
SCANLOCK M3

Counter Surveillance Receiver



User Manual

- 1 -

MN401305 Issue 1.0
AUDIOTEL INTERNATIONAL (11/2008)

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Radio Approval's

CE MARK EMC COMPLIANCE

The CE mark is affixed to the ScanLock M3 to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC on the approximation of Laws of Member States relating to Electromagnetic Compatibility and the following EMC and Radio Type Approval standards:

EN 61326-1
EN 61010 LVD

Warnings

When operating the equipment within Europe where Type Approval is a legal requirement, all equipment, including receivers and batteries must be to type approved standard in order for the system to remain type approved. Therefore, only equipment supplied by Audiotel International should be used.

How to use this manual

This manual is divided into a number of sections. The following brief description shows the type of information presented in each section:

Introduction to ScanLock M3	A brief description of ScanLock M3 and how it functions.
Getting Started	Setting up and looking after your ScanLock M3 – contains packing list, details of power requirements and battery care. Also how to set up the ScanLock M3 for use.
Basic Operation	Covers how to use the equipment in. Explanation of the Detect Mode, Analyse Mode and Locate mode. The final section covers search techniques.
Technical Specifications	Technical details relating to the M3 Basic and Advanced Models
Alarm Icons	Shows the various Alarm icons used.
MMI Icons	Shows the Man Machine Icons used.

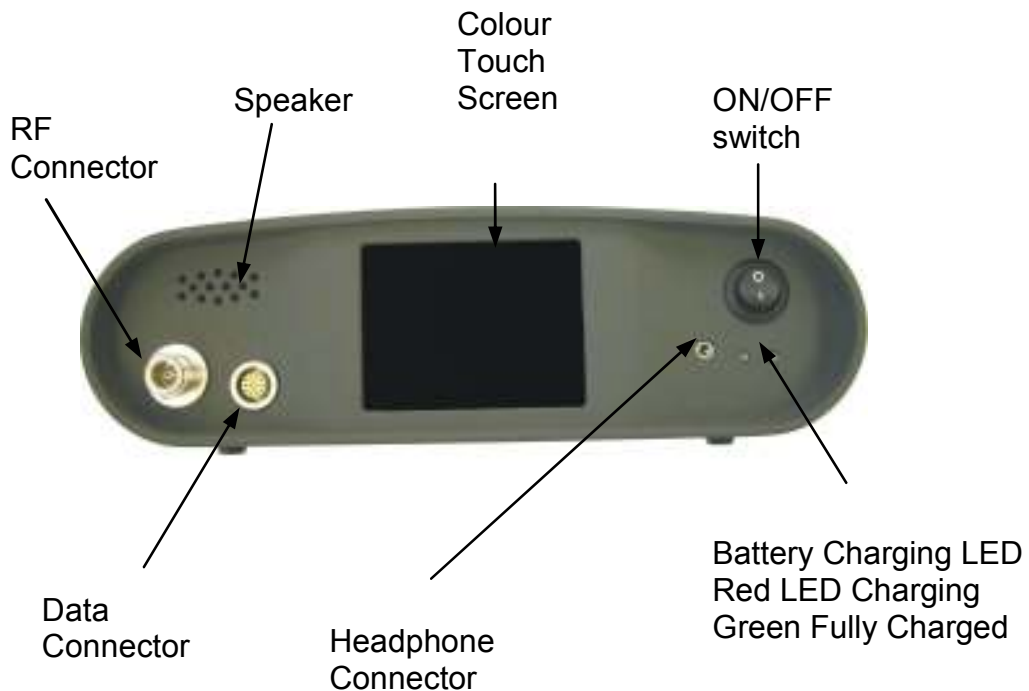
Introduction

The ScanLock M3 is a sophisticated Radio Counter Surveillance Receiver which is designed to enable the operator to detect, identify and locate concealed electronic radio devices with ease.

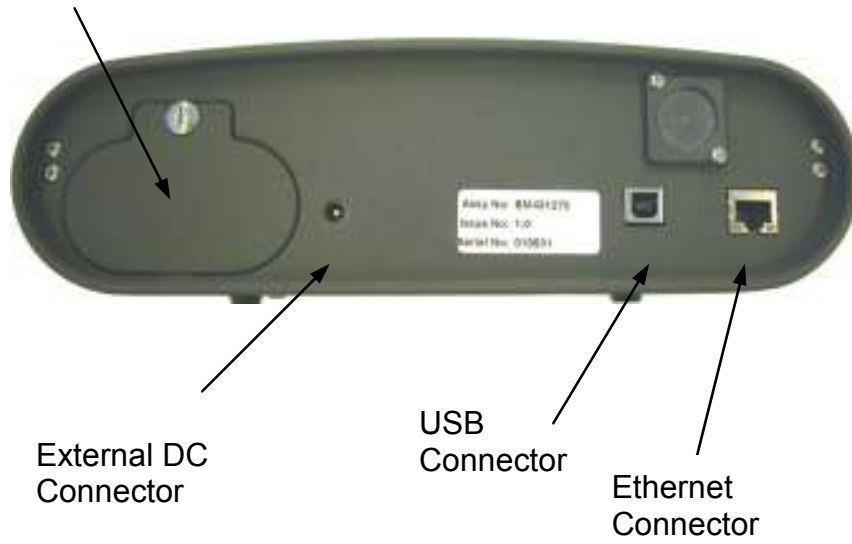
Utilising an icon based man machine interface, spectral analysis capability and advanced digital signal detection algorithms enables electronic radio transmitting targets to be found quickly and accurately.

