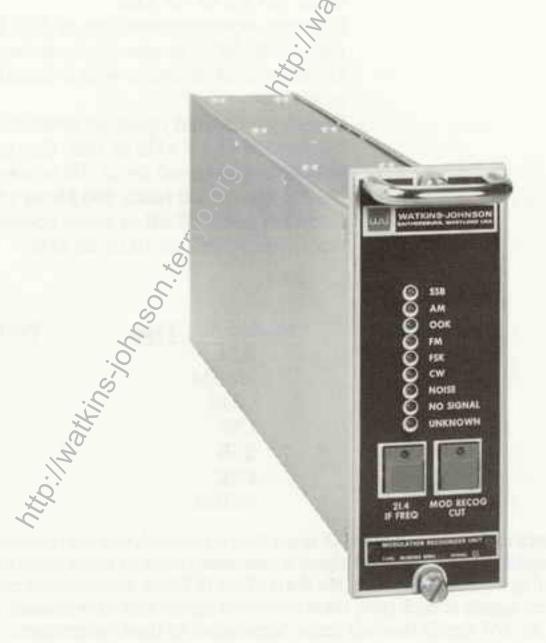
TECHNICAL DATA C E T Division



WATKINS-JOHNSON

237.14

WJ-9040 MRU109 MODULATION RECOGNIZER



DESCRIPTION

The MRU109 is a WJ-9040 system-compatible modulation recognition unit designed to work in conjunction with HF and VHF/UHF receivers. The MRU109 has been designed primarily to recognize AM, NBFM, CW, and OOK signals. Limited recognition of SSB, FSK, and NOISE is also provided.

The unit does not demodulate the signal but instead uses digital signal processing techniques to generate an approximation of the amplitude and frequency characteristics of the applied input signal. A pattern-matching algorithm is then activated. If a match is found, the modulation type is indicated by the appropriate front panel LED and is

simultaneously made available to the system interface. If no match is found or no signal is present, an LED is activated to indicate either UNKNOWN or NO SIGNAL as appropriate.

Provisions have been incorporated to permit either local or remote control. For local operation, two front panel pushbuttons allow for selection of either the 21.4 MHz or 455 kHz IF input and initiation of a modulation recognition cut. Results of the recognition process are indicated by lighting of a front panel LED. The same control and status information is available remotely through the WJ-9040 system remote interface options.

SPECIFICATIONS

Input Fraguency	21.4 MHz or 455 kHz		
Input Frequency			
Input Bandwidth	3 kHz to 20 kHz		
Input Impedance	50 ohms nominal		
Input Level			
	21.4 MHz at -10, -15, -20, or -30 dBm ± 2 dB		
Recognizable Modulation Types and Conditions			
AM	Speech modulation from 300	Hz to 3.2 kHz. Modula-	
	tion percentages from 30 to	90	
NBFM	Speech modulation from 300		
	from 500 Hz to 7.5 kHz	from 500 Hz to 7.5 kHz	
OOK	. Random asynchronous data at 5 to 100 baud. On/off ratio of 30 dB or greater (approximately 5 to 100 WPM)		
оок			
cw	Unmodulated sinewave with a duration of 1 second		
	or greater		
SSB	bandwidth of 3.2 kHz or less. Carrier and unwanted sideband suppressed by 25 dB or more		
FSK	Data at 60 to 6400 baud, 800 Hz to 15 kHz peak-to-peak		
NOISE	Gaussian noise 20 dB or more above receiver noise		
	floor, bandwidth of 10 to 20	kHz	
		The state of the s	
Identification Accuracy		To the second se	
Input SNR of 20 dB or more	Modulation Type	Probability Correct	
<u> </u>	AM	85%	
	NBFM	85%	
	ООК	80%	
	CW	85%	
	SSB	65%	
	FSK	75%	
	NOISE	75%	
		A	
Note: The above table lists typical performance and assumes that	[2] [2] [2] [2] [2] [2] [2] [2] [2] [2]		
and IF bandwidth, are appropriate for the signal type, and that			
venting, for example, FM signals from deviating outside of, or on			
case. Also, performance is specified for typical signals of each type extreme phase poise or overmodulation on an AM signal) that			
Identification Speed	4 seconds maximum, 2 seconds typical		
Remote Control Options	RS-232 or IEEE-488 interfac	e through the WJ-9040	
	IOM108		
Remote Commands	MOD? Returns modulation type		
(ASCII Format)	IF? Returns selected IF		
	IF1 Selects the 21.4 MHz input		
	IF2 Selects the 455 kHz input		
	CUT Initiates recognition cut		
Front Panel Controls	21.4 IF FREQ — IF input select at 21.4 MHz (LED on)		
La company of the com	or 455 kHz (Led off)		
	MOD RECOG CUT — Initiates a modulation recog-		
	nition cut		
Required Inputs	J1 \rightleftharpoons 25-pin type D male connector \pm 18.2 VDC and		
	+®.3 VDC from a WJ-9040 EPS100 power supply or		
	equivalent. Serial I/O from a WJ-9040 IOM108 or		
equivalent if remote control		is desired	

1. For best operation against OOK and SSB, the receiver should be set to the slow AGC mode; for all other modulation types, the fast AGC setting should be used. Manual gain should not be used.

5.2 inches high, 2.0 inches wide, 14.38 inches deep

6 lbs., approximately

2. For best results, the receiver should be set to a bandwidth wide enough to pass the entire signal of interest and only the signal of interest.