# Appendix D

# Description of Files on the Companion Websites

In this book, many MATLAB, Simulink, C, and assembly programs are used for examples and experiments. These programs and related coefficient and data files are available on the companion CD and websites. These files are described and listed in this appendix.

## D.1 CHAPTER 1

The seven files used in Chapter 1 are located in the folder `chap1` and can be copied to the subdirectory `c:/dsps/chap1`. The files are listed in the following table:

| Files | Descriptions |
| --- | --- |
| exp1c54.asm | C54x assembly code for use in Section 1.7.1 |
| exp1c55.asm | C55x assembly code for use in Section 1.7.1 |
| exp1c54.cmd | C54x linker-command file for use in Section 1.7.1 |
| exp1c55.cmd | C55x linker-command file for use in Section 1.7.1 |
| exp1.m | MATLAB program M-file that generates the data used in Section 1.7.1 |
| try1c55.asm | C55x assembly code for use in the Problems section |
| try1c54.asm | C55x assembly code for use in the Problems section |

## D.2 CHAPTER 2

The 28 files used in Chapter 2 are located in the folder `chap2` and can be copied to the subdirectory `c:/dsps/chap2`. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| exmp2_1.m | MATLAB M-file for use in Example 2.1 |
| sn.dat | Data file generated from `exmp2_1.m` |
| exmp2_2.m | MATLAB M-file for use in Example 2.2 |
| xngen.m | MATLAB M-file for generating a noisy sinewave for Example 2.4 |
| xn.dat | Data file generated from `xngen.m` |
| exmp2_4.m | MATLAB M-file for use in Example 2.4 |
| mov_avg.c<br>datamov.c<br>fir.c | C file for the moving averaging filter used in Example 2.5<br>C file used in `mov_avg.c` to update a signal vector<br>C file used in `mov_avg.c` for FIR filtering |
| exmp2_6.m | MATLAB M-file for use in Example 2.6 |
| exmp2_7.m | MATLAB M-file for use in Example 2.7 |
| fft.c | C file for performing FFT in Section 2.4.4 |
| exmp2_8.m | MATLAB M-file for use in Example 2.8 |
| exmp2_9.m | MATLAB M-file for use in Example 2.9 |
| timit1.asc | Digitized speech file (ASCII format) for use in Example 2.9 |
| exmp2_10.m | MATLAB M-file for use in Example 2.10 |
| exmp2_11.m | MATLAB M-file for use in Example 2.11 |
| spectrum.m | MATLAB M-file that computes the magnitude spectrum of a signal (see Section 2.6.1) |
| mag_res.m | MATLAB M-file that computes the magnitude response of a first-order IIR filter (see Section 2.6.1) |
| iir1.m | MATLAB M-file that computes first-order IIR filtering on a noisy sinewave (see Section 2.6.2) |
| iir1.c | C program for first-order IIR filtering (see Section 2.6.2) |
| plotxy.m | MATLAB M-file that plots both `xn.dat` and `yn.dat` (see Section 2.6.2) |
| chap2.spt | SPTool file for use in Section 2.6.3 |
| c54x.cmd<br>c55x.cmd | C54x linker-command file for use in Section 2.6.4<br>C55x linker-command file for use in Section 2.6.4 |

(*Continued*)

| Files | Descriptions |
|---|---|
| `vectorsc54.asm` | C54x interrupt-vector file for use in Section 2.6.4 |
| `iir2.c` | C program for first-order IIR filtering using probe input in CCS (see Section 2.6.4) |
| `xn2.dat` | The `xn.dat` file with a special header for use in `iir2.c` (see Section 2.6.4) |