The Unit

Below shows the front and rear profiles of the ScanLock M3 Unit:



Battery Door



Multi-Function Antenna (M3 Advanced Option)



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Getting Started

This section covers setting up the ScanLock M3 ready for operation with a basic description of the controls and how to use the ScanLock M3 to Detect, Identify and locate hidden electronic devices.

Out of the box

The ScanLock M3 basic unit is supplied with a number of accessories. The actual specification of the accessories will vary from country to country dependant on supply voltage.

The ScanLock M3 basic consists of;

- ScanLock M3 Unit
- Monopole Antenna
- AC/DC power adaptor
- Mains Lead (Type depending on Country)
- Shoulder Strap
- Headphones (Folding)
- 2m RF Extension Lead
- Test Transmitter
- Manual

The ScanLock M3 Advanced Additional Equipment;

- Multi-Functional Antenna
- M3 PC Analysis Software

Charging the battery

The ScanLock M3 is shipped with the battery pack reversed in the battery compartment. Remove battery pack and insert the battery the correct way round as shown below:



Remove battery compartment door.



Remove and turn battery pack round and insert battery pack as shown



Replace battery door.

The battery pack should now be fully charged before use. Connect the AC/DC adaptor to the unit and charger for approximately 2 hours or until the Green LED is Lit.

WARNING: Only factory supplied, batteries should be inserted into this compartment.

Battery

The internal rechargeable Lithium Ion battery pack gives approximately 4 hours continuous use and is automatically re-charged when external power is applied to the ScanLock M3 via an external AC/DC adaptor.

Internal protection circuitry protects the battery against over voltage, over current, short circuit and reverse polarity connections.

WARNING: This input should only be connected to a 12v DC @ 4.16A, reverse polarity, overvoltage and over current protected external AC to DC adaptor as supplied by Audiotel.

Switching the unit On (and Off)

To switch the ScanLock M3 unit “On” press the “On / Off” switch.

The unit will perform a self-test and calibration during which scrolling LED will be displayed on the screen (this will take approximately 90 seconds).

Once the initialisation is completed the main screen will be displayed, giving a list of signals found.



The unit can be switched “Off” at any time by pressing the “On / Off” switch.

Screen Layouts

The ScanLock M3 uses a 640 by 480 colour TFT screen and has four basic layouts. The Man Machine Interface is purely Icon based.

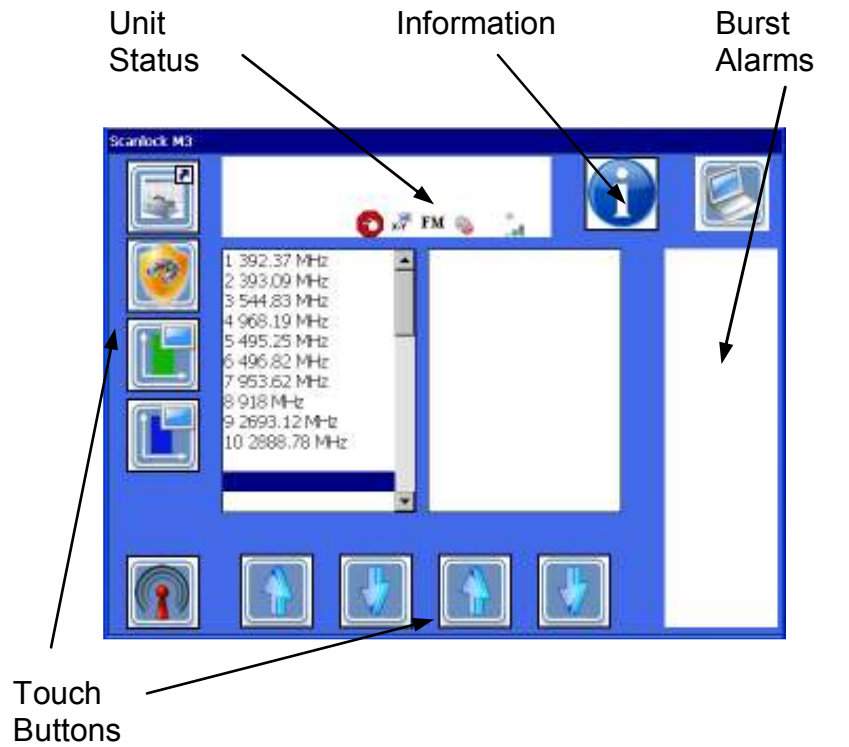
Help

On screen help can accessed by selecting the icon from any screen.



The Information Icon will change state to Green to indicate Help mode and by selecting an icon will display a message giving a brief description for the button function, continual press of icons will display further messages. To exit Help mode select the information icon again and it will return to its original Blue state.

Initial Screen



Selecting this icon will display the Detect Screen.



