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Motorola Semiconductor Engineering Bulletin

EB372

Template for Initializing the Exception Vector Table of CPU16-Based Devices

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Introduction

The assembly language program listed in this engineering bulletin is a template for initializing all of the exception and interrupt vectors in a CPU16-based device.

The Program

The program starts at `$00 0000` because the exception vector table always starts at that address from the release of RESET. The exception vector table for CPU16- based devices is always located at `$00 0000` and cannot be relocated.

The first part of the program consists of four `dc.w` directives that specify the initial values of the K register, initial stack pointer, initial program counter, and initial IZ values. Then, 252 `dc.w` declarations simply define a word for labels `v4` through `v255`.

The first word value will be at address `$00 0000`, the second word at `$00 0002`, the third word at `$00 0004`, and so on.

When the program is assembled, the assembler will find each label and assign an address to it. For instance, the assembler will find the label `v5`, which is the label for the bus error handler, and put the address of that

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label in location $00 000A. This is the purpose of the dw v5 ;Bus Error directive at line 12 of the listing file in this bulletin. Likewise, addresses will be assigned to each of the labels and those addresses will be appropriately substituted for the label names for all of the "dw label" directives at lines 7 through 264 in the listing file here.

The second part of the program simply puts an rti instruction at each label except for the initial K register, initial stack pointer, initial program counter, and initial IZ register values.

The initial K register, initial stack pointer, initial program counter, and initial IZ register values must be supplied by modifying the first four dc.w statements in the assembly file.

When the program is assembled, an absolute address for all the labels will be calculated. Then, these values are used in the dc.w statements. Thus, the address of v4 will be placed at memory location $00 0008, the address of v5 at $00 000A, the address of v6 at $00 000C and so on. When a particular exception or interrupt occurs, the machine will fetch the associated vector number. The vector number is left shifted by one place for word alignment and then "zero extended" to become the address of the exception vector.

In other words, when a BERR exception occurs, the machine will fetch vector number 5. The machine will go to memory location $00 000A. The contents of this memory location is the address of the label v5 which is the BERR exception handler.

To use this template to initialize the exception vector table, follow these steps:

1. Cut and paste the assembly file into the first part of the user application.
2. Put in the appropriate values for the initial K register, initial program counter, initial stack pointer, and the initial IZ register.
3. Put in exception handler code at each label for which an exception handler is needed. This code will replace the RTI instruction that is at the label now. For instance, a BERR exception handler starts at label v5. The spurious interrupt handler starts a label v24. User defined vector 0 starts at label v56. Be sure to end the exception handler with an RTI instruction.

Exception Vector Initialization Program

The following is the listing file for the exception vector initialization program. The assembly source code follows this listing file.

Listing File

```
ASM16VEC.ASM           Assembled with IASM16 09/18/2000  16:47  PAGE 1


                        1
                        2
00000                   3          org $0000
                        4
                        5
                        6
00000      0F00         7          dw    $0f00   ;Initial ZK, SK and PK
                        8                        ;Replace with correct user value
00002      0200         9          dw    $0200   ;Initial Program Counter
                       10                        ;Replace with correct user value
00004      3FFC        11          dw    $3ffc   ;Initial Stack Pointer
                       12                        ;Replace with correct user value
00006      F000        13          dw    $f000   ;Initial IZ Register
                       14                        ;Replace with correct user value
00008      0208        15          dw    v4      ;Breakpoint
0000A      020A        16          dw    v5      ;Bus Error
0000C      020C        17          dw    v6      ;SWI Software Interrupt
0000E      020E        18          dw    v7      ;Illegal Instruction
00010      0210        19          dw    v8      ;Division By Zero
00012      0212        20          dw    v9      ;Unassigned, Reserved
00014      0214        21          dw    v10     ;Unassigned, Reserved
00016      0216        22          dw    v11     ;Unassigned, Reserved
00018      0218        23          dw    v12     ;Unassigned, Reserved
0001A      021A        24          dw    v13     ;Unassigned, Reserved
0001C      021C        25          dw    v14     ;Unassigned, Reserved
0001E      021E        26          dw    v15     ;Uninitialized Interrupt
00020      0220        27          dw    v16     ;Unassigned
00022      0222        28          dw    v17     ;Level 1 Interrupt Autovector
00024      0224        29          dw    v18     ;Level 2 Interrupt Autovector
00026      0226        30          dw    v19     ;Level 3 Interrupt Autovector
00028      0228        31          dw    v20     ;Level 4 Interrupt Autovector
0002A      022A        32          dw    v21     ;Level 5 Interrupt Autovector
0002C      022C        33          dw    v22     ;Level 6 Interrupt Autovector
0002E      022E        34          dw    v23     ;Level 7 Interrupt Autovector
00030      0230        35          dw    v24     ;Spurious Interrupt
00032      0232        36          dw    v25     ;Unassigned, Reserved
00034      0234        37          dw    v26     ;Unassigned, Reserved
00036      0236        38          dw    v27     ;Unassigned, Reserved
00038      0238        39          dw    v28     ;Unassigned, Reserved
0003A      023A        40          dw    v29     ;Unassigned, Reserved
0003C      023C        41          dw    v30     ;Unassigned, Reserved
0003E      023E        42          dw    v31     ;Unassigned, Reserved
00040      0240        43          dw    v32     ;Unassigned, Reserved
00042      0242        44          dw    v33     ;Unassigned, Reserved
00044      0244        45          dw    v34     ;Unassigned, Reserved
```

```
00046     0246        46          dw    v35     ;Unassigned, Reserved
00048     0248        47          dw    v36     ;Unassigned, Reserved
0004A     024A        48          dw    v37     ;Unassigned, Reserved
0004C     024C        49          dw    v38     ;Unassigned, Reserved
0004E     024E        50          dw    v39     ;Unassigned, Reserved
00050     0250        51          dw    v40     ;Unassigned, Reserved
00052     0252        52          dw    v41     ;Unassigned, Reserved
00054     0254        53          dw    v42     ;Unassigned, Reserved
00056     0256        54          dw    v43     ;Unassigned, Reserved
```

