

# **ST7MDT25-DVP3 Probe User Guide**

Release 1.0

**August 2004**



Ref: DOC-MDT0017



### INSTRUCTIONS FOR USE—WARNING

This product is conform to the 89/336/EEC Directive. It complies with the ITE EN55022 (1998 edition) standard for EMC emissions and the 55024 (1998 edition) immunity standards.

**This product is an FCC Class-A apparatus. In a residential environment, it may cause radioelectrical disturbances.**

In addition, this development board is not contained in an outer casing; consequently, it cannot be immune against electrostatic discharges (ESD). Please refer to [Appendix B EMC Conformity and Safety Requirements](#) on page 28 for relevant safety information.

### USE IN LIFE SUPPORT DEVICES OR SYSTEMS MUST BE EXPRESSLY AUTHORIZED.

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1. Life support devices or systems are those which (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided with the product, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can reasonably be expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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## 1 INTRODUCTION

The **ST7-DVP3 series emulators** are the latest generation of low cost emulators for ST7. These emulators are based on a modular design so that they can be configured to emulate a specific MCU and package type.

ur emulator's **Main Emulation Board (MEB)** is common to all DVP3 series emulators. This board provides the connection to your host PC. For information about this connection and emulator features, refer to your *ST7-DVP3 Emulator User Manual*.

The **ST7MDT25-DVP3 probe**, consisting of the Target Emulation Board (TEB), Adapter Kit and flat cables ([Figure 1](#)), is what gives your emulator the versatility to emulate MCUs form different families, with different packages.

The **Target Emulation Board** contains target-emulating hardware that is specific to an ST7 MCU, or a family of MCUs. Your ST7MDT25-TEB/DVP emulates MCUs in the **ST72561** family.

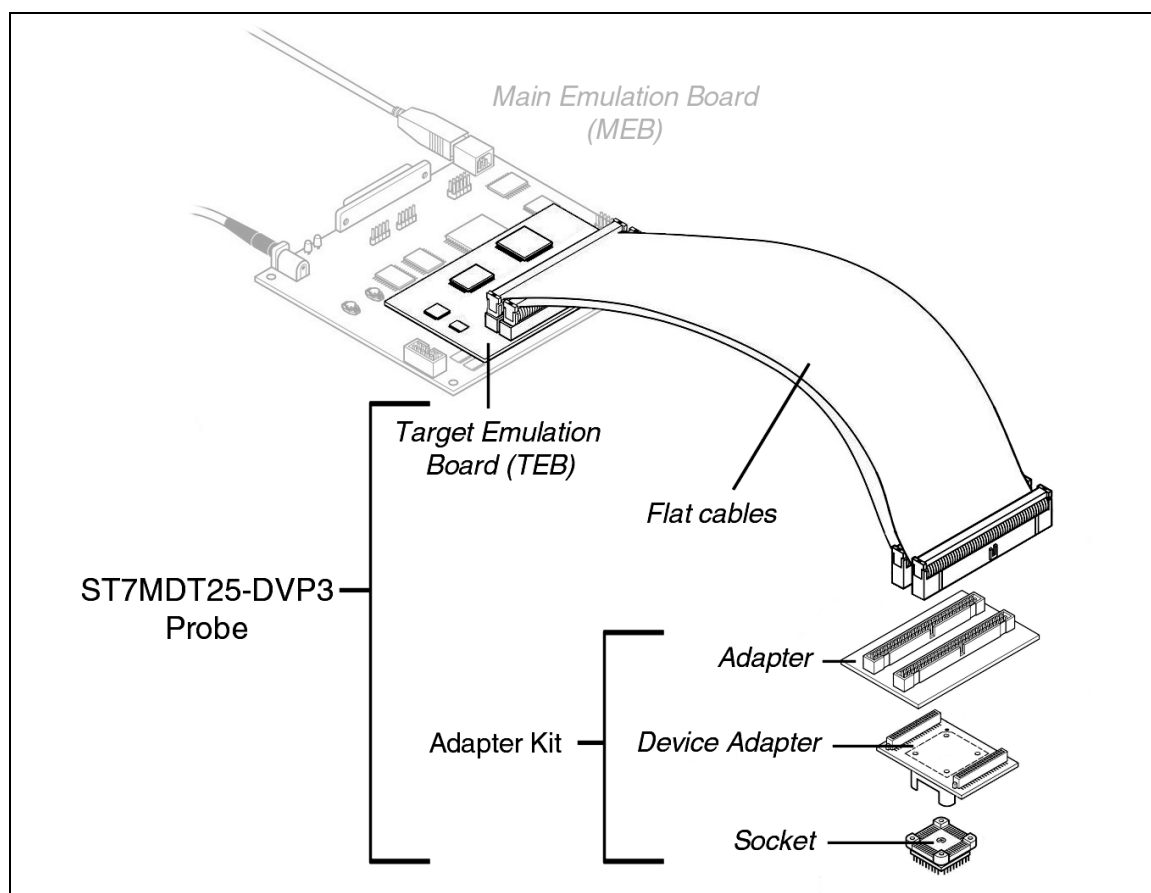


Figure 1: ST7MDT25-DVP3 probe

**Flat cables** connect your TEB to your application board. However, connecting to your application board requires either the use of the appropriate adapters and sockets provided in an Adapter Kit, or the installation of connectors on your application board, which allow the direct connection of the emulator's flat cables or the TQFP64/44 adapter.

**Adapter Kits** provide all the components you will need to adapt your flat cables to four different MCU packages: **TQFP64 (14 x 14)**, **TQFP64 (10 x 10)**, **TQFP44 (10 x 10)**, **TQFP32 (7 x 7)**. [Table 1](#) provides a list of components for each Adapter Kit. In general, Adapter Kits consist of ([Figure 1](#)):

- An **Adapter** that receives the flat cables from the TEB and provides a connection for the Device Adapter.
- A **Device Adapter** that adapts the connection to a socket that is specific to your MCU's package.
- A **Socket** that matches your MCUs package. It is soldered onto your application board in place of your MCU.

Thanks to the modularity of the ST7-DVP3 series emulators, the components of the ST7MDT25-DVP3 probe allow you to adapt any DVP3 Main Emulation Board to emulate the ST72561 family of MCUs.

## 1.1 About the user manuals...

This manual will help you connect your ST7MDT25-DVP3 emulator to your application board in place of your ST7 microcontroller. Information is provided to help you connect using the adapters and sockets that you may have ordered, or via connectors that you install on your application board. You will also find information about the emulation characteristics of your ST7MDT25-DVP3 emulator.

For information about the software and additional hardware intended for use with your emulator, refer to the following documents that are included with it:

**ST7 Visual Develop User Manual** - build and debug your application software

**ST7-DVP3 Emulator User Manual** - set up instructions for your emulator

**ST75261 Datasheet** - includes debugging and programming information that is specific to your MCU

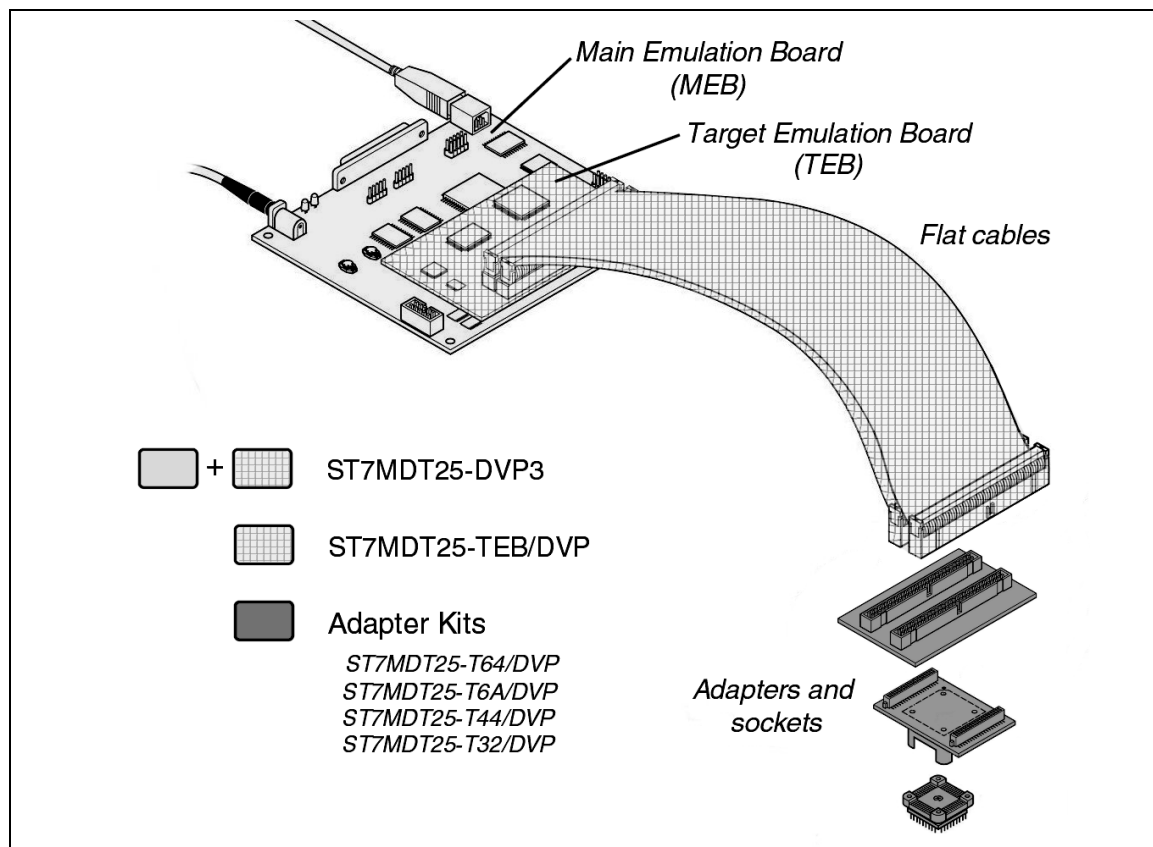
Because of the modularity of the DVP3 emulator, this guide is delivered with the following products:

- ST7MDT25-TEB/DVP
- ST7MDT25-DVP3 emulator

## 2 DELIVERY CHECKLIST

Due to the modular structure of the ST7-DVP3 series emulators, different ordering codes allow you to order only the components you need to emulate your chosen MCU. The ordering codes allow you to specify ([Figure 2](#)):

- Main Emulation Board plus Target Emulation Board and flat cables
- Target Emulation Board and flat cables only
- which Adapter Kit that you will need.



