**iMAGEcraft**
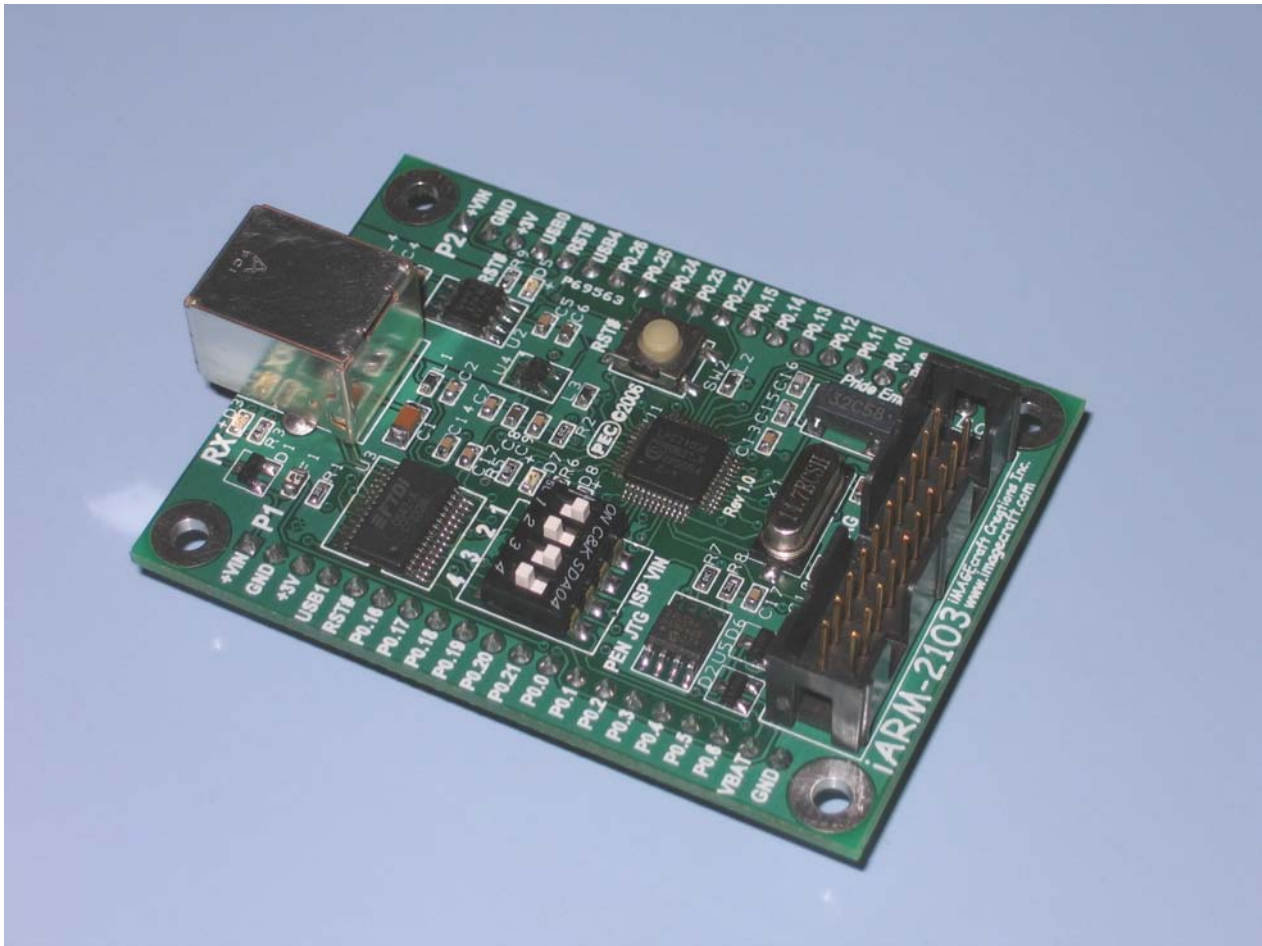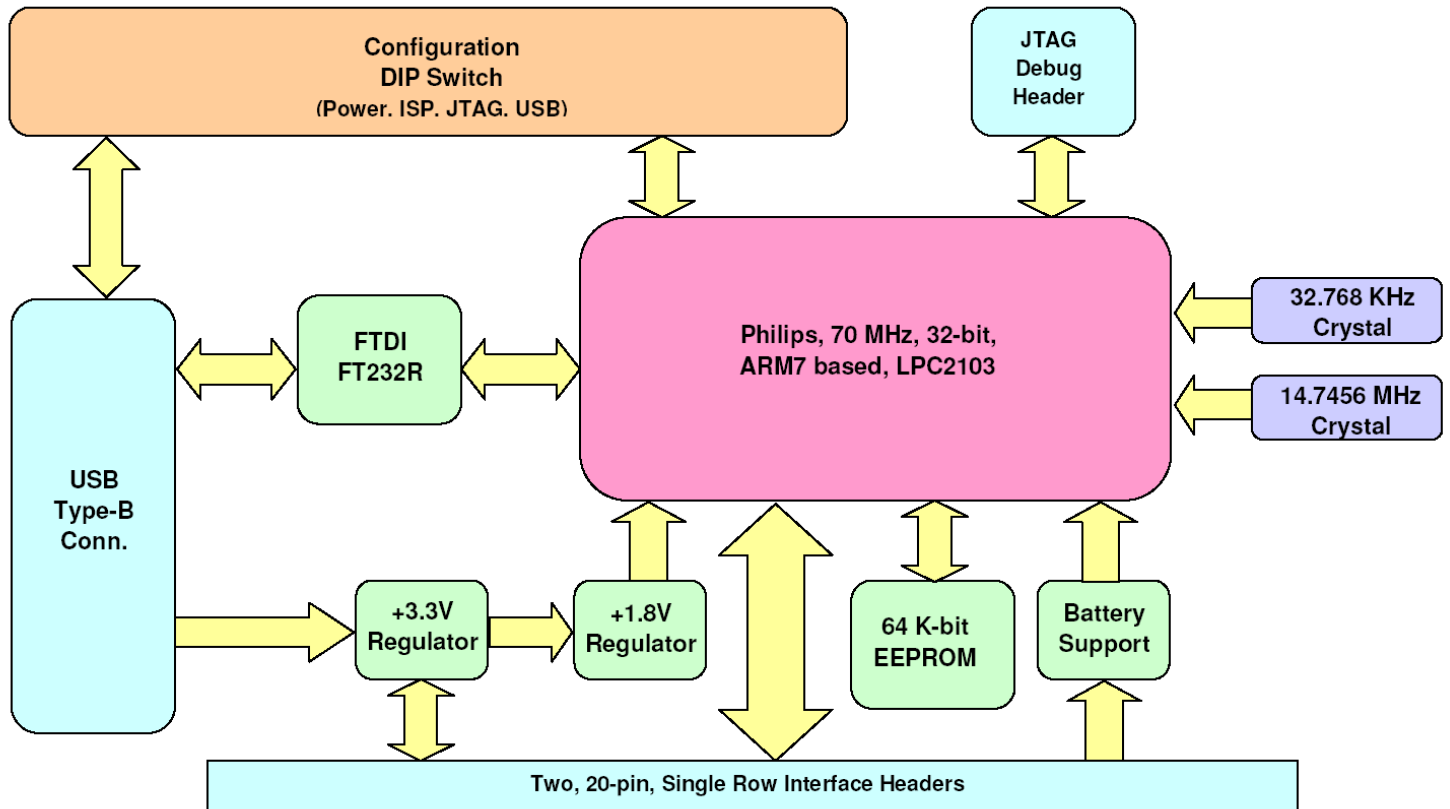
# iARM-2103

## Introduction:

**Introducing ImageCraft iARM-2103 Complete ARM Development Board with USB interface**

The iARM-2103 is first of the new series of highly integrated boards from ImageCraft with ARM7 and PC USB interface. The boards not only satisfy the needs of development and experimentation, but also are meant to follow through to production as professional and reliable single board computer solutions.

