40 - 7/16/2025 13:30:08
2459
2460
2461      2337/      27A7 : 99          ghi r9
2462      2338/      27A8 : 51          str r1
2463      2339/      27A9 : 11          inc r1
2464      2340/      27AA : 89          glo r9
2465      2341/      27AB : 51          str r1
2466      2342/      27AC : (MACRO)     ldAD r1, _USER_R10
2467      2343/      27B2 : 9A          ghi r10
2468      2344/      27B3 : 51          str r1
2469      2345/      27B4 : 11          inc r1
2470      2346/      27B5 : 8A          glo r10
2471      2347/      27B6 : 51          str r1
2472      2348/      27B7 : (MACRO)     ldAD r1, _USER_R11
2473      2349/      27BD : 9B          ghi r11
2474      2350/      27BE : 51          str r1
2475      2351/      27BF : 11          inc r1
2476      2352/      27C0 : 8B          glo r11
2477      2353/      27C1 : 51          str r1
2478      2354/      27C2 : (MACRO)     ldAD r1, _USER_R12
2479      2355/      27C8 : 9C          ghi r12
2480      2356/      27C9 : 51          str r1
2481      2357/      27CA : 11          inc r1
2482      2358/      27CB : 8C          glo r12
2483      2359/      27CC : 51          str r1
2484      2360/      27CD : (MACRO)     ldAD r1, _USER_R13
2485      2361/      27D3 : 9D          ghi r13
2486      2362/      27D4 : 51          str r1
2487      2363/      27D5 : 11          inc r1
2488      2364/      27D6 : 8D          glo r13
2489      2365/      27D7 : 51          str r1
2490      2366/      27D8 : (MACRO)     ldAD r1, _USER_R14
2491      2367/      27DE : 9E          ghi r14
2492      2368/      27DF : 51          str r1
2493      2369/      27E0 : 11          inc r1
2494      2370/      27E1 : 8E          glo r14
2495      2371/      27E2 : 51          str r1
2496      2372/      27E3 : (MACRO)     ldAD r1, _USER_R15
2497      2373/      27E9 : 9F          ghi r15
2498      2374/      27EA : 51          str r1
2499      2375/      27EB : 11          inc r1
2500      2376/      27EC : 8F          glo r15
2501      2377/      27ED : 51          str r1
2502      2378/      27EE : C0 00 00    lbr 0      ; return to system monitor
2503      2379/      27F1 :              L412:
2504      2380/      27F1 : (MACRO)     Cretn
2505      2381/      27F2 :
2506      2382/      27F2 :              _load_user_subroutines:
2507      2383/      27F2 : (MACRO)     ldaD R11,0xf000; reg:acon
2508      2384/      27F8 : (MACRO)     st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
2509      2385/      2803 : (MACRO)     ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2510      2386/      280D : (MACRO)     st2 R11,'D',(_dptr),0; ASGNP2
2511      2387/      2818 : (MACRO)     ld2z R11
2512      2388/      281C : (MACRO)     st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
2513      2389/      2827 :              L415:
2514      2390/      2827 : (MACRO)     ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
2515      2391/      2831 : (MACRO)     ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
2516      2392/      283B : (MACRO)     alu2 R10,R11,R10,add,adc
2517      2393/      2847 : (MACRO)     ld1 R11,'0',R11,(_user_delay)
2518      2394/      2851 : (MACRO)     str1 R11,R10; ASGNU1(indaddr,reg)
2519      2395/      2853 :              L416:
2520      2396/      2853 : (MACRO)     ld2 R11,'D',(_i),0 ;reg:INDIRI2(addr)
2521
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2521
2521    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 41 - 7/16/2025 13:30:08
2522
2523
2524    2397/    285D : (MACRO)                incm R11,1
2525    2398/    285E : (MACRO)                st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
2526    2399/    2869 : (MACRO)                ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
2527    2400/    2873 : (MACRO)                jcI2I r11,17,lnbf,L415 ;LT=lnbf i.e. subtra
2528    2401/    2884 : (MACRO)                ldaD R11,0xf020; reg:acon
2529    2402/    288A : (MACRO)                st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
2530    2403/    2895 : (MACRO)                ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2531    2404/    289F : (MACRO)                st2 R11,'D',(_dptr),0; ASGNP2
2532    2405/    28AA : (MACRO)                ld2z R11
2533    2406/    28AE : (MACRO)                st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
2534    2407/    28B9 : C0 28 FE                lbr L422
2535    2408/    28BC :
2536    2409/    28BC : (MACRO)                L419:
2537    2410/    28C6 : (MACRO)                ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
2538    2411/    28D0 : (MACRO)                ld2 R10,'D',(_dptr),0;reg: INDIRP2(addr)
2539    2412/    28DC : (MACRO)                alu2 R10,R11,R10,add,adc
2540    2413/    28E6 : (MACRO)                ld1 R11,'0',R11,(_interrupt_test)
2541    2414/    28E8 : (MACRO)                str1 R11,R10; ASGNU1(indaddr,reg)
2542    2415/    28E8 : (MACRO)                L420:
2543    2416/    28F2 : (MACRO)                ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
2544    2417/    28F3 : (MACRO)                incm R11,1
2545    2418/    28FE : (MACRO)                st2 R11,'D',(_i),0; ASGNI2(addr,reg)*;
2546    2419/    28FE : (MACRO)                L422:
2547    2420/    2908 : (MACRO)                ld2 R11,'D',(_i),0;reg:INDIRI2(addr)
2548    2421/    290C : (MACRO)                cpy2 RL10,R11
2549    2422/    2917 : (MACRO)                sext4 RL10; CVIU4
2550    2423/    2923 : (MACRO)                ldI4 RL8,41 ;loading a long unsigned constan
2551    2424/    2938 : (MACRO)                jcU4 rL10,rL8,lnbf,L419; LT=lnbf i.e. subtra
2552    2425/    2938 : (MACRO)                L414:
2553    2426/    2939 : (MACRO)                Cretn
2554    2427/    2939 : (MACRO)                _main:
2555    2428/    2939 : (MACRO)                reserve 4
2556    2429/    293D : (MACRO)                ld2 R11,'D',(_segment),0;reg: INDIRP2(addr)
2557    2430/    2947 : (MACRO)                ldaD R10,0; reg:acon
2558    2431/    294D : (MACRO)                str1 R10,R11; ASGNU1(indaddr,reg)
2559    2432/    294F : (MACRO)                ld2 R11,'D',(_digit),0;reg: INDIRP2(addr)
2560    2433/    2959 : (MACRO)                ldaD R10,255; reg:acon
2561    2434/    295F : (MACRO)                str1 R10,R11; ASGNU1(indaddr,reg)
2562    2435/    2961 : (MACRO)                ld2 R11,'D',(_gpio1),0;reg: INDIRP2(addr)
2563    2436/    296B : (MACRO)                ldaD R10,0; reg:acon
2564    2437/    2971 : (MACRO)                str1 R10,R11; ASGNU1(indaddr,reg)
2565    2438/    2973 : (MACRO)                ld2 R11,'D',(_tick),0;reg: INDIRP2(addr)
2566    2439/    297D : (MACRO)                ldaD R10,0; reg:acon
2567    2440/    2983 : (MACRO)                str1 R10,R11; ASGNU1(indaddr,reg)
2568    2441/    2985 : (MACRO)                ldaD R11,0; reg:acon
2569    2442/    298B : (MACRO)                st1 R11,'D',(_state),0; ASGNU1
2570    2443/    2993 : (MACRO)                Ccall _init_8250
2571    2444/    2996 : (MACRO)                Ccall _InitLcd
2572    2445/    2999 : (MACRO)                ld2 RL10,'D',(_warm),0
2573    2446/    29A3 : (MACRO)                zext4 RL10 ;CVUI4: widen unsigned int to sig
2574    2447/    29A7 : (MACRO)                ldI4 RL8,43690 ;loading a long integer const
2575    2448/    29B3 : (MACRO)                jeqI4 rL10,rL8,L424
2576    2449/    29D7 : (MACRO)                ldaD R11,0; reg:acon
2577    2450/    29DD : (MACRO)                st1 R11,'D',(_flag),0; ASGNU1
2578    2451/    29E5 : (MACRO)                ldaD R11,0xaaaa; reg:acon
2579    2452/    29EB : (MACRO)                st2 R11,'D',(_warm),0; ASGNU2(addr,reg)*
2580    2453/    29F6 : (MACRO)                Ccall _blink_q
2581    2454/    29F9 : (MACRO)                L424:
2582    2455/    29F9 : (MACRO)                ldaD R11,0x8000; reg:acon
2583    2456/    29FF : (MACRO)                st2 R11,'D',(_PC),0; ASGNU2(addr,reg)*
2584

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2584
2584      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 42 - 7/16/2025 13:30:08
2585
2586
2587      2457/      2A0A : (MACRO)          st2 R11,'D',(_save_PC),0; ASGNU2(addr,reg)*
2588      2458/      2A15 : (MACRO)          Ccall _load_user_subroutines
2589      2459/      2A18 : (MACRO)          ld2 R11,'D',(_PC),0; reg:INDIRU2(addr)
2590      2460/      2A22 : (MACRO)          st2 R11,'D',(_dptr),0; ASGNP2
2591      2461/      2A2D : (MACRO)          ldaD R12,_text2; reg:acon
2592      2462/      2A33 : (MACRO)          Ccall _PutLCD
2593      2463/      2A36 : (MACRO)          ld2z R12
2594      2464/      2A3A : (MACRO)          ldaD R13,1; reg:acon
