z ilog®

- **32/64 KB FLASH**
- **512 B/1 KB RAM**
- **CRIMZON Z8 LXMC CORE**
- **IR TRANSMISSION**
- **IR LEARNING**
- **TUNED IR AMPLIFIER**
- **UP TO 40 GPIOs**
- **C-COMPILER SUPPORT**
- **UP TO 8 MHz INTERNAL CLOCK**

TARGET APPLICATIONS

- **UNIVERSAL REMOTE CONTROLS**
- **LEARNING REMOTE CONTROLS**
- **UPGRADEABLE REMOTE CONTROLS**
- **KEYBOARDS**
- **LOW POWER METERS**
- **LOW LATENCY SENSORS**

ZLF645 Crimzon Flash Microcontroller with ZBase Database
Industry Leading Universal Infrared Remote Control (UIR) Solution
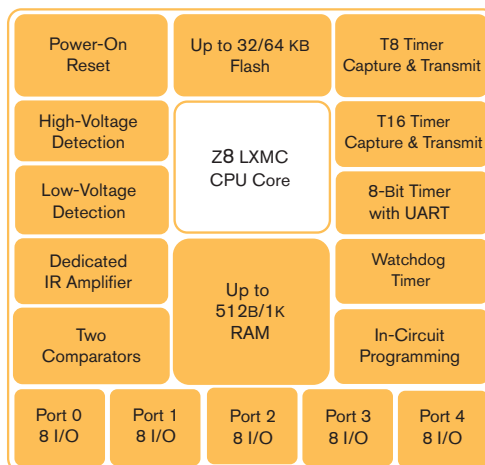
Overview

The Crimzon ZLF645 Flash Microcontroller with ZBase database is the latest industry leading universal remote control solution in Zilog's popular UIR product line. The ZLF645 Flash MCU incorporates Flash technology for greater supply chain flexibility and faster time-to-market. With the Crimzon ZLF645 Flash Microcontroller, the program code and Zilog's ZBase database, the industry-leading infrared database, can be programmed into the Flash memory at the final manufacturing stage.

The Crimzon ZLF645 Flash microcontroller also offers exceptional Bill of Material (BOM) costs savings. With up to 64 KB of Flash, the Crimzon ZLF645 MCU can be used to store the user programmed data, learning infrared signal timing and the infrared database eliminating the need for external EEPROM. For learning remote applications, the Crimzon ZLF645 Flash MCU has an integrated tuned IR amplifier with a learning distance range of 0 to 8 inches, a significant increase over other solutions on the market that typically work in a small 0 to 3 inch range. Additionally, our integrated tuned IR amplifier eliminates the need for an external signal filter, amplifier, and automatic-gain-control circuit, further reducing the overall BOM cost.

Zilog's ZBase database is a complete IR database with comprehensive brand and model coverage based on Point-of-Sale (POS) data for most all consumer electronic equipment. Independent third party field tests show that Zilog's ZBase database outperforms the competition in brand and model coverage. The use of POS data allows us to scientifically articulate our market coverage. ZBase database coverage includes thousands of codes for devices such as TVs, DVRs, DVDs and cable/satellite boxes. And, unlike other databases in the market, Zilog captures codes directly from OEM remote controls. Our Zero Defect policy ensures precise capture of the OEM remote, resulting in the highest quality database available in the market today. The benefits to our customers are lower call center volume, lower return rate, and more satisfied consumers.

Zilog's Crimzon ZLF645 Flash Microcontroller with ZBase database is a complete universal remote control solution that decreases system BOM cost, minimizes inventory management costs, and delivers the highest quality database coverage.

