



Dragonchip

**User Manual
for
DC66XXF Developer III
board ver3.0
(DC6688EMT)**

Document Revision 2.0

Aug, 2007

Revision History

The following table shows the revision history for this document.

| Date | Rev | Description | Edited By | Reviewed By |
|------------|-----|----------------------------------------------------------------------------------------------------------------------------|-----------|-------------|
| July, 2005 | 1.0 | Preliminary for DC66XXF Developer III board ver3.0 | | |
| Dec, 2005 | 1.1 | Revise section 7, 8 add description when using DEEMAX ICE | | |
| May, 2006 | 1.2 | Revise section 1 and 7 | | |
| June, 2006 | 1.3 | Add section 2 hardware setup | | |
| June, 2006 | 1.4 | 1) Add DC6688F05S information 2) Add section 10 | | |
| Sept, 2006 | 1.5 | revise section 9.1 | | |
| Jan, 2007 | 1.6 | | | |
| July, 2008 | 1.7 | Remove appendix A | | |
| July, 2008 | 1.8 | Remove all related to Micetek EPLV52 ICE section Added edited by and reviewed by in revision history Added DC6688FLX | Ken Yeung | Danny Ho |
| July, 2008 | 1.9 | Added DC6688FLB | Danny Ho | Ken Yeung |
| Aug, 2008 | 2.0 | Added DC6688FSB | Kennis To | Ken Yeung |

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1 Introduction

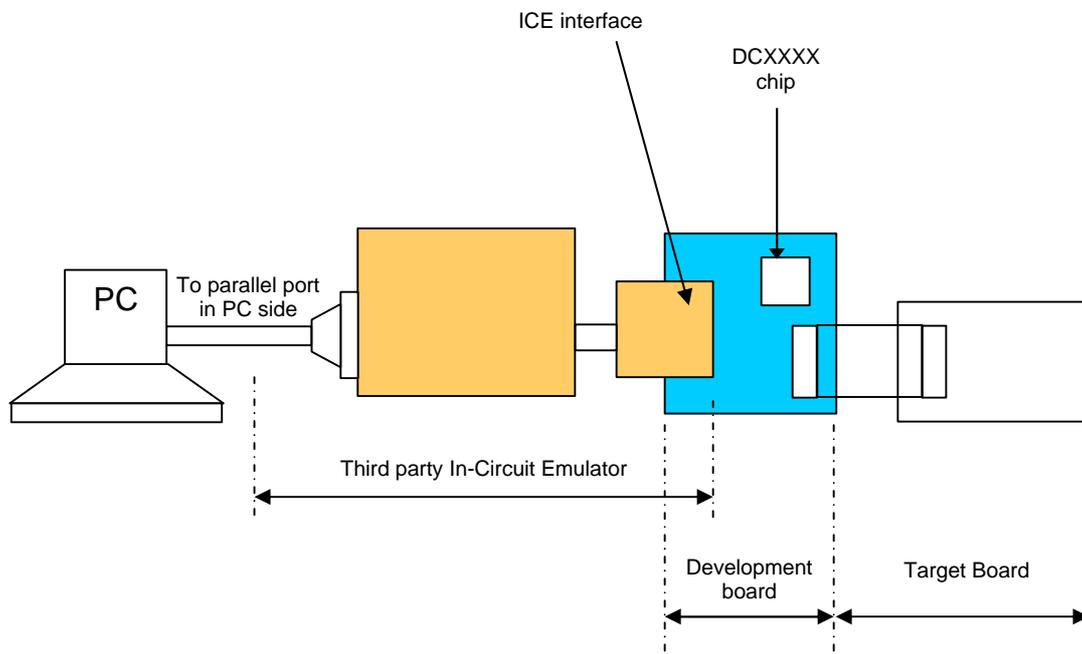
The Objective of this document is to provide the user a quick start to evaluate our products on their application development. A block diagram for the environment setup for development is shown below. The scope of this manual covers the Development board. The development board is DC66XXF Developer III board ver3.0 (DC6688EMT) in this case.

This board is applicable to the following devices:

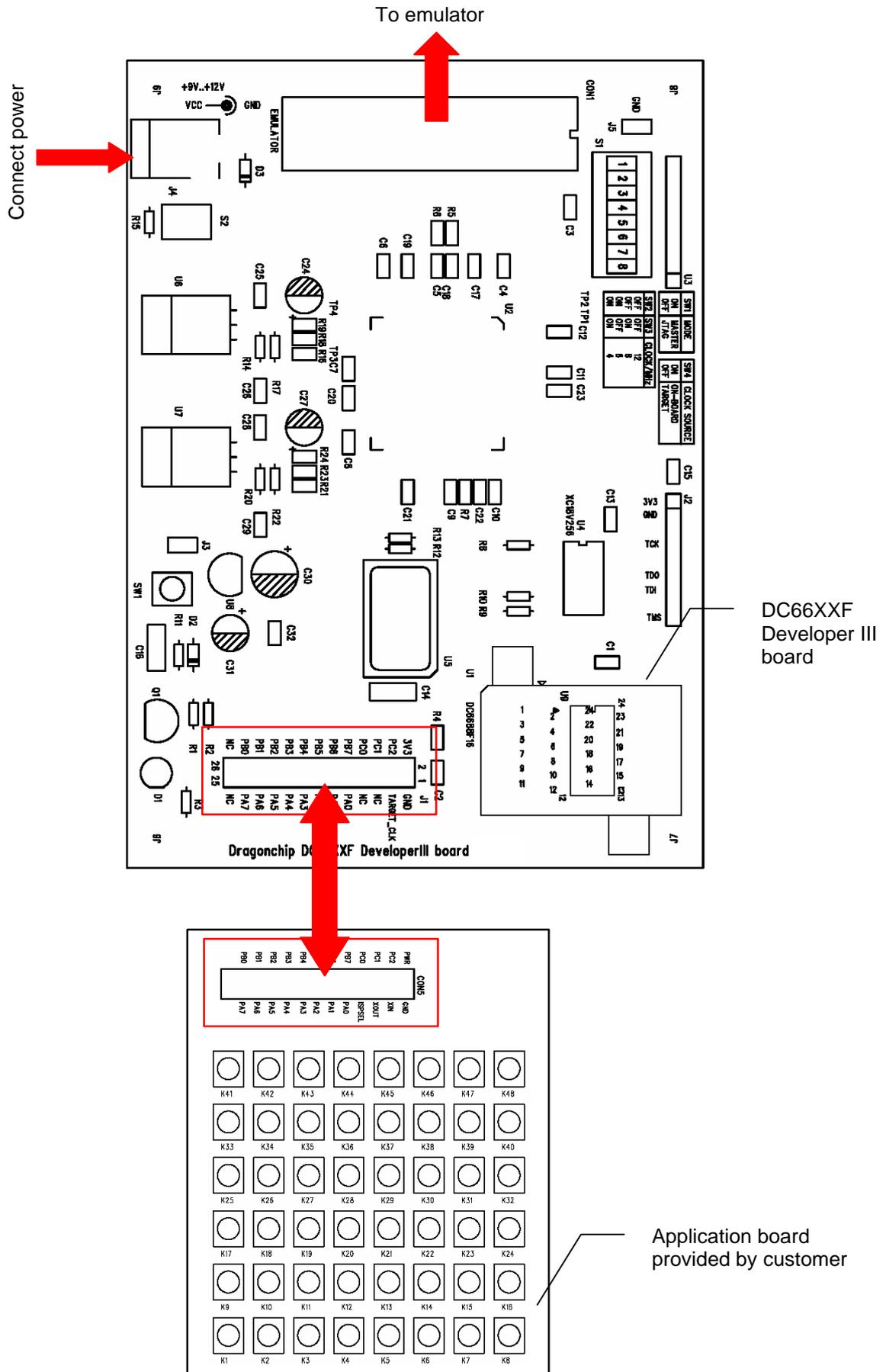
- 1) DC6688FSA,
- 2) DC6688FSB
- 3) DC6688FL32A
- 4) DC6688FLX
- 5) DC6688F05S
- 6) DC6688FLB

The whole setup involves two parts. One is PC to ICE while the other is ICE to development board. There is no pre-requisite software required for the development board.

Here, the third vendor in-circuit-emulator (ICE) from DEEMAX (model: 80532-4T) is suggested.

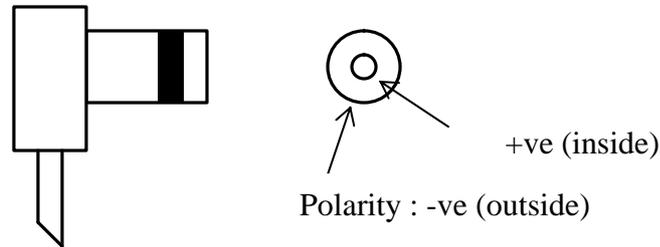


2 Hardware Setup



3 Powering up the developer III board

Attach a fixed power supply to the power-connector at J4. An unregulated +9V up to +12V/800mA power source can be used to supply the power of the developer III board (DC6688EMT). The correct polarity of the power plug is shown below.



4 DIP Switch Settings

'S1' Dip switch on the board applies to section 3. **To change the settings, the board should remove the power first.**

4.1 Clock Frequency selection

The on-board clock source of developer III board is derived from 48MHz. It can run up to a maximum frequency of 24 MHz. It can be changed to various frequencies according to customer's preference by the SW3, SW4 and SW5 switch settings. Their settings are as follows:

| SW3 | SW4 | SW5 | Clock frequency |
|-----|-----|-----|-----------------|
| Off | Off | On | Invalid |
| Off | On | On | Invalid |
| On | Off | On | Invalid |
| On | On | On | 24[1] |
| Off | Off | Off | 12 (default) |
| Off | On | Off | 8 |
| On | Off | Off | 6 |
| On | On | Off | 4[2] |

Remarks:

[1] only available for DC6688FL32A/DC6688FLB

[2] DC6688F05S can only use this frequency

4.2 Clock source selection

This board can support the clock source from target system by setting SW2 to "Off" position.

| SW2 | Clock Source |
|-----|--------------------|
| Off | Target-board |
| On | On-board (default) |

4.3 Device selection

It is required to determine which device to emulate by using this SW6 and SW7. The table below only applies to v1.2 (see marking on 'U4' component) as shown below.

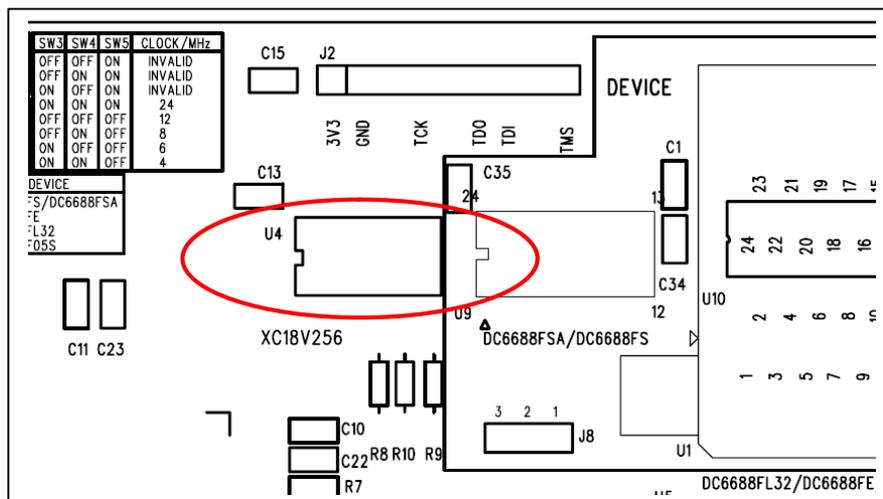
| SW6 | SW7 | Device |
|-----|-----|-------------------------------|
| On | Off | DC6688FSA/DC6688FSB (default) |
| Off | Off | Reserved |
| On | On | DC6688FL32A/DC6688FLB |
| Off | On | DC6688F05S |

