



Assembly Examples in Appendix C

EXPERIMENT C.1



Propose of the experiment

- Use CCS to view the software examples given by the Appendix
- 

Start CCS

(Example: Code Composer Studio Version 5)

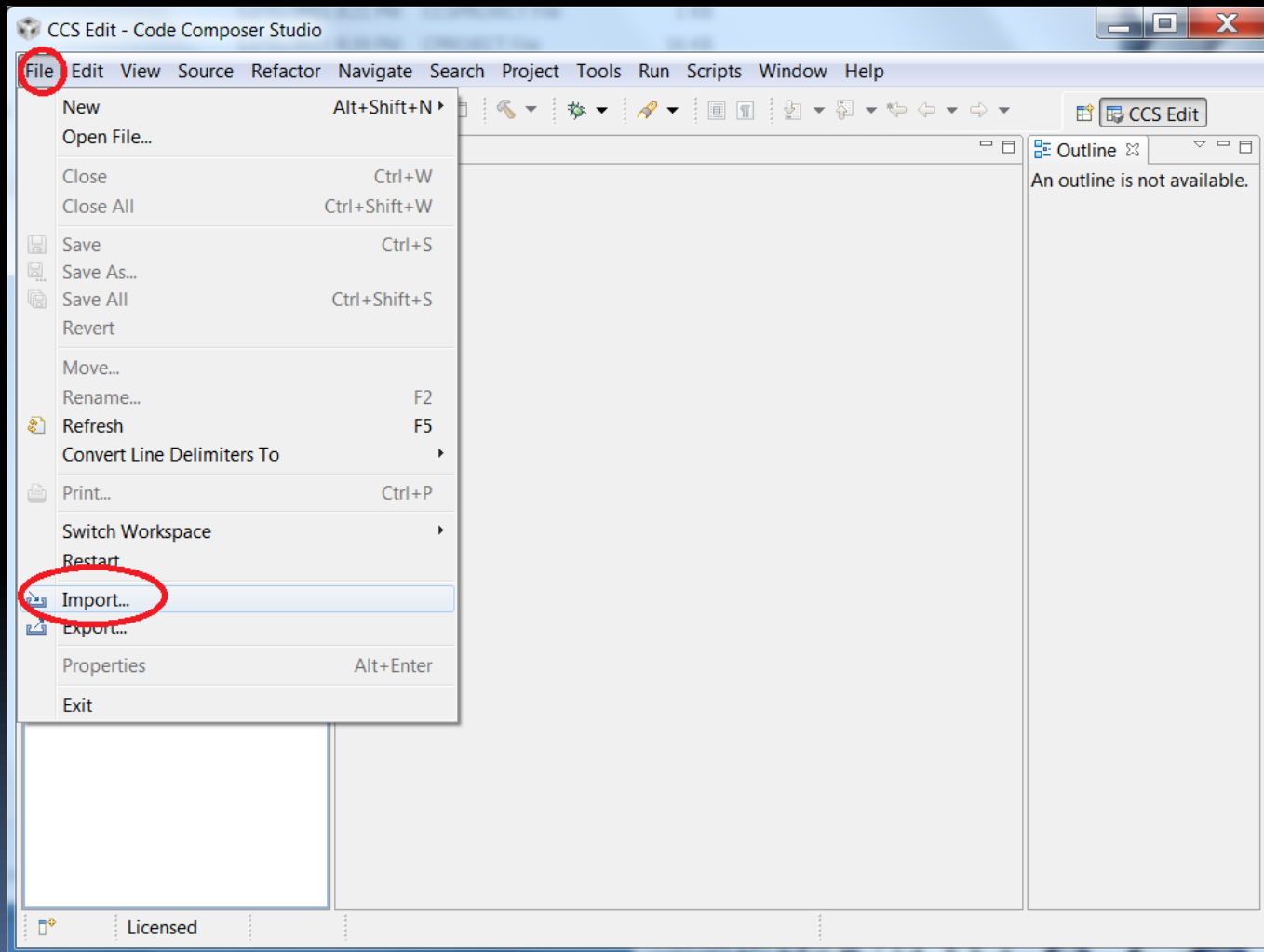


