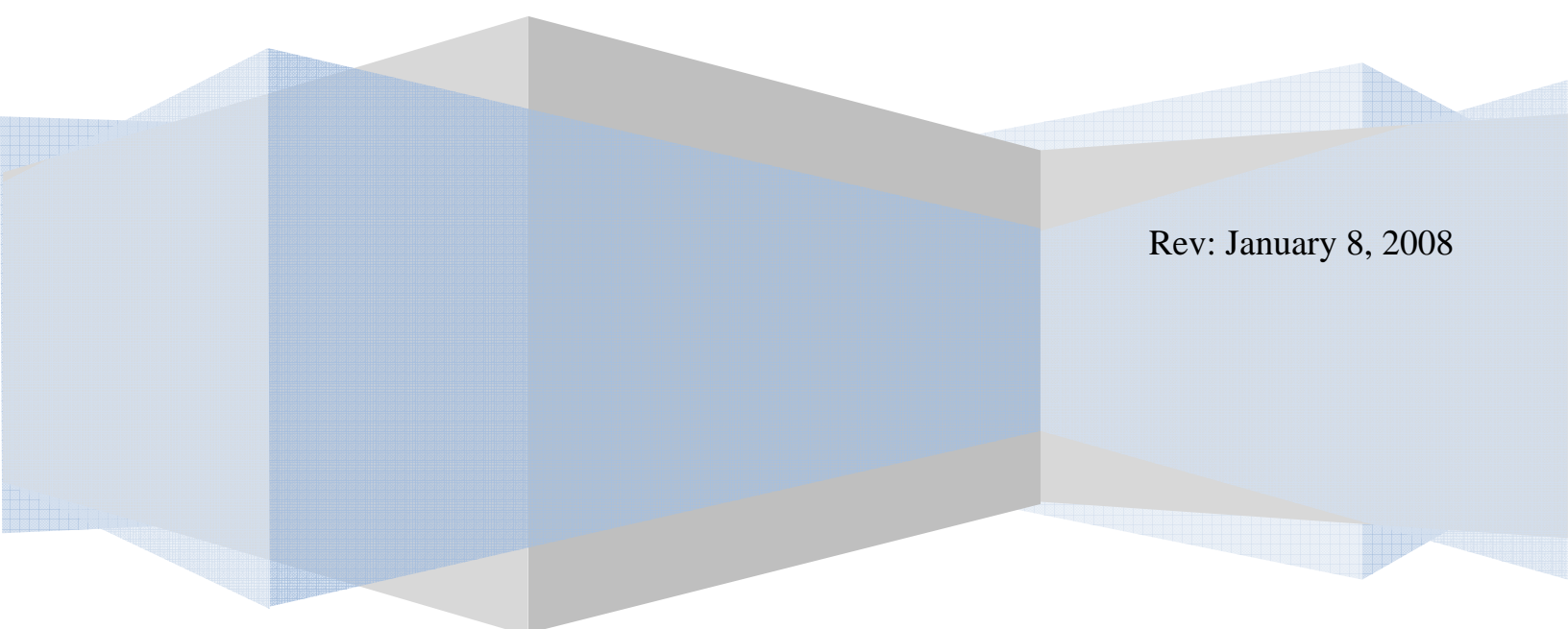




*Information Security Associates, LLC*

MDC-5

# **OPERATOR'S MANUAL**

A decorative graphic at the bottom of the page consists of several overlapping, semi-transparent cubes. The cubes are rendered in shades of light blue and grey, creating a 3D effect. The front-most cube is a solid light blue, while the others behind it are more translucent, showing the grid-like texture of the background.

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## MDC-5 OPERATING INSTRUCTIONS

The microwave down converter extends the frequency coverage of the ECR-3 to 3000 MHz allowing identification and inspection of signals that are above the ECR-3's upper frequency range. When using the MDC-5, keep in mind that there is conversion loss and the signal detection range will not be as great as it is for signals below 1000 MHz. Conversion loss is loss of sensitivity that occurs when the higher frequencies are converted to frequencies that the ECR-3 can receive.

There are many fewer signals above 1 GHz than below. Approximately 95% of all signals found in an RF sweep are below 1 GHz. Keep in mind that digital signals are quite common in the microwave frequencies and that there are commercially available transmitters, both video and audio, at 2.4 GHz

### Set Up

#### Connection

The MDC-5 acts like an antenna. It must be connected to the ECR-3's antenna connector. Connect the MDC-5 to the ECR-3 with the supplied coax cable with BNC male fittings on each end. Other coax cables can be used, provided they have 50Ω impedance and are not more than 10feet long.

