

DCR822

Compact Dual Channel Digital Receiver

DCR822-A1B1, DCR822-B1C1



Quick Start Summary

The following checklist includes the minimum required settings to start using the receiver.

- Connect power to the receiver or install batteries
- Set the COMPAT (compatibility) mode for the transmitters to be used
- Choose clean frequencies for your receiver channels using SmartTune or RF scan
- Set transmitters on the matching frequencies (see transmitter manual) or use IR sync
- Verify transmitters are set to the same compatibility mode as the receiver (see transmitter manual).
- Adjust transmitter input gain to match voice level and mic position (see transmitter manual).
- Adjust receiver output level as needed for the camera or mixer input level desired
- Turn on transmitter RF signals (see transmitter manual)



Fill in for your records:

Serial Number:

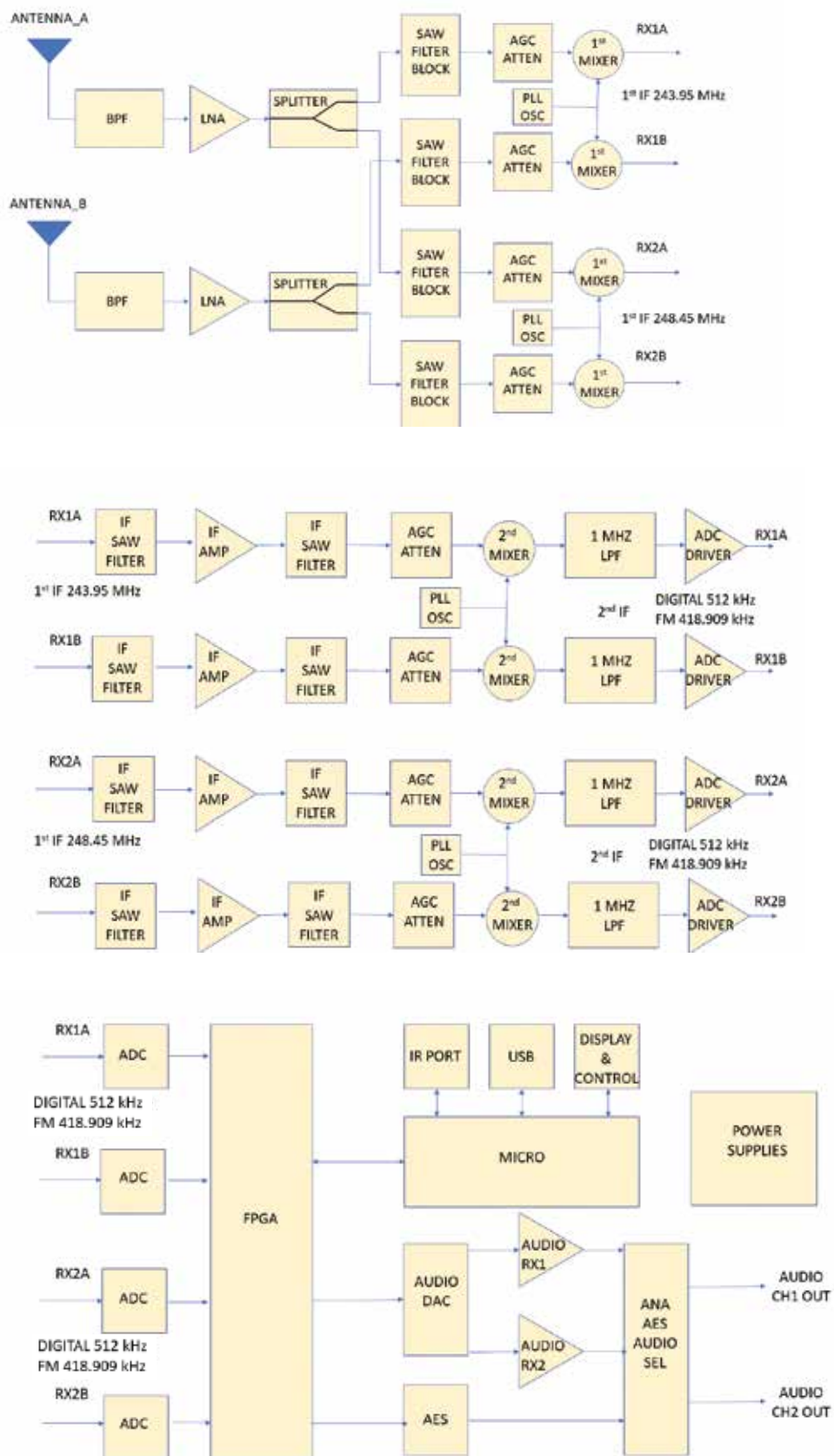
Purchase Date:

Table of Contents

General Technical Description	4
Compatibility with microSDHC memory cards	7
Front Panel Controls and Functions.....	8
MENU/SELECT Button.....	8
Power/Back Button.....	8
Up/Down Arrow Buttons.....	8
IR (infrared) Port.....	8
microSDHC Memory Card Port.....	8
Antenna Port (2).....	8
Rear Panel Features	8
XLR Audio Output Jacks	8
Power Input Jack.....	8
USB Port	8
Battery Compartment.....	8
LCD Main Window.....	9
Navigating the Menus	9
DCR822 LCD Menu Map	10
Menu Item Descriptions	13
Recovering an Interrupted Recording	16
Antenna Use and Placement	17
Antenna/Block Reference Table	18
Installation and Operating Instructions.....	19
Finding Clear Frequencies.....	19
Locking and Unlocking the Front Panel Controls	19
Diagnostics	21
Multi-channel System Checkout.....	21
Pilot Tone Bypass.....	21
Replacement Parts and Accessories.....	22
Troubleshooting.....	23
Specifications and Features.....	25
Service and Repair	26
Returning Units for Repair	26

General Technical Description

DCR822 Block Diagram



The DCR822 digital 2-channel receiver is the true successor to the venerable UCR411a - a dual-channel package in the same size - and represents state-of-the-art RF performance with Vector Diversity (an advanced type of true diversity) and extremely robust front-end architecture, bringing the highest level of RF and audio performance to field and location production.

Extremely high Third Order Intercept (IP3) performance of +15 dBm, 24-bit/48 kHz audio performance, and AES-256 CTR mode encryption ensure that professionals in all audio disciplines have the tools needed to get the job done, even in extremely tough environments. On-board recording in .WAV (BWF) format via microSDHC card give this receiver unique possibilities for different workflows.

Compatibility Modes

The DCR822 receiver was designed to operate with Lectrosonics digital transmitters from the D2, DCH and M2 series. The receiver is also backward compatible with Digital Hybrid Wireless transmitters® including those with NA Hybrid, NU Hybrid and EU Hybrid modes.

Encryption

The DCR822 receiver features AES 256-bit, CTR mode encryption, