

## A Brief Guide to DCE/FSW for Code Walkthru

The version selected for review is named v17000, in celebration of its status elevation. This version satisfies many, but not all, requirements. Most importantly, this version establishes a design baseline upon which all future versions will be compatible (or in other words, you will always be able to upload a patch to this basic design, except to initialization). The following functions have not been completed:

- HV State commands are not implemented.
- Digitizer commands that implement a B segment or Y axis have been coded but not tested
- HST error parameter is not being returned properly;
- The Count-Rate-Protection (CRP) algorithm is not functioning properly
- The background CRC test does not work properly.
- (Temp limits check not implemented)
- (PMON limit check not implemented)

The software is composed of the following source files:

- Common.inc, which is included at the top of all the source code files. The include file describes the memory map of the DCE, some named constants, and the interfaces among the source code files.
- Initialz.a51, which defines the code executing starting at address 0 after power-on or any reset.
- Executiv.a51, which defines the timing and function of the FSW mainloop.
- Commands.a51, which defines the function of every command accepted by the DCE.
- Internal.a51, which defines some background routines and 8051-specific utilities.
- Patchcst.a51, which defines regions of code-referenced constants.

The assembler generates the following listing files:

- Initialz.lst
- Executiv.lst
- Commands.lst
- Internal.lst
- Patchcst.lst

These files contain useful information about how the source code was assembled.

The creation of boot or operate code images is a function of the linker parameter file:

- Bootmode, which locates all code in PROM, so code executes in PROM (boot mode).
- Lower, which locates code, except initialz, in the LCA (operate mode) memory region.
- Upper, which locates code, except initialz, in UCA (operate mode) memory region.

The linker creates one of the following map files:

- Bootmode.m51
- Lower.m51
- Upper.m51

NOTE: To start reading the code as executed by the DCE, start with DPUINIT in module Initialz, which is executed after power on or any reset.

Index to labels referenced in \*.lst listing files:

Label	Module	Page
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aARMED:	COMMANDS	13
ABORT_RESET:	COMMANDS	39
ACT1_BIT:	PATCHCST	16
ACT2_BIT:	PATCHCST	17
ACTIVE:	EXECUTIV	15
ACT_1_ON:	COMMANDS	37
ACT_2_ON:	COMMANDS	37
ACT_EN_BIT:	PATCHCST	17
ACT_RESET:	COMMANDS	38
ADD3BYTE:	EXECUTIV	13
ADDIDX:	EXECUTIV	31
ADDLP:	EXECUTIV	31
ADVANCE:	EXECUTIV	29
aJMPCODE:	COMMANDS	9
ALLDONE:	INTERNAL	19
AL_EXIT:	EXECUTIV	24
AL_STATE0:	EXECUTIV	24
AL_STATE1:	EXECUTIV	24
AL_STATE2:	EXECUTIV	24
AL_STATE3:	EXECUTIV	24
AL_STATE:	PATCHCST	2
AL_TBL:	EXECUTIV	24
ARMED_OK:	COMMANDS	13
AR_EXIT:	EXECUTIV	25
AR_STATE0:	EXECUTIV	25
AR_STATE1:	EXECUTIV	25
AR_STATE2:	EXECUTIV	25
AR_STATE3:	EXECUTIV	25
AR_STATE:	PATCHCST	2
AR_TBL:	EXECUTIV	25
ASSERTED:	PATCHCST	17
AUXIINFO:	PATCHCST	7
AUX_ISR:	INTERNAL	5
AUX_PWR_ENA_BIT:	PATCHCST	17
aZAP_TS30:	COMMANDS	9
B0D_CRC:	COMMANDS	51
B1D_CRC:	COMMANDS	51
B2D_CRC:	COMMANDS	52
BACKGROUND:	INTERNAL	17
BACKTRACK:	INTERNAL	17
BAD_CRC:	COMMANDS	50
BAD_LENGTH:	COMMANDS	50
BAILOUT:	INTERNAL	4
BEG_WALK:	PATCHCST	8
BEG_WLK_A:	COMMANDS	34
BEG_WLK_B:	COMMANDS	34
BIT_DISARM:	COMMANDS	13
BIT_DONE:	COMMANDS	13
BKGACTIVITY:	EXECUTIV	48
BLINK_LEDS:	INITIALZ	5
BRG_TBL:	COMMANDS	45
BRIDGE_CLOSE:	COMMANDS	45
BRIDGE_OFF:	COMMANDS	45