ASM16VEC.ASM Assembled with IASM16 09/18/2000 16:47 PAGE 2

```
00058     0258        55          dw    v44     ;Unassigned, Reserved
0005A     025A        56          dw    v45     ;Unassigned, Reserved
0005C     025C        57          dw    v46     ;Unassigned, Reserved
0005E     025E        58          dw    v47     ;Unassigned, Reserved
00060     0260        59          dw    v48     ;Unassigned, Reserved
00062     0262        60          dw    v49     ;Unassigned, Reserved
00064     0264        61          dw    v50     ;Unassigned, Reserved
00066     0266        62          dw    v51     ;Unassigned, Reserved
00068     0268        63          dw    v52     ;Unassigned, Reserved
0006A     026A        64          dw    v53     ;Unassigned, Reserved
0006C     026C        65          dw    v54     ;Unassigned, Reserved
0006E     026E        66          dw    v55     ;Unassigned, Reserved
                      67
                      68
00070     0270        69          dw    v56     ;User Defined Vector 0
00072     0272        70          dw    v57     ;User Defined Vector 1
00074     0274        71          dw    v58     ;User Defined Vector 2
00076     0276        72          dw    v59     ;User Defined Vector 3
00078     0278        73          dw    v60     ;User Defined Vector 4
0007A     027A        74          dw    v61     ;User Defined Vector 5
0007C     027C        75          dw    v62     ;User Defined Vector 6
0007E     027E        76          dw    v63     ;User Defined Vector 7
00080     0280        77          dw    v64     ;User Defined Vector 8
00082     0282        78          dw    v65     ;User Defined Vector 9
00084     0284        79          dw    v66     ;User Defined Vector 10
00086     0286        80          dw    v67     ;User Defined Vector 11
00088     0288        81          dw    v68     ;User Defined Vector 12
0008A     028A        82          dw    v69     ;User Defined Vector 13
0008C     028C        83          dw    v70     ;User Defined Vector 14
0008E     028E        84          dw    v71     ;User Defined Vector 15
00090     0290        85          dw    v72     ;User Defined Vector 16
00092     0292        86          dw    v73     ;User Defined Vector 17
00094     0294        87          dw    v74     ;User Defined Vector 18
00096     0296        88          dw    v75     ;User Defined Vector 19
00098     0298        89          dw    v76     ;User Defined Vector 20
0009A     029A        90          dw    v77     ;User Defined Vector 22
0009C     029C        91          dw    v78     ;User Defined Vector 23
0009E     029E        92          dw    v79     ;User Defined Vector 24
000A0     02A0        93          dw    v80     ;User Defined Vector 25
```

```
 000A2      02A2        94          dw    v81     ;User Defined Vector 26
 000A4      02A4        95          dw    v82     ;User Defined Vector 27
 000A6      02A6        96          dw    v83     ;User Defined Vector 28
 000A8      02A8        97          dw    v84     ;User Defined Vector 29
 000AA      02AA        98          dw    v85     ;User Defined Vector 30
 000AC      02AC        99          dw    v86     ;User Defined Vector 31
 000AE      02AE       100          dw    v87     ;User Defined Vector 32
 000B0      02B0       101          dw    v88     ;User Defined Vector 33
 000B2      02B2       102          dw    v89     ;User Defined Vector 34
 000B4      02B4       103          dw    v90     ;User Defined Vector 35
 000B6      02B6       104          dw    v91     ;User Defined Vector 36
 000B8      02B8       105          dw    v92     ;User Defined Vector 37
 000BA      02BA       106          dw    v93     ;User Defined Vector 38
 000BC      02BC       107          dw    v94     ;User Defined Vector 39
 000BE      02BE       108          dw    v95     ;User Defined Vector 40
 000C0      02C0       109          dw    v96     ;User Defined Vector 41
 000C2      02C2       110          dw    v97     ;User Defined Vector 42
 000C4      02C4       111          dw    v98     ;User Defined Vector 43
 000C6      02C6       112          dw    v99     ;User Defined Vector 44


ASM16VEC.ASM          Assembled with IASM16 09/18/2000  16:47  PAGE 3


 000C8      02C8       113          dw    v100    ;User Defined Vector 45
 000CA      02CA       114          dw    v101    ;User Defined Vector 46
 000CC      02CC       115          dw    v102    ;User Defined Vector 47
 000CE      02CE       116          dw    v103    ;User Defined Vector 48
 000D0      02D0       117          dw    v104    ;User Defined Vector 49
 000D2      02D2       118          dw    v105    ;User Defined Vector 50
 000D4      02D4       119          dw    v106    ;User Defined Vector 51
 000D6      02D6       120          dw    v107    ;User Defined Vector 52
 000D8      02D8       121          dw    v108    ;User Defined Vector 53
 000DA      02DA       122          dw    v109    ;User Defined Vector 54
 000DC      02DC       123          dw    v110    ;User Defined Vector 55
 000DE      02DE       124          dw    v111    ;User Defined Vector 56
 000E0      02E0       125          dw    v112    ;User Defined Vector 57
 000E2      02E2       126          dw    v113    ;User Defined Vector 58
 000E4      02E4       127          dw    v114    ;User Defined Vector 59
 000E6      02E6       128          dw    v115    ;User Defined Vector 60
 000E8      02E8       129          dw    v116    ;User Defined Vector 61
 000EA      02EA       130          dw    v117    ;User Defined Vector 62
 000EC      02EC       131          dw    v118    ;User Defined Vector 63
 000EE      02EE       132          dw    v119    ;User Defined Vector 64
 000F0      02F0       133          dw    v120    ;User Defined Vector 65
 000F2      02F2       134          dw    v121    ;User Defined Vector 66
 000F4      02F4       135          dw    v122    ;User Defined Vector 67
 000F6      02F6       136          dw    v123    ;User Defined Vector 68
 000F8      02F8       137          dw    v124    ;User Defined Vector 69
 000FA      02FA       138          dw    v125    ;User Defined Vector 70
 000FC      02FC       139          dw    v126    ;User Defined Vector 71
 000FE      02FE       140          dw    v127    ;User Defined Vector 72
 00100      0300       141          dw    v128    ;User Defined Vector 73
```

```
 00102      0302       142          dw    v129    ;User Defined Vector 74
 00104      0304       143          dw    v130    ;User Defined Vector 75
 00106      0306       144          dw    v131    ;User Defined Vector 76
 00108      0308       145          dw    v132    ;User Defined Vector 77
 0010A      030A       146          dw    v133    ;User Defined Vector 78
 0010C      030C       147          dw    v134    ;User Defined Vector 79
 0010E      030E       148          dw    v135    ;User Defined Vector 80
 00110      0310       149          dw    v136    ;User Defined Vector 81
 00112      0312       150          dw    v137    ;User Defined Vector 82
 00114      0314       151          dw    v138    ;User Defined Vector 83
 00116      0316       152          dw    v139    ;User Defined Vector 84
 00118      0318       153          dw    v140    ;User Defined Vector 85
 0011A      031A       154          dw    v141    ;User Defined Vector 86
 0011C      031C       155          dw    v142    ;User Defined Vector 87
 0011E      031E       156          dw    v143    ;User Defined Vector 88
 00120      0320       157          dw    v144    ;User Defined Vector 89
 00122      0322       158          dw    v145    ;User Defined Vector 90
 00124      0324       159          dw    v146    ;User Defined Vector 91
 00126      0326       160          dw    v147    ;User Defined Vector 92
 00128      0328       161          dw    v148    ;User Defined Vector 93
 0012A      032A       162          dw    v149    ;User Defined Vector 94
 0012C      032C       163          dw    v150    ;User Defined Vector 95
 0012E      032E       164          dw    v151    ;User Defined Vector 96
 00130      0330       165          dw    v152    ;User Defined Vector 97
 00132      0332       166          dw    v153    ;User Defined Vector 98
 00134      0334       167          dw    v154    ;User Defined Vector 99
 00136      0336       168          dw    v155    ;User Defined Vector 100
 00138      0338       169          dw    v156    ;User Defined Vector 101
 0013A      033A       170          dw    v157    ;User Defined Vector 102


ASM16VEC.ASM          Assembled with IASM16 09/18/2000  16:47  PAGE 4


 0013C      033C       171          dw    v158    ;User Defined Vector 103
 0013E      033E       172          dw    v159    ;User Defined Vector 104
 00140      0340       173          dw    v160    ;User Defined Vector 105
 00142      0342       174          dw    v161    ;User Defined Vector 106
 00144      0344       175          dw    v162    ;User Defined Vector 107
 00146      0346       176          dw    v163    ;User Defined Vector 108
 00148      0348       177          dw    v164    ;User Defined Vector 109
 0014A      034A       178          dw    v165    ;User Defined Vector 110
 0014C      034C       179          dw    v166    ;User Defined Vector 111
 0014E      034E       180          dw    v167    ;User Defined Vector 112
 00150      0350       181          dw    v168    ;User Defined Vector 113
 00152      0352       182          dw    v169    ;User Defined Vector 114
 00154      0354       183          dw    v170    ;User Defined Vector 115
 00156      0356       184          dw    v171    ;User Defined Vector 116
 00158      0358       185          dw    v172    ;User Defined Vector 117
 0015A      035A       186          dw    v173    ;User Defined Vector 118
 0015C      035C       187          dw    v174    ;User Defined Vector 119
 0015E      035E       188          dw    v175    ;User Defined Vector 120
 00160      0360       189          dw    v176    ;User Defined Vector 121
```

```
 00162      0362       190          dw    v177    ;User Defined Vector 122
 00164      0364       191          dw    v178    ;User Defined Vector 123
 00166      0366       192          dw    v179    ;User Defined Vector 124
 00168      0368       193          dw    v180    ;User Defined Vector 125
 0016A      036A       194          dw    v181    ;User Defined Vector 126
 0016C      036C       195          dw    v182    ;User Defined Vector 127
 0016E      036E       196          dw    v183    ;User Defined Vector 128
 00170      0370       197          dw    v184    ;User Defined Vector 129
 00172      0372       198          dw    v185    ;User Defined Vector 130
 00174      0374       199          dw    v186    ;User Defined Vector 131
 00176      0376       200          dw    v187    ;User Defined Vector 132
 00178      0378       201          dw    v188    ;User Defined Vector 133
 0017A      037A       202          dw    v189    ;User Defined Vector 134
 0017C      037C       203          dw    v190    ;User Defined Vector 135
 0017E      037E       204          dw    v191    ;User Defined Vector 136
 00180      0380       205          dw    v192    ;User Defined Vector 137
 00182      0382       206          dw    v193    ;User Defined Vector 138
 00184      0384       207          dw    v194    ;User Defined Vector 139
 00186      0386       208          dw    v195    ;User Defined Vector 140
 00188      0388       209          dw    v196    ;User Defined Vector 141
 0018A      038A       210          dw    v197    ;User Defined Vector 142
 0018C      038C       211          dw    v198    ;User Defined Vector 143
 0018E      038E       212          dw    v199    ;User Defined Vector 144
 00190      0390       213          dw    v200    ;User Defined Vector 145
 00192      0392       214          dw    v201    ;User Defined Vector 146
 00194      0394       215          dw    v202    ;User Defined Vector 147
 00196      0396       216          dw    v203    ;User Defined Vector 148
 00198      0398       217          dw    v204    ;User Defined Vector 149
 0019A      039A       218          dw    v205    ;User Defined Vector 150
 0019C      039C       219          dw    v206    ;User Defined Vector 151
 0019E      039E       220          dw    v207    ;User Defined Vector 152
 001A0      03A0       221          dw    v208    ;User Defined Vector 153
 001A2      03A2       222          dw    v209    ;User Defined Vector 154
 001A4      03A4       223          dw    v210    ;User Defined Vector 155
 001A6      03A6       224          dw    v211    ;User Defined Vector 156
 001A8      03A8       225          dw    v212    ;User Defined Vector 157
 001AA      03AA       226          dw    v213    ;User Defined Vector 158
 001AC      03AC       227          dw    v214    ;User Defined Vector 159
 001AE      03AE       228          dw    v215    ;User Defined Vector 160


ASM16VEC.ASM           Assembled with IASM16 09/18/2000  16:47  PAGE 5


 001B0      03B0       229          dw    v216    ;User Defined Vector 161
 001B2      03B2       230          dw    v217    ;User Defined Vector 162
 001B4      03B4       231          dw    v218    ;User Defined Vector 163
 001B6      03B6       232          dw    v219    ;User Defined Vector 164
 001B8      03B8       233          dw    v220    ;User Defined Vector 165
 001BA      03BA       234          dw    v221    ;User Defined Vector 166
 001BC      03BC       235          dw    v222    ;User Defined Vector 167
 001BE      03BE       236          dw    v223    ;User Defined Vector 168
 001C0      03C0       237          dw    v224    ;User Defined Vector 169
```

```
001C2      03C2       238          dw    v225    ;User Defined Vector 170
001C4      03C4       239          dw    v226    ;User Defined Vector 171
001C6      03C6       240          dw    v227    ;User Defined Vector 172
001C8      03C8       241          dw    v228    ;User Defined Vector 173
001CA      03CA       242          dw    v229    ;User Defined Vector 174
001CC      03CC       243          dw    v230    ;User Defined Vector 175
001CE      03CE       244          dw    v231    ;User Defined Vector 176
001D0      03D0       245          dw    v232    ;User Defined Vector 177
001D2      03D2       246          dw    v233    ;User Defined Vector 178
001D4      03D4       247          dw    v234    ;User Defined Vector 179
001D6      03D6       248          dw    v235    ;User Defined Vector 180
001D8      03D8       249          dw    v236    ;User Defined Vector 181
001DA      03DA       250          dw    v237    ;User Defined Vector 182
001DC      03DC       251          dw    v238    ;User Defined Vector 183
001DE      03DE       252          dw    v239    ;User Defined Vector 184
001E0      03E0       253          dw    v240    ;User Defined Vector 185
001E2      03E2       254          dw    v241    ;User Defined Vector 186
001E4      03E4       255          dw    v242    ;User Defined Vector 187
001E6      03E6       256          dw    v243    ;User Defined Vector 188
001E8      03E8       257          dw    v244    ;User Defined Vector 189
001EA      03EA       258          dw    v245    ;User Defined Vector 190
001EC      03EC       259          dw    v246    ;User Defined Vector 191
001EE      03EE       260          dw    v247    ;User Defined Vector 192
001F0      03F0       261          dw    v248    ;User Defined Vector 193
001F2      03F2       262          dw    v249    ;User Defined Vector 194
001F4      03F4       263          dw    v250    ;User Defined Vector 195
001F6      03F6       264          dw    v251    ;User Defined Vector 196
001F8      03F8       265          dw    v252    ;User Defined Vector 197
001FA      03FA       266          dw    v253    ;User Defined Vector 198
001FC      03FC       267          dw    v254    ;User Defined Vector 199
001FE      03FE       268          dw    v255    ;User Defined Vector 200
                      269
                      270
                      271
00200                 272          org $0200     ;Location $200 is the first address
                      273                         ;after the exception vector table.
                      274                        ;The org statement could be anywhere
                      275                          ;in memory.
                      276
                      277
                      278
00200       0000      279  v0     fcb $00,$00     ;Reset: Initial ZK, SK and PK
00202       0200      280  v1     fcb $02,$00     ;Reset: Initial Program counter
00204       3FFC      281  v2     fcb $3f,$fc     ;Reset: Initial Stack


ASM16VEC.ASM          Assembled with IASM16 09/18/2000  16:47  PAGE 6


                                                                  Pointer
00206      F000       282   v3      fcb $f0,$00    ;Reset: Initial IZ Register
                      283                         ;The values at v0, v1, v2 and v3 are
                      284                         ;never used.They are simply put here
```

```
                        285                             ;as place holders so that the lable
                         286                              ;v4 will start at address $xxx8
00208 [12] 2777          287  v4      rti                ;Breakpoint
0020A [12] 2777          288  v5      rti                ;BERR
0020C [12] 2777          289  v6      rti                ;Software Interrupt
0020E [12] 2777          290  v7      rti                ;Illegal Instruction
00210 [12] 2777          291  v8      rti                ;Division by Zero
00212 [12] 2777          292  v9      rti                ;Unassigned
00214 [12] 2777          293  v10     rti                ;Unassigned
00216 [12] 2777          294  v11     rti                ;Unassigned
00218 [12] 2777          295  v12     rti                ;Unassigned
0021A [12] 2777          296  v13     rti                ;Unassigned
0021C [12] 2777          297  v14     rti                ;Unassigned
0021E [12] 2777          298  v15     rti                ;Unitialized Interrupt
00220 [12] 2777          299  v16     rti                ;Unassigned
00222 [12] 2777          300  v17     rti                ;Level 1 Autovector
00224 [12] 2777          301  v18     rti                ;Level 2 Autovector
00226 [12] 2777          302  v19     rti                ;Level 3 Autovector
00228 [12] 2777          303  v20     rti                ;Level 4 Autovector
0022A [12] 2777          304  v21     rti                ;Level 5 Autovector
0022C [12] 2777          305  v22     rti                ;Level 6 Autovector
0022E [12] 2777          306  v23     rti                ;Level 7 Autovector
00230 [12] 2777          307  v24     rti                ;Spurious Interrupt
00232 [12] 2777          308  v25     rti                ;Unassigned, Reserved
00234 [12] 2777          309  v26     rti                ;Unassigned, Reserved
00236 [12] 2777          310  v27     rti                ;Unassigned, Reserved
00238 [12] 2777          311  v28     rti                ;Unassigned, Reserved
0023A [12] 2777          312  v29     rti                ;Unassigned, Reserved
0023C [12] 2777          313  v30     rti                ;Unassigned, Reserved
0023E [12] 2777          314  v31     rti                ;Unassigned, Reserved
00240 [12] 2777          315  v32     rti                ;Unassigned, Reserved
00242 [12] 2777          316  v33     rti                ;Unassigned, Reserved
00244 [12] 2777          317  v34     rti                ;Unassigned, Reserved
00246 [12] 2777          318  v35     rti                ;Unassigned, Reserved
00248 [12] 2777          319  v36     rti                ;Unassigned, Reserved
0024A [12] 2777          320  v37     rti                ;Unassigned, Reserved
0024C [12] 2777          321  v38     rti                ;Unassigned, Reserved
0024E [12] 2777          322  v39     rti                ;Unassigned, Reserved
00250 [12] 2777          323  v40     rti                ;Unassigned, Reserved
00252 [12] 2777          324  v41     rti                ;Unassigned, Reserved
00254 [12] 2777          325  v42     rti                ;Unassigned, Reserved
00256 [12] 2777          326  v43     rti                ;Unassigned, Reserved
00258 [12] 2777          327  v44     rti                ;Unassigned, Reserved
0025A [12] 2777          328  v45     rti                ;Unassigned, Reserved
0025C [12] 2777          329  v46     rti                ;Unassigned, Reserved
0025E [12] 2777          330  v47     rti                ;Unassigned, Reserved
00260 [12] 2777          331  v48     rti                ;Unassigned, Reserved
00262 [12] 2777          332  v49     rti                ;Unassigned, Reserved
00264 [12] 2777          333  v50     rti                ;Unassigned, Reserved
00266 [12] 2777          334  v51     rti                ;Unassigned, Reserved
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ASM16VEC.ASM          Assembled with IASM16 09/18/2000  16:47  PAGE 7


 00268 [12] 2777       335  v52     rti             ;Unassigned, Reserved
 0026A [12] 2777       336  v53     rti             ;Unassigned, Reserved
 0026C [12] 2777       337  v54     rti             ;Unassigned, Reserved
 0026E [12] 2777       338  v55     rti             ;Unassigned, Reserved
 00270 [12] 2777       339  v56     rti             ;User Vector 0
 00272 [12] 2777       340  v57     rti             ;User Vector 1
 00274 [12] 2777       341  v58     rti             ;User Vector 2
 00276 [12] 2777       342  v59     rti             ;User Vector 3
 00278 [12] 2777       343  v60     rti             ;User Vector 4
 0027A [12] 2777       344  v61     rti             ;User Vector 5
 0027C [12] 2777       345  v62     rti             ;User Vector 6
 0027E [12] 2777       346  v63     rti             ;User Vector 7
 00280 [12] 2777       347  v64     rti             ;User Vector 8
 00282 [12] 2777       348  v65     rti             ;User Vector 9
 00284 [12] 2777       349  v66     rti             ;User Vector 10
 00286 [12] 2777       350  v67     rti             ;User Vector 12
 00288 [12] 2777       351  v68     rti             ;User Vector 13
 0028A [12] 2777       352  v69     rti             ;User Vector 14
 0028C [12] 2777       353  v70     rti             ;User Vector 15
 0028E [12] 2777       354  v71     rti             ;User Vector 16
 00290 [12] 2777       355  v72     rti             ;User Vector 17
 00292 [12] 2777       356  v73     rti             ;User Vector 18
 00294 [12] 2777       357  v74     rti             ;User Vector 19
 00296 [12] 2777       358  v75     rti             ;User Vector 20
 00298 [12] 2777       359  v76     rti             ;User Vector 21
 0029A [12] 2777       360  v77     rti             ;User Vector 22
 0029C [12] 2777       361  v78     rti             ;User Vector 23
 0029E [12] 2777       362  v79     rti             ;User Vector 24
 002A0 [12] 2777       363  v80     rti             ;User Vector 25
 002A2 [12] 2777       364  v81     rti             ;User Vector 26
 002A4 [12] 2777       365  v82     rti             ;User Vector 27
 002A6 [12] 2777       366  v83     rti             ;User Vector 28
 002A8 [12] 2777       367  v84     rti             ;User Vector 29
 002AA [12] 2777       368  v85     rti             ;User Vector 30
 002AC [12] 2777       369  v86     rti             ;User Vector 31
 002AE [12] 2777       370  v87     rti             ;User Vector 32
 002B0 [12] 2777       371  v88     rti             ;User Vector 33
 002B2 [12] 2777       372  v89     rti             ;User Vector 34
 002B4 [12] 2777       373  v90     rti             ;User Vector 35
 002B6 [12] 2777       374  v91     rti             ;User Vector 36
 002B8 [12] 2777       375  v92     rti             ;User Vector 37
 002BA [12] 2777       376  v93     rti             ;User Vector 38
 002BC [12] 2777       377  v94     rti             ;User Vector 39
 002BE [12] 2777       378  v95     rti             ;User Vector 40
 002C0 [12] 2777       379  v96     rti             ;User Vector 41
 002C2 [12] 2777       380  v97     rti             ;User Vector 42
 002C4 [12] 2777       381  v98     rti             ;User Vector 43
 002C6 [12] 2777       382  v99     rti             ;User Vector 44
 002C8 [12] 2777       383  v100    rti             ;User Vector 45
 002CA [12] 2777       384  v101    rti             ;User Vector 46
 002CC [12] 2777       385  v102    rti             ;User Vector 47
```

