

0001 0000

0002 \*\*\*\*\*

0003 \*

0004 \* **MICROSTIM DB Version 1.0**

0005 \* © Colin Maxwell : 27<sup>th</sup> January 1991

0006 \*

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0008 \*

0009 \* PORT USAGE :

0010 \* :

0011 \* : PORT A BIT 0 OUTPUT

0012 \* : BIT 1 PATIENT DETECT

0013 \*

0014 \* : PORT B BIT 0 SOUNDER

0015 \*

0016 \*

0017 \* : PORT C BIT 0 SWITCH INPUT

0018 \* : BIT 1 SWITCH INPUT

0019 \* : BIT 2 SWITCH INPUT

0020 \* : BIT 3 SWITCH INPUT

0021 \* : BIT 7 LED OUTPUT

0022 \*

0023 \*

0024 \*

0025 \*

0026 \* I/O CONTROL REGISTERS

0027 \*

0028 0000 IOCNT0 EQU P0 INTERRUPTS 1,2,3 AND EXPANSION MODE

M20

|      |      |                 |         |                                |
|------|------|-----------------|---------|--------------------------------|
| 0029 | 0002 | IOCNT1          | EQU P2  | INTERRUPTS 4,5                 |
| 0030 | 0001 | IOCNT2          | EQU P1  | INTERRUPT POLARITY AND LEVEL   |
| 0031 | *    |                 |         |                                |
| 0032 | *    |                 |         |                                |
| 0033 | *    |                 |         |                                |
| 0034 | *    | PORTS           |         |                                |
| 0035 | *    |                 |         |                                |
| 0036 | 0004 | APORT           | EQU P4  | PORT A DATA REGISTER           |
| 0037 | 0006 | BPORT           | EQU P6  | PORT B DATA REGISTER           |
| 0038 | 0008 | CPORT           | EQU P8  | PORT C DATA REGISTER           |
| 0039 | 000A | DPORT           | EQU P10 | PORT D DATA REGISTER           |
| 0040 | 0005 | ADDR            | EQU P5  | PORT A DATA DIRECTION REGISTER |
| 0041 | 0009 | CDDR            | EQU P9  | PORT C DATA DIRECTION REGISTER |
| 0042 | 000B | DDDR            | EQU P11 | PORT D DATA DIRECTION REGISTER |
| 0043 | *    |                 |         |                                |
| 0044 | *    |                 |         |                                |
| 0045 | *    |                 |         |                                |
| 0046 | *    | TIMER REGISTERS |         |                                |
| 0047 | *    |                 |         |                                |
| 0048 | 000F | T1CTL0          | EQU P15 | TIMER 1 CONTROL REGISTER 0     |
| 0049 | 000E | T1CTL1          | EQU P14 | TIMER 1 CONTROL REGISTER 1     |
| 0050 | 000D | T1LSDA          | EQU P13 | TIMER 1 LSB RELOAD REGISTER    |
| 0051 | 000C | T1MSDA          | EQU P12 | TIMER 1 MSB RELOAD REGISTER    |
| 0052 | 0013 | T2CTL0          | EQU P19 | TIMER 2 CONTROL REGISTER 0     |
| 0053 | 0012 | T2CTL1          | EQU P18 | TIMER 2 CONTROL REGISTER 1     |
| 0054 | 0011 | T2LSDA          | EQU P17 | TIMER 2 LSB RELOAD REGISTER    |
| 0055 | 0010 | T2MSDA          | EQU P16 | TIMER 2 MSB RELOAD REGISTER    |
| 0056 | *    |                 |         |                                |
| 0057 | *    |                 |         |                                |

