



**THE TSA COMPUSCAN**  
**For Use with Mk Vb Scanlock**

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COMPUSCAN™ IA  
OPERATING INSTRUCTIONS°

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## Introduction

The Compuscan™IA is used to partially replace the human operator or a radio receiver. That is, it tunes the receiver in the search for signals from eavesdropping devices. When it encounters a signal, it decides if it might be from an eavesdropping signal and either alerts the operator or proceeds along on its search. If the human operator is not present at the time an unusual signal is acquired, its presence can be automatically noted in a memory for future reference when the operator returns.

The Compuscan™IA is designed to operate with Scanlock radios. When connected to the Scanlock it causes it to tune from one end of its tuning range to the other, reverse its direction and continue the process until commanded to stop.

The tuning actually occurs in small increments (4096 per scan). If a signal is received at one of those tuning points, the Compuscan stops, consults the memory to see if that signal is also represented in the memory and then decides on the next action to be taken. If the signal has been previously put into the memory, tuning can automatically resume. If the signal is not represented in memory, tuning can automatically stop until the operator has an opportunity to examine the signal. If the operator is not present, the frequency of the new signal can be recorded in a second memory and then examined later.

The time required to tune from one end of the tuning range to the other is approximately 1 minute. The tuning can be made slower (about 4 minutes per scan), or slower still if desired. Tuning can also be done manually by pushing the MANUAL clock button on the front panel of the Compuscan. A fine tuning control is also provided to allow signals to be brought precisely into tune. Automatic tuning is initiated by pushing in the START button. It can be stopped by pushing the STOP button. The direction in which tuning proceeds is indicated by the UP and DOWN LEDs. The direction can be reversed by pushing the REVERSE DIRECTION button.

The decision as to whether a signal is unusual or not is made by the Compuscan when it examines its memory (Memory 1) to see if that signal was previously recorded in the memory. Memory 1 is loaded with the frequencies (actually, a representation of the frequencies) of normal signals simply by setting the system up at a point well away from the area to be protected. It is set to automatically record the signals that it acquires. The process requires about 45 seconds and Memory 1 then has a representation of all the signals from broadcast stations, two-way radios, paging transmitters and signals from other sources that were transmitting at the time. Then, when the system is taken to the area to be protected, these normal signals are ignored by the system and only new signals are brought to the attention of the operator. When a new signal is encountered that is not represented in the memory but which is also found to be

position. The UP LED should be on and the START button pushed. The CLOCK LED should come on and the counter should be seen to increase its readings.

When the frequency displayed has gone over 20000, the DOWN LED will light and tuning will proceed in the downward direction. At this time all information in Memory 1 should have been erased. This will be evidenced by the fact that the SIGNAL IN MEMORY 1 LED will not light as tuning progresses.

NOTE: All illustrations are at the end of this manual (in duplicate) so that they can be detached and kept with the Compuscan when it is in use, if desired.

The STOP button should then be pushed, which will cause the CLOCK light to go out. The ERASE SELECT switch should be moved to the MEMORY 2 position and the START button pushed again. It is necessary that all of the frequencies to which the receiver tunes be covered during the erase operation. That is, the tuning must proceed all the way from top to bottom of the frequency range. Therefore, at this point time can be saved by pushing the REVERSE DIRECTION button to cause tuning to go up. The tuning will proceed to the high end of the range, reverse direction automatically and go to the bottom of the range. After it has finished a complete tuning cycle, the STOP button can be pushed.

AT THIS TIME, BOTH MEMORIES SHOULD BE CLEAR OF INFORMATION.

The second step is to load the memory with the frequency of signals that are normal to the area. The method is quite simple. The Scanlock is caused to tune one or more times throughout its tuning range. As it tunes, it picks up signals and puts them into Memory 1 of the Compuscan. These signals will be those from the local broadcasting stations, overseas broadcasting stations, police radios, hams, and any others that are on the air at the time the recordings are made.

There two important considerations here. If the signal from a "bug" is present at the time this recording is made, it will also be put into memory and then ignored during subsequent searches. Therefore, IT IS IMPERATIVE that the initial loading of the memory be done at a point well away from the area to be protected or swept for "bugs". The actual distance from that area will depend on a number of things and can be several hundred yards to several miles. The second consideration is the fact that some signals will not be on the air at the time that the memory is loaded. To pick up and record as many normal signals as possible, the system can be left to automatically record for an extended period of time (minutes or hours) if desired. One scan will be enough to get most of the signals that will be encountered in the area to be protected however.

Another consideration is the setting of the THRESHOLD ADJUST control at the time that the recording scan is made. The setting

restart automatically). It would also be advisable to make a note of the frequency displayed on the counter for future reference. Then, push the MANUAL (clock) button several times, push the REVERSE DIRECTION button and push the MANUAL button again several times. This will tune the receiver slowly across the signal and then back across it again. Listen carefully for any indication of room sounds. Then, on the Scanlock, select the FM demodulator and repeat the process. Select the sub-carrier demodulator (SC) and do it again. Then try the AM demodulator. If you use the spectrum monitor, observe the pattern created by the signal on the screen and look closely for evidence of room sounds. THEN push the record button if everything looks safe.

### Scan Control Options

When set up to scan the spectrum in the area to be protected the system can perform several different functions. They are:

a. With the AUTO STOP switch on and the other switches along the bottom of the panel in the off position, tuning will stop each time a signal is encountered. A human operator must be present to examine the signal and make the decision on whether to proceed with the search or not.

b. With the AUTO STOP and the AUTO BYPASS switches on, signals that are represented in memory will be bypassed but short-term signals not represented in memory will stop tuning and it will not restart until the operator has made the decision to do so.

c. With the AUTO STOP, AUTO BYPASS, and AUTO RESTART switches on, signals that are represented in memory will be bypassed and other signals that do not remain on during the test interval (see Alarm Conditions below) will cause the system to automatically restart tuning when they disappear.

d. When a new signal is acquired and it remains present for more than 45 seconds, it will cause an Alarm Condition to occur in the Compuscan. That is, when tuning stops and does not restart within 45 seconds, a relay will actuate in the Compuscan. The contacts of that relay appear at the ALARM OUTPUT jack at the left side of the Compuscan panel. An alarm light, a tone alarm or a remote alarm device can be controlled through those contacts. The relay will handle a 1 Ampere non-inductive load.

e. If the ALARM RESTART switch (at the upper left edge of the panel) is on, after the alarm has occurred, tuning will resume automatically. It should be noted that some signals occupy more than one tuning step. Therefore, a restart command may only cause tuning to advance one step. In that case, a second alarm will occur after 45 seconds, and the

To bring the signal into exact tune, get it as close as possible to being in proper tune with the MANUAL CLOCK and REVERSE DIRECTION SWITCHES. Then, use the tuning knob. BE ABSOLUTELY SURE TO TURN THE FINE TUNING SWITCH OFF WHEN AUTOMATIC RECORDING OR SCANNING IS TO BE DONE. This is important because the system will see an entirely different set of frequencies at each tuning step if the switch is on and the tuning knob is not set to the exact center of its tuning range.

#### Battery Life

As the Compuscan operates from the Scanlock battery, the battery life (per charge) is reduced to about 1 hour when the Compuscan is in operation. Therefore, it is advisable to have the Scanlock connected to the a.c. mains as much as possible when using the Compuscan.

#### Memory Battery

The memories in the Compuscan are supported by a 9 volt battery that is installed inside the Compuscan. This battery prevents the content of the memories from being erased when power to the Compuscan is removed. The life of this battery in this application has not been determined to date (1/1/84) simply because the data supplied by the battery manufacturers does not cover the extremely low rate of drain of these memories. Therefore, a life of one year is expected but, if the material in the memories is extremely critical, the battery should be replaced once each 6 months.

The battery is located inside the Compuscan. The top half of the Compuscan is removed after first removing the two screws from the bottom of the cabinet. The battery is visible at the back side of the unit. The rear panel can be lifted out of place to make the battery more accessible. The battery is held in a clip and is simply pulled up and out. The power cord clips to the battery. The battery can then be discarded and a new battery connected and installed. USE CARE TO CONNECT THE BATTERY PROPERLY.