ZLF645 Block Diagram

Power-On Reset	Up to 32/64 KB Flash	T8 Timer Capture & Transmit
High-Voltage Detection	Z8 LXMC CPU Core	T16 Timer Capture & Transmit
Low-Voltage Detection		8-Bit Timer with UART
Dedicated IR Amplifier	Up to 512B/1K RAM	Watchdog Timer
Two Comparators		In-Circuit Programming
Port 0 8 I/O	Port 1 8 I/O	Port 2 8 I/O	Port 3 8 I/O	Port 4 8 I/O

Key Features

- Crimzon Z8 LXMC core
- 32/64 KB Flash memory
- 512 B/1 KB RAM
- Up to 40 I/O pins
- Built-in IR timer
- Patented T8/T16 timer pair
- High and Low Voltage Detection
- Programmable Watchdog timer of up to 5 seconds timeout period
- 2 comparators
- 6 interrupt vectors with 23 interrupt sources
- Flexible Stop Mode Recovery from 14 sources
- Programmable internal port pull up transistor on each port - P0, P1, P2, P3, and P4
- Low Stop mode current (typical 2 µA)
- 2.0 – 3.6 V operation

Crimzon ZLF645 Flash MCU Detailed Feature Set

Z8® LXMC CPU CORE

The Z8 LXMC CPU is an enhanced version of the Z8 CPU, with the following features:

- Program/constant memory with 64/128 pages of 512 bytes each (total 32/64 KB Flash memory)

- Up to 4 KB of register file address space (512 B/1 KB is implemented in ZLF645)

- Direct register-to-register architecture allows fast data

- Code compatible with other Crimzon / Z8 MCUs

- Software stack can be allocated in 1 K linear RAM, which allows much greater depth in subroutine calls and interrupt nesting than a hardware stack

- C-compiler support

FLASH CONTROLLER

The Crimzon ZLF645 family of devices can address up to 64 KB of Flash memory. The Flash controller pro-vides the appropriate Flash controls and timing for byte programming, Page Erase, and Mass Erase. Reading of the Flash memory for Flash accesses is made by either the CPU or through the In-Circuit Programming (ICP) interface. The Flash controller contains protection mechanisms to prevent accidental programming or erasure. It also has the read protection for maximum code security. The Flash option bits provide additional customization in input port pull up, 16-bit stack pointer, oscillation filter, etc.

The In-Circuit Programming (ICP) interface is a single pin RS-232 like interface for programming, reads, and memory erasures to the Crimzon ZLF645's Flash memory. Zilog's USB Smart Cable can be used across dif-ferent Zilog Flash MCUs.

INFRARED LEARNING AMPLIFIER & LEARNING ALGORITHM

The Crimzon ZLF645 Flash MCU's infrared learning amplifier can detect and decode infrared transmissions directly from the output of an infrared photodiode without the need for external circuitry. The MCU also has an integrated digital timer that allows it to filter out the carrier signal while capturing the envelope signal. This capability eliminates external components for the filter, automatic gain control, and the amplifier, thereby greatly simplifying your design, increasing reliability and lowering your cost.

The Zilog learning algorithm has been characterized with all popular infrared signals to ensure excellent performance. In addition, Zilog's tuned IR amplifier can support a wide range of distance between the OEM remote to the learning remote. Our expertise creates a real user-friendly learning remote application.

UART

The Universal Asynchronous Receiver/Transmitter (UART) is a full-duplex communication channel capable of handling asynchronous data transfers. The UART uses a single 8-bit data mode with selectable parity. This communication interface is well suited for Master/Slave system communications and factory diagnostics.

Zilog also provides a complete Application Program Interface (API) to the user. Using the API, it is very simple to send UART/ I^2C commands to the Crimzon RC Blaster. The complete remote functions can be integrated into any system quickly and easily using Zilog's solution.

Crimzon ZLF645 Flash MCU Detailed Feature Set (continued…)

TIMERS

Zilog's patented timers can generate and capture infrared signal precisely without the need of the external filter. The infrared timer features a 16-bit and an 8-bit counter/timer, each of which can be used simultaneously for transmitting. In addition to the 16-bit and 8-bit timers, the UART's baud rate generator can be used as an additional 8-bit timer when the UART receiver is not in use. The Crimzon ZLF645 Flash MCU's infrared timer contains a glitch filter for removing noise from the input when demodulating an input carrier.

