FREQUENTLY ASKED QUESTIONS – grouped by category:

Architecture	**Question:** What core is in the ZFx86 chip?
	Answer: The core is a single pipeline, five stage 486 microprocessor with 8KB of write back cache. The design takes features of Pentium-class chipsets and marries them with the space savings and legacy features of a single-pipeline x86 processor. The core was originally designed by Cyrix Corporation.
Architecture	**Question:** How can I shutdown the FPU to reduce power consumption?
	Answer: There is no need to 'shut down' the FPU - if no FPU instructions are executed, the FPU will not be active and will not consume any power. To save power that would be consumed by the FPU, make sure that software 'idle' loops do not execute FPU instructions.
Architecture	**Question:** Are there plans to increase the performance of the ZFx86?
	Answer: There are plans to take the ZFx86 design to a smaller manufacturing geometry however this will not take place this year. This should result in some increase in performance and a further reduction in power consumption. The resulting device will continue to have pin-to-pin compatibility.
Architecture	**Question:** Does ZF have a roadmap for future products?
	Answer: ZF Micro Solutions' detailed product roadmap is confidential. We will make announcements of new products when they are close to completion and available for Beta testing. If you have suggestions for new products please contact ZF Micro Solutions' marketing department to discuss your ideas or requirements.
Audio	**Question:** What audio device should I use with the ZFx86?
	Answer: We do not recommend any specific audio device; any well-behaved ISA or PCI audio device should work.
Availability	**Question:** What is standard lead time for the ZFx86?
	Answer: ZF and its distributors will maintain some level of inventory on the shelf but standard lead time for any significant ramp up in requirements is 16 weeks.
Availability	**Question:** What is the expected life of the product?
	Answer: It is our intention to produce the ZFx86 long-term. As a minimum the production is expected to be five+ years from date of first shipments.
BIOS	**Question:** What methods are provided for updating the BIOS in the ZFx86?
	Answer: ZF Micro provides a Windows application called the Z-Tag Manager that can write the BIOS to a Dongle which is then used on the target to transfer the BIOS to it. See the Z-Tag Manager User Manual at: http://www.zfmicro.com/downloadtable.html
BIOS	**Question:** Can the Phoenix BIOS for ZFx86 be embedded in the M-System DOC so that the target system does not need an additional FLASH for storing BIOS?
	Answer: You cannot run the BIOS from a Compact Disk or DOC because both devices require the system to be initialized before they can load, and the system must be initialized with code. You can share a single flash or EPROM device from which you would first BOOT and then load both the OS and Application program.
BIOS	**Question:** If you cannot use a battery to save the set up, can you customize the BIOS to ensure the BIOS loads the right set up config at boot time?
	Answer: Yes the ZEB utility provided with our Phoenix 1.03 BIOS allows you to define the default CMOS settings and create a BIOS image that supports your choices.
BIOS	**Question:** Does the BIOS support SMM?
	Answer: Yes. See the Data Book for specific details.
BIOS	**Question:** Will the ZFx86 BIOS support a logo loader option?
	Answer: Yes

BIOS	**Question:** My ZFx86 based embedded system hangs when I try to boot Embedded NT. I have no video or keyboard in this application and I am using the serial ports to control specialized hardware.
	Answer: In a "headless" embedded NT installation, The NT loader may send video data to the serial port. This may be undesirable if the serial port is connected to application hardware. For example, your design may require a camera position controller attached to COM1, and while NT is sending boot time characters to the serial port, the system hangs. This may be solved by using a small custom BIOS extension to intercept the INT 10H BIOS Video function with a null function. Thus when the NT Embedded boot code uses the INT 10H video function the characters go to NULL instead of the COM port. We have developed the extension, NULLVID.ABS which may be obtained from this web site, see the download library page (http://www.zfmicro.com/downloadtable.html). This extension may be placed in the same flash as the BIOS using the ZFx86 BIOS Memory Window Chip Select Configuration Options. See the "Zfx86 BIOS User's Supplement" for details (http://www.zfmicro.com/downloadtable.html). Or for a quick installation, follow this procedure, which places the NULLVID.ABS extension at offset 0 of the AMDFlash and maps that area to linear address C8000h (C800:0000). 1. Use the ZF supplied AMDFLASH.EXE utility (http://www.zfmicro.com/downloadtable.html) to write the NULLVID.ABS image to offset 0 of the flash device. 2. Set the mem_cs0 memory window to the following values: - Window Size = 1 - Window Base = C8h - Window Page = F38h 3. Reboot the platform. NOTE: Other flash devices and different memory windows may be installed using the ZF Dongle.
BIOS	**Question:** Does the ZFx86 include a BIOS license?
	Answer: Yes, the price of the ZFx86 includes the cost of the BIOS license. The ZFx86 will once again ship with the ZF FailSafe® Embedded BIOS based on the Phoenix Technologies kernel.
BIOS - Video	**Question:** Can I put my own custom video BIOS in the same Flash as the Main BIOS?
	Answer: Yes. However, the video controller does not initialize until after POST. Therefore, the main BIOS sign-on display is not visible. (If you need the sign-on data for service and/or debugging, redirect the BIOS sign-on information to a serial port terminal, until the OS is in the boot phase.) Follow these video BIOS installation steps: 1. Place the custom image into the Flash in a sector that does not conflict with the main BIOS using the ZF dongle or other Flash programmer. 2. Use the main BIOS mem_cs0 Memory Window Configuration Setting to map the Flash sector to an available ZFx86 shadow memory area, for example, 0xC0000 or 0xC8000. For example, use the Z-tag Manager (P/N 9270-0010-01) to write a custom 32 Kbyte video BIOS image to Flash sector zero. Then set the configured mem_cs0 memory window to the following values: Size = 7, Base = C8, Page = F38. When you reboot the system, the video initialization occurs after the main BIOS POST and sign-on activity completes. Note: A new ZEB/BIOS release (currently being assessed research/feasibility) allows you to write custom video BIOS images directly to the main BIOS using the ZEB BIOS edit utility. Check with ZF Support for availability.