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 002CE [12] 2777       386  v103    rti             ;User Vector 48
 002D0 [12] 2777       387  v104    rti             ;User Vector 49
 002D2 [12] 2777       388  v105    rti             ;User Vector 50
 002D4 [12] 2777       389  v106    rti             ;User Vector 51
 002D6 [12] 2777       390  v107    rti             ;User Vector 52
 002D8 [12] 2777       391  v108    rti             ;User Vector 53
 002DA [12] 2777       392  v109    rti             ;User Vector 54


ASM16VEC.ASM           Assembled with IASM16 09/18/2000  16:47  PAGE 8


 002DC [12] 2777       393  v110    rti             ;User Vector 55
 002DE [12] 2777       394  v111    rti             ;User Vector 56
 002E0 [12] 2777       395  v112    rti             ;User Vector 57
 002E2 [12] 2777       396  v113    rti             ;User Vector 58
 002E4 [12] 2777       397  v114    rti             ;User Vector 59
 002E6 [12] 2777       398  v115    rti             ;User Vector 60
 002E8 [12] 2777       399  v116    rti             ;User Vector 61
 002EA [12] 2777       400  v117    rti             ;User Vector 62
 002EC [12] 2777       401  v118    rti             ;User Vector 63
 002EE [12] 2777       402  v119    rti             ;User Vector 64
 002F0 [12] 2777       403  v120    rti             ;User Vector 65
 002F2 [12] 2777       404  v121    rti             ;User Vector 66
 002F4 [12] 2777       405  v122    rti             ;User Vector 67
 002F6 [12] 2777       406  v123    rti             ;User Vector 68
 002F8 [12] 2777       407  v124    rti             ;User Vector 69
 002FA [12] 2777       408  v125    rti             ;User Vector 70
 002FC [12] 2777       409  v126    rti             ;User Vector 71
 002FE [12] 2777       410  v127    rti             ;User Vector 72
 00300 [12] 2777       411  v128    rti             ;User Vector 73
 00302 [12] 2777       412  v129    rti             ;User Vector 74
 00304 [12] 2777       413  v130    rti             ;User Vector 75
 00306 [12] 2777       414  v131    rti             ;User Vector 76
 00308 [12] 2777       415  v132    rti             ;User Vector 77
 0030A [12] 2777       416  v133    rti             ;User Vector 78
 0030C [12] 2777       417  v134    rti             ;User Vector 79
 0030E [12] 2777       418  v135    rti             ;User Vector 80
 00310 [12] 2777       419  v136    rti             ;User Vector 81
 00312 [12] 2777       420  v137    rti             ;User Vector 82
 00314 [12] 2777       421  v138    rti             ;User Vector 83
 00316 [12] 2777       422  v139    rti             ;User Vector 84
 00318 [12] 2777       423  v140    rti             ;User Vector 85
 0031A [12] 2777       424  v141    rti             ;User Vector 86
 0031C [12] 2777       425  v142    rti             ;User Vector 87
 0031E [12] 2777       426  v143    rti             ;User Vector 88
 00320 [12] 2777       427  v144    rti             ;User Vector 89
 00322 [12] 2777       428  v145    rti             ;User Vector 90
 00324 [12] 2777       429  v146    rti             ;User Vector 91
 00326 [12] 2777       430  v147    rti             ;User Vector 92
 00328 [12] 2777       431  v148    rti             ;User Vector 93
 0032A [12] 2777       432  v149    rti             ;User Vector 94
 0032C [12] 2777       433  v150    rti             ;User Vector 95
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 0032E [12] 2777       434  v151    rti             ;User Vector 96
 00330 [12] 2777       435  v152    rti             ;User Vector 97
 00332 [12] 2777       436  v153    rti             ;User Vector 98
 00334 [12] 2777       437  v154    rti             ;User Vector 99
 00336 [12] 2777       438  v155    rti             ;User Vector 100
 00338 [12] 2777       439  v156    rti             ;User Vector 101
 0033A [12] 2777       440  v157    rti             ;User Vector 102
 0033C [12] 2777       441  v158    rti             ;User Vector 103
 0033E [12] 2777       442  v159    rti             ;User Vector 104
 00340 [12] 2777       443  v160    rti             ;User Vector 105
 00342 [12] 2777       444  v161    rti             ;User Vector 106
 00344 [12] 2777       445  v162    rti             ;User Vector 107
 00346 [12] 2777       446  v163    rti             ;User Vector 108
 00348 [12] 2777       447  v164    rti             ;User Vector 109
 0034A [12] 2777       448  v165    rti             ;User Vector 110
 0034C [12] 2777       449  v166    rti             ;User Vector 111
 0034E [12] 2777       450  v167    rti             ;User Vector 112


ASM16VEC.ASM           Assembled with IASM16 09/18/2000  16:47  PAGE 9


 00350 [12] 2777       451  v168    rti             ;User Vector 113
 00352 [12] 2777       452  v169    rti             ;User Vector 114
 00354 [12] 2777       453  v170    rti             ;User Vector 115
 00356 [12] 2777       454  v171    rti             ;User Vector 116
 00358 [12] 2777       455  v172    rti             ;User Vector 117
 0035A [12] 2777       456  v173    rti             ;User Vector 118
 0035C [12] 2777       457  v174    rti             ;User Vector 119
 0035E [12] 2777       458  v175    rti             ;User Vector 120
 00360 [12] 2777       459  v176    rti             ;User Vector 121
 00362 [12] 2777       460  v177    rti             ;User Vector 122
 00364 [12] 2777       461  v178    rti             ;User Vector 123
 00366 [12] 2777       462  v179    rti             ;User Vector 124
 00368 [12] 2777       463  v180    rti             ;User Vector 125
 0036A [12] 2777       464  v181    rti             ;User Vector 126
 0036C [12] 2777       465  v182    rti             ;User Vector 127
 0036E [12] 2777       466  v183    rti             ;User Vector 128
 00370 [12] 2777       467  v184    rti             ;User Vector 129
 00372 [12] 2777       468  v185    rti             ;User Vector 130
 00374 [12] 2777       469  v186    rti             ;User Vector 131
 00376 [12] 2777       470  v187    rti             ;User Vector 132
 00378 [12] 2777       471  v188    rti             ;User Vector 133
 0037A [12] 2777       472  v189    rti             ;User Vector 134
 0037C [12] 2777       473  v190    rti             ;User Vector 135
 0037E [12] 2777       474  v191    rti             ;User Vector 136
 00380 [12] 2777       475  v192    rti             ;User Vector 137
 00382 [12] 2777       476  v193    rti             ;User Vector 138
 00384 [12] 2777       477  v194    rti             ;User Vector 139
 00386 [12] 2777       478  v195    rti             ;User Vector 140
 00388 [12] 2777       479  v196    rti             ;User Vector 141
 0038A [12] 2777       480  v197    rti             ;User Vector 142
 0038C [12] 2777       481  v198    rti             ;User Vector 143
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 0038E [12] 2777       482  v199    rti             ;User Vector 144
 00390 [12] 2777       483  v200    rti             ;User Vector 145
 00392 [12] 2777       484  v201    rti             ;User Vector 146
 00394 [12] 2777       485  v202    rti             ;User Vector 147
 00396 [12] 2777       486  v203    rti             ;User Vector 148
 00398 [12] 2777       487  v204    rti             ;User Vector 149
 0039A [12] 2777       488  v205    rti             ;User Vector 150
 0039C [12] 2777       489  v206    rti             ;User Vector 151
 0039E [12] 2777       490  v207    rti             ;User Vector 152
 003A0 [12] 2777       491  v208    rti             ;User Vector 153
 003A2 [12] 2777       492  v209    rti             ;User Vector 154
 003A4 [12] 2777       493  v210    rti             ;User Vector 155
 003A6 [12] 2777       494  v211    rti             ;User Vector 156
 003A8 [12] 2777       495  v212    rti             ;User Vector 157
 003AA [12] 2777       496  v213    rti             ;User Vector 158
 003AC [12] 2777       497  v214    rti             ;User Vector 159
 003AE [12] 2777       498  v215    rti             ;User Vector 160
 003B0 [12] 2777       499  v216    rti             ;User Vector 161
 003B2 [12] 2777       500  v217    rti             ;User Vector 162
 003B4 [12] 2777       501  v218    rti             ;User Vector 163
 003B6 [12] 2777       502  v219    rti             ;User Vector 164
 003B8 [12] 2777       503  v220    rti             ;User Vector 165
 003BA [12] 2777       504  v221    rti             ;User Vector 166
 003BC [12] 2777       505  v222    rti             ;User Vector 167
 003BE [12] 2777       506  v223    rti             ;User Vector 168
 003C0 [12] 2777       507  v224    rti             ;User Vector 169
 003C2 [12] 2777       508  v225    rti             ;User Vector 170