The table below only applies to v1.3 (see marking on 'U4' component) as shown below.

| SW6 | SW7 | Device |
|-----|-----|------------|
| Off | On | DC6688F05S |

The table below only applies to 'DC6688EMT dvlp3-080710b' (see marking on 'U4' component) as shown below.

| SW6 | SW7 | Device |
|-----|-----|-----------|
| On | On | DC6688FLX |



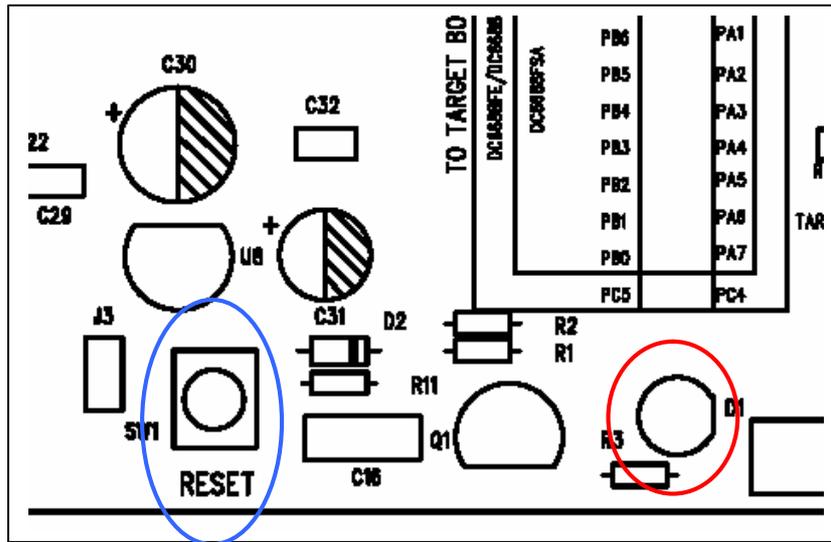
4.4 Default settings

| | |
|-----|-----|
| SW1 | On |
| SW2 | On |
| SW3 | Off |
| SW4 | Off |
| SW5 | Off |
| SW6 | On |
| SW7 | Off |
| SW8 | Off |

Warning: SW1, SW8 should not be changed

5 Reset Button and Green LED

When pressed the reset button (the blue circle as shown below), the Green LED (the red circle as shown below) turns off. After released the button, the Green LED will be lit up again to indicate the success of reset. **This button should be pressed whenever re-starting the program.**



6 Target interface

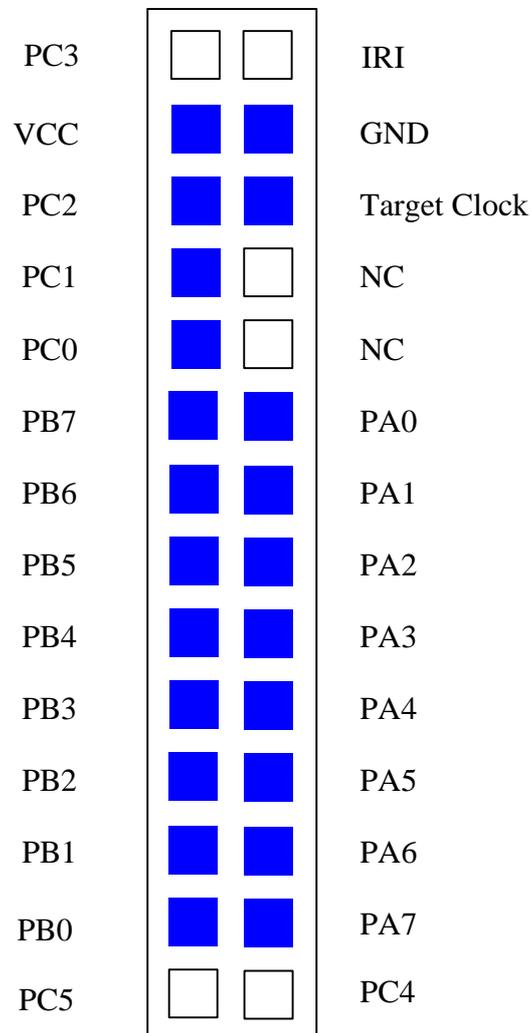
6.1 DC6688FSA

6.1.1 24-pin

If device DC6688FSA is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|---------------------|
| On | Off | DC6688FSA (default) |

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

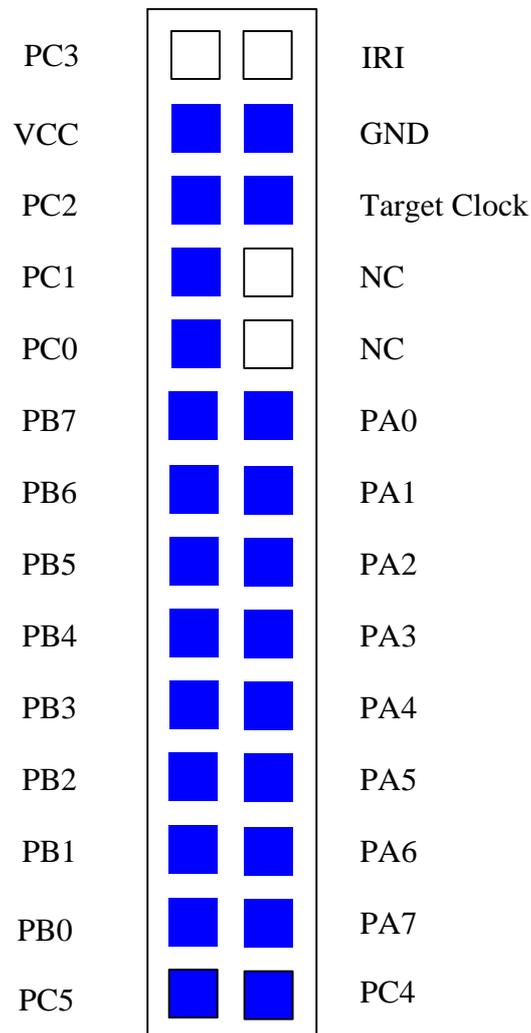
6.1.2 28-pin

If device DC6688FSA is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|---------------------|
| On | Off | DC6688FSA (default) |

DC6688FSA is also available in 28-pin. The part number is DC6688FSAE.