ANALOG COMPARATORS

The Crimzon ZLF645 Flash MCU has two on-board analog comparators with independent reference voltages and programmable interrupt polarity. They are ideal for converting analog voltage levels into digital levels. These comparators can also generate interrupts and are ideal for system monitoring.

WATCHDOG TIMER

The Watchdog Timer (WDT) is a programmable one-shot timer that resets the Z8 LXMC CPU if it reaches its terminal count. The maximum WDT period in the Crimzon ZLF645 Flash MCU is 5 seconds. The MCU can essentially put itself into STOP mode to minimize current consumption. Typical STOP mode current with the Watchdog running is about 8 µA.

Crimzon ZLF645 Series Architecture

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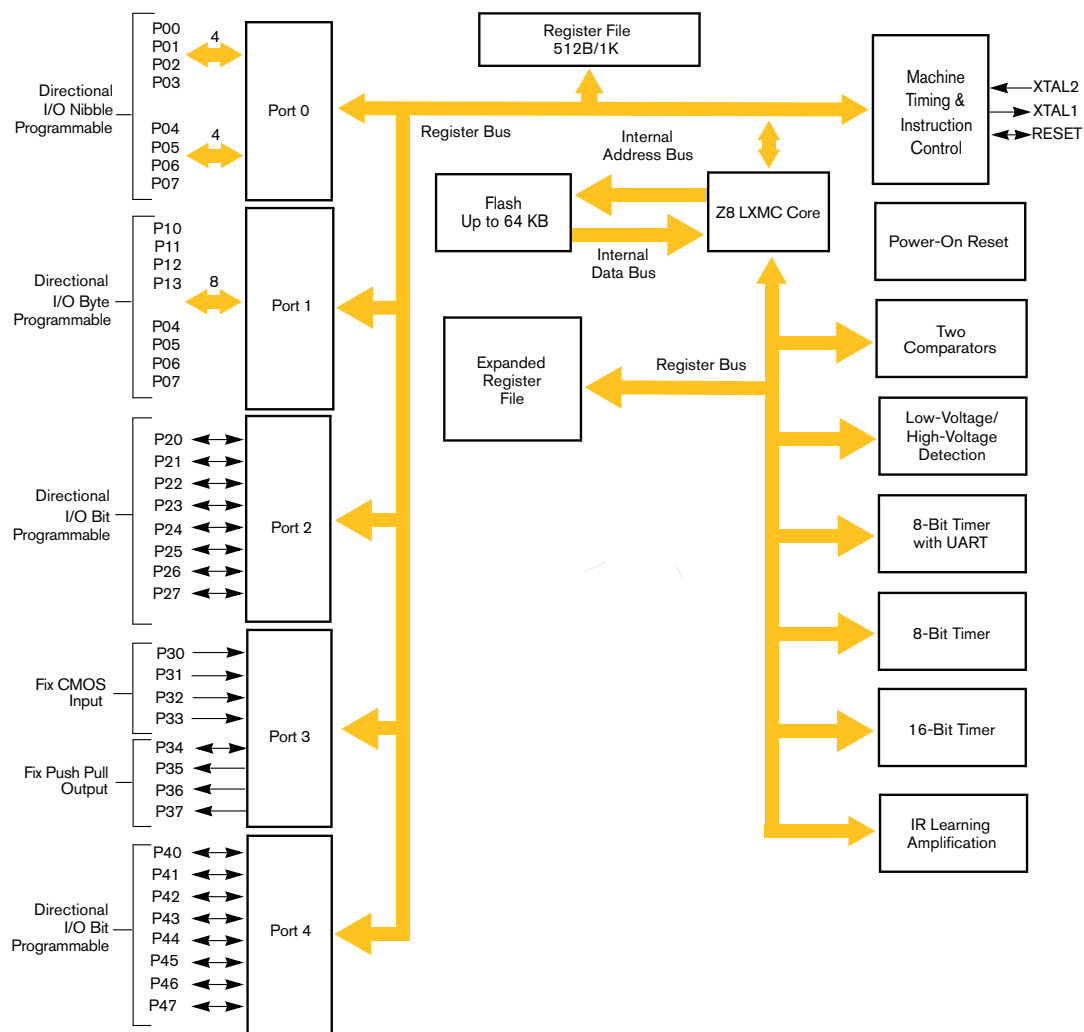
Crimzon ZLF645 Development Tool Support