The iARM-2103 can draw its power from the USB port and thus allowing "plug-and-go" immediate development without additional hardware investment. It includes many features not found in comparable priced boards such as DIP switch for configuration instead of jumpers, JTAG header, 64K I2C EEPROM, brown out protection, all IO signals brought out to headers and many more. Designed in USA and manufactured in a production house meeting military and NASA standards, the iARM-2103 is of the highest quality.

The iARM-2103 is fully supported by the ImageCraft ICCARM C compiler. ICCARM demo is fully functional for 45 days, and becomes 10K code limited for non-commercial use after 45 days, and is perfect for iARM-2103 development. Flash programming can be done using the free Philips provided serial downloader over the USB port.

The product comes with many examples programs, including iARM-2103 programs and Windows applications demonstrating communications between the PC and the iARM-2103.

The iARM-2103 is available now for a low introductory price of $69 until August 31, 2006 and will cost $89 thereafter. Quantity pricing available upon request. Contact info@imagecraft.com, 650 493-9326, http://www.imagecraft.com/software for details.

## Typical Applications:

- USB I/O controller
- USB datalogger (analog and digital input reading with accurate time date stamp, etc.)

- USB communication bridge/protocol converter (USB<=>UART, USB<=>I²C, USB<=>SPI)
- USB PC peripheral
- USB powered Single Board Computer (SBC) solution, with no external power source requirements
- USB controlled lab equipment
- High performance, low power, standalone SBC solution
- High performance, low power, plug-in module solution
- High performance industrial controller solution
- Complete single board solution for hardware and software experimentations in "Typical Applications"