Selects the Harmonic Display



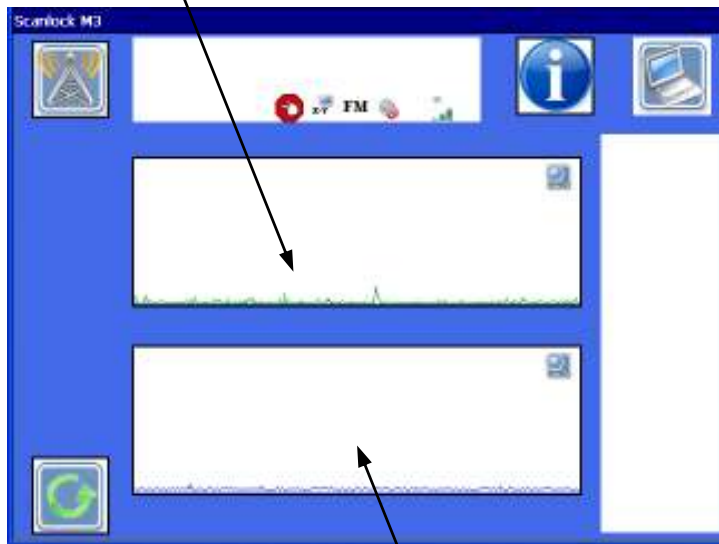
Selects the Broadband Display



Selecting this icon will rescan the RF background.

Detect Screen

Composite
Harmonic Display

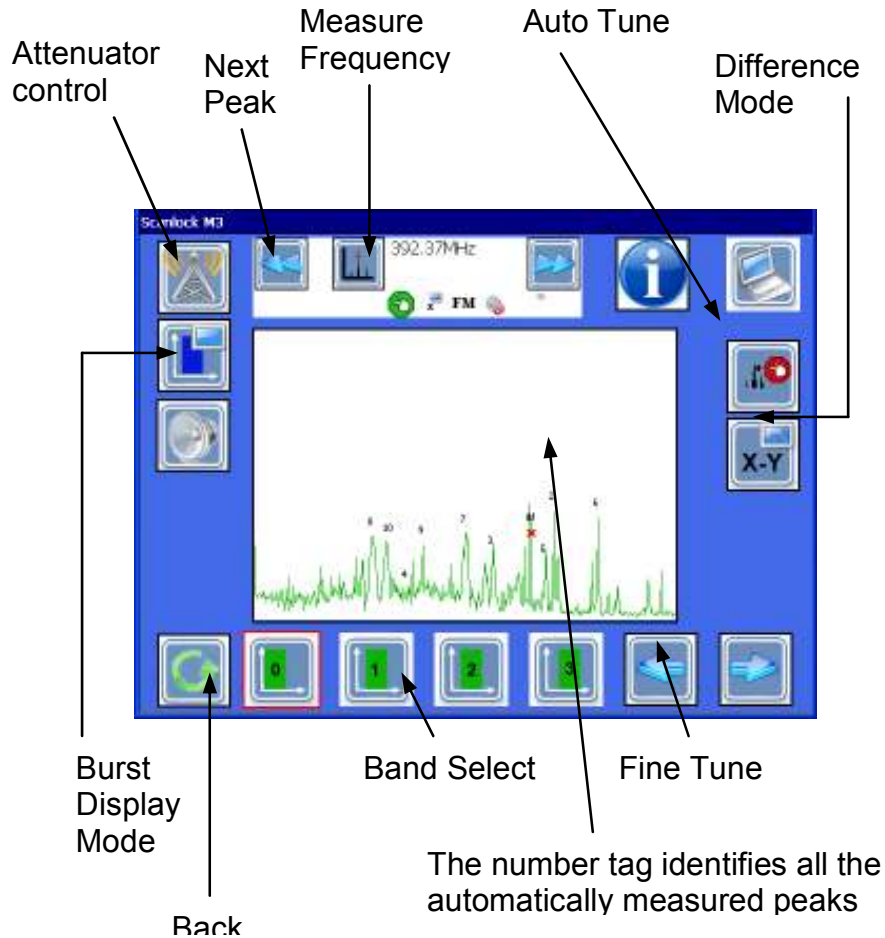


Composite Burst
Display

Note: - The ScanLock M3 is scanning all the Harmonic and burst bands and any new signals will be displayed on the screens. The screens are composite displays of the four harmonic bands and the four non mobile burst bands.

The harmonic screen is displayed in difference mode.

Harmonic Screen



Note: - The ScanLock is only scanning the band selected.

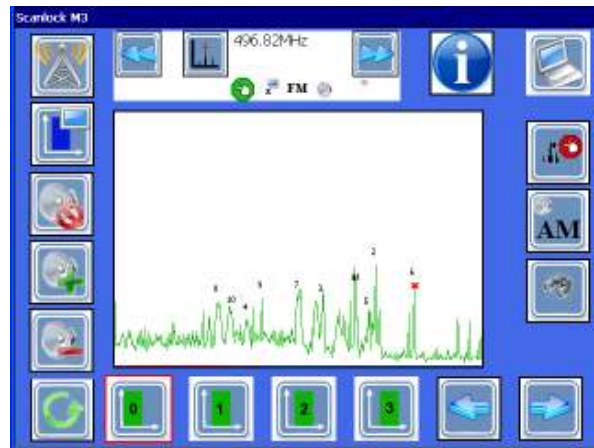
If the receiver is overloaded the Attenuator Icon will change state as shown below;