The Crimzon ZLF645 is backed by a comprehensive development tools package that includes all the necessary design essentials to get your application up and running in record time. Below is a sample of the tools available with the Crimzon ZLF645 family of products:

- **Crimzon In-Circuit Emulator Kit** (part number: ZCRMZNICE01ZEMG)
    - Features:
        - An In-Circuit Emulator
        - USB Smart Cable for ZLF645 in-circuit programming
        - ZCRMZN00100KITG Crimzon IR development kit
        - 28-pin target pod for emulation
        - OTP programming module (for ZLP12840/ZLP32300)

- **Crimzon IR Development Kit** (part number: ZCRMZN00100KITG)
    - Features:
        - ZLF645 64 KB Flash
        - 20/28-pin PDIP sockets
        - 8 x 8 key matrix
        - IR transmission LED
        - IR learning photodiode
        - External IR signal amplifier (option)
        - 32 KB EEPROM for learning and user storage
        - Prototype area
        - LED display
        - Smart Cable connector for flash programming
        - RS-232 interface

- **Crimzon 20-Pin Accessory Kit** (part number: ZCRMZNICE01ZACG)
    - Supports 20-pin PDIP devices for the Crimzon In Circuit Emulator Kit (ZCRMZNICE01ZEMG)

- **Crimzon 48-Pin Accessory Kit** (part number: ZCRMZNICE02ZACG)
    - Supports 40-pin PDIP and 48-pin SSOP devices for the Crimzon In Circuit Emulator Kit (ZCRMZNICE01ZEMG)

Silicon Ordering Information

Order the Crimzon ZLF645 Flash MCU from your local Zilog sales representative by using the part numbers below. For more information, or to download product collateral and/or software, please visit us at www.zilog.com.

Part Number	Description/Options	Packages
ZLF645S0XXX64G	64 KB Flash; 512 B RAM; IR Learning; API	20-, 28-, and 48-pins
ZLF645S0XXX32G	32 KB Flash; 512 B RAM; IR Learning; API	20-, 28-, and 48-pins
ZLF645E0XXX64G	64 KB Flash; 1K RAM; IR Learning; API	20-, 28-, and 48-pins
ZLF645E0XXX32G	32 KB Flash; 1K RAM; IR Learning; API	20-, 28-, and 48-pins

