

AT89C51RE2: Code Banking and Bank Switching with Keil μ Vision

AT89C51RE2 is a standard 8051 controller implementing an internal 128Kbps flash memory. Bank switching and code banking strategies facilitate application program development.

The code banking mechanism implemented on the AT89C51RE2 is compatible with all the major compilers on the market.

This application note gives the key points for implementation of code banking and bank switching on the 128K bytes Flash memory of the AT89C51RE2 controller with Keil μ Vision software.

References:

- AT89C51RE2 Datasheet
- Keil μ Vision Online Help



AT89C51RE2

Application Note



1. Creating a Code-Banked Project

Red software implements all the features to support applications based on: banked memory, & new aspects of the hardware design results, for specified to the linker so it can create a code-banking project that works on the target system.

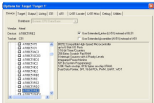
Implementation of a code-banked project with Red yf linker works in three main operations:

- The Red Software configuration for banked application support
- The file `_bank.cbf` and `bank.cbf` source code files configuration to fit the ARMv8-M architecture
- Assign bank number to each source file

1.1 Red Software Configuration

To get Red yf linker ready for use for a banked project, only perform the following steps:

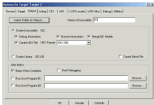
- Run Red yf linker
- Select 'Project' menu and New Project
- Enter the project name 'myproject'
- Select the target microcontroller: `STM32L1xx-ARMv8-M`
- Select the 'Use Extended Linker' option



• Then press 'OK'



- In the "Output" tab, under the "Output" section, you can select the output format of the results. The default is "Text", but you can also select "HTML" or "PDF".



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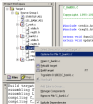
Since this project created you need to create your own code file. Here is the example we recommended for this course: `main.c`, `header.h`, `library.c`, and `library.h`.

- Add all the files to the project
 - ...Right click on the "Source Group 1" item of your project
 - ...Select "Add Files to..."
 - ...Add all your source code files.

Each source file from the project shall be assigned two build numbers. The build configuration for all source files are mapped on the common area. The following steps show how to define another source file in the source file:

- Robert is aware the
- Right side of the the
- Robert has "Gallons for the world" team

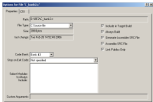
Keywords: child sexual abuse; disclosure; disclosure strategies



- ... the line mapped to back. I interpret as the first upper back (first back from anterior) (L1000) or (L1001).

- ...the file mapped to bank 0 belongs to the second upper bank (second bank from address 0x0000 to 0x0FFF)
- ...the file mapped to bank 1 belongs to the third upper bank (third bank from address 0x1000 to 0x1FFF)

Figure 4.6 Source file option definition (1)



• Then select "OK"

1.2 `LD_LIBRARY_PATH` and `LD_STARTUP_PATH` source file configuration

When `FastCompiler` software, a code building application must include the assembly files `ldc_start.asm` and `ldc_end.asm`. These source modules contain the code that is invoked to switch code blocks and the initial context.

The `LD_LIBRARY_PATH` and `LD_STARTUP_PATH` are located in the folder "`FastCompiler`" under your `FastCompiler`. Copy them to your project environment and change their addresses.

1.2.1 `ldc_start.asm`

The following configurations are the only points to set to have a `LD_LIBRARY_PATH` file that is `FastCompiler`'s main switching architecture and instructions.

