

# PRO-8220

IF/Video/Baseband Remote Spectrum Display



Data Sheet

intelligentRF solutions

## FEATURES

- Remote IF/Video display of up to eight separate receivers
- 100 MHz maximum real-time signal bandwidth
- High sensitivity
- Dual 12-bit  $213\frac{1}{3}$  MS/s ADC
- Integrated anti-aliasing IF filters
- Spectrum analyzer, spectrogram, and oscilloscope displays
- Optional dual channel capability
- Optional digital I/Q outputs



## DESCRIPTION

### Signal Display

The PRO-8220 is a member of the Prospector Series of DSP-based, Signal Processing Products. Built on a high-performance, FPGA-based hardware platform, the Prospector Remote Spectrum Display offers the performance benefits of an FFT-based real time spectrum analyzer, with the ability to incorporate software features and upgrades available in the future.

The PRO-8220 is designed to provide local or remote spectral display and analysis of up to eight separate receiver outputs. As an enhanced replacement for the Model 692R line of Remote IF Pan displays, the PRO-8220 can accept IF signal inputs as high as 200 MHz. Additionally, the PRO-8220 provides the capability to process up to 100 MHz of baseband or video signals, such as FDM or other post-detection signals, making it also a replacement for the Model 692B and 692B/DT products.

The PRO-8220 is intended for direct interface with HF, VHF/UHF and microwave receivers, and it includes preamplifiers to extend the sensitivity beyond that of the A/D converter alone. The overall signal range extends from +20 dBm to below -90 dBm. Anti-aliasing filters ensure that spurious signal outputs from

receivers, or harmonics generated from external preamplifiers, do not appear as signals at the desired IF frequency.

As many as eight input signals can be multiplexed, or effectively scanned, by the PRO-8220, to provide spectrum monitoring capability. In cases where high POI is critical, the PRO-8220 provides an optional dual channel capability, where one channel can be dedicated to monitor a given input in real-time, and the other channel is assigned to multiplex the remaining inputs. Alternatively, the two channels can be assigned to provide simultaneous monitoring of two of the eight inputs. Input scan rates are programmable by the user.

As a remote spectrum display, the PRO-8220 produces spectral data frames for each of the active inputs. The standard spectrum size is 512 frequency points per frame, though this can be reduced down to as few as 64 points if desired. All eight input traces may be viewed simultaneously. The frequency span of the trace is selectable by the user, and the maximum spectrum width is dependent upon center frequency with a maximum BW of 100 MHz. Additionally, an optional Zoom Trace feature may be activated, where a selected portion of the displayed spectrum is further processed for fine resolution. The Zoom Trace width may be reduced to view a section as narrow as 4 kHz.

While the PRO-8220 supports the conventional, spectrum analyzer style, amplitude-versus-frequency display, it also optionally provides Spectrogram mode (“waterfall” or falling raster), which provides enhanced visibility for viewing short-time spectral events. Additionally, the optional digital oscilloscope mode provides the ability to view and trigger on video signals for analysis. The user may select any combination of the display modes to display any combination of IF, video, or baseband

This equipment does not contain provisions for the installation of an intelligence database (i.e. threat signal parametric data).

This equipment may be subject to U.S. Government export controls. Consult factory for details.

## PRO-8220

inputs from the available receivers.

Optional frame grab and “Video Clip” capabilities allow the user to save individual frames, or real-time successive frame videos, along with time stamping for documenting spectral events. As an option, snapshot mode capabilities permit limited storage of raw digitized IF data for off-line analysis.

Standard display features such as spectrum averaging, peak hold, variable rate decay, variable display scaling, and frequency/amplitude/time markers provide the necessary tools for measuring and evaluating spectral events.

Digital spectral display generation in the PRO-8220 is made possible by the high-performance FPGA-based FFT-engine, which calculates spectral data in real time. Raw data samples from the A/D Converters are processed, down-converted to complex baseband by the integral digital down converters (digital tuner), filtered, decimated and then made available to the FFT process. Selectable FFT-windowing is provided for optimization of signal resolution and noise properties for the particular application (all FFT’s are 2048 point).

### Post-Filtered I/Q

As a future option, the PRO-8220 can be configured with digital I/Q outputs (LVDS or fiber) to support digital recording or real-time processing/demodulation. The user selects the portion of the displayed signal spectrum. This range of spectrum is then converted to complex baseband using the internal digital tuner, digitally filtered, decimated, and made available to the digital output.

### Applications

The PRO-8220 is designed for use in a variety of system

applications in order to provide flexibility of integration into **intelligentRFsolutions** systems, as well as customer-defined systems.