**Figure 2: ST7MDT25-DVP3 ordering codes**

When using the delivery check list, keep in mind that the components you receive depend on the ordering codes that you have specified. [Table 1](#) shows the components delivered for each ordering code and the supported MCU package. Standard components are illustrated in [Figure 3](#) and Adapter Kit contents are shown in [Figure 4](#).

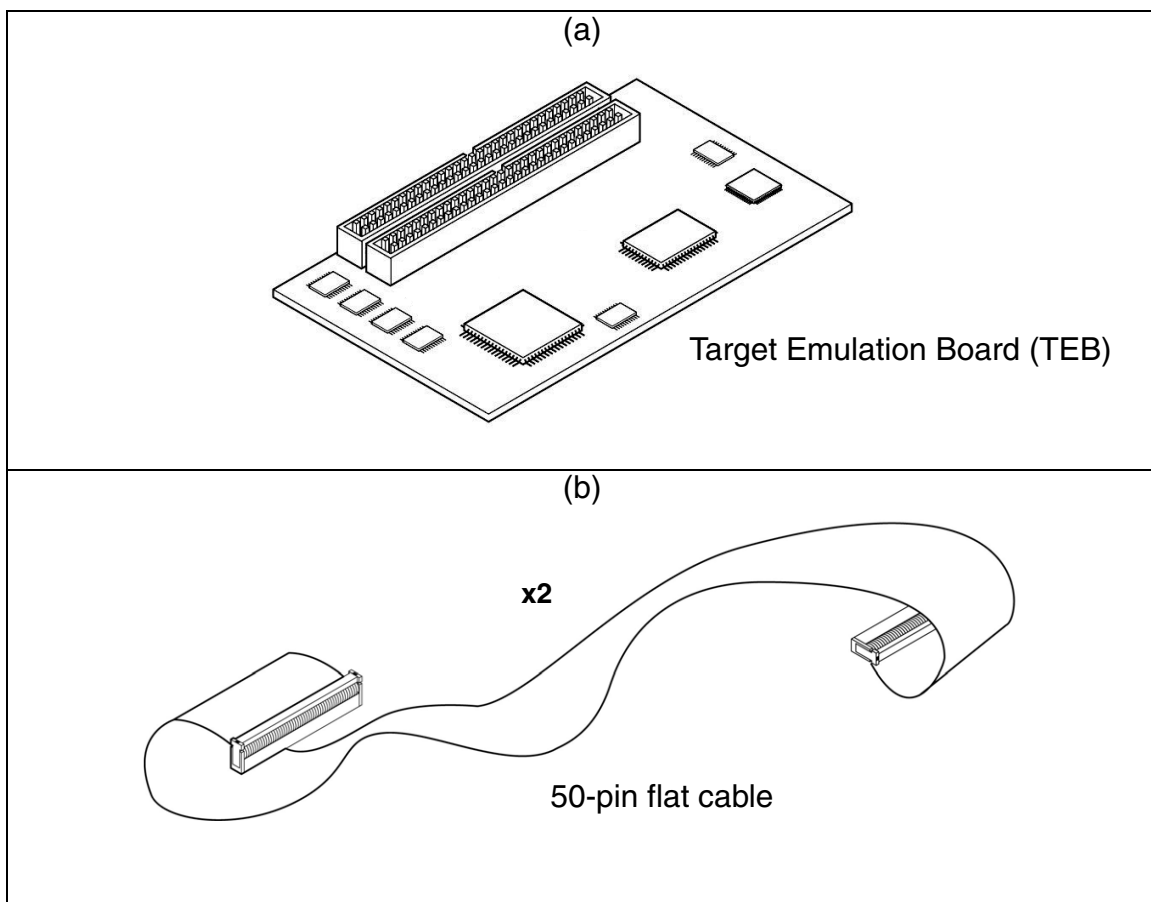
## Ordering codes and included components

| Ordering code                             | MCU package                  | Includes                                                                                                                                                                                                                 |
|-------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Emulator or Target Emulation Board</b> |                              |                                                                                                                                                                                                                          |
| <b>ST7MDT25-DVP3</b>                      | —                            | <b>(a)</b> One ST7MDT25-DVP3 Target Emulation Board<br><b>(b)</b> Two 50-pin flat cables<br><i>Also includes Main Emulation Board, PC connection accessories, power supply and ICC cable (See ST7-DVP3 User Manual).</i> |
| <b>ST7MDT25-TEB/DVP</b>                   | —                            | <b>(a)</b> One ST7MDT25-DVP3 Target Emulation Board<br><b>(b)</b> Two 50-pin flat cables                                                                                                                                 |
| <b>Adapter Kit Contents</b>               |                              |                                                                                                                                                                                                                          |
| <b>ST7MDT25-T64/DVP</b>                   | TQFP64<br>(14 x 14)          | <b>(c)</b> TQFP64/44 adapter (ref.: DB612) <sup>1</sup><br><b>(f)</b> TQFP64 14x14 device adapter (ref.: DB543)<br><b>(g)</b> TQFP64 socket and cover (not shown)<br>(refs. CAB 3303262 and CAB 3303307)                 |
| <b>ST7MDT25-T6A/DVP</b>                   | TQFP64<br>(10 x 10)          | <b>(c)</b> TQFP64/44 adapter (ref.: DB612) <sup>1</sup><br><b>(d)</b> TQFP64 10x10 device adapter (ref.: DB583)<br><b>(e)</b> YAMAICHI TQFP64 10x10 socket with cover<br>(ref.: IC149-064-075-B5)                        |
| <b>ST7MDT25-T44/DVP</b>                   | TQFP44<br>(10 x 10)          | <b>(c)</b> TQFP64/44 adapter (ref.: DB612) <sup>1</sup><br><b>(h)</b> TQFP44 device adapter (ref.: DB613)<br><b>(i)</b> YAMAICHI TQFP44 socket with cover<br>(ref.: IC149-044-052-S5)                                    |
| <b>ST7MDT25-T32/DVP</b>                   | TQFP32 <sup>2</sup><br>(7x7) | <b>(j)</b> TQFP32 adapter (ref.: DB615)<br><b>(k)</b> TQFP32 device adapter (ref.: DB522)<br><b>(l)</b> IRONWOOD TQFP32 socket (ref.: SK-UGA06/32A-01)                                                                   |

Table 1: Ordering codes and included components

1. You can use the TQFP64/44 adapter to connect directly to your application, without using the other adapters and sockets provided in the Adapter Kits if you design your application with two 40-pin SAMTEC connectors. More information is provided in [Appendix A](#): on page 25.
2. Replacing the ST7MDT25-DVP3 TQFP32 probe with your ST7 can be done using the IRONWOOD clam shell socket (ref.: CA-QFE32SA-L-Z-T-02-D1442) not provided with the kit.