2595      2465/      2A40 : (MACRO)          Ccall _goto_xy
2596      2466/      2A43 : (MACRO)          ldaD R12,_text3; reg:acon
2597      2467/      2A49 : (MACRO)          Ccall _PutLCD
2598      2468/      2A4C : (MACRO)          ldaD R12,_text1; reg:acon
2599      2469/      2A52 : (MACRO)          Ccall _pstr
2600      2470/      2A55 : (MACRO)          ldaD R11,0; reg:acon
2601      2471/      2A5B : (MACRO)          st1 R11,'D',(_buffer),0; ASGNU1
2602      2472/      2A63 : (MACRO)          st1 R11,'D',(_buffer+1),0; ASGNU1
2603      2473/      2A6B : (MACRO)          ldaD R11,155; reg:acon
2604      2474/      2A71 : (MACRO)          st1 R11,'D',(_buffer+2),0; ASGNU1
2605      2475/      2A79 : (MACRO)          ldaD R11,189; reg:acon
2606      2476/      2A7F : (MACRO)          st1 R11,'D',(_buffer+3),0; ASGNU1
2607      2477/      2A87 : (MACRO)          ldaD R11,191; reg:acon
2608      2478/      2A8D : (MACRO)          st1 R11,'D',(_buffer+4),0; ASGNU1
2609      2479/      2A95 : (MACRO)          ldaD R11,48; reg:acon
2610      2480/      2A9B : (MACRO)          st1 R11,'D',(_buffer+5),0; ASGNU1
2611      2481/      2AA3 : C0 2A A9          lbr L432
2612      2482/      2AA6 :                  L431:
2613      2483/      2AA6 : (MACRO)          Ccall _scan1
2614      2484/      2AA9 :                  L432:
2615      2485/      2AA9 : C0 2A A6          lbr L431
2616      2486/      2AAC :                  L423:
2617      2487/      2AAC : (MACRO)          release 4
2618      2488/      2AB0 : (MACRO)          Cretn
2619      2489/      2AB1 :
2620      2490/      2AB1 :
2621      2491/      2AB1 : =2AB1H          _setRAM:
2622      2492/      FE00 :                  ROM_END1: EQU $
2623      2493/      FE00 :                  org 0fe00h
2624      2494/      FE00 : (MACRO)          L434:
2625      2495/      FE01 :                  Cretn
2626      2496/      FE01 :
2627      2497/      FE01 : 00 00          _user_r15:
2628      2498/      FE03 :                  db 2 dup (0); zerofill global
2629      2499/      FE03 : 00 00          _user_r14:
2630      2500/      FE05 :                  db 2 dup (0); zerofill global
2631      2501/      FE05 : 00 00          _user_r13:
2632      2502/      FE07 :                  db 2 dup (0); zerofill global
2633      2503/      FE07 : 00 00          _user_r12:
2634      2504/      FE09 :                  db 2 dup (0); zerofill global
2635      2505/      FE09 : 00 00          _user_r11:
2636      2506/      FE0B :                  db 2 dup (0); zerofill global
2637      2507/      FE0B : 00 00          _user_r10:
2638      2508/      FE0D :                  db 2 dup (0); zerofill global
2639      2509/      FE0D : 00 00          _user_r9:
2640      2510/      FE0F :                  db 2 dup (0); zerofill global
2641      2511/      FE0F : 00 00          _user_r8:
2642      2512/      FE11 :                  db 2 dup (0); zerofill global
2643      2513/      FE11 : 00 00          _user_r7:
2644      2514/      FE13 :                  db 2 dup (0); zerofill global
2645      2515/      FE13 : 00 00          _user_r6:
2646      2516/      FE15 :                  db 2 dup (0); zerofill global
2647      2516/      FE15 :                  _user_r5:

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2647
2647    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 43 - 7/16/2025 13:30:08
2648
2649
2650    2517/    FE15 : 00 00                db 2 dup (0); zerofill global
2651    2518/    FE17 :                _user_r4:
2652    2519/    FE17 : 00 00                db 2 dup (0); zerofill global
2653    2520/    FE19 :                _user_r3:
2654    2521/    FE19 : 00 00                db 2 dup (0); zerofill global
2655    2522/    FE1B :                _user_xp:
2656    2523/    FE1B : 00                db 1 dup (0); zerofill global
2657    2524/    FE1C :                _user_df:
2658    2525/    FE1C : 00                db 1 dup (0); zerofill global
2659    2526/    FE1D :                _user_d:
2660    2527/    FE1D : 00                db 1 dup (0); zerofill global
2661    2528/    FE1E :                _dptr2:
2662    2529/    FE1E : 00 00                db 2 dup (0); zerofill global
2663    2530/    FE20 :                _dptr:
2664    2531/    FE20 : 00 00                db 2 dup (0); zerofill global
2665    2532/    FE22 :                _x:
2666    2533/    FE22 : 00                db 1 dup (0); zerofill global
2667    2534/    FE23 :                _state:
2668    2535/    FE23 : 00                db 1 dup (0); zerofill global
2669    2536/    FE24 :                _save_PC:
2670    2537/    FE24 : 00 00                db 2 dup (0); zerofill global
2671    2538/    FE26 :                _PC:
2672    2539/    FE26 : 00 00                db 2 dup (0); zerofill global
2673    2540/    FE28 :                _desti:
2674    2541/    FE28 : 00 00                db 2 dup (0); zerofill global
2675    2542/    FE2A :                _end:
2676    2543/    FE2A : 00 00                db 2 dup (0); zerofill global
2677    2544/    FE2C :                _start:
2678    2545/    FE2C : 00 00                db 2 dup (0); zerofill global
2679    2546/    FE2E :                _num:
2680    2547/    FE2E : 00 00                db 2 dup (0); zerofill global
2681    2548/    FE30 :                _timeout:
2682    2549/    FE30 : 00 00                db 2 dup (0); zerofill global
2683    2550/    FE32 :                _temp16:
2684    2551/    FE32 : 00 00                db 2 dup (0); zerofill global
2685    2552/    FE34 :                _buffer:
2686    2553/    FE34 : 00 00 00 00 00 00    db 6 dup (0); zerofill global
2687    2554/    FE3A :                _key_pressed:
2688    2555/    FE3A : 00                db 1 dup (0); zerofill global
2689    2556/    FE3B :                _key:
2690    2557/    FE3B : 00                db 1 dup (0); zerofill global
2691    2558/    FE3C :                _q:
2692    2559/    FE3C : 00                db 1 dup (0); zerofill global
2693    2560/    FE3D :                _o:
2694    2561/    FE3D : 00                db 1 dup (0); zerofill global
2695    2562/    FE3E :                _record_type:
2696    2563/    FE3E : 00                db 1 dup (0); zerofill global
2697    2564/    FE3F :                _bcc_error:
2698    2565/    FE3F : 00                db 1 dup (0); zerofill global
2699    2566/    FE40 :                _save_bcc:
2700    2567/    FE40 : 00                db 1 dup (0); zerofill global
2701    2568/    FE41 :                _bcc:
2702    2569/    FE41 : 00                db 1 dup (0); zerofill global
2703    2570/    FE42 :                _flag:
2704    2571/    FE42 : 00                db 1 dup (0); zerofill global
2705    2572/    FE43 :                _warm:
2706    2573/    FE43 : 00 00                db 2 dup (0); zerofill global
2707    2574/    FE45 :                _temp:
2708    2575/    FE45 : 00 00                db 2 dup (0); zerofill global
2709    2576/    FE47 :                _k:
2710
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2710
2711 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 44 - 7/16/2025 13:30:08
2712
2713      2577/    FE47 : 00 00          db 2 dup (0); zerofill global
2714      2578/    FE49 :          _j:
2715      2579/    FE49 : 00 00          db 2 dup (0); zerofill global
2716      2580/    FE4B :          _i:
2717      2581/    FE4B : 00 00          db 2 dup (0); zerofill global
2718      2582/    FE4D :          _hit:
2719      2583/    FE4D : 00            db 1 dup (0); zerofill global
2720      2584/    FE4E :          _t:
2721      2585/    FE4E : 00            db 1 dup (0); zerofill global
2722      2586/    FE4F :          _c:
2723      2587/    FE4F : 00            db 1 dup (0); zerofill global
2724      2588/    FE50 :          _n:
2725      2589/    FE50 : 00            db 1 dup (0); zerofill global
2726      2590/    FE51 :          include lcc1802Epilofl.inc
2727      (1) 1/    FE51 :          ;lcc1802Epilog.inc initialization and runtime
2728      (1) 2/    FE51 :          ;Dec 21 2012 - out5/putc moved to separate p
2729      (1) 3/    FE51 :          ;this is the version published with the lcc18
2730      (1) 4/    FE51 :          ;jan 1 2013 incleasing stack beginning lcatic
2731      (1) 5/    FE51 :          ;jan 2 removed test routines, moved code not
2732      (1) 6/    FE51 :          ;jan 11 going back to SCRT conventions for NC
2733      (1) 7/    FE51 :          ;Jan 21 adding _mulu4 32 bit multiplication
2734      (1) 8/    FE51 :          ;Jan 28 archived before beginning work on Bin
2735      (1) 9/    FE51 :          ;Feb 5 dubdab algorithm being brought in for
2736      (1) 10/   FE51 :          ;Feb 12 fixed bugs in modi2/u2