Go to CCS



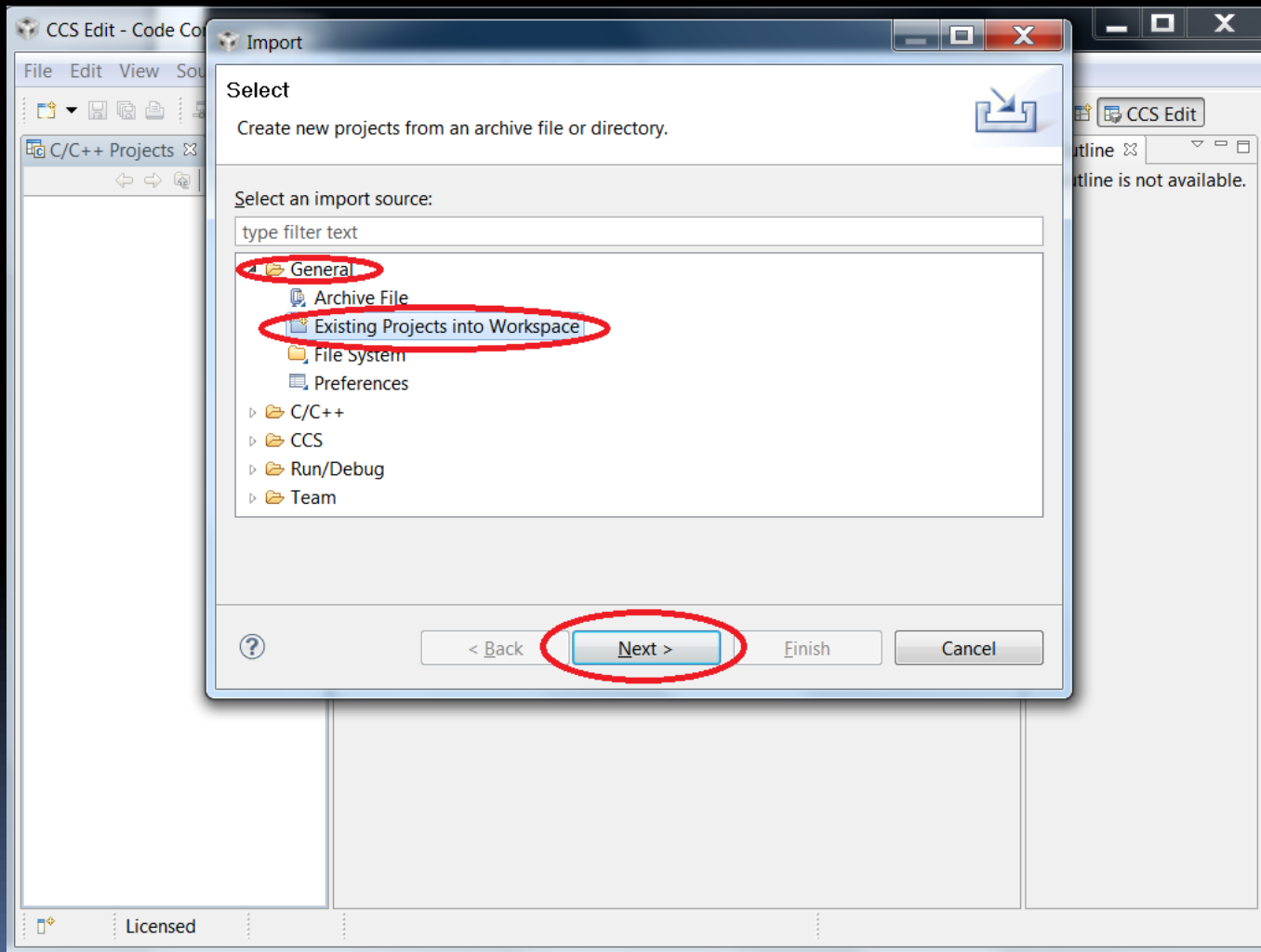
Import existing CCS project (1)

(File -> Import)



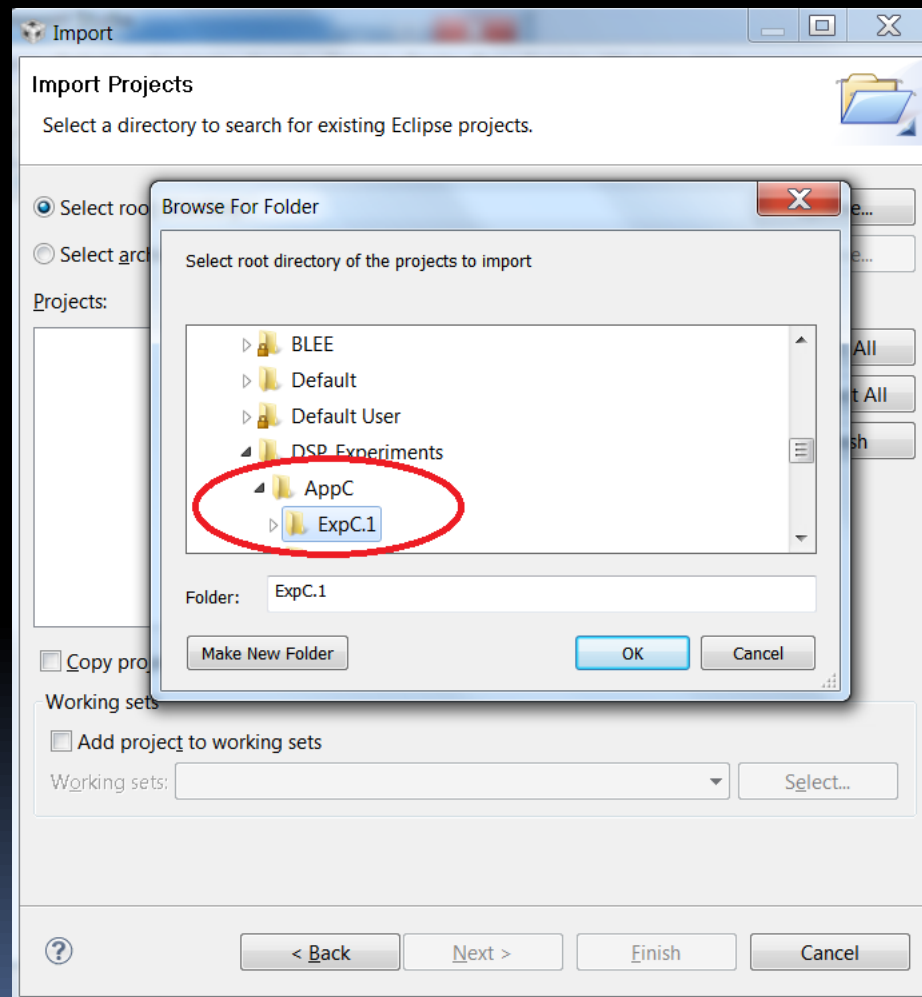
Import existing CCS project (2)

(General, select Existing Project into Workspace, then Next)