## Emulator/TEB components



**Figure 3: Emulator/TEB components**

Adapter Kit components

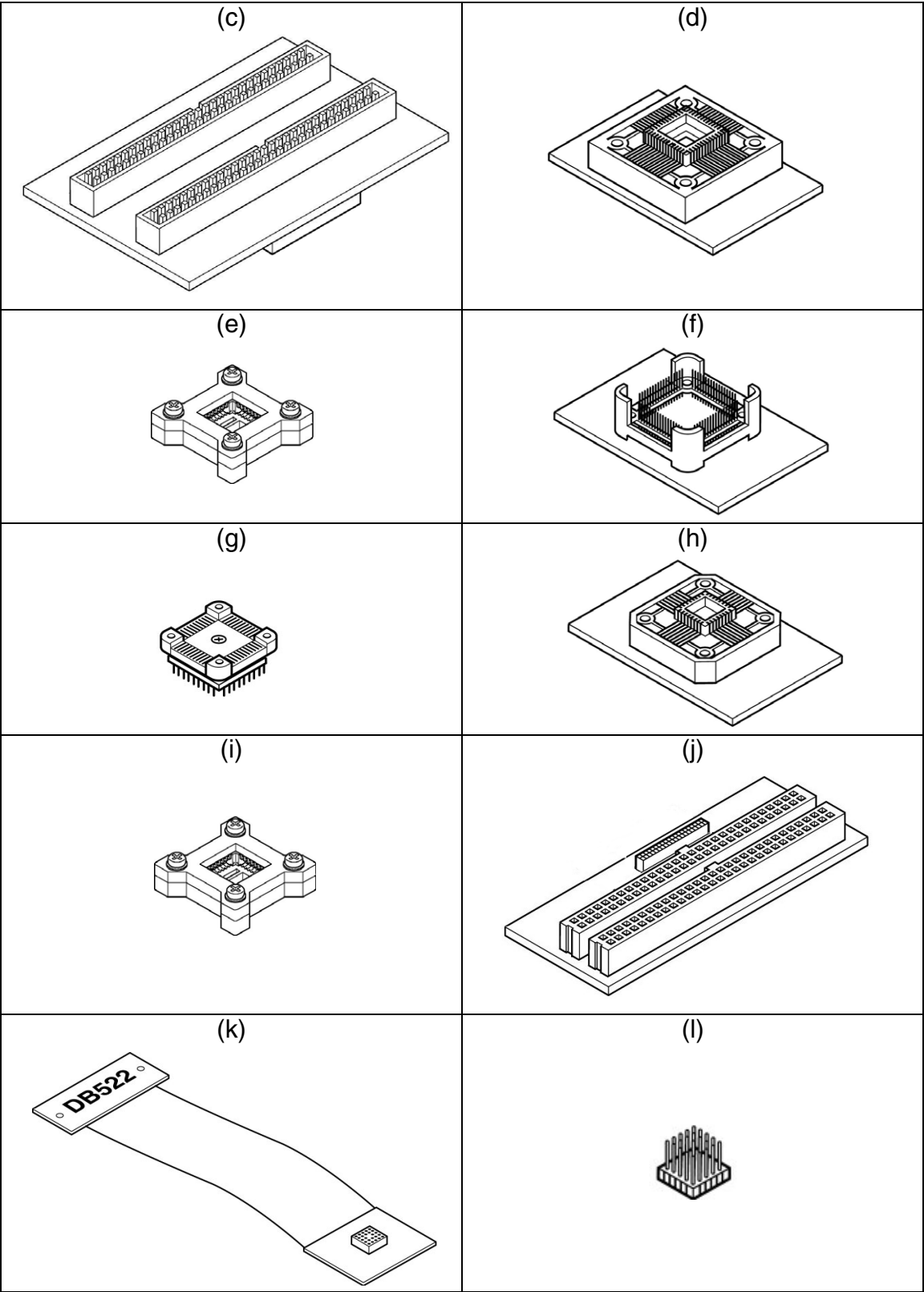


Figure 4: Adapter Kit components

### 3 CONNECTING TO YOUR APPLICATION BOARD

In addition to providing the firmware to emulate your MCU, the ST7MDT25-DVP3 probe serves as the hardware interface between your host PC and your application board. To connect to your application board, you can use the **Adapter Kit** corresponding to your MCU's package, or you can install 50-pin connectors corresponding to the emulator's J1 and J2 connectors on your application board that will allow you to connect without using the device adapter and socket provided in an Adapter Kit.

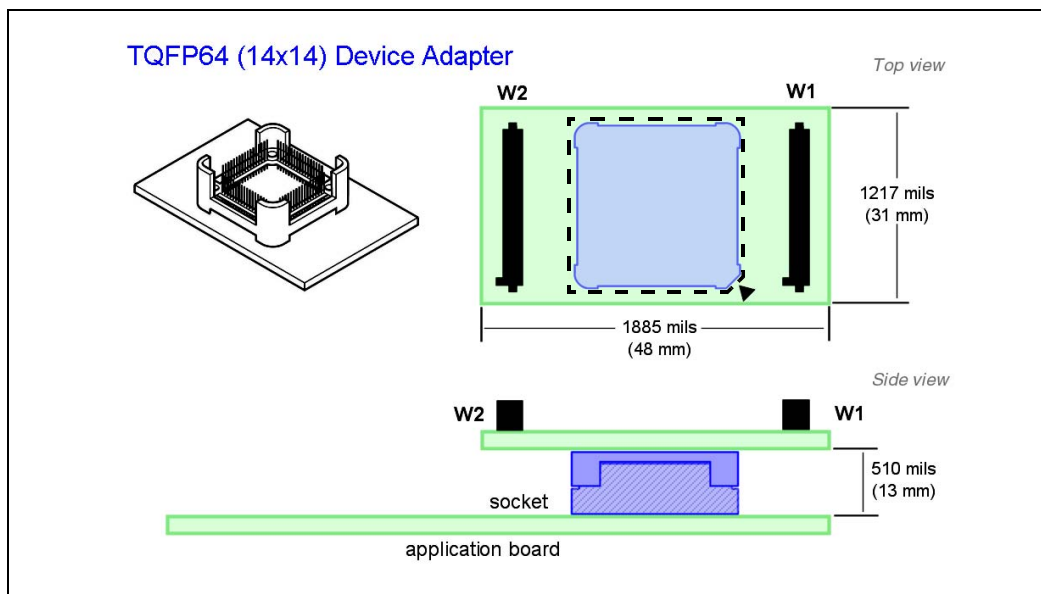
This chapter provides information about connecting your emulator using:

- [Section 3.1](#) — the Adapter Kit for the TQFP64 (14 x 14) package
- [Section 3.2](#) — the Adapter Kit for the TQFP64 (10 x 10) package
- [Section 3.3](#) — the Adapter Kit for the TQFP44 (10 x 10) package
- [Section 3.4](#) — the Adapter Kit for the TQFP32 (7 x 7) package
- [Section 3.5](#) — two 50-pin connectors to receive the flat cables

### 3.1 TQFP64 (14 x 14) package

This procedure tells you how to connect the ST7MDT25-DVP3 to your application board when your target ST7 microcontroller is in the TQFP64 (14 x 14) package. This requires the ST7MDT25-T64/DVP Adapter Kit.

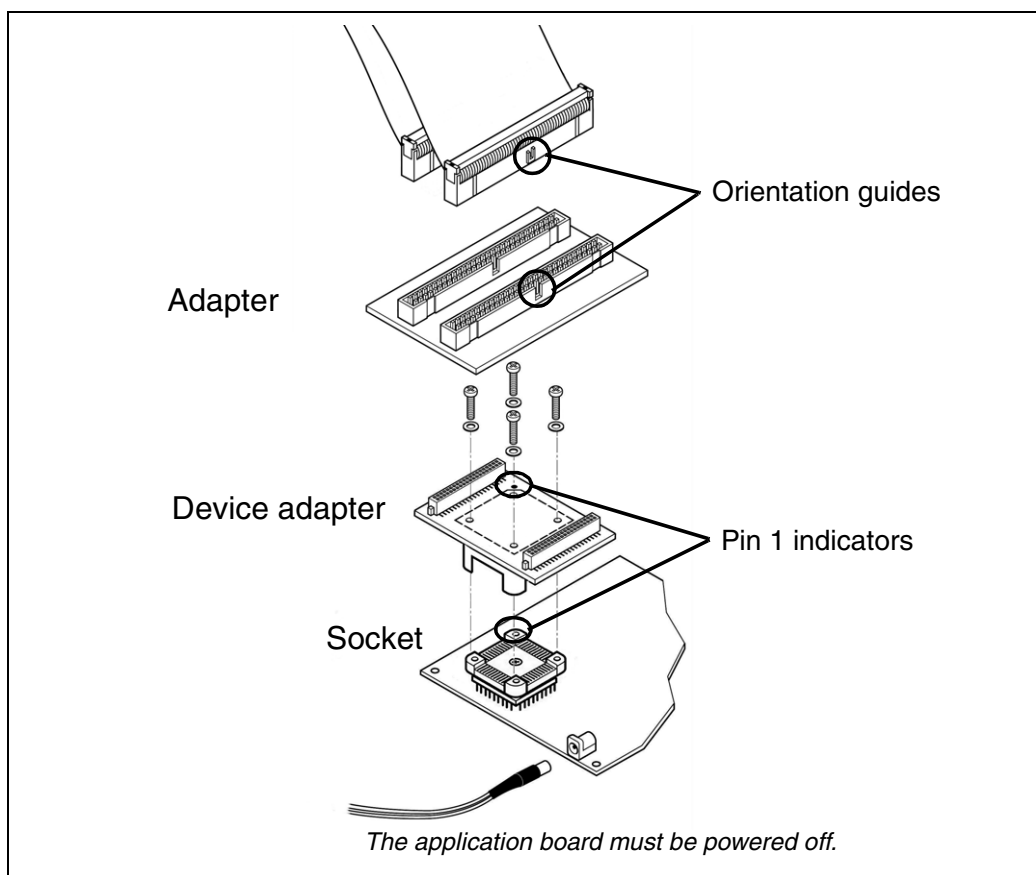
- 1 Solder the TQFP64 (14 x 14) socket on to your application board in place of your MCU. Keep in mind, when designing your application board you should ensure that there will be enough room to accommodate the device adapter (Ref.: DB543), which will connect to the socket in place of your MCU (see [Figure 5](#)).



**Figure 5: Device adapter critical dimensions**

- 2 Align the pin 1 of the device adapter (Ref.: DB543) with pin 1 of the socket, then secure the device adapter to the socket with the provided screws as shown in [Figure 6](#).
- 3 With the emulator and the application board powered off, connect the 50-pin flat cables to the J1 and J2 connectors on the TEB.

- 4 Connect the other ends of the flat cables to the J1 and J2 connectors on the TQFP64/44 adapter (Ref.: DB612). The orientation guides allow only one connection configuration.