## D.3 CHAPTER 3

The 16 files used in Chapter 3 are located in the folder `chap3` and can be copied to the subdirectory `c:/dsps/chap3`. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| `fxpmult_add.mdl` | Simulink file that multiplies and adds two sinewaves using fixed-point arithmetic in Section 3.7.1 |
| `fxlimitcycle.mdl` | Simulink file that investigates the limit cycle in Section 3.7.1 |
| `iir1fx.c` | C program of the fixed-point IIR filtering in Section 3.7.2 |
| `iir1fx.exe` | Executable file for `iir1fx.c` |
| `xn.dat` | Input-data file (ASCII) to the IIR filter in `iir1fx.c` |
| `yn.dat` | Output-data file (ASCII) from the IIR filter in `iir1fx.c` |
| `exp3c54.cmd` | C54x linker-command file for use in Section 3.7.3 |
| `c55x.cmd` | C55x linker-command file for use in Section 3.7.3 |
| `vectors c54.asm` | C54 interrupt-vector file for use in Section 3.7.3 |
| `exp3c5x_1.c` | C file for use in Section 3.7.3 for both the C54x and C55x |
| `qvalue.gel` | GEL file that displays variables with a specific Q format in the watch window (from Texas Instruments) |
| `exp3c5x_2.c` | C file for use in Section 3.7.3 for both the C54x and C55x |
| `exp3c5x_3.c` | C file for use in Section 3.7.3 for both the C54x and C55x |
| `exp3c5x_4.c` | C file for use in Section 3.7.3 for both the C54x and C55x |
| `exp3c5x_5.c` | C file for use in Section 3.7.3 for both the C54x and C55x |
| `exp3c5x_6.c` | C file for use in the Problems section for both the C54x and C55x |

## D.4 CHAPTER 4

The 27 files used in Chapter 4 are located in the folder `chap4` and can be copied to the subdirectory `c:/dsps/chap4`. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| engen.m | MATLAB M-file for generating a data file in digital PLL (see Section 4.2.6) |
| en.dat | Data file (ASCII) for testing a signal in Section 4.2.6 |
| cn.dat | Data file (ASCII) generated by dpll.c in Section 4.2.6 |
| dpll.c | C program simulation of PLL using a median filter and a lowpass filter (see Section 4.2.6) |
| plotec.m | MATLAB M-file for plotting en.dat and cn.dat (see Section 4.2.6) |
| dpll.asm | TMS320F2407 assembly code for a PLL simulation (see Section 4.2.6) |
| dpll.cmd | C2000 linker-command file for use in Section 4.2.6 |
| f240regs.h | F240 header file, which contains peripheral register declarations and other useful definitions |
| xn.int | Data file for an use in Section 4.2.6 |
| asc2int.c | C program that converts an integer in ASCII format to .int for a CCS simulation (see Section 4.2.6) |
| en.int | Data file (integer format) for en.dat (see Section 4.2.6) |
| exp4c54.cmd | C54x linker-command file for use in Section 4.6 |
| exp4c55x.cmd | C55x linker-command file for use in Section 4.6 |
| exp4c54_1.asm | C54x assembly code for use in Section 4.6.1 |
| exp4c55_1.asm | C55x assembly code for use in Section 4.6.1 |
| exp4c54_2.asm | C54x assembly code for use in Section 4.6.2 |
| exp4c55_2.asm | C55x assembly code for use in Section 4.6.2 |
| exp4c54_3.asm | C54x assembly code for use in Section 4.6.3 |
| exp4c55_3.asm | C55x assembly code for use in Section 4.6.3 |
| exp4c54_4.asm | C54x assembly code for use in Section 4.6.4 |
| exp4c55_4.asm | C55x assembly code for use in Section 4.6.4 |
| exp4c54_5.asm | C54x assembly code for use in Section 4.6.5 |
| exp4c55_5.asm | C55x assembly code for use in Section 4.6.5 |
| exp4c54_6.asm | C54x assembly code for use in Section 4.6.6 |
| exp4c55_6.asm | C55x assembly code for use in Section 4.6.6 |
| exp4c54_7.asm | C54x assembly code for use in Section 4.6.7 |
| exp4c55_7.asm | C55x assembly code for use in Section 4.6.7 |