ASM16VEC.ASM           Assembled with IASM16 09/18/2000  16:47  PAGE 10


 003C4 [12] 2777       509  v226    rti             ;User Vector 171
 003C6 [12] 2777       510  v227    rti             ;User Vector 172
 003C8 [12] 2777       511  v228    rti             ;User Vector 173
 003CA [12] 2777       512  v229    rti             ;User Vector 174
 003CC [12] 2777       513  v230    rti             ;User Vector 175
 003CE [12] 2777       514  v231    rti             ;User Vector 176
 003D0 [12] 2777       515  v232    rti             ;User Vector 177
 003D2 [12] 2777       516  v233    rti             ;User Vector 178
 003D4 [12] 2777       517  v234    rti             ;User Vector 179
 003D6 [12] 2777       518  v235    rti             ;User Vector 180
 003D8 [12] 2777       519  v236    rti             ;User Vector 181
 003DA [12] 2777       520  v237    rti             ;User Vector 182
 003DC [12] 2777       521  v238    rti             ;User Vector 183
 003DE [12] 2777       522  v239    rti             ;User Vector 184
 003E0 [12] 2777       523  v240    rti             ;User Vector 185
 003E2 [12] 2777       524  v241    rti             ;User Vector 186
 003E4 [12] 2777       525  v242    rti             ;User Vector 187
 003E6 [12] 2777       526  v243    rti             ;User Vector 188
 003E8 [12] 2777       527  v244    rti             ;User Vector 189
 003EA [12] 2777       528  v245    rti             ;User Vector 190
 003EC [12] 2777       529  v246    rti             ;User Vector 191
```

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003EE [12] 2777       530  v247    rti             ;User Vector 192
003F0 [12] 2777       531  v248    rti             ;User Vector 193
003F2 [12] 2777       532  v249    rti             ;User Vector 194
003F4 [12] 2777       533  v250    rti             ;User Vector 195
003F6 [12] 2777       534  v251    rti             ;User Vector 196
003F8 [12] 2777       535  v252    rti             ;User Vector 197
003FA [12] 2777       536  v253    rti             ;User Vector 198
003FC [12] 2777       537  v254    rti             ;User Vector 199
003FE [12] 2777       538  v255    rti             ;User Vector 200
                      539
                      540
```