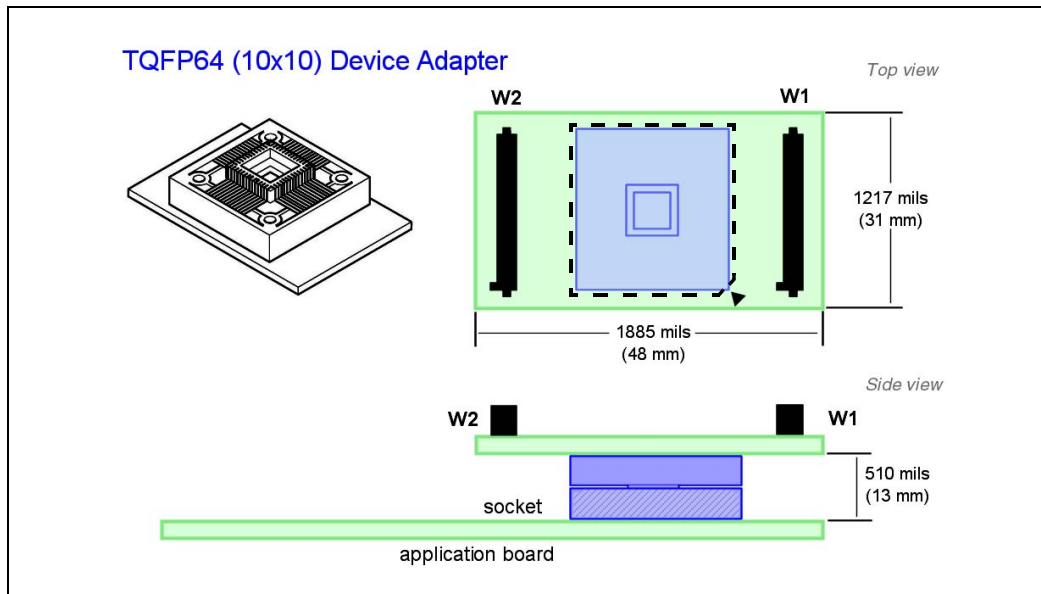
**Figure 6: Connection for TQFP64 (14 x 14) package**

- 5 Plug the TQFP64/44 adapter's W1 and W2 connectors into the corresponding W1 and W2 connectors on the device adapter.

### 3.2 TQFP64 (10 x 10) package

This procedure tells you how to connect the ST7MDT25-DVP3 to your application board when your target ST7 microcontroller is in the TQFP64 (10x10) package. This requires the ST7MDT25-T6A/DVP Adapter Kit.

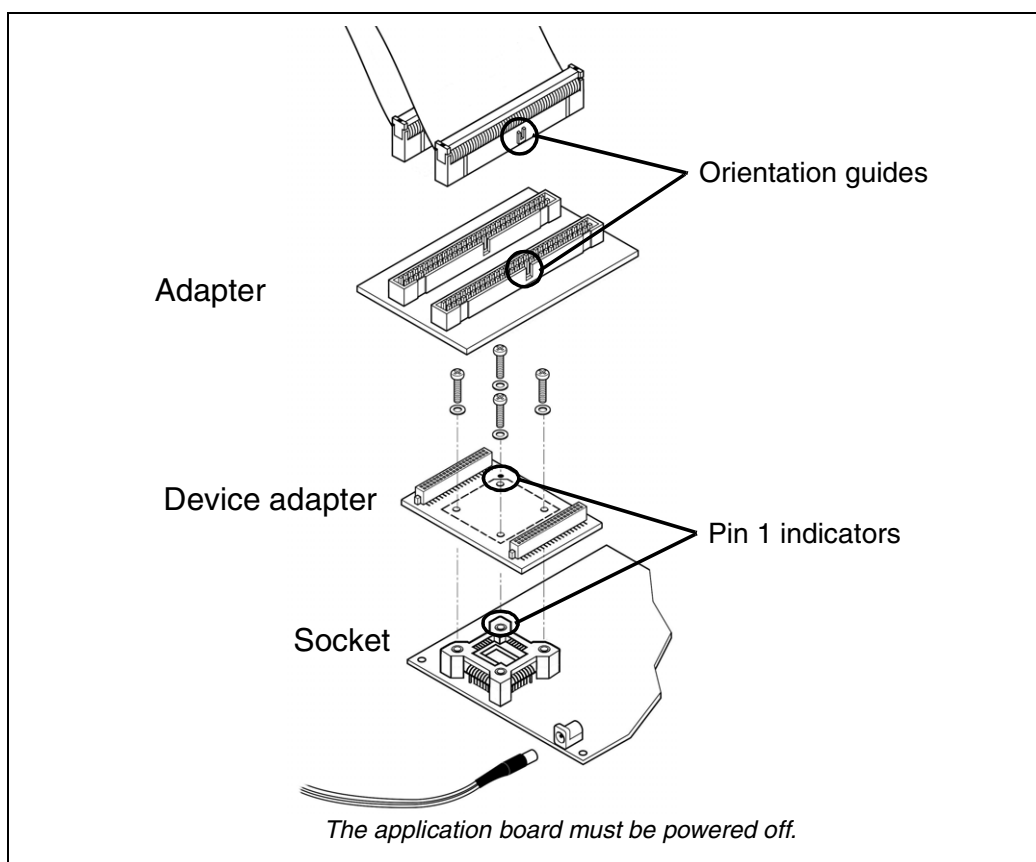
- 1 Solder the TQFP64 (10 x 10) socket on to your application board. Keep in mind, when designing your application board you should ensure that there will be enough room to accommodate the device adapter (Ref.: DB583), which will connect to the socket in place of your MCU (see [Figure 7](#)).



**Figure 7: Device adapter critical dimensions**

- 2 Align the pin 1 of the device adapter (Ref.: DB583) with pin 1 of the socket, then secure the device adapter to the socket with the provided screws as shown in [Figure 8](#).
- 3 With the emulator and the application board powered off, connect the 50-pin flat cables to the J1 and J2 connectors on the TEB.

- 4 Connect the other ends of the flat cables to the J1 and J2 connectors on the TQFP64/44 adapter (Ref.: DB612). The orientation guides allow only one connection configuration.



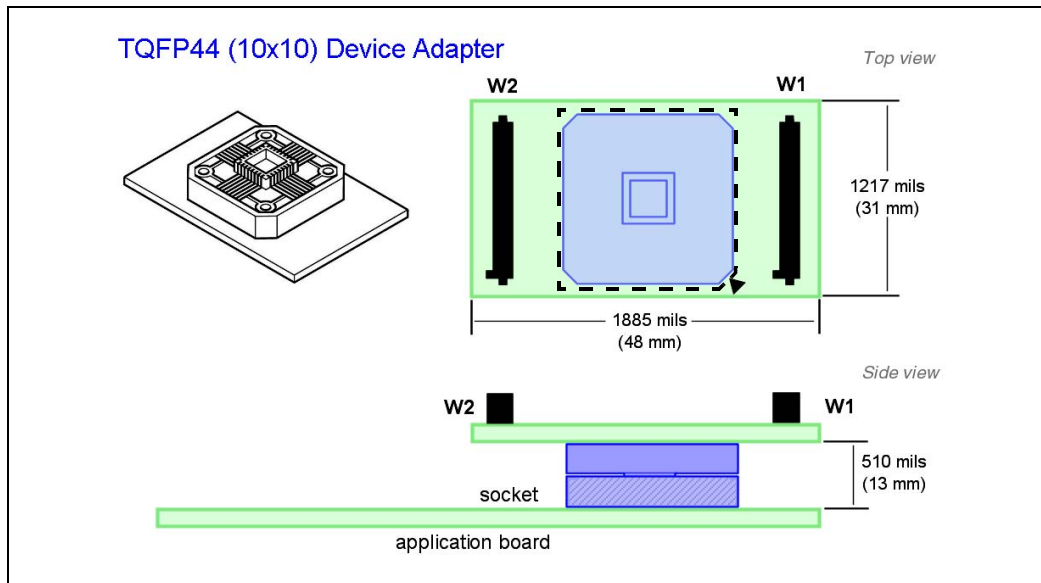
**Figure 8: Connection for TQFP64 (10x10) package**

- 5 Plug the TQFP64/44 adapter's W1 and W2 connectors into the corresponding W1 and W2 connectors on the device adapter.

### 3.3 TQFP44 (10 x 10) package

This procedure tells you how to connect the ST7MDT25-DVP3 to your application board when your target ST7 microcontroller is in the TQFP44 (10 x 10) package. This requires the ST7MDT25-T44/DVP Adapter Kit.