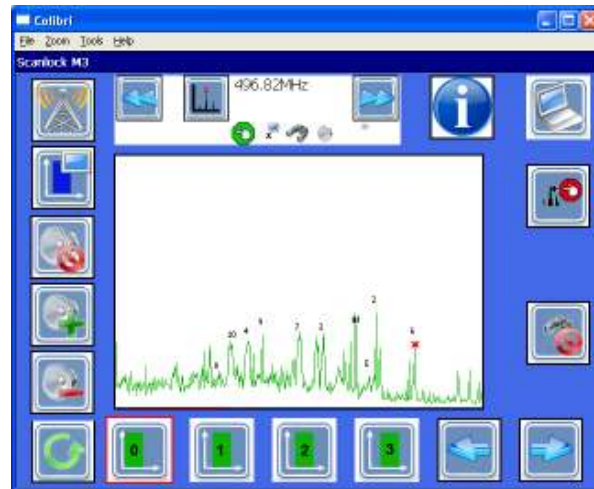
Selecting this icon will switch in 15dB of attenuation, pressing it again will add an additional

15 dB's. Further press of the Attenuator icon will remove 15dB of attenuation. Varying levels of attenuation is denoted by the different size antenna within the icon.

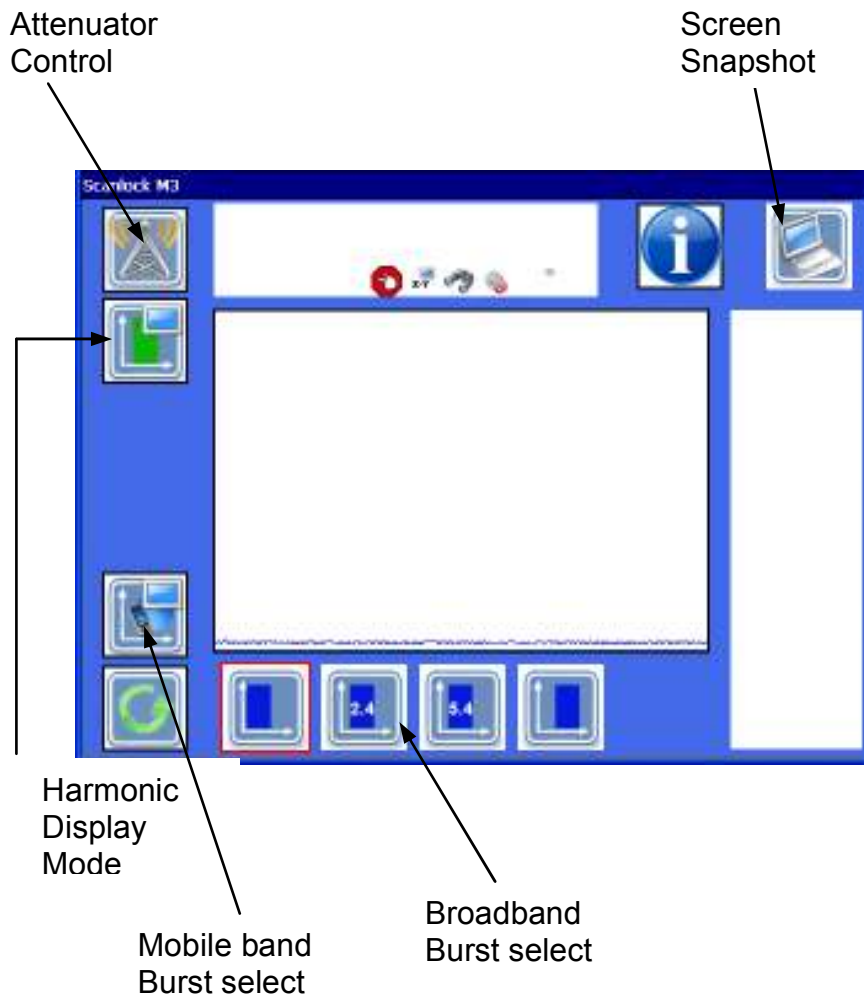
Audio Mode Screen



Geiger Mode Screen



Burst Screen

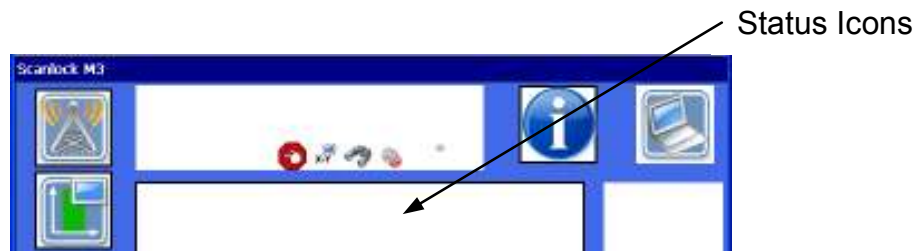


Note: - The ScanLock M3 is only scanning the band selected.

Attenuator control is only available for 10MHz - 2.5GHZ and 2.5GHz to 10GHz bands.

Status Bar

The display incorporates a status window, and a sample screen is shown below:



These Icons give the user an indication of the setup of the ScanLock M3 and a brief description of these is given below.



Volume level set



Speaker Muted



Audio Demodulation



Harmonic Display in Difference Mode



Harmonic Display in Spectrum Mode



Auto Tune ScanLock M3 locked on to Strongest Signal in the selected band.



Manual Tune, operator selects signal of interest in the selected band.