|      |         |                |                        |                                                            |  |
|------|---------|----------------|------------------------|------------------------------------------------------------|--|
| 0058 | *       |                |                        |                                                            |  |
| 0059 | *       | UART REGISTERS |                        |                                                            |  |
| 0060 | *       |                |                        |                                                            |  |
| 0061 | 0017    | T3DATA         | EQU P23                | TIMER 3 RELOAD REGISTER                                    |  |
| 0062 | 0014    | SMODE          | EQU P20                | SERIAL PORT MODE CONTROL REGISTER                          |  |
| 0063 | 0015    | SCTLO          | EQU P21                | SERIAL PORT CONTROL REGISTER 0                             |  |
| 0064 | 0016    | SSTAT          | EQU P22                | SERIAL PORT STATUS REGISTER                                |  |
| 0065 | 0018    | SCTL1          | EQU P24                | SERIAL PORT CONTROL REGISTER 1                             |  |
| 0066 | 0019    | RXBUF          | EQU P25                | RECIEVER BUFFER                                            |  |
| 0067 | 001A    | TXBUF          | EQU P26                | TRANSMITER BUFFER                                          |  |
| 0068 | 0000    |                |                        |                                                            |  |
| 0069 | 0000    |                |                        |                                                            |  |
| 0070 | 0000    |                |                        |                                                            |  |
| 0071 | 0000    |                |                        |                                                            |  |
| 0072 | E300    | INT            | AORG >E300             |                                                            |  |
| 0073 | E300    |                |                        |                                                            |  |
| 0074 | E300 A2 |                | MOVP %?00000000,T1CTL0 | stop timer1                                                |  |
|      | E301 00 |                |                        |                                                            |  |
|      | E302 0F |                |                        |                                                            |  |
| 0075 | E303 0B |                | RETI                   |                                                            |  |
| 0076 | E304    |                |                        |                                                            |  |
| 0077 | E304    |                |                        |                                                            |  |
| 0078 | E800    | INIT           | AORG >E800             |                                                            |  |
| 0079 | E800    |                |                        |                                                            |  |
| 0080 | E800 06 |                | DINT                   | prevent interrupts during set-up                           |  |
| 0081 | E801 A2 |                | MOVP %?00000000,APORT  | set-up port A to prevent any output pulse during power up. |  |
|      | E802 00 |                |                        |                                                            |  |
|      | E803 04 |                |                        |                                                            |  |
| 0082 | E804 A2 |                | MOVP %?00000001,ADDR   |                                                            |  |

|      |      |    |                        |                                |
|------|------|----|------------------------|--------------------------------|
|      | E805 | 01 |                        |                                |
|      | E806 | 05 |                        |                                |
| 0083 | E807 | 52 | MOV %>C8,B             | set stack pointer in upper RAM |
|      | E808 | C8 |                        |                                |
| 0084 | E809 | 0D | LDSP                   |                                |
| 0085 | E80A | A2 | MOVP%?00101110,IOCNT0  | set registers                  |
|      | E80B | 2E |                        |                                |
|      | E80C | 00 |                        |                                |
| 0086 | E80D | A2 | MOVP%?00000000,IOCNT1  |                                |
| E80E | 00   |    |                        |                                |
|      | E80F | 02 |                        |                                |
| 0087 | E810 | A2 | MOVP %?00000000,IOCNT2 |                                |
|      | E811 | 00 |                        |                                |
|      | E812 | 01 |                        |                                |
| 0088 | E813 | A2 | MOVP %?10000000,CDDR   |                                |
|      | E814 | 80 |                        |                                |
|      | E815 | 09 |                        |                                |
| 0089 | E816 | A2 | MOVP %?00000000,T1CTL1 |                                |
|      | E817 | 00 |                        |                                |
|      | E818 | 0E |                        |                                |
| 0090 | E819 | A2 | MOVP %?01000000,T2CTL1 |                                |
|      | E81A | 40 |                        |                                |
|      | E81B | 12 |                        |                                |
| 0091 | E81C | A2 | MOVP %?00000000,T2MSDA |                                |
|      | E81D | 00 |                        |                                |
|      | E81E | 10 |                        |                                |
| 0092 | E81F | A2 | MOVP %?10110010,T2LSDA |                                |
|      | E820 | B2 |                        |                                |
|      | E821 | 11 |                        |                                |