IF IT IS IMPORTANT TO RETAIN THE INFORMATION STORED IN THE MEMORIES, maintain power to the Compuscan during the time that the battery is being replaced.

#### Threshold Adjust Considerations

The setting of the THRESHOLD ADJUST control during the AUTO RECORD and the SCAN modes of operation is quite important to a good eavesdropping defense. The basic reason for this is simply that if the setting is too low during recording, a lot of noise and otherwise unnecessary information will be stored in Memory 1. On the other hand, if the setting is too high during scanning, weak signals that may be of importance may be missed. The precise

mentioned above, the frequency that is observed on the Compuscan frequency counter display is the frequency of a signal generated by the local oscillator in the Scanlock. That local oscillator signal mixes with the signal arriving through the antenna of the Scanlock (the signal frequency) and produces a new signal (containing all of the information carried by the original). The new signal is called the intermediate frequency (IF) signal and it is this signal that goes to the demodulators (AM, FM, SUB-CARRIER) where the audio or video, etc., information is separated for amplification and reproduction by the loudspeaker. The IF of the Scanlock is 2000 kHz or 2 MHz.

This last number is significant because it is the basic difference between the local oscillator signal and the signal frequency. For example, if the signal that is being received is at 14000 kHz, the local oscillator frequency (as displayed on the frequency counter) will be either 12000 kHz or 16000 kHz. Conversely, if the frequency counter displays 12000 the signal could be at 10000 kHz (a difference of 2000 kHz), or 14000 kHz (still a difference of 2000 kHz). And so forth. Therefore, the number 12000 displayed in this case is of interest only because it allows the signal of interest at that point to be found again. This is done simply by tuning the receiver until 12000 is displayed again on the Compuscan counter.

There are other circuit peculiarities of the Scanlock that make the situation vis a vis signal frequency determination somewhat more complicated than that described above. The significant factor here is that the number displayed is an accurate reference point.





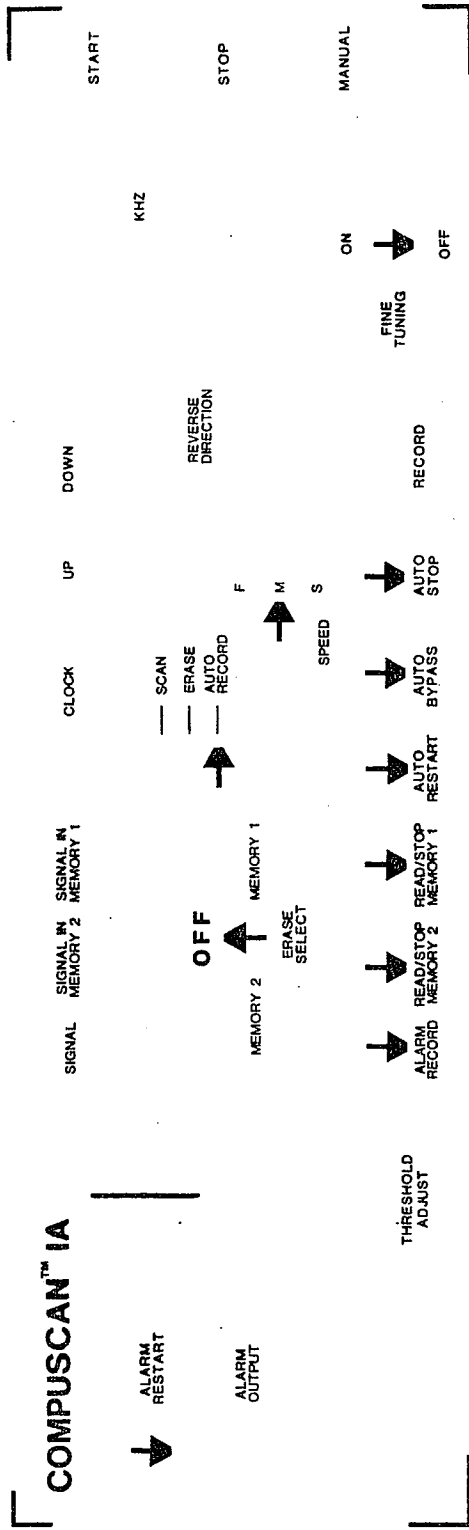


Figure 2. Switch positions for automatic RECORDING of signals.