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

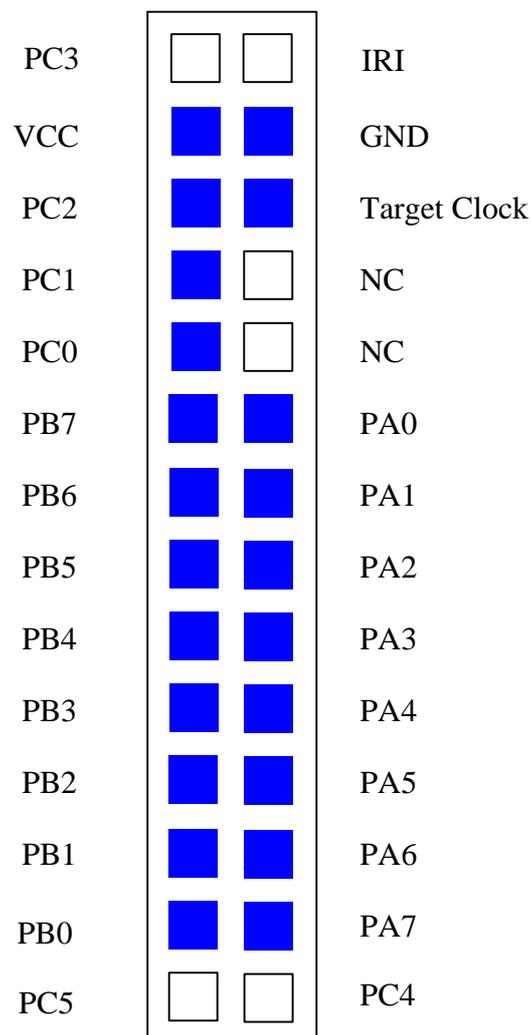
6.2 DC6688FSB

6.2.1 24-pin

If device DC6688FSB is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|-----------|
| On | Off | DC6688FSB |

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

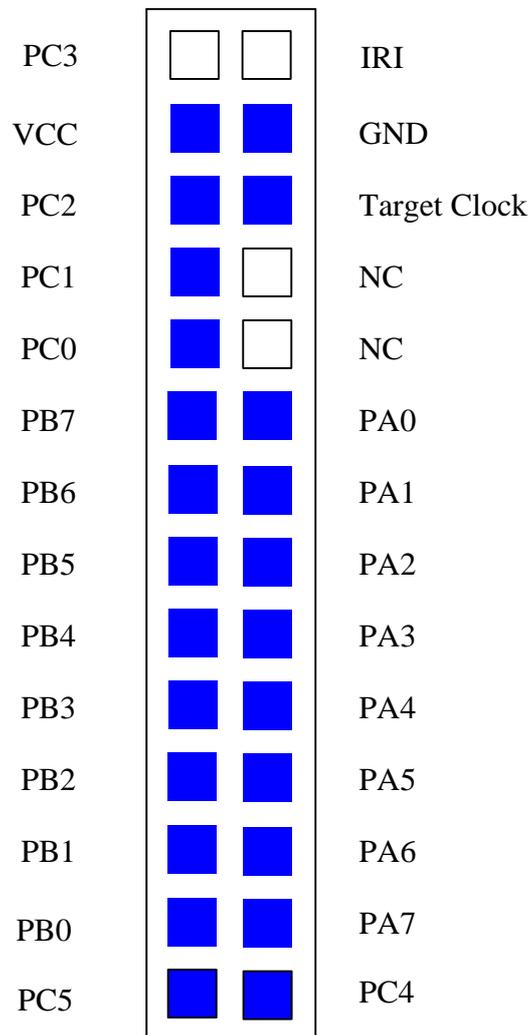
6.2.2 28-pin

If device DC6688FSB is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|-----------|
| On | Off | DC6688FSB |

DC6688FSB is also available in 28-pin. The part number is DC6688FSBE.

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



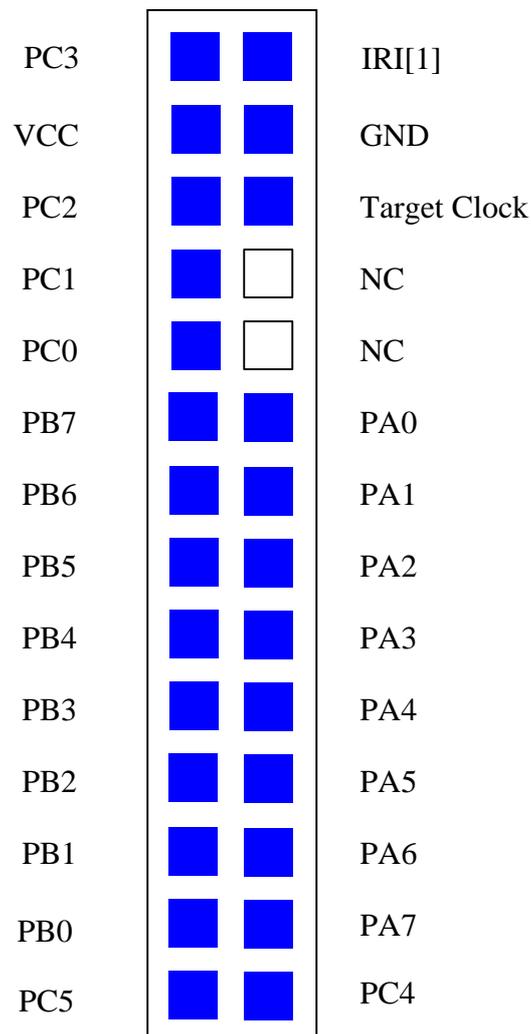
Top view of 28 pin header (J1)