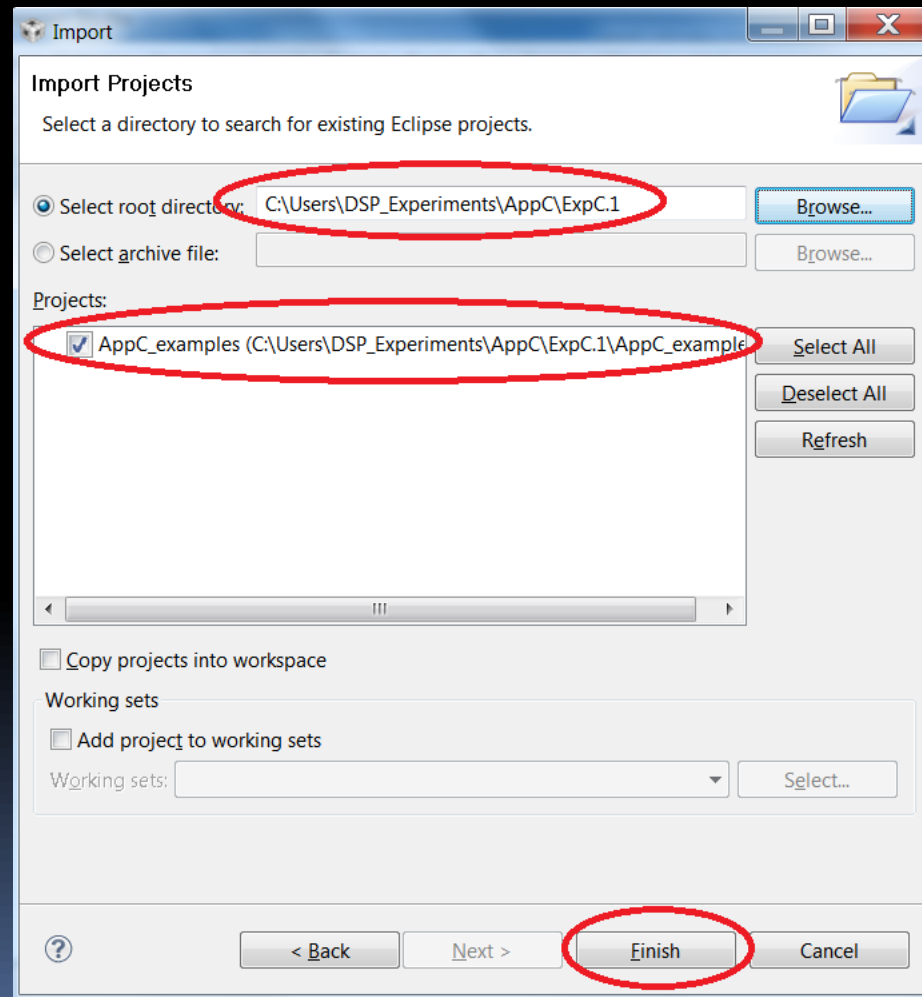
Import existing CCS project (3)

(Browse..., go to your folder, then OK)



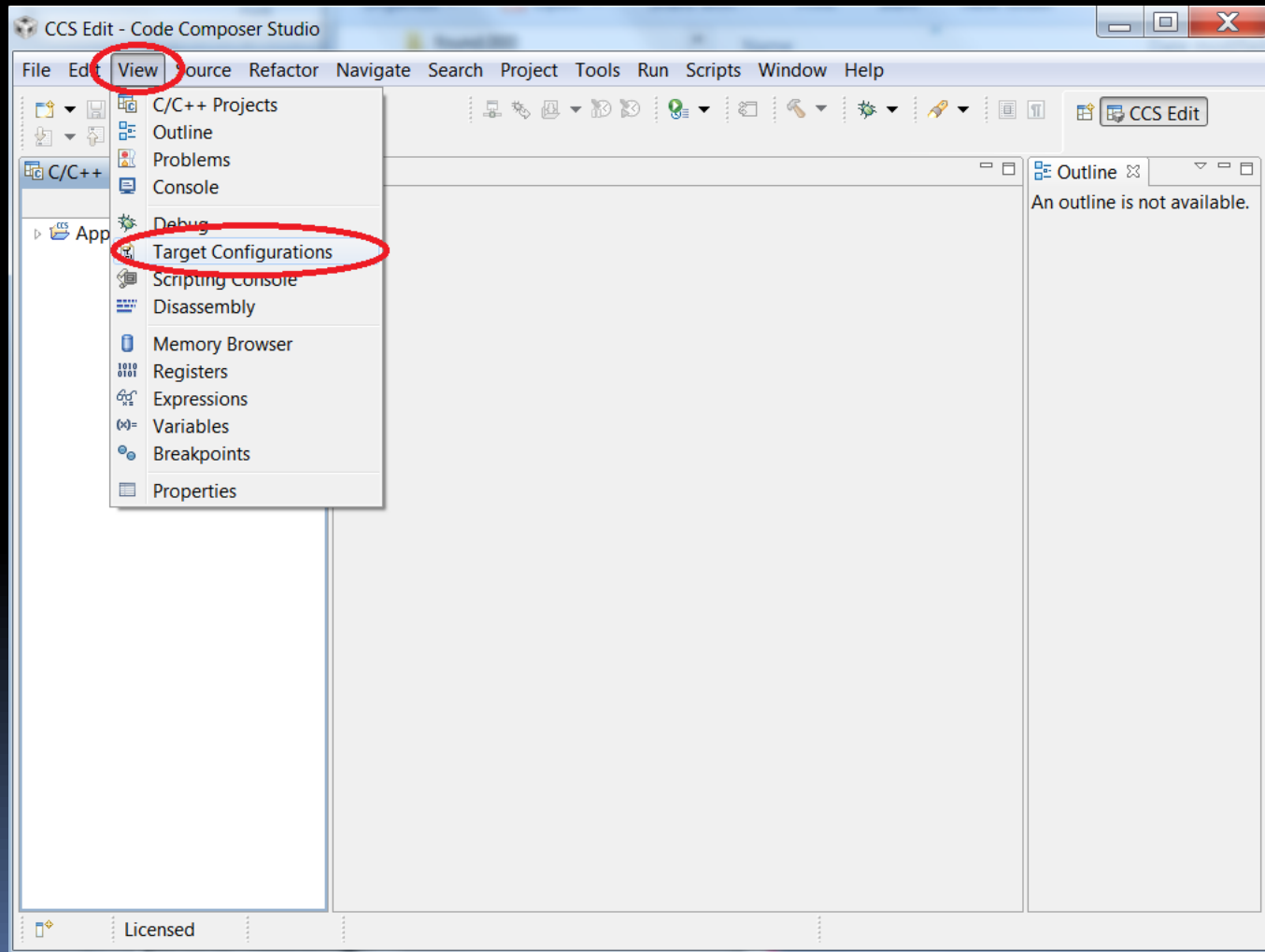
Import existing CCS project (4)