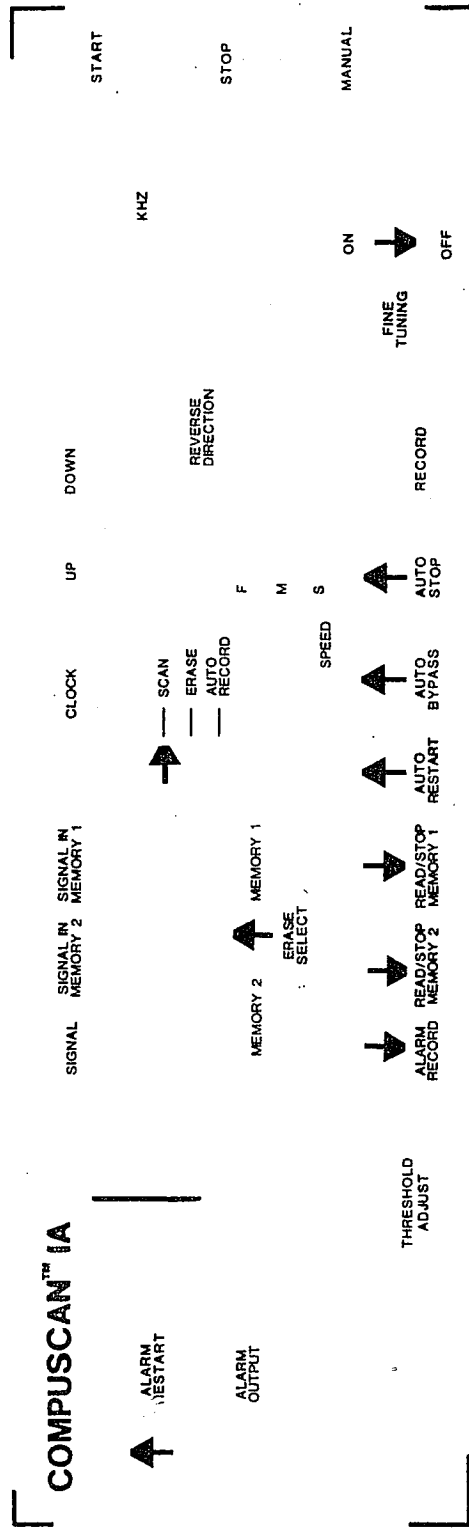


Figure 3. Switch Positions automatic SCANNING.

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Addendum to Operating Instructions

After publication of the operating manual, the clock circuitry of the Compuscan was changed to increase the speed of operation of the unit.

The new speeds are:

Fast - 5 seconds

Medium - 30 seconds

Slow - 1 minute and 20 seconds

The speeds are approximations and will vary slightly from unit to unit.

PLEASE NOTE: That the FAST speed is primarily useful for erasing the memories. It is not suitable for the AUTO RECORD mode. While it might be suitable for the SCAN mode if the signal to be discovered is strong, it is advisable to use the MEDIUM or SLOW speeds for both AUTO RECORD and SCAN. In summary, use FAST for erase and MEDIUM or SLOW for AUTO RECORD and SCAN.

#### POWER-DOWN PRECAUTION

In this model, a bit will be put into Memory 1 when power is turned off unless the following precaution is observed. The bit will appear at the frequency at which the power was turned off. As they will be added each time power is turned off they will gradually accumulate and unnecessarily load up Memory 1.

To prevent that from happening, set the ERASE SELECT switch to MEMORY 1 before the Compuscan IA is turned off. Other switches may be left in whatever position they happen to be at the time.

In addition, the bit recorded in Memory 2 may be erased when power is turned off. Therefore, simply move the frequency away from the point at which there is a recording in Memory 2. Then turn the unit off. The information in Memory 2 will not be disturbed.