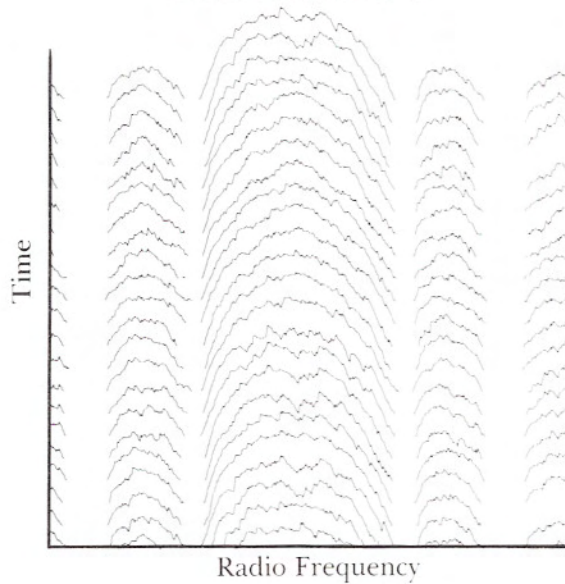


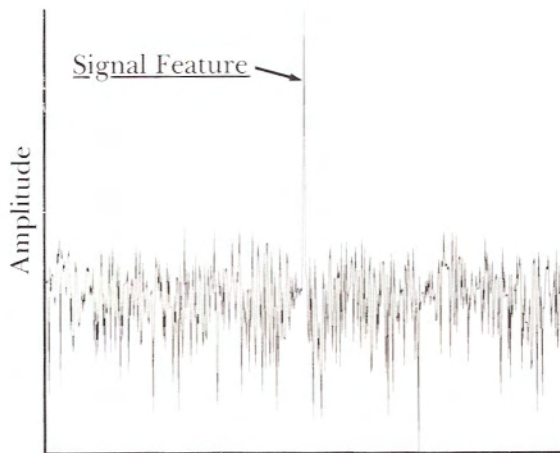


# Capabilities in Spread Spectrum Signal Exploitation

Phase-Switched

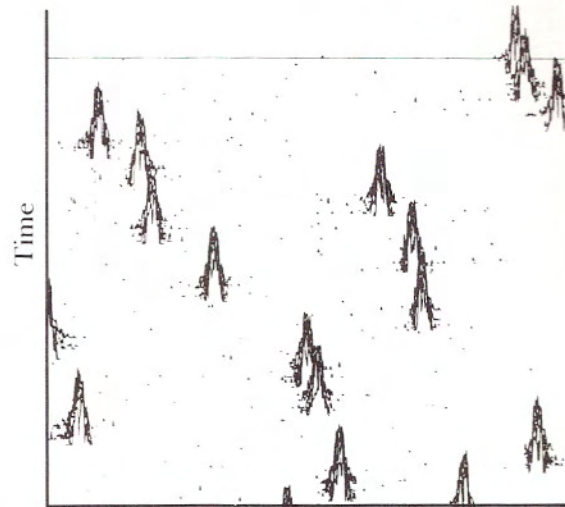


Radio Frequency

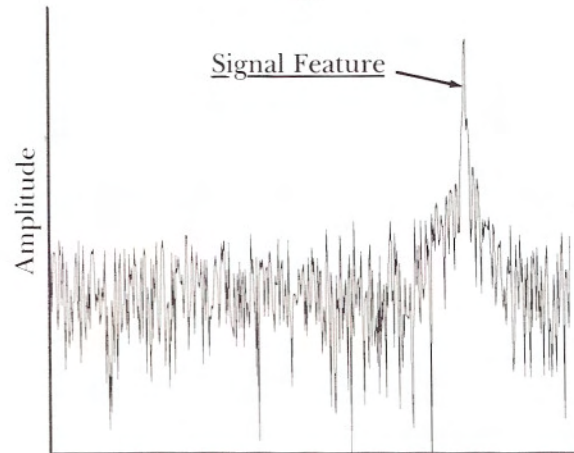


Modulation Frequency

Frequency-Hopped



Radio Frequency



Modulation Frequency



## Capabilities in Spread Spectrum Signal Exploitation

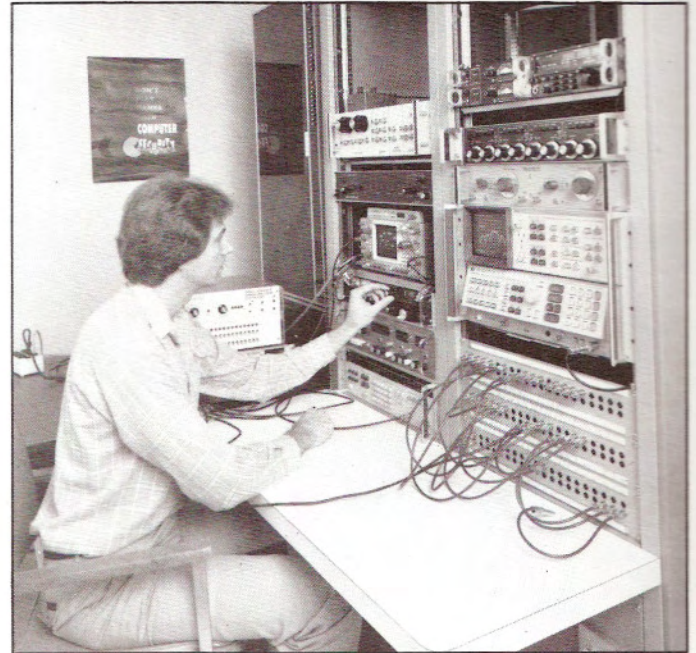
### General Activities

Signal Science undertakes projects pertaining to National Defense in areas involving:

- Definition of the target signal environment.
- Development of signal processing algorithms applicable to spread spectrum signal exploitation.
- Analysis of spread spectrum signals such as direct sequence spread spectrum, frequency hop, and other formats.
- Laboratory and field testing of spread spectrum signal detection algorithms and systems.
- Evaluation of advanced spread spectrum detection and processing concepts.