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|      |      |      |        |                    |                             |
|------|------|------|--------|--------------------|-----------------------------|
| 0093 | E822 |      |        |                    |                             |
| 0094 | E822 | 72   |        | MOV %>80,R21       | 0.25 second delay           |
|      | E823 | 80   |        |                    |                             |
|      | E824 | 15   |        |                    |                             |
| 0095 | E825 | 72   | X2     | MOV %>00,R20       | to enable circuit to charge |
|      | E826 | 00   |        |                    |                             |
|      | E827 | 14   |        |                    |                             |
| 0096 | E828 | DA   | X1     | DJNZ R20,X1        | at switch on                |
|      | E829 | 14   |        |                    |                             |
|      | E82A | FD   |        |                    |                             |
| 0097 | E82B | DA   |        | DJNZ R21,X2        |                             |
|      | E82C | 15   |        |                    |                             |
|      | E82D | F7   |        |                    |                             |
| 0098 | E82E |      |        |                    |                             |
| 0099 | E82E | 05   | EINT   |                    | ok. allow interrupts        |
| 0100 | E82F |      |        |                    |                             |
| 0101 | E82F | 80   | RDKEYS | MOVPCPORT,A        | read key status             |
|      | E830 | 08   |        |                    |                             |
| 0102 | E831 | 23   |        | AND %#?111110000,A |                             |
|      | E832 | 0F   |        |                    |                             |
| 0103 | E833 | 2D   |        | CMP %>04,A         | check for TOF               |
|      | E834 | 04   |        |                    |                             |
| 0104 | E835 | E6   |        | JNE ON1            |                             |
|      | E836 | 03   |        |                    |                             |
| 0105 | E837 | 8E   |        | CALL @TOF          |                             |
|      | E838 | E851 |        |                    |                             |
| 0106 | E83A | 2D   | ON1    | CMP %>08,A         |                             |
|      | E83B | 08   |        |                    |                             |
| 0107 | E83C | E6   |        | JNE ON2            | check for DBS               |

|      |           |      |  |                       |                         |
|------|-----------|------|--|-----------------------|-------------------------|
| 0108 | E83D 03   |      |  |                       |                         |
|      | E83E 8E   |      |  | CALL @DB              |                         |
|      | E83F E876 |      |  |                       |                         |
| 0109 | E841 2D   | ON2  |  | CMP %>01,A            |                         |
|      | E842 01   |      |  |                       |                         |
| 0110 | E843 E6   |      |  | JNE ON3               | check for TET           |
|      | E844 03   |      |  |                       |                         |
| 0111 | E845 8E   |      |  | CALL @TET             |                         |
|      | E846 E8C7 |      |  |                       |                         |
| 0112 | E848 2D   | ON3  |  | CMP %>02,A            |                         |
|      | E849 02   |      |  |                       |                         |
| 0113 | E84A E6   |      |  | JNE ON4               | check for 1 Hz          |
|      | E84B 03   |      |  |                       |                         |
| 0114 | E84C 8E   |      |  | CALL @ONEHZ           |                         |
|      | E84D      | E917 |  |                       |                         |
| 0115 | E84F E0   | ON4  |  | JMP RDKEYS            | repeat for ever         |
|      | E850 DE   |      |  |                       |                         |
| 0116 | E851      |      |  |                       |                         |
| 0117 | E85       |      |  |                       |                         |
| 0118 | E851 A2   | TOF  |  | MOVP%?11110100,T1MSDA | set timer 1             |
|      | E852 F4   |      |  |                       |                         |
|      | E853 0C   |      |  |                       |                         |
| 0119 | E854 A2   |      |  | MOVP%?00100100,T1LSDA | for a cycle of 1 second |
|      | E855 24   |      |  |                       |                         |
|      | E856 0D   |      |  |                       |                         |
| 0120 | E857 72   |      |  | MOV %>04,R7           | set TOF counter         |
|      | E858 04   |      |  |                       |                         |

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0121 E859 07  
 E85A A2 TOFL2 MOVP%?10001011,T1CTL0  
 E85B 8B  
 E85C 0F  
 0122 E85D 8E CALL @PULSE  
 E85E E936  
 0123 E860 72 MOV %>10,R6 set LED on time  
 E861 10  
 E862 06  
 0124 E863 8E TOFL1 CALL @DELAY  
 E864 E954  
 0125 E866 DA DJNZ R6,TOFL1  
 E867 06  
 E868 FA  
 0126 E869 A3 ANDP %?01111111,CPORT set LED off  
 E86A 7F  
 E86B 08  
 0127 E86C A2 MOVP%?00000000,T2CTL0 set SOUNDER off  
 E86D 00  
 E86E 13  
 0128 E86F 01 IDLE wait for timer1  
 0129 E870 DA DJNZ R7,TOFL2 do 4 pulses  
 E871 07  
 E872 E7  
 0130 E873 E0 TOFL3 JMP TOFL3 idle forever  
 E874 FE  
 0131 E875 0A RETS  
 0132 E876  
 0133 E876

