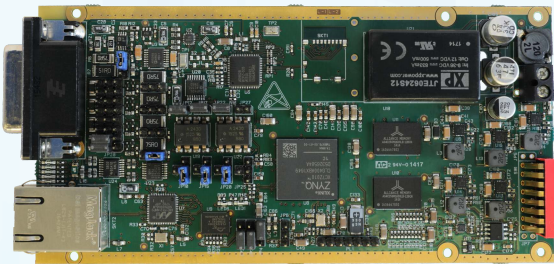


HPx-346

Analogue to Network Radar Video Data Converter

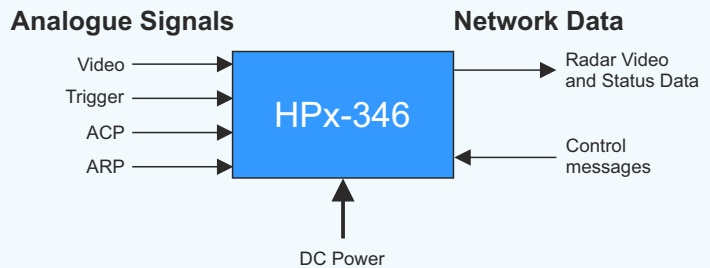


Features:

- Self-contained primary radar acquisition and network distribution card
- Small form factor (149x74mm)
- Low power combined ARM/FPGA processor
- Analogue radar inputs:
 - Analogue video
 - Trigger
 - ACP/ARP
- 100 MHz sample rate
- Easily controlled via web interface
- Supports PRFs up to 16kHz
- Supports scan rates up to 120RPM
- Wide range of input signal support:
 - Single-ended, open collector or RS422 differential
 - Single-ended voltages up to 60V
 - 50 Ohm, 75 Ohm or high impedance video input
- Status and diagnostic LEDs
- Opto-coupled inputs for noise immunity
- Programmable pre-trigger compensation
- Ship's head/end of range pulse input
- Optional digital input
- General purpose input/output lines (x2)
- Optional NMEA input for North correction
- 1000BASE-T Ethernet output
- Open network radar video formats, including ASTERIX CAT-240
- Low latency
- Lossless compression
- Radar video processing:
 - STC/FTC filtering
 - Sector blanking
 - Azimuth offset
- Open control protocol
- Heartbeat messages
- On-board test pattern generator
- Loss of signal detection
- Fully supported by SPx software, under Windows and Linux
- Wide range of radars supported including:
 - Furuno
 - Kelvin Hughes
 - Terma
 - JRC
 - Koden
 - Sperry
 - Raytheon
 - Specialist Military Radars
- Also available as integrated, box-level product (Consult Cambridge Pixel for details of options)

The HPx-346 is a small form factor, combined analogue radar input and network radar video distribution card. The card connects to the analogue video interface on a radar, digitises the data and distributes it as UDP packets over Ethernet. Offering high performance in a compact, low power and cost-effective package, the HPx-346 is designed to meet the demands of modern radar interfacing projects.

The HPx-346 card features a low-power SoC (System on Chip) to process the digitised radar video samples and packetise them ready for distribution over the card's Ethernet port. Radar returns are processed and distributed as they are captured, ensuring low latency between capture and distribution.



With the HPx-346 card, an analogue radar video output can quickly and easily be turned into an open network data stream that multiple clients can access.

Radar Capture

Building on Cambridge Pixel's extensive experience in radar interfacing, the HPx-346 uses the latest signal input design and 100 MHz sampling. The HPx-346 accepts radar video, trigger and azimuth signals in the form of ACP/ARP pulses. A wide variety of signal types and input voltages are supported, allowing the card to be connected to many different radar models.

The radar video is digitised to high resolution but the resolution of the distributed radar video may be reduced to 8, 4, 2 or 1-bit packed sample formats in order to save network bandwidth. The number of samples and the sampling range are easily and readily controllable, giving the user full control over the radar capture process.

