QAM Shadow User's Guide

DDF Series: Digital Dual-Frequency

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Technical Support

ComSonics maintains a Technical Support Service for customer convenience. Representatives may be contacted Monday - Friday: 8:00 a.m. - 5:00 p.m. Eastern Time by phone at 1-800-336-9681 or 540-435-4352; or by E-Mail at Tech-Support@ComSonics.com.

Product information and software updates are available for download at www.ComSonics.com.

Introduction

The ComSonics Dual Frequency Digital (DDF) Series QAM Shadow™ is a compact, lightweight cable signal leakage detector designed for in-home use. Working with ComSonics QAM Markers™ installed at the local cable system head-end or hub and the new Mini Mobile Marker (M3), the QAM Shadow™ provides technicians with both visual and audible indications of signal leakage in both the VHF and UHF bands allowing them to find and repair in-home leaks that would otherwise go unrepaired.

General Operation

The QAM Shadow™ has one multifunction button on the front.

Turning the Unit On and Off:
The QAM Shadow™ can be turned ON using two different methods. If the lid is closed, momentarily pressing the front button will power the unit on. The speaker will make a brief sound to confirm power is on. The LED at the top of the unit will begin to flash about every 15 seconds to also confirm the power on the unit is on. The second method to turn the unit on is to simply lift the lid. The screen will activate and a short sound will confirm the unit is turned on.

To turn the QAM Shadow™ OFF, press and hold the button for approximately 5 seconds. The speaker will also emit a tone on power off. This will work with the lid either open or closed. Note, if the lid is open, the device will emit a sound after two seconds during the button push. This initial sound is not related to power down but rather to changing the detection frequency. Continue to hold the button for 5 seconds and the next sound will indicate power down. The screen will also turn off as well. Note: Closing the lid does not turn the device off. The QAM Shadow™ can **only** be turned off via a 5 second button push.

Modes of Operation
The QAM Shadow™ has two modes of operation: (1) Measure Mode and (2) Monitor Mode

The unit is in Measure Mode when the lid is **open** and the display is active. In this mode, the unit is actively displaying any detected leakage and will simultaneously emit a warble tone as a secondary indicator of leakage.

The unit is in Monitor mode when both the Lid is closed and the unit is powered on. In Monitor Mode the indicator LED flashes green at every 15 second interval. If the user closes the lid while the unit is still on, the device will automatically enter the Monitor Mode.

Detecting Cable Leakage
When cable leakage is detected, either in monitor or measure mode, the internal speaker emits a warble tone to warn the technician. The QAM Shadow™ detects leakage at both 138 MHz (VHF) and 612 MHz (UHF) for standard systems using NTSC 6 MHz QAMs or at 139MHz and 614MHz for PAL based systems using 8 MHz QAMs. The QAM Sniffer produces unique tones for each frequency detected: lower frequency tones for 138/139 MHz leaks and a higher frequency tones for 612/614 MHz leaks. This

allows the technician to differentiate between the detected frequencies without needing to look at the display. If both frequencies are detected, both tones will sound in an alternating sequence. The QAM Shadow™ will now simultaneously detect both the Marker and M3 leakage. This means there are 4 unique warble sounds that can be produced: VHF Marker, VHF M3, UHF Marker, and UHF M3. A maximum of two warbles will sound during any mode of operation.

Monitor Mode

The Monitor Mode is active when the QAM Shadow™ is on and the lid is closed. In this mode the QAM Shadow™ samples for leakage every 15 seconds with a corresponding green LED flash to indicate measurements are being made. The device automatically monitors both 138/139 MHz and 612/614 MHz when in Monitor Mode. When a Marker leak is detected at a level exceeding the Monitor Mode Squelch setting, the speaker will emit a short warble tone that is associated with the detected frequency. If leakage is detected at both frequencies, the warble tone will sound for both the 138/139 MHz tone and the 612/614 MHz tone. Pressing the front button momentarily will mute the warble tone for five minutes. Opening the display cover will cancel the mute. The Monitor mode also monitors for M3 leaks as well and will emit a short warble similar to the leakage warnings.

Measure Mode

Opening the lid activates Measure Mode and will also illuminate the display backlight for approximately ten seconds. Measure Mode allows technicians to take continuous leakage measurements. Momentarily pressing the button reactivates the backlight for another 10 seconds.

When in the Measure mode the QAM Shadow™ monitors both the 138/139 MHz **AND** 612/614 MHz frequencies. It automatically switches between the two frequencies approximately every two seconds. In addition, the QAM Shadow™ simultaneously detects both the Marker and M3 leakage at each frequency. Thus there are 4 measurements that are automatically being measured: the Marker and M3 at 138/139 MHz and the Marker and M3 at 612/614 MHz. The benefit to the technician is that it allows them to do a single sweep of an area such as a house without having to switch frequencies. It also provides operational simplicity as the tech can now simply open the lid and the device will automatically scan both frequencies and both signal types… without the tech performing any additional steps.

Selecting a Fixed Frequency

When cable leakage is detected, the QAM Shadow™ will continue to automatically switch between the VHF and UHF frequencies approximately every 2 seconds. The technician may desire to have the device monitor a single frequency of choice in a continuous mode. This can be done by pressing and holding the button for 2 seconds to cycle between the UHF and VHF frequencies. The 1st two second button push will cycle the device to a continuous VHF frequency measurement only. The 2nd push of the button will cycle the device to a continuous UHF frequency measurement only. Each subsequent two second push will continue to cycle between the two frequencies. In order to return the device to the default two frequency scan, the user can close and reopen the lid.

