

## REDLEN TECHNOLOGIES

Redlen Technologies is a leading manufacturer of high-performance CZT radiation detectors and nuclear imaging modules.

Redlen's innovative solutions have created the foundation for the development of a new generation of high-performance equipment in such diverse fields as Nuclear Cardiology, CT Scanning, Airport Baggage Scanning and Dirty Bomb Detection.

With its industry-leading CZT crystal growth technology, pioneered by a management and technical team that is deeply rooted in semiconductor and imaging technologies, Redlen is leading the revolution in high-performance, CZT-based radiation detection and imaging technology.

## MEDICAL IMAGING

Today, x-ray and gamma-ray equipment use various scintillation materials as the underlying radiation detection and imaging technology. It has been known for more than two decades that Cadmium Zinc Telluride (CZT) semiconductor detectors provide superior performance to scintillation-based radiation detection due to CZT's direct conversion capability. All major medical imaging equipment vendors have produced prototype CZT cameras but few have been commercialized due to the lack of a reliable supply of high-quality detectors at an economically viable price point.

With Redlen's proprietary CZT semiconductor production technology, the cost of CZT radiation detectors is significantly reduced and it offers superior energy resolution, detection efficiency, sensitivity, image resolution and imaging speed relative to alternative scintillation-based solutions.

## NUCLEAR IMAGING MODULE

Redlen's nuclear imaging module combines advanced CZT semiconductor detectors, a custom charge-collection ASIC and an industry-standard digital communications interface that provides best-in-class energy-resolution, detection efficiency, sensitivity and image resolution.

The imaging module provides 256-pixels within a 40 x 40 mm surface area and operates under room-temperature conditions without the need for complex and expensive cooling-system infrastructure.

## APPLICATIONS

- High-resolution medical imaging
- Organ-specific imaging systems for cardiology and mammography
- Low-dose CT scanning equipment
- Intra-operative surgical probes
- Hand-held x- and gamma-imaging cameras
- Full-body scanners

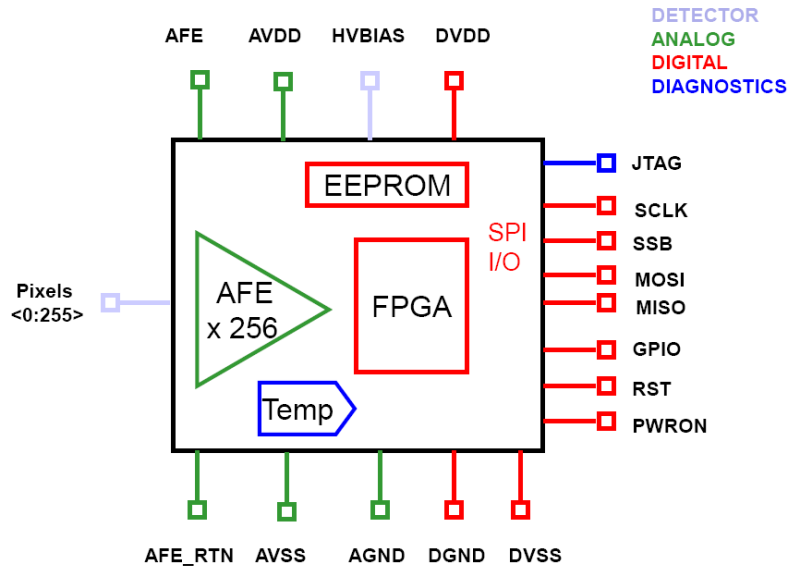
## FEATURES

- Revolutionary CZT-based imaging technology
- Off-the-shelf radiation detection and imaging solution for x and gamma radiation
- Innovative design maintains pixel-pitch across arbitrary arrays of multiple modules.
- Intelligent imaging solution with on-board ASIC , FPGA & high-speed digital communication port
- Energy resolution (typical): 6.5% with Co-57
- 256 pixels within a 40mm x 40mm area
- Industry-standard digital interface
- Room-temperature operation.
- Low-power consumption
- High-speed operation and data throughput.

## BENEFITS

- Enables development of next-generation radiation detection & medical imaging solutions
- High-performance alternative to traditional scintillation-crystal solutions
- Facilitates construction of 1-D and 2-D arrays for large image area applications
- Direct digital interface simplifies integration into existing and new digital camera control systems
- High spectral energy resolution allows better discrimination of energy signatures for dual-isotope applications
- High imaging resolution provides superior image definition and clarity
- Facilitates rapid integration into existing end-user equipment.
- Allows reduced cooling-system infrastructure and associated expense.
- Ideal for portable applications
- Innovative modular design ideal for a wide range of applications.