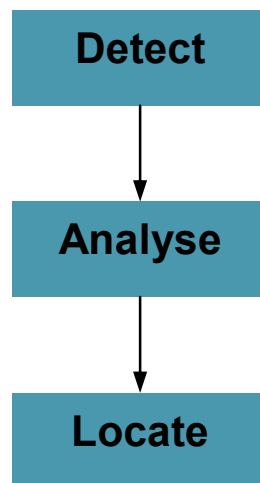
Receiver overloaded.



ScanLock M3 in Locate Mode

Basic Operation

The basic operating method for using the ScanLock M3 follows three sequential steps.



The equipment is located within the search area and switched on.

Detect Mode

As part of the initialisation and start up the ScanLock M3 scans the RF back ground and list all the signals found. A screen shot after initialisation is shown below:



The highest 10 CW signals from each band plus one manual measure are listed on the left hand panel with burst listed on the right hand panel. Each frequency is identified by a tag and the following numbering convention is used:

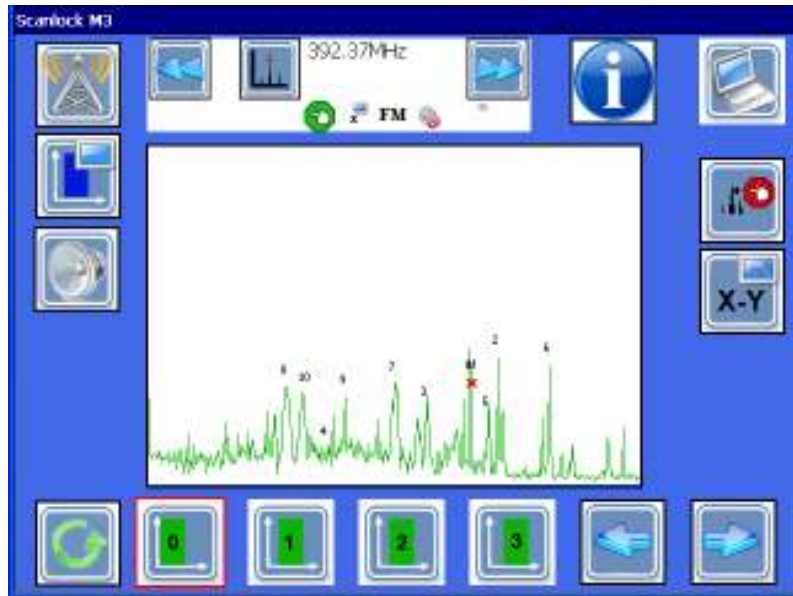
- 1 – 11 Band 0
- 12 – 23 Band 1
- 24 – 35 Band 2
- 36 – 47 Band 3

The right hand panel lists the Digital signals found and the associated icon being displayed in the Alarm panel.



Selecting this icon will rescan the RF background.

Using the UP/DOWN arrows to highlight the signal of interest and then tapping that list area will display that signal band and for harmonic signals a marker will be placed on the signal of interest a sample screen is show below for signal number 1 from the harmonic list.



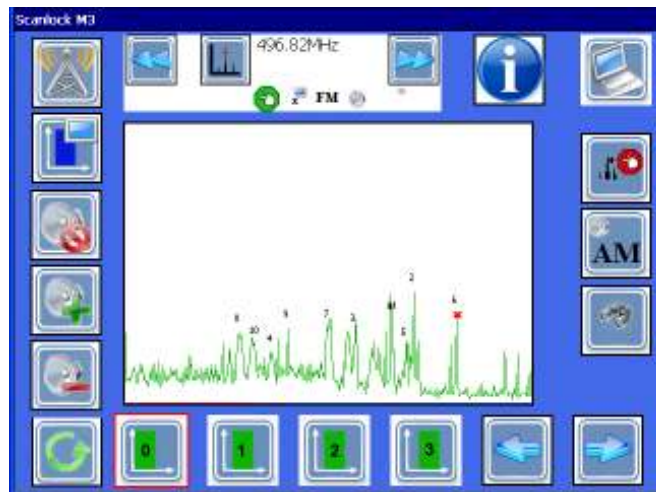
Signals that have not been automatically listed can be measured using the measure icon.

Background signals which have been measured can be analysed for any FM/AM content as described in the Analyse section of this manual. Once all the signals have been checked the ScanLock M3 is set into continuous scanning mode.

Analyse Mode

Listed signals can now be analysed to identify any suspicious signals. This can be done through knowledge of local RF signals, comparison of previous scan lists or using FM/AM demodulation to check for audio.

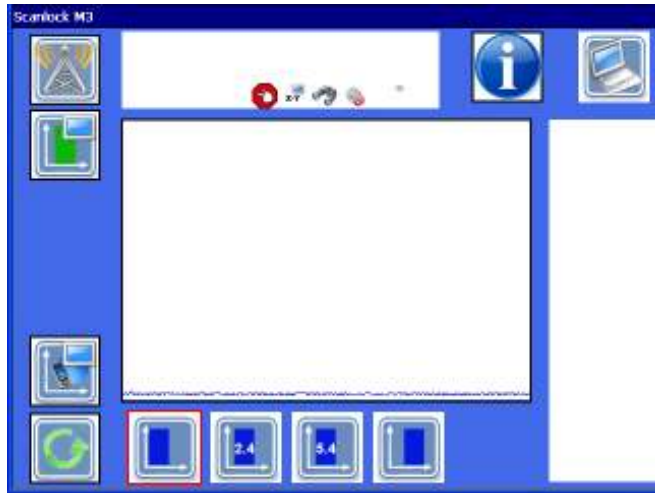
Using the next peak arrow the marker will move to all known peaks. Selecting the Volume icon will allow the operator to demodulate any FM or AM for the selected signal.