## Microcontroller Features:

- Based upon the highly integrated, 32-bit, 70 MHz, ARM7 based, Philips LPC2103 microcontroller
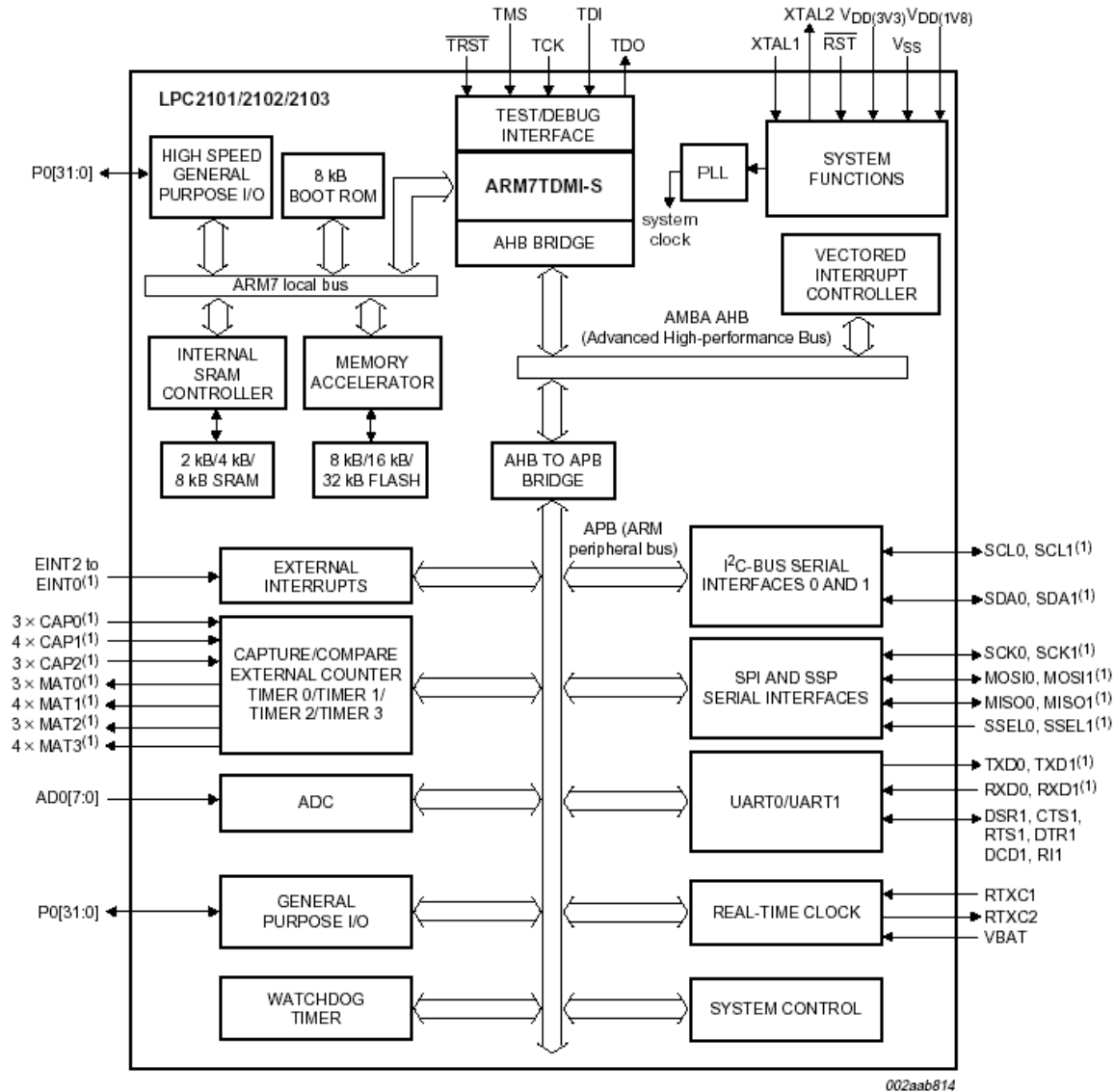


(1) Pins shared with GPIO.

## Configuration:

- Configuration of the board is done via the onboard DIP switch
- No configuration jumpers to lose
- The DIP switch configures the following:

- o Whether the circuit is powered by USB or external power
- o Whether JTAG is enabled or not
- o Whether In System Programming (ISP) via USB is selected or not
- o Whether the USB power enable signal is connected to the LPC2103 P0.6 GPIO bit or not

## Dimensions:

Small board size of 2.6" x 1.9"

