

PM30X high performance PC based Pulser Receiver



- Unbeatable performance in a PC format
- 250Mps, 14 bit dual ADC's
- Single and multi-channel capability with remote Pulser Preamps and Multiplexers
- High power pulser - exceptional S/N ratio
- Linear and logarithmic amplifiers in the same board

The PM30X is the culmination of over 25 years experience at USL in the design and manufacture of PC-based Pulser Receivers. Our designers have one thing in mind - to achieve top class performance with the convenience and flexibility of a PC board package.

With the exceptionally low noise characteristics, high gain and signal/noise ratio and wide dynamic range the PM30 can be applied in the most demanding situations. In production environments, the noise immunity and high PRF makes it ideally suited to industrial testing systems.

The logarithmic detector in the PM30 provides an exceptionally wide instantaneous dynamic range at a single gain setting - ideal for inspection of aerospace composites and capture of both high level and low level signals in a single scan.

The board incorporates sophisticated pulse control and amplifier filtering, so that the characteristics can be matched to suit virtually any probe.

The PM30X is used in conjunction with a small (125 x 80 x 58mm) remote Pulser Preamplifier (PPA15) or the USL Multiplexer (MUX8), providing up to 32 channels in pulse echo and through transmission operation. Connection to the remote units - up to 300 metres distant - is made with a custom umbilical cable. This gives exceptional noise immunity, whilst allowing full remote software control of all the parameters.

The settings in the main Pulser Receiver can be switched at full PRF rates, up to 20kHz. This is ideal for situations where multi channel systems use different probe frequencies or different gains, for example.

The PM30X occupies a single full length PCIe slot.

PM30X Pulser Receiver Specification

FORMAT and CONTROL	
Format	Single PCI / PCIe expansion board.
Control	Via I ² C, USB or PCIe bus
INPUTS/OUTPUTS	
PPA/MUX	“D” type connector on end bracket for connection to PPA15 or USL Multiplexer
Outputs	5 outputs selectable as RF, rectified, log, secondary amplifier or external input signal.
Trigger	Internal or external
Data	All settings can be read back
PULSER	
Pulse voltage	0-400 volts into 50 ohms
Pulse rise time	<10 nanosecs (10%-90%)
Pulse fall time	<10 nanosecs (10-90%)
Pulse shape	Square wave (spike pulse at lowest setting of pulse width)
Pulse width	10-250 nanosecs, measured at 50% amplitude points
Pulse control	Width software controlled in 256 steps Voltage software controlled in 1V steps
PRF	20kHz maximum
PREAMPLIFIER	
Bandwidth	<0.5 - 45MHz (-3dB)
Gain / attenuation	-20 to +20dB in 10 dB steps
Mode	Pitch catch and pulse echo
Damping	33, 50, 100, 200 ohms
RECEIVER	
Gain range	100dB (linear), 20dB (log)
Accuracy	+/- 0.2dB
Gain adjustment	Main amplifier (linear amp) 0.1dB steps Log detector (log amp) 0, 10, 20dB plus 0 - 10dB in 0.1dB steps
Bandwidth	Linear 0.5-30MHz (-3dB), Log 0.5-15MHz (-3dB)
Dynamic range	Instantaneous dynamic range of 90dB+ in log mode
RF Filters, band pass	Selectable pre-rectification / pre-detection filters having adjustable bandwidth and centre frequency
Filter bandwidth 10 ranges	0.5-2MHz, 1-4MHz, 2-8MHz, 4-15MHz, 8-32MHz Selectable wide and narrow band in all ranges
Frequency offset	Centre frequency of filter can be adjusted within each bandwidth range in 60 discrete steps.
Filters, low pass	4 selectable pre-rectifier/detection filters 15, 10, 5, 3.5MHz (-3dB)
Rectifier	Full wave, +ve half wave, -ve half wave
Filters - post rect.	Selectable - 240 settings (Slope range 5 to 255)

RECEIVER	
Filter frequency	32, 10, 3, 1, 0.8MHz
Log filters	Post detection filters - 6 ranges 500kHz to 15MHz
O/P impedance	50 ohms
Output voltage	+/- 4 volts (unterminated)
O/P sensitivity	Log output 1volt/20dB
Trigger	Internal or external External trigger TTL, active low, minimum low period 10usecs, minimum high period 40usecs
TVG/DAC	
Min/Max period	100 nanosecs to 10 milliseconds
Clockrate	10MHz to 100kHz (7 options)
No of points	Selectable, 1 to 1000
Range	64, 128, 256, 1024 microsecs
Gain range	60dB in 0.1dB steps
Slope	Recommended maximum 20dB/microsec. (60dB/100 nanosecs is possible)
TVG/DAC control	On/Off Trigger from PRF or interface echo, +ve or -ve Trigger threshold programmable I/F trigger blanking, 0—6.55msecs in 100nsec steps TVG/DAC delay trigger
A-D CONVERTER	
Dual ADC's	Each 14 bit, 250MSPS
On board memory	16K per ADC (32K option)
SECONDARY AMPLIFIER	
Function	Separate programmable output, for example used for backwall monitoring.
Gain range	0 - 45dB in 0.2dB steps
Filter	10MHz or wideband
SELF CHECK	
Function	The Pulser Preamplifier can be programmed to inject a sine wave, for the purpose of automated self testing or calibration.
Frequency range	400kHz to 20MHz in 5kHz steps
Input amplitude	22µvolt P-P to 1volt P-P
MULTIPLEXING	
Capability	32 physical channels in modules of 8. Physical channels are programmable on a timeslot basis (One physical channel can be programmed with different settings in each timeslot at 20kHz).
SOFTWARE	
OEM	Software Development Kit (SDK) and Application Programming Interface (API) for OEM customers.

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