

Users Manual

Model ND0103-P

3 Pulse Channel Distribution Amplifier



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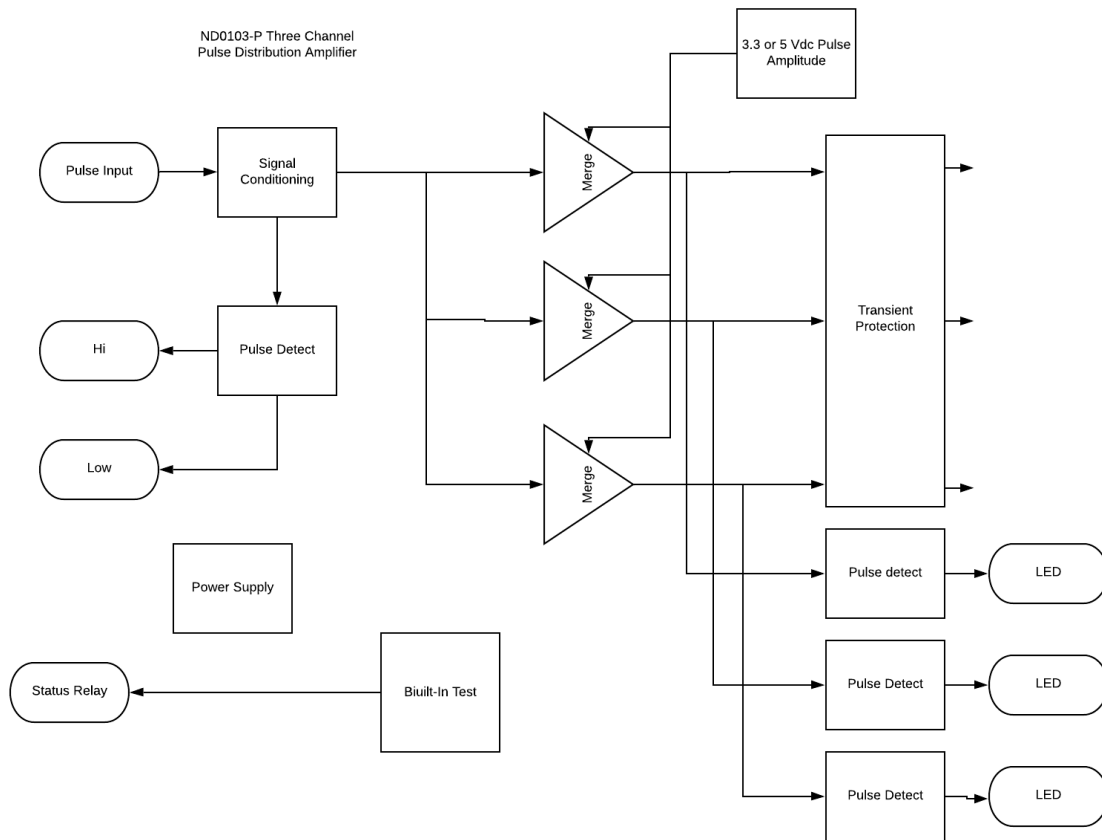
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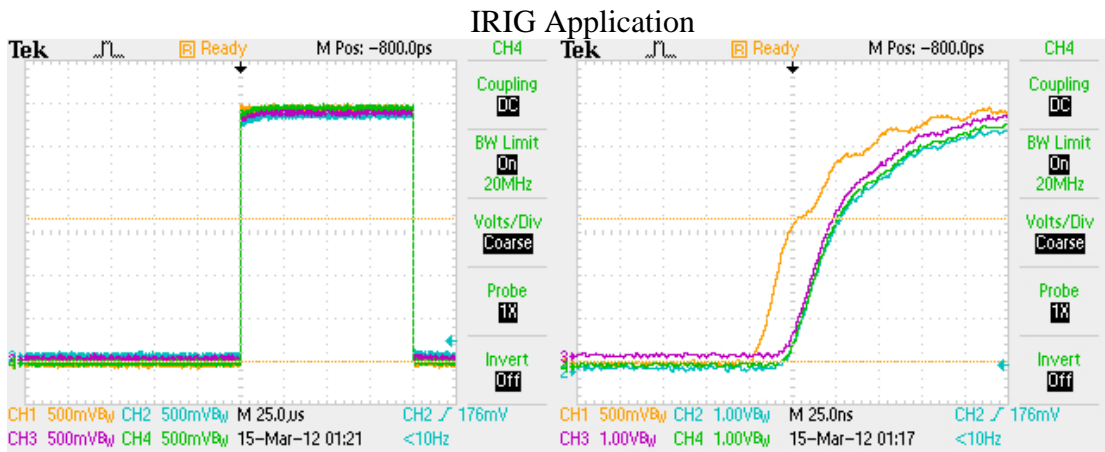
1.0 Summary