|      |      |      |      |                       |                      |
|------|------|------|------|-----------------------|----------------------|
| 0134 | E876 |      |      |                       |                      |
| 0135 | E876 | 72   | DB   | MOV %>03,R17          | set for 3 pulses     |
|      | E877 | 03   |      |                       |                      |
|      | E878 | 11   |      |                       |                      |
| 0136 | E879 | A2   |      | MOVP%?01110101,T1MSDA | set up timer 1       |
|      | E87A | 75   |      |                       |                      |
|      | E87B | 0C   |      |                       |                      |
| 0137 | E87C | A2   |      | MOVP%?00110000,T1LSDA | for a cycle of 20ms  |
|      | E87D | 30   |      |                       |                      |
|      | E87E | 0D   |      |                       |                      |
| 0138 | E87F | A2   | DBL2 | MOVP%?10000000,T1CTL0 | start timer1         |
|      | E880 | 80   |      |                       |                      |
|      | E881 | 0F   |      |                       |                      |
| 0139 | E882 | 8E   |      | CALL @PULSE           |                      |
|      | E883 | E936 |      |                       |                      |
| 0140 | E885 | 72   |      | MOV %>02,R6           | set delay for LED on |
|      | E886 | 02   |      |                       |                      |
|      | E887 | 06   |      |                       |                      |
| 0141 | E888 | 8E   | DBL1 | CALL @DELAY           |                      |
|      | E889 | E954 |      |                       |                      |
| 0142 | E88B | DA   |      | DJNZ R6,DBL1          |                      |
|      | E88C | 06   |      |                       |                      |
|      | E88D | FA   |      |                       |                      |
| 0143 | E88E | A3   |      | ANDP %?01111111,CPORT | turn LED off         |
|      | E88F | 7F   |      |                       |                      |
|      | E890 | 08   |      |                       |                      |
| 0144 | E891 | A2   |      | MOVP%?00000000,T2CTL0 | turn SOUNDER off     |
|      | E892 | 00   |      |                       |                      |

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|      |      |      |                       |                       |
|------|------|------|-----------------------|-----------------------|
| 0145 | E894 | 01   | IDLE                  | wait for timer1       |
| 0146 | E895 | DA   | DJNZ R17,DBL2         | repeat 3 times        |
|      | E896 | 11   |                       |                       |
|      | E897 | E7   |                       |                       |
| 0147 | E898 | A2   | MOVP%?10001110,T1MSDA | set timer 1           |
|      | E899 | 8E   |                       |                       |
|      | E89A | 0C   |                       |                       |
| 0148 | E89B | A2   | MOVP%?11110110,T1LSDA | for delay of 1 second |
|      | E89C | F6   |                       |                       |
|      | E89D | 0D   |                       |                       |
| 0149 | E89E | A2   | MOVP%?10010111,T1CTL0 |                       |
|      | E89F | 97   |                       |                       |
|      | E8A0 | 0F   |                       |                       |
| 0150 | E8A1 | 01   | IDLE                  | wait for timer 1      |
| 0151 | E8A2 | 72   | MOV %>02,R17          | set for 2 pulses      |
|      | E8A3 | 02   |                       |                       |
|      | E8A4 | 11   |                       |                       |
| 0152 | E8A5 | A2   | MOVP%?01110101,T1MSDA | and repeat as above   |
|      | E8A6 | 75   |                       |                       |
|      | E8A7 | 0C   |                       |                       |
| 0153 | E8A8 | A2   | MOVP%?00110000,T1LSDA |                       |
|      | E8A9 | 30   |                       |                       |
|      | E8AA | 0D   |                       |                       |
| 0154 | E8AB | A2   | DBL4                  | MOVP%?10000000,T1CTL0 |
|      | E8AC | 80   |                       |                       |
|      | E8AD | 0F   |                       |                       |
| 0155 | E8AE | 8E   | CALL @PULSE           |                       |
|      | E8AF | E936 |                       |                       |