## D.5 CHAPTER 5

The 14 files used in Chapter 5 are located in the folder chap5 and can be copied to the subdirectory c:/dsps/chap5. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| `uran.c` | C file that generates pseudo-random numbers in Section 5.2.6 |
| `uran_c3x.asm` | C3x assembly code for `uran.c` (see Section 5.2.6) |
| `geq.mdl` | Simulink file that implements the three-band equalizer in Section 5.3.5 |
| `geq_C6711_dsk.mdl` | Simulink file that implements the three-band equalizer and runs on the C6711 DSK in Section 5.3.5 |
| `ex5_sum.mdl` | Simulink file for use in Section 5.4.1 |
| `ex5_sum1.mdl` | Modified Simulink file of `ex5_sum.mdl` for use in Section 5.4.1 |
| `ex5_mult.mdl` | Simulink file for use in Section 5.4.2 |
| `ex5_mult1.mdl` | Modified Simulink file of `ex5_mult.mdl` for use in Section 5.4.2 |
| `ex5_mult2.mdl` | Modified Simulink file of `ex5_mult.mdl` for use in Section 5.4.2 |
| `ex5_div.mdl` | Simulink file for use in Section 5.4.2 |
| `ex5_fir.mdl` | Simulink file for use in Section 5.4.3 |
| `ex5_fir_correct.mdl` | Correct Simulink file for use in Section 5.4.3 |
| `ex5_iir.mdl` | Simulink file for use in Section 5.4.4 |
| `rangen.c` | C file that generates 128 random samples in Section 5.4.5 |

## D.6  CHAPTER 6

The 32 files used in Chapter 6 are located in the folder `chap6` and can be copied to the subdirectory `c:/dsps/chap6`. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| `exmp6_2.m` | MATLAB M-file for use in Example 6.2 |
| `exmp6_3.m` | MATLAB M-file for use in Example 6.3 |
| `fir.c` | C file that performs floating-point FIR filtering in Section 6.1.6 |
| `datamov.c` | C file that updates a data buffer in Section 6.1.6 |
| `tmwtypes.h` | Header file for type conversion of MATLAB-generated C-code (in the directory `C:\MATLAB6p5\extern\include\tmwtypes.h`) |
| `C3xfir.asm` | C3x assembly code for FIR filtering (see Section 6.4.1) |
| `timit_1.asc` | Speech file for use in Example 6.4 |
| `exmp6_4.m` | MATLAB M-file for use in Example 6.4 |
| `singen6_6.m` | MATLAB M-file for generating a noisy sinewave in Section 6.6.1 |
| `in.mat` | MATLAB MAT-file for a noisy sinewave generated by `singen6_6.m` |
| `in.dat` | Data file (ASCII) for a noisy sinewave generated by `singen6_6.m` |

(*Continued*)

| Files | Descriptions |
| --- | --- |
| `in_int.dat` | Data file (in integer format) for a noisy sinewave generated by `singen6_6.m` |
| `coeff_c_sp.h` | Header file for coefficients (single-precision, floating-point format) of an FIR filter (see Section 6.6.2) |
| `fir_floatpt.c` | C program for floating-point FIR filtering (see Section 6.6.2) |
| `coeff_16int.h` | Header file for coefficients (Q.15 format) of an FIR filter (see Section 6.6.3) |
| `fir_fixpt.c` | C program for fixed-point FIR filtering (see Section 6.6.3) |
| `coeff_ccs_16int.h` | File similar to `coeff_16int.h`, except that it has been used in CCS (see Section 6.6.4) |
| `fir_fixpt_ccs.c` | C program that runs fixed-point FIR filtering in CCS (see Section 6.6.4) |
| `vectorsc54.asm` | C54x interrupt-vector file |
| `cmdc54.cmd` | C54x linker-command file |
| `c55x.cmd` | C55x linker-command file |
| `in_int_ccs.dat` | Data file with a special header for FILE I/O in CCS |
| `fir_fixpt_intr.c` | C program with intrinsics that run fixed-point FIR filtering in CCS (see Section 6.6.5) |
| `fir_fixpt_asm.asm` | C54x assembly file that runs fixed-point FIR filtering in CCS (see Section 6.6.6) |
| `vectors.asm` | C54x interrupt-vector file for used in Section 6.6.6 |
| `in1_int.dat` | Data file with an `.int` directive |
| `c54.cmd` | C54x linker-command file for use in Section 6.6.6 |
| `fir_fixpt_c55x.c` | C program that calls the `fir_c55.asm` file (see Section 6.6.6) |
| `fir_c55.asm` | C55x assembly file that runs fixed-point FIR filtering in CCS |
| `fir_fixpt_dsplib.c` | C program that calls the `fir.asm` routine in the TI C5000 DSPLIB (see Section 6.6.7) |
| `coeff_ccs_16int_lib.h` | Header file of coefficients used in `fir_fixpt_dsplib.c` |
| `input.h` | Header file of the input signal used in `fir_fixpt_dsplib.c` |