#### Receiver Settings

The ECR-3 can be set up two ways- a wide view to look at the entire spectrum and another to look at narrower spans of frequency. Keep in mind that the MDC-5 conversion process causes a signal overlap. That is, it shows a 2000 (1000-3000) MHz span superimposed on a 0-1000 MHz display. It does this by layering 1000-2000 MHz on top of 2000-3000 MHz. See the Frequency Identification section for more detail.

In a crowded signal environment or an area where weak signals may be encountered, the wide view may not provide enough resolution to make an accurate evaluation. It is good for a quick look at what strong signals are in the area. A more detailed spectrum analysis can be made using the narrower span setting.

#### *Wide View (1-3 GHz)*

- Turn on the ECR-3 and connect the MDC-5
- Refer to the ECR-3 Manual for how to do the specific settings
- Set the Center Frequency to 500 MHz
- Set the Span to 1000 MHz.
- This display will show signals from 1000-2000 MHz and 2000 to 3000 MHz.

#### *Narrow View*

- Turn on the ECR-3 and connect the MDC-5
- Refer to the ECR-3 Manual for how to do the specific settings
- For this setting, the receiver will be set to a span of 100 MHz and the spectrum will be examined in 10 tuning steps.
- Set the Center Frequency to 50 MHz.
- Set the Span to 100 MHz.
- The display will show frequencies that correlate to 0-100 MHz.

## Use and Evaluation

### *Wide View*

The entire 3 GHz range will appear on the ECR-3's display. The MDC-5's antenna is somewhat directional. For best signal detection, it should be pointed around the area and simultaneously be rotated from vertical to horizontal. Rotating the antenna improves detection of vertically or horizontally polarized transmissions and aids in detecting circularly polarized signals.

To tune in to a detected signal, estimate its frequency by looking at its position on the display. The vertical lines indicate 100 MHz chunks of the spectrum. Input the estimated frequency via the ECR-3 keypad and keep narrowing the span until the signal is viewable in detail and it can be demodulated.

After evaluation, return the 1000 MHz span and examine any other signals.

### *Narrow View*

The initial frequency setting displays 0-100 MHz with 50 MHz being the center. This correlates to 1.9-2.0 GHz and 2.0-2.1 GHz. Aim and rotate the MDC-5 as described above. Any signals that are seen can be demodulated and evaluated by tuning to them and demodulating.

After checking this span, change the Center Frequency to 150 MHz. The ECR now displays a span of 100-200 MHz, correlating to 1.8-1.9 GHz and 2.2-2.3 GHz.

Continue to change the center frequency in 100 MHz steps to examine the entire spectrum.

## Frequency Identification

The MDC superimposes a span of 2 GHz onto the ECR-3's 1 GHz display and the 2 GHz span wraps around the display. Frequencies from 1 GHz to 2 GHz are displayed from the right hand edge of the display to the left hand edge, opposite of 0-1000 MHz. Frequencies from 2-3 GHz are displayed from left to right. This means that the detected signal does not correspond exactly to the frequency displayed on the ECR. For example, a signal that appears to be at 200 MHz on the ECR-3 display could be at 1.8 GHz or at 2.2 GHz.

There is a circuit built into the MDC-5 to help identify which of the two bands a signal is in. It is activated by the pushbutton switch on the MDC-5's rear panel.

With a signal on the display, push the thumb-button on the MDC-5 panel, watching the signal jump left or right on the screen.

If the shift was to the left approximately two divisions on the screen, subtract the counter reading from 2000 MHz to obtain the signal frequency (between 1-2GHz).

If the shift was to the right approximately two divisions, then ADD the counter reading to 2000 MHz for the correct frequency (between 2-3 GHz).

**MDC-5 Power**

Check that a fresh 9 volt battery is in the holder next to the handle. A blinking LED indicates that the battery is weak and must be replaced. Always keep spare batteries with the MDC-5.

**TT-3 Test Transmitter**

The optional TT3 microwave test transmitter can be used to test the MDC for proper operation and to determine the size of the area that can be covered.

The approximate frequency of the test transmitter is marked on the label affixed to its case. Since the test transmitter is not crystal controlled, the frequency will drift from the marked value depending on the ambient temperature, surrounding environment and battery voltage. The signal output of the TT3 has a pulsing output which easily identifies the test transmitter's signal.

It is powered by a 9 volt battery accessible through a door on the bottom of the TT3 case.

**Specifications**

Frequency coverage:	1 to 3 GHz
Dynamic Range:	-70 dBm- +10 dBm
Power Requirement:	9 volt battery
Accessories:	antenna cable log periodic antenna instructions carrying case test transmitter (optional)

## Warranty

Information Security Associates, LLC, warrants to the original user that its products are free from defect in workmanship and material for a period of one year from the date of purchase. Information Security Associates, LLC, under this warranty, is limited to correcting or replacing without charge, at its factory, any part or parts thereof which shall be returned to its factory, transportation prepaid, and upon examination by Information Security Associates, LLC, shall be found to have been originally defective.

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