2737      (1) 11/   FE51 :          ;feb 27 changed stack to start at 7fff
2738      (1) 12/   FE51 :          ;mar 3, 2013 saved as epiloNO for optimizati
2739      (1) 13/   FE51 :          ;mar 28,2013 - LCCepilofl.inc changes scrt to
2740      (1) 14/   FE51 :          ;april 4 adding digit count argument to dubd
2741      (1) 15/   FE51 :
2742      (1) 16/   FE51 :          ;September 2018, add disbale interrupt, set
2743      (1) 17/   FE51 :          ;
2744      (1) 18/   FE51 :          ;
2745      (1) 19/   FE51 :
2746      (1) 20/   FE51 :
2747      (1) 21/   FE51 :
2748      (1) 22/   2ABB :          segment code
2749      (1) 23/   2ABB :          org ROM_END1+10 ; continue code segment
2750      (1) 24/   2ABB :
2751      (1) 25/   2ABB : =EH          rwork equ memAddr ;work register
2752      (1) 26/   2ABB :
2753      (1) 27/   2ABB :
2754      (1) 28/   2ABB :          lcc1802init:
2755      (1) 29/   2ABB :
2756      (1) 30/   2ABB : E0          sex r0 ; disable interrupt Wichit
2757      (1) 31/   2ABC : 71          dis
2758      (1) 32/   2ABD : 00          db 0
2759      (1) 33/   2ABE :
2760      (1) 34/   2ABE : (MACRO)      ldiReg RCALL,_call
2761      (1) 35/   2AC4 : (MACRO)      ldiReg RRET,_return
2762      (1) 36/   2ACA : (MACRO)      ldiReg SP,0xfff0;wjr jan 1 start stack at hi
2763      (1) 37/   2AD0 : E2          sex SP
2764      (1) 38/   2AD1 : (MACRO)      ldiReg RPC,$$_00000
2765      (1) 39/   2AD7 : D3          sep RPC
2766      (1) 40/   2AD8 :          $$$_00000:
2767      (1) 41/   2AD8 : (MACRO)      Ccall _main ;call the main routine
2768      (1) 42/   2ADB : C0 2A DB      $$$_die:lbr $$$_die ;loop here when main retur
2769      (1) 43/   2ADE : DE AD          db 0xde,0xad
2770      (1) 44/   2AE0 :
2771      (1) 45/   2AE0 :          ;the following routines don't have short jump
2772      (1) 46/   2AE0 :          _setqOn:
2773

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2773
2773      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 45 - 1
2774
2775
2776      (1) 47/      2AE0 : 7B                      seq
2777      (1) 48/      2AE1 : (MACRO)                  Cretn
2778      (1) 49/      2AE2 :                          _setqOff:
2779      (1) 50/      2AE2 : 7A                      req
2780      (1) 51/      2AE3 : (MACRO)                  Cretn
2781      (1) 52/      2AE4 :
2782      (1) 53/      2AE4 :                          _modU2;;16 bit unsigned remainder
2783      (1) 54/      2AE4 :                          ; just calls the 16 bit division then puts r
2784      (1) 55/      2AE4 : (MACRO)                  Ccall _divU2
2785      (1) 56/      2AE7 : 8D                      glo regArg2
2786      (1) 57/      2AE8 : AF                      plo retVal
2787      (1) 58/      2AE9 : 9D                      ghi regArg2
2788      (1) 59/      2AEA : BF                      phi retVal
2789      (1) 60/      2AEB : (MACRO)                  Cretn
2790      (1) 61/      2AEC :
2791      (1) 62/      2AEC :                          _modI2;;16 bit signed remainder
2792      (1) 63/      2AEC :                          ; just calls the 16 bit division then puts r
2793      (1) 64/      2AEC : (MACRO)                  Ccall _divI2
2794      (1) 65/      2AEF : 8D                      glo regArg2
2795      (1) 66/      2AF0 : AF                      plo retVal
2796      (1) 67/      2AF1 : 9D                      ghi regArg2
2797      (1) 68/      2AF2 : BF                      phi retVal
2798      (1) 69/      2AF3 : (MACRO)                  Cretn
2799      (1) 70/      2AF4 :
2800      (1) 71/      2AF4 :                          _out4:
2801      (1) 72/      2AF4 : 8C                      glo regArg1
2802      (1) 73/      2AF5 : 22                      dec sp
2803      (1) 74/      2AF6 : 52                      str sp
2804      (1) 75/      2AF7 : 64                      out 4
2805      (1) 76/      2AF8 : (MACRO)                  Cretn
2806      (1) 77/      2AF9 :
2807      (1) 78/      2AF9 :                          ;the following routines have short branches :
2808      (1) 79/      2AF9 :                          align 256
2809      (1) 80/      2B00 :                          ;non-standard Call routine invoked as D4xxxx
2810      (1) 81/      2B00 :                          ;requires programs to save the return address
2811      (1) 82/      2B00 :                          ;Standard Call routine invoked as D4xxxx - b:
2812      (1) 83/      2B00 : D3                      sep      R3 ;go to subroutine
2813      (1) 84/      2B01 : E2                      _call sex SP ;make sure X=SP
2814      (1) 85/      2B02 : 86                      glo retAddr ;save previous return pointer on
2815      (1) 86/      2B03 : 22                      dec sp
2816      (1) 87/      2B04 : 73                      stxd
2817      (1) 88/      2B05 : 96                      ghi retAddr
2818      (1) 89/      2B06 : 52                      str sp
2819      (1) 90/      2B07 : 83                      glo RPC ;copy old PC to retAddr
2820      (1) 91/      2B08 : A6                      plo retAddr
2821      (1) 92/      2B09 : 93                      ghi RPC
2822      (1) 93/      2B0A : B6                      phi retAddr
2823      (1) 94/      2B0B : 46                      lda retAddr ;pick up subroutine address into
2824      (1) 95/      2B0C : B3                      phi RPC
2825      (1) 96/      2B0D : 46                      lda retAddr
2826      (1) 97/      2B0E : A3                      plo RPC
2827      (1) 98/      2B0F : 30 00                  br _call-1
2828      (1) 99/      2B11 :
2829      (1) 100/     2B11 :                          ;Standard subroutine return
2830      (1) 101/     2B11 : D3                      sep RPC ;return to the original program
2831      (1) 102/     2B12 : 86                      _returnglo retAddr ;transfer the current retu
2832      (1) 103/     2B13 : A3                      plo RPC
2833      (1) 104/     2B14 : 96                      ghi retAddr
2834      (1) 105/     2B15 : B3                      phi RPC
2835      (1) 106/     2B16 : 42                      lda SP ;pick up old return address
2836

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2836
2836      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 46 - 1
2837
2838
2839      (1) 107/      2B17 : B6      phi retAddr
2840      (1) 108/      2B18 : 42      lda SP
2841      (1) 109/      2B19 : A6      plo retAddr
2842      (1) 110/      2B1A : 30 11   br _return-1
2843      (1) 111/      2B1C :
2844      (1) 112/      2B1C :
2845      (1) 113/      2B1C : F8 24   _oneMs: ;execute 100 instructions including
2846      (1) 114/      2B1E : FF 01   ldi (100-15-10-2)/2
2847      (1) 115/      2B20 : 3A 1E   $$mslp:smi 1
2848      (1) 116/      2B22 : (MACRO)  bnz $$mslp
2849      (1) 117/      2B23 :          Cretn
2850      (1) 118/      2B23 :
2851      (1) 119/      2B23 :
2852      (1) 120/      2B23 :
2853      (1) 121/      2B23 :          ;16 bit unsigned multiply thanks to Ted Ross:
2854      (1) 122/      2B23 :          ;retVal=regArg1*regArg2. uses register rwork
2855      (1) 123/      2B23 : 22      _mulu2:
2856      (1) 124/      2B24 : F8 10   dec sp
2857      (1) 125/      2B26 : AE      ldi 16
2858      (1) 126/      2B27 : F8 00   plorwork;bit count
2859      (1) 127/      2B29 : BF      ldi 0
2860      (1) 128/      2B2A : AF      phiretVal;quotient
2861      (1) 129/      2B2B :          plo retVal
2862      (1) 130/      2B2B : 9C      $$MultLoop16_16:
2863      (1) 131/      2B2C : F6      ghi regArg1
2864      (1) 132/      2B2D : BC      shr
2865      (1) 133/      2B2E : 8C      phi regArg1
2866      (1) 134/      2B2F : 76      glo regArg1
2867      (1) 135/      2B30 : AC      shrc
2868      (1) 136/      2B31 : 3B 3D   plo regArg1
2869      (1) 137/      2B33 : 8D      bnf $$MultSkip16_16
2870      (1) 138/      2B34 : 52      glo regArg2
2871      (1) 139/      2B35 : 8F      str sp
2872      (1) 140/      2B36 : F4      glo retVal
2873      (1) 141/      2B37 : AF      add
2874      (1) 142/      2B38 : 9D      plo retVal
2875      (1) 143/      2B39 : 52      ghi regArg2
2876      (1) 144/      2B3A : 9F      str sp
2877      (1) 145/      2B3B : 74      ghi retVal
2878      (1) 146/      2B3C : BF      adc
2879      (1) 147/      2B3D :          phi retVal
2880      (1) 148/      2B3D : 8D      $$MultSkip16_16:
2881      (1) 149/      2B3E : FE      glo regArg2
2882      (1) 150/      2B3F : AD      shl
2883      (1) 151/      2B40 : 9D      plo regArg2
2884      (1) 152/      2B41 : 7E      ghi regArg2
2885      (1) 153/      2B42 : BD      shlc
2886      (1) 154/      2B43 : 2E      phi regArg2