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BRIDGE_SHORT:	COMMANDS	45
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BYTE_CONT:	INTERNAL	20
BYTE_MOVE:	INTERNAL	20
BYTE_MOVX:	INTERNAL	20
B_SIDE:	COMMANDS	29
cACT_ENA:	COMMANDS	38
CALCDIFF:	EXECUTIV	12
CALCEK:	EXECUTIV	12
CALC_CRC:	COMMANDS	58
CALC_IT:	EXECUTIV	11
CALC_ITEMS:	EXECUTIV	13
cAUX_PWR_ENA:	COMMANDS	39
CCR_EXIT:	COMMANDS	58
CDCTABLE:	PATCHCST	8
CDC_A_OUT:	COMMANDS	13
CDC_B_OUT:	COMMANDS	14
cFORMAT:	COMMANDS	26
changed:	INTERNAL	18
CHECK1HZ:	EXECUTIV	47
CHECK:	COMMANDS	11
CHECKBOOT:	COMMANDS	63
CHECKBREADBOARD:	INITIALZ	11
CHECKCMD:	EXECUTIV	46
CHECKED:	EXECUTIV	14
CHECKFAST:	EXECUTIV	48
CHECKGP:	EXECUTIV	44
CHECKING:	EXECUTIV	36
CHECKRXD:	INTERNAL	3
CHECKRXDFLAG:	EXECUTIV	32
CHECK_ACT_LATCH:	EXECUTIV	23
CHECK_ACT_RESET:	EXECUTIV	24
CHECK_COMMAND:	COMMANDS	54
CHECK_CRC:	COMMANDS	51
CHECK_HV_I:	EXECUTIV	39
CHECK_I:	EXECUTIV	36
CHECK_MOTOR_TICK:	EXECUTIV	25
CHECK_NEXT_PARAM:	COMMANDS	55
CHECK_RAMP:	EXECUTIV	21
CHECK_STACK:	EXECUTIV	27
CLEANUP:	COMMANDS	16
CLOCK_TICK:	PATCHCST	17
CLOCK_TOCK:	PATCHCST	17
CLRSOMEBITS:	INITIALZ	14
CLR_LEDS:	INTERNAL	11
CLR_RI:	INTERNAL	9
CLR_SER_IE:	INTERNAL	9
CLR_TI:	INTERNAL	9
CMDACTIVITY:	EXECUTIV	46
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CMUXTABLE:	PATCHCST	9
CODESpace:	PATCHCST	17
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CONTEXT:	PATCHCST	2
CONVERT_A2D:	EXECUTIV	6
COPYRITE:	EXECUTIV	35
COSCDC:	COMMANDS	29
COSPHD:	EXECUTIV	5
COUNTERTABLE:	PATCHCST	7
COUNT_CMDS_RXD:	COMMANDS	58
CPROMS:	COMMANDS	16
CRCBANNER:	PATCHCST	18
CRCH:	PATCHCST	2
CRCL:	PATCHCST	2
CRCONLY:	INTERNAL	20
CRCPADD:	EXECUTIV	2
CRCPADX:	EXECUTIV	35
CRCSAVEH:	PATCHCST	2
CRCSAVEL:	PATCHCST	2
CRCXONLY:	INTERNAL	20
CRCZONLY:	INTERNAL	21
CRPMODE:	COMMANDS	29
cSCRUB_ON:	COMMANDS	27
CTR0:	PATCHCST	2
CTR1:	PATCHCST	2
CTRS_FLAG:	PATCHCST	17
DBAD_LENGTH:	COMMANDS	52
DEBUGG:	COMMANDS	9
DELAY_20:	EXECUTIV	6
DENDADDROK:	COMMANDS	52
DH:	PATCHCST	2
DIAG_PTR:	PATCHCST	2
DL:	PATCHCST	2
dLOOP:	COMMANDS	61
DMOVE_LOOP:	COMMANDS	53
DMPPACKET:	EXECUTIV	43
DOCRC:	INTERNAL	11
DOG_WOOF:	INITIALZ	6
DOOR_I_MAX:	COMMANDS	49
DOOR_STOP:	EXECUTIV	26
DOTHIS:	EXECUTIV	40
DOTOGL:	EXECUTIV	32
DO_AGIN9:	INTERNAL	14
DO_TEST0:	COMMANDS	7
DO_TEST10:	COMMANDS	7
DO_TEST11:	COMMANDS	7
DO_TEST12:	COMMANDS	7
DO_TEST13:	COMMANDS	7
DO_TEST14:	COMMANDS	7
DO_TEST15:	COMMANDS	7
DO_TEST16:	COMMANDS	7
DO_TEST17:	COMMANDS	7
DO_TEST18:	COMMANDS	7

