

KINETIS CAMERA DEVELOPMENT KIT

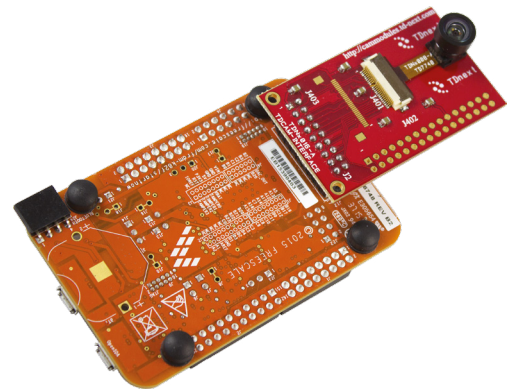
IMAGING SOLUTION FOR LOW RESOLUTION VIDEO APPLICATIONS

Avnet Silica, expert in vision solutions, provides a low-cost and flexible imaging tool for NXP Kinetis K82F Cortex[®]-M4 microcontrollers. The NXP Kinetis K82F ultra low power MCU has a FlexIO interface, which is a highly configurable module, providing a wide range of functionality and protocols. The FlexIO can emulate a variety of serial/parallel communication protocols like UART, SPI, I²C, I²S, but most of all it is capable of interfacing to a camera interface.

The TD next TD7740 miniature camera module is particularly suited to connect to the Kinetis K82F MCU. TD next modules are high-quality camera modules with a long lifetime.

A demo is included for the Kinetis Design Studio development tool to stream the video data from the camera to a host computer or terminal via USB. The solution is a full development platform to simplify development and to create your own application.

The camera driver is included as well as an example application to capture and display video. This is a low resolution implementation. If your application requires a higher resolution video, NXP provides other devices like the i.MX6 product family with its VPU/GPU accelerators.



KEY FEATURES

- Flexible and low-cost video solution for low resolution DVP applications
- Video USB interfacing
- Real-time low resolution video streaming with QQVGA resolution (160x120) @ 25 frames per second (fps)
- Still image capturing
- Low current consumption

TARGET APPLICATIONS

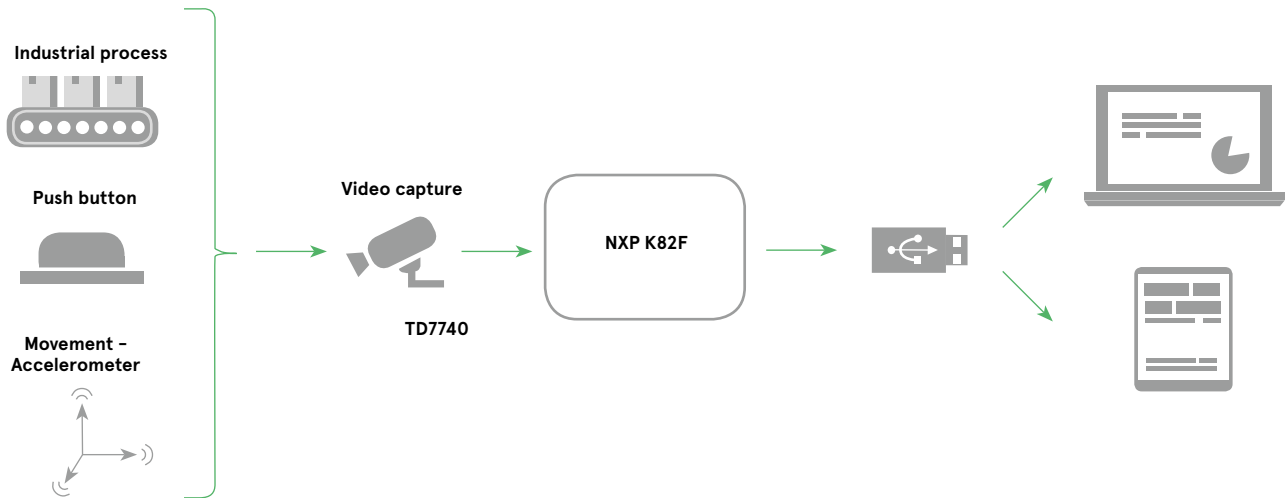
- Low resolution USB video streaming
- Monitoring systems
- Automated inspection
- Part sorting and identification
- Camera PIR sensors
- Security & Surveillance
- Home Automation
- Access control systems
- Logistics / retail analytics

NXP Kinetis Camera Development Kit order code

Part Number	Description	Includes	Resale
EV-NXPKINCAM-DVK	NXP Kinetis Camera Development Kit	FRDM-K82F main board TD7740 adapter board TD7740-FBAC camera module USB A to Micro B cable Quick Reference Card Quick Start Guide, software and application to download	€ 89.-

APPLICATION EXAMPLE

Capture video to monitor an industrial process, or start streaming video when movement is detected or a button is pushed. The captured video will be streamed to a terminal over USB.