Compatibility – 186, 386, 486	**Question:** We have been using a (186, 386, 386ex, 486SX, DX2, DX4) processor from another supplier (AMD, STMicroelectronics, National Semiconductor, Intel) that has been discontinued – can the ZFx86 be used as a replacement?
	Answer: Although the ZFx86 is not a pin-for-pin replacement for any other x86 processors, it should run any operating system, utilities and application software that was working on any processor from an 8086 to a 486DX4.
Compatibility	**Question:** Will our system cost increase as a result of upgrading to the ZFx86 from another x86 processor?
	Answer: The ZFx86 is a very cost effective choice as a replacement for many x86 processors. In fact, you may find that significant overall savings will be realized by a redesign incorporating the ZFx86.
Compatibility	**Question:** How can the ZFx86 lower overall system cost as part of a redesign?
	Answer: Unlike most other x86 processors that found their way into the embedded market when their useful life in the desktop market ended, the ZFx86 was designed with the embedded market as its sole target. - The high level of integration may mean that several other support chips that were required with other processors are no longer necessary. This will also reduce component procurement costs. - The low power requirement of the ZFx86 (around 1W) and the reduced need for additional chips to provide all of the I/O included in the ZFx86 will mean you have less heat to dissipate and may require a lower cost power supply. - The most significant savings may well be eliminating the need to re-write code that is already debugged, functional, and generating revenue as well as the significant savings obtained by eliminating code re-validation.
Compilers	**Question:** Do you recommend any compiler for the ZFx86?
	Answer: Any compiler for x86 or PC architecture will run fine. For example, you can use compilers such as GCC and PGCC (Linux), DJGPP (DOS version of GCC) or Turbo-C V2.01 (free download from Borland).
Corporate	**Question:** Is ZF Micro Solutions a public or private company?
	Answer: ZF Micro Solutions is a privately owned corporation incorporated in the State of Delaware, USA.
Corporate	**Question:** Where is the ZFx86 manufactured?
	Answer: Wafer production as well as chip assembly and test are all done in the USA. Production wafers for the ZFx86 are being manufactured for ZF Micro Solutions at the Essex Junction Vermont wafer fabrication facility of IBM Microelectronics. Wafers are tested in Wichita, Kansas by Integra Technologies. The packaged parts are assembled in San Jose, California by i2a Technologies and tested in by Integra in Kansas.
Corporate	**Question:** How many customers are using the ZFx86?
	Answer: ZF is a privately held company and does not release this specific information however we can state that more than 300 companies around the world have done designs based on the ZFx86.
Corporate	**Question:** What are the production yields of the ZFx86?
	Answer: We do not disclose this information as it is proprietary to both ZF Micro Solutions and our supplier IBM Microelectronics. We can state that we do not expect to have any manufacturing yield issues as most companies in this industry recognize IBM as a premier producer of semiconductor products of the highest quality in the industry.