## D.7  CHAPTER 7

The 37 files used in Chapter 7 are located in the folder `chap7` and can be copied to the subdirectory `c:/dsps/chap7`. The files are listed in the following table:

| Files | Descriptions |
| --- | --- |
| `example7_1.m` | MATLAB M-file for use in Example 7.1 |
| `example7_3.m` | MATLAB M-file for use in Example 7.3 |

(*Continued*)

| Files | Descriptions |
|---|---|
| example7_4.m | MATLAB M-file for use in Example 7.4 |
| iir1.c | C file that implements IIR filtering using the direct-form I structure (see Section 7.2.4) |
| iir2.c | C file that implements IIR filtering using the direct-form II structure (see Section 7.2.4) |
| tmwtypes.h | Header file for type conversion of MATLAB generated C-code (in the directory C:\MATLAB6p5\extern\include\tmwtypes.h ) |
| dtmf_gen.m | MATLAB M-file that generates DTMF tones (see Section 7.6.1) |
| dtmf_goertzel.m | MATLAB M-file that detects DTMF tones using a Goertzel filter (see Section 7.6.1) |
| singen6_6.m | MATLAB M-file that generates the sinewave corrupted by white noise for use in Section 7.7.1 |
| in.mat | MATLAB MAT-file for a noisy sinewave generated by singen6_6.m |
| in.dat | Data file (in ASCII format) for a noisy sinewave generated by singen6_6.m |
| in_int.dat | Data file (in integer format) for a noisy sinewave generated by singen6_6.m |
| iircascade_sp.h | Header file that contains IIR coefficients in single-precision, floating-point format (see Section 7.7.1) |
| iir_floatpt.c | C program for floating-point IIR filtering (direct-form II) in Section 7.7.2 |
| iir_fixpt.c | C program for fixed-point IIR filtering (direct-form II) in Section 7.7.3 |
| iircascade_16int.h | Header file that contains fixed-point, 16-bit IIR-filter coefficients |
| iir_fixpt_ccs.c | C program for fixed-point IIR filtering (direct-form II) that runs in the C5000 CCS in Section 7.7.4 |
| iircoeff_ccs_16.h | Header file that contains fixed-point, 16-bit IIR-filter coefficients and that is used in the C5000 CCS |
| vectorsc54.asm | C54x interrupt-vector file |
| cmdc54.cmd | C54x linker-command file |
| c55x.cmd | C55x linker-command file |
| in_int_ccs.dat | Data file with a special header for FILE I/O in CCS |
| iir_fixpt_intr.c | C program with intrinsics that run fixed-point IIR filtering in CCS (see Section 7.7.5) |
| iir_fixpt_asm.asm | C54x assembly file that runs fixed-point IIR filtering in CCS for use in Section 7.7.6 |