### Local Mode

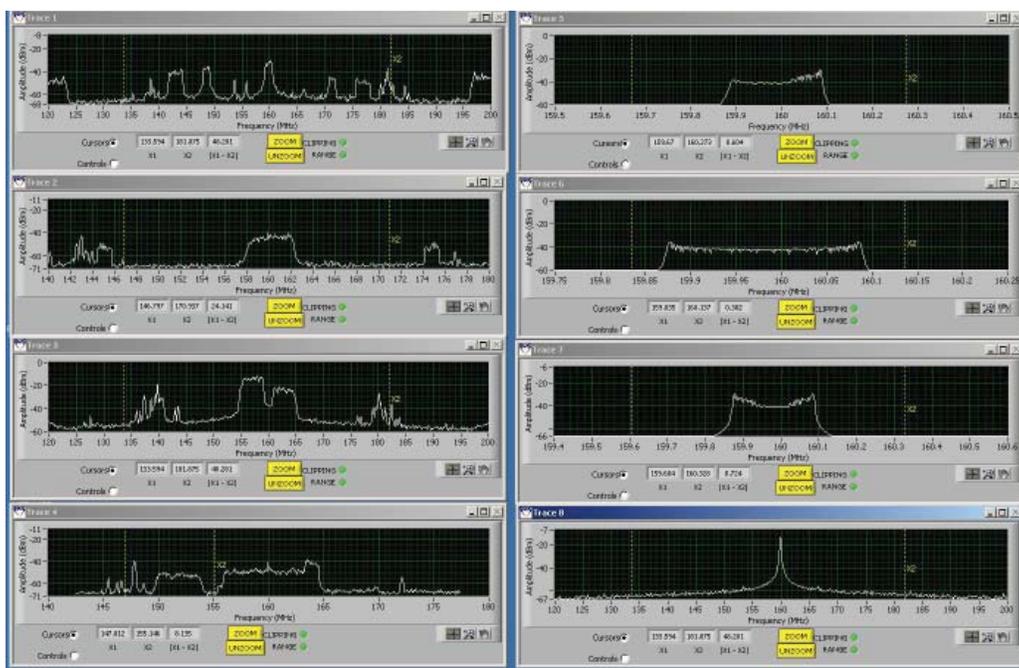
In local operating mode, the PRO-8220 is used standalone, with only an external keyboard, mouse and monitor. A single operator has control and display of eight input signals. Optional dual channel operation allows one channel to be constantly monitored while the others are scanned. Spectral data frames processed by the unit are displayed on the local monitor under control of the GUI resident on the integrated single board computer.

### Remote Mode

In a Remote mode configuration, the PRO-8220 operates as a remote device on the LAN, and is controlled by a host-computer operating as the system controller. Commands are sent from the host controller to the remoted PRO-8220 to define the configuration of the eight signal inputs as well as the desired outputs. Spectral data frames generated from the various input signals by the PRO-8220 are sent over Ethernet to the host controller, where they are appropriately displayed. The host controller may show all the traces on a single display, or may act as a server to direct spectral data frames to different clients, depending upon the particular system configuration.

### Server Mode

Offered as an option, Server Mode allows the PRO-8220 to serve a number of clients connected to the network. Each client can command and request displays from the particular inputs to which it has been assigned. Control hierarchy is programmable under control of the administrator client.



GUI eight trace display

# PRO-8220 SPECIFICATIONS

**Inputs** Eight, SMA (50 Ω)

**Channels** Single Multiplexed Dual(Optional)

**Input scanning** Up to eight inputs per channel

**ADC** 12-bit at 213½ MS/s

**Usable input signal level** -90 dBm to +20 dBm

**Maximum input with out damage** +23 dBm

**Frequency range** Baseband: DC to 95.5 MHz, IF: 455 kHz to 160 MHz

**Frequency span** 100 MHz max., adjustable down to 500 kHz. Dependent upon tune frequency

### Spectral Display

**FFT points** 2048

**Windowing** Rectangular, Blackman-Harris, Hamming, Hann, Bartlett, Gaussian, Nuttall, Kaiser, Chebychev

**Display modes** Conventional spectrum analyzer (amplitude vs frequency), Optional Spectrogram, Oscilloscope (amplitude vs. time)