## Board Connections:

- The two headers allow the board to be plugged into a motherboard as a "pluggable module" or allow a cable connector(s) to plug into the board (see below)
- Although the iARM-2103 has two headers, only a minimum of one cable connection is required for using the iARM board with cable connectors; each connector has Power, Ground, Reset, and USB control signals. This eliminates cabling and is a very flexible option
- Each pin is labeled on the front board silkscreen and back board copper for clarity and ease of use
- The header spacing is 1.5". This will accommodate solderless breadboards or proto-board holes
- The mating connectors for connecting to the iARM-2103 are readily available through many distributors, including Digikey: Molex connector 903-0120 (http://dkc3.digikey.com/PDF/T062/0112.pdf) with Molex pins 90119-2110 and 90119-2121 (also available through Digikey)  A flex cable is also a good choice: http://dkc3.digikey.com/PDF/T062/0052.pdf.
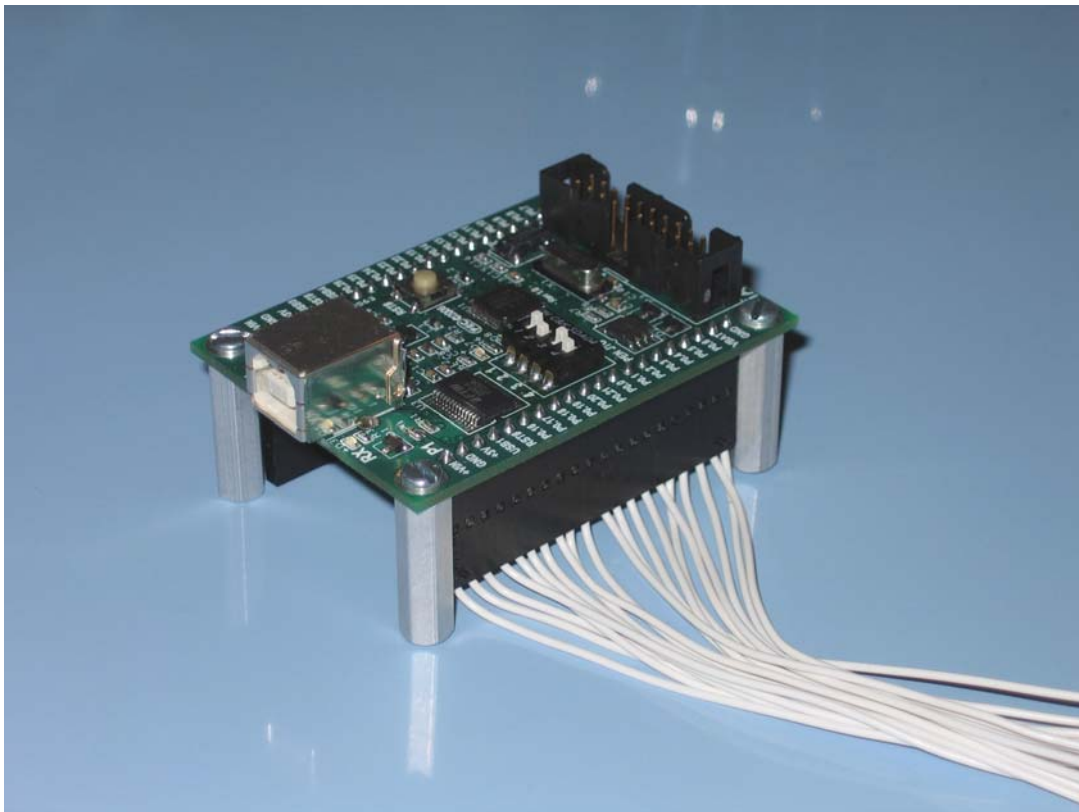


## Power Options:

- Ability to be powered by USB or externally via headers
- When the board is powered by USB via selection from the onboard DIP switch, power from the USB connector is driven onto the "+VIN" line as well. This allows the users hardware to be powered by USB as well since the voltage comes out of the header
- +3.3V from the on-board voltage regulator is accessible via the headers for powering of external circuits.
- Resettable fuse and diode protection when powered from USB protects PC

- The Real time clock (RTC) VBAT signal is available on a header so the RTC can be battery backed via an external battery
- Low power design (e.g., Voltage regulators, EEPROM, etc. draw microamps)