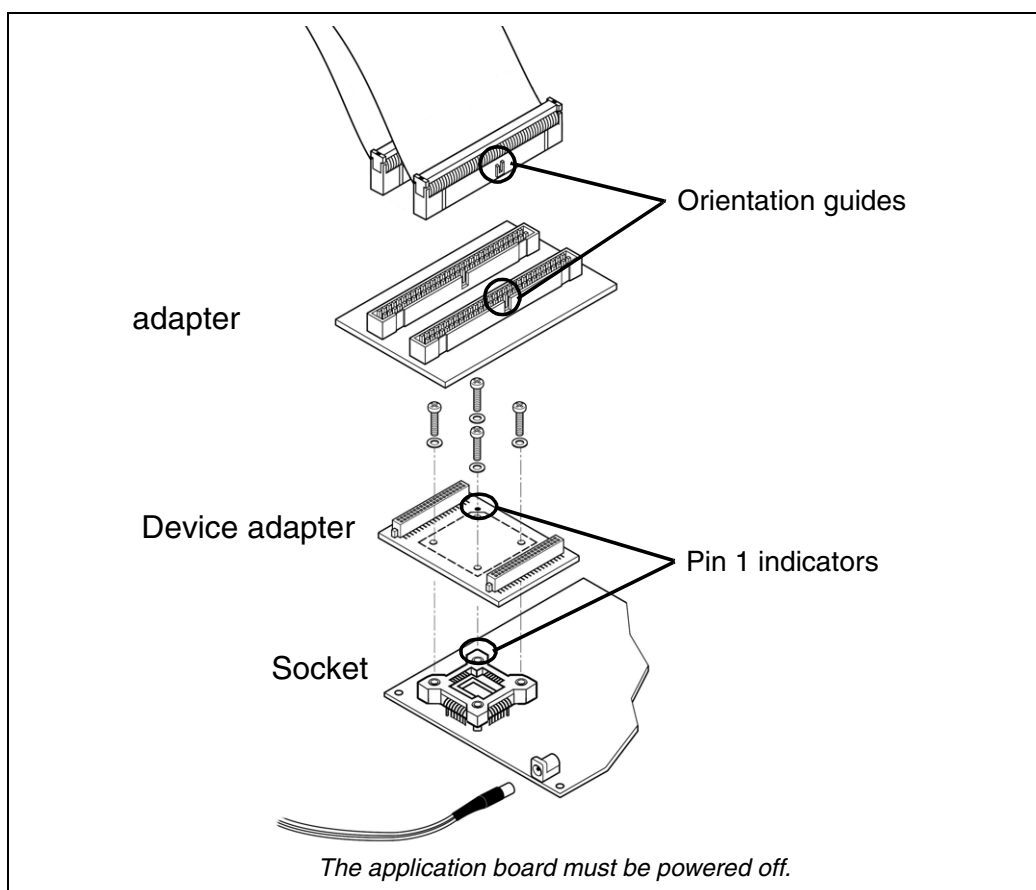
- 1 Solder the TQFP44 (10 x 10) socket on to your application board. Keep in mind, when designing your application board you should ensure that there will be enough room to accommodate the device adapter (Ref.: DB613), which will connect to the socket in place of your MCU (see [Figure 9](#)).



**Figure 9: Device adapter critical dimensions**

- 2 Align the pin 1 of the device adapter (Ref.: DB613) with pin 1 of the socket, then secure the device adapter to the socket with the provided screws as shown in [Figure 10](#).
- 3 With the emulator and the application board powered off, connect the 50-pin flat cables to the J1 and J2 connectors on the TEB.

- 4 Connect the other ends of the flat cables to the J1 and J2 connectors on the TQFP64/44 adapter (Ref.: DB612). The orientation guides allow only one connection configuration.



**Figure 10: Connection for TQFP44 (10 x 10) package**

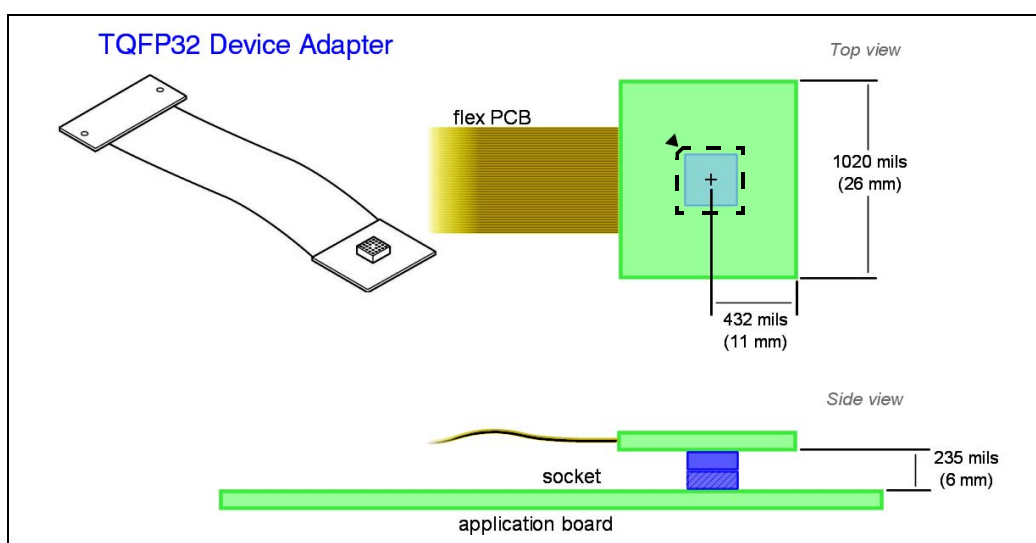
- 5 Plug the TQFP64/44 adapter's W1 and W2 connectors into the corresponding W1 and W2 connectors on the device adapter.

### 3.4 TQFP32 (7 x 7) package

This procedure tells you how to connect the ST7MDT25-DVP3 to your application board when your target ST7 microcontroller is in the TQFP32 package. This requires the ST7MDT25-T32/DVP Adapter Kit.

Because of the small size of the TQFP32 socket, a specific flex cable has been designed in order to minimize the mechanical stress applied to the socket adapter.

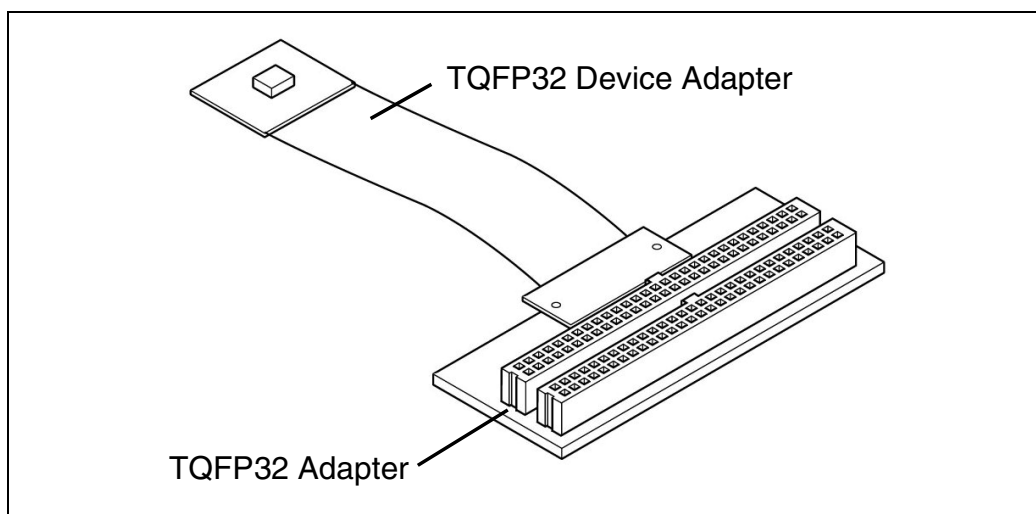
- 1 Solder the TQFP32 socket (Ironwood SK-UGA06/32A-01) onto your application board. Keep in mind, when designing your application board you should ensure that there will be enough room to accommodate the device adapter (Ref.: DB522), which will connect to the socket in place of your MCU (see [Figure 11](#)).



**Figure 11: Device adapter critical dimensions**

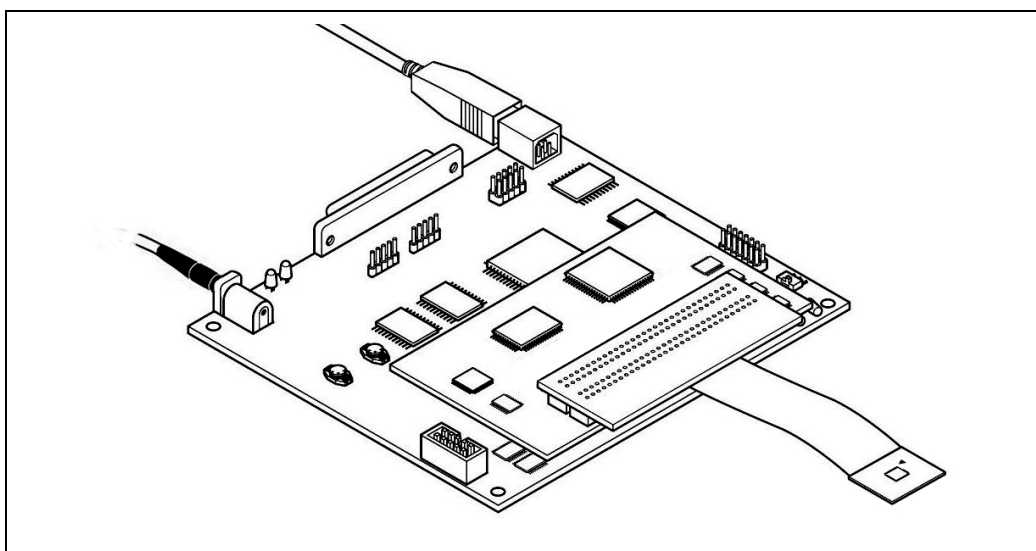
**Note:** The socket provided in the Adapter Kit does not allow the replacement of the socket with a microcontroller, without unsoldering and removing the socket from the application board. Using an IRONWOOD clam shell socket (ref.: CA-QFE32SA-L-Z-T-02-D1442), facilitates the replacement of the flex connector with an actual MCU, however this socket is not provided in the Adapter Kit.

- 2 With the emulator and the application board powered off, connect the TQFP32 device adapter (ref.: DB522) to the TQFP32 adapter (ref.: DB615), as shown in [Figure 12](#).