The ND0103-P is a Three Channel Pulse Distribution amplifier. The incoming drive signal is conditioned to restore levels and edges and then buffered through amplifiers capable of driving 50 ohms at 3,3 or 5 Vdc levels. The 3.3 or 5 Vdc levels is a factory setting . All outputs are fault and transient protected capable of sustaining a continuous fault. A wide bandwidth distribution amplifier. When used with a reference signal, the user will have available 3 channels of the reference to be routed as required. All inputs and outputs are electrostatic discharge protected. Any output can be shorted indefinitely with no permanent damage to the unit. The product is in a modular ~4x6x1.7 mount chassis with 0.5 flanges on each side for mounting. There is also a chassis with bottom mounting with out flanges –allowing a smaller overall configuration.

The unit is optimized for pulse operation with an amplitude of 3 volts p-p into 50 ohms or 6 volts p-p for impedances of 1k or larger. A popular application for the amplifier is for the pps signal. Skewing between channels is typically less than 5ns- rise and fall times are less than 25 ns.

All inputs and outputs are electrostatic discharge protected. Any output can be shorted indefinitely with no permanent damage to the unit. The product is in a modular ~4x6x1.7 mount chassis with 0.5 flanges on each side for mounting.



PPS Signal Distribution

2.0 Controls and Indicators

2.1 Channel Status

There are three LEDs on the front panel. Under normal conditions the LED is green. If a channel is locally faulted the indicator will turn red. This is not considered a system fault and the status relay will remain closed. The time constant on this fault indicator is a few seconds to be able to handle extremely low duty cycles such as the PPS signal.

