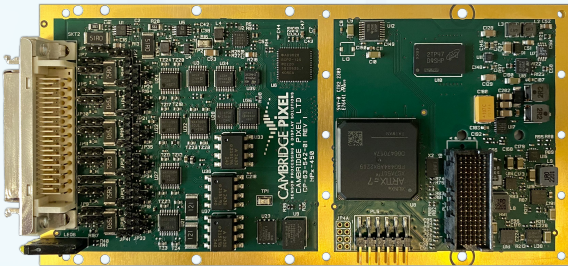


HPx-450 XMC Radar Input Card



Features:

- High performance primary radar acquisition card
- XMC form factor for hosting on SBC
- Two sets of radar inputs:
 - Analogue radar video
 - Trigger
 - ACP/ARP
- Single or dual-stream versions
- All versions support dual redundant mode
- Dual-stream versions support dual independent radars or dual sampling of one radar
- 125 MHz sample rate
- 12-bit A-to-D for analogue samples
- Wide range of input signal support:
 - Single-ended, RS422 or open-collector
 - Single-ended voltages up to 55V
 - 50 Ohm, 75 Ohm or high impedance video input
 - Opto-coupled inputs for noise immunity
- Status LEDs
- 8-bit digital inputs with clock
- Parallel azimuth
- Programmable pre-trigger compensation
- Optional end-of-range input signal
- Programmable mixing of analogue and digital videos
- Loss of signal detection
- High-speed DMA transfers
- Supported under Windows and Linux
- C/C++/.NET board support library
- On-board test pattern generator
- Fully supported by SPx software
- Wide range of radars supported
- Designed for rugged embedded solutions
- Backwards compatibility with the HPx-250 PMC Radar Input Card

The HPx-450 is an enhanced-performance XMC single or dual-stream radar input card. The card is capable of capturing and processing analogue and digital primary radar video from up to two radars. The card may be used with a board support library for basic radar signal acquisition, or else with Cambridge Pixel's SPx software for complex processing, tracking or display requirements.

The HPx-450 card supports a number of multi-channel input modes, including dual redundancy and fully independent dual-stream capture. This flexibility allows the number of radar input cards to be reduced while retaining system capability.

Radar Capture

The HPx-450 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 HPx-450 card provides a dual set of inputs, allowing up to two independent radars to be connected to the same card.

Analogue radar video is captured at up to 125 MHz using high precision analogue to digital converters at 12-bit resolution. The captured video(s) can be processed as single or dual-streams, depending upon the version of the card, and can also be optionally down-sampled to reduce the data rate before transfer across the XMC PCI Express bus.

Input Signals

The HPx-450 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, allowing the card to support many different radar models. The card provides a capability to detect missing signals in order 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, providing low-level access to the video samples. Example code is available for Windows and Linux.

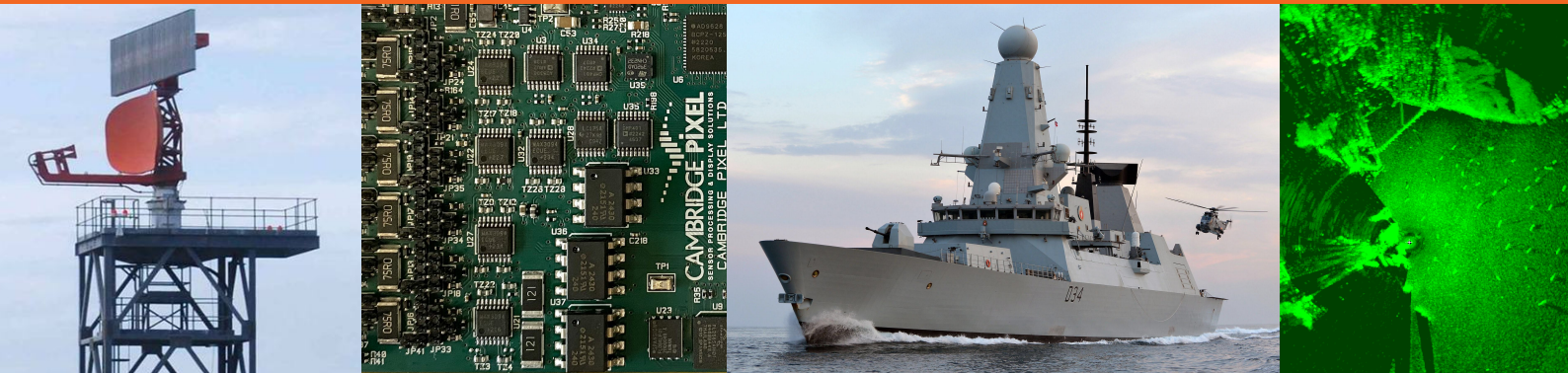
Alternatively, Cambridge Pixel's extensive SPx software is available to provide advanced processing and display of the radar video data. SPx software can be supplied in the form of a library for use in custom application code or as ready-made applications, such as SPx Server, which have built-in support for the HPx-450 card.

