SPREAD SPECTRUM IDENTIFICATION/DETECTION UNIT

SSIU*1*

■ The SSIU-1 Spread Spectrum Identification/Detection Unit works in conjunction with the R-110B Wide Range Receiver to detect and characterize a variety of spread spectrum and digital communication emanations at negative received signal-to-noise ratios. The SSIU-1 utilizes a proprietary *analog* signal processor to perform the detection function, and the outputs of the unit may be displayed with any RF spectrum analyzer.

■ Operation: Operation of the SSIU-1 is simple and easily learned by the novice operator. The system has two basic modes: direct sequence (DS) and frequency hop (FH). Detection consists of viewing the spectrum analyzer and recognizing the distinctive waveform structures produced by the SSIU-1 when (and only when) a target signal is present. Spread spectrum, symbol rate and hop rate are also easily and quickly determined from the spectrum analyzer presentation. The approach takes advantage of the human operator's inherent capacity for accurately assessing the character of the processed waveform, permitting identification of emanations without triggering false alarms.

■ Signal Processing: The SSIU-1 uses unique signal processing techniques to transform wideband modulated signals from the receiver IF into very narrowband signals. These processed signals exhibit deterministic and recognizable structures which fully characterize the signals of interest. The resulting outputs are visually presented on a spectrum analyzer and are available for additional processing in an optional host computer.

■ Capabilities: The SSIU-1, working in conjunction with the R-110B receiver, can detect and characterize virtually all important methods of digital communications, including spread spectrum, even when received at negative signal-to-noise ratios (SNR). Specifically, polyphase phase shift keying (PSK), quadrature PSK (QPSK), staggered QPSK (SQPSK), quadrature AM (QAM), m-ary frequency shift keying (FSK), direct sequence (DS), frequency hop (FH), and their hybrids are supported by the SSIU-1.

■ The SSIU-1 analog processor provides a substantial amount of processing gain, approximately +42 dB for DS and +55 dB for FH spread spectrum signals. At the same time, the SSIU-1 manipulates the raw spread spectrum intercept into distinctive baseband output signals that are easily recognized and interpreted by a non-technical operator viewing the spectrum analyzer display.

■ Electrical Interference: Because the SSIU-1 uses analog circuits exclusively, it does not electrically interfere with the receiver operation, as could be the case if a powerful digital signal processor was used.

■ Growth Capability: A special feature of the SSIU-1 is growth capability. High performance options can be added to increase the detection range, and the performance and range of capabilities can be augmented by processing the SSIU-1 outputs in a portable or desktop PC. A special plug-in board and accompanying software can be provided to increase the ability of the unit to detect and classify the modulation of a variety of spread spectrum and digital communication signals. In addition, a user-friendly human interface can be provided for both novice and experienced operators.

SPECIFICATIONS

Chip rate detection range:	less than 1 M-chip/sec to 8 M-chip/sec
IF Input to SSIU-1:	21.4 MHz, 15 MHz BW (max)
Spectrum Signal Output:	Baseband, 8 MHz bandwidth
In/Output Connector type:	BNC
Dimensions:	H x W x D
	3.5 x 8.5 x 13 in.
	8.9 x 22 x 33 cm
Weight:	9.2 lbs.; 4.2 kg
Line Voltage:	117/230 V AC +/- 15%
Power Dissipation:	10 watts