DiskOnChip	**Question:** Is the ZFx86 capable of supporting M-System's or another Disk On Chip product for emulating a hard disk? **Answer:** The ZFx86 is capable of supporting various media for storing Operating Systems and Application SW. We have used DOC, as well as Compact Flash from M-Systems and SanDisk
DOS	**Question:** Using a DOS O/S, booting time is about 15 seconds. Is this fixed or can it be reduced? **Answer:** The booting time cannot currently be reduced.
Environmental	**Question:** Is the ZFx86 "green" (RoHS compliant)? **Answer:** Yes, all new devices will be fully RoHS (Reduction of Hazardous Substances) compliant. ZF will provide necessary documentation regarding compliance.
Environmental	**Question:** What is the operating temperature range of the ZFx86? **Answer:** There are two versions of the ZFx86 available: ZFx86BGA388-c (<u>c</u>ommercial) is rated 0C to +70C at 100MHz ZFx86BGA388-i (<u>i</u>ndustrial) is rated -40C to +85C at 100MHz
FailSafe Boot ROM	**Question:** What s in the 12KB ZF FailSafe boot ROM, if it s not the BIOS/VxWorks/Linux-Image? **Answer:** It is a mask ROM containing our patented FailSafe boot up ROM code. Read the BUR documentation in the databook for more details.
I²C Bus	**Question:** What data rates (min/max) are supported on the I²C bus and how is it set? **Answer:** The I²C bus supports data rates at two speed levels: 100 kbps and 400 kbps. Our chip has an interface that will run to 1.5Mbps. Since it uses a handshake mechanism no setting is required.
Integrated Development System	**Question:** In the IDS (Integrated Development System), where do the Phoenix BIOS and Linux OS reside? Are they in Internal or External ROM/Flash or Hard disk? **Answer:** On the Integrated Development System, the BIOS is in the flash when delivered. There is a DOS and a Linux partition on the hard disk. The Phoenix BIOS will fit into 256K of the flash.
Integrated Development System	**Question:** Can we get a parts list of the IDS board (evaluation board)? **Answer:** The BOM is available on the IDS CD shipped with each IDS. IDS BOM and schematics are also available on our website (http://www.zfmicro.com/downloadtable.html).
Integrated Development System	**Question:** Do I need to buy a development system to start a design using the ZFx86? **Answer:** Although not a requirement, we highly recommend you purchase an IDS (Integrated Development System). The complete package of hardware, software and technical support will help you ensure a quick and effective design.
IrDA	**Question:** Regarding the ZFx86 IrDA function, what module did ZF use to test this? **Answer:** ZF has used the Vishay Telefunken Fast Infrared Transceiver TFDU6101E. The Data sheet is supplied under...\\documents\\datasheets on the ZFx86 Integrated Development System CD. For testing ZF used Win95 and Win98. We used a standard IR driver for this. No proprietary driver was required.
IrDA	**Question:** Regarding the ZFx86 IrDA function, how do I access the IR port on the development system? What is the port address? **Answer:** The IR port address is hard coded into BIOS at 3E8h. The IR base port can be accessed as an ordinary serial port. All other accesses to other IR specific registers are IR protocol specific.

ISA	**Question:** What kind of interface controls the ISA memory mapper? If I connect flash memories to the ISA bus, is there a way to somehow define how the ZFx86 takes care of the write-operations? **Answer:** The ISA memory mapper is simple. It is fully described in the ZF logic chapter of the data book, and highlighted in the ZF Logic Chapter of the Training Manual.
JTAG	**Question:** What emulation/test support is available via the JTAG port? **Answer:** The JTAG port will support most standard manufacturing test requirements such as input test forcing, read of any pin, and I/O tri-stating.
JTAG	**Question:** Is the BSDL file for the ZFx86 provided by ZF for user J-Tag testing? **Answer:** The BSDL file is available under NDA (Non-Disclosure Agreement).
Memory - DDR RAM	**Question:** Is it possible to use DDR RAM with the ZFx86? **Answer:** At this time the ZFx86 only supports SDRAM.
Memory - FLASH	**Question:** How much FLASH memory will the ZFx86 support and what are the number and page sizes? **Answer:** The ZFx86 will support up to four independent regions of FLASH memory, each of which can be up to 16MB deep. This gives a grand total of up to 64 MB. Each region must have an access "window" that resides in the address range C0000-EFFFF. The size of the access "window" can be different for each region. The "window" or Page size will determine the number of pages within each region. See the ZFx86 Data Book for details (www.zfmicro.com/downloadtable.html).
Memory - SDRAM	**Question:** What is the maximum speed of the SDRAM currently supported (100MHz or higher)? Is Burst mode supported in ZFx86? **Answer:** We recommend PC100 compliant SDRAM. Burst mode is supported. The System clock drives the North bridge (including the SDRAM interface), the CPU and the South bridge PCI interface. It is possible to use any frequency up to 66 MHz.
Memory - SDRAM	**Question:** Is it possible to mix 3.3V DRAM and 5V DRAM? **Answer:** The SDRAM Interface on the ZFx86 is designed for 3.3V devices and is not 5V I/O tolerant.
Memory - SO_DIMM	**Question:** How do I use the 144-pin SO_DIMM memory module with the ZFx86? **Answer:** On our Download Library web page (http://www.zfmicro.com/downloadtable.html), see the section called "Shareware (non-supported contributed software and hardware)" at the bottom of the page. There is a reference design there that covers Memory SODIMM (contributed by Tri-M). It is titled **Memory (SODIMM) —from TRI-M. Size: 176K. Date: 1-7-02.**
Power Saving	**Question:** What power savings modes are supported? **Answer:** Four power saving modes are supported: On, Doze, Standby and Suspend.
Current ZFx86 vs. pre-2006 ZFx86	**See ZF Application Note: AN-0001 Spec Changes 01-June-2006**
Current ZFx86 vs. pre-2006 ZFx86	**Question:** Is there a different reflow profile for the "green" package? **Answer:** Yes, ZF provides information about the SMT reflow profile.
Current ZFx86 vs. pre-2006 ZFx86	**Question:** Will there be a non-RoHS version available for existing (leaded) designs? **Answer:** There are no plans to make a non-RoHS version of the ZFx86.