|      |      |      |      |      |                   |                |
|------|------|------|------|------|-------------------|----------------|
| 0156 | E8B1 | 72   |      | MOV  | %>02,R6           |                |
|      | E8B2 | 02   |      |      |                   |                |
|      | E8B3 | 06   |      |      |                   |                |
| 0157 | E8B4 | 8E   | DBL3 | CALL | @DELAY            |                |
|      | E8B5 | E954 |      |      |                   |                |
| 0158 | E8B7 | DA   |      | DJNZ | R6,DBL3           |                |
|      | E8B8 | 06   |      |      |                   |                |
|      | E8B9 | FA   |      |      |                   |                |
| 0159 | E8BA | A3   |      | ANDP | %?01111111,CPORT  |                |
|      | E8BB | 7F   |      |      |                   |                |
|      | E8BC | 08   |      |      |                   |                |
| 0160 | E8BD | A2   |      | MOVP | %?00000000,T2CTL0 |                |
|      | E8BE | 00   |      |      |                   |                |
|      | E8BF | 13   |      |      |                   |                |
| 0161 | E8C0 | 01   |      | IDLE |                   |                |
| 0162 | E8C1 | DA   |      | DJNZ | R17,DBL4          |                |
|      | E8C2 | 11   |      |      |                   |                |
|      | E8C3 | E7   |      |      |                   |                |
| 0163 | E8C4 | E0   | DBL5 | JMP  | DBL5              | idle for ever  |
|      | E8C5 | FE   |      |      |                   |                |
| 0164 | E8C6 | 0A   |      | RETS |                   |                |
| 0165 | E8C7 |      |      |      |                   |                |
| 0166 | E8C7 |      |      |      |                   |                |
| 0167 | E8C7 |      |      |      |                   |                |
| 0168 | E8C7 |      |      |      |                   |                |
| 0169 | E8C7 | A2   | TET  | MOVP | %?01110101,T1MSDA | set up timer 1 |
|      | E8C8 | 75   |      |      |                   |                |
|      | E8C9 | 0C   |      |      |                   |                |

|      |           |       |                       |                        |
|------|-----------|-------|-----------------------|------------------------|
| 0170 | E8CA A2   |       | MOVP%?00110000,T1LSDA | for a cycle of 20ms    |
|      | E8CB 30   |       |                       |                        |
|      | E8CC 0D   |       |                       |                        |
| 0171 | E8CD 72   |       | MOV %>FA,R8           |                        |
|      | E8CE FA   |       |                       |                        |
|      | E8CF 08   |       |                       |                        |
| 0172 | E8D0 A2   | TETL2 | MOVP%?10000000,T1CTL0 | start timer            |
|      | E8D1 80   |       |                       |                        |
|      | E8D2 0F   |       |                       |                        |
| 0173 | E8D3 8E   |       | CALL @PULSE           |                        |
|      | E8D4 E936 |       |                       |                        |
| 0174 | E8D6 72   |       | MOV %>02,R6           | set LED on time        |
|      | E8D7 02   |       |                       |                        |
|      | E8D8 06   |       |                       |                        |
| 0175 | E8D9 8E   | TETL1 | CALL @DELAY           |                        |
|      | E8DA E954 |       |                       |                        |
| 0176 | E8DC DA   |       | DJNZ R6,TETL1         |                        |
|      | E8DD 06   |       |                       |                        |
|      | E8DE FA   |       |                       |                        |
| 0177 | E8DF A3   |       | ANDP %?01111111,CPORT | turn off LED           |
|      | E8E0 7F   |       |                       |                        |
|      | E8E1 08   |       |                       |                        |
| 0178 | E8E2 A2   |       | MOVP%?00000000,T2CTL0 | turn off SOUNDER       |
|      | E8E3 00   |       |                       |                        |
|      | E8E4 13   |       |                       |                        |
| 0179 | E8E5 01   |       | IDLE                  | wait for timer 1       |
| 0180 | E8E6 DA   |       | DJNZ R8,TETL2         | dec counter & do again |
|      | E8E7 08   |       |                       |                        |
|      | E8E8 E7   |       |                       |                        |