2887      (1) 155/      2B44 : 8E      dec rwork
2888      (1) 156/      2B45 : 3A 2B   glo rwork
2889      (1) 157/      2B47 : 12      bnz $$MultLoop16_16
2890      (1) 158/      2B48 : D5      inc sp
2891      (1) 159/      2B49 :          sep 5
2892      (1) 160/      2B49 :
2893      (1) 161/      2B49 :
2894      (1) 162/      2B49 :          _divU2:
2895      (1) 163/      2B49 :          ; retVal = regArg1/regArg2 (remainder in re
2896      (1) 164/      2B49 :          ; This is really an unsigned 23 bit divide
2897      (1) 165/      2B49 :          ;thanks to Ted Rossin
2898      (1) 166/      2B49 : 22      ;bodged Dec 12 to shuffle registers at the e
2899      (1) 166/      2B49 :          dec sp

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2899
2899      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 47 - 1
2900
2901
2902      (1) 167/      2B4A : F8 10      ldi 16
2903      (1) 168/      2B4C : AE      plo rwork
2904      (1) 169/      2B4D : F8 00      ldi 0
2905      (1) 170/      2B4F : BF      phi retVal
2906      (1) 171/      2B50 : AF      plo retVal
2907      (1) 172/      2B51 : BE      phi rwork
2908      (1) 173/      2B52 :      $$DivLoop16_16:
2909      (1) 174/      2B52 : 8C      glo regArg1
2910      (1) 175/      2B53 : FE      shl
2911      (1) 176/      2B54 : AC      plo regArg1
2912      (1) 177/      2B55 : 9C      ghi regArg1
2913      (1) 178/      2B56 : 7E      shlc
2914      (1) 179/      2B57 : BC      phi regArg1
2915      (1) 180/      2B58 : 8F      glo retVal
2916      (1) 181/      2B59 : 7E      shlc
2917      (1) 182/      2B5A : AF      plo retVal
2918      (1) 183/      2B5B : 9F      ghi retVal
2919      (1) 184/      2B5C : 7E      shlc
2920      (1) 185/      2B5D : BF      phi retVal
2921      (1) 186/      2B5E : 9E      ghi rwork
2922      (1) 187/      2B5F : 7E      shlc
2923      (1) 188/      2B60 : BE      phi rwork
2924      (1) 189/      2B61 : 3B 73      bnf $$DivSub16_16
2925      (1) 190/      2B63 : 8D      glo regArg2
2926      (1) 191/      2B64 : 52      str sp
2927      (1) 192/      2B65 : 8F      glo retVal
2928      (1) 193/      2B66 : F4      add
2929      (1) 194/      2B67 : AF      plo retVal
2930      (1) 195/      2B68 : 9D      ghi regArg2
2931      (1) 196/      2B69 : 52      str sp
2932      (1) 197/      2B6A : 9F      ghi retVal
2933      (1) 198/      2B6B : 74      adc
2934      (1) 199/      2B6C : BF      phi retVal
2935      (1) 200/      2B6D : 9E      ghi rwork
2936      (1) 201/      2B6E : 7C 00      addi 0
2937      (1) 202/      2B70 : BE      phi rwork
2938      (1) 203/      2B71 : 30 81      br $$DivSkip16_16
2939      (1) 204/      2B73 :      $$DivSub16_16:
2940      (1) 205/      2B73 : 8D      glo regArg2
2941      (1) 206/      2B74 : 52      str sp
2942      (1) 207/      2B75 : 8F      glo retVal
2943      (1) 208/      2B76 : F7      sm
2944      (1) 209/      2B77 : AF      plo retVal
2945      (1) 210/      2B78 : 9D      ghi regArg2
2946      (1) 211/      2B79 : 52      str sp
2947      (1) 212/      2B7A : 9F      ghi retVal
2948      (1) 213/      2B7B : 77      smb
2949      (1) 214/      2B7C : BF      phi retVal
2950      (1) 215/      2B7D : 9E      ghi rwork
2951      (1) 216/      2B7E : 7F 00      smbi 0
2952      (1) 217/      2B80 : BE      phi rwork
2953      (1) 218/      2B81 :      $$DivSkip16_16:
2954      (1) 219/      2B81 : FE      shl
2955      (1) 220/      2B82 : 33 88      bdf $$DivSkipClear16_16
2956      (1) 221/      2B84 :      $$DivSetBit16_16:
2957      (1) 222/      2B84 : 8C      glo regArg1
2958      (1) 223/      2B85 : F9 01      ori 0x01
2959      (1) 224/      2B87 : AC      plo regArg1
2960      (1) 225/      2B88 :      $$DivSkipClear16_16:
2961      (1) 226/      2B88 : 2E      dec rwork
2962

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2962
2962      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 48 - 1
2963
2964
2965      (1) 227/      2B89 : 8E                                glo rwork
2966      (1) 228/      2B8A : 3A 52                             bnz $$DivLoop16_16
2967      (1) 229/      2B8C : 9E                                ghi rwork
2968      (1) 230/      2B8D : FE                                shl
2969      (1) 231/      2B8E : 3B 9A                             bnf $$DivSkipFinalAdd16_16
2970      (1) 232/      2B90 : 8D                                glo regArg2
2971      (1) 233/      2B91 : 52                                str sp
2972      (1) 234/      2B92 : 8F                                glo retVal
2973      (1) 235/      2B93 : F4                                add
2974      (1) 236/      2B94 : AF                                plo retVal
2975      (1) 237/      2B95 : 9D                                ghi regArg2
2976      (1) 238/      2B96 : 52                                str sp
2977      (1) 239/      2B97 : 9F                                ghi retVal
2978      (1) 240/      2B98 : 74                                adc
2979      (1) 241/      2B99 : BF                                phi retVal
2980      (1) 242/      2B9A :                                $$DivSkipFinalAdd16_16:
2981      (1) 243/      2B9A : 12                                inc sp
2982      (1) 244/      2B9B :                                ;here I have the quotient in regArg1 and rema
2983      (1) 245/      2B9B : 8F                                glo retVal
2984      (1) 246/      2B9C : AD                                plo regArg2
2985      (1) 247/      2B9D : 9F                                ghi retVal
2986      (1) 248/      2B9E : BD                                phi regArg2
2987      (1) 249/      2B9F : 8C                                glo regArg1
2988      (1) 250/      2BA0 : AF                                plo retVal
2989      (1) 251/      2BA1 : 9C                                ghi regArg1
2990      (1) 252/      2BA2 : BF                                phi retVal
2991      (1) 253/      2BA3 :                                ;return with quotient in retVal and rema
2992      (1) 254/      2BA3 : D5                                sep 5
2993      (1) 255/      2BA4 :
2994      (1) 256/      2BA4 :                                ;signed integer division retVal=regArg1/regA
2995      (1) 257/      2BA4 :                                ;uses unsigned division of absolute values th
2996      (1) 258/      2BA4 :                                _divI2:
2997      (1) 259/      2BA4 :                                ;pushr retAddr ;save the return address M
2998      (1) 260/      2BA4 : 22                                decsp ;leave a work area available
2999      (1) 261/      2BA5 : 9C                                ghi regArg1
3000      (1) 262/      2BA6 : 52                                str sp ;save the sign of the 1st arg
3001      (1) 263/      2BA7 : FE                                shl
3002      (1) 264/      2BA8 : 3B B3                             bnf $$pos1 ;if the 1st arg is -v
3003      (1) 265/      2BAA : (MACRO)                          negI2 regArg1,regArg1 ;flip it to positiv
3004      (1) 266/      2BB3 :                                $$pos1: ;1st is now +v, check 2nd
3005      (1) 267/      2BB3 : 9D                                ghi regArg2
3006      (1) 268/      2BB4 : F3                                xor
3007      (1) 269/      2BB5 : 52                                str sp ;the stack now has bit 8 set if tl
3008      (1) 270/      2BB6 : 9D                                ghi regArg2
3009      (1) 271/      2BB7 : FE                                shl
3010      (1) 272/      2BB8 : 3B C3                             bnf $$pos2 ;if the 2nd arg is -v
3011      (1) 273/      2BBA : (MACRO)                          negI2 regArg2,regArg2 ;flip it to +v
3012      (1) 274/      2BC3 :                                $$pos2: ; both args now +v
3013      (1) 275/      2BC3 : (MACRO)                          Ccall _divU2;call unsigned division
3014      (1) 276/      2BC6 :                                ;now the quotient is in retVal and the remain
3015      (1) 277/      2BC6 : 42                                ldasp ;get back the sign bits and restore
3016      (1) 278/      2BC7 : FE                                shl
3017      (1) 279/      2BC8 : 3B D3                             bnf $$done ;if the signs were different
3018      (1) 280/      2BCA : (MACRO)                          negI2 retVal,retVal ;negate the quotient
3019      (1) 281/      2BD3 :                                $$done:
3020      (1) 282/      2BD3 :                                ;popr RetAddr ;restore the return address
3021      (1) 283/      2BD3 : (MACRO)                          Cretn ;and we're done - I hope!