Current ZFx86 vs. pre-2006 ZFx86 / Architecture	**Question:** Does ZF own the intellectual property for the ZFx86? **Answer:** In the settlement of the lawsuit against National Semiconductor all of ZF Micro Solutions' intellectual property was delivered to ZF as well as a worldwide perpetual license to all other intellectual property included in the chip that is or was owned by National Semiconductor. ZF have full rights to make, have made, modify or create derivatives using the intellectual property in the ZFx86. The full details of the agreement are confidential.
Current ZFx86 vs. pre-2006 ZFx86 / Compatibility	**Question:** Is the current version of the ZFx86 pin compatible with the pre-2006 version? **Answer:** Yes. Both devices are 388BGA devices and all pin designations remain identical.
Current ZFx86 vs. pre-2006 ZFx86 / Operating	**Question:** What are the differences between the pre-2006 version of the ZFx86 and the current version? **Answer:** There are three major differences. - Maximum Operating Frequency: The previous version of the ZFx86 was offered at an operating frequency of up to 128MHz at a commercial temperature rating (0C to +70C) and an operating frequency of up to 100MHz at an industrial temperature rating (-40C to +85C). The new version will only be offered at an operating frequency of up to 100MHz but will still be available in both commercial and industrial ratings. - Core Voltage: The core voltage requirement for the previous version was 2.25V at 100MHz and 2.7V at 128MHz. The Vdd-Core voltage specification at 100MHz for the current version is: Minimum 2.09V Nominal 2.20V Maximum 2.31V - Device Package: The ZFx86 package is now RoHS compliant.
RTC	**Question:** How much RAM is available in the RTC? **Answer:** There are a total of 242 bytes in the RTC. See the Clock discussion in the ZFx86 databook.
Static Design	**Question:** What is the advantage of a fully static design? **Answer:** Minimal power consumption. Also it provides the ability to clock down to DC, which results in power consumption proportional to clock rate.
USB	**Question:** What USB devices are supported under Linux? Where can I find additional information about USB support under Linux? **Answer:** There is a very good website, www.linux-usb.org, that gives both driver support information as well as many other technical details for consideration when implementing a USB solution.

USB	**Question:** Can the ZFx86 USB act as a device as well as a host? **Answer:** The ZFx86 is HOST compliant only and cannot act as a device. All USB ports are Open Host Controller Interface (OpenHCI) version 1.1 compliant. The OpenHCI specification provides a register-level description for a host controller, as well as providing common industry hardware/software interface and drivers. The USB host controller masters Front-PCI to fetch setup and control information related to OpenHCI. The USB host controller also masters the PCI bus, performing read and write bursts to move transmit and receive packet data to the system memory. Per USB specification, there can only be one host in the system so the ZFx86 device must act as the host. Further information on USB, including specifications, can be found at: http://www.usb.org/developers/docs.html
USB	**Question:** Does the ZFx86 support USB 2.0? **Answer:** The USB controller in the ZFx86 is USB 1.1 compliant only.
ZFx86 clock	**Question:** Is there a safe way to clock down the ZFx86 during runtime to reduce power consumption? How does this effect the operating system more then reducing the timer ticks? **Answer:** While it is theoretically possible to switch System Clock frequencies on the fly, this is not recommended. Changing the System Clock frequency may necessitate changing the PCI clock divider or other configuration options. These are set only at startup (or during a hardware reset). The ZFx86 does support APM. This is the preferred method for reducing power consumption during idle periods etc.