# Nicholas C. Ipri
## Quakertown, PA 18951
## 215-264-1055 (cell)
## nipri@ncielectronics.com

## *Summary of Skills*

Experienced in all phases of product development from concept through Production release and ongoing support. Hardware development skills include component sourcing, schematic capture, PCB layout and routing, EDA library creation and maintenance. FPGA/CPLD development using VHDL and simulation. SoC development. ARM processors, 8/32 bit microcontrollers. Software skills include C/C++, Python, Java, HTML, PHP and TCL. Test experience includes test plan development, execution and hardware / software debugging, Production experience includes training of technicians and assemblers, setup of ESD safe workstations, creation of QA test procedures and automation of product testing using GPIB compatible test equipment and customized test fixtures and software.

## *Experience*

**Solar Technology Inc.**          **Lead Embedded Systems Engineer March 2003 - Present**

Portable Message Signs and Asset Tracking Equipment

- Developed an embedded platform for the Changeable Message Sign (CMS) product. This design includes a TI Sitara series processor, DDR3 memory, switching power supplies, a u-Blox Sara series 3G device and GPS.
- Developed an embedded platform for the companies' flagship Arrow Board product based on a Microchip AT91SAM processor. This design also includes DDR2 DRAM and a Microsemi FPGA.
- Designed and tested a PCIe format communications module using a u-Blox Sara R410 module and Zoe GPS module.
- Was responsible for hardware and software development of an MPPT solar battery charger with a 30 ampere capacity. This design includes an STM32F series processor and data acquisition of voltage, current and temperature data. I developed the firmware for the product in C++ and includes a proprietary MPPT algorithm as well as a serial communications interface.
- Developed a device used for real time tracking of portable assets such as generators and trailers. This device includes an NXP iMX287 processor, DDR3 DRAM, embedded GPS and a 4G LTE CAT-M1 cellular module with options to use either an internal SMT antenna or an external antenna.
- Continued development and support of CMS Display Module hardware and software. The hardware includes Microchip AVR processors, switching power supplies and LED string drivers. The firmware is written in C++ and includes data acquisition of voltage and temperature data as well as PWM control of LED brightness. I am also responsible for the ongoing development of the proprietary communications protocol that controls the module.
- Numerous other projects as needed that utilize embedded 8 or 32 bit microcontrollers and associated firmware.
- Redesign and revision of existing products to address issues of component obsolescence, long lead times or to realize substantial cost reduction.
- Technical support for all other departments of the Company including Customer Service, Sales and Production.

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## *Earlier Experience*

**Inrange Technologies Inc.**                    **Senior Design Engineer June 1998-March 2003**
Data Communications Equipment


**Telesciences Inc.**                            **Senior Design Engineer May 1996-June 1998**
Telecommunications: Systems for call billing data collection and fraud management


**Liberty Technologies Inc.**                    **Staff Engineer May 1991–March 1995**
MOV diagnostic equipment and industrial radiography

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## *Skills*

- Schematic Capture and PCB Layout: Cadence Allegro/OrCAD, Altium Designer and Autodesk Eagle.
- FPGA/CPLD: Intel (Altera) Arria, Stratix, Flex and Max series and Quartus II software, Nios 2 processor, Microsemi Igloo series and Libero software, Synopsys and Synplicity synthesis tools, Mentor Graphics ModelSim..
- Microprocessors and Microcontrollers: NXP iMX28x, TI Sitara and MSP430, Microchip SAM, AVR, PIC, Altera Nios2, ST Micro STM32F4x. and associated debugging tools.
- PSoC: Cypress PSoC 5LP series devices and PSoC Creator IDE.
- Programming languages: C/C++, Python, Java, TCL, HTML, PHP.
- Eclipse and Net Beans IDE.
- Communications Protocols: Ethernet, USB, RS232/422/485, SPI, I2C, CAN, Wifi, Bluetoote/BLE, Zigbee.
- GPIB Compatible Test Equipment: Oscilloscopes, logic analyzers, spectrum analyzers, multimeters, arbitrary waveform generators,
- Operating Systems: FreeRTOS, VXWorks, ThreadX, Windows, Linux (various distributions), Unix
- Microsoft Office 365, Visio, MySQL, PostgreSQL, Git, GitHub, Atlassian Jira and BitBucket.

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## *Education, Training and Certifications*

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| Temple University | BSEE | 3.23 GPA |
| Delaware County Community College | ASE | 3.8 GPA |
| IPC Certified Interconnect Designer | CID | Awarded September, 2017 |
| Amateur Extra Class Radio License | KB3JPK | |
| Co-inventor | US Patent 6,140,663 October, 2000 | |
| | "Method and Apparatus for Accelerated Removal of Energy and Residual Images From Phosphor Screen Employed in Filmless Radiography" | |

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## *Organizations*

IEEE and IEEE Consultants Network
American Radio Relay League (ARRL)
Meetup: Mid Atlantic Renewable Energy Association and Lehigh Valley Tech

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## *Specific Accomplishments*

In my current position, I have been responsible for the successful completion of several hardware and firmware development projects. My responsibilities for these projects span the entire development cycle from concept through Production release and ongoing support.