Note: - When in audio mode the display will stop updating but the marker will move to different peaks when the next peak icon is pressed.



Using the Burst Display icon will switch the display from Harmonic to burst; a sample screen is shown



The screen below shows mobile communications bands



Locate Mode



Connecting the 2m RF cable from the monopole antenna to the ScanLock M3 will make locating hidden devices easier.

Setting the unit into difference mode, auto tune and locate from the volume menu will allow the operator to search the room for transmitting devices or locate a suspicious signal. As the operator approaches a local transmitting device the Geiger will increase in intensity. If the receiver is overloaded before the transmitting device has been located, selecting the Attenuator Control icon will reduce the signal level to the receiver and allow the search to continue so that the transmitting device can be located.

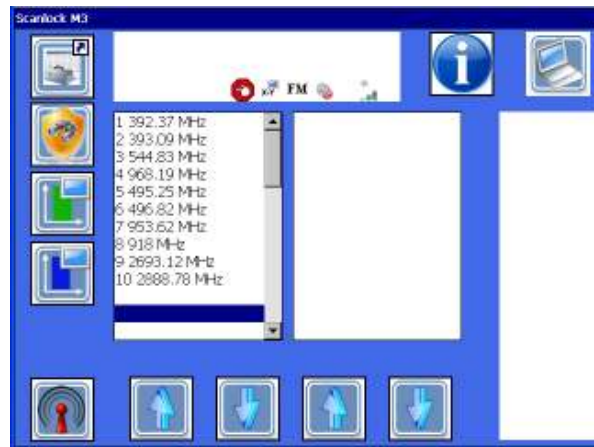


If the signal of interest is not the strongest signal, selecting Manual tune will allow the operator to select a signal for the locate Geiger tone.

Searching Technique



Selecting this Icon on the top level display will set the ScanLock M3 into continuous scanning mode and will take the operator to the Detect graphs and a sample screen is shown below:



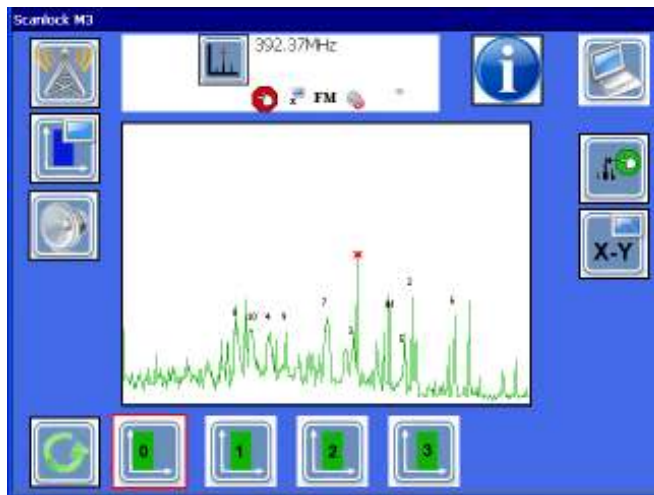
In this mode the ScanLock M3 is scanning all the Harmonic and burst bands and any new signals will be displayed on the screens, digital signals which have been identified will have the appropriate alarm icon displayed. The screens are composite displays of the four harmonic bands (shown in difference mode) and the four non mobile communication burst bands.

The ScanLock M3 is moved around the target area whilst sweeping the antenna over the surfaces of walls and furniture. Should a covert analogue transmitter have been planted within the target area as the operator approaches the device a new signal will appear on the harmonic display and will increase in amplitude as the operator gets closer where as background RF signals should have a relatively constant power over the target area. Once the signal level of a suspicious signal is large enough its frequency and any potential FM/AM content can be ascertained.

The screen below shows a spurious signal which has been located.



At this point the operator does not know which band the signal is located in, by tapping the harmonic display band 0 is displayed full size as shown below.

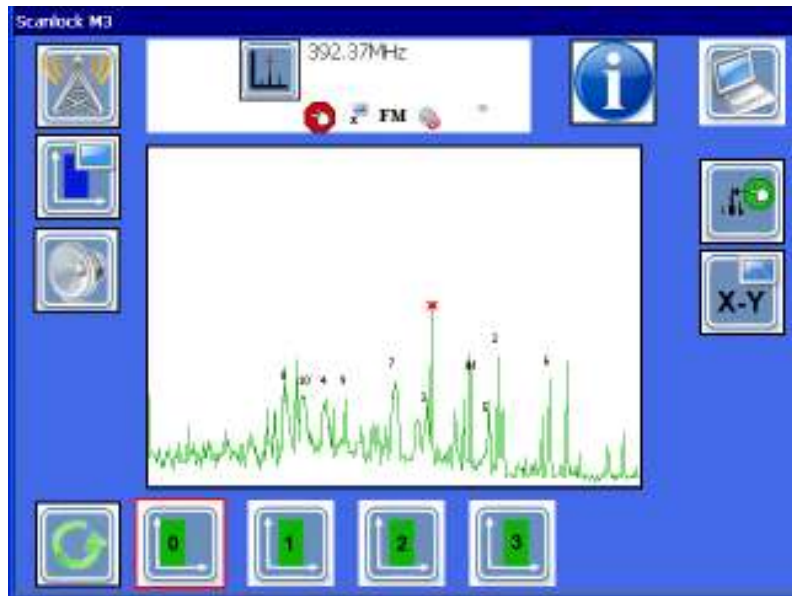


At this point the ScanLock M3 is in difference mode and in auto tune, it easily shows that the suspicious signal is in band 0. If the signal did not appear it signifies that it is in

another band so step through band 1 - 3 until the signal is found.