3022      (1) 284/      2BD4 :
3023      (1) 285/      2BD4 :
3024      (1) 286/      2BD4 :                                align 256      ;32 bit operations follow
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3025
3026 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 49 - 1
3027
3028 (1) 287/ 2C00 : _divu4:
3029 (1) 288/ 2C00 : ;This is an unsigned 32 bit restoring division
3030 (1) 289/ 2C00 : ;The arguments are in RL8 and RL10, the result
3031 (1) 290/ 2C00 : ;Rp1p2:RL8 form a 64 bit work area A:Q
3032 (1) 291/ 2C00 : ;the dividend, in RL10 is repeatedly combined
3033 (1) 292/ 2C00 : ;the algorithm is described in http://www2.i
3034 (1) 293/ 2C00 :
3035 (1) 294/ 2C00 : F8 20 ldi 32 ;set loop count
3036 (1) 295/ 2C02 : AE plo memaddr ;in temp register
3037 (1) 296/ 2C03 : (MACRO) ldi4 Rp1p2,0 ;clear Rp1p2
3038 (1) 297/ 2C0F : $$loop:
3039 (1) 298/ 2C0F : (MACRO) shl4 RL8 ;shift bottom 32 bits left 1
3040 (1) 299/ 2C1B : (MACRO) shLC4 Rp1p2 ;continue the shift into the top
3041 (1) 300/ 2C27 :
3042 (1) 301/ 2C27 : (MACRO) alu4 Rp1p2,Rp1p2,RL10,sm,smb ;subtract dividend
3043 (1) 302/ 2C3D :
3044 (1) 303/ 2C3D : FA 80 ani 0x80 ;check the top bit
3045 (1) 304/ 2C3F : 32 5D bz $$norestore;if it's 0
3046 (1) 305/ 2C41 : 89 glo RL8
3047 (1) 306/ 2C42 : FA FE ani 0xfe ;turn off the bottom bit
3048 (1) 307/ 2C44 : A9 plo RL8
3049 (1) 308/ 2C45 : (MACRO) alu4 Rp1p2,Rp1p2,RL10,add,adc
3050 (1) 309/ 2C5B : 30 61 br $$endlp ;else
3051 (1) 310/ 2C5D : $$norestore:
3052 (1) 311/ 2C5D : 89 glo RL8
3053 (1) 312/ 2C5E : F9 01 ori 1;turn on the bottom bit
3054 (1) 313/ 2C60 : A9 plo RL8
3055 (1) 314/ 2C61 : ;end if
3056 (1) 315/ 2C61 : $$endlp:
3057 (1) 316/ 2C61 : 2E dec memaddr ;check the cycle count
3058 (1) 317/ 2C62 : 8E glo memaddr
3059 (1) 318/ 2C63 : 3A 0F bnz $$loop;back for more if needed
3060 (1) 319/ 2C65 :
3061 (1) 320/ 2C65 : (MACRO) Cretn ;and we're done - quotient is in RL8,
3062 (1) 321/ 2C66 :
3063 (1) 322/ 2C66 :
3064 (1) 323/ 2C66 : _mulu4:
3065 (1) 324/ 2C66 : ;this is a 32 bit signed multiplication using
3066 (1) 325/ 2C66 : ;much thanks to David Schultz for the code
3067 (1) 326/ 2C66 : ;input is in register pairs R8:R9 and R10:R11
3068 (1) 327/ 2C66 : ;output is in R8:R9, with the top 32 bits in
3069 (1) 328/ 2C66 : ;the bottom byte of memaddr is used as a cycle
3070 (1) 329/ 2C66 : ;initially R12:13=0, R8:R9=operand 1, DF=0
3071 (1) 330/ 2C66 : ;for 32 cycles we check the low bit of R8:R9
3072 (1) 331/ 2C66 : ;for 01 we add the R10:R11 to R12:13 and shift
3073 (1) 332/ 2C66 : ;for 10 we subtract and shift
3074 (1) 333/ 2C66 : ;for 00 and 11 we just shift
3075 (1) 334/ 2C66 :
3076 (1) 335/ 2C66 : (MACRO) ldi4 rp1p2,0;eventual product top 32 bit
3077 (1) 336/ 2C72 : F8 20 ldi 32
3078 (1) 337/ 2C74 : AE plo memaddr ;cycle count
3079 (1) 338/ 2C75 : FC 00 adi 0 ;clear df
3080 (1) 339/ 2C77 : $$mloop:
3081 (1) 340/ 2C77 : 89 glo RL8
3082 (1) 341/ 2C78 : FA 01 ani 1 ;isolate bottom bit of result
3083 (1) 342/ 2C7A : 3B 96 bnf$$check_sub ;
3084 (1) 343/ 2C7C : 3A AE bnz$$shift ;that would be the 11 case
3085 (1) 344/ 2C7E : ;this is case 01: add second operand to top
3086 (1) 345/ 2C7E : (MACRO) alu4 Rp1p2,Rp1p2,RL10,add,adc ;32 bit add
3087 (1) 346/ 2C94 : 30 AE br $$shift
3088

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3088
3089 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 50 - 1
3090
3091 (1) 347/ 2C96 : $$$check_sub:
3092 (1) 348/ 2C96 : 32 AE          bz $$$shift ;that would be the 00 case
3093 (1) 349/ 2C98 :          ;this is case 10: subtract 2nd operand from 1
3094 (1) 350/ 2C98 : (MACRO)      alu4 Rp1p2,Rp1p2,RL10,sm,smb
3095 (1) 351/ 2CAE :          $$$shift:
3096 (1) 352/ 2CAE : (MACRO)      shRI4 Rp1p2 ;shift the top 32 bits
3097 (1) 353/ 2CBC : (MACRO)      shRC4 RL8 ;continue the shift to the bot
3098 (1) 354/ 2CC8 :
3099 (1) 355/ 2CC8 : 2E          dec memaddr ;cycle count
3100 (1) 356/ 2CC9 : 8E          glo memaddr
3101 (1) 357/ 2CCA : 3A 77      bnz $$$mloop ;repeat cycle once for each
3102 (1) 358/ 2CCC :
3103 (1) 359/ 2CCC : (MACRO)      cretn ;and we're done. if Rp1p2 is not 0
3104 (1) 360/ 2CCD :
3105 (1) 361/ 2CCD :          align 256
3106 (1) 362/ 2D00 :          ;signed integer division RL8=RL8/RL10, remain
3107 (1) 363/ 2D00 :          ;uses unsigned division of absolute values tl
3108 (1) 364/ 2D00 :          _divI4:
3109 (1) 365/ 2D00 : 22          decsp ;leave a work area available
3110 (1) 366/ 2D01 : 98          ghi RL8-1;get the top of the dividend
3111 (1) 367/ 2D02 : 52          str sp ;save the sign of the 1st arg
3112 (1) 368/ 2D03 : FE          shl
3113 (1) 369/ 2D04 : 3B 26      bnf $$$pos1 ;if the 1st arg is -v
3114 (1) 370/ 2D06 : (MACRO)    negI4 RL8,RL8 ;flip it to positive
3115 (1) 371/ 2D26 :          $$$pos1: ;1st is now +v, check 2nd
3116 (1) 372/ 2D26 : 9A          ghi RL10-1
3117 (1) 373/ 2D27 : F3          xor
3118 (1) 374/ 2D28 : 52          str sp ;the stack now has bit 8 set if tl
3119 (1) 375/ 2D29 : 9A          ghi RL10-1
3120 (1) 376/ 2D2A : FE          shl
3121 (1) 377/ 2D2B : 3B 4D      bnf $$$pos2 ;if the 2nd arg is -v
3122 (1) 378/ 2D2D : (MACRO)    negI4 RL10,RL10 ;flip it to +v
3123 (1) 379/ 2D4D :          $$$pos2: ; both args now +v
3124 (1) 380/ 2D4D : (MACRO)    Ccall _divU4;call unsigned division
3125 (1) 381/ 2D50 :          ;now the quotient is in RL8 and the remainder
3126 (1) 382/ 2D50 : 42          ldasp ;get back the sign bits and restore
3127 (1) 383/ 2D51 : FE          shl
3128 (1) 384/ 2D52 : 3B 74      bnf $$$done ;if the signs were different
3129 (1) 385/ 2D54 : (MACRO)    negI4 RL8,RL8 ;negate the quotient
3130 (1) 386/ 2D74 :          $$$done:
3131 (1) 387/ 2D74 : (MACRO)      Cretn ;and we're done - I hope!
