

Users manual	ND0100
Revision #:	H
Date:	0717

Users Manual

Model ND0100

10 Channel Distribution Amplifier



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1.0 Summary

The ND0100 is a 10 Channel wide bandwidth distribution amplifier. The ND0100 was designed primarily as a 10 MHz frequency reference amplifier. The unit can be configured for applications from 100kHz to 15 MHz. The amplifier is a good general purpose product that can be used in many applications. When used with a reference signal, the user will have available 10 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 1 ru rack mount chassis. Unit is available with discrete status indicators or an OLED 4x 20 display that also has a serial port for remote status (ND2310-R)

2.0 Controls and Indicators

2.1 Channel Status

There are ten 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 unit is also available with a 4x20 line OLED display that replaces the discrete indicators on the front panel. There is also a serial port available to report channel status and self-test status.

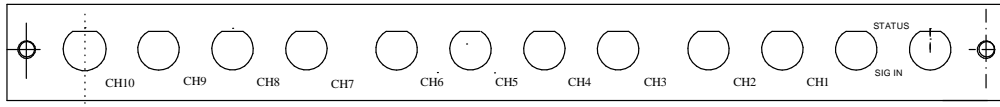
2.2 Alert

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. If the digital display is ordered the alert status will be presented. The alert status will also be reported on the serial bus.

2.3 HI, LOW

These two LED's give an indication as to whether the input signal falls within the optimum operating range of the amplifier. The LOW LED will normally be green and will turn red if the input signal falls below $\approx 0.3V_{rms}$. The HI LED is normally green but will turn red if the input signal exceeds $\approx 1.3 V_{rms}$. The Hi Low status is also indicated on the digital display option.

3.0 Rear Panel



3.1 Channel Outputs - BNC

There are 10 outputs on the left hand side of the rear panel. They are labeled 1 through 10.

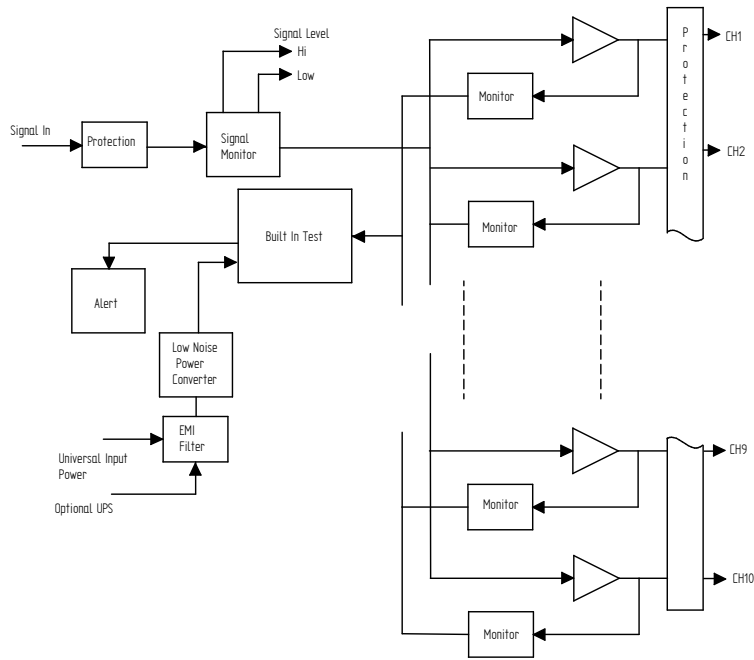
3.2 Status

The status signal is available from the BNC that is on the right hand side edge of the rear panel. This connects to the alert relay and the relay contacts are rated at 20VDC or AC 0.5 amps. The normal operating mode is relay contacts closed.

