CAMBRIDGE PIXEL
SENSOR PROCESSING & DISPLAY SOLUTIONS

DATA SHEET

HPx-346

Analogue to Network Radar Video Data Converter

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

Features:

- Self-contained primary radar acquisition and network distribution unit
- 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 (dual network on HPx-346D variant)
- Open network radar video formats, including ASTERIX CAT-240
- Low latency
- Lossless compression
- Radar video processing:
  - STC/FTC filtering
  - Dynamic thresholding
  - 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 card-level product for OEM

With the HPx-346 unit, 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 unit 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.
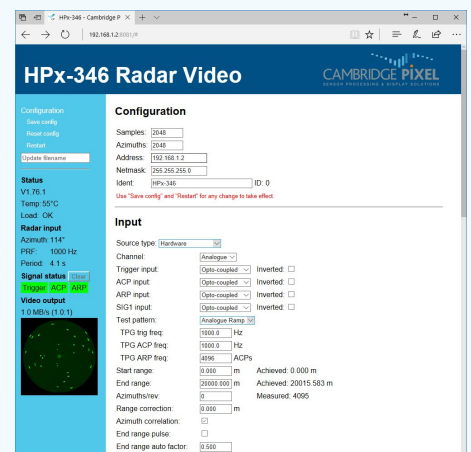
Radar Output

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 unit's operation to be configured, quickly and easily.
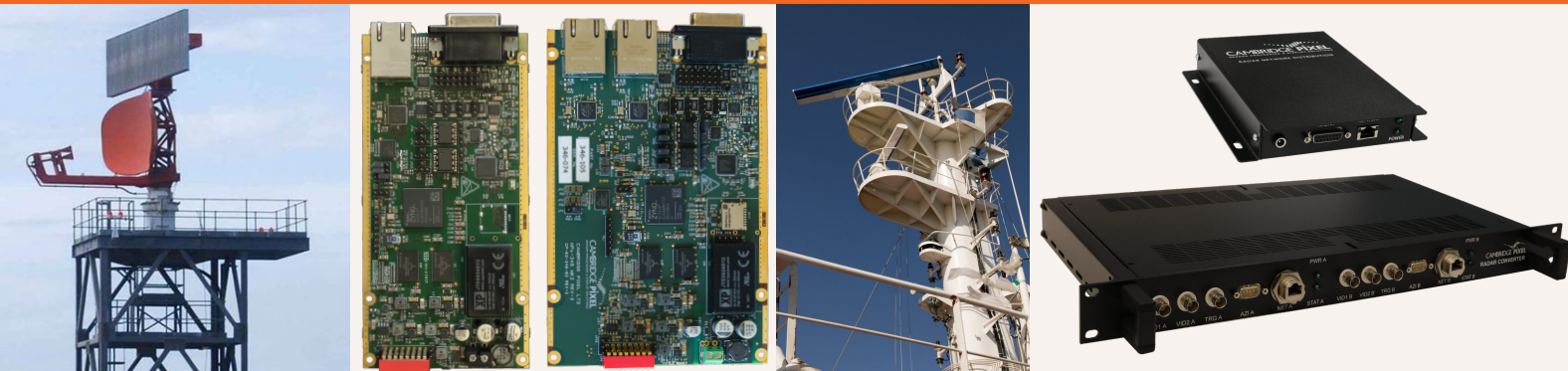
As with the radar video data format, the format of the control messages is published, allowing external code full control of the unit. Alternatively, the SPx software library is available to provide a convenient C++ control class.

cambridgepixel.com

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 HPx-346 is also available in a dual variant as a 19" rack enclosure, and as a card for OEM applications. Front panel connectors on the 19" rack version can be customised. Contact Cambridge Pixel for specific requirements.

Connectors

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

Network Output: Standard RJ45 Ethernet socket (2 sockets on HPx-346D variant).

Power: 5.5mm circular connector. Locking Lemo connector as option.

Performance

Sample Frequency:	100 MHz.	**Returns per scan:**	Up to 16k.
Maximum input BW:	50 MHz.	**Data transfer rate:**	Up to 100 Mbytes/sec.
PRF:	0 to 16 kHz.	**Scan rate:**	Up to 120 rpm.
Samples per return:	Up to 16k.		

Environmental

Dimensions: 195 x 160 x 32mm.

Mass: 900g.

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

Cooling: Forced air or conduction.

Temperature: -15°C to +55°C (operational), -40°C to +85° (storage)

Compliance: Environmental: EN60945 (protected).
EMC: EN60945, EN55032, EN61000, EN55024.
RoHS compliant.

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).

Options

The HPx-346 is also available in a dual card variant as a 19" rack enclosure, and as a card for OEM applications. Front panel connectors on the 19" rack version can be customised. Contact Cambridge Pixel for specific requirements.

CAMBRIDGE PIXEL
SENSOR PROCESSING & DISPLAY SOLUTIONS

cambridgepixel.com