Now the frequency of the signal can be measured by selecting the frequency measure icon.

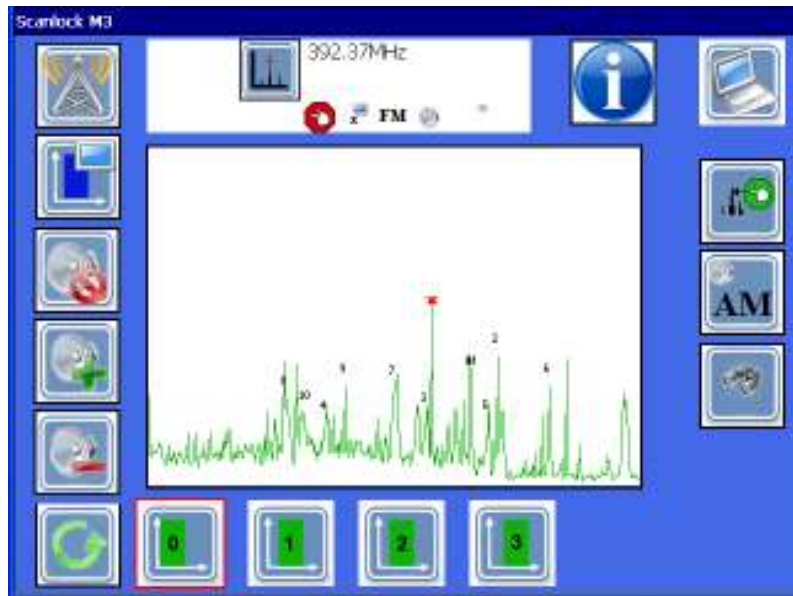


Once the frequency has been measured an 'M' is placed above the red cross.




The signal can now be analysed for any FM/AM content by selecting the Volume Icon.

Once the volume icon has been selected the screen changes to allow additional functions to be displayed as show below.



Any FM signal will be heard subject to volume level setting, selecting AM will allow amplitude modulated signal to be heard.

Note: - When in audio mode the screen will stop updating.

 Selecting the locate icon will switch the audio output to Geiger to enable the user to locate the source of the transmission.

Note: - For signals located in band 0, the monopole antenna is far superior at locating sources.

Technical Specifications

ScanLock M3 Basic

- Harmonic Receiver
 - Near DC to 5GHz in 2 Bands.
 - Sensitivity Better than -50dBm
 - Dynamic range greater than 50dBm
- Man machine interface
 - Display TFT 640 x 480 VGA LCD
 - Screen update
 - 2 x per second in scan mode
 - 5 x per second in locate mode
- General
 - Size 270mm x 170mm x 80mm
 - Unit weight 2.1Kg
 - Environmental benign office environment +5C to +35C
- Connectivity
 - USB for software upgrades
 - Disabled RJ45 for Ethernet interface
- Battery Life
 - 4 hours on internal Lithium Ion battery pack
- External PSU
 - 12V DC 4Amp
- Supplied with a Mono Pole Antenna, Test transmitter, Manual and accessory kit.

ScanLock M3 Advanced

Same as above plus the following:

- Harmonic Receiver
 - Near DC to 10GHz in 4 Bands.
 - Sensitivity Better than -50dBm
 - Dynamic range greater than 50dBm

- 28 -

-
- Multi-Functional Head
 - Broadband Detectors
 - 10MHz to 10GHz
 - Sensitivity Better than -50dBm
 - Dynamic range greater than 50dBm
 - ISM Band Detectors
 - 2.4GHz and 5.8GHz International bands
 - Sensitivity Better than -50dBm
 - Dynamic range greater than 50dBm
 - 3G, GSM Detectors
 - Covering Worldwide mobile Communication bands
 - Sensitivity Better than -50dBm
 - Dynamic range greater than 50dBm
 - Man machine interface same as Basic model
 - M3 PC Analysis software
 - Supplied with a Mono Pole Antenna, Multi-functional antenna, Test transmitter, Manual and accessory kit.

Alarm Icons



Mobile Commutations UMTS or CDMA



Bluetooth



Digital Cordless Telephone



Mobile Communications GSM



Unidentified Burst Transmission



Analogue Video transmission



Wireless LAN

MMI Icons



Monopole Antenna attached



Multi-functional Antenna attached



Re-Scan RF Background



Display Detect Screen



On screen Help



Scroll Up/Dwn arrows



Antenna gain control (0dB of attenuation)



ScanLock M3 Receiver overloaded



15dB of attenuation added



30dB of attenuation added



Back to top level screen



Toggles the display between Burst and Harmonics



Audio control



Increase volume level



Decrease volume level



Toggle between AM & FM demodulation



Toggle between Geiger and Audio demodulation mode



Selects Manual Peak Tune for Harmonic display



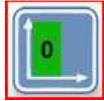
Selects Auto Peak Tune for Harmonic display



Selects Spectrum Mode for Harmonic display



Selects Difference Mode for Harmonic display



Harmonic Band 0 select, Red outline indicates selected Band.