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DO_TEST1:	COMMANDS	7
DO_TEST1A:	COMMANDS	8
DO_TEST1B:	COMMANDS	8
DO_TEST1C:	COMMANDS	8
DO_TEST1D:	COMMANDS	8
DO_TEST1E:	COMMANDS	8
DO_TEST1F:	COMMANDS	8
DO_TEST20:	COMMANDS	8
DO_TEST2:	COMMANDS	7
DO_TEST3:	COMMANDS	7
DO_TEST4:	COMMANDS	7
DO_TEST5:	COMMANDS	7
DO_TEST6:	COMMANDS	7
DO_TEST7:	COMMANDS	7
DO_TEST8:	COMMANDS	7
DO_TEST9:	COMMANDS	7
DO_TESTA:	COMMANDS	7
DO_TESTB:	COMMANDS	7
DO_TESTC:	COMMANDS	7
DO_TESTD:	COMMANDS	7
DO_TESTE:	COMMANDS	7
DO_TESTF:	COMMANDS	7
DPUINIT:	INITIALZ	18
DUMMYB:	PATCHCST	18
DUMMYBIT02:	PATCHCST	18
DUMMYBIT03:	PATCHCST	18
DUMMYBIT04:	PATCHCST	18
DUMMYBIT05:	PATCHCST	18
DUMMYBIT06:	PATCHCST	18
DUMP:	COMMANDS	52
dUPLOAD:	COMMANDS	50
DUPL_COMPLETE:	COMMANDS	53
E0_ISR:	INTERNAL	5
E1_ISR:	INTERNAL	5
ENDADDROK:	COMMANDS	50
endramp:	EXECUTIV	21
END_COMMAND:	COMMANDS	9
END_ITEST:	EXECUTIV	26
END_MOVE:	INTERNAL	21
END_WALK:	PATCHCST	8
END_WLK_A:	COMMANDS	34
END_WLK_B:	COMMANDS	34
ESSENTIAL:	EXECUTIV	9
ESS_FLAG:	PATCHCST	17
EVERYTIME:	EXECUTIV	6
FEED_DOG:	INTERNAL	8
FETCHACC:	INTERNAL	16
FETCHC:	EXECUTIV	7
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fFAST:	INTERNAL	8
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FINDRESETTYPE:	INITIALZ	6
FIRST:	INITIALZ	7
FLAGUPDATED:	COMMANDS	11
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FLB_MUX:	EXECUTIV	23
FLB_TS:	EXECUTIV	23
FNEXTC:	EXECUTIV	7
FORLOOP:	EXECUTIV	13
FORMAT_BIT:	PATCHCST	17
FROMC2DE:	INTERNAL	20
FROMCODE:	INTERNAL	20
FROMDATA:	COMMANDS	60
fSLOW:	INTERNAL	7
fSLOW:	INTERNAL	8
GALPHD:	EXECUTIV	5
GDGBOFFX:	COMMANDS	33
GDGBOFFY:	COMMANDS	33
GDGBSCLX:	COMMANDS	33
GDGBSCLY:	COMMANDS	34
GDGBWKY:	COMMANDS	34
GDGEOFFX:	COMMANDS	30
GDGEOFFY:	COMMANDS	30
GDGESCLX:	COMMANDS	30
GDGESCLY:	COMMANDS	30
GDGEWKY:	COMMANDS	35
GDGTTY:	COMMANDS	31
GETIMAGE:	EXECUTIV	32
GETMUXINFO:	EXECUTIV	7
GETVAL:	EXECUTIV	31
GF0:	PATCHCST	18
GMUXTABLE:	PATCHCST	12
GOODENOUGH:	EXECUTIV	32
GOOD_1_CMD:	COMMANDS	54
GOOD_2_CMD:	COMMANDS	55
GOOD_BOY:	COMMANDS	39
GOOD_CNT:	EXECUTIV	14
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GOOD_LO_PARAMS:	COMMANDS	55
GOOD_NZ_PTR:	EXECUTIV	27
GOTO:	COMMANDS	9
GO_S:	EXECUTIV	15
GPFLAG:	PATCHCST	17
GPROMS:	COMMANDS	16
GPTICK:	EXECUTIV	44
GPTMR:	PATCHCST	2
HARD_RESET:	COMMANDS	34
HARD_TEST:	INITIALZ	7
HA_STATE:	PATCHCST	2
HB_STATE:	PATCHCST	2