(Select the path, the project, then click Finish)

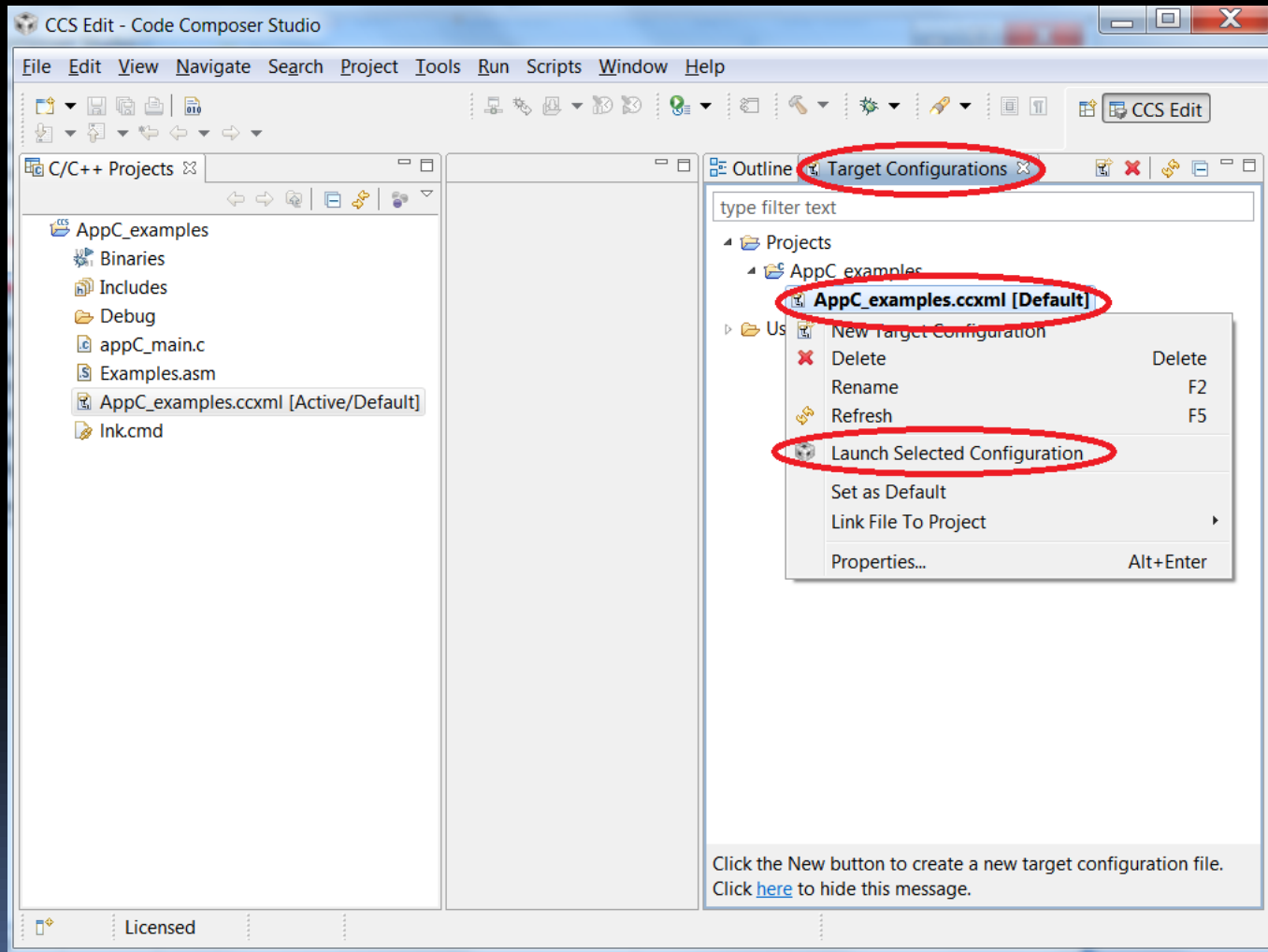


Depends upon the computers settings, the path will be different than what is shown here.