|      |           |       |                       |                    |
|------|-----------|-------|-----------------------|--------------------|
| 0181 | E8E9 72   |       | MOV %>0C,R7           | delay of x seconds |
|      | E8EA 0C   |       |                       |                    |
|      | E8EB 07   |       |                       |                    |
| 0182 | E8EC 72   | TETL4 | MOV %>32,R6           |                    |
|      | E8ED 32   |       |                       |                    |
|      | E8EE 06   |       |                       |                    |
| 0183 | E8EF 8E   | TETL3 | CALL @DELAY           |                    |
|      | E8F0 E954 |       |                       |                    |
| 0184 | E8F2 DA   |       | DJNZ R6,TETL3         |                    |
|      | E8F3 06   |       |                       |                    |
|      | E8F4 FA   |       |                       |                    |
| 0185 | E8F5 DA   |       | DJNZ R7,TETL4         |                    |
|      | E8F6 07   |       |                       |                    |
|      | E8F7 F4   |       |                       |                    |
| 0186 | E8F8 A2   |       | MOVP%?11111110,T1MSDA | set up timer 1     |
|      | E8F9 FE   |       |                       |                    |
|      | E8FA 0C   |       |                       |                    |
| 0187 | E8FB A2   |       | MOVP%?11000001,T1LSDA | for 1 HZ cycle     |
|      | E8FC C1   |       |                       |                    |
|      | E8FD 0D   |       |                       |                    |
| 0188 | E8FE A2   | TETL6 | MOVP?10010110,T1CTL0  |                    |
|      | E8FF 96   |       |                       |                    |
|      | E900 0F   |       |                       |                    |
| 0189 | E901 8E   |       | CALL @PULSE           |                    |
|      | E902 E936 |       |                       |                    |
| 0190 | E904 72   |       | MOV %>10,R6           | set up LED on time |
|      | E905 10   |       |                       |                    |
|      | E906 06   |       |                       |                    |

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|      |      |      |       |                        |                         |
|------|------|------|-------|------------------------|-------------------------|
| 0191 | E907 | 8E   | TETL5 | CALL @DELAY            |                         |
|      | E908 | E954 |       |                        |                         |
| 0192 | E90A | DA   |       | DJNZ R6,TETL5          |                         |
|      | E90B | 06   |       |                        |                         |
|      | E90C | FA   |       |                        |                         |
| 0193 | E90D | A3   |       | ANDP %?01111111,CPORT  | turn LED off            |
|      | E90E | 7F   |       |                        |                         |
|      | E90F | 08   |       |                        |                         |
| 0194 | E910 | A2   |       | MOVP %?00000000,T2CTL0 | turn SOUNDER off        |
|      | E911 | 00   |       |                        |                         |
|      | E912 | 13   |       |                        |                         |
| 0195 | E913 | 01   |       | IDLE                   | wait for timer 1        |
| 0196 | E914 | E0   |       | JMP TETL6              | repeat cont. 1hz output |
|      | E915 | E8   |       |                        |                         |
| 0197 | E916 | 0A   |       | RETS                   |                         |
| 0198 | E917 |      |       |                        |                         |
| 0199 | E917 |      |       |                        |                         |
| 0200 | E917 |      |       |                        |                         |
| 0201 | E917 |      |       |                        |                         |
| 0202 | E917 | A2   | ONEHZ | MOVP %?11111110,T1MSDA | set up timer 1          |
|      | E918 | FE   |       |                        |                         |
|      | E919 | 0C   |       |                        |                         |
| 0203 | E91A | A2   |       | MOVP %?11000001,T1LSDA | for a cycle of 1 second |
|      | E91B | C1   |       |                        |                         |
|      | E91C | 0D   |       |                        |                         |
| 0204 | E91D | A2   | ONEL2 | MOVP %?10010110,T1CTL0 |                         |
|      | E91E | 96   |       |                        |                         |
|      | E91F | 0F   |       |                        |                         |
| 0205 | E920 | 8E   |       | CALL @PULSE            |                         |