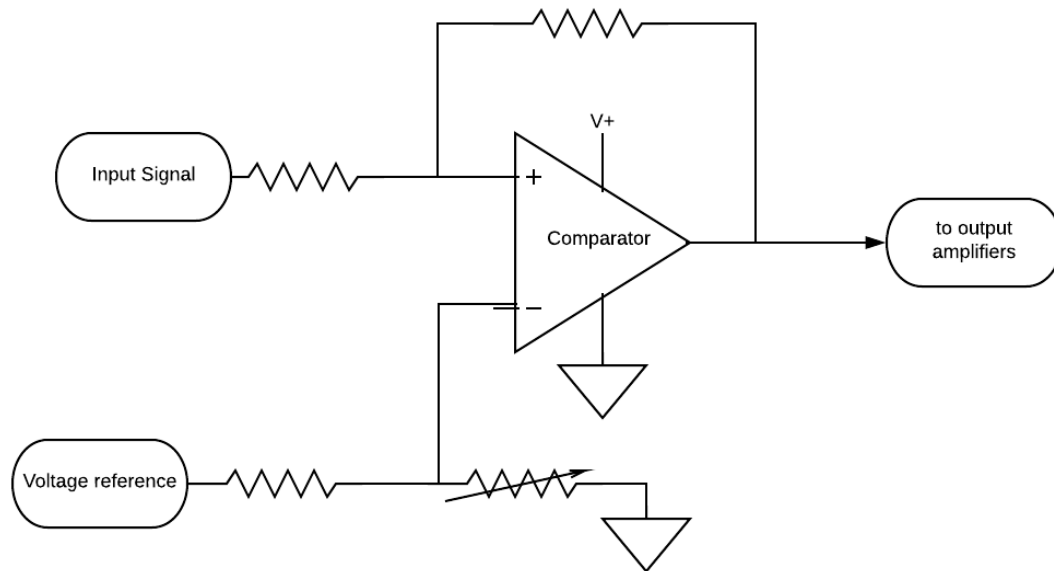
2.2 Alert

An alert condition causes an LED on the front panel to illuminate. This is normally green. If an ALERT condition exists, the LED will flash red and the

status relay will be opened. An alert condition occurs if one of the power supplies in the unit becomes out of tolerance.

2.3 HI, LOW

The unit has an internal set point for a logic level one~1.5 Volts. The input impedance to the unit is 1000 ohms. Other voltage thresholds can be set at the factory for unique pulse amplitudes. The HI and low indicators measure signal amplitude and provide a gross indication of amplitude. The front end process is completely fault and transient protected.





3.0 Rear Panel

3.1 Status

The status signal is available from lower two pins on the power connector. This connects to the alert relay and the relay contacts are rated at 20VDC or AC 0.1 amps. The normal operating mode is relay contacts closed.

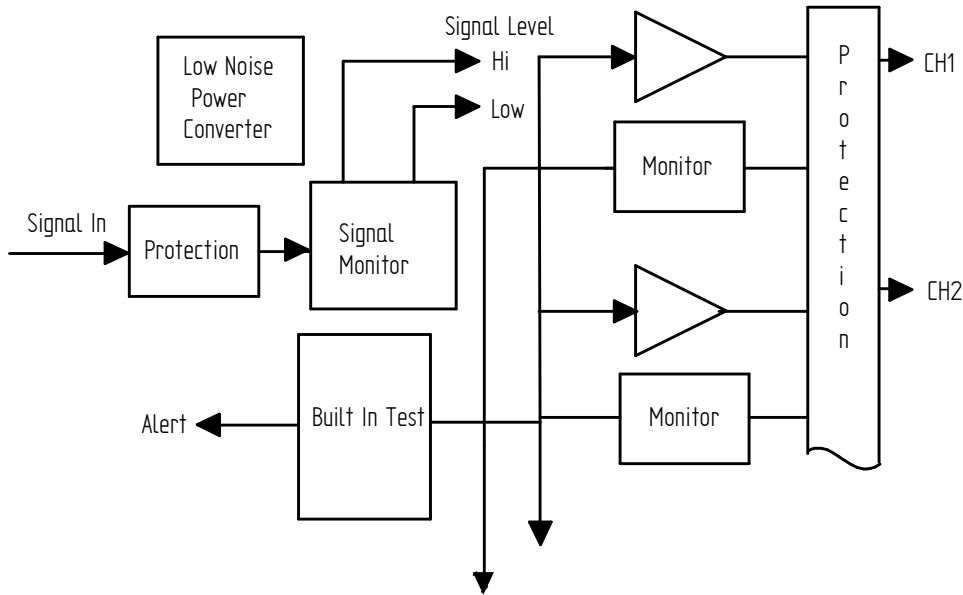
3.2 Sig In

Signal input. Standard impedance is 1000 ohms. Max input is 5 Vdc limited to a maximum current of 10 ma. The unit will respond to a pulse amplitude greater than 1.5 Volt. Pulse width must be greater than 100 ns Input is electrostatic discharge protected.

3.3 Power connector

This four pin connector provides power. Depending on the options, the DC ranges as purchased. The top two pins are DC input and the bottom two pins are connected to the alert relay and are floating. The normal operating mode is the relay closed. 20Vdc/Vac 0.1 amps relay contacts.