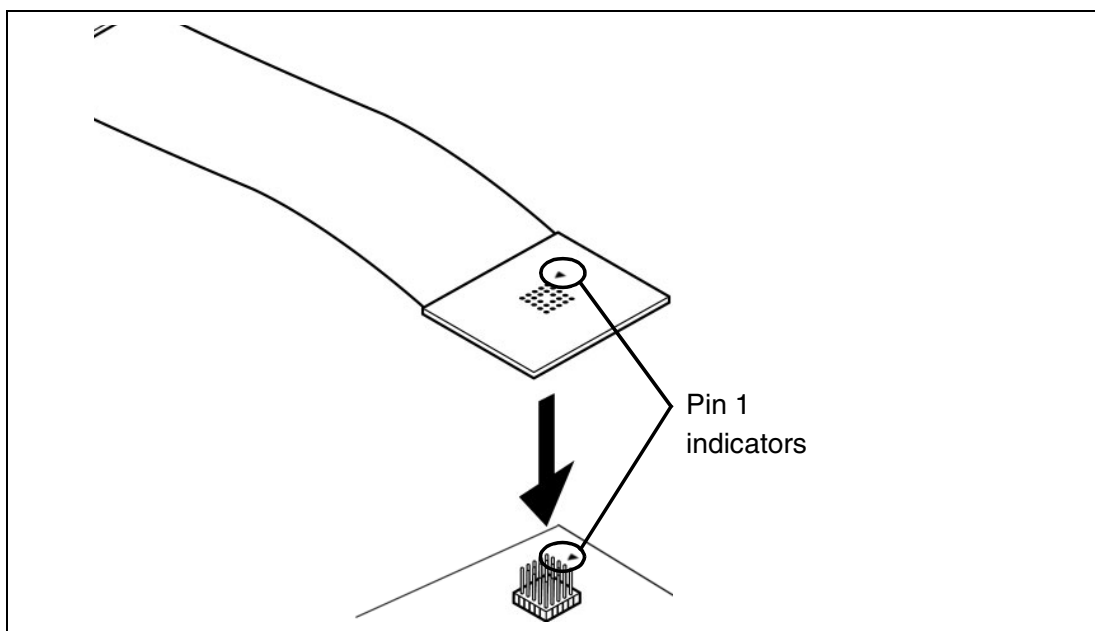
**Figure 12: Flex PCB mounted on TEB adapter**

- 3 Connect the TQFP32 adapter to the TEB's J1 and J2 connectors, as shown in [Figure 13](#).



**Figure 13: DVP3 configuration for TQFP32 emulation**

- 4 Connect the TQFP32 device adapter to the soldered TQFP32 socket, ensuring that pin 1 of the device adapter is aligned with pin 1 of the socket. Pin 1 is identified by a white triangle.



**Figure 14: TQFP32 connector**

### 3.5 Installing 50-pin connectors on your application board

Installing two male, 50-pin, HE-10 type connectors on your application board that correspond to the **J1** and **J2** connectors of your emulator, will allow you to plug the emulator flat cables directly into your application board. The following tables show the pin specification for J1 ([Table 2](#)) and J2 ([Table 3](#)) for each MCU package.

**Table 2: Pin specification by MCU package for J1 connector**

| Pin N° | TQFP64 | TQFP44 | TQFP32 | Description/Comments | Pin N° | TQFP64               | TQFP44        | TQFP32    | Description/Comments |
|--------|--------|--------|--------|----------------------|--------|----------------------|---------------|-----------|----------------------|
| 1      | 23     | 14     | 11     | PB6                  | 2      | 2                    | 2             | 2         | OSC2                 |
| 3      | 22     | 13     | 10     | PB5                  | 4      | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 5      | 21     | -      | -      | PE3                  | 6      |                      |               |           |                      |
| 7      | 20     | -      | -      | PE2                  | 8      |                      |               |           |                      |
| 9      | 19     | 12     | 9      | PB4                  | 10     |                      |               |           |                      |
| 11     | 18     | -      | -      | PE1                  | 12     |                      |               |           |                      |
| 13     | 17     | -      | -      | PE0                  | 14     | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 15     | 16     | 11     | 8      | PB3                  | 16     |                      |               |           |                      |
| 17     | 15     | 10     | 7      | PB2                  | 18     |                      |               |           |                      |
| 19     | 14     | 9      | 6      | PB1                  | 20     |                      |               |           |                      |
| 21     | 13     | -      | -      | PB0                  | 22     |                      |               |           |                      |
| 23     | 12     | -      | -      | PA7                  | 24     | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 25     | 11     | 8      | -      | PA6                  | 26     |                      |               |           |                      |
| 27     | 10     | 7      | 5      | PA5                  | 28     |                      |               |           |                      |
| 29     | 7      | 6      | -      | PA4                  | 30     |                      |               |           |                      |
| 31     | 6      | 5      | -      | PA3                  | 32     |                      |               |           |                      |
| 33     | 5      | 4      | 4      | PA2                  | 34     | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 35     | 4      | 3      | 3      | PA1                  | 36     |                      |               |           |                      |
| 37     | 3      | -      | -      | PA0                  | 38     |                      |               |           |                      |
| 39     | 64     | -      | -      | PF7                  | 40     |                      |               |           |                      |
| 41     | 63     | -      | -      | PF6                  | 42     |                      |               |           |                      |
| 43     | 62     | 44     | -      | PD7                  | 44     | 57                   | 39            | 29        | VDDA                 |
| 45     | 61     | 43     | -      | PD6                  | 46     |                      |               |           |                      |
| 47     | 59     | 41     | 31     | PB5                  | 48     |                      |               |           |                      |
| 49     | 60     | 42     | 32     | /RESET               | 50     |                      |               |           |                      |

**Caution:** Pins #18, and 34 are reserved. They must not be connected.

Table 3: Pin specification by MCU package for J2 connector

| Pin N° | TQFP64 | TQFP44 | TQFP32 | Description/Comments | Pin N° | TQFP64               | TQFP44        | TQFP32    | Description/Comments |
|--------|--------|--------|--------|----------------------|--------|----------------------|---------------|-----------|----------------------|
| 1      | 26     | 17     | 12     | PB7                  | 2      | 9, 25, 41, 58        | 16, 40        | 30        | VDD                  |
| 3      | 27     | 18     | 13     | PC0                  | 4      | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 5      | 28     | 19     | 14     | PC1                  | 6      |                      |               |           |                      |
| 7      | 29     | 20     | 15     | PC2                  | 8      |                      |               |           |                      |
| 9      | 30     | 21     | -      | PE4                  | 10     |                      |               |           |                      |
| 11     | 33     | 23     | 17     | PC3                  | 12     |                      |               |           |                      |
| 13     | 34     | 24     | 18     | PC4                  | 14     |                      |               |           |                      |
| 15     | 35     | -      | -      | PE5                  | 16     |                      |               |           |                      |
| 17     | 36     | 25     | -      | PE6                  | 18     |                      |               |           | reserved             |
| 19     | 37     | 26     | 19     | PC5                  | 20     | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 21     | 38     | 27     | 20     | PC6                  | 22     |                      |               |           |                      |
| 23     | 39     | 28     | 21     | PC7                  | 24     |                      |               |           |                      |
| 25     | 42     | 29     | 22     | PD0                  | 26     |                      |               |           |                      |
| 27     | 43     | -      | -      | PE7                  | 28     |                      |               |           |                      |
| 29     | 44     | -      | -      | PF0                  | 30     |                      |               |           |                      |
| 31     | 45     | 30     | -      | PF1                  | 32     |                      |               |           |                      |
| 33     | 46     | 31     | -      | PF2                  | 34     |                      |               |           | reserved             |
| 35     | 47     | 32     | 23     | PD1                  | 36     | 8, 24, 40, 55 and 56 | 15, 37 and 38 | 27 and 28 | GND                  |
| 37     | 48     | 33     | 24     | PD2                  | 38     |                      |               |           |                      |
| 39     | 49     | -      | -      | PF3                  | 40     |                      |               |           |                      |
| 41     | 50     | -      | -      | PF4                  | 42     |                      |               |           |                      |
| 43     | 51     | -      | -      | TLI                  | 44     |                      |               |           |                      |
| 45     | 52     | 34     | -      | PF5                  | 46     |                      |               |           |                      |
| 47     | 53     | 35     | 25     | PD3                  | 48     |                      |               |           |                      |
| 49     | 54     | 36     | 26     | PD4                  | 50     |                      |               |           |                      |

**Caution:** Pins #18 and 34 are reserved. They must not be connected.

4 EMULATION CHARACTERISTICS

4.1 On-chip peripherals configuration

You can configure certain on-chip peripherals in ST7 Visual Develop’s **MCU Configuration** dialog box so that the ST7-DVP3 accurately emulates the target device. The on-chip peripheral options available for configuration for the ST7MDT25-DVP3 are described in this section.

MCU

In STVD7’s **MCU Selection** window, choose the MCU that you are using in your application. A complete and up-to-date listing of supported MCU’s for your ST7MDT25-DVP3 emulator is provided in the current version of the *STVD7 Release Notes*.

F<sub>osc</sub>

The clock frequency (F<sub>OSC</sub>) options are summarized in [Table 4](#) below.

| Clock options                     | Clock Source Location                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------------|
| 16 MHz<br>8 MHz<br>4 MHz<br>2 MHz | On probe                                                                                  |
| External                          | Provided by user via the EXTCLK pin on connector W3 of the ST7-DVP3 Main Emulation Board. |

Table 4: Clock frequency options

F<sub>CPU</sub>

The CPU frequency (F<sub>CPU</sub>) is always in the range from 250 KHz to 8 MHz even if slow mode or PLL are selected.