Harmonic Band 1 select



Harmonic Band 2 select



Harmonic Band 3 select



Broadband Burst band Low band select, Red outline indicates selected Band



Broadband Burst band 2.4GHz band select



Broadband Burst band 5.4GHz band select



Broadband Burst band High band select



Selects Burst Detectors for Mobile Communication Bands



Selects the 1950MHz Mobile Communications band, Red outline indicates selected Band



Selects the 1800MHz Mobile Communications band



Selects the 1900MHz Mobile Communications band



Selects the 850MHz Mobile Communications band



Selects the 900MHz Mobile Communications band



Selecting the config icon brings up the network setting display



Indicates that the Control of the ScanLock M3 Unit is via the screen you are looking at



Indicates that the Control of the ScanLock M3 Unit is not via the screen you are looking at

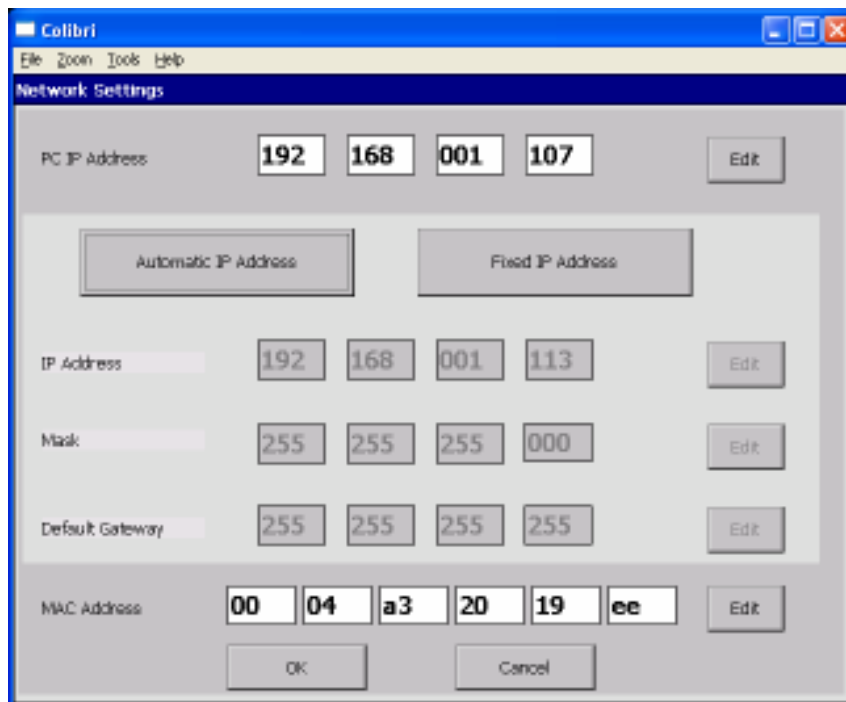
Network Settings

The ScanLock M3 Advanced system is supplied with PC analysis software, the ScanLock M3 unit will need to be configured in order to communicate with the host PC.



PC IP Address can be found out by selecting the configure icon on the PC display software. Enter the PC IP address.

If the ScanLock M3 is to be operated over a network, then Selecting the Automatic IP address will display the screen below and no further data entry is required.



The screenshot shows a window titled "Calibri" with a menu bar containing "File", "Zoom", "Tools", and "Help". The main area is titled "Network Settings". It features several input fields and buttons:

- PC IP Address:** Four input boxes containing "192", "168", "001", and "107", followed by an "Edit" button.
- IP Address Selection:** Two buttons: "Automatic IP Address" (selected) and "Fixed IP Address".
- IP Address:** Four input boxes containing "192", "168", "001", and "113", followed by an "Edit" button.
- Mask:** Four input boxes containing "255", "255", "255", and "000", followed by an "Edit" button.
- Default Gateway:** Four input boxes containing "255", "255", "255", and "255", followed by an "Edit" button.
- MAC Address:** Six input boxes containing "00", "04", "a3", "20", "19", and "ee", followed by an "Edit" button.
- Bottom Buttons:** "OK" and "Cancel" buttons.

If the ScanLock M3 is to be connected directly to the Host PC then an Ethernet cross over cable will be required and Fixed IP option needs to be selected.

Set the ScanLock M3 IP address within the address range of the Host PC and set the Mask and default Gateway as given in the example below:

The screenshot displays the 'ScanLock M3 Settings' window. It features several input fields for network configuration:

- Host Address:** 192, 168, 001, 107
- Subnet Mask:** 255, 255, 255, 000
- IP Address:** 192, 168, 001, 113
- Mask:** 255, 255, 255, 000
- Default Gateway:** 255, 255, 255, 255
- MAC Address:** 00, 04, a3, 20, 19, ee

Buttons for 'OK' and 'Cancel' are located at the bottom of the window.

