



# Implementing and Testing Efficient Video Line Stores

(Includes 7 ready to use macros for popular line lengths)

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# Introduction

This reference design for the Spartan-3E Starter Kit serves two quite different purposes. As such, you may be interested in one particular aspect or both.

**Hardware Development and Testing of Macros** - The design provides an example of how the Starter Kit can be used as a test bed for macros enabling real implementations to be evaluated during development. This technique can be applied to many parts of designs and helps reduce the burden of testing and debugging when putting a final system together. Such 'real simulation' can also be significantly faster than using a traditional software simulator since the logic is working at full clock rate. When testing a macro, it is not always necessary to have all the peripherals and connectors that the final system will have. The macro is effectively placed in a 'virtual socket' within the Spartan-3E device and some means provided to stimulate and monitor the macro. In this example PicoBlaze is used as a convenient way to control and monitor the macros under test with an RS232 (UART) link to the PC providing the human interface (HyperTerminal). So in fact the test design only uses 2 pins on the Spartan device and all others are 'virtual pins' (OK, I used the LEDs too).

**Efficient Video Line Store Macros** - In this case the macros under evaluation are a set of highly efficient video line stores implemented using Block Memory (BRAM). Line stores are often used when performing image processing algorithms. In recent years the resolution of images has been increasing resulting in more pixels per line and pixels of greater resolution (more bits to represent each colour). Unless these line stores are implemented efficiently it becomes very difficult to implement an adequate number of line stores on a Spartan-3E device. This reference design provides 7 ready to use line store macros all of which can be evaluated using this design. If your main interest in this reference design is purely to use one or more of these macros then you may wish to advance directly to page 16 (without passing GO and without collecting £200!).