The SPx library provides an extensible toolkit of radar specific functions that can be linked together to form a processing chain. 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. Cambridge Pixel's ready-to-run applications offer solutions for both server-side processing and network distribution and for client-side receipt and display.

Dual-Stream Functionality

Dual-stream versions of the HPx-450 can provide two fully independent radar processing channels, which may be used in a number of ways, including:

- Dual sampling of one radar video at different rates – typically, this might be higher sampling for short ranges to get maximum close-in detail, with lower sampling across the full radar range to give maximum coverage.
- Dual independent radars – simultaneous, independent capture of two separate radars. ■



Architecture

| | |
|---------------------|-----------------------------|
| Form Factor: | XMC |
| Interface: | XMC/PCIe x4 |
| Programming: | C/C++/.NET software library |
| Platform: | Windows 10/11, Linux |

Functional

| | |
|-------------------------|---|
| Radar Video: | 2x Analogue (configurable gain/offset in range -5V to +5V), 50 Ω, 75Ω or high impedance termination (link selectable) 2x Digital (RS422) with clock |
| Azimuth Data: | 2x ACP/ARP inputs, configurable for: RS422 differential, discrete single-ended signals. Single-ended options for: opto-coupled inputs for electrical isolation, selectable 75Ω or high impedance, open collector (1kΩ pull-up to 5V) 1x parallel azimuth |
| Trigger: | 2x trigger inputs, configurable for: RS422 differential, discrete single-ended signals. Single-ended options for: opto-coupled inputs for electrical isolation, selectable 75Ω or high impedance, open collector (1kΩ pull-up to 5V) Programmable range zero trigger delay |
| Video Combiner: | Programmable mix of analogue and digital inputs using LUT |
| Test Generation: | Built-in test pattern generator |
| Output: | Radar returns onto XMC/PCIe bus |
| Radar Capture: | Single or dual-stream radar acquisition Programmable return length up to 64k Staggered PRFs supported 12-bit A-to-D |

Connectors

| | |
|---------------------|---|
| Radar Input: | 50W MDR connector for videos, trigger and ACP/ARP |
| XMC: | Standard XMC connector |

Performance

| | |
|----------------------------|--|
| Sample Frequency: | 125 MHz |
| Maximum input BW: | 60 MHz |
| PRF: | 0 to 16 kHz |
| Samples per return: | Up to 64k |
| Returns per scan: | Up to 16k |
| Data transfer rate: | Up to 500 MB/s peak (250 MB/s sustained) |
| Scan rate: | Up to 120 rpm |

Environmental

| | |
|---------------------|---|
| Cooling: | Forced air cooling |
| Temperature: | 0°C to 55°C (operational), -40°C to 85°C (storage) Extended temperature version -20°C to +70°C available |

Software Support

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

Ordering Information

| | |
|--------------------|---|
| 542-100 | HPx-450 XMC Radar Input Card (single-stream) |
| 542-110 | HPx-450 XMC Radar Input Card (dual-stream) |
| 542-100-ET1 | HPx-450 XMC Radar Input Card (single-stream) ext. temp. |
| 542-110-ET1 | HPx-450 XMC Radar Input Card (dual-stream) ext. temp. |

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