

May 1996

Digital Tunable Demodulator WJ-9499



The WJ-9499 Digital Tunable Demodulator uses advanced digital signal processing (DSP) and surface mount technology to provide precision tuning, filtering, and demodulation of received signals. The demodulator accepts digital input with 12-bit parallel data streams up to 50 megasamples per second (MSPS). Direct digital-synthesis techniques provide accurate tuning with resolution down to 1 Hz. An operator can use manual or automatic gain control (AGC) with a range of 50 dB.

The WJ-9499's flexible, DSP-based architecture allows for the implementation of any IF bandwidth (IFBW) between 100 Hz and 20 MHz. The standard set of filters provides 24 bandwidths from 100 Hz to 20 MHz. The unit also provides a corresponding set of selectable video filters.

The WJ-9499 provides digital output signals including predetection IF, selected video and audio. It provides the digital predetection IF output as 16-bit parallel data in a multiplexed inphase/quadrature (I/Q) format along with word clock and a I/Q qualifier signal. The WJ-9499 provides the digital video output as 12-bit parallel data with clock, while the digital audio output is provided in a commercial digital audiotape (DAT) format. A two-channel analog audio output is also standard.

Features

- Precision tuning, filtering & demodulation
- Digital inputs & outputs
- Up to 50 MSPS data rate for digital input signals with 12 bits of precision
- Standard AM, FM, DSB, SSB, ISB demodulation modes
- 1-Hz tuning resolution
- Automatic or manual gain control
- 24 selectable IFBW's from 100 Hz to 20 MHz
- Selectable video filtering
- Low phase noise, passband ripple & differential group delay
- Standard Ethernet & RS-232 remote control
- Built-in test capability to detect faults to circuit card level
- 3.5-in (8.89 cm) half-rack package

HEIGHT	3.5 in (8.89 cm)	WIDTH	8.5 in (21.59 cm)
DEPTH*	21 in (53.34 cm)	WEIGHT	21 lbs (9.5 kg)

*Excluding connectors, knobs & handles

Restricted International Distribution

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All International sales of WJ equipment are subject to USA export license approval.

This material provides up-to-date general information on product performance and use. It is not contractual in nature, nor does it provide warranty of any kind.

The WJ-9499 supports AM, FM, USB, LSB, DSB, and ISB demodulation modes. AM and FM modes are available for all IFBW's. USB, LSB, and DSB modes are available for conventional voice-grade bandwidths and standard IFBW's up to 20 kHz. ISB mode is available for standard IFBW's up to 10 kHz.

Control of the WJ-9499 is performed remotely via an Ethernet interface, which is available as either a 10BASE-T or an AUI port. The 10BASE-T port provides network access to twisted-pair cables via a modular RJ-45 connector. The AUI port interfaces to an appropriate external Media Access Unit via a 15-pin D connector to provide network access to thick and thin-coaxial, twisted-pair, or fiber-optic cabling. An auxiliary RS-232 control interface allows localized, single-point control of the WJ-9499. The Ethernet and RS-232 interfaces are not active simultaneously.

A standard 0.25-inch (0.63 cm) headphone jack and volume control on the front panel permit an operator to locally monitor demodulated audio.

For all of its capability, the WJ-9499 is extremely compact. It is contained in a 3.5-inch (8.89 cm) high by 8.5-inch (21.59 cm) wide by 21-inch (53.34 cm) deep rack-mount enclosure. The unit weighs approximately 21 pounds (9.50 kg).