6.3 DC6688FL32A

If device DC6688FL32A is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|-------------|
| On | On | DC6688FL32A |

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

Remarks:

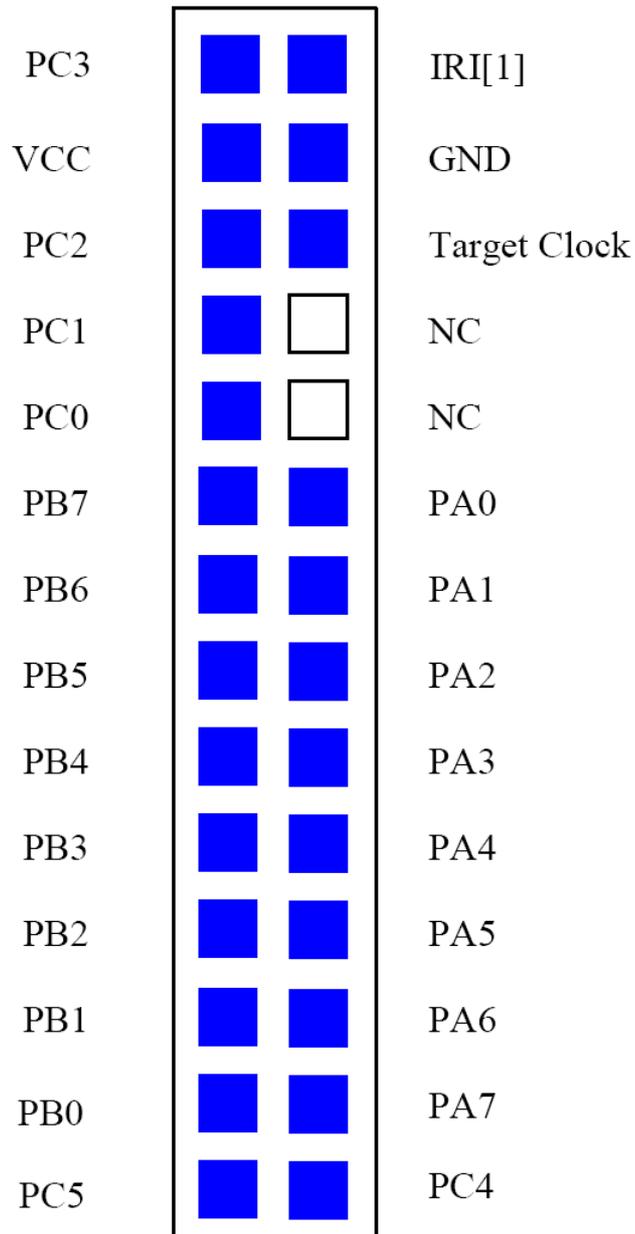
[1] Don't use this pin. Use the on board IR sensor for IR signal reception.

6.4 DC6688FLX

If device DC6688FLX is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|-----------|
| On | On | DC6688FLX |

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

Remarks:

[1] Don't use this pin. Use the on board IR sensor for IR signal reception.

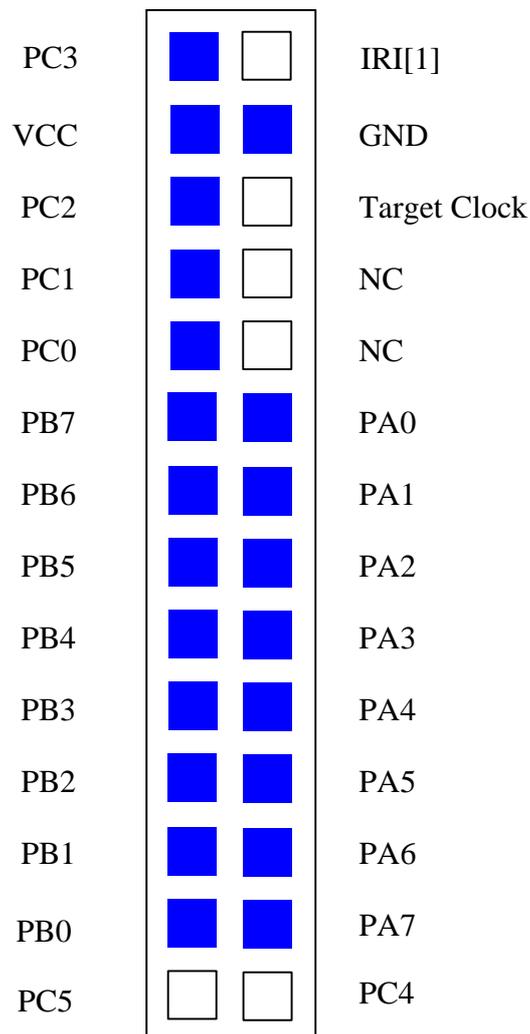
6.5 DC6688F05S

If device DC6688F05S is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|------------|
| Off | On | DC6688F05S |