**SFDR** >70 dB

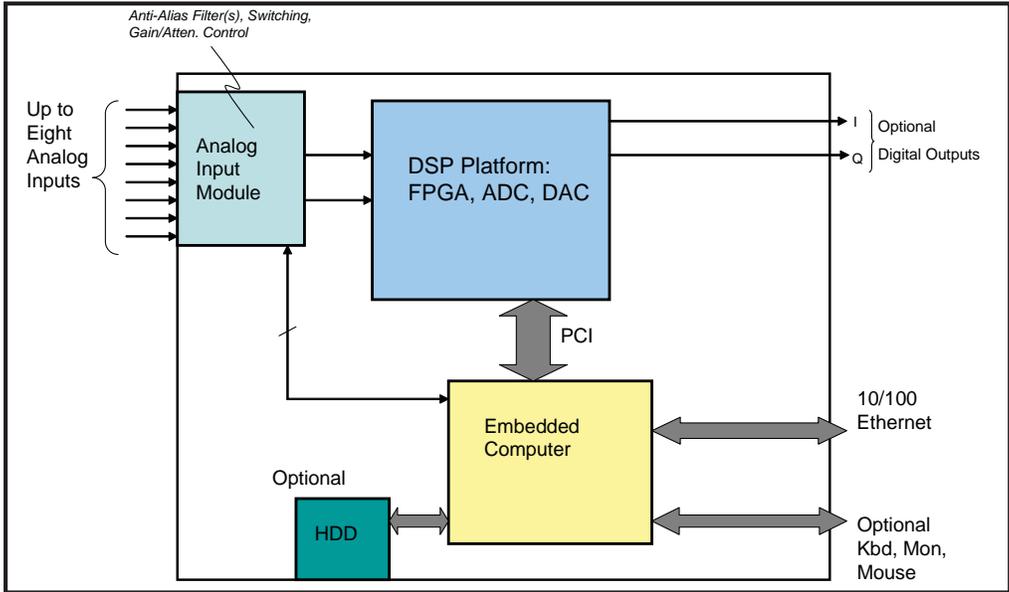
**Frame rate** >200 frames/sec.; (composite)

**Outputs** Spectral data is output via Ethernet port to remote controller. In stand alone mode, spectral data is output directly to monitor.

**Power** 100-240 Vac, 47-63 Hz, ≤72 watts

**Size** 1.75” H x 20.16” D x 17” W  
4.38 cm H x 51.2 cm D x 43.18 cm W  
Mounts in Standard 19” rack  
Note: D dimension is panel to panel and does not include connectors.

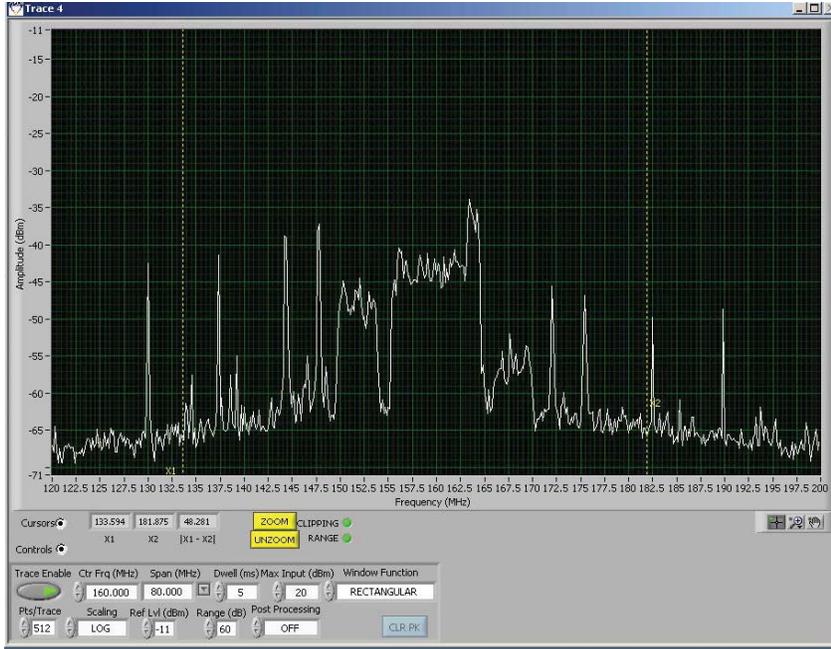
**Weight** 12.2 lbs (5.5 kg)



**PRO-8220 FUNCTIONAL DIAGRAM**



PRO-8220 Rear panel



GUI single trace display with control section showing

**Configuration Information**

PRO-8220-01 Remote 160 MHz Spectrum Mode support, 8 Inputs, Single Channel Multiplexed operation, 100 MHz maximum Bandwidth

**OPTIONS**

- 160 MHz IF Input Capability
- Dual Channel Mode
- Zoom Mode
- Local Mode Support
- Server Mode Support
- Enhanced Display Modes(oscilloscope, spectrogram)
- I/Q Digital Output

**WARRANTY**

All intelligentRFsolutions equipment is warranted for one year, except for damage caused by accident or misuse, provided the equipment is returned for repair to the plant in Sparks, Maryland U.S.A

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