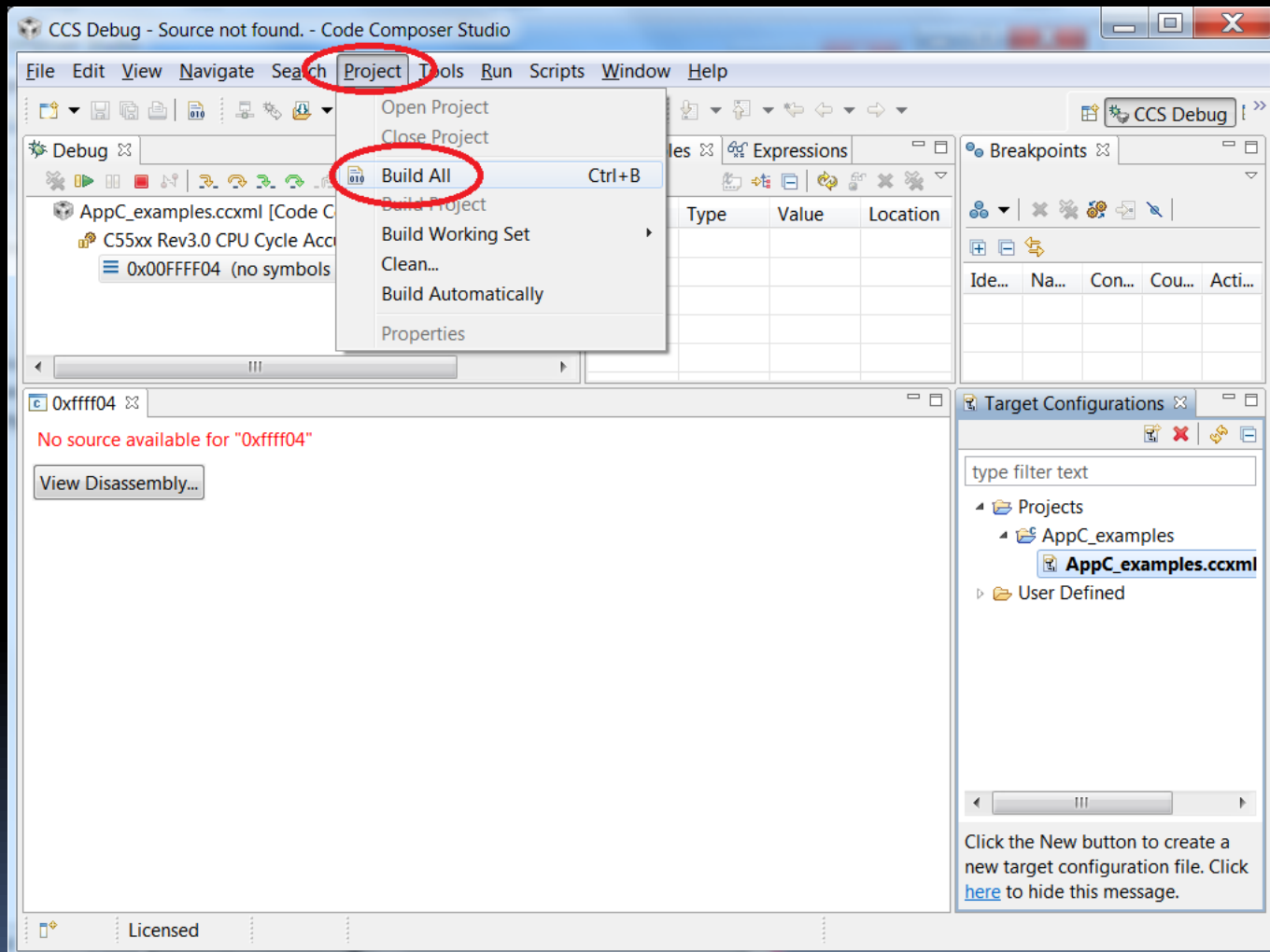
View Target Configuration



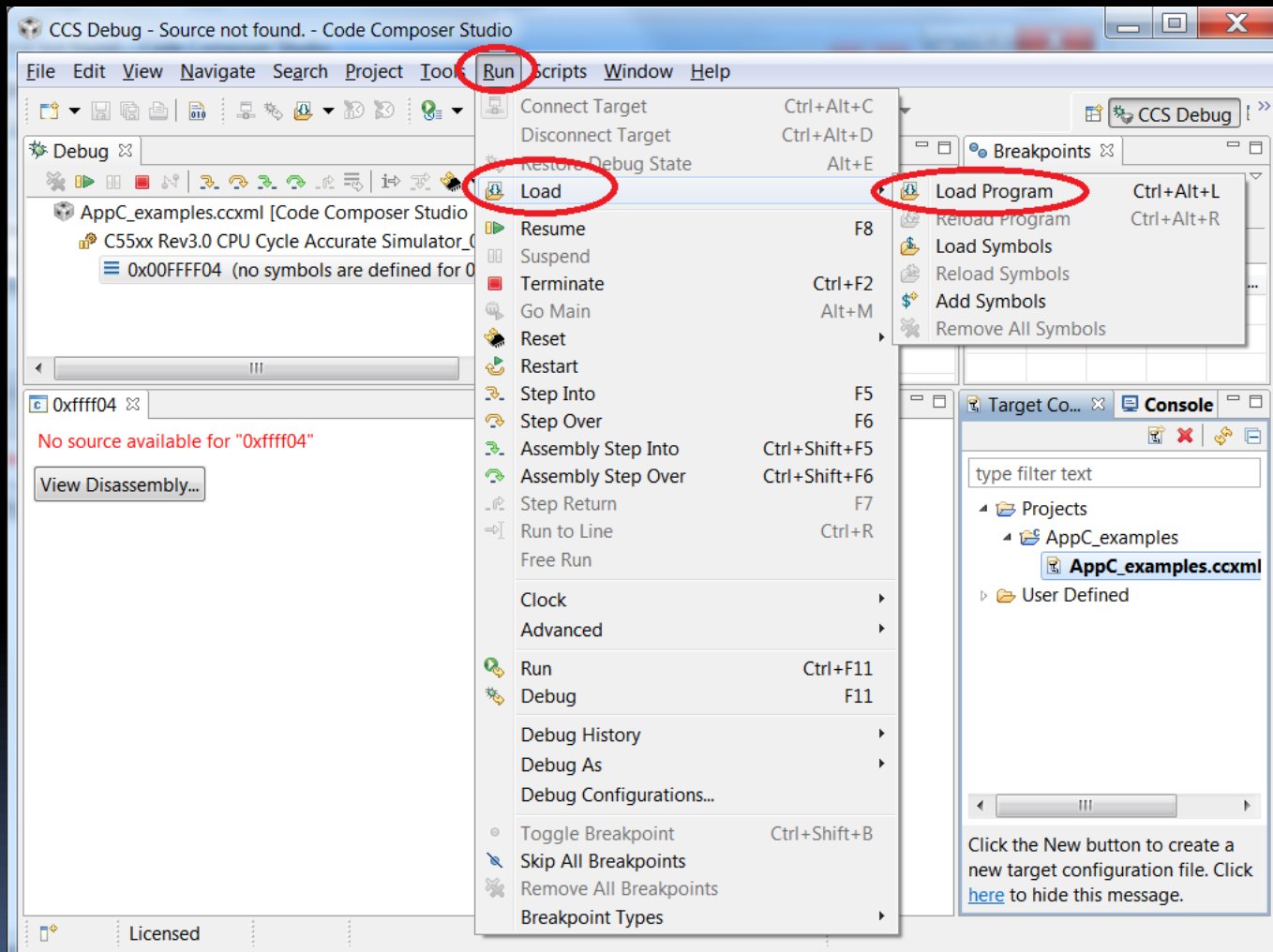
Launch and connect target



Build experiment



Load program



Example_C1

The screenshot displays a development environment with two main panels. The left panel shows assembly code for 'appC_main.c' with three functions: `_Example_init`, `_Example_C1`, `_Example_C2`, and `_Example_C3`. The `ret` instruction in `_Example_C1` is highlighted. The right panel shows a 'Registers' window with a table of core registers. A red oval highlights the `XDP` register, which has a yellow background and the value `0x030100`.