The relationship between F<sub>CPU</sub> and F<sub>OSC</sub> is the following:

- if PLL is OFF: **F<sub>CPU</sub> = (F<sub>OSC</sub> / 2) / Slow mode**
- if PLL is ON: **F<sub>CPU</sub> = (F<sub>OSC</sub> \* 2) / Slow mode**

### MCC (Main Clock Counter)

Allows you to configure the Main Clock Counter to:

**Frozen when not run:** The counter runs when the application is running, but stops if a break occurs.

**Free when not run:** The counter runs even when the application is stopped. Note that this counter is also used as a prescaler for the watchdog counter.

### PWM (Pulse Width Modulated Auto-reload Timer)

The Pulse Width Modulated Auto-reload Timer consists of an 8-bit counter with compare and capture features and a 7-bit prescaler clock source. Among other uses, it can be used to wake up the MCU from Wait or Halt modes.

You have the following two configuration options:

**Frozen when not run:** The timer runs when the application is running, but stops if a break occurs.

**Free when not run:** The counter runs even when the application is stopped.

### Timer\_16 and Timer\_8

A 16-bit and an 8-bit timer, Timer\_16 and Timer\_8 respectively, are available. They consist of a 16-bit and 8-bit free-running counter driven by a programmable prescaler. Both timers feature output compare, pulse width modulation (PWM) and input capture functions with associated registers.

You can choose between two options:

- **Frozen\_when\_not\_run:** the counter will run while the application runs, but when a breakpoint is encountered, the counter will stop.
- **Free\_when\_not\_run:** the counter will continue to run even if a breakpoint is encountered.

### AFI\_MAP\_0 (AFI Mapping 0)

This option allows the mapping of alternate pin functions for PD1 and PC1.

You can specify one of two configurations:

**Timer 16 ICAP2 on PC1:** PC1 is used for the input capture function of the 16-bit timer.

**Timer 16 ICAP2 on PD1:** PD1 is used for the input capture function of the 16-bit timer.

### AFI\_MAP\_1 (AFI Mapping 1)

This option allows you to map the 16-bit timer functions to specific pins when Local Interconnect Network Serial Communication Interface (LINSICI) is enabled.

You can specify one of two configurations:

**T16 on PB & PC LINSICI on PD:** PD3, PD4 and PD5 are used for LINSICI functions and 16-bit timer functions are mapped to PB6, PB7 and PC0.

**T16 on PD LINSICI disable:** LINSICI functions are disabled and 16-bit timer functions are mapped to PD3, PD4 and PD5.

### CSS (Clock Security System)

This option allows you to *Enable* or *Disable* the clock security system function (CSS) which includes the clock filter and the backup safe oscillator. When enabled, the selected OSCRANGE is used to determine the operating frequency range. If the operating frequency goes outside of the specified range, the clock source will be switched to the backup oscillator.

#### OSCRANGE

This option allows you to select the normal operating frequency range for the Clock Security System (CSS). The following operating frequency range options are available:

- HS: 16..8 MHz
- MS: 8..4 MHz
- MP: 4..2 MHz
- LP: 2..1 MHz

#### PLL

This option allows you to *Enable* or *Disable* the PLL which allows the multiplication by two of the main input clock frequency. The PLL is guaranteed only when the input frequency is between 2 and 4 MHz.

For more information about the PLL, refer to your *ST72561 Datasheet*.

### RSTC (Reset clock cycle selection)

This option allows you to select the number of CPU cycles applied during the RESET phase and when exiting HALT mode. You can choose between *4096 CPU cycles* and *256 CPU cycles*.

### WDG.HALT (Watchdog halt)

There are two options:

- **Reset:** when the Watchdog is enabled and a Halt instruction is encountered in the executable code, a chip reset will be performed.
- **No Reset:** no chip reset is performed upon a Halt instruction.

### WDG.SW (Watchdog)

This option allows you to choose whether the watchdog timer is enabled by software or by hardware.

For more information, refer to your *ST72561 Datasheet*.

## 4.2 Emulation functional limitations and discrepancies

- Evolutions of all discrepancies according to the hardware used are available in in STVD7's **Emulator Discrepancies** dialog box.
- 5V is the only power supply configuration for the ST7MDT25-DVP3 emulator. The SW1 switch located on the ST7-DVP3 Main Emulation Board should be set to the 5V position whenever you use the ST7MDT25-DVP3 target emulation board.

*Note: Even when set to the 3.3V position, the emulator functions at 5V. While there is no risk of damaging your emulator, leaving the switch set to 3.3V may cause STVD7 to malfunction.*

Consequences on Port I/Os are:

- Port E and F I/Os are always TTL 3.3V compatible regardless of the SW1 position chosen.
- Ports other than E and F I/Os are 5V CMOS compatible regardless of the position of SW1.

## 5 PROGRAMMING WITH YOUR ST7MDT25-DVP3

Once you have finished refining your application software, you can use your ST7MDT25-DVP3 emulator to in-circuit program the application to a supported ST7 with Flash memory.

For more information about your emulator's In-Circuit Programming feature, refer to the *ST7-DVP3 Emulator User Manual*.

## APPENDIX A: INSTALLING CONNECTORS FOR THE TQFP64/44 ADAPTER

Installing two 40-pin SAMTEC connectors on your application board, will allow you to connect your emulator directly to your application board using the flat cables and the TQFP64/44 adapter. The connectors that you will need to install correspond to W1 and W2 on the adapter. These are 40-pin SAMTEC connectors, Ref.: TFM 120-22-S-D-A.

When designing your application board with the corresponding SAMTEC connectors, you must also be sure to orient them correctly and leave enough clearance to accommodate the adapter, in addition to ensuring the pin connections required by the emulator.

### Physical connection constraints

The following schematic ([Figure 15](#)) will help you physically orient the connectors on your application board to receive the TQFP64/44 adapter. When installing the connectors, be careful to ensure that:

- connectors are correctly oriented relative to the TQFP64/44 adapter.
- the distance between the connectors is 1400 mils, measured as shown in [Figure 15](#)
- other application components do not impede the connection of the adapter.

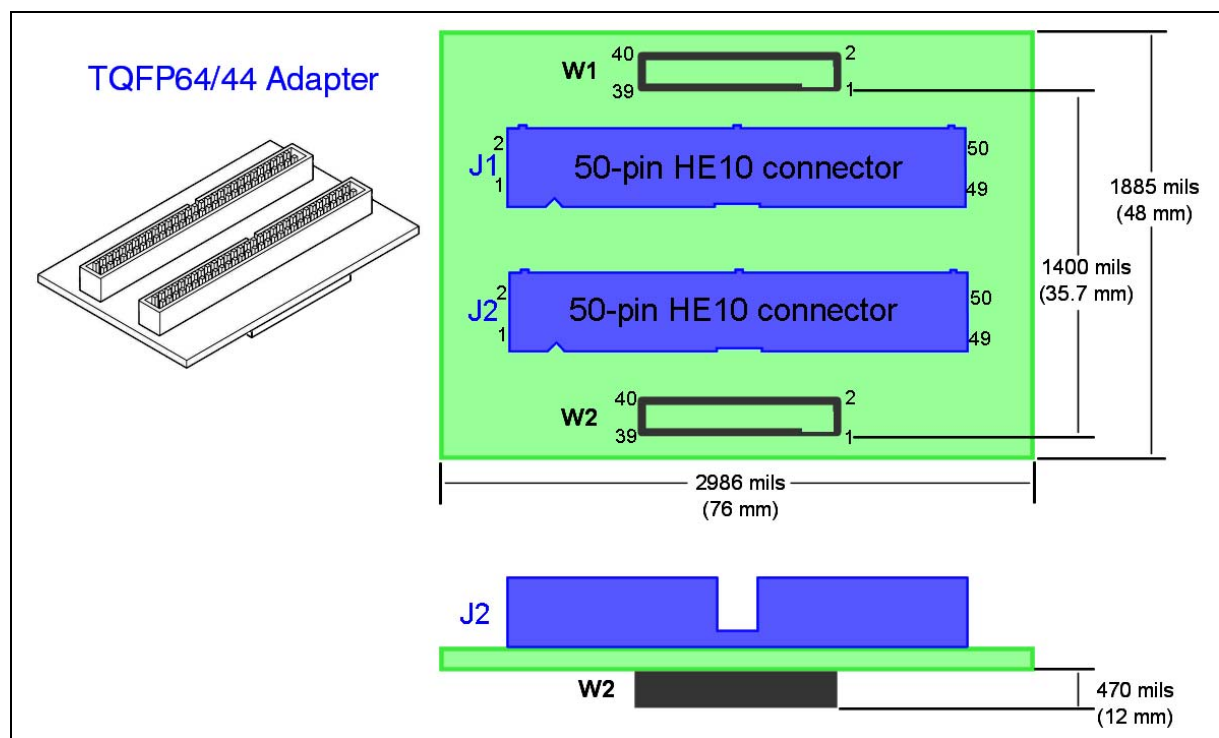


Figure 15: TQFP64/44 adapter (DB612) dimensions

## Required pin connections for emulation

When installing the connectors, you must ensure the pin connections shown in the following tables:

- [Table 5](#) – for the W1 connector
- [Table 6](#) – for the W2 connector

The pin connections depend on the package of the MCU you are emulating.