4.0 Functional Description



4.3 Outputs

Each output is fault and electrostatic discharge protected. Each output is independent, and any output can be faulted for an indefinite period of time with no permanent damage. Each output is connected to a monitor circuit that detects a local fault on the output. The fault status is indicated on the front panel. The fault status and the protection on each output facilitate installation to help prevent damage. A channel fault will not activate an “ALERT” state and the status relay will not be opened.

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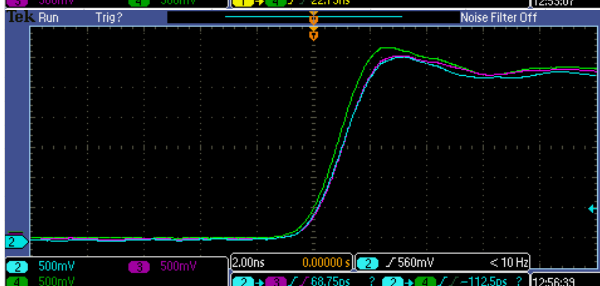
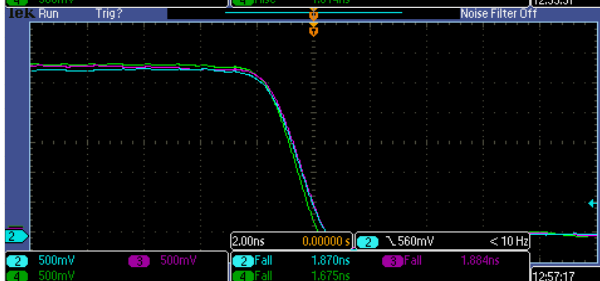
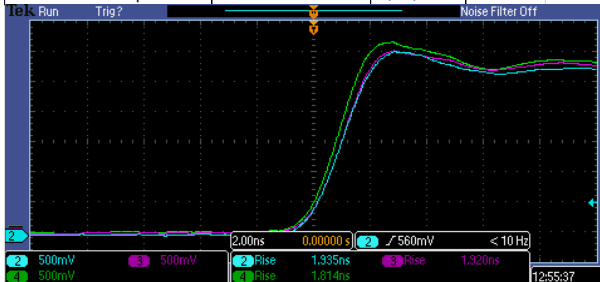
Date	8/26/2020	Model	ND0103-PPS
Tech	MM	Serial	35201482

Output amplitude		Channel	amplitude @ 50Ω	Rise time	Fall time
Hi Limit	3.1	1	2.78 V	1.935 ns	1.870 ns
Measurement Hi @ 50Ω	2.80	2	2.80 V	1.920 ns	1.884 ns
Measurement Lo @ 50Ω	2.78	3	2.80 V	1.814 ns	1.675 ns
Low limit	2.5				

Minimum Drive 1.96

Channel	Propigation Delay	Skew from Ch 1
1	22.92 nS	-----
2	22.95 nS	68.75 pS
3	22.79 ns	-112.5pS

Equipment	Model	Cal Exp Date
Oscilloscope	Tektronics 2024B	8/21/2021



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4.4 Built in Test

There are number of power supplies in the design to meet special needs and noise reduction. Each supply is monitored, and a power failure will open the status relay. The relay is a solid state optically coupled relay. The contacts are floating and can withstand up to 20 vdc and 100 ma.