appC_main.c Examples.asm 0xffff04 »

Target Configurat... Console Memory Browser Registers

```
26 .def _Example_init
27
28 _Example_C1:
29     mov #0x3,DPH
30     mov #0x0100,DP
31     ret
32
33 _Example_C2:
34     mov *AR0,AC0
35     ret
36
37 _Example_C3:
38     mov *AR2+,*AR3-,AC0
39     ret
```

Name	Value	Description
AC0	0x000FAB8678	Core Register
AC1	0x0000000000	Core Register
AC2	0x0000000008	Core Register
AC3	0x000FABEF45	Core Register
XDP	0x030100	Core Register
PDP	0x0000	Core Register
XCDP	0x000400	Core Register
XAR0	0x000100	Core Register
XAR1	0x000000	Core Register
XAR2	0x000200	Core Register

Example_C2

The screenshot displays a development tool interface with two main panels. The left panel shows assembly code for 'appC_main.c' with three functions: `_Example_init`, `_Example_C1`, and `_Example_C2`. The right panel shows a 'Registers' window with a table of core registers. A red circle highlights the `AC0` register, which has a value of `0x00000012AB`. The `AC1` register is also highlighted with a yellow background.

Name	Value	Description
CSET	0x00	Core Register
AC0	0x00000012AB	Core Register
AC1	0x0000000000	Core Register
AC2	0x0000000008	Core Register
AC3	0x000FABEF45	Core Register
XDP	0x030100	Core Register
PDP	0x0000	Core Register
XCDP	0x000400	Core Register
XAR0	0x000100	Core Register
XAR1	0x000000	Core Register

Example_C3

The screenshot displays an IDE with two main panels. The left panel shows assembly code for 'appC_main.c' and 'Examples.asm'. The right panel shows the 'Registers' window.

Assembly Code:

```
29  mov #0x3,DPH
30  mov #0x0100,DP
31  ret
32
33  _Example_C2:
34  mov *AR0,AC0
35  ret
36
37  _Example_C3:
38  mov *AR2+,*AR3-,AC0
39  ret
40
41  _Example_C4:
42  mov *+CDP(#2),AC3
43  ret
```

Registers Window:

Name	Value	Description
AC0	0x0033335555	Core Register
AC1	0x0000000000	Core Register
AC2	0x0000000008	Core Register
AC3	0x000FABEF45	Core Register
XDP	0x030100	Core Register
PDP	0x0000	Core Register
XCDP	0x000400	Core Register
XAR0	0x000100	Core Register
XAR1	0x000000	Core Register
XAR2	0x000201	Core Register
XAR3	0x0002FF	Core Register

Red circles highlight the values of AC0, XAR2, and XAR3 in the registers window.

Example_C4

The screenshot displays a debugger interface with three main panels. The left panel shows assembly code for 'Examples.asm'. The middle panel shows the 'Registers' window with a list of registers and their values. The right panel shows the 'Memory' window with a hex dump of memory starting at address 0x400.

Assembly Code (Examples.asm):

```
33 _Example_C2:  
34     mov *AR0,AC0  
35     ret  
36  
37 _Example_C3:  
38     mov *AR2+,*AR3-,AC0  
39     ret  
40  
41 _Example_C4:  
42     mov *+CDP(#2),AC3  
43     ret  
44  
45 _Example_C5:  
46     mov *(#0x11234),T2  
47     ret
```

Registers:

Name	Value
AC0	0x0033335555
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0000005631
XDP	0x030100
BDP	0x0000
XCDP	0x000402
XAR0	0x000100
XAR1	0x000000
XAR2	0x000201
XAR3	0x0002FF
XAR4	0x7F0000

Memory (DATA:0x400 <Memory Rendering>):

Hex 16 Bit - TI Style Hex

Address	Hex Value
0x000400	0000 0000 5631 0000
0x000404	0000 0000 0000 0000
0x000408	0000 0000 0000 0000
0x00040C	0000 0000 0000 0000
0x000410	0000 0000 0000 0000
0x000414	0000 0000 0000 0000
0x000418	0000 0000 0000 0000
0x00041C	0000 0000 0000 0000
0x000420	0000 0000 0000 0000
0x000424	0000 0000 0000 0000

Example_C5

The screenshot displays a debugger interface with three main panels:

- Assembly Panel (Left):** Shows the source code for `Examples.asm`. The assembly code includes three examples: `_Example_C3`, `_Example_C4`, and `_Example_C5`. The instruction `ret` on line 47 of `_Example_C5` is highlighted in green.
- Registers Panel (Middle):** A table of registers and their values. Register `T2` is circled in red and has a yellow background, showing a value of `0xFFFF`.
- Memory Panel (Right):** Shows the memory dump for address `0x11234`. The value `0xFFFF` at address `0x011234` is circled in red.

Registers Table:

Name	Value
XAR1	0x000000
XAR2	0x000201
XAR3	0x0002FF
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0xFFFF
T3	0x0000
ST0	0x3802

Memory Dump (Hex 16 Bit - TI Style Hex):

Address	Value
0x011234	FFFF
0x011238	EC00 921B 0020
0x01123C	122C 1425 697C 0002
0x011238	6904 64E5 ED31 0800
0x011240	2AC4 9200 2264 5062
0x011244	4804 EC31 8E00 0000
0x011248	4804 5250 5800 2206
0x01124C	5166 2264 08FC 9590
0x011250	8004 0010 EC01 BE65
0x011254	867C 0001 9652 9C48
0x011258	00E6 6300 5062 4804

Example_C6

The screenshot displays a debugger interface with three main panels. The left panel shows assembly code for 'Examples.asm'. The middle panel shows the 'Registers' window. The right panel shows the 'Memory' window.