NXP FREEDOM K82F (FRDM-K82F) BOARD

The NXP Freedom K82F (FRDM-K82F) is a low-cost development platform for Kinetis K82, K81, and K80 MCUs. The NXP Freedom K82F can capture still images or stream low resolution video in QVGA (160x120).



Additional peripherals enable rapid prototyping, including a six-axis digital accelerometer and magnetometer to create full eCompass capabilities, a tri-colored LED and two user push-buttons for direct interaction, 2x32Mb QuadSPI external flash, FlexIO camera header, touch pads and headers for use with Bluetooth® and 2.4 GHz radio add-on modules. OpenSDAv2.1, the NXP open source hardware embedded serial and debug adapter running an open source bootloader, offers options for serial communication, flash programming, and run-control debugging.

NXP Freedom K82F Features

- Kinetis MK82FN256VLL15 MCU (ARM® Cortex®-M4 @ 150 MHz, 256KB SRAM, USB, advanced security)
- Two 32 Mbit (4MB) dual on-board QuadSPI memory @ 1.8 V
- Dual independent voltage domains: VDD and VDDIO_E
- Accelerometer and magnetometer
- Three user-controlled status LEDs
- USB support on-board with micro USB cable
- FlexIO header compatible with TD7740
- Easy access to MCU input/output through Arduino R3 compatible I/O connectors
- Programmable OpenSDAv2 debug circuit supporting the CMSIS-DAP interface software

FlexIO

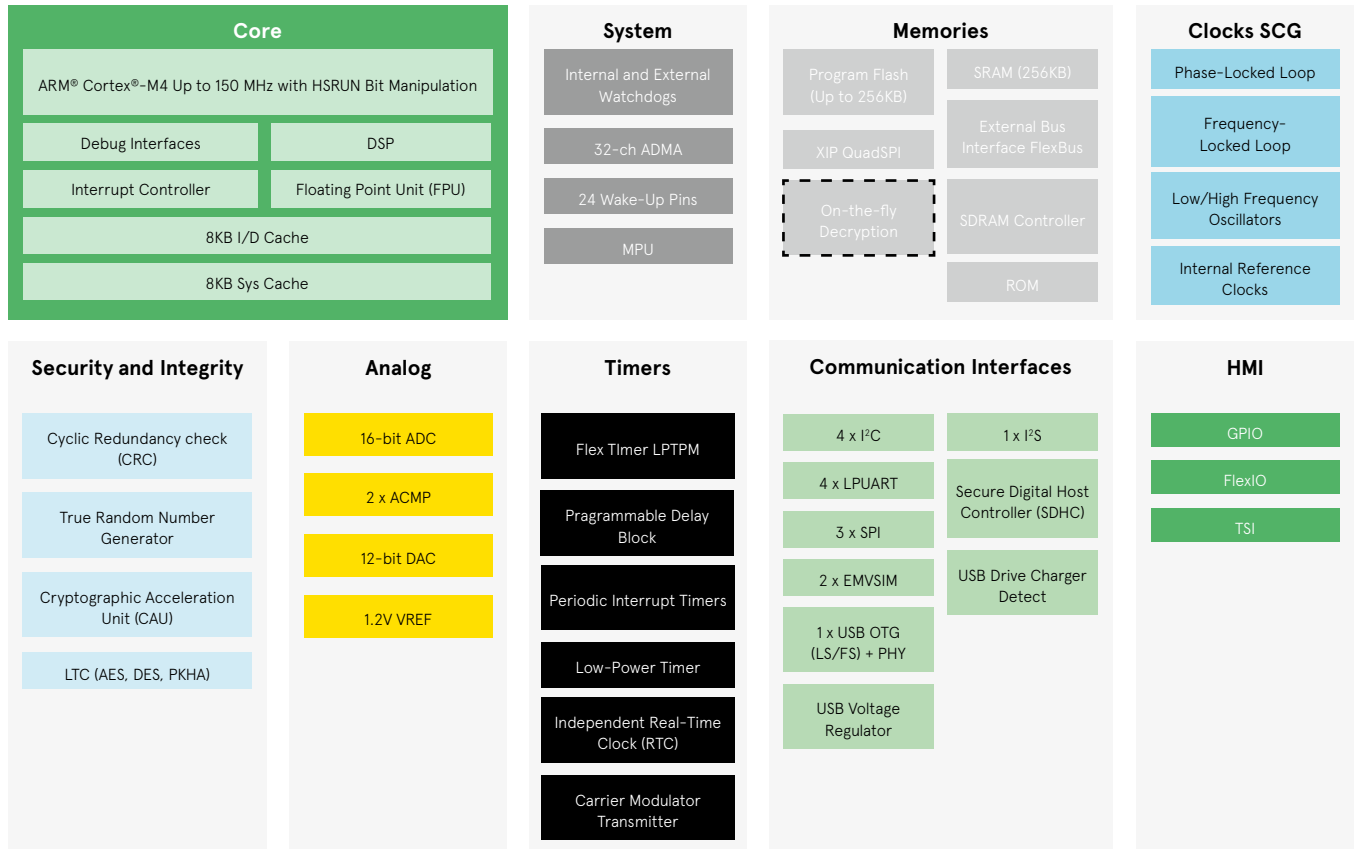
The FlexIO is a highly configurable module on the Kinetis devices. The main components of the FlexIO module are the shifters, timers, and pins. Data is loaded onto a shifter and a timer is assigned to generate the shifter clock and use a pin to output the data from the shifter.