(*Continued*)

| Files | Descriptions |
|-------|--------------|
| `in1_int.dat` | Data file with an `.int` directive |
| `vectors.asm` | C54x interrupt-vector file for use in Section 7.6.6 |
| `c54.cmd` | C54x linker-command file for use in Section 7.7.6 |
| `iir_fixpt_c55x.c` | Modifies the C file `iir_fixpt_ccs.c` for use in the C55x CCS and calls the `iir_c55.asm` file (see Section 7.7.6) |
| `iir_c55.asm` | C55x assembly file that runs fixed-point IIR filtering in CCS (see Section 7.7.6) |
| `gain_c55x.asm` | C55x assembly file that amplifies the input (see Section 7.7.6) |
| `iir_fixpt_dsplib.c` | C program that calls the `iircas4.asm` routine in the TI C5000 DSPLIB (see Section 7.7.7) |
| `input1.h` | Header file for the input signal and IIR filter coefficient used in `iircas` |
| `input2.h` | Header file for the input signal and IIR filter coefficient used in `iircas5` |
| `input3.h` | Header file for the input signal and IIR filter coefficient used in `iircas5` |
| `iir_fixpt_dsplib32.c` | C program that calls the `iir32.asm` routine in the TI C5000 DSPLIB for Section 7.7.7 |
| `input3a.h` | Header file for the input signal and IIR filter coefficients used in `iir_fixpt_dsplib32.c`. |
| `desired_tf.mat` | MATLAB MAT-file for use in the Problems section |

## D.8 CHAPTER 8

The 46 files used in Chapter 8 are located in the folder `chap8` and can be copied to the subdirectory `c:/dsps/chap8`. The files are listed in the following table:

| Files | Descriptions |
|-------|--------------|
| `example8_1.m` | MATLAB M-file for use in Example 8.1 |
| `property1.m` | MATLAB M-file that illustrates the linearity property of the FFT in Section 8.3.2 |
| `property2.m` | MATLAB M-file that illustrates the symmetrical property of the FFT in Section 8.3.2 |
| `property3.m` | MATLAB M-file that illustrates the circular-shifting property of the FFT in Section 8.3.2 |
| `property4.m` | MATLAB M-file that illustrates the circular-convolution property of the FFT in Section 8.3.2 |
| `property5.m` | MATLAB M-file that illustrates the Parseval's theorem property of the FFT in Section 8.3.2 |

(*Continued*)

| Files | Descriptions |
|---|---|
| example8_2.m | MATLAB M-file for use in Example 8.2 |
| bit_reversal.c | C file that performs a bit-reversal operation on input samples (see Section 8.3.4) |
| ditr2fft.c | C file that performs a DIT, radix-2 FFT (see Section 8.3.4) |
| combine_N.m | MATLAB M-file that performs two $N$-point FFTs using one $N$-point complex FFT (see Section 8.4.2) |
| combine_2N.m | MATLAB M-file that performs 2$N$-point FFTs using one $N$-point complex FFT (see Section 8.4.2) |
| example8_3.m | MATLAB M-file for use in Example 8.3 |
| example8_3a.m | MATLAB M-file for use in Example 8.3 using scaling |
| example8_4.m | MATLAB M-file for use in Example 8.4 |
| overlap_save.m | MATLAB M-file that illustrates the concept of overlap-save convolution (see Section 8.7.1) |
| overlap_add.m | MATLAB M-file that illustrates the concept of overlap-add convolution (see Section 8.7.1) |
| example8_5.m | MATLAB M-file for use in Example 8.5 |
| sine3.m | MATLAB M-file that generates and mixes three sinewaves |
| in.dat | Data file (ASCII) that contains the mixed signal (see Section 8.8.1) |
| psd_881.m | Power-spectrum-estimation program used in Section 8.8.1 |
| psd_ex.m | MATLAB M-file that implements power-spectrum estimation using several MATLAB functions in Section 8.8.1 |
| psd_ex_quant.m | MATLAB M-file that implements power-spectrum estimation using Q.15 representations and analyzes quantization errors in Section 8.8.1 |
| psd_floatpt.c | C program that computes the power-spectrum estimation (periodogram) using floating-point calculations (see Section 8.8.2) |
| psd_bar_floatpt.c | C program that computes the power-spectrum estimation (Bartlett periodogram) in floating-point calculations (see Section 8.8.2) |
| psd_wel_floatpt.c | C program that computes the power-spectrum estimation (Welch periodogram) in floating-point calculations (see Section 8.8.2) |
| def_complex.h | Header file that defines the complex data type for floating-point C |
| def_complex_fixpt.h | Header file that defines the complex-integer data type for Q.15 and Q.31 formats in fixed-point C |
| psd_fixpt.c | C file that calls ditr2fft_fixpt.c and ibit_reversal.c (see Section 8.8.3) |
| ditr2fft_fixpt.c | C file that performs a DIT, radix-2 FFT operation using fixed-point precision (see Section 8.8.3) |
| ibit_reversal.c | C file that performs a bit-reversal operation on input samples using fixed-point precision (see Section 8.8.3) |