**Table 5: Pin specification by MCU package for W1 connector**

| Pin N° | Connects to MCU Pin |        |        | Description |
|--------|---------------------|--------|--------|-------------|
|        | TQFP64              | TQFP44 | TQFP32 |             |
| 1      |                     |        |        |             |
| 3      | 57                  | 39     | 29     | VDDA        |
| 5      | 59                  | 41     | 31     | PD5         |
| 7      | 61                  | 43     |        | PD6         |
| 9      | 63                  |        |        | PF6         |
| 11     | 1                   | 1      | 1      | OSC1        |
| 13     | 3                   |        |        | PA0         |
| 15     | 5                   | 4      | 4      | PA2         |
| 17     | 7                   | 6      |        | PA4         |
| 19     |                     |        |        |             |
| 21     |                     |        |        |             |
| 23     | 9                   |        |        | VDD_3       |
| 25     | 11                  | 8      |        | PA6         |
| 27     | 13                  |        |        | PB0         |
| 29     | 15                  | 10     | 7      | PB2         |
| 31     |                     |        |        |             |
| 33     | 17                  |        |        | PE0         |
| 35     | 19                  | 12     | 9      | PB4         |
| 37     | 21                  |        |        | PE3         |
| 39     | 23                  | 14     | 11     | PB6         |

| Pin N° | Connects to MCU Pin |        |        | Description |
|--------|---------------------|--------|--------|-------------|
|        | TQFP64              | TQFP44 | TQFP32 |             |
| 2      |                     |        |        |             |
| 4      | 58                  | 40     | 30     | VDD_0       |
| 6      | 60                  | 42     | 32     | /RESET      |
| 8      | 62                  | 44     |        | PD7         |
| 10     | 64                  |        |        | PF7         |
| 12     | 2                   | 2      | 2      | OSC2        |
| 14     | 4                   | 3      | 3      | PA1         |
| 16     | 6                   | 5      |        | PA3         |
| 18     | 8                   |        |        | VSS_S       |
| 20     |                     |        |        |             |
| 22     |                     |        |        |             |
| 24     | 10                  | 7      | 5      | PA5         |
| 26     | 12                  |        |        | PA7         |
| 28     | 14                  | 9      | 6      | PB1         |
| 30     | 16                  | 11     | 8      | PB3         |
| 32     |                     |        |        |             |
| 34     | 18                  |        |        | PE1         |
| 36     | 20                  |        |        | PE2         |
| 38     | 22                  | 13     | 10     | PB5         |
| 40     | 24                  | 15     |        | VSS_2       |

Table 6: Pin specification by MCU package for W2 connector

| Pin N° | Connects to MCU Pin |        |        | Description |
|--------|---------------------|--------|--------|-------------|
|        | TQFP64              | TQFP44 | TQFP32 |             |
| 1      |                     |        |        |             |
| 3      | 55                  | 37     | 27     | VSSA        |
| 5      | 53                  | 35     | 25     | PD3         |
| 7      | 51                  |        |        | TLI         |
| 9      | 49                  |        |        | PF3         |
| 11     | 47                  | 32     | 23     | PD1         |
| 13     | 45                  | 30     |        | PF1         |
| 15     | 43                  |        |        | PE7         |
| 17     | 41                  |        |        | VDD_1       |
| 19     |                     |        |        |             |
| 21     |                     |        |        |             |
| 23     | 39                  | 28     | 21     | PC7         |
| 25     | 37                  | 26     | 19     | PC5         |
| 27     | 35                  |        |        | PE5         |
| 29     | 33                  | 23     | 17     | PC3         |
| 31     | 31                  |        |        | NC          |
| 33     | 29                  | 20     | 15     | PC2         |
| 35     | 27                  | 18     | 13     | PC0         |
| 37     | 25                  | 16     |        | VDD_2       |
| 39     |                     |        |        |             |
| 2      |                     |        |        |             |
| 4      | 56                  | 38     | 28     | VSS_0       |
| 6      | 54                  | 36     | 26     | PD4         |
| 8      | 52                  | 34     |        | PF5         |
| 10     | 50                  |        |        | PF4         |
| 12     | 48                  | 33     | 24     | PD2         |
| 14     | 46                  | 31     |        | PF2         |
| 16     | 44                  |        |        | PF0         |
| 18     | 42                  | 29     | 22     | PD0         |
| 20     |                     |        |        |             |
| 22     |                     |        |        |             |
| 24     | 40                  |        |        | VSS_1       |
| 26     | 38                  | 27     | 20     | PC6         |
| 28     | 36                  | 25     |        | PE6         |
| 30     | 34                  | 24     | 18     | PC4         |
| 32     | 32                  | 22     | 16     | VPP         |
| 34     | 30                  | 21     |        | PE4         |
| 36     | 28                  | 19     | 14     | PC1         |
| 38     | 26                  | 17     | 12     | PB7         |
| 40     |                     |        |        |             |

## APPENDIX B EMC CONFORMITY AND SAFETY REQUIREMENTS

This product respects the EMC requirements of the European guideline 89/336/EEC under the following conditions:

- Any tester, equipment, or tool used at any production step, or for any manipulation of semiconductor devices, must have its shield connected to ground.
- All provided ferrites must be attached as described in the hardware installation instructions of the relevant user manual(s).
- The product must be placed on a conductive table top, made of steel or clean aluminum, or covered by an antistatic surface (superficial resistivity equal to or higher than  $0.5 \text{ M}\Omega/\text{cm}^2$ ), grounded through a ground cable (conductive cable from protected equipment to ground isolated with a  $1 \text{ M}\Omega$  resistor placed in series). All manipulation of finished must be done at such a grounded worktable.
- The worktable must be free of all non-antistatic plastic objects.
- An antistatic floor covering grounded through a conductive ground cable (with serial resistor between  $0.9$  and  $1.5 \text{ M}\Omega$ ) should be used.
- It is recommended that you wear an antistatic wrist or ankle strap, connected to the antistatic floor covering or to the grounded equipment.
- If no antistatic wrist or ankle strap is worn, before each manipulation of the powered-on tool, you must touch the surface of the grounded worktable.
- It is recommended that antistatic gloves or finger coats be worn.
- It is recommended that nylon clothing be avoided while performing any manipulation of parts.
- If you are using this product under conditions where there may be blackouts or power surges (such as during an electrical storm), it is recommended that you isolate it by elevating it at least 10 cm above the grounded work surface using blocks of insulating material.

## PRODUCT SUPPORT

If you experience any problems with this product, if you need spare parts or repairs, contact the distributor or the STMicroelectronics sales office where you purchased the product. Phone numbers for major sales regions are provided in the [Contact List](#), below.

In addition, at our Internet site [www.st.com/mcu](http://www.st.com/mcu), you will find a complete listing of ST sales offices and distributors, as well as documentation, software downloads and user discussion groups to help you answer questions and stay up to date with our latest product developments.

## Software updates

All our latest software and related documentation are available for download from the ST Internet site, [www.st.com/mcu](http://www.st.com/mcu). For information about firmware and hardware revisions, call your distributor or ST using the [Contact List](#) provided below.

## Hardware spare parts

Your development tool comes with the hardware you need to set it up, connect it to your PC and connect to your application. However, some components can be bought separately if you need additional ones. You can order extra components, such as sockets and adapters, from STMicroelectronics, from the component manufacturer or from a distributor.

### Sockets

Complete documentation and ordering information for P/TQFP sockets from Yamaichi, Ironwood, CAB and Enplas are provided at the following Internet sites:

[www.yamaichi.de](http://www.yamaichi.de)

[www.ironwoodelectronics.com](http://www.ironwoodelectronics.com)

[www.cabgmbh.com](http://www.cabgmbh.com)

[www.enplas.com](http://www.enplas.com)

### Connectors

Complete documentation and ordering information for SAMTEC connectors is provided at [www.samtec.com](http://www.samtec.com).

## Getting prepared before you call

Collect the following information about the product before contacting ST or your distributor:

- 1 Name of the company where you purchased the product.
- 2 Date of purchase.
- 3 Order Code: Refer to the side your emulators box. The order code will depend on the region in which it was ordered (i.e. the UK, Continental Europe or the USA).
- 4 Serial Number: The serial number is found on the Global Reference card provided with the emulator.
- 5 TEB (Target Emulation Board) hardware and firmware versions: The hardware and firmware versions can be found by opening an STVD7 session, entering the debug context and selecting **Help>About** from the main menu. The TEB version numbers are given in the *Target box* – scroll downwards until you find the TEB version (hardware) and TEB PLD version (firmware).
- 6 Target Device: The sales type of the ST microcontroller you are using in your application.

# Contact List

## North America

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### Canada and East Coast

STMicroelectronics  
Lexington Corporate Center  
10 Maguire Road, Building 1, 3rd floor  
Lexington, MA 02421  
Phone: (781) 402-2650

### Mid West

STMicroelectronics  
1300 East Woodfield Road, Suite 410  
Schaumburg, IL 60173  
Phone: (847) 585-3000

### West coast

STMicroelectronics, Inc.  
1060 E. Brokaw Road  
San Jose, CA 95131  
Phone: (408) 452-8585

*Note: For American and Canadian customers seeking technical support the US/Canada is split in 3 territories. According to your area, contact the appropriate sales office from the list above and ask to be transferred to an 8-bit microcontroller Field Applications Engineer.*

## Europe

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**France** +33 (0)1 47 40 75 75

**Germany** +49 89 46 00 60

**U.K.** +44 162 889 0800

## Asia/Pacific Region

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**Japan** +81 3 3280 4120

**Hong-Kong** +85 2 2861 5700

**Sydney** +61 2 9580 3811

**Taipei** +88 6 2 2378 8088

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