|      |      |      |       |                        |                              |
|------|------|------|-------|------------------------|------------------------------|
| 0206 | E921 | E936 |       |                        |                              |
|      | E923 | 72   |       | MOV %>10,R6            | set up delay for LED on time |
|      | E924 | 10   |       |                        |                              |
|      | E925 | 06   |       |                        |                              |
| 0207 | E926 | 8E   | ONEL1 | CALL @DELAY            |                              |
|      | E927 | E954 |       |                        |                              |
| 0208 | E929 | DA   |       | DJNZ R6,ONEL1          |                              |
|      | E92A | 06   |       |                        |                              |
|      | E92B | FA   |       |                        |                              |
| 0209 | E92C | A3   |       | ANDP %?01111111,CPORT  | turn off LED                 |
|      | E92D | 7F   |       |                        |                              |
|      | E92E | 08   |       |                        |                              |
| 0210 | E92F | A2   |       | MOVP %?00000000,T2CTL0 | turn off SOUNDER             |
|      | E930 | 00   |       |                        |                              |
|      | E931 | 13   |       |                        |                              |
| 0211 | E932 | 01   |       | IDLE                   | wait for timer 1             |
| 0212 | E933 | E0   |       | JMP ONEL2              | then repeat for ever         |
|      | E934 | E8   |       |                        |                              |
| 0213 | E935 | 0A   |       | RETS                   |                              |
| 0214 | E936 |      |       |                        |                              |
| 0215 | E936 |      |       |                        |                              |
| 0216 | E936 |      |       |                        |                              |
| 0217 | E936 | A4   | PULSE | ORP %?00000001,APORT   | set OUTPUT hi                |
|      | E937 | 01   |       |                        |                              |
|      | E938 | 04   |       |                        |                              |
| 0218 | E939 | A4   |       | ORP %?10000000,CPORT   | set LED hi                   |
|      | E93A | 80   |       |                        |                              |
|      | E93B | 08   |       |                        |                              |

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|      |      |    |       |                        |                           |
|------|------|----|-------|------------------------|---------------------------|
| 0219 | E93C | 72 |       | MOV %>2F,R3            | delay for 200 us pulse    |
|      | E93D | 2F |       |                        |                           |
|      | E93E | 03 |       |                        |                           |
| 0220 | E93F | DA | PL1   | DJNZ R3,PL1            |                           |
|      | E940 | 03 |       |                        |                           |
|      | E941 | FD |       |                        |                           |
| 0221 | E942 | 80 |       | MOVP APORT,A           | read PORT A               |
|      | E943 | 04 |       |                        |                           |
| 0222 | E944 | 23 |       | AND %?00000010,A       | check PATIENT DETECT      |
|      | E945 | 02 |       |                        |                           |
| 0223 | E946 | E2 |       | JEQ PJ1                | jump to JP1 if no patient |
|      | E947 | 05 |       |                        |                           |
| 0224 | E948 | A2 |       | MOVP %?10000000,T2CTL0 | turn on SOUNDER           |
|      | E949 | 80 |       |                        |                           |
|      | E94A | 13 |       |                        |                           |
| 0225 | E94B | E0 |       | JMP PJ2                | jump to PJ2               |
|      | E94C | 03 |       |                        |                           |
| 0226 | E94D | A2 | PJ1   | MOVP %?00000000,T2CTL0 | turn off SOUNDER          |
|      | E94E | 00 |       |                        |                           |
|      | E94F | 13 |       |                        |                           |
| 0227 | E950 | A3 | PJ2   | ANDP %?11111110,APORT  | turn off OUTPUT           |
|      | E951 | FE |       |                        |                           |
|      | E952 | 04 |       |                        |                           |
| 0228 | E953 | 0A |       | RETS                   | exit PULSE subroutine     |
| 0229 | E954 |    |       |                        |                           |
| 0230 | E954 |    |       |                        |                           |
| 0231 | E954 |    |       |                        |                           |
| 0232 | E954 |    |       |                        |                           |
| 0233 | E954 | 72 | DELAY | MOV %>06,R4            | Use registers R4 & 5      |