Radar Output

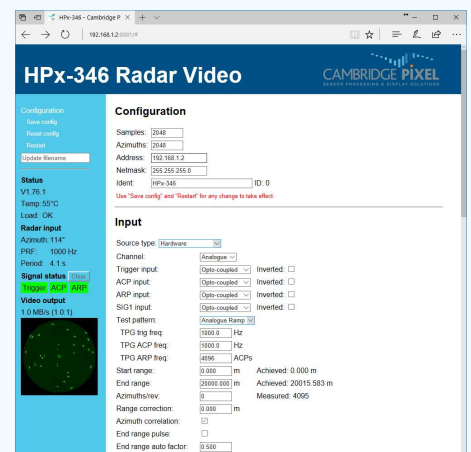
The digitised radar video samples are formed into UDP packets, automatically fragmented if required. The video samples may optionally be compressed, using lossless compression, in order to save network bandwidth without losing information. The resultant UDP packets are then output on a standard RJ45 Ethernet connector, under control of the on-board ARM processor.

The data packets are sent in an open format, which is published, so may freely be received and decoded by external code. The data format is also fully compatible with Cambridge Pixel's SPx software, meaning that it may be received, processed and displayed by a number of ready-made applications, as well as being supported by the SPx Development library.

Control

The HPx-346 is controlled by a convenient, easy-to-use, built-in web interface. Simply point a modern Internet browser on a connected host at the correct IP address and port number, and the HPx-346 presents a graphical control interface. The web interface allows many aspects of the card's operation to be configured, quickly and easily.

As with the radar video data format, the format of the control messages is published, allowing external code full control of the card. Alternatively, the SPx software library is available to provide a convenient C++ control class. ■



HPx-346 Analogue to Network Radar Video Data Converter Card Specification

CP-16-346-01, V1.2

DATA SHEET



Functional

Radar Video: Analogue (configurable gain/offset in range -5V +5V), 50 Ohm, 75 Ohm or high impedance termination (link selectable)

Azimuth Data: ACP/ARP inputs, configurable for: RS422 differential, discrete single-ended signals. Single-ended options for: opto-coupled inputs for electrical isolation, selectable 75 Ohm or high impedance, open collector (1 kOhm pull-up to 5V)

Trigger: Trigger inputs, configurable for: RS422 differential, discrete single-ended signals. Single-ended options for: opto-coupled inputs for electrical isolation, selectable 75 Ohm or high impedance, open collector (1 kOhm pull-up to 5V)

Programmable range zero trigger delay

SIG1: Configurable for: RS422 differential, discrete single-ended signals. Single-ended options for: opto-coupled inputs for electrical isolation, selectable 75 Ohm or high impedance, open collector (1 kOhm pull-up to 5V).

May be used as ship's head marker, end of range pulse or digital input mixed with analogue input.

Test Generation: Built-in test pattern generator. Generates analogue test pattern to test full signal path.

Output: Radar video data UDP packets over Ethernet

Compression: Lossless run-length encoding, plus raw 8-bit, 4-bit, 2-bit and 1-bit packed formats.

Radar Capture: Programmable return length up to 16k
Staggered PRFs supported

General Purpose IO: 2 general purpose input/output lines, each configurable as input or output

Control: Built-in web interface, open network control protocol, SPx library support

Options

The card is also available in 2 enclosure variants - the single-card radar converter or the dual-card radar converter in a 19" rack enclosure.

Front panel connectors on the 19" rack version can be customised. Contact Cambridge Pixel for specific requirements.

Architecture

Form Factor: IEEE 1386 CMC (149x74mm)

Processor: Combined ARM/FPGA SoC

Connectors

Radar Input: 15W D connector for video, trigger and ACP/ARP

Network Output: Standard RJ45 Ethernet socket

Power: Molex mini-lock or screw terminal

Performance

Sample Frequency: 100 MHz

Maximum input BW: 50 MHz

PRF: 0 to 16 kHz

Samples per return: Up to 16k

Returns per scan: Up to 16k

Data transfer rate: Up to 100 Mbytes/sec

Scan rate: Up to 120 rpm

Environmental

Power: 9-36V DC, 4.5W peak consumption, galvanically isolated from card.
19" rack version is mains powered (100-240V AC).

Cooling: Forced air or conduction

Temperature: -15°C to 55°C

Software Support

Open format data output and control messages
SPx Development Library (C++ library)
RadarView and RadarWatch Client Display Applications
SPx Server (Plot Extraction, Tracking)

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