3132 (1) 388/ 2D75 :
3133 (1) 389/ 2D75 :          _dubdabx:
3134 (1) 390/ 2D75 :          ;experimental binay-ascii conversion using tl
3135 (1) 391/ 2D75 :          ;thanks to Charles Richmond for the suggestio
3136 (1) 392/ 2D75 :          ;long interger is passed in rp1p2
3137 (1) 393/ 2D75 :          ;buffer pointer is passed at sp+2+4
3138 (1) 394/ 2D75 :          ;a pointer to the 1st non-zero byte in the bu
3139 (1) 395/ 2D75 :          ;r8-11 are used as temps
3140 (1) 396/ 2D75 :          ;r8 is the working pointer
3141 (1) 397/ 2D75 :          ;r15.0 is bit count(32) and the return value
3142 (1) 398/ 2D75 :          ;r9.0 is digit count
3143 (1) 399/ 2D75 :          ;r10 is the number of digits wanted in the r
3144 (1) 400/ 2D75 : (MACRO)      ld2 r8,'0',sp,(2+4); pick up the buffer poin
3145 (1) 401/ 2D81 : (MACRO)      ld2 r10,'0',sp,(2+4+2); pick up the number o
3146 (1) 402/ 2D8D : (MACRO)      cpy2 r15,r8 ;save address for now
3147 (1) 403/ 2D91 : F8 0B      ldi 11 ;digit count+1 for trailing 0
3148 (1) 404/ 2D93 : A9          plo r9
3149 (1) 405/ 2D94 :          $$$clr1p:;clear the passed buffer
3150 (1) 406/ 2D94 : F8 00      ldi 0
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3151
3151      AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 51 - 1
3152
3153
3154      (1) 407/      2D96 : 58          str r8 ;clear a byte
3155      (1) 408/      2D97 : 18          inc r8
3156      (1) 409/      2D98 : 29          dec r9
3157      (1) 410/      2D99 : 89          glo r9 ;check the count
3158      (1) 411/      2D9A : 3A 94        bnz $$clrlp ;back for more
3159      (1) 412/      2D9C : (MACRO)      cpy2 r8,r15 ;get the address back
3160      (1) 413/      2DA0 :
3161      (1) 414/      2DA0 : F8 20          ldi 32 ;bit count
3162      (1) 415/      2DA2 : AF          plo r15
3163      (1) 416/      2DA3 :              ;now i'm going to spin off any leading 0's in
3164      (1) 417/      2DA3 :              $$cktop:
3165      (1) 418/      2DA3 : 9C          ghi rp1p2-1 ;get the top bit of the number
3166      (1) 419/      2DA4 : FE          shl ;check for a 1
3167      (1) 420/      2DA5 : 33 B8        bdf $$bitloop;move on if we have one
3168      (1) 421/      2DA7 : (MACRO)      shl4 rp1p2 ;shift the input number
3169      (1) 422/      2DB3 : 2F          dec r15 ;reduce the number of times to shif
3170      (1) 423/      2DB4 : 8F          glo r15
3171      (1) 424/      2DB5 : 3A A3        bnz $$cktop ;
3172      (1) 425/      2DB7 : 1F          inc r15 ;our whole number was 0 but force a
3173      (1) 426/      2DB8 :              $$bitloop:
3174      (1) 427/      2DB8 : F8 0A          ldi 10 ;digit count
3175      (1) 428/      2DBA : A9          plo r9
3176      (1) 429/      2DBB :              $$dcklp:
3177      (1) 430/      2DBB : 08          ldn r8 ;pick up a digit
3178      (1) 431/      2DBC : FF 05        smi 5 ;see if it's greater than 4
3179      (1) 432/      2DBE : 3B C3        bnf $$dnoadd ;if not, bypass add
3180      (1) 433/      2DC0 : FC 08        adi 0x08 ;add the 5 black and 3 more
3181      (1) 434/      2DC2 : 58          str r8 ;put it back
3182      (1) 435/      2DC3 :              $$dnoadd:
3183      (1) 436/      2DC3 : 18          inc r8
3184      (1) 437/      2DC4 : 29          dec r9 ;decrement digit count
3185      (1) 438/      2DC5 : 89          glo r9
3186      (1) 439/      2DC6 : 3A BB        bnz $$dcklp ;and back for next digit
3187      (1) 440/      2DC8 :
3188      (1) 441/      2DC8 : (MACRO)      shl4 rp1p2 ;shift the input number
3189      (1) 442/      2DD4 :
3190      (1) 443/      2DD4 : F8 0A          ldi 10 ;load the digit count again
3191      (1) 444/      2DD6 : A9          plo r9
3192      (1) 445/      2DD7 :              ;r8 is now just past the units location and 1
3193      (1) 446/      2DD7 :              $$dshlp:
3194      (1) 447/      2DD7 : 28          dec r8 ;walk back from 0's position
3195      (1) 448/      2DD8 : 08          ldn r8 ;get the digit back
3196      (1) 449/      2DD9 : 7E          shl ;continue the shift
3197      (1) 450/      2DDA : BF          phi r15 ;save it for the carry test
3198      (1) 451/      2ddb : FA 0F        ani 0x0f ;clear the 10 bit
3199      (1) 452/      2DDD : 58          str r8 ;put the digit back
3200      (1) 453/      2DDE : 9F          ghi r15 ;now test for carry
3201      (1) 454/      2DDF : FF 10        smi 0x10 ; this will make df 1 if the 10 bit
3202      (1) 455/      2DE1 : 29          dec r9 ;decrement the digit count
3203      (1) 456/      2DE2 : 89          glo r9
3204      (1) 457/      2DE3 : 3A D7        bnz $$dshlp ;back for more if needed
3205      (1) 458/      2DE5 :
3206      (1) 459/      2DE5 : 2F          dec r15
3207      (1) 460/      2DE6 : 8F          glo r15
3208      (1) 461/      2DE7 : 3A B8        bnz $$bitloop
3209      (1) 462/      2DE9 :
3210      (1) 463/      2DE9 : (MACRO)      cpy2 r15,r8 ;save the starting location of t
3211      (1) 464/      2DED : F8 0A          ldi 10 ;digit count again
3212      (1) 465/      2DEF : A9          plo r9
3213      (1) 466/      2DF0 :              $$upnxt:
3214

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3214
3214 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm(lcc1802Epilofl.inc) - page 52 - 1
3215
3216
3217 (1) 467/ 2DF0 : 08          ldn r8 ;get digit
3218 (1) 468/ 2DF1 : F9 30      ori 0x30 ;make ascii
3219 (1) 469/ 2DF3 : 58          str r8 ;put it back
3220 (1) 470/ 2DF4 : 18          inc r8 ;next digit
3221 (1) 471/ 2DF5 : 29          dec r9 ;counter
3222 (1) 472/ 2DF6 : 89          glo r9
3223 (1) 473/ 2DF7 : 3A F0      bnz $$upnxt ;upgrade all 10 spots
3224 (1) 474/ 2DF9 :
3225 (1) 475/ 2DF9 : (MACRO)    ldaX memaddr,sp,(2+4+2+1) ;point to lsb of d
3226 (1) 476/ 2E01 : EE          sex memaddr ;set up
3227 (1) 477/ 2E02 : F8 0A      ldi 10 ;max number of 0's to skip
3228 (1) 478/ 2E04 : F7          sm ;desired number of digits to skip
3229 (1) 479/ 2E05 : E2          sex sp ;reset index register
3230 (1) 480/ 2E06 : A9          plo r9 ;number of leading 0's to skip
3231 (1) 481/ 2E07 :           $$cknext:
3232 (1) 482/ 2E07 : 0F          ldn r15 ;check digit
3233 (1) 483/ 2E08 : FF 30      smi 0x30 ;for '0'
3234 (1) 484/ 2E0A : 3A 11      bnz $$done
3235 (1) 485/ 2E0C : 1F          inc r15 ;next digit
3236 (1) 486/ 2E0D : 29          dec r9 ;reduce count
3237 (1) 487/ 2E0E : 89          glo r9
3238 (1) 488/ 2E0F : 3A 07      bnz $$cknext
3239 (1) 489/ 2E11 :           $$done:
3240 (1) 490/ 2E11 : (MACRO)    cretn
3241 (1) 491/ 2E12 :
3242 (1) 492/ 2E12 :
3243 (1) 493/ 2E12 :           _modU4::32 bit unsigned remainder
3244 (1) 494/ 2E12 :           ; just calls the 32 bit division then puts r
3245 (1) 495/ 2E12 : (MACRO)    ccall _divU4