- Definition of the block number
- Definition of the block switching strategy
- Definition of the default block after reset. This option is used for code optimization by the compiler.
- Definition of the block switching process. The block address definition is based on the configuration of the `MMIO` (Block Memory Select) register of the `ARMV7-M`.

```
ldc_start      equ     0
ldc_end        equ     1
ldc_start_page equ     0x00000000

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;

;-----
; ld = ldc_start + 0;
; ldc_end =      1;
```

6.3.4 STARTUP.000

The following lines must be commented or deleted at the end of the STARTUP.000 file:

```
if
*
*
*
*) These lines are required if you use the STARTUP.000 with function() mode. If
  you use mode (/no_function)
  then
    /no_function
  else
    /no_function
*) These lines are required to make sure it
  runs
  runs
```




2.1 Source Code

2.1.1 `Algebra - Gaussian.cu`

```
__device__ int rows=64;
__device__ int cols=64;

__device__ void Thrust::sort()
__device__ void Thrust::sort2()
__device__ void Thrust::sort3()
__device__ void Thrust::sort4()
__device__ void Thrust::sort5()

__device__ void update(integral float *xmat)

__device__ void sort4() {
    int i=0;
    /* Mapping index and then sort function is to sort 4
    update(xmat);

    /* Sort function is used
    /* Sort index that is mapped to sort4
    sort4();
    update(xmat);

    /* Mapping index and then sort function is to sort 4
    /* Sort function is used
    /* Sort index that is mapped to sort4
    /* Sort index that is mapped to sort4
    sort4();
    update(xmat);
}

__device__ void sort5()
{
    __device__ void sort5()
    {
        int i=0;
        while(i<rows)
        {
            sort5();
            i++;
        }
    }
}

__device__ void sort5()
{
    __device__ void sort5()
    {
        int i=0;
        while(i<rows)
        {
            sort5();
            i++;
        }
    }
}

__device__ void update(integral float *xmat)
{
    int i=0;
    sort5();
}
```

13 **C** **14** **B** **15** **A** **16** **B** **17** **A** **18** **B** **19** **A** **20** **B** **21** **A** **22** **B** **23** **A** **24** **B** **25** **A** **26** **B** **27** **A** **28** **B** **29** **A** **30** **B** **31** **A** **32** **B** **33** **A** **34** **B** **35** **A** **36** **B** **37** **A** **38** **B** **39** **A** **40** **B** **41** **A** **42** **B** **43** **A** **44** **B** **45** **A** **46** **B** **47** **A** **48** **B** **49** **A** **50** **B** **51** **A** **52** **B** **53** **A** **54** **B** **55** **A** **56** **B** **57** **A** **58** **B** **59** **A** **60** **B** **61** **A** **62** **B** **63** **A** **64** **B** **65** **A** **66** **B** **67** **A** **68** **B** **69** **A** **70** **B** **71** **A** **72** **B** **73** **A** **74** **B** **75** **A** **76** **B** **77** **A** **78** **B** **79** **A** **80** **B** **81** **A** **82** **B** **83** **A** **84** **B** **85** **A** **86** **B** **87** **A** **88** **B** **89** **A** **90** **B** **91** **A** **92** **B** **93** **A** **94** **B** **95** **A** **96** **B** **97** **A** **98** **B** **99** **A** **100** **B**

```

//Recursive solution for
//Recursive string reversal

//Function to reverse string
//using recursion
//Time Complexity: O(N)
//Space Complexity: O(N)

//Code for Recursive String Reversal
//C++
#include <iostream>
using namespace std;

//Function to reverse string
//using recursion
//Time Complexity: O(N)
//Space Complexity: O(N)
void reverseString(string str)
{
    //Base Case
    if (str.length() == 0)
        return;

    //Recursive Case
    reverseString(str.substr(1));

    //Print the string
    cout << str << " ";
}

//Driver Code
int main()
{
    string str = "Geeksforgeeks";
    reverseString(str);
    return 0;
}

```

24 **CHAPTER 1**

[illegible]

346 *Journal of Management Inquiry* 16(3)

```

@misc{catalan2019,
  author = {Catalan, J.},
  title = {Catalan, J.},
  year = {2019},
  journal = {Catalan, J.},
  volume = {1},
  number = {1},
  pages = {1-1},
  url = {https://doi.org/10.1000/1234567890},
  doi = {10.1000/1234567890}
}

```



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