Note: The 'XXX' represented in the part number above refers to the package type and number of pins in a given package. See the chart below to see available configurations. The "G" denotes "green" silicon and tools that are ROHS compliant. Page 6 of this document gives a complete explanation as to what each element of the part numbers mean. Contact your local Zilog sales representative for more information and a complete list of available devices, or visit Zilog's corporate website at www.zilog.com.
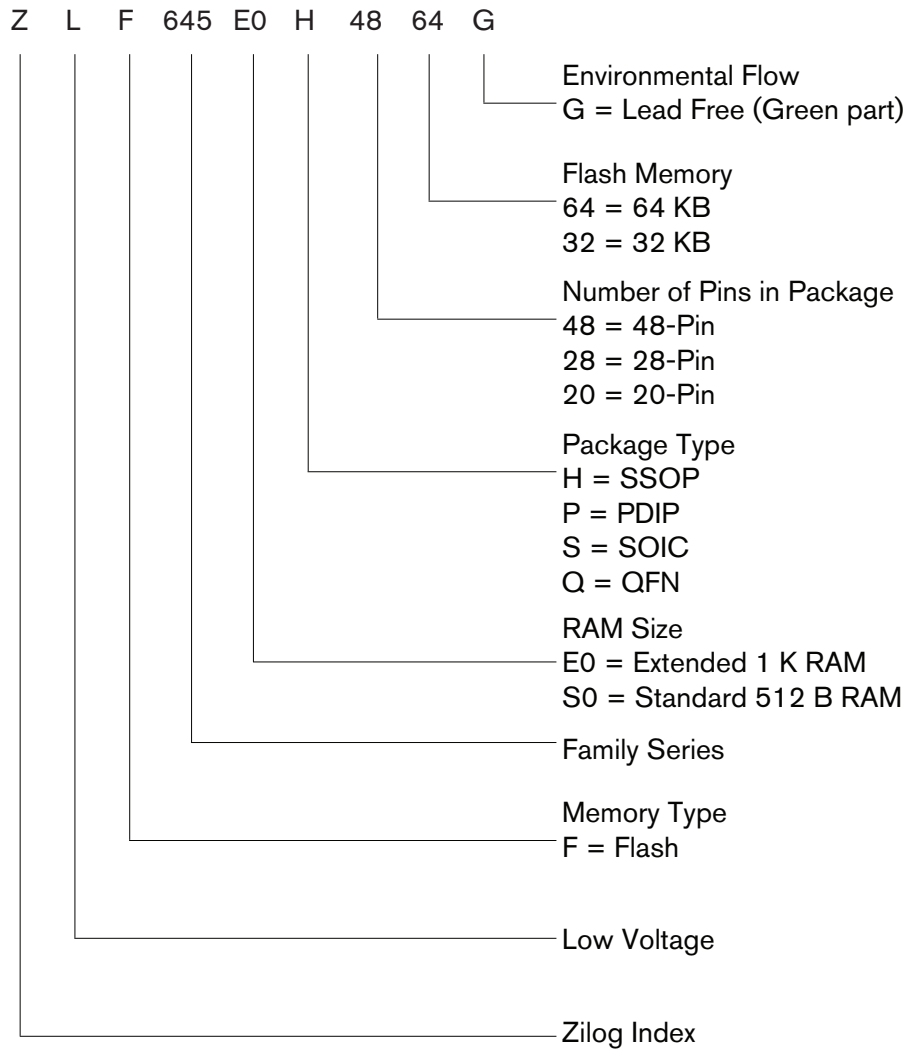
Packages	20-Pin	28-Pin	48-Pin
SSOP	✓	✓	✓
SOIC	✓	✓	
PDIP	✓	✓	
QFN	✓		

Documentation

The collateral referenced below is just a sample of the documentation available for Crimzon ZLF645 Flash Microcontroller. For a complete listing of all available product specifications and user manuals, please visit us at www.zilog.com.

Document Number	Description
PS0264	Crimzon ZLF645 Series Flash MCUs Product Specification
QS0066	ZCRMZNICE01ZEMG Crimzon In-Circuit Emulator Quick Start Guide
UM0217	ZCRMZNICE1ZEMG Crimzon In-Circuit Emulator User Manual
UM0215	Z8 LXMC CPU Core User Manual

Part Number Suffix Designations

Z   L   F   645   E0   H   48   64   G

Environmental Flow
G = Lead Free (Green part)

Flash Memory
64 = 64 KB
32 = 32 KB

Number of Pins in Package
48 = 48-Pin
28 = 28-Pin
20 = 20-Pin

Package Type
H = SSOP
P = PDIP
S = SOIC
Q = QFN

RAM Size
E0 = Extended 1 K RAM
S0 = Standard 512 B RAM

Family Series

Memory Type
F = Flash

Low Voltage

Zilog Index

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As used herein
Life support devices or systems are devices 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 in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

Document Disclaimer
The product brief contains an overview of the silicon feature set and operating parameters and should not be considered as the final speci-fication. See the product specification or manuals for the actual feature set and operating parameters for this product. This publication is subject to replacement by a later edition. To determine whether a later edition exists, contact:

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