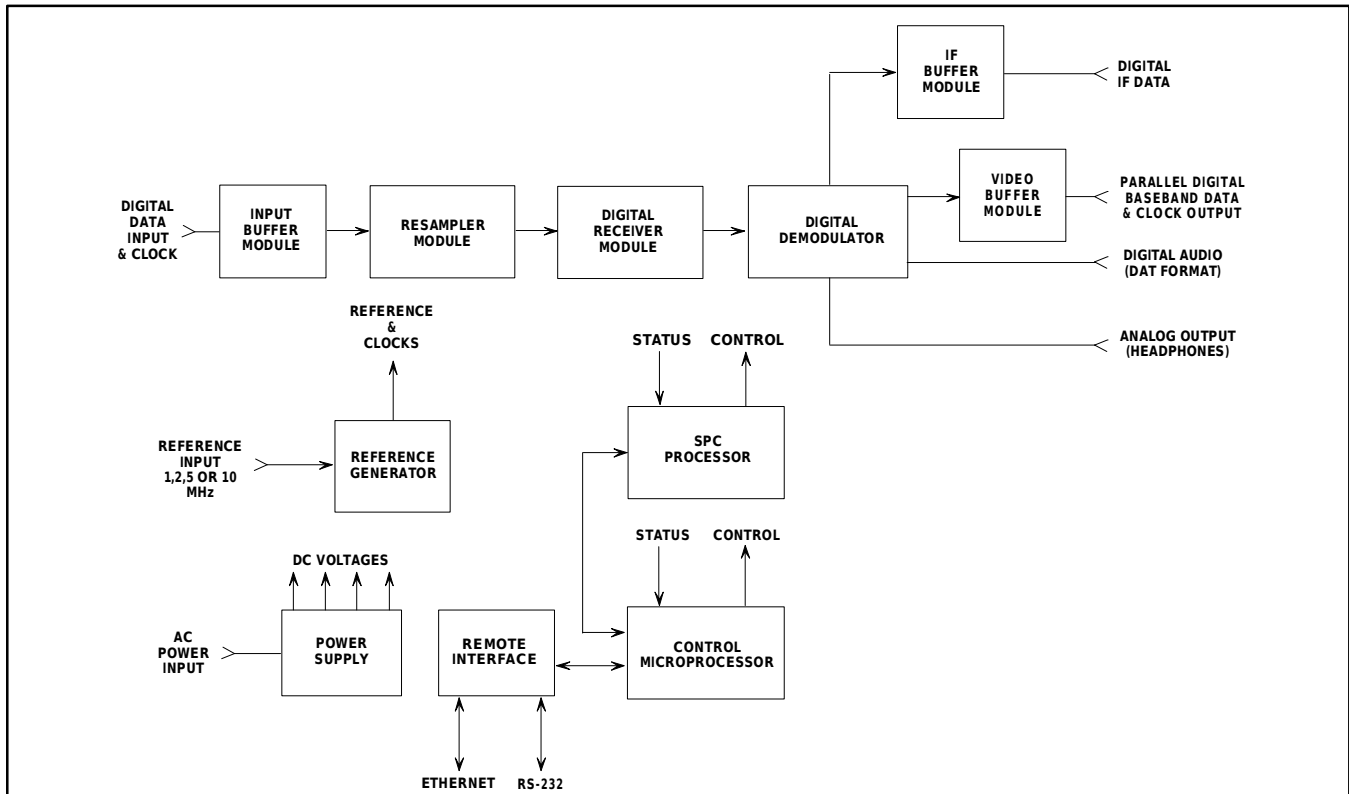
Functional Description

The unit accepts a digital input via the Input Buffer Module. The Resampler Module synchronously converts the selected data stream to a data rate compatible with subsequent processing, and passes that data to the Digital Receiver Module (DRM). The DRM performs the tuning and IF filtering required to extract the desired signal from the input digital baseband.

The Digital Demodulator performs AM, FM, DSB, SSB, and ISB demodulation of the predetection IF signal provided by the DRM. It also provides post-detection FM video filtering. The Digital Demodulator outputs include:

- Multiplexed I/Q Predetection IF
- Selected digital video
- Digital audio
- 2-channel analog audio

A 32-bit control microprocessor interprets remote commands to provide overall high-level control of the unit. The microprocessor sends commands to the 24-bit Signal Path Control (SPC) processor that controls the processing functions and provides gain control supervision.



WJ-9499 Functional Block Diagram

WPG075

Specifications

Digital Input Characteristics

Input Sample Rates	50, 25, 12.5, 10, 6.25, 3.125, 2.5, 1.56 MSPS 781, 391, 195, 97.7, 48.8 kSPS
Data Format	12-bit parallel 2's complement
Sample Clock	50 ±10% duty cycle required
Logic Format	Differential 100K ECL, data & clock

Tuner Characteristics

Tuning Step Size	1 Hz to 1 MHz, selectable
IF Bandwidths	20, 10, 5, 2.5, 2, 1.3 & 1 MHz 750, 600, 500, 200, 100, 50, 20, 10, 5, 3.8, 3.2, 2.6, 2, 1kHz 500, 200, 100 Hz Other filters optional
IF Shape Factor	1.8:1 (3 to 70 dB), max
Passband Ripple	0.3 dB, max
Phase Response	All filters linear phase FIR
Image Rejection	70 dB, min
Gain Control	Manual or automatic
Manual Gain Control Range	50 dB, nominal
Output Spectrum	Normal or inverted

Demodulator Characteristics

Detection Modes	AM, FM, SSB, ISB, DSB
Video Bandwidths	10, 5, 2.5, 1 MHz 500, 250, 100, 50, 25, 10, 5, 2.5, 1.9, 1.6, 1.3, 1 kHz 500, 250, 100, 50 Hz Other filters optional
Audio Bandwidths	20, 10, 5, 3.8, 3.2, 2.6, 2.5, 2, 1.9, 1.6, 1.3, 1 kHz 500, 250, 200, 100, 50 Hz

Digital Output Characteristics

Digital Outputs	Predetection IF, selected video, audio
Predetection IF Data Format	16-bit parallel 2's complement; Multiplexed I/Q
Video Data Format	12-bit parallel 2's complement
IF & Video Logic Format	Differential 100K ECL, data & clock
Audio Data Format	Commercial DAT format

Analog Output Characteristics

Analog Outputs	2 audio
Output Impedance	600 ohms
Headphone Audio (Standard)	Toll-quality stereo Independent & volume control for each side

Control

Local	Headphone volume controls
Remote	Ethernet (10BASE-T or AUI) & RS-232 (only 1 active at a time); consult factory for alternates
Internal Reference Stability	±5 x 10 ⁻⁷ , max
External Reference Input	Accepts 1, 2, 5, or 10 MHz ±1 PPM, 200 mV peak-to-peak min into high-impedance load; automatically switches to external reference upon application of signal

Physical Environment

Temperature Range	
Operating	0 to 50°C
Meets All Specifications	10 to 40°C
Operating Altitude (50°C Ambient)	10,000 ft (3,048 meters) max
Power Requirements	115 Vac ±10%, 46 to 400 Hz, and 230 Vac ±10%, 46 to 65 Hz
Power Consumption	100 W, max, no options installed

Options

Model #	Functions	Physical Characteristics
WJ-949X/DTNF Digital Tunable Notch Filter Module	<ul style="list-style-type: none"> • Allows placement of a tunable filter within the received signal passband • Provides selectable tuning Step size: 1 to 100 kHz • Provides: <ul style="list-style-type: none"> - Notch width proportional to IFBW - Notch depth: 40 dB, min 	<ul style="list-style-type: none"> • Installs in a dedicated option slot inside the chassis • Consists of a single PC Assembly • Derives power & control from basic WJ-9499

Contact factory for availability of this option.