(*Continued*)

| Files | Descriptions |
|---|---|
| `in_int.dat` | Data file (ASCII) that stores time-domain input or frequency-domain output (in-place computation) |
| `psd_fixpt_ccs.c` | C program that implements the fixed-point power-spectrum estimation in the C5000 CCS (see Section 8.8.4) |
| `ditr2fft_fixpt_ccs.c` | C file that implements the DIT, radix-2 FFT in the C5000 CCS (see Section 8.8.4) |
| `ibit_reversal_ccs.c` | C file that implements bit reversal in the C5000 CCS (see Section 8.8.4) |
| `in_int_ccs.dat` | Data file (ASCII) that includes the CCS header |
| `vectorsc54.asm` | C54x interrupt-vector file |
| `cmdc54.cmd` | C54x linker-command file |
| `c55x.cmd` | C55x linker-command file |
| `psd_fixpt_intr.c` | C program that implements the fixed-point power-spectrum estimation in the C5000 CCS using intrinsics (see Section 8.8.5) |
| `ditr2fft_fixpt_intr.c` | C file that implements the DIT, radix-2 FFT in the C5000 CCS using intrinsics (see Section 8.8.5) |
| `ibit_reversal_intr.c` | C file that implements bit reversal in the C5000 CCS (similar to `ibit_reversal_ccs.c`). |
| `psd_fixpt_c54x.c` `psd_fixpt_c55x.c` | C files that perform power-spectrum estimation using the C54x and C55x DSP Libraries (see Section 8.8.6) |
| `in_int_asm.dat` | Data file that is included in the preceding main programs |
| `timit_1.asc` | Data file for use in the Problems section |
| `distorted_chirp.mat` | MAT-file for use in the Problems section |

## D.9 CHAPTER 9

The 31 files used in Chapter 9 are located in the folder `chap9` and can be copied to the subdirectory `c:/dsps/chap9`. The files are listed in the following table.

| Files | Descriptions |
|---|---|
| `sysident.mdl` | Simulink file for use in Example 9.1 |
| `adeq.mdl` | Simulink file for use in Example 9.2 |
| `anc.mdl` | Simulink file for use in Example 9.3 |
| `ale.mdl` | Simulink file for use in Example 9.4 |
| `adapred.mdl` | Simulink file that modifies the file `ale.mdl` (see Section 9.4.4) |
| `exmp9_5.m` | MATLAB M-file for use in Example 9.5 |
| `error_plot.m` | MATLAB M-file that plots the error signal in Example 9.5 |
| `algorithms.m` | MATLAB M-file that displays errors using different adaptive algorithms in Section 9.5.1 |

(*Continued*)