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HEXBIT:	INTERNAL	9
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HKPACTIVITY:	EXECUTIV	43
HKPBUFF:	PATCHCST	37
HKPFULL:	COMMANDS	58
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HKPPACKET:	EXECUTIV	43
HKPTIMEO:	EXECUTIV	28
HKPTMR:	PATCHCST	2
HKPUPDATE:	EXECUTIV	44
HKP_FULL:	PATCHCST	18
HKP_SECOND:	INTERNAL	7
HSTERR_TABLE:	PATCHCST	4
HVArampcnt:	PATCHCST	3
HVAsetting:	PATCHCST	3
HVAtarget:	PATCHCST	3
HVBrampcnt:	PATCHCST	3
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HVI_DELAY:	PATCHCST	2
HVNOMINAL:	COMMANDS	29
HVNOMINBL:	COMMANDS	29
HVQ_ON:	COMMANDS	22
HVQ_ON_BIT:	PATCHCST	17
HVRAMP:	PATCHCST	2
HVSDA:	PATCHCST	17
HVSDB:	PATCHCST	17
HV_ARM:	COMMANDS	24
HV_ARM_BIT:	PATCHCST	17
HV_A_CMD:	COMMANDS	19
HV_A_DAC:	COMMANDS	19
HV_A_MAX:	COMMANDS	21
HV_A_UPDATE:	COMMANDS	18
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HV_B_DAC:	COMMANDS	20
HV_B_MAX:	COMMANDS	21
HV_B_UPDATE:	COMMANDS	19
HV_I_MAX:	COMMANDS	48
HV_ON:	COMMANDS	24
HV_ON_BIT:	PATCHCST	17
IDISABLED:	EXECUTIV	36
ILLEGFMT:	PATCHCST	18
Image0:	PATCHCST	2
Image1:	PATCHCST	2
Image2:	PATCHCST	3
Image3:	PATCHCST	3
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INANYCASE:	EXECUTIV	6
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INC_COMPLETE:	COMMANDS	57
INITCMDIMAGE:	EXECUTIV	32
INITIALIZATION:	INITIALZ	17
INITMEMORYMONITORS:	INITIALZ	15
INIT_REGION:	INTERNAL	14
INIT_T0:	INTERNAL	5
INIT_TEST_BKGRND:	INTERNAL	14
INIT_WD:	INTERNAL	8
INSTAT:	INTERNAL	9
IP_1_ON:	COMMANDS	25
IP_1_ON_BIT:	PATCHCST	17
IP_2_ON:	COMMANDS	25
IP_2_ON_BIT:	PATCHCST	17
IP_ENA:	COMMANDS	25
IP_ENA_BIT:	PATCHCST	17
ISAMPLE:	PATCHCST	2
IVTIMAGE:	INTERNAL	67
IVTINDIR:	INTERNAL	11
IVTPATCH:	EXECUTIV	33
JMPCODE:	COMMANDS	49
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LastErrInfo:	PATCHCST	3
LASTSAMPLE:	PATCHCST	18
LAST_CH:	PATCHCST	2
LAST_SAMPLE:	EXECUTIV	38
LATCH_FLAG:	PATCHCST	18
LCHANGED:	EXECUTIV	28
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LLOOP:	EXECUTIV	33
LOADCNTS:	EXECUTIV	12
LOADPOR:	INITIALZ	5
LOADPTR:	INTERNAL	17
LOADTEMP:	EXECUTIV	13
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LOAD_CONTEXT:	INTERNAL	16
LOAD_MEMPTR:	INTERNAL	14
LOAD_RAM_CODE:	INITIALZ	4
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LWR_T_THR_A:	COMMANDS	30