3246 (1) 496/ 2E15 : (MACRO)    cpy4 RL8,Rp1p2
3247 (1) 497/ 2E1D : (MACRO)    cretn
3248 (1) 498/ 2E1E :
3249 (1) 499/ 2E1E :           _modI4::32 bit signed remainder
3250 (1) 500/ 2E1E :           ; just calls the 32 bit division then puts r
3251 (1) 501/ 2E1E : (MACRO)    ccall _divI4
3252 (1) 502/ 2E21 : (MACRO)    cpy4 RL8,Rp1p2
3253 (1) 503/ 2E29 : (MACRO)    cretn
3254 (1) 504/ 2E2A :
3255 (1) 505/ 2E2A :
3256 (1) 506/ 2E2A :
3257 2591/ 2E2A :           include I01802.inc
3258 (1) 1/ 2E2A :           ;I01802.inc contains input/output runtime rou
3259 (1) 2/ 2E2A :           ;The port is in regArg1, the output byte is :
3260 (1) 3/ 2E2A :           align 64
3261 (1) 4/ 2E40 :           _putc:
3262 (1) 5/ 2E40 :           _out5:
3263 (1) 6/ 2E40 : 8C          glo regArg1
3264 (1) 7/ 2E41 : 22          dec sp
3265 (1) 8/ 2E42 : 52          str sp
3266 (1) 9/ 2E43 : 65          out 5
3267 (1) 10/ 2E44 : (MACRO)    cretn
3268 (1) 11/ 2E45 :           _inp: ;raw port input
3269 (1) 12/ 2E45 :           ;stores a small tailored program on the sta
3270 (1) 13/ 2E45 : 22          dec sp ;work backwards
3271 (1) 14/ 2E46 : F8 D3      ldi 0xD3 ;return instruction
3272 (1) 15/ 2E48 : 73          stxd
3273 (1) 16/ 2E49 : 8C          glo regarg1 ;get the port number
3274 (1) 17/ 2E4A : FA 07      ani 0x07 ;clean it
3275 (1) 18/ 2E4C : 32 5C      bz +; inp(0) isn't valid
3276 (1) 19/ 2E4E : F9 68      ori 0x68 ;make it an input instruction
3277

```


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3313
3313 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 54 - 7/16/2025 13:30:08
3314
3315
3316 symbol table (* = unused):
3317 -----
3318
3319 *ARCHITECTURE : i386-unknown-win32 - *BIGENDIAN : 0 -
3320 BITLOOP462 : 2DB8 C *BRANCHEXT : 0 -
3321 *CASESENSITIVE : 0 - *CHECK_SUB460 : 2C96 C
3322 CKNEXT462 : 2E07 C *CKTOP462 : 2DA3 C
3323 CLRLP462 : 2D94 C *CONSTPI : 3.141592653589793 -
3324 *DATE : 7/16/2025 - DCKLP462 : 2DBB C
3325 DIVL00P16_16457 : 2B52 C *DIVSETBIT16_16457 : 2B84 C
3326 DIVSKIP16_16457 : 2B81 C DIVSKIPCLEAR16_16457 : 2B88 C
3327 DIVSKIPFINALADD16_16457 : 2B9A C DIVSUB16_16457 : 2B73 C
3328 DNOADD462 : 2DC3 C DONE458 : 2BD3 C
3329 DONE461 : 2D74 C DONE462 : 2E11 C
3330 DSHLP462 : 2DD7 C ENDLP459 : 2C61 C
3331 *FALSE : 0 - *FULLPMMU : 1 -
3332 *HAS64 : 1 - *HASDSP : 0 -
3333 *HASFPU : 0 - *HASPMMU : 0 -
3334 *INEXTMODE : 0 - *INLWORDMODE : 0 -
3335 *INMAXMODE : 0 - *INSRCMODE : 0 -
3336 *INSUPMODE : 0 - *L1 : 12F C
3337 L101 : C51 C L103 : D87 C
3338 L105 : CE6 C *L106 : D20 C
3339 L108 : D36 C *L109 : DB2 C
3340 *L110 : E03 C L111 : DE6 C
3341 L112 : DEF C *L113 : E6A C
3342 *L119 : F30 C *L12 : 373 C
3343 *L125 : FAC C L13 : 1C0 C
3344 *L131 : 1072 C *L137 : 10A0 C
3345 *L139 : 10D2 C *L14 : 327 C
3346 *L141 : 1104 C *L143 : 1136 C
3347 *L145 : 1168 C *L147 : 119A C
3348 *L149 : 11CC C *L151 : 11FE C
3349 *L153 : 1230 C *L155 : 1262 C
3350 *L157 : 1294 C *L159 : 12C6 C
3351 *L161 : 12F8 C *L163 : 13C4 C
3352 L164 : 13C4 C L165 : 13C4 C
3353 L167 : 1373 C L168 : 1379 C
3354 L169 : 137F C L17 : 245 C
3355 L170 : 1385 C L171 : 138B C
3356 L172 : 1391 C L173 : 1397 C
3357 L174 : 139D C L175 : 13A3 C
3358 L176 : 13A9 C L177 : 13AF C
3359 L178 : 13B5 C L179 : 13BB C
3360 L18 : 248 C L180 : 13C1 C
3361 L181 : 1353 C *L182 : 1467 C
3362 L183 : 13F3 C *L185 : 14C6 C
3363 L186 : 147B C *L187 : 1495 C
3364 L19 : 27F C *L190 : 1514 C
3365 L193 : 186F C L194 : 1531 C
3366 L196 : 154B C L198 : 1565 C
3367 *L2 : 14A C *L20 : 2DC C
3368 L200 : 157F C L202 : 1599 C
3369 L204 : 15B3 C L206 : 15CD C
3370 L208 : 15E7 C L210 : 1601 C
3371 L212 : 161B C L214 : 1635 C
3372 L216 : 164F C L218 : 1669 C
3373 L22 : 2F0 C L220 : 1683 C
3374 L222 : 169D C L224 : 16B7 C
3375 L226 : 16D1 C L228 : 16EB C
3376

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3376
3376    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 55 - 7/16/2025 13:30:08
3377
3378
3379    L23 :                2AD C |    L230 :                1705 C |
3380    L232 :              171F C |    L234 :                1739 C |
3381    L236 :              1753 C |    L238 :                176D C |
3382    L24 :                2C1 C |    L240 :                1787 C |
3383    L242 :              179D C |    L244 :                17B7 C |
3384    L246 :              17D1 C |    L248 :                17EB C |
3385    *L25 :                428 C |    L250 :                1805 C |
3386    L252 :              181F C |    L254 :                1839 C |
3387    L256 :              184F C |    L258 :                1869 C |
3388    *L260 :              18B0 C |    L262 :                187F C |
3389    *L265 :              1932 C |    L266 :                18D8 C |
3390    *L267 :              1902 C |    L269 :                1916 C |
3391    *L270 :              1952 C |    *L271 :                1971 C |
3392    L272 :              195A C |    L273 :                196E C |
3393    *L277 :              1BBF C |    L278 :                1995 C |
3394    L280 :              1B3A C |    L281 :                1BBF C |
3395    L282 :              19CB C |    L284 :                19E5 C |
3396    L286 :              19FF C |    L288 :                1A19 C |
3397    L290 :              1A33 C |    L292 :                1A4D C |
3398    L294 :              1A67 C |    L296 :                1A81 C |
3399    L298 :              1A9B C |    L3 :                  13C C |
3400    L300 :              1AB5 C |    L302 :                1ACF C |
3401    L304 :              1AE9 C |    L306 :                1B03 C |
3402    L308 :              1B1D C |    L312 :                1BBF C |
3403    L313 :              1BBF C |    L315 :                1B9E C |
3404    L316 :              1BA4 C |    L317 :                1BAA C |
3405    L318 :              1BB0 C |    L319 :                1BB6 C |
3406    L320 :              1BBC C |    L321 :                1B90 C |
3407    *L323 :              1C7E C |    L324 :                1BCE C |
3408    *L325 :              1BCE C |    L327 :                1BED C |
3409    *L328 :              1BED C |    L330 :                1C7E C |
3410    *L332 :              1CDF C |    *L333 :                1D13 C |
3411    L334 :              1CE0 C |    *L335 :                1CE0 C |
3412    *L337 :              1D5A C |    L338 :                1D14 C |
3413    *L339 :              1D14 C |    *L341 :                1D91 C |
3414    L342 :              1D6B C |    L343 :                1D7C C |
3415    *L345 :              1DED C |    L346 :                1DAF C |
3416    *L347 :              1DBD C |    L349 :                1DD1 C |
3417    *L350 :              1E08 C |    *L351 :                1F4D C |
3418    L352 :              1EC1 C |    L353 :                1EDB C |