A short series of tones rising in pitch will be heard when switching to the UHF only frequency and a short series of tones decreasing in pitch are heard when switching to VHF only frequency. The front LED light will also indicate which frequency the detector is set at by flashing at a different rate: just under once a second for 612/614 MHz, and just under 2 seconds for 139/139 MHz. The small antenna above the bar graph will also flash at a faster or slower rate depending on the frequency selected. Note that the LED and antenna indicators only provide useful information when the device is set to a single frequency.

Marker vs M3 Detection

Approximately every one second the QAM Shadow™ scans for both Marker and M3 leakage simultaneously, one second for each band. The design intent is to simply the operation by eliminating the need to put the QAM Shadow™ into a special M3 mode of operation. If a signal from a Marker is detected at one or both frequencies, the QAM Shadow™ will produce the appropriate warble for each marker detected. However if a M3 leakage signal is detected, it always takes priority over a Marker signal (at the same frequency); therefore the QAM Shadow™ will only provide a M3 warble. In other words, if a Marker and a M3 leak were found at the same frequency band, the QAM Shadow™ will only warble and display the information related to the M3 leak. In another scenario where there is a Marker signal on one frequency band and a M3 signal on the other band, the QAM Shadow™ will then warble and display the level for each of the two signals as it alternates back and forth between bands. If this occurs, it is recommended that the tech switch the mode of operation to a single frequency band to either monitor the Marker or M3. The reasoning behind the M3 priority is to allow a technician who is using an M3 to troubleshoot or qualify a network to mask out the unwanted Marker detection. They only are interested in finding M3 leakage.

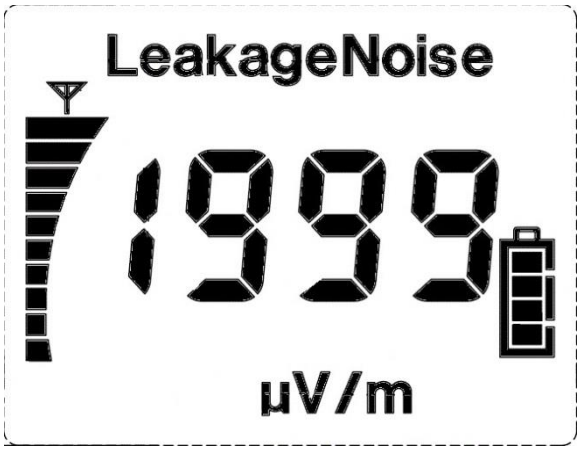

Figure 1: QAM Shadow DDF Display

Leakage measurements are displayed in large, easy to read numbers. The leakage level bar indicator on the left of the display shows the relative leakage level. If an RF field is present but does not contain the QAM Marker™ or M3 signal, “NOISE” will be displayed above the numbers. If the QAM Marker™ or M3 signal is detected, “LEAKAGE” is displayed. In addition, if the M3 signal is detected, the units of measure indicator (uV/m) will start flashing. If the signal strength exceeds the Measure mode Squelch setting, the warble tone, based on the frequency and type of signal detected, will sound.

A visual battery indicator is shown at the lower right corner of the display. The unit of measure is displayed below the signal strength numbers near the bottom of the screen.

Volume Control: The volume level may be adjusted when the device is in Measure Mode. A momentary press of the button will active the backlight. Subsequent presses of the button will then step the volume through the range of settings. The settings are: MUTE, 1, 2, 3, 4, and 5 with 1 representing

the lowest volume and 5 representing the highest volume level. Once the maximum volume is reached, the setting will roll over and start with MUTE. A beep will be emitted (except on mute) each time the button is pressed to indicate the new volume level selected.

Battery Care

An internal Lithium Ion rechargeable battery powers the QAM Shadow™. Charge the battery for three hours before using the unit for the first time. Only use the included AC Charger, the optional DC Charger, or a connected Personal Computer to charge the battery. Use of other chargers may cause equipment failure, create a safety hazard, and void the warranty.

The QAM Shadow™ has one visible multifunction LED indicator light. The light will turn red when the unit is charging. It turns green when the battery is fully charged. If the ambient temperature is out of range (too hot or too cold), the light flashes green/red and the battery will not receive a charge. This feature prevents premature failure of the battery due to charging at temperature extremes.

The unit will automatically power off to protect the battery from excessive discharge after 15 minutes of non-use or detecting a leak in Measure mode or 8 hours in Monitor mode. The QAM Shadow™ should not be operated while charging the battery.

QAM Shadow DDF Configuration Utility

The QAM Shadow™ operates in conjunction with QAM Markers™ installed at the local head-end/hub and the M3 device. The QAM Markers and M3 generate a very specific signal for detection by the QAM Shadow™, therefore the QAM Shadow™ must be configured to recognize the specific QAM Marker™ and M3 output. This is accomplished by using the "QAM Leakage Detector Configuration Utility". Note that this file is used to configure the QAM Shadow™, the QAM Sniffer™, and the QAM Compass. ***Earlier versions of the QAM Sniffer ™ configuration utility are not compatible with the QAM Shadow™.***

Download and Install

The utility is available for download at www.ComSonics.com. New users must create a user ID and password to gain access to the site. On the Downloads tab under the "Software and Drivers" section, select the QAM Sniffer link. Locate and download the QAM Leakage Detector Configuration Utility Installation file to your PC. When the download is complete, right click on the file icon and select "Extract to Here" to extract the required installation files. After the file extraction is completed, double-click on the Setup.exe icon to begin. Follow the on-screen prompts to complete the installation process. When the installation is complete double-click the QAM Sniffer DF™ Configuration Utility icon.

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EMC Standards:
EN 61000-6-1:2007
EN 61000-6-3:2007

Return Information

Safely package products returned for repair, calibration, etc. Please enclose contact information as well as a brief description of the reason for return. Ship product prepaid to:

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Harrisonburg, VA 22801 USA