LWR_T_THR_B:	COMMANDS	31
MAINROUTINE:	EXECUTIV	49
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MASK_SELECT:	PATCHCST	18
MAX_TRIGD:	EXECUTIV	26
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MEMPTR:	PATCHCST	2
MEM_COPY:	COMMANDS	60
MMVALUE:	EXECUTIV	31
MM_BAD:	EXECUTIV	30
MM_COD:	EXECUTIV	30
MM_EXT:	EXECUTIV	30
MM_INT:	EXECUTIV	30
MM_TBL:	EXECUTIV	30
MODE:	COMMANDS	10
MODREGION:	COMMANDS	58
MON51RECURSIONF:	PATCHCST	17
MoreErrInfo:	PATCHCST	3
MOTORTMR:	PATCHCST	2
MOTOR_ARM:	COMMANDS	40
MOTOR_ARM_BIT:	PATCHCST	17
MOTOR_CNTRL:	COMMANDS	40
MOTOR_CNTRL_A_BIT:	PATCHCST	17
MOTOR_CNTRL_B_BIT:	PATCHCST	17
MOTOR_ENA:	COMMANDS	40
MOTOR_ENA_BIT:	PATCHCST	17
MOTOR_OFF:	EXECUTIV	26
MOTOR_SAFETY_OVERRI:	COMMANDS	40
MOVE_AGAIN:	COMMANDS	51
MOVE_LOOP:	COMMANDS	51
MSG_JMPG:	COMMANDS	49
MUSTBEOK:	INTERNAL	4
MUSTBEOVER:	COMMANDS	36
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MUXLOOP:	EXECUTIV	9
MUX_BWALY:	PATCHCST	9
MUX_B_WALK_X:	PATCHCST	8
MUX_EWALY:	PATCHCST	9
MUX_E_WALK_X:	PATCHCST	8
MUX_FLAG:	PATCHCST	17
MUX_GND1:	PATCHCST	9
MUX_GND2:	PATCHCST	9
MUX_GND3:	PATCHCST	9
MUX_M15V:	PATCHCST	9
MUX_M52V:	PATCHCST	9
MUX_P15V:	PATCHCST	9
MUX_QLO:	PATCHCST	8
MUX_QUP:	PATCHCST	8
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MUX_XSTRETCE:	PATCHCST	8
MUX_XSTRETCH:	PATCHCST	8
MUX_YSHIFE:	PATCHCST	8
MUX_YSHIFT:	PATCHCST	8
MUX_YSTRETCE:	PATCHCST	9
MUX_YSTRETCH:	PATCHCST	9
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NEXT_BYTE:	COMMANDS	57
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NoDiag:	INTERNAL	19
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NORELOAD:	EXECUTIV	6
NOREPORT:	EXECUTIV	11
NOROLL_A:	EXECUTIV	9
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NOTCODE:	EXECUTIV	32
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NOZAPPING:	EXECUTIV	44
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NO_INCREASE:	EXECUTIV	10
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RDIAG0023:	EXECUTIV	10
REAL_THING:	INITIALZ	12
REENTRY:	EXECUTIV	40
REGION0:	PATCHCST	15
REGION1:	PATCHCST	15
REGION2:	PATCHCST	15
REGION3:	PATCHCST	15
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REGION5:	PATCHCST	16
REGION6:	PATCHCST	16
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Reserved:	PATCHCST	3
RESETBIT:	COMMANDS	16
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