3419    L354 :              1F33 C |    L355 :                1F4D C |
3420    *L356 :              201A C |    *L357 :                21A3 C |
3421    L358 :              21A3 C |    *L36 :                  4D9 C |
3422    L360 :              2050 C |    L361 :                2069 C |
3423    *L362 :              218B C |    L365 :                208A C |
3424    *L366 :              20B9 C |    L369 :                20D8 C |
3425    *L370 :              213F C |    L373 :                2136 C |
3426    L374 :              213F C |    L375 :                21ED C |
3427    L376 :              21DB C |    *L378 :                2292 C |
3428    *L379 :              230C C |    *L380 :                23F9 C |
3429    L381 :              2331 C |    *L382 :                23E6 C |
3430    L384 :              233F C |    *L385 :                233F C |
3431    L387 :              2388 C |    *L388 :                23AC C |
3432    L390 :              23B4 C |    *L391 :                2474 C |
3433    L392 :              2418 C |    L393 :                242E C |
3434    L395 :              2474 C |    *L396 :                248E C |
3435    *L397 :              258F C |    L398 :                258F C |
3436    L399 :              258F C |    *L4 :                  13C C |
3437    L400 :              2506 C |    L401 :                2529 C |
3438    L402 :              254C C |    L403 :                256F C |
3439

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3439
3439 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 56 - 7/16/2025 13:30:08
3440
3441
3442 L404 : 24FE C *L405 : 25DD C
3443 *L406 : 264D C L407 : 25FD C
3444 *L408 : 261F C L410 : 2627 C
3445 *L411 : 269A C *L412 : 27F1 C
3446 *L414 : 2938 C L415 : 2827 C
3447 *L416 : 2853 C L419 : 28BC C
3448 *L420 : 28E8 C L422 : 28FE C
3449 *L423 : 2AAC C L424 : 29F9 C
3450 L431 : 2AA6 C L432 : 2AA9 C
3451 *L434 : FE00 C *L47 : 614 C
3452 *L52 : 63B C *L53 : 710 C
3453 *L55 : 71D C *L56 : 748 C
3454 *L57 : 773 C L58 : 86A C
3455 L59 : 7BB C L6 : 13D C
3456 L61 : 79F C L62 : 814 C
3457 L64 : 86A C *L66 : 8F5 C
3458 L67 : 8F5 C *L7 : 17B C
3459 L71 : 89D C L72 : 8A1 C
3460 L73 : 8C1 C L74 : 8C5 C
3461 *L75 : 9C1 C L76 : 950 C
3462 *L78 : 9E2 C *L79 : A7A C
3463 L80 : A0D C *L82 : B6A C
3464 L83 : B6A C L85 : AA6 C
3465 L86 : ACC C *L87 : AF8 C
3466 *L90 : C25 C L91 : C25 C
3467 L93 : B96 C L94 : BBA C
3468 *L95 : BE3 C *L98 : D87 C
3469 L99 : C5D C LCC1802INIT : 2ABB C
3470 *LISTON : 1 - LOOP459 : 2C0F C
3471 *MACEXP : 0 - MEMADDR : E -
3472 ML00P460 : 2C77 C *MOMCPU : 1802 -
3473 *MOMCPUNAME : 1802 - MSLP455 : 2B1E C
3474 MULTLOOP16_16456 : 2B2B C MULTSKIP16_16456 : 2B3D C
3475 *NESTMAX : 100 - NORESTORE459 : 2C5D C
3476 *PACKING : 0 - *PADDING : 1 -
3477 POS1458 : 2BB3 C POS1461 : 2D26 C
3478 POS2458 : 2BC3 C POS2461 : 2D4D C
3479 R0 : 0 - R1 : 1 -
3480 R10 : A - R11 : B -
3481 R12 : C - R13 : D -
3482 R14 : E - R15 : F -
3483 R2 : 2 - R3 : 3 -
3484 R4 : 4 - R5 : 5 -
3485 R6 : 6 - R7 : 7 -
3486 R8 : 8 - R9 : 9 -
3487 RCALL : 4 - REGARG1 : C -
3488 REGARG2 : D - *RELAXED : 1 -
3489 RETADDR : 6 - RETVAL : F -
3490 *RL0 : 1 - RL10 : B -
3491 *RL12 : D - RL8 : 9 -
3492 ROM_END1 : 2AB1 - RP1P2 : D -
3493 RPC : 3 - RRET : 5 -
3494 RT1 : 8 - *RT2 : 9 -
3495 RWORK : E - SHIFT460 : 2CAE C
3496 SP : 2 - *TIME : 13:30:08 -
3497 *TRUE : 1 - UPNXT462 : 2DF0 C
3498 *VERSION : 142F - _00000447 : 2AD8 C
3499 _ADDRESS_DISPLAY : 615 C _BCC : FE41 C
3500 _BCC_ERROR : FE3F C _BEEP : 18B1 C
3501 _BLINK_Q : 14F C _BUFFER : FE34 C
3502

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3502
3503 AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 57 - 7/16/2025 13:30:08
3504
3505 _C : FE4F C | _CALL : 2B01 C |
3506 _CIN : 1D14 C | _CLEAR_BUFFER : 146C C |
3507 _CLR_SCREEN : 2475 C | _CONVERT : 27 C |
3508 _COUT : 1CE0 C | _CUT_BYTE : B6F C |
3509 _DATA_DISPLAY : 640 C | _DATA_HEX : 902 C |
3510 _DELAY_BEEP : 1870 C | _DELAY_MS : 130 C |
3511 _DELAY_NUM1 : 115 C | _DESTI : FE28 C |
3512 _DIE447 : 2ADB C | _DIGIT : 7 C |
3513 _DIVI2 : 2BA4 C | _DIVI4 : 2D00 C |
3514 _DIVU2 : 2B49 C | _DIVU4 : 2C00 C |
3515 _DOT_ADDRESS : 378 C | _DOT_DATA : 429 C |
3516 _DPTR : FE20 C | _DPTR2 : FE1E C |
3517 * _DUBDABX : 2D75 C | _END : FE2A C |
3518 _ENTER_NUM : 13CD C | _FLAG : FE42 C |
3519 _GET16BITADDRESS : 229F C | _GETHEX : 21EE C |
3520 _GOTO_XY : 2493 C | _GPIO1 : 3 C |
3521 _HEX4 : 4DA C | _HEX_ADDRESS : 9E7 C |
3522 _HIT : FE4D C | _I : FE4B C |
3523 _INITLCD : 2594 C | _INIT_8250 : 1C85 C |
3524 * _INP : 2E45 C | _INSERT : A7F C |
3525 _INTERRUPT_TEST : EC C | _J : FE49 C |
3526 _K : FE47 C | _KEY : FE3B C |
3527 _KEY_ADDRESS : 722 C | _KEY_CODE : 1519 C |
3528 _KEY_COPY : 14C7 C | _KEY_DATA : 74D C |
3529 _KEY_DUMP : 201F C | _KEY_EXE : 1976 C |
3530 _KEY_GO : C2A C | _KEY_LOAD : DB7 C |
3531 _KEY_MINUS : 86F C | _KEY_MUTE : 1937 C |
3532 _KEY_PC : 9C6 C | _KEY_PLUS : 778 C |
3533 _KEY_PRESSED : FE3A C | _KEY_QLED : 1953 C |
3534 _KEY_REG : E08 C | _KEY_TEST : D8C C |
3535 _LCDREADY : 2406 C | _LCD_CRD : 21 C |
3536 _LCD_CWR : 1D C | * _LCD_DRD : 23 C |
3537 _LCD_DWR : 1F C | _LOAD_USER_SUBROUTINES : 27F2 C |
3538 _MAIN : 2939 C | * _MODI2 : 2AEC C |
3539 * _MODI4 : 2E1E C | * _MODU2 : 2AE4 C |
3540 * _MODU4 : 2E12 C | * _MULU2 : 2B23 C |
3541 * _MULU4 : 2C66 C | _N : FE50 C |
3542 _NEWLINE : 1DF2 C | _NIBBLE2HEX : 21B0 C |
3543 _NUM : FE2E C | _O : FE3D C |
3544 * _ONEMS : 2B1C C | * _OUT : 2E5F C |
3545 * _OUT4 : 2AF4 C | * _OUT5 : 2E40 C |
3546 _PC : FE26 C | _PORT0 : 9 C |
3547 _PORT1 : B C | _PORT2 : D C |
3548 _PSTR : 1D5B C | * _PUTC : 2E40 C |
3549 * _PUTCH_LCD : 265A C | _PUTLCD : 25E2 C |
3550 _Q : FE3C C | _READ_MEMORY : 713 C |
3551 _READ_RECORD1 : 2315 C | _RECORD_TYPE : FE3E C |
3552 _REG_D : E6B C | * _REG_DF : F31 C |
3553 _REG_DISPLAY : 12FD C | _REG_R10 : 11D1 C |
3554 _REG_R11 : 1203 C | _REG_R12 : 1235 C |
3555 _REG_R13 : 1267 C | _REG_R14 : 1299 C |
3556 _REG_R15 : 12CB C | _REG_R3 : 1073 C |
3557 _REG_R4 : 10A5 C | _REG_R5 : 10D7 C |
3558 _REG_R6 : 1109 C | _REG_R7 : 113B C |
3559 _REG_R8 : 116D C | _REG_R9 : 119F C |
3560 * _REG_XP : FAD C | _RETURN : 2B12 C |
3561 * _SAVE_BCC : FE40 C | _SAVE_PC : FE24 C |
3562 _SCAN : 180 C | _SCAN1 : 1BC8 C |
3563 _SEGMENT : 5 C | _SEND_HEX : 1E0D C |
3564 _SEND_WORD_HEX : 1F52 C | * _SERVICE_BREAK : 269F C |
3565

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```
3645
3645    AS V1.42 Beta [Bld 87] - source file mon1806v1.asm - page 60 - 7/16/2025 13:30:08
3646
3647
3648    codepages:
3649    -----
3650
3651    STANDARD (0 changed characters)
3652
3653
3654    0.27 seconds assembly time
3655
3656        3984 lines source file
3657        15603 lines incl. macro expansions
3658        2 passes
3659        0 errors
3660        0 warnings
3661
```