Assembly Code (Examples.asm):

```
37 _Example_C3:
38   mov *AR2+, *AR3-, AC0
39   ret
40
41 _Example_C4:
42   mov *+CDP(#2), AC3
43   ret
44
45 _Example_C5:
46   mov *(#0x11234), T2
47   ret
48
49 _Example_C6:
50   mov mmap(@AC0L), T2
51   ret
52
53 _Example_C7:
54   bclr #13, ST0_55
55   bclr #12, ST0_55
56   btstp @28, AC0
57   ret
58
59 _Example_C8:
60   mov *AR0, *AR3, AC0
```

Registers Window:

Name	Value
AC0	0x0033335555
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0000005631
XDP	0x030100
PDP	0x0000
XCDP	0x000402
XAR0	0x000100
XAR1	0x000000
XAR2	0x000201
XAR3	0x0002FF
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x0000

Memory Window (DATA:0x11234 <Memory Rendering>):

Hex 16 Bit - TI Style Hex

Address	Value
0x011234	FFFF EC00 921B 0020
0x011238	122C 1425 697C 0002
0x01123C	6904 64E5 ED31 0800
0x011240	2AC4 9200 2264 5062
0x011244	4804 EC31 8E00 0000
0x011248	4804 5250 5800 2206
0x01124C	5166 2264 08FC 9590
0x011250	8004 0010 EC01 BE65
0x011254	867C 0001 9652 9C48
0x011258	00E6 6300 5062 4804
0x01125C	5066 4EFE EB00 0820
0x011260	2020 ED00 08ED 0018
0x011264	6C02 30EC 3C06 3C16
0x011268	9E94 2264 4E02 5062
0x01126C	4804 3876 50D5 4EF2
0x011270	EB08 08EB 0418 ED08
0x011274	0808 FFC2 6D14 00CC
0x011278	ED04 0808 FFC2 6D14

Example_C7

The screenshot displays a debugger window with three main panes. The left pane shows assembly code for 'Examples.asm'. The middle pane shows the 'Registers' window. The right pane shows the 'Memory' window.

Assembly Code (Left Pane):

```
41 _Example_C4:  
42   mov *+CDP(#2),AC3  
43   ret  
44  
45 _Example_C5:  
46   mov *(#0x11234),T2  
47   ret  
48  
49 _Example_C6:  
50   mov mmap(@AC0L), T2  
51   ret  
52  
53 _Example_C7:  
54   bclr #13,ST0_55  
55   bclr #12,ST0_55  
56   btstp @28,AC0  
57   ret  
58  
59 _Example_C8:  
60   mpym *AR0+,*CDP-,AC0  
61   ret  
62  
63 _Example_C9:  
64   amov #0x200,AR1  
65   amov #0x300,AR2
```

Registers (Middle Pane):

Name	Value
AC0	0x0033335555
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0000005631
XDP	0x030100
PDP	0x0000
XCDP	0x000402
XAR0	0x000100
XAR1	0x000000
XAR2	0x000201
XAR3	0x0002FF
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x0000
ST0	0x3802

Memory (Right Pane):

DATA:0x11234 <Memory Rendering>

Hex 16 Bit - TI Style Hex

Address	Value
0x011234	FFFF EC00 921B 0020
0x011238	122C 1425 697C 0002
0x01123C	6904 64E5 ED31 0800
0x011240	2AC4 9200 2264 5062
0x011244	4804 EC31 8E00 0000
0x011248	4804 5250 5800 2206
0x01124C	5166 2264 08FC 9590
0x011250	8004 0010 EC01 BE65
0x011254	867C 0001 9652 9C48
0x011258	00E6 6300 5062 4804
0x01125C	5066 4EFE EB00 0820
0x011260	2020 ED00 08ED 0018
0x011264	6C02 30EC 3C06 3C16
0x011268	9E94 2264 4E02 5062
0x01126C	4804 3876 50D5 4EF2
0x011270	EB08 08EB 0418 ED08
0x011274	0808 FFCC 6D14 00CC
0x011278	ED04 0808 FFC2 6D14
0x01127C	00C2 ED08 0876 00FF

Example_C8

The screenshot displays a debugger interface with three main panels. The left panel shows the assembly code for 'Examples.asm'. The middle panel shows the 'Registers' window, and the right panel shows the 'Memory' window.

Assembly Code (Examples.asm):

```
54 bclr #13,ST0_55
55 bclr #12,ST0_55
56 btstp @28,AC0
57 ret
58
59 _Example_C8:
60 mpym *AR0+,*CDP-,AC0
61 ret
62
63 _Example_C9:
64 amov #0x200,AR1
65 amov #0x300,AR2
66 mov #0xffff0,T3
67 sub AC3,AC3
```

Registers Window:

Name	Value
AC0	0x00064904BB
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0000005631
XDP	0x030100
PDP	0x0000
XCDP	0x000401
XAR0	0x000101
XAR1	0x000000
XAR2	0x000201
XAR3	0x0002FF

Memory Window:

DATA:0x100 <Memory Rendering>

Hex 16 Bit - TI Style Hex

Address	Value
0x000100	12AB 0000 0000 0000
0x000104	0000 0000 0000 0000
0x000108	0000 0000 0000 0000
0x00010C	0000 0000 0000 0000
0x000110	0000 0000 0000 0000
0x000114	0000 0000 0000 0000
0x000118	0000 0000 0000 0000
0x00011C	0000 0000 0000 0000
0x000120	0000 0000 0000 0000

Example_C9

The screenshot displays a debugger interface with three main panels. The left panel shows assembly code for 'Examples.asm'. The middle panel shows the 'Registers' window with several registers circled in red. The right panel shows the 'Memory' window displaying data at address 0x200.