1) DC6688F05S 24-pin package

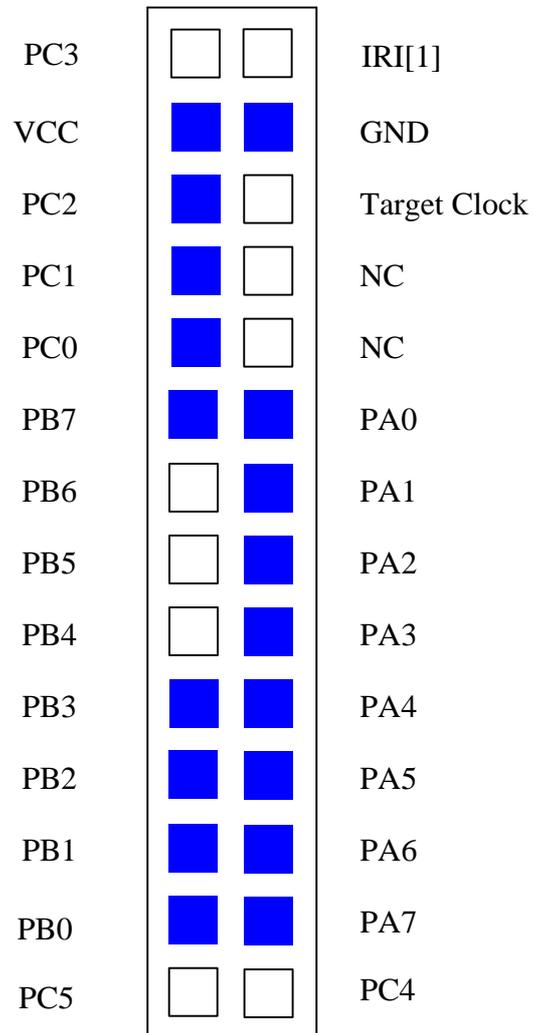
The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



Top view of 28 pin header (J1)

2) DC6688F05S 20-pin package

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.



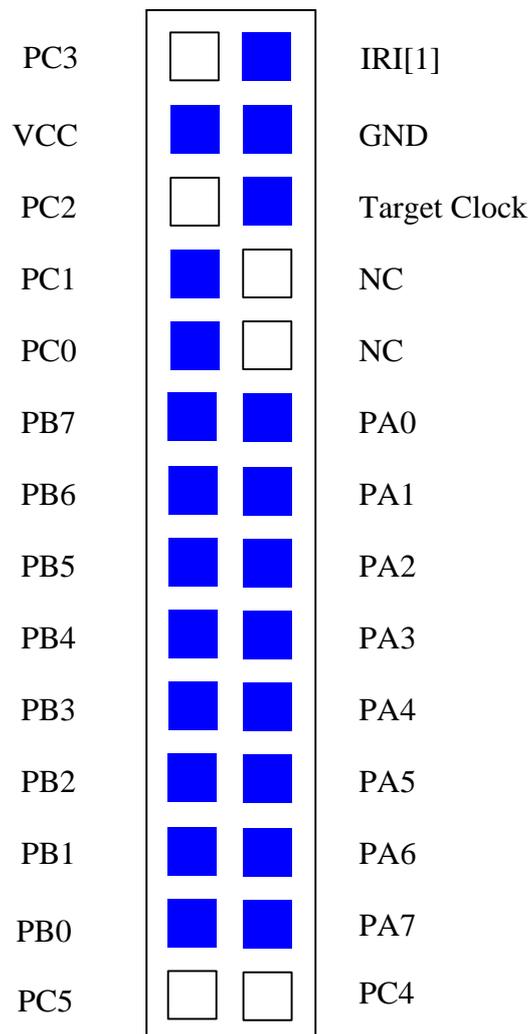
Top view of 28 pin header (J1)

6.6 DC6688FLB

If device DC6688FLB is selected according to following settings, then the pin assignment for component 'J1' will be shown below.

| SW6 | SW7 | Device |
|-----|-----|-----------|
| On | On | DC6688FLB |

The target pin-out is 14x2 header (2.54mm pitch) and the pin layout for target interface is illustrated below. Only pins in blue color are used.