Our breadth of experience in field testing under real-world conditions places us at the forefront of knowledge in spread spectrum signal exploitation techniques that work. Our staff comprises a unique expertise achievable only from many years of activity with DoD projects requiring robust solutions to spread spectrum signal exploitation problems in the field.

Signal Science's approach to new spread spectrum signal exploitation problems encompasses theory, development, laboratory demonstration and field testing. In addition to our full-time staff, we retain nationally recognized experts as consultants. Our library of spread spectrum signals masked by various types of RF interference (recorded on analog tape) enables us to carry out laboratory demonstrations which represent real-world conditions before taking a system to the field. Our library of computer algorithms permits easy configuration of spread spectrum signal exploitation approaches so that algorithm performance can be evaluated prior to capital outlays for expensive spread spectrum hardware.



The spread spectrum signal exploitation approaches generally permit a configuration of commercial equipment driven by a suitable mini-computer for maximum versatility. By implementing a test bed configured with commercial hardware, our customers realize significant savings in hardware costs, development time, maintenance support and documentation. Primary components for most test bed configurations will include:

- RF Receiver
- Spectrum Analyzer
- Signal Conditioner
- Computer/Controller, with Peripherals
- Analog Recording Equipment (Optional)



## *SSDS-11 Spread Spectrum Test Bed*

### *General Description*

The Signal Science SSDS-11 Spread Spectrum Test Bed is a computer-driven system which detects Bi-Phase Shift Keyed (BPSK) and Quad-Phase Shift Keyed (QPSK) signals. The SSDS-11 searches a programmed RF band and performs on-line signal processing to detect BPSK and QPSK spread spectrum signals. Use of standard commercial receiving equipment accommodates the specific RF band and BPSK/QPSK clock rates unique to user application.

In the SSDS-11, computer control permits RF search functions to be carried out automatically and unattended. Search parameters, programmed for specific user applications, are retrieved from digital storage and used by the Computer/Controller to set Receiver and Spectrum Analyzer controls. The Signal Conditioner transforms received signals for processing by built-in features of the Spectrum Analyzer and computer software. The combined processing of signal data by the Spectrum Analyzer and Computer/Controller yield on-line detection alarms and produce digital records of detected signal parameters.

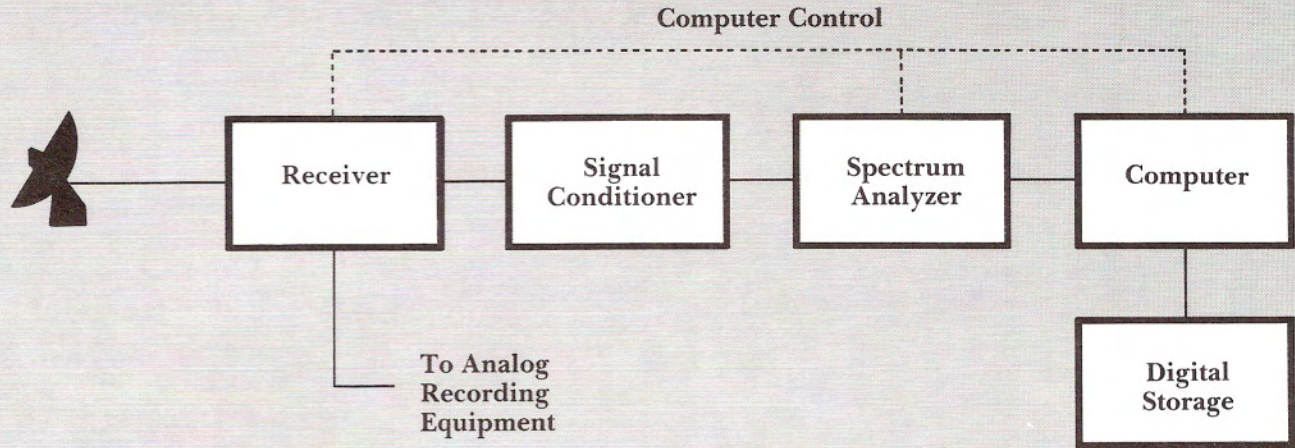
Software for the SSDS-11 permits optimizing the search strategies for different user applications, such as BPSK and QPSK detection where signal-to-noise, signal-to-interference, and clock rates vary in different RF search bands.

### *Physical Description*

The SSDS-11 occupies one full-sized or two half-height equipment racks and is easily transportable for field applications. Once configured for its specific applications, no cable changes are required to operate the system. The SSDS-11 operates on either 110 VAC, 60 Hz or 400 Hz. Remote control modes of the Receiver and Spectrum Analyzer are accessed by the GPIB and other standard busses through commercially available bus interface units.



## SSDS-11 Configuration



## SSDS-11 Specifications

<i>Parameter</i>	<i>Specification</i>
<i>Modulation Format</i>	<i>BPSK, QPSK</i>
<i>Carrier Frequency Range</i>	<i>Same as tuning range of commercial receiver</i>
<i>Clock Rate Range</i>	<i>100 kHz to 100 MHz, subject to receiver IF bandwidth</i>
<i>Detection Sensitivity for Carrier and Clock Rate</i>	<i>At least 0 dB signal-to-noise ratio in frequency main lobe bandwidth for rapid search mode; higher sensitivities achievable with longer dwells</i>



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