## Pin-out:
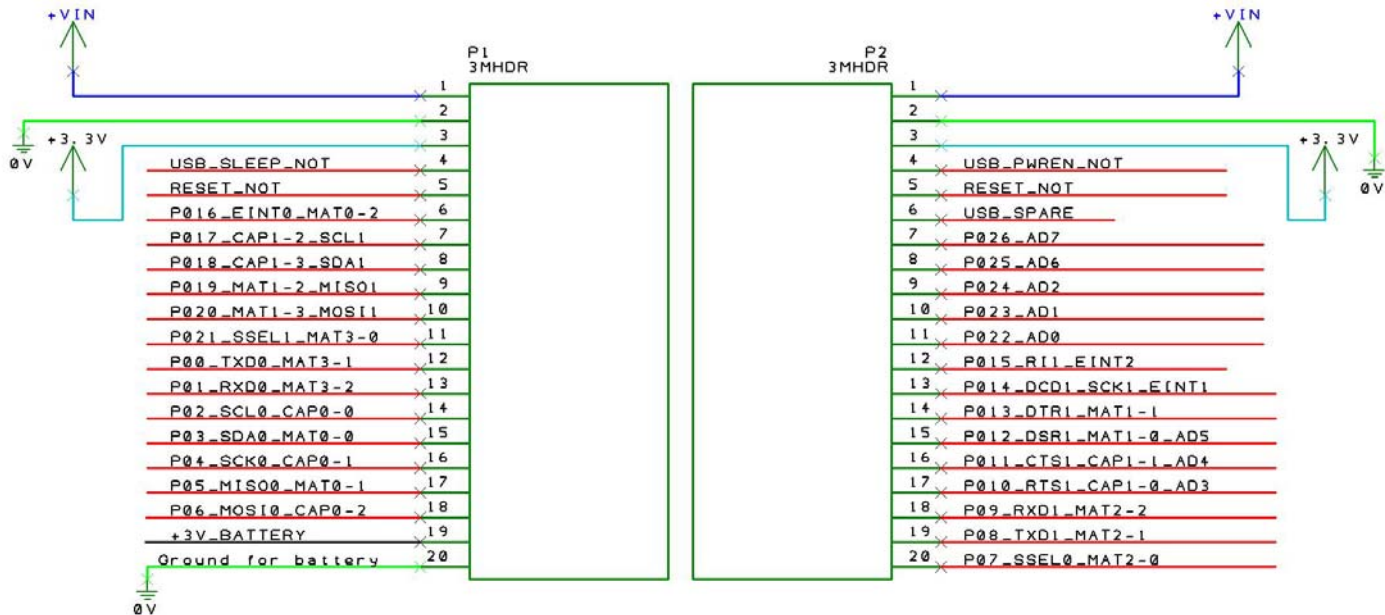


- All the ARM GPIO bits come out to the headers except for the JTAG signals.  If the user desires the use of the JTAG signals as I/O, the user can plug a connector into the JTAG connector and use the signals as GPIO
- All common signals are grouped on the same connector when possible.  An example is all the A to D signals are on one header, the SPI Channel-1 signals on one connector, the various I²C channels are together, UART-1 modem signals, and at least one external interrupt on each header
- On one header the RTC's VBAT is coupled with a separate ground connection.  This makes it very convenient to wire in an external battery
- Three of the FTDI USB I/O signals are available on the headers to allow control for USB power enable and sleep functions.  These signals can also be customized through the FTDI configuration utility.

## Mounting:

- Four 0.120" mounting holes; one located on each corner of the board. This allows the board to be bolted down via readily available standoffs making it an easily mountable, standalone SBC solution.

## USB Communications:

- FREE Industry proven Windows, Linux, and Mac OS USB drivers
- The USB connector is of Type-B for ease of use, stability, and cable availability

## ISP and Debug:

- In-Circuit Programming (ISP) is via USB making field upgrades easy
- Debugging is via the industry standard on-board JTAG connector, which is pin compatible with standard ARM JTAG debuggers.  The recommended debugger is the soon to be released low cost ImageCraft ARM debugger

## LEDs:

- Debug LEDs on LPC2103 pins P0-17 and P0-18

- Two programmable LEDs monitor USB communications. Currently one is for USB Transmit and the other Receive, but both can be programmed to monitor other USB functions

## Software Support:

- Fully integrated with ImageCraft's low cost ARM compiler and debugger
- A multitude of ImageCraft ICCARM demo projects are provided to get the user up and running quickly.  The demo projects setup the LPC2103 controller, demo many of the LPC2103 features, and show how easy it is to use USB on the iARM-2103 board
- A variety of PC Windows applications are provided to demonstrate USB communications and data exchange to and from the iARM-2103 board

