

## ST62 In-Circuit Programming

### IN-CIRCUIT PROGRAMMING

This note provides information on the steps required in order to perform in-circuit programming of ST62Exx EPROM or OTP devices for both on-chip EPROM and EEPROM.

In-circuit EPROM programming is possible if the relevant pins of the programming socket located on the ST62 EPROM Programming tool (either the ST6 Starter kit, Remote Programming board or Gang programmer) are connected to a 16-pin connector (8x2 header HE10), which must be provided on the application board by the customer.

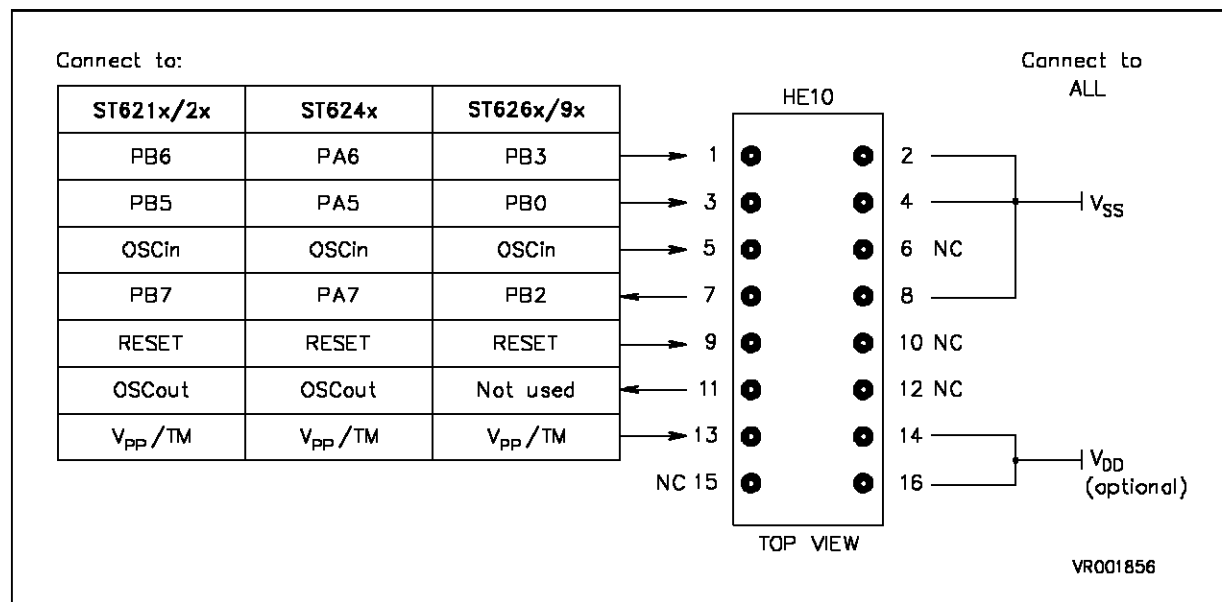
**Note:** In-circuit programming embedded in production test is not possible. If the EPROM programmer cable is connected to the application, the RESET signal for instance is tied to GND before and after programming.

### In Circuit Programming Procedure

The procedure for in-circuit programming is as follows:

- Power up the PC and invoke the ST6 EPROM programmer software.

**Figure 1. 16-pin PCB Socket Connection**



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- Connect the programmer to the application board which must be in the power off condition.
- Power on the application board (+5V) and use the ST6 EPROM programmer software in the usual way. The target chip may be supplied by the programmer (in the case where the power supply of the chip can be separated from the remaining parts of the application).

Only a few signals of the 16-pin cable are used. These are listed below including their functional characteristics, seen from the programming tool point of view, and the interconnection to ST62 family members:

The signals shown in Figure 1 should be completely separated from the application circuitry for the time of programming and all signals must be connected to the ST62Exx on the application board. In addition it is mandatory to add a ceramic capacitor with a value of 100nF between  $V_{PP/TM}$  and  $V_{SS}$ !

Separation of  $V_{SS}$  to the application board GND is not necessary.

### Programming Conditions

If separation between the ST62Exx and its application circuitry is not possible, certain conditions concerning the application circuitry must be fulfilled:

- $V_{PP/TM}$  (TEST) on the ST62Exx application must not be connected directly to  $V_{SS}$ , instead it should be pulled down by a resistor with a minimum value of 10k $\Omega$ . It is mandatory to add a ceramic capacitor with a value of 100nF between  $V_{PP/TM}$  and  $V_{SS}$ !
- Both EPROM programmer pins for  $V_{SS}$  must be connected to the  $V_{SS}$  input of the ST62Exx to be programmed.
- Connection of the EPROM Programmer pin  $V_{DD}$  is optional (and not recommended). If the ST62Exx chip is supplied by the application power circuit, the supplied  $V_{DD}$  voltage must be +5V to avoid excessive current through the ST62Exx CMOS input protection diodes. If the ST62Exx is supplied by the Programmer, the total load current should not exceed 100mA and the capacitive load must be lower than 50 $\mu$ F.
- The RESET pin on the application ST62Exx must be left open or pulled up by a resistor with a minimum value of 2k $\Omega$ . The capacitive load should not exceed 1 $\mu$ F.
- OSCin on the application ST62Exx must not be connected to a clock generator. A quartz crystal or a ceramic resonator is allowed.
- The Programmer cable header's Pin 1 and Pin 3 are applied to different members of the ST62Exx families as shown in Figure 1. These signals must not be connected to any other **output** on the application to prevent any voltage contention. Pullup resistors of a minimum value of 2k $\Omega$  and pulldown resistors of 10k $\Omega$  minimum are allowed.

**Note:** The connection of Pin 5 of the cable header is not necessary if a high voltage level on the ST62Exx pin is guaranteed. This pin is set to input with pullup mode during reset, meaning another pullup, or CMOS inputs, are allowed for the application.

- Pin 7 of the cable header is applied to the members of the ST6 family, as shown in Figure1. On the application board this signal must not be connected to any other **output**. A pullup resistor of a minimum value of 2k $\Omega$  and a pulldown resistor of 2k $\Omega$  minimum are allowed.
- **For ST626X and ST629X only:** Pin EXTAL = OSCout must be tied directly to V<sub>DD</sub>. PB7 must not be connected to any other output. PB6 must be at a high voltage level. PB6 is set to input with pullup mode during reset, meaning another pullup, or CMOS inputs, may be connected.
- **For ST624X only:** Pin PB0 must be at a high voltage level. It is set to input with pullup mode during reset, meaning another pullup, or CMOS inputs, may be connected.

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