|      |      |    |                         |             |                      |
|------|------|----|-------------------------|-------------|----------------------|
|      | E955 | 06 |                         |             |                      |
|      | E956 | 04 |                         |             |                      |
| 0234 | E957 | 72 | DL2                     | MOV %>E1,R5 | to create a delay of |
|      | E958 | E1 |                         |             |                      |
|      | E959 | 05 |                         |             |                      |
| 0235 | E95A | DA | DL1                     | DJNZ R5,DL1 | 10 milliseconds      |
|      | E95B | 05 |                         |             |                      |
|      | E95C | FD |                         |             |                      |
| 0236 | E95D | DA |                         | DJNZ R4,DL2 |                      |
|      | E95E | 04 |                         |             |                      |
|      | E95F | F7 |                         |             |                      |
| 0237 | E960 | 0A | RETS                    |             |                      |
| 0238 | E961 |    |                         |             |                      |
| 0239 | E961 |    |                         |             |                      |
| 0240 | E961 |    |                         |             |                      |
| 0241 | E961 |    |                         |             |                      |
| 0242 | FF00 |    | AORG >FF00              |             |                      |
| 0243 |      |    | TEXT ' MICROSTIM-MSDB ' |             |                      |
|      | FF00 | 20 |                         |             |                      |
|      | FF01 | 4D |                         |             |                      |
|      | FF02 | 49 |                         |             |                      |
|      | FF03 | 43 |                         |             |                      |
|      | FF04 | 52 |                         |             |                      |
|      | FF05 | 4F |                         |             |                      |
|      | FF06 | 53 |                         |             |                      |
|      | FF07 | 54 |                         |             |                      |
|      | FF08 | 49 |                         |             |                      |
|      | FF09 | 4D |                         |             |                      |

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|      |      |    |                       |
|------|------|----|-----------------------|
|      | FF0A | 2D |                       |
|      | FF0B | 4D |                       |
|      | FF0C | 53 |                       |
|      | FF0D | 44 |                       |
|      | FF0E | 42 |                       |
|      | FF0F | 20 |                       |
| 0244 |      |    | TEXT ' Version 1.0 '  |
|      | FF10 | 20 |                       |
|      | FF11 | 20 |                       |
|      | FF12 | 56 |                       |
|      | FF13 | 65 |                       |
|      | FF14 | 72 |                       |
|      | FF15 | 73 |                       |
|      | FF16 | 69 |                       |
|      | FF17 | 6F |                       |
|      | FF18 | 6E |                       |
|      | FF19 | 20 |                       |
|      | FF1A | 31 |                       |
|      | FF1B | 2E |                       |
|      | FF1C | 30 |                       |
|      | FF1D | 20 |                       |
|      | FF1E | 20 |                       |
|      | FF1F | 20 |                       |
| 0245 |      |    | TEXT ' Colin Maxwell' |
|      | FF20 | 20 |                       |
|      | FF21 | 43 |                       |
|      | FF22 | 6F |                       |
|      | FF23 | 6C |                       |
|      | FF24 | 69 |                       |

FF25 6E  
FF26 20  
FF27 4D  
FF28 61  
FF29 78  
FF2A 77  
FF2B 65  
FF2C 6C  
FF2D 6C  
FF2E 20  
FF2F 20

0246

TEXT '

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FF30 20  
FF31 20  
FF32 20  
FF33 32  
FF34 37  
FF35 2F  
FF36 30  
FF37 31  
FF38 2F  
FF39 31  
FF3A 39  
FF3B 39  
FF3C 31  
FF3D 20  
FF3E 20  
FF3F 20

|      |      |    |            |               |
|------|------|----|------------|---------------|
| 0247 | FF40 |    |            |               |
| 0248 | FF40 |    |            |               |
| 0249 | FFFA |    | AORG >FFFA |               |
| 0250 | FFFA |    |            |               |
| 0251 | FFFA | E3 | BYTE >E3   | TIMER1 vector |
| 0252 | FFFB | 00 | BYTE >00   |               |
| 0253 | FFFC | FF | BYTE >FF   | TIMER2 vector |
| 0254 | FFFD | FF | BYTE >FF   |               |
| 0255 | FFFE | E8 | BYTE >E8   | RESET vector  |
| 0256 | FFFF | 00 | BYTE >00   |               |

**NO ERRORS,      NO WARNINGS**