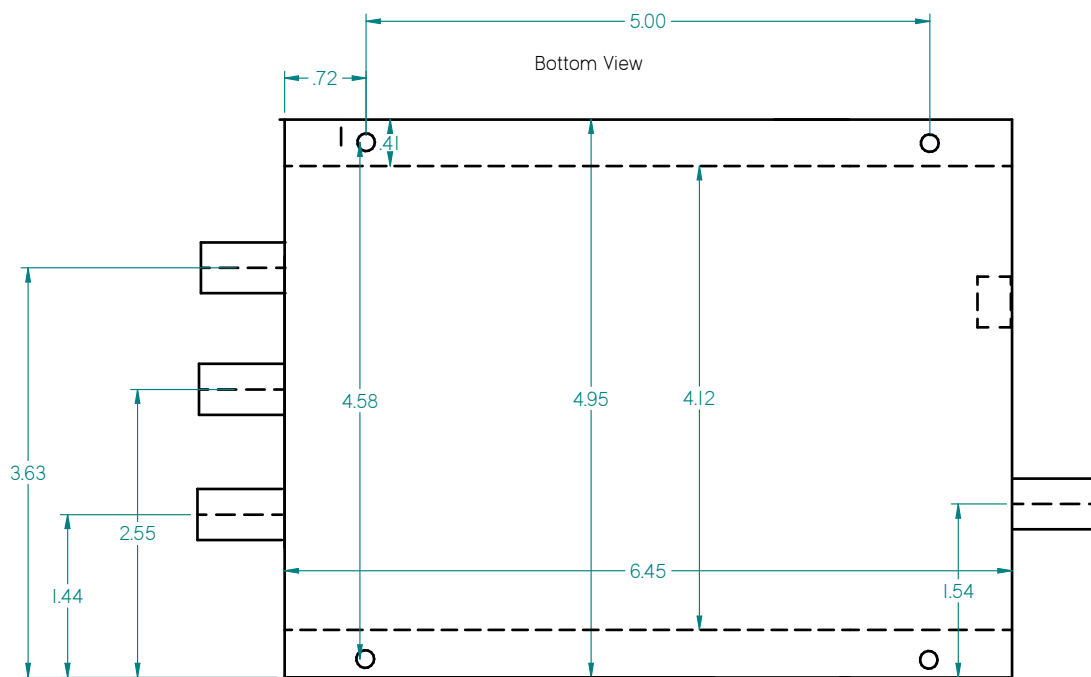
4.5 Power Supplies

The standard unit is designed to operate from a nominal 12 vdc. However the unit can be operated from 110 vac to 250vac and/or -60 to +60 VDC. A power adapter is available that provides 12 VDC from standard AC power. The unit can also be provided to operate from -60 to +60 vdc in three ranges. Contact the factory to define this requirement.

5.0 Reliability

The key to excellent reliability is component derating. The power supply is operated at approximately 40% of maximum capability. All passive elements are operated at less than 50% of maximum rating. A standard to develop a figure of merit of anticipated reliability is MIL-STD-217F. This standard combines the expected failure rate for all of the components in the unit based upon the expected operating environment. The result of the calculation is the MTBF (Mean Time Between Failure) a calculation of the MTBF for this product resulted in an MTBF of 447,000 hours.

6.0 Mechanical



7.0 Technical Specification

Input	Logic 1 > 1.5 Volts, Pulse width > 100 ns, Z _{in} = 1000 Ohm
Channel status, System	3 channel status, system status
Rear panel connectors	3 output, Signal in and system status BNC, AC power in
HI, Low indicators	Hi ≈ 1.5Vrms, Low ≈ .3Vrms- @50 Ohms
Harmonics	< -30db
Impedance	1000 Ohm- Hi Z Ohm optional
DC input	+12 vdc Nominal (9 to 15) options available to operate from -60 to +60 vdc
Alert	20Vdc/Vac 0.5 amp relay contacts- relay closed for normal condition
Calculated MTBF	447,000 hours
Mating connector	TE Connectivity- 106527-4
Output	Rise and fall time < 5 ns, drive > 50 Ohm
Signal level	1.2Vrms 50 Ohms, 6 v p-p at impedance Z>1Kohm

Environmental and Mechanical

Operating temperature	0 to 50C non-condensing
Storage temperature	-40 to 70C
Height	~1.7 inches
Width	~4 inches-0.5 mounting flanges or a bottom mounting configuration
Depth	6 inches
Weight	<2 lbs



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