The FlexIO provides a wide range of functionalities including:

- Emulation of a variety of serial/parallel communication protocols
- Flexible 16-bit timers with support for a variety of trigger, reset, enable and disable conditions
- Programmable logic blocks allowing the implementation of digital logic functions on-chip and configurable interaction of internal and external modules
- Programmable state machine for offloading basic system control functions from CPU

All with less overhead than software bit-banging, while allowing for more flexibility than dedicated IP.

KINETIS MICROCONTROLLER



 Cryptographic hardware support and execution from external encrypted memories is available on the Kinetis K82 MCU

MICROCONTROLLER OPTIONS

MCU	Description
K80_150	Kinetis K80 – 150 MHz, Scalable Memory, Advanced Security Microcontrollers (MCUs)
K81_150	Kinetis K81 – 150 MHz, Scalable Memory, Advanced Security Microcontrollers (MCUs) with Anti-Tamper Features
K82_150	Kinetis K82 – 150 MHz, Scalable Memory, Advanced Security Microcontrollers (MCUs) with Cryptographic Co-Processor

TD NEXT MINIATURE CAMERA MODULES

TD next provides a wide range of high quality and cost-effective miniature camera modules for VGA, 720p and 5Mp resolution. The TD7740 modules include a VGA image sensor, an optimized lens and a robust connector. Customized modules can be developed depending on requirements and volume. Avnet Silica and TD next provide in-depth design support and full customer service.



The Kinetis Camera Development Kit includes a TD7740-FBAC VGA module with flex connector, 90° HFOV (Horizontal Field of View) lens and IR filter on top of the lens.

Camera module options



TD' 7740 SB BB

VGA
Dual filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 100°



TD' 7740 SB AB

VGA
Dual filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 90°



TD' 7740 SB AC

VGA
IR filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 90°



TD' 7740 FB AC

VGA
IR filter
Flex 25 mm
Color bayer
Lens 90°



TD' 7740 SB AA

VGA
No filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 90°



TD' 7740 SB DC

VGA
IR filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 128°



TD' 7740 SB EC

VGA
IR filter
SMK socket 8 mm x 8 mm
Color bayer
Lens 66°



TD' 7740 GB AC

VGA
IR filter
Flex 38 mm
Color bayer
Lens 90°

Visit our Avnet Silica "Embedded Vision" dedicated website avnet-silica.com/embedded-vision to find out more about other Embedded Vision solutions.



All trademarks and logos are the property of their respective owners. This document provides a brief overview only, no binding offers are intended. No guarantee as to the accuracy or completeness of any information. All information is subject to change, modifications and amendments without notice.