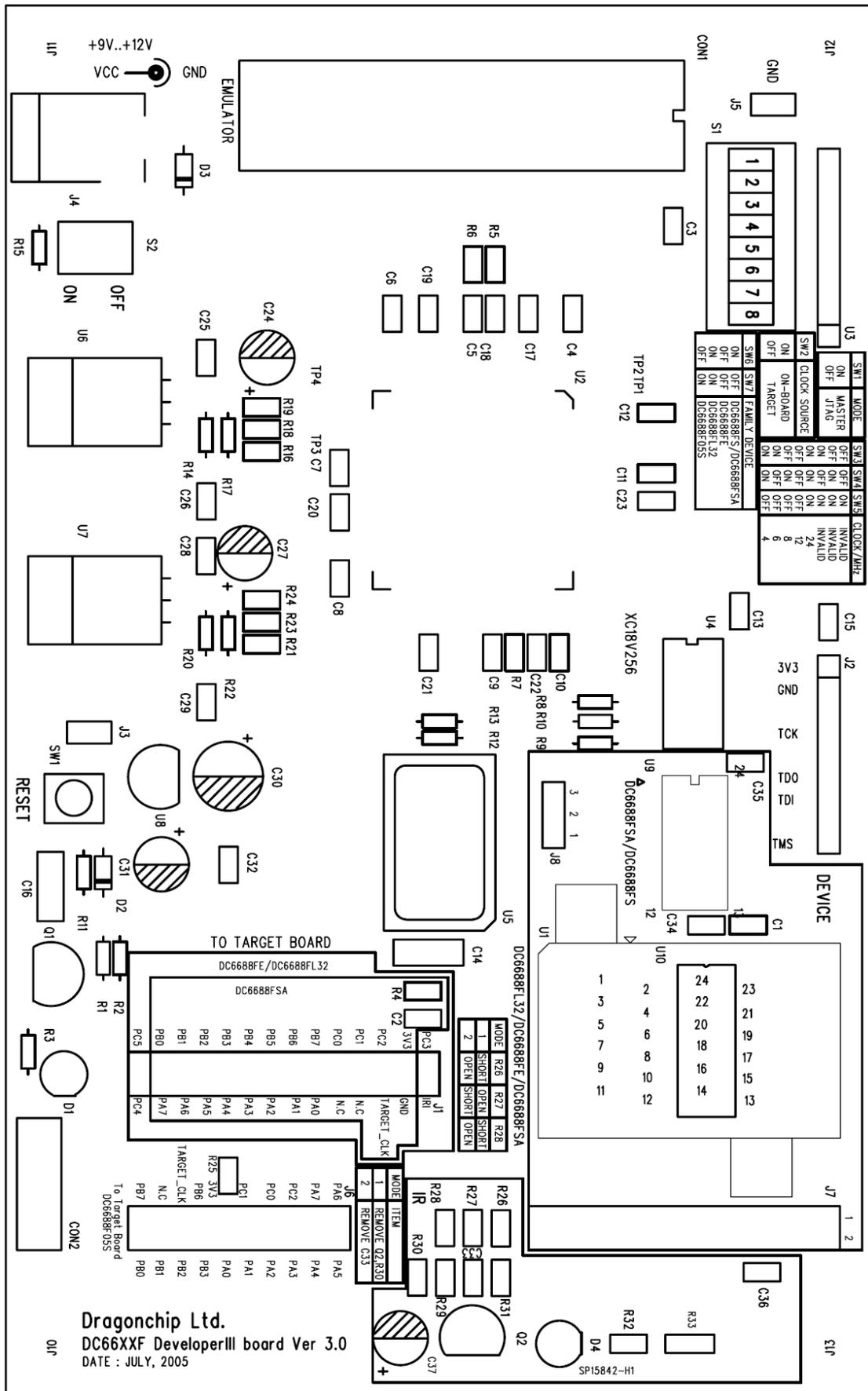


Top view of 28 pin header (J1)

Remarks:

[1] Don't use this pin. Use the on board IR sensor for IR signal reception.

7 Top view of the component diagram



8 Memory Configuration in In-Circuit Emulator (ICE)

8.1 DEEMAX 80532-4T

8.1.1 DC6688FSA

The memory configuration in ICE environment is shown below:

| ICE Status Break Points Memory Map Events | | | | | | | | | | | | | | | | |
|-------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000000 | EM |
| 001000 | EM |
| 002000 | EM |
| 003000 | EM |
| 004000 | EM |
| 005000 | EM |
| 006000 | EM |
| 007000 | EM |
| 008000 | EM |
| 009000 | EM |
| 00A000 | EM |
| 00B000 | EM |
| 00C000 | EM |
| 00D000 | EM |
| 00E000 | EM |
| 00F000 | EM |
| X: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000000 | UM | UP |
| 001000 | UP |
| 002000 | UP |
| 003000 | UP |
| 004000 | UP |
| 005000 | UP |
| 006000 | UP |
| 007000 | UP |
| 008000 | UP |
| 009000 | UP |
| 00A000 | UP |
| 00B000 | UP |
| 00C000 | UP |
| 00D000 | UP |
| 00E000 | UP |
| 00F000 | UP |

8.1.2 DC6688FSB

The memory configuration in ICE environment is shown below:

The screenshot shows the 'Memory Map' tab in the ICE environment. It displays a grid of memory addresses and their status. The 'C:' drive shows all memory blocks as 'EM' (Empty Memory). The 'X:' drive shows all memory blocks as 'UP' (Used Memory), except for the first block (000000) which is 'UM' (Used Memory).

| Address | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: 000000 | EM |
| C: 001000 | EM |
| C: 002000 | EM |
| C: 003000 | EM |
| C: 004000 | EM |
| C: 005000 | EM |
| C: 006000 | EM |
| C: 007000 | EM |
| C: 008000 | EM |
| C: 009000 | EM |
| C: 00A000 | EM |
| C: 00B000 | EM |
| C: 00C000 | EM |
| C: 00D000 | EM |
| C: 00E000 | EM |
| C: 00F000 | EM |
| X: 000000 | UM | UP |
| X: 001000 | UP |
| X: 002000 | UP |
| X: 003000 | UP |
| X: 004000 | UP |
| X: 005000 | UP |
| X: 006000 | UP |
| X: 007000 | UP |
| X: 008000 | UP |
| X: 009000 | UP |
| X: 00A000 | UP |
| X: 00B000 | UP |
| X: 00C000 | UP |
| X: 00D000 | UP |
| X: 00E000 | UP |
| X: 00F000 | UP |

8.1.3 DC6688FL32A

The memory configuration in ICE environment is shown below:

| ICE Status Break Points Memory Map Events | | | | | | | | | | | | | | | | |
|-------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000000 | EM |
| 001000 | EM |
| 002000 | EM |
| 003000 | EM |
| 004000 | EM |
| 005000 | EM |
| 006000 | EM |
| 007000 | EM |
| 008000 | EM |
| 009000 | EM |
| 00A000 | EM |
| 00B000 | EM |
| 00C000 | EM |
| 00D000 | EM |
| 00E000 | EM |
| 00F000 | EM |
| X: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000000 | UM | UP | EM | EM | UP |
| 001000 | UP |
| 002000 | UP |
| 003000 | UP |
| 004000 | UP |
| 005000 | UP |
| 006000 | UP |
| 007000 | UP |
| 008000 | UP |
| 009000 | UP |
| 00A000 | UP |
| 00B000 | UP |
| 00C000 | UP |
| 00D000 | UP |
| 00E000 | UP |
| 00F000 | UP |

8.1.4 DC6688FLX

The memory configuration in ICE environment is shown below:

