Noise Killer!

DSP-8100c

Audio Signal Processor

Timewave's Digital Signal Processing (DSP) technology provides superior performance in reducing noise and interfering signals.

- **Automatic noise reduction reduces operator fatigue**
- **Reduces noise on AM and SSB**
- **Wideband filter for AM and FM (VHF & UHF)**
- **Automatic tone eliminator for hearing safety**
- **Optimized data filters for fewer errors**
- **RTTY modem**
- **LCD display for Visible Memory™ and Calibrated Filters™**
- **Audio Test Instrument Generator, Voltmeter, and Tone Decoder**
- **600 Ohm balanced line input and output**
- **Dual rack mount available for redundant military installations**
- **Built in 115/220 Volt AC power supply**

The Timewave DSP-8100c is the latest generation DSP voice and data filter designed for demanding commercial/military audio and radio installations. The DSP-8100c features noise reduction, channel bandwidth filtering, tone elimination and test instrumentation. Noise reduction reduces operator fatigue during long operating shifts. Channel bandwidth filtering decreases data circuit errors and reduces voice circuit noise and interference. Tone elimination on voice circuits wipes out potential hearing-impairing test and interference tones in milliseconds. The DSP-8100c incorporates the newest high-speed DSP technology to give the operator an unparalleled feature set. The LCD display, pushbuttons, optical encoders, and Visible Memory™ let the operator see and adjust settings quickly and accurately. The DSP-8100c can be ordered in three configurations: stand-alone, single 19-inch rack mount, and dual 19-inch rack mount.

VOICE

The DSP-8100c uses steep-skirted adjustable highpass and lowpass filters to remove noise and interference. The noise reduction and tone elimination functions of the DSP-8100c operate by examining a characteristic of signals and noise called correlation, and dynamically filtering out the undesired noise and tones. The degree of correlation is relative. Random noise such as white noise or static is uncorrelated. Speech is moderately correlated. Pure tones such as heterodynes are highly correlated. The DSP-8100c measures correlation and automatically filters out noise and tones that are outside its correlation thresholds.

DATA

Narrow band signals like RTTY require bandpass filters with steep skirts and linear phase response. Linear phase response maximizes the usable signaling rate for a given bandwidth and minimizes intersymbol interference. Filter skirts are so steep that a signal literally falls off the edge of the passband as the operator tunes through a signal. To minimize the data error rate for a channel, the DSP-8100c has optimized data filter characteristics for each mode and baud rate. The DSP-8100c supports RTTY, SITOR, and WeFAX data modes. In addition to the RTTY filters, the DSP-8100c has a FSK demodulator and modulator for complete RTTY operation.

TEST INSTRUMENTATION

The Test Instrument mode mode provides the audio test instruments necessary for normal maintenance and setup of audio circuits in radio equipment installations. A low distortion audio sinewave generator and an audio voltmeter cover the frequency range from 20 Hz to 10 kHz. The voltmeter measures true rms and peak voltages as low as 1 mV and the calibrated sinewave generator output ranges from 4 mV to 2000 mV. The sinewave generator and the voltmeter operate simultaneously for gain and frequency response measurements. The voltmeter and LCD display also enhance the CTCSS or "PL" tone encoder/decoder. Voltmeter measurements allow relative frequency deviation measurements of a received signal's CTCSS tone. A CTCSS squelch output can switch a tape recorder or other device. A Two-Tone audio generator provides SSB linearity testing.

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SPECIFICATIONS TIMEWAVE DSP-8100c

AUDIO INPUT

Impedance input	600 ohms, transformer balanced
Signal range for full output	-16.5 dBV to +6.0 dBV, front panel programmable

AUDIO OUTPUT

Line output	600 ohms, transformer balanced
Full scale Line output	-15 dBV to + 6 dBV, front panel programmable
Monitor output power	1.0 watt into 8 ohms
Monitor jack	1/4" two circuit jack, < 1 ohm or 100 ohms, selectable

NOISE REDUCTION FILTERS

	Frequency range	Attenuation	Type	Delay
Random Noise Reduction	Entire freq. range of selected filter	Up to 20 dB, varies with noise characteristics	Adaptive	5 msec max
Variable Noise Reduction		Noise reduction aggressiveness front panel adjustable		
Variable Tone Elimination (multiple automatic notch)	Entire freq. range of selected filter	Up to 50 dB, varies with noise characteristics	Adaptive	5 msec max
Tone Eliminator (manual notch)	Entire freq. range of selected filter	Up to 50 dB, varies with noise characteristics	Manual	5 msec max

Note: The random noise reduction and data filters can operate simultaneously.
The random noise reduction, tone notch and highpass/lowpass filters can operate simultaneously.

DATA FILTERS

RTTY, SITOR	Mark/Space bandwidth 60 Hz to 100 Hz Selectable center frequency	40 dB at 60 Hz outside the passband	FIR linear phase	37 msec max
	Frequency shift, 170, 200, 425, and 850 Hz, selectable			
	Note: RTTY and SITOR filters have a notch at center frequency			
WEFAX	1500-2300 Hz	55 dB at 75 Hz outside the passband	FIR linear phase	37 msec max
FSK Marker Tones	1) RY string- Alternating sine waves at mark-space freq. of selected data filter Baud rate matches selected RTTY data mode 2) Sync-Nul Character (Diddle) - Baud rate matches selected data filter.			

DATA MODEM

Shifts	170, 200, 425, 850 Hz
Data Rates	45, 50, 57, 75 Baud
Input	Audio from receiver
Output	Open collector FSK and variable level AFSK
Transmit Data Polarity	Normal or Reverse
I/O	Receive data, Transmit data, PTT (RS-232 compatible)

VOICE FILTERS

Highpass	Corner freq. = 100 to 1000 Hz., 10 Hz. steps.	60 dB at 180 Hz. outside the passband	FIR linear phase	24 msec max combination
Lowpass	Corner Freq. = 1000 to 5000 Hz., 10 Hz. steps.	60 dB at 180 Hz. outside the passband	FIR linear phase	Highpass & lowpass Filters

AUTOMATIC GAIN CONTROL (AGC)

Voice	36 dB
Data Modes	18 dB

SIGNAL PROCESSING

A-D/D-A Converter	16 bit linear, sigma-delta conversion
Signal Processor	16 bit, 27 ns Analog Devices ADSP-2181 with 80 KB of memory

TEST INSTRUMENT

Audio Generator	Single or two-tone, single sine wave tunable from 20 Hz to 10 kHz. Two-tone 700 Hz + 1900 Hz. Sine wave distortion less than 1%
Audio millivoltmeter	True RMS from 4 mV to 2000 mV., 20 Hz-10 kHz
CTCSS encoder-decoder	Decodes and displays CTCSS "PL" tones from 67.0 Hz to 254.1 Hz
CTCSS squelch	Open collector output pulls low when selected CTCSS tone is present. (connection on back panel DB9 connector)

MEMORY

Six Memories - all configuration setups can be stored and recalled (except volume control setting)

DISPLAY

2x16 alphanumeric characters, dot-matrix, yellow-green backlit LCD.

DIMENSIONS (Stand Alone Configuration)

Size	7.6 in. wide x 11.23 in. deep x 1.9 in. high (193 mm wide x 285 mm deep x 48 mm high)
Weight	4.01 lb. (1.82 Kg.)

Note: RTTY and SITOR data filter bandwidths are specified at -3 dB points to comply with traditional data filter specification methods. All other filter bandwidths are specified to comply with conventional DSP FIR filter parametric descriptions.