## OEM Options (Contact ImageCraft for more information):

- OEM connector selection can allow a multitude of connectivity options (e.g., Terminal blocks).
- For those connecting cables to the iARM-2103, custom cable assemblies (similar to the above cable connected to the iARM board) are available upon request from our professional assembly house
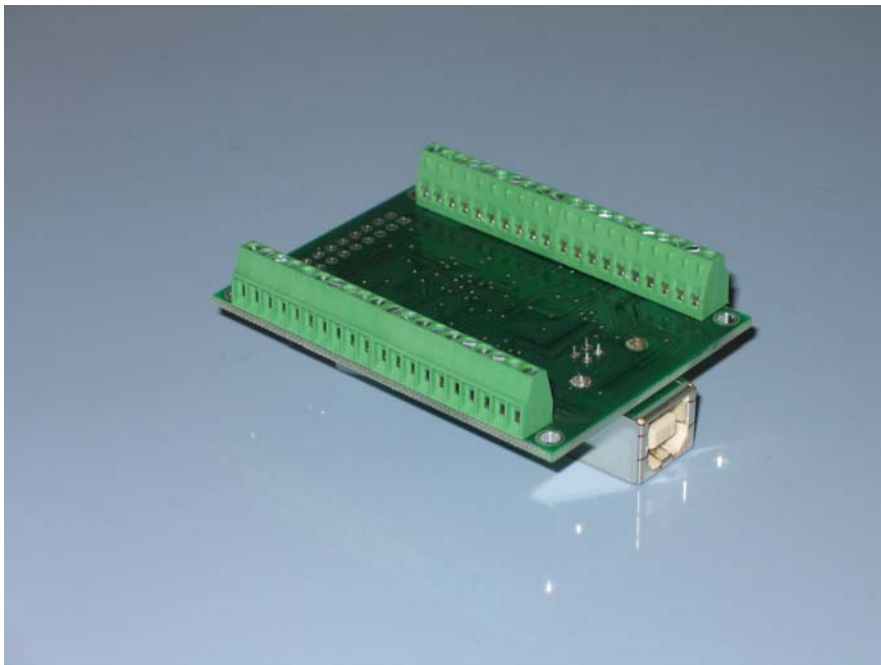


## Extra Features:

- 14.7456 MHz crystal for the main clock source; provides accurate divisors for baud rates
- 32.768 KHz crystal for the real time clock provides precise time-keeping
- Battery backup capability for the real time clock assures the clock keeps running when the board is powered off
- 64 K-bit I²C EEPROM for nonvolatile storage
- On-board JTAG debug connector
- Power on reset with brown out detection
- Unique, read-only ID programmed into every board and accessible via USB. Perfect for providing security dongle functionality
- Resettable fuse and diode protects PC supplied power from the USB connector

## Manufacturing Facility and Info:

- All production assembly and test is done in the USA via a professional, production assembly house that has been in business for over 13 years.
- Workmanship to IPC-A-610D and IPC-A-620 specifications. Also qualified for Navy Weapons Specification WS-6536E, DOD-STD-2000, MIL-STD-2000, MIL-STD-2000A, and NASA Specification NHB5300.4
- MIL-I-45208 Quality Inspection System

- Full E.S.D. protection throughout the production facility
- The iARM-2103 is RoHS compliant with NO components containing lead and currently utilizes Kester® EnviroMark 907 No-Clean Lead-Free Solder Paste for joints that are cosmetically bright as SnPb joints and SAC305 solders
- Reliability and consistency from board to board is realized when using a professional assembly house
- Production capabilities to satisfy your low or high volume production needs
- As a result of all this, the iARM-2103 board is assembled to military specifications but at a commercial price to the end customer

## Design Info:

- The ImageCraft hardware solutions partner Pride Embedded, LLC, designed the iARM-2103.  With over 10 years of experience in industrial design and thousands of production boards in the field, the iARM-2103 carries the reliability and robustness that are trademarks of Pride Embedded.