Assembly Source Code

The following is the assembly source code for the previous listing. This code can be cut and pasted into an assembler for use with a user program.

```
        org $0000


        dw    $0f00   ;Initial ZK, SK and PK
                      ;Replace with correct user value
        dw    $0200   ;Initial Program Counter
                      ;Replace with correct user value
        dw    $3ffc   ;Initial Stack Pointer
                      ;Replace with correct user value
        dw    $f000   ;Initial IZ Register
                      ;Replace with correct user value
        dw    v4      ;Breakpoint
        dw    v5      ;Bus Error
        dw    v6      ;SWI Software Interrupt
        dw    v7      ;Illegal Instruction
        dw    v8      ;Division By Zero
        dw    v9      ;Unassigned, Reserved
        dw    v10     ;Unassigned, Reserved
        dw    v11     ;Unassigned, Reserved
        dw    v12     ;Unassigned, Reserved
        dw    v13     ;Unassigned, Reserved
        dw    v14     ;Unassigned, Reserved
        dw    v15     ;Uninitialized Interrupt
        dw    v16     ;Unassigned
        dw    v17     ;Level 1 Interrupt Autovector
        dw    v18     ;Level 2 Interrupt Autovector
        dw    v19     ;Level 3 Interrupt Autovector
        dw    v20     ;Level 4 Interrupt Autovector
        dw    v21     ;Level 5 Interrupt Autovector
        dw    v22     ;Level 6 Interrupt Autovector
        dw    v23     ;Level 7 Interrupt Autovector
        dw    v24     ;Spurious Interrupt
        dw    v25     ;Unassigned, Reserved
        dw    v26     ;Unassigned, Reserved
        dw    v27     ;Unassigned, Reserved
        dw    v28     ;Unassigned, Reserved
```

```
dw    v29     ;Unassigned, Reserved
dw    v30     ;Unassigned, Reserved
dw    v31     ;Unassigned, Reserved
dw    v32     ;Unassigned, Reserved
dw    v33     ;Unassigned, Reserved
dw    v34     ;Unassigned, Reserved
dw    v35     ;Unassigned, Reserved
dw    v36     ;Unassigned, Reserved
dw    v37     ;Unassigned, Reserved
dw    v38     ;Unassigned, Reserved
dw    v39     ;Unassigned, Reserved
dw    v40     ;Unassigned, Reserved
dw    v41     ;Unassigned, Reserved
dw    v42     ;Unassigned, Reserved
dw    v43     ;Unassigned, Reserved
dw    v44     ;Unassigned, Reserved
dw    v45     ;Unassigned, Reserved
dw    v46     ;Unassigned, Reserved
dw    v47     ;Unassigned, Reserved
dw    v48     ;Unassigned, Reserved
dw    v49     ;Unassigned, Reserved
dw    v50     ;Unassigned, Reserved
dw    v51     ;Unassigned, Reserved
dw    v52     ;Unassigned, Reserved
dw    v53     ;Unassigned, Reserved
dw    v54     ;Unassigned, Reserved
dw    v55     ;Unassigned, Reserved


dw    v56     ;User Defined Vector 0
dw    v57     ;User Defined Vector 1
dw    v58     ;User Defined Vector 2
dw    v59     ;User Defined Vector 3
dw    v60     ;User Defined Vector 4
dw    v61     ;User Defined Vector 5
dw    v62     ;User Defined Vector 6
dw    v63     ;User Defined Vector 7
dw    v64     ;User Defined Vector 8
dw    v65     ;User Defined Vector 9
dw    v66     ;User Defined Vector 10
dw    v67     ;User Defined Vector 11
dw    v68     ;User Defined Vector 12
dw    v69     ;User Defined Vector 13
dw    v70     ;User Defined Vector 14
dw    v71     ;User Defined Vector 15
dw    v72     ;User Defined Vector 16
dw    v73     ;User Defined Vector 17
dw    v74     ;User Defined Vector 18
dw    v75     ;User Defined Vector 19
dw    v76     ;User Defined Vector 20
dw    v77     ;User Defined Vector 22
dw    v78     ;User Defined Vector 23
dw    v79     ;User Defined Vector 24
dw    v80     ;User Defined Vector 25
dw    v81     ;User Defined Vector 26
dw    v82     ;User Defined Vector 27
```

```
dw    v83     ;User Defined Vector 28
dw    v84     ;User Defined Vector 29
dw    v85     ;User Defined Vector 30
dw    v86     ;User Defined Vector 31
dw    v87     ;User Defined Vector 32
dw    v88     ;User Defined Vector 33
dw    v89     ;User Defined Vector 34
dw    v90     ;User Defined Vector 35
dw    v91     ;User Defined Vector 36
dw    v92     ;User Defined Vector 37
dw    v93     ;User Defined Vector 38
dw    v94     ;User Defined Vector 39
dw    v95     ;User Defined Vector 40
dw    v96     ;User Defined Vector 41
dw    v97     ;User Defined Vector 42
dw    v98     ;User Defined Vector 43
dw    v99     ;User Defined Vector 44
dw    v100    ;User Defined Vector 45
dw    v101    ;User Defined Vector 46
dw    v102    ;User Defined Vector 47
dw    v103    ;User Defined Vector 48
dw    v104    ;User Defined Vector 49
dw    v105    ;User Defined Vector 50
dw    v106    ;User Defined Vector 51
dw    v107    ;User Defined Vector 52
dw    v108    ;User Defined Vector 53
dw    v109    ;User Defined Vector 54
dw    v110    ;User Defined Vector 55
dw    v111    ;User Defined Vector 56
dw    v112    ;User Defined Vector 57
dw    v113    ;User Defined Vector 58
dw    v114    ;User Defined Vector 59
dw    v115    ;User Defined Vector 60
dw    v116    ;User Defined Vector 61
dw    v117    ;User Defined Vector 62
dw    v118    ;User Defined Vector 63
dw    v119    ;User Defined Vector 64
dw    v120    ;User Defined Vector 65
dw    v121    ;User Defined Vector 66
dw    v122    ;User Defined Vector 67
dw    v123    ;User Defined Vector 68
dw    v124    ;User Defined Vector 69
dw    v125    ;User Defined Vector 70
dw    v126    ;User Defined Vector 71
dw    v127    ;User Defined Vector 72
dw    v128    ;User Defined Vector 73
dw    v129    ;User Defined Vector 74
dw    v130    ;User Defined Vector 75
dw    v131    ;User Defined Vector 76
dw    v132    ;User Defined Vector 77
dw    v133    ;User Defined Vector 78
dw    v134    ;User Defined Vector 79
dw    v135    ;User Defined Vector 80
dw    v136    ;User Defined Vector 81
dw    v137    ;User Defined Vector 82
dw    v138    ;User Defined Vector 83
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```
dw    v139    ;User Defined Vector 84
dw    v140    ;User Defined Vector 85
dw    v141    ;User Defined Vector 86
dw    v142    ;User Defined Vector 87
dw    v143    ;User Defined Vector 88
dw    v144    ;User Defined Vector 89
dw    v145    ;User Defined Vector 90
dw    v146    ;User Defined Vector 91
dw    v147    ;User Defined Vector 92
dw    v148    ;User Defined Vector 93
dw    v149    ;User Defined Vector 94
dw    v150    ;User Defined Vector 95
dw    v151    ;User Defined Vector 96
dw    v152    ;User Defined Vector 97
dw    v153    ;User Defined Vector 98
dw    v154    ;User Defined Vector 99
dw    v155    ;User Defined Vector 100
dw    v156    ;User Defined Vector 101
dw    v157    ;User Defined Vector 102
dw    v158    ;User Defined Vector 103
dw    v159    ;User Defined Vector 104
dw    v160    ;User Defined Vector 105
dw    v161    ;User Defined Vector 106
dw    v162    ;User Defined Vector 107
dw    v163    ;User Defined Vector 108
dw    v164    ;User Defined Vector 109
dw    v165    ;User Defined Vector 110
dw    v166    ;User Defined Vector 111
dw    v167    ;User Defined Vector 112
dw    v168    ;User Defined Vector 113
dw    v169    ;User Defined Vector 114
dw    v170    ;User Defined Vector 115
dw    v171    ;User Defined Vector 116
dw    v172    ;User Defined Vector 117
dw    v173    ;User Defined Vector 118
dw    v174    ;User Defined Vector 119
dw    v175    ;User Defined Vector 120
dw    v176    ;User Defined Vector 121
dw    v177    ;User Defined Vector 122
dw    v178    ;User Defined Vector 123
dw    v179    ;User Defined Vector 124
dw    v180    ;User Defined Vector 125
dw    v181    ;User Defined Vector 126
dw    v182    ;User Defined Vector 127
dw    v183    ;User Defined Vector 128
dw    v184    ;User Defined Vector 129
dw    v185    ;User Defined Vector 130
dw    v186    ;User Defined Vector 131
dw    v187    ;User Defined Vector 132
dw    v188    ;User Defined Vector 133
dw    v189    ;User Defined Vector 134
dw    v190    ;User Defined Vector 135
dw    v191    ;User Defined Vector 136
dw    v192    ;User Defined Vector 137
dw    v193    ;User Defined Vector 138
dw    v194    ;User Defined Vector 139
```

```
dw    v195    ;User Defined Vector 140
dw    v196    ;User Defined Vector 141
dw    v197    ;User Defined Vector 142
dw    v198    ;User Defined Vector 143
dw    v199    ;User Defined Vector 144
dw    v200    ;User Defined Vector 145
dw    v201    ;User Defined Vector 146
dw    v202    ;User Defined Vector 147
dw    v203    ;User Defined Vector 148
dw    v204    ;User Defined Vector 149
dw    v205    ;User Defined Vector 150
dw    v206    ;User Defined Vector 151
dw    v207    ;User Defined Vector 152
dw    v208    ;User Defined Vector 153
dw    v209    ;User Defined Vector 154
dw    v210    ;User Defined Vector 155
dw    v211    ;User Defined Vector 156
dw    v212    ;User Defined Vector 157
dw    v213    ;User Defined Vector 158
dw    v214    ;User Defined Vector 159
dw    v215    ;User Defined Vector 160
dw    v216    ;User Defined Vector 161
dw    v217    ;User Defined Vector 162
dw    v218    ;User Defined Vector 163
dw    v219    ;User Defined Vector 164
dw    v220    ;User Defined Vector 165
dw    v221    ;User Defined Vector 166
dw    v222    ;User Defined Vector 167
dw    v223    ;User Defined Vector 168
dw    v224    ;User Defined Vector 169
dw    v225    ;User Defined Vector 170
dw    v226    ;User Defined Vector 171
dw    v227    ;User Defined Vector 172
dw    v228    ;User Defined Vector 173
dw    v229    ;User Defined Vector 174
dw    v230    ;User Defined Vector 175
dw    v231    ;User Defined Vector 176
dw    v232    ;User Defined Vector 177
dw    v233    ;User Defined Vector 178
dw    v234    ;User Defined Vector 179
dw    v235    ;User Defined Vector 180
dw    v236    ;User Defined Vector 181
dw    v237    ;User Defined Vector 182
dw    v238    ;User Defined Vector 183
dw    v239    ;User Defined Vector 184
dw    v240    ;User Defined Vector 185
dw    v241    ;User Defined Vector 186
dw    v242    ;User Defined Vector 187
dw    v243    ;User Defined Vector 188
dw    v244    ;User Defined Vector 189
dw    v245    ;User Defined Vector 190
dw    v246    ;User Defined Vector 191
dw    v247    ;User Defined Vector 192
dw    v248    ;User Defined Vector 193
dw    v249    ;User Defined Vector 194
dw    v250    ;User Defined Vector 195
```

```
        dw    v251    ;User Defined Vector 196
        dw    v252    ;User Defined Vector 197
        dw    v253    ;User Defined Vector 198
        dw    v254    ;User Defined Vector 199
        dw    v255    ;User Defined Vector 200


        org $0200       ;Location $200 is the first address
                        ;after the exception vector table.
                        ;The org statement could be anywhere
                        ;in memory.


v0      fcb $00,$00     ;Reset: Initial ZK, SK and PK
v1      fcb $02,$00     ;Reset: Initial Program Counter