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: | | | | | | | | | | | | | | | | |
| 0000000 | EM |
| 0010000 | EM |
| 0020000 | EM |
| 0030000 | EM |
| 0040000 | EM |
| 0050000 | EM |
| 0060000 | EM |
| 0070000 | EM |
| 0080000 | EM |
| 0090000 | EM |
| 00A0000 | EM |
| 00B0000 | EM |
| 00C0000 | EM |
| 00D0000 | EM |
| 00E0000 | EM |
| 00F0000 | EM |
| X: | | | | | | | | | | | | | | | | |
| 0000000 | UM | UP | UP | UP | UP | UP | UP |
| 0010000 | UP |
| 0020000 | UP |
| 0030000 | UP |
| 0040000 | UP |
| 0050000 | UP |
| 0060000 | UP |
| 0070000 | UP |
| 0080000 | UP |
| 0090000 | UP |
| 00A0000 | UP |
| 00B0000 | UP |
| 00C0000 | UP |
| 00D0000 | UP |
| 00E0000 | UP |
| 00F0000 | UP |

8.1.5 DC6688F05S

The memory configuration in ICE environment is shown below:

The screenshot shows the 'ICE Status' window with the 'Memory Map' tab selected. It displays a grid of memory status for two drives: C: and X:. Each cell in the grid represents a 16KB memory block, with columns labeled 0-F and rows labeled 000000-00F000. The C: drive shows 'EM' (Empty) in all cells. The X: drive shows 'UP' (Used) in all cells, with the first cell (000000) highlighted in red.

| Drive | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: 000000 | EM |
| C: 001000 | EM |
| C: 002000 | EM |
| C: 003000 | EM |
| C: 004000 | EM |
| C: 005000 | EM |
| C: 006000 | EM |
| C: 007000 | EM |
| C: 008000 | EM |
| C: 009000 | EM |
| C: 00A000 | EM |
| C: 00B000 | EM |
| C: 00C000 | EM |
| C: 00D000 | EM |
| C: 00E000 | EM |
| C: 00F000 | EM |
| X: 000000 | UM | UP |
| X: 001000 | UP |
| X: 002000 | UP |
| X: 003000 | UP |
| X: 004000 | UP |
| X: 005000 | UP |
| X: 006000 | UP |
| X: 007000 | UP |
| X: 008000 | UP |
| X: 009000 | UP |
| X: 00A000 | UP |
| X: 00B000 | UP |
| X: 00C000 | UP |
| X: 00D000 | UP |
| X: 00E000 | UP |
| X: 00F000 | UP |

8.1.6 DC6688FLB

The memory configuration in ICE environment is shown below:

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|----|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C: | 000000 | EM |
| | 001000 | EM |
| | 002000 | EM |
| | 003000 | EM |
| | 004000 | EM |
| | 005000 | EM |
| | 006000 | EM |
| | 007000 | EM |
| | 008000 | EM |
| | 009000 | EM |
| | 00A000 | EM |
| | 00B000 | EM |
| | 00C000 | EM |
| | 00D000 | EM |
| | 00E000 | EM |
| | 00F000 | EM |
| X: | 000000 | UM | UP | EM | EM | UP |
| | 001000 | UP |
| | 002000 | UP |
| | 003000 | UP |
| | 004000 | UP |
| | 005000 | UP |
| | 006000 | UP |
| | 007000 | UP |
| | 008000 | UP |
| | 009000 | UP |
| | 00A000 | UP |
| | 00B000 | UP |
| | 00C000 | UP |
| | 00D000 | UP |
| | 00E000 | UP |
| | 00F000 | UP |

9 Precaution on using emulator

At this moment, one type of emulator is available:

- 1) DEEMAX 80532-4T ICE (from DEEMAX company)

This type of emulator has its own limitation when used together with the developer III board (DC6688EMT), and will be described in detail in the following section 9.1.

9.1 DEEMAX 80532-4T ICE

9.1.1 Limitation

The number of machine cycles occupied for each instruction and the period of machine cycle in ICE is all the same as real silicon only with the following exception:

- 1) INC DPTR
- 2) RET
- 3) RETI
- 4) JMP @A+DPTR
- 5) MOVC A,@A+DPTR
- 6) MOVC A,@A+PC

The exact number of machine cycles occupied for each instruction above refers to the document "Development Tools Setup Guide for Dragonchip Development board".

9.1.2 Additional limitation on Emulate DC6688FSA

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No watchdog (basic timer)
- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

9.1.3 Additional limitation on Emulate DC6688FSB

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No watchdog (basic timer)
- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

9.1.4 Additional limitation on Emulate DC6688FL32A

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No watchdog (basic timer)
- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

9.1.5 Additional limitation on Emulate DC6688FLX

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No port D
- No watchdog (basic timer)
- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

9.1.6 Additional limitation on Emulate DC6688F05S

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No watchdog (basic timer)
- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

9.1.7 Additional limitation on Emulate DC6688FLB

- Power down mode is not implemented in ICE, don't use it, otherwise, undetermined result occurs.
- No ISP select pin on CON4 in the ICE
- No XOUT pin on CON4 in the ICE
- No pull-up resistors in the ICE's port A, B and C
- No watchdog (basic timer)

- No backup mode
- No ISP programming
- No UART1
- Only operated at 3.3V power
- No access to 'T1_PCNTA' register
- No T2 output on PC2 by setting bit 'T2OE' in 'T2MOD' register

10 Notes on Customer Target board

Customer Target board means the one described in section 1.

When building a target board, the following points have to be checked **before** connecting to the Developer III board (DC6688EMT):

- 1) Pull-up resistors on port
For example, to use DC6688FSA for remote control application, pull-up resistors should be put on the target board to connect to port A.
- 2) Power line
Make sure the line is not shorted to ground line
- 3) Ground line
Make sure the line is not shorted to power line and connected to ground line in development board.
- 4) Cable between Target board and Development board
Choose cable as short as possible to avoid any noise
- 5) Power down mode
When running the program, make sure the power down mode instruction is disabled. otherwise, the emulator will have no response.

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