3.3 Sig In

Signal input. Standard impedance is 50 ohms. Maximum signal input is 1.3 Vrms

4.0 Functional Description

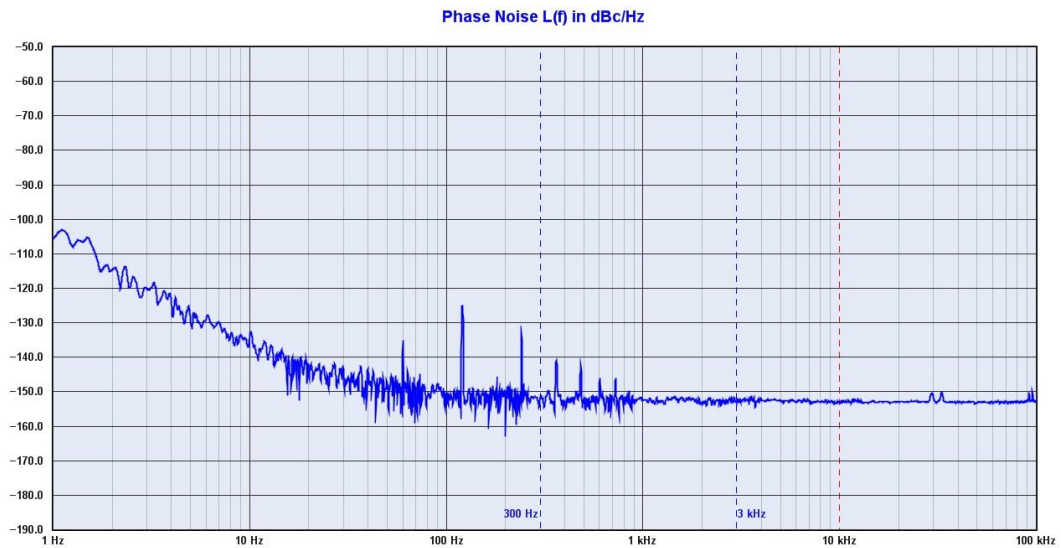


4.1 Bandwidth

100 KHz to 15Mhz. Gain flatness is ± 2 dB.

4.2 Phase Noise

Low phase noise contribution is achieved through careful PCB design, component selection and minimization of power supply noise. Below is a typical phase noise performance for a 10 MHz reference application:



Trace	Input Freq	Input Amplitude	dBc/Hz at 10 kHz	RMS Noise (degs)	RMS Jitter	SSB C/N dB	Duration
NR2310-PN (Unsaved)	10.000 MHz	5.0 dBm	-153.2	1.04E-4	2.9E-14 s	-117.8	2m 0s

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 facilitates installation to help prevent damage. A channel fault will not activate an “ALERT” state and the status relay will not be opened.

The nominal application is for a 10 MHz sine wave output in the range of 1 Vrms.

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.

4.5 Power Supplies

The unit is designed to accept power in the range of 90 to 264VAC, 50 to 60 Hz. This allows global application. The design is such that no action need be taken to operate from global power types. This feature avoids installation damage that occurs in designs that require an input power switch mode be used.

The unit may also be ordered with a DC power option. This may have a DC source as the primary power source or as a secondary to the AC source. DC voltages from -60 to +60 VDC can be accommodated.

There is an EMI filter between the internal power supply and the available power being used. This filter minimizes the electrical noise from entering the circuitry and negatively impacting noise performance. Also, in most applications, the equipment that surrounds this unit is sensitive and the filter also reduces noise that could impact the performance of other equipment.

The demands on the power supplies are two fold—maximum efficiency and minimum noise. Maximum efficiency reduces power dissipation in the unit. Temperature impacts reliability and stability. To achieve maximum efficiency, the primary converter is a switching converter with an efficiency of approximately 90%.

High efficiency of switching converters is well known and holds a major position in the power supply industry. But one of the problems with a switching converter is noise. By its nature a switching power supply must use fast rise and fall times of the switching elements. These fast edges generate high frequency noise. The

power supply chosen has a noise level that is more than 50dB below primary. To further reduce noise, the power supply is in its own enclosure and is followed by a noise filter. The filtered power is then used by width bandwidth linear regulators to further reduce noise.

5.0 Technical Specification

5.1 Technical specifications

Linear Amplifier Bandwidth	20Khz to 15Mhz ± 2 db, 1.3 Vrms Max(Option to DC available). The unit is typically shipped optimized for 10 MHz phase noise.
Impedance	50 Ohm
Output Amplitude Range	200mv to 1.15 V rms
Gain	0 dB
Channel status, System	10 channel status, system status
Rear panel connectors	10 output, Signal in and system status BNC, AC power in
HI, Low indicators	Hi ≈ 1.3 Vrms, Low ≈ 0.3 Vrms (HB option)
Harmonics	< -30db
Serial Port	RS232 port for unit status
AC input	90 to 250 vac, 50/60hz, IEC 320-C14
Alert	20VdcVac, 0.5 amp relay contacts- relay closed for normal condition,

5.2 Environmental and Mechanical

Operating temperature	0 to 50C non-condensing
Storage temperature	-40 to 70C
Height	1RU (~1.73)
Width	19 inch
Depth	12 inch
AC input	90 to 250 VAC, 50/60hz, less than 10 watts
Weight	5.5 lbs



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