Assembly Code (Examples.asm):

```
63 _Example_C9:  
64 amov #0x200,AR1  
65 amov #0x300,AR2  
66 mov #0xfff0,T3  
67 sub AC3,AC3  
68 mov #0x1234,AC3  
69 bset FRCT  
70  
71 macmr40 T3=*AR1+,*AR2  
72  
73 bclr FRCT  
74 ret  
75  
76 _Example_C10:  
77 bclr #11,ST0_55  
78 ret  
79  
80 _Example_C11:  
81 bset #13,ST0_55  
82 mov #0x100,AR1
```

Registers:

Name	Value
AC3	0x002220000
XDP	0x030100
PDP	0x0000
XCDP	0x000401
XAR0	0x000101
XAR1	0x000201
XAR2	0x000301
XAR3	0x000201
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x5555

Memory (DATA:0x200 <Memory Rendering>):

Hex 16 Bit - TI Style Hex	Value
0x000200	5555 0000 0000 0000
0x000204	0000 0000 0000 0000
0x000208	0000 0000 0000 0000
0x00020C	0000 0000 0000 0000
0x000210	0000 0000 0000 0000
0x000214	0000 0000 0000 0000
0x000218	0000 0000 0000 0000
0x00021C	0000 0000 0000 0000
0x000220	0000 0000 0000 0000
0x000224	0000 0000 0000 0000
0x000228	0000 0000 0000 0000
0x00022C	0000 0000 0000 0000
0x000230	0000 0000 0000 0000
0x000234	0000 0000 0000 0000
0x000238	0000 0000 0000 0000

Example_C10

The screenshot displays a debugger window with three main panes. The left pane shows assembly code for 'Examples.asm' with lines 72 through 81. Line 78, containing 'ret', is highlighted. The middle pane, titled 'Registers', lists various registers including XAR7, T0, T1, T2, T3, ST0, ST1, and ST2. The 'ST0' register is circled in red and has a yellow highlight on its value '0x3002'. The right pane shows the 'Memory' view for address '0x200', displaying a hex dump where the value '5555' at offset '0x000200' is highlighted in blue.

```
72  
73     bclr FRCT  
74     ret  
75  
76 _Example_C10:  
77     bclr #11,ST0_55  
78     ret  
79  
80 _Example_C11:  
81     bset #13,ST0_55
```

Name	Value
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x5555
ST0	0x3002
ST1	0x6900
ST2	0x5000

DATA: 0x200 Go New Tab
DATA: 0x200 <Memory Rendering>
Hex 16 Bit - TI Style Hex
0x000200 5555 0000 0000 0000
0x000204 0000 0000 0000 0000
0x000208 0000 0000 0000 0000
0x00020C 0000 0000 0000 0000
0x000210 0000 0000 0000 0000

Example_C11 (True condition)

The screenshot displays a development environment with three main panels. The left panel shows assembly code for 'Examples.asm'. The middle panel shows the 'Registers' window with a list of registers and their values. The right panel shows the 'Console' window with target-specific output.

Assembly Code (Examples.asm):

```
78     ret
79
80 _Example_C11:
81     bset #13,ST0_55
82     mov #0x100,AR1
83     sub AC0,AC0
84     xcc _test2,TC1
85     mov *AR1+,AC0
86 _test2
87
88     bclr #13,ST0_55
89     mov #0x100,AR1
90     sub AC0,AC0
91     xcc _test3,TC1
92     mov *AR1+,AC0
93 _test3
94     nop
95     ret
96
97 _Example_C12:
98     bset #13,ST0_55
99     mov #0x100,AR1
100    sub AC0,AC0
101    xccpart _test4,TC1
```

Registers:

Name	Value
AC0	0x00000012AB
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0022220000
XDP	0x030100
PDP	0x0000
XCDP	0x000401
XAR0	0x000101
XAR1	0x000101
XAR2	0x000301
XAR3	0x0002FF
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x5555
ST0	0x3802

Console:

AppC_examples.ccxml:CIO

Exp C.1 --- Examples in Appendi
Exp C.1 --- Examples in Appendi

Example_C12 (False condition)

The screenshot displays a development environment with three main panels. The left panel shows assembly code in 'Examples.asm'. The middle panel shows the 'Registers' window with a list of registers and their values. The right panel shows the 'Console' window with target console output.

Assembly Code (Examples.asm):

```
95     ret
96
97 _Example_C12:
98     bset #13,ST0_55
99     mov #0x100,AR1
100    sub AC0,AC0
101    xccpart_test4,TC1
102    mov *AR1+,AC0
103 _test4
104
105     bclr #13,ST0_55
106     mov #0x100,AR1
107     sub AC0,AC0
108     xccpart_finish_test
109     mov *AR1+,AC0
110 _finish_test
111     nop
112     ret
113
114
115 _Example_init:
116     mov #0,DPH
117     mov #0,DP
118
```

Registers Window:

Name	Value
AC0	0x0000000000
AC1	0x0000000000
AC2	0x0000000008
AC3	0x0022220000
XDP	0x030100
PDP	0x0000
XCDP	0x000401
XAR0	0x000101
XAR1	0x000101
XAR2	0x000301
XAR3	0x0002FF
XAR4	0x7F0000
XAR5	0x000000
XAR6	0x7FFFFFFF
XAR7	0x000000
T0	0x0023
T1	0x0000
T2	0x5555
T3	0x5555
ST0	0x1802

Console Window:

AppC_examples.ccxml:CIO

Exp C.1 --- Examples in Appendi
Exp C.1 --- Examples in Appendi

References

- <http://processors.wiki.ti.com/index.php/Category:CCS>
- http://processors.wiki.ti.com/index.php/Category:Code_Composer_Studio_v5
- TMS320C5505 Fixed-Point Digital Signal Processor, SPRS660E, Jan 2012
- TMS320C55x Assembly Language Tools v 4.4, SPRU280I, Nov 2011
- TMS320C55x Optimizing C/C++ Compiler v 4.4, SPRU281G, Dec 2011
- C55x v3.x CPU Mnemonic Instruction Set Reference Guide, SWPU067E, Jun 2009