

HPx-250 Primary Radar Acquisition



Features:

- PMC Primary Radar Acquisition Card
- Dual analogue video inputs
- Trigger input
- ACP/ARP or parallel azimuth (for use with external synchro to digital module)
- 50 MHz sample rate
- Programmable pre-trigger compensation
- 2-bit digital inputs (e.g. for IFF video input), with clock
- 12-bit A-to-D for analogue samples
- Wide range of supported signal levels
- Opto-coupled inputs for noise immunity
- Optional end-of-range input signal
- Programmable mixing of analogue and digital videos
- Loss of signal detection (video, trigger, ACP, ARP)
- High-speed DMA transfers
- Supported under Windows and Linux
- C/C++ board support package
- Optional SPx processing library for dynamic thresholding, STC, FTC, clutter suppression, plot extraction, scan conversion, compression and network distribution.
- On-board test pattern generator
- Software and function compatible with HPx-150
- Supported with RadarView and SPx Server applications
- Wide range of radars supported including:
 - Furuno
 - Kelvin Hughes
 - Terma
 - JRC
 - Koden
 - Sperry
 - Raytheon
 - Specialist Military Radars

The HPx-250 is a high-performance PMC-based radar acquisition card that captures and processes one or two analogue and up to 2 bits of digital primary radar video. The card may be used with a board support library for basic radar signal acquisition, or else with Cambridge Pixel's SPx library for complex processing, tracking or display requirements.

The HPx 250 card is an evolution of the HPx-150 and retains connector, functional and software compatibility through the board support library and SPx library. For most applications, users of the existing HPx-150 card can deploy HPx-250 with minimal changes.

Radar Capture

The HPx-250 interfaces to analogue or digital radar signals, and provides a flexible set of input options to handle a wide range of radar types. A flexible mixing capability allows a combination of analogue and digital inputs to be captured and combined.

The dual analogue inputs are captured at up to 50 MHz using high precision analogue to digital converters at 12 bits resolution. The captured video can be optionally down-sampled to reduce the data rate before transfer across the PCI bus using high-speed DMA. On the host computer, a driver and board-support library for Windows or Linux is available.

Additionally, the SPx processing library is available to provide a full complement of radar processing functions including scan conversion and target tracking.

An on-board FPGA provides data processing and control and offers capability for expanding the data processing functions for customised applications.

Input Signals

The HPx-250 accepts radar video, trigger and azimuth signals in the form of ACP/ARP or parallel data. A wide variety of signal types and input voltages are supported and customised versions of the interface are available on request. The card provides a capability to detect missing signals to provide software alarms for loss of triggers or azimuth data.

Board Support Library and SPx Processing

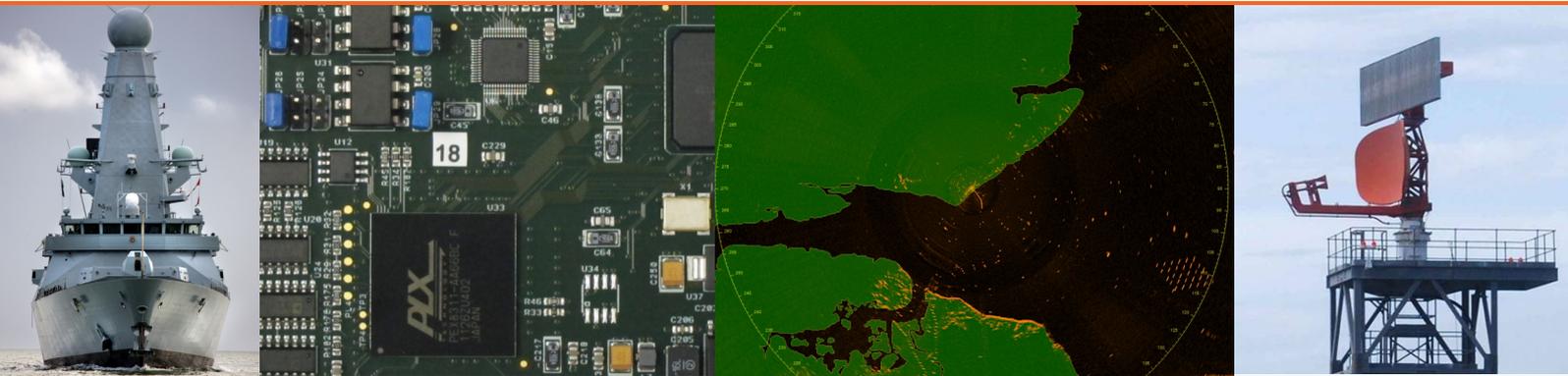
A low-level board support library is available to provide a C++ class interface to configure the board and capture video. Sample code for Windows and Linux is available.

