

NRU-600 DSP Noise Reduction Unit



The NRU-600 is an audio signal processor that eliminates or reduces most types of interference from voice, CW and data transmissions. The unit uses a high speed Digital Signal Processor (DSP) to provide simultaneous band pass filtering, noise reduction and multiple tone/heterodyne removal.

Benefits

- Superior noise reduction on audio signals.
- Both frequency domain and time domain reduction algorithms are provided.
- Manual and automatic noise reduction control.
- Operates on radio receiver or other audio.
- High speed digital signal processor (DSP).
- All modes operate simultaneously.
- Automatic notch filter.
- Built in voice modulation recognition.

NRU-600 Overview

Operating in 5 milliseconds or less, the automatic notch filter removes multiple heterodynes from tune-ups, adjacent channel carriers, CW, RTTY, or similar signals without interfering with voice signals when a voice bandwidth has been selected. Two noise reduction algorithms are provided to give the operator the best audio noise reduction possible; an frequency domain (FD) algorithm and a time domain (TD) algorithm.

The FD mode automatically enhances received signals by recognizing speech, CW or data and reducing the amplitude of all signals which are not part of the desired information. The amount of noise reduction in this mode is continuously variable from zero to maximum using the front panel FD control. A fully automatic noise level reduction is

also provided in which the proper noise reduction level is dynamically adjusted based upon the measured Signal-to-Noise ratio of the received signal. TD noise reduction, which is quite effective at reducing white noise and other similar noise types, is also continuously adjustable via a front panel control to provide the smoothest sounding audio characteristic for the existing conditions.

The NRU-600 connects to the audio output of a receiver, transceiver, or other source. This audio signal is processed internally before being amplified and fed to the line output of external speaker. Under most conditions, the unit will make a dramatically improve the quality of received speech. The unit removes broadband noise, repetitive impulse noise, interfering heterodynes and receiver "birdies". A direct

result of this improvement in signal quality is the reduction of fatigue created when an operator spends a prolonged time attempting to interpret barely-intelligible signals.

The front panel adjustable Finite Impulse Response (FIR) filters have steep skirt selectivity, linear phase in the passband, and minimum passband ripple. The bandwidth of the filter is variable from 50 Hz to 3400 Hz and the center frequency of the chosen filter is also variable from 100 to 3400 Hz. The front panel gives the user quick references to set up the optimal filter. The steep skirts of the filters provide excellent rejection of adjacent channel chatter or interference from close-in stations.

The NRU-600 also has a sophisticated built-in VMR function that provides speech detection capability in noisy audio signals.

Capabilities

- Reduces atmospheric white noise, automobile ignition noise, power line noise, computer/TV interference, digs out weak, difficult to read signals
- Band Pass Filter provide fully adjustable bandwidth and center frequency, steep skirts, greater than 60dB ultimate rejection, linear phase and minimum passband ripple, usable as bandpass, lowpass, or highpass filters.
- Built-in voice modulation features a sophisticated DSP algorithm and front panel threshold adjust.

General

Audio Input:	Balanced or Unbalanced 600 ohms or 47k ohms, jumper selectable
Input Level:	-20 dBm to + 10 dBm, internally adjustable
Freq. Response:	150 Hz to 3400 Hz \pm 2dB
Absolute Output Delay:	
FD Mode:	130ms
All other Modes:	< 19ms
FD Mode White Noise Reduction:	
Max Control Setting:	Approximately 15 dB
Min Control Setting:	0 dB
TD Mode White Noise Reduction:	
Max Control Setting:	Approximately 15 dB
Min Control Setting:	0 dB
Auto Notch Mode:	
Ultimate Tone Reduction:	0 dB
Bandpass Filter:	
Bandwidth:	Adjustable between 50 Hz and 3200 Hz total width
Center Frequency:	Adjustable between 100 and 3400 Hz
Ultimate Attenuation:	>60 dB
Filter Shape factor (60/-6dB):	1.18:1 typical at voice bandwidths
Bypass Input P1-8:	
Input Impedance:	Forces unit audio bypass when pulled down to +2V or lower 1k ohms to +5V, protected to \pm 50V
Headphone Output:	For 8 ohms and higher impedance headphones (stereo phone jack)
Speaker Output:	2W @ 10% distortion into 8 ohms external speaker
Line Output:	600 ohms balanced, -20 to +10 dBm, internally adjustable
Line Output Distortion:	Less than 0.5% @ 1kHz
AC Input Power:	115 or 230 VAC \pm 15%, 47-63 Hz. 20VA max
DC Input Power:	+12 V range: +11 to +15 VDC; +24V range: +20 to + 26VDC +28V range: +25 to +32 VDC, ranges are internally selectable
Size:	1.8"H x 19"W x 10"D (4.3 x 4.8 x 25.4cm)
Weight:	6lbs (2.7kg)
Environmental	
Temperature:	Operating: -20 to +55 degrees C. Storage: -40 to +85 degrees C
Humidity:	Up to 95% @ +55 degrees C.
Shock and Vibration:	MIL-STD-810D for fixed installations
Altitude:	Up to 10,000 feet

Raytheon Company
Civil Communications Solutions
 5800 Departure Drive
 Raleigh, NC 27616
legacy.sales@raytheon.com

www.raytheon.com

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