v2      fcb $3f,$fc     ;Reset: Initial Stack Pointer
v3      fcb $f0,$00     ;Reset: Initial IZ Register
                        ;The values at v0, v1, v2 and v3 are
                        ;never used.  They are simply put here
                        ;as place holders so that the label
                        ;v4 will start at address $0008
v4      rti             ;Breakpoint
v5      rti             ;BERR
v6      rti             ;Software Interrupt
v7      rti             ;Illegal Instruction
v8      rti             ;Division by Zero
v9      rti             ;Unassigned
v10     rti             ;Unassigned
v11     rti             ;Unassigned
v12     rti             ;Unassigned
v13     rti             ;Unassigned
v14     rti             ;Unassigned
v15     rti             ;Unitialized Interrupt
v16     rti             ;Unassigned
v17     rti             ;Level 1 Autovector
v18     rti             ;Level 2 Autovector
v19     rti             ;Level 3 Autovector
v20     rti             ;Level 4 Autovector
v21     rti             ;Level 5 Autovector
v22     rti             ;Level 6 Autovector
v23     rti             ;Level 7 Autovector
v24     rti             ;Spurious Interrupt
v25     rti             ;Unassigned, Reserved
v26     rti             ;Unassigned, Reserved
v27     rti             ;Unassigned, Reserved
v28     rti             ;Unassigned, Reserved
v29     rti             ;Unassigned, Reserved
v30     rti             ;Unassigned, Reserved
v31     rti             ;Unassigned, Reserved
v32     rti             ;Unassigned, Reserved
v33     rti             ;Unassigned, Reserved
v34     rti             ;Unassigned, Reserved
v35     rti             ;Unassigned, Reserved
v36     rti             ;Unassigned, Reserved
```

```
v37     rti             ;Unassigned, Reserved
v38     rti             ;Unassigned, Reserved
v39     rti             ;Unassigned, Reserved
v40     rti             ;Unassigned, Reserved
v41     rti             ;Unassigned, Reserved
v42     rti             ;Unassigned, Reserved
v43     rti             ;Unassigned, Reserved
v44     rti             ;Unassigned, Reserved
v45     rti             ;Unassigned, Reserved
v46     rti             ;Unassigned, Reserved
v47     rti             ;Unassigned, Reserved
v48     rti             ;Unassigned, Reserved
v49     rti             ;Unassigned, Reserved
v50     rti             ;Unassigned, Reserved
v51     rti             ;Unassigned, Reserved
v52     rti             ;Unassigned, Reserved
v53     rti             ;Unassigned, Reserved
v54     rti             ;Unassigned, Reserved
v55     rti             ;Unassigned, Reserved
v56     rti             ;User Vector 0
v57     rti             ;User Vector 1
v58     rti             ;User Vector 2
v59     rti             ;User Vector 3
v60     rti             ;User Vector 4
v61     rti             ;User Vector 5
v62     rti             ;User Vector 6
v63     rti             ;User Vector 7
v64     rti             ;User Vector 8
v65     rti             ;User Vector 9
v66     rti             ;User Vector 10
v67     rti             ;User Vector 12
v68     rti             ;User Vector 13
v69     rti             ;User Vector 14
v70     rti             ;User Vector 15
v71     rti             ;User Vector 16
v72     rti             ;User Vector 17
v73     rti             ;User Vector 18
v74     rti             ;User Vector 19
v75     rti             ;User Vector 20
v76     rti             ;User Vector 21
v77     rti             ;User Vector 22
v78     rti             ;User Vector 23
v79     rti             ;User Vector 24
v80     rti             ;User Vector 25
v81     rti             ;User Vector 26
v82     rti             ;User Vector 27
v83     rti             ;User Vector 28
v84     rti             ;User Vector 29
v85     rti             ;User Vector 30
v86     rti             ;User Vector 31
v87     rti             ;User Vector 32
v88     rti             ;User Vector 33
v89     rti             ;User Vector 34
v90     rti             ;User Vector 35
v91     rti             ;User Vector 36
v92     rti             ;User Vector 37
```

```
v93     rti             ;User Vector 38
v94     rti             ;User Vector 39
v95     rti             ;User Vector 40
v96     rti             ;User Vector 41
v97     rti             ;User Vector 42
v98     rti             ;User Vector 43
v99     rti             ;User Vector 44
v100    rti             ;User Vector 45
v101    rti             ;User Vector 46
v102    rti             ;User Vector 47
v103    rti             ;User Vector 48
v104    rti             ;User Vector 49
v105    rti             ;User Vector 50
v106    rti             ;User Vector 51
v107    rti             ;User Vector 52
v108    rti             ;User Vector 53
v109    rti             ;User Vector 54
v110    rti             ;User Vector 55
v111    rti             ;User Vector 56
v112    rti             ;User Vector 57
v113    rti             ;User Vector 58
v114    rti             ;User Vector 59
v115    rti             ;User Vector 60
v116    rti             ;User Vector 61
v117    rti             ;User Vector 62
v118    rti             ;User Vector 63
v119    rti             ;User Vector 64
v120    rti             ;User Vector 65
v121    rti             ;User Vector 66
v122    rti             ;User Vector 67
v123    rti             ;User Vector 68
v124    rti             ;User Vector 69
v125    rti             ;User Vector 70
v126    rti             ;User Vector 71
v127    rti             ;User Vector 72
v128    rti             ;User Vector 73
v129    rti             ;User Vector 74
v130    rti             ;User Vector 75
v131    rti             ;User Vector 76
v132    rti             ;User Vector 77
v133    rti             ;User Vector 78
v134    rti             ;User Vector 79
v135    rti             ;User Vector 80
v136    rti             ;User Vector 81
v137    rti             ;User Vector 82
v138    rti             ;User Vector 83
v139    rti             ;User Vector 84
v140    rti             ;User Vector 85
v141    rti             ;User Vector 86
v142    rti             ;User Vector 87
v143    rti             ;User Vector 88
v144    rti             ;User Vector 89
v145    rti             ;User Vector 90
v146    rti             ;User Vector 91
v147    rti             ;User Vector 92
v148    rti             ;User Vector 93
```

```
v149    rti             ;User Vector 94
v150    rti             ;User Vector 95
v151    rti             ;User Vector 96
v152    rti             ;User Vector 97
v153    rti             ;User Vector 98
v154    rti             ;User Vector 99
v155    rti             ;User Vector 100
v156    rti             ;User Vector 101
v157    rti             ;User Vector 102
v158    rti             ;User Vector 103
v159    rti             ;User Vector 104
v160    rti             ;User Vector 105
v161    rti             ;User Vector 106
v162    rti             ;User Vector 107
v163    rti             ;User Vector 108
v164    rti             ;User Vector 109
v165    rti             ;User Vector 110
v166    rti             ;User Vector 111
v167    rti             ;User Vector 112
v168    rti             ;User Vector 113
v169    rti             ;User Vector 114
v170    rti             ;User Vector 115
v171    rti             ;User Vector 116
v172    rti             ;User Vector 117
v173    rti             ;User Vector 118
v174    rti             ;User Vector 119
v175    rti             ;User Vector 120
v176    rti             ;User Vector 121
v177    rti             ;User Vector 122
v178    rti             ;User Vector 123
v179    rti             ;User Vector 124
v180    rti             ;User Vector 125
v181    rti             ;User Vector 126
v182    rti             ;User Vector 127
v183    rti             ;User Vector 128
v184    rti             ;User Vector 129
v185    rti             ;User Vector 130
v186    rti             ;User Vector 131
v187    rti             ;User Vector 132
v188    rti             ;User Vector 133
v189    rti             ;User Vector 134
v190    rti             ;User Vector 135
v191    rti             ;User Vector 136
v192    rti             ;User Vector 137
v193    rti             ;User Vector 138
v194    rti             ;User Vector 139
v195    rti             ;User Vector 140
v196    rti             ;User Vector 141
v197    rti             ;User Vector 142
v198    rti             ;User Vector 143
v199    rti             ;User Vector 144
v200    rti             ;User Vector 145
v201    rti             ;User Vector 146
v202    rti             ;User Vector 147
v203    rti             ;User Vector 148
v204    rti             ;User Vector 149
```

```
v205    rti             ;User Vector 150
v206    rti             ;User Vector 151
v207    rti             ;User Vector 152
v208    rti             ;User Vector 153
v209    rti             ;User Vector 154
v210    rti             ;User Vector 155
v211    rti             ;User Vector 156
v212    rti             ;User Vector 157
v213    rti             ;User Vector 158
v214    rti             ;User Vector 159
v215    rti             ;User Vector 160
v216    rti             ;User Vector 161
v217    rti             ;User Vector 162
v218    rti             ;User Vector 163
v219    rti             ;User Vector 164
v220    rti             ;User Vector 165
v221    rti             ;User Vector 166
v222    rti             ;User Vector 167
v223    rti             ;User Vector 168
v224    rti             ;User Vector 169
v225    rti             ;User Vector 170
v226    rti             ;User Vector 171
v227    rti             ;User Vector 172
v228    rti             ;User Vector 173
v229    rti             ;User Vector 174
v230    rti             ;User Vector 175
v231    rti             ;User Vector 176
v232    rti             ;User Vector 177
v233    rti             ;User Vector 178
v234    rti             ;User Vector 179
v235    rti             ;User Vector 180
v236    rti             ;User Vector 181
v237    rti             ;User Vector 182
v238    rti             ;User Vector 183
v239    rti             ;User Vector 184
v240    rti             ;User Vector 185
v241    rti             ;User Vector 186
v242    rti             ;User Vector 187
v243    rti             ;User Vector 188
v244    rti             ;User Vector 189
v245    rti             ;User Vector 190
v246    rti             ;User Vector 191
v247    rti             ;User Vector 192
v248    rti             ;User Vector 193
v249    rti             ;User Vector 194
v250    rti             ;User Vector 195
v251    rti             ;User Vector 196
v252    rti             ;User Vector 197
v253    rti             ;User Vector 198
v254    rti             ;User Vector 199
v255    rti             ;User Vector 200
```

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