The optional SPx processing library is an extensible toolkit of radar specific functions that can be linked together to form a processing chain. Using this library, radar video can be processed prior to network distribution, scan-conversion or tracking. Custom functions are easily incorporated into the processing chain, allowing an application to be built from a combination of SPx library functions and user-written processing modules.

SPx Distribution and Scan Conversion

The captured video may be compressed, distributed or displayed with the SPx library software. A complete server application, optionally incorporating radar recording and scenario generation, is built from just a few function calls into the SPx library. Server applications that capture, compress and distribute radar video on standard Ethernet networks are easily built. Client applications can be built with high-performance software-based scan conversion with Windows or Linux displays. ■

DATA SHEET



Architecture

| | |
|---------------------|-------------------------------|
| Form factor: | PMC (PCI Mezzanine Connector) |
| Interface: | PCI Bus, 32-bit, 33/66 MHz |
| Programming: | C/C++ software library |
| Platform: | Windows 10, Linux |
| Processor: | x86 |

Functional

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|--------------------------|---|
| Radar Video: | 2 x Analogue (configurable gain/offset in range -5V +5V), 75 Ohm termination (link selectable). 2 x Digital (RS422) with clock |
| Azimuth Data: | ACP/ARP or parallel azimuth RS422 or discrete single-ended configurable for 3 to 60 V signal input with option for opto-coupled inputs for electrical isolation. Link selectable 75 Ohm or high-R input. |
| Trigger: | RS422 or discrete single-ended configurable for 3V to 60V signal input with option for opto-coupled inputs for electrical isolation. Link selectable 75 Ohm or high-R input Programmable range zero trigger delay |
| End Range Signal: | Optional input signal to terminate sampling RS422 or discrete signal up to 60V. |
| Video Combiner: | Programmable mix of analogue and digital inputs using LUT |
| Test Generation: | Built-in test pattern generator |
| Output: | Radar returns onto PCIe bus |
| Radar Capture: | Programmable return length up to 64k Staggered PRFs supported 12-bit A-to-D. |
| Input Monitoring: | Software support for detection of video, trigger ACP and ARP signal loss. |

Connectors

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| Radar Input: | 50W MDR front panel connector |
| PCIe: | Standard PMC connectors (32 bit interface) DMA transfers up to 100 MB/sec. |

Performance

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| Sample Frequency: | 50 MHz (for higher capture rates consult factory) |
| Maximum input BW: | 25 MHz |
| Maximum ACPs: | 32k |
| PRF: | 0 to 16 kHz |
| Samples per return: | Up to 64k |
| Returns per scan: | Up to 16k |
| Data transfer rate: | >50 MB/sec |
| Scan rate: | Up to 120 rpm |

Environmental

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|---------------------|--|
| Cooling: | Forced air cooling |
| Temperature: | 0 to 55C, Extended temperature version -20C to +75C available |

Software Support

Board support library (C/C++)
SPx Development Library
RadarView Radar Visualisation Client
SPx Server (Distribution, Plot Extraction, Tracking)

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