| Files | Descriptions |
|---|---|
| quant_af.m | MATLAB M-file that performs the quantized adaptive filter in Section 9.5.2 |
| ale_lms.m | MATLAB M-file that performs the adaptive-line enhancer in Section 9.8.1 |
| adaptive_ale.m | MATLAB M-file that investigates the convergence rate of different adaptive algorithms in Section 9.8.1 |
| singen9_8.m | MATLAB M-file that generates a noisy sinewave for use in Section 9.8.2 |
| in.dat | Data file of a noisy sinewave in floating-point format |
| in_int.dat | Data file of a noisy sinewave in Q.15 fixed-point format |
| ale_floatpt.c | C file that performs the floating-point adaptive-line enhancer (see Section 9.8.2) |
| ale_fixpt.c | C file that performs the fixed-point adaptive-line enhancer (see Section 9.8.3) |
| ale_fixpt_ccs.c | C file that performs the adaptive-line enhancer in fixed-point format for the C5000 CCS (see Section 9.8.4) |
| in_int_ccs.dat | Data file that includes the CCS header (see Section 9.8.4) |
| vectorsc54.asm | C54x interrupt-vector file |
| cmdc54.cmd | C54x linker-command file |
| c55x.cmd | C55x linker-command file |
| ale_fixpt_intr.c | C program that implements the fixed-point adaptive-line enhancer in the C5000 CCS using intrinsics (see Section 9.8.5) |
| ale_fixpt_c54x.asm | C54x assembly file that implements the fixed-point ALE filter in CCS in Section 9.8.6 |
| in1_int.dat | Data file with an .int directive |
| c54.cmd | C54x linker-command file for use in Section 9.8.6 |
| vectors.asm | C54x interrupt-vector file for use in Section 9.8.6 |
| ale_fixpt_c55x.c | C program that calls shift_c55x.asm and adapt_c55x.asm in Section 9.8.6 |
| shift_c55x.asm | C55x assembly file that refreshes the signal buffer (see Section 9.8.6) |
| adapt_c55x.asm | C55x assembly file that performs FIR filtering with the LMS algorithm (see Section 9.8.6) |
| ale_fixpt_dsplib.c | C file that performs power-spectrum estimation using the C54x DSP Library (see Section 9.8.7) |
| newtest.h | Header file that contains input and desired signals (see Section 9.8.7) |

## D.10  COMMON HEADER AND LIBRARY FILES BY TEXAS INSTRUMENTS

The following DSPLIBs and header files are included in all of the preceding CCS project files. They can be downloaded from the Texas Instruments website.

| Files | Directories and descriptions |
|-------|------------------------------|
| `54xdsp.lib` | `C:/ti/c5400/dsplib/54xdsp.lib`; C54x DSPLIB that contains many useful DSP kernel functions |
| `55xdsp.lib` | `C:/ti/c5500/dsplib/55xdsp.lib`; C55x DSPLIB that contains many useful DSP kernel functions |
| `rts.lib` | `C:/ti/c5400/cgtools/lib/rts.lib`; run-time support library for the C54x processor that initializes a run-time environment |
| `rts55.lib` | `C:/ti/c5500/cgtools/lib/rts55.lib`; run-time support library for the C55x processor that initializes a run-time environment |
| `tms320.h` | `C:/ti/c5400/dsplib/include/tms320.h` or `C:/ti/c5500/dsplib/include/tms320.h`; header file for data types |
| `dsplib.h` | `C:/ti/c5400/dsplib/include/tms320.h` or `C:/ti/c5500/dsplib/include/tms320.h`; header file that contains data types used in the C5000 DSPLIB |
| `math.h` | `C:/ti/c5400/dsplib/include/math.h` or `C:/ti/c5500/dsplib/include/math.h`; header file that contains math function declarations |
| `stdio.h` | `C:/ti/c5400/dsplib/include/stdio.h` or `C:/ti/c5500/dsplib/include/stdio.h`; header file that contains standard I/O declarations |
| `intrindefs.h` | `C:/ti/c5400/cgtools/include/intrindefs.h` or `C:/ti/c5500/cgtools/include/intrindefs.h`; header file for intrinsic commands |

## D.11  APPENDIX A

The 7 files used in Appendix A are located in the folder `appA` and can be copied to the subdirectory `c:/dsps/appA`. The files are listed in the following table:

| Files | Descriptions |
|-------|--------------|
| `bpf.mdl` | Simulink file for the first example in Section A.3 |
| `combfilter.mdl` | Simulink file for second example in Section A.3 (also in the Simulink demo) |
| `fxpadc.mdl` | Simulink file in Section A.4.2 (modified from the Simulink demo file) |
| `ccstut_54xxx.pjt` | CCS C5400 project file for use in Section A.5 |
| `ccstut.c` | C file for use in Section A.5 |
| `vectors_54x.asm` | Vector file for use in Section A.5 |
| `ccstut_54xx.cmd` | Linker-command file for use in Section A.5 (The preceding files can be found in `c:\matlab6p5\toolbox\ccslink\ccsdemo\ccstutorial\.`) |