**June 2012 - present:** Developed the hardware for a product used to track the location and operating characteristics of portable equipment i.e. generators, light towers and message signs. This system includes an embedded NXP IMX287 ARM processor running Linux, uSD card, DDR3 and flash memories and embedded GPS / 4G LTE cat M1 cellular service. To date, the company has sold approximately 20k units in the US and Canada.

**May 2010 - present:** Designed an embedded controller for a portable electronic message sign. This design includes a TI Sitara AM3354 ARM Processor, GPS, 4G LTE cellular service, 10/100/1000 Ethernet, capacitive touchscreen and TFT LCD display. In addition to hardware development, I was (and still am) partially responsible for developing and maintaining the proprietary protocol that the system uses to display messages on the display panel. This display panel is composed of up to 28 individual Printed Circuit Boards, each of which is an array of LEDs controlled by an AVR series MCU. I am also fully responsible for maintaining and developing the firmware in C that runs on this assembly. This system (and variants which do not include cellular service) is currently in widespread use in the US, Canada, Europe and in parts of the Middle East.

The messaging system noted above is fully compliant with the National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP) standard 1203 and is typically used as a Field Device used to direct traffic flow and provide useful or safety critical information to drivers.

**June 2016 - present:** Developed the hardware and firmware for a Multi Power Point Tracking (MPPT) Solar Charge Controller, used to charge flooded and AGM batteries. The charger is rated to handle up to 30 amperes of charge current and includes an STM32F4 series processor, LCD display, RS232 communication to the host controller and data acquisition of voltage, current and temperature data. The firmware that I developed in C also includes a proprietary Perturb and Observe (P&O) algorithm as well as an algorithm to de-sulfate flooded lead acid batteries. The system is currently pending release. Prototype testing demonstrates that this new controller boosts the power efficiency of the solar panel array by up to 30% as compared to the existing product and will provide more rapid and efficient charging of the customers batteries as well as to greatly extend battery life.

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## *Specific Accomplishments*

In past positions, I have worked for companies involved in the fields of data communications, telecommunications and nuclear power. Although my time at each of these companies was limited due to circumstances which led to their demise, I was still able to make some significant contributions to each one while gaining the experience that I currently have.

**Inrange Technologies Inc: June 1998-March 2003**
Hardware (schematic capture and PCB development) and FPGA development for systems used in 10/100 Ethernet and Fibre Channel data switching and routing networks. Inrange designed and manufactured data communications equipment and realized sales that exceeded 50,000,000 units / year during it's existence. The product lines that I worked on were used mostly by various businesses and were sold throughout the US, Canada and Europe.

**Telesciences Inc: May 1996-June 1998**
Hardware and FPGA development for systems used to collect call billing data from telephone switching systems, specifically, the Lucent 5ESS and Nortel DMS 10 and DMS 100 model switches. I was responsible for developing the hardware for the portion of the system that functioned as a magnetic tape emulator and served to collect the data from the switch and transfer it to a server for further processing. Telesciences products were used extensively throughout the US in telephone Central Offices of all sizes until the company ceased operation.

**Liberty Technologies Inc  May 1991–March 1995**.
At this company, I worked as part of an Engineering development team to develop hardware for equipment used to acquire electrical and mechanical data from Motor Operated Valves (MOVs) and check valves used in nuclear power plants and petrochemical plants. These products were used to determine the operating condition of these valves that handle various hazardous materials that include radioactive water or steam or various hazardous chemicals. My projects included designing the hardware used to generate a magnetic field across a check valve and analyzing the changes in the field to detect difference from run to run that could indicate degradation in valve operation. I was also partially responsible for developing a system that collected three phase voltage and current data from an operating motor, along with vibration and temperature data, used to evaluate the operation of the motor. In the latter days of the company, Liberty acquired the rights to a system of filmless digital radiography and I was a key participant in the creation of a laser based scanner used to recover radiographic images from a phosphor material. Although the system never gained much traction in the field of industrial radiography, the scanner was a technical success in that it could recover and display images that rivaled film in contrast and detail. This position also allowed me to participate in developing a method used to erase the image from the phosphor plate, making it available for re exposure as per the patent listed below.

**Liberty Technologies Inc: Co-inventor, US Patent 6,140,663, awarded October, 2000**
"Method and Apparatus for Accelerated Removal of Energy and Residual Images From Phosphor Screen Employed in Filmless Radiography"