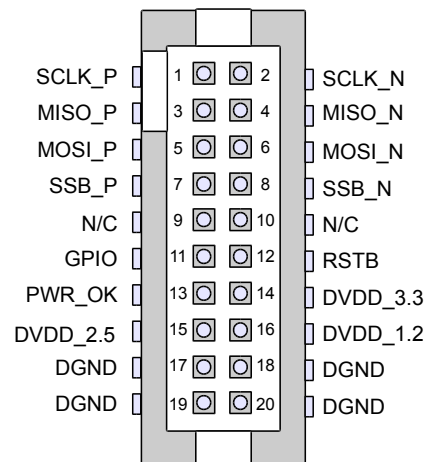
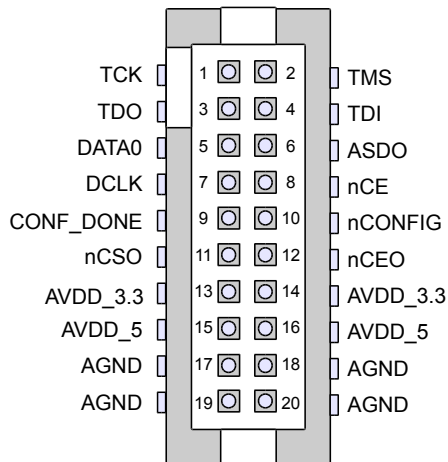
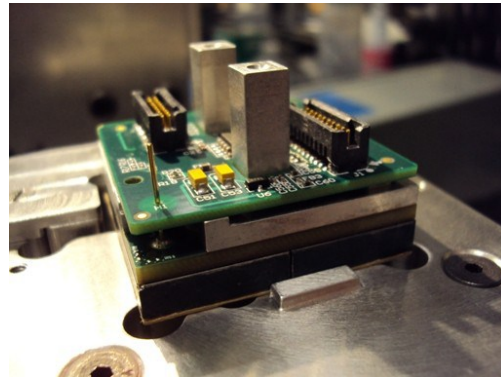
## Functional Block Diagram



## Electrical Interface

Electrical connection to the Nuclear Imaging Module is achieved via two SMT male header connectors and a single HV bias pin.

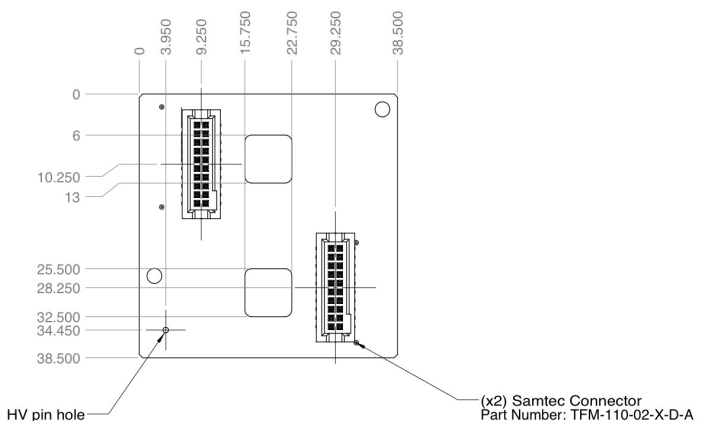
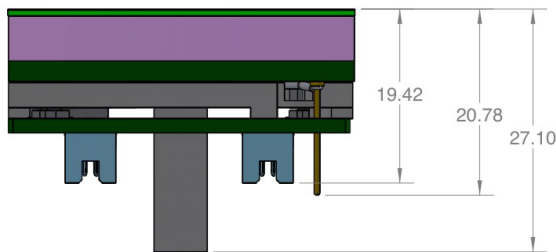
All module configuration and data output registers are accessed via an industry-standard SPI digital communications interface. Pin-out assignments for each of the module's connectors is provided below.



## Technical Specifications

### NUCLEAR IMAGING MODULE

- Part#: M1762
- Description: Nuclear Imaging Module
- Detector Material: CZT solid-state semiconductor crystal
- Detector Technology: CZT detector with integrated spectral imaging ASIC and digital interface
- Pixels per module: 256
- Pixel pitch: 2.46mm (nominal)
- Pixel size: 2.2mm x 2.2mm (nominal)
- Energy Range: 40 to 300 keV
- Energy Resolution: Module mean ER (typical): 6.5 % (under Co-57 source)
- Incident Count Rate: 60,000 cps / module (230 cps / pixel)
- Physical dimensions: 40mm x 40mm x 28mm (L x W x H nominal)
- Power requirements: Bias voltage: -400 to -600 VDC, < 1 uA max (maximum Vbias ripple = 1mV)  
Analog supply voltage: +5.0 VDC, +3.3 VDC (all +/- 5%), 40mA (typical)  
Digital supply voltage: +5.0 VDC, +2.5 VDC, +1.2 VDC (all +/- 5%), 90 mA (typ)
- Operating temperature: +20 to +30 degrees C
- Storage temperature: +5 to +50 degrees C



UNLESS OTHERWISE SPECIFIED:

TOLERANCES:	INCH	mm	FRACTIONAL:
X	±.05	±.25	1/16
XX	±.02	±.1	
XXX	±.01	±.05	ANGULAR:
XXXX	±.005	±.025	MACH: 10:1*
XXXXX	±.0005		BEND: 11°

UNITS: mm

THIRD ANGLE PROJECTION

Nuclear Imaging Module technical specifications are preliminary and subject to change.