## D.12  APPENDIX B

The 37 files used in Appendix B are located in the folder `appB` and can be copied to the subdirectory `c:/dsps/appB`. The files are listed in the following table:

| Files | Descriptions |
|---|---|
| `ex6_i.mdl` | Simulink file for an experiment (sound localizer) in Section B.1.2 |
| `ex6_i.m` | MATLAB M-file for an experiment in Section B.1.2 |
| `female_footsteps2.wav` | Data sound file #1 |
| `door-open2.wav` | Data sound file #2 |
| `hrtf.mat` | MATLAB MAT-file that contains the HRTF data for left 150°, right 150°, left 210°, and right 210° (refer to [1] in Appendix B). |
| `ex6_ii.mdl` | Simulink file for an experiment (graphic equalizer) in Section B.2.2 |
| `geq.m` | MATLAB M-file that implements the graphic equalizer |
| `drums.wav` | Audio-sound file that is input into the graphic equalizer |
| `drums.dat` | Data file of the preceding audio signal |
| `noisy_drums.wav` | A noisy audio signal sound file |
| `design_qmf.m` | MATLAB M-file that designs a two-channel QMF in Section B.3.2 |
| `ex6_iii.mdl` | Simulink file for a two-channel QMF in Section B.3.2 |
| `timit1.wav` | Speech sound file that is input into the QMF |
| `timit1.asc` | Speech sound file in ASCII format |
| `timit_noise.wav` | A noisy speech sound file |
| `gen_triangular.m` | MATLAB M-file that generates the periodic triangular wave in Section B.4.2 |
| `ex7_ii.mdl` | Simulink file for implementing the reverberation algorithm in Section B.5.2 |
| `drums.wav` | Speech sound file that is input into the reverberation circuit |
| `ex7_iii.mdl` | Simulink file for implementing the parametric equalizer in Section B.6.2 |
| `equalizer.m` `octave.m` | MATLAB M-file that computes the coefficients for the IIR Filter-based parametric equalizer |
| `drums.wav` | Audio sound file that is input into the parametric equalizer |
| `drums.dat` | Data file of the preceding audio signal |
| `noisy_drums.wav` | A noisy audio-signal sound file |
| `overlap_save.m` | MATLAB M-file that performs an overlap-save operation in Section B.7.1 |
| `overlap_add.m` | MATLAB M-file that performs an overlap-add operation in Section B.7.1 |

(*Continued*)

| Files | Descriptions |
|---|---|
| slidingfft.m | MATLAB M-file that performs the sliding FFT and compares it with the block FFT function in Section B.8.2 |
| timit1.asc | Speech sound file in ASCII format |
| input.dat | Input-data file for the zoom-FFT algorithm in Section B.9.2 |
| bpf.mat | MATLAB MAT-file that contains bandpass filter coefficients |
| zoomfft.m | MATLAB M-file that performs the zoom-FFT algorithm |
| commsignal.dat | An amplitude-modulated data signal |
| aec.c | C program that performs the acoustic echo canceller in Section B.10.2 |
| gmos.dat | Far-end speech signal |
| bmjs.dat | Near-end speech signal |
| echogen.c | C program that generates the microphone signal $d(n)$ |
| fxlms.m | MATLAB M-file that performs the filtered-X LMS algorithm in Section B.11.2 |
| xn.dat | Input data file |
| p_z.asc | Numerator coefficient file for the primary-path transfer function |
| p_p.asc | Denominator coefficient file for the primary-path transfer function |
| s_z.asc | Numerator coefficient file for the secondary-path transfer function |
| s_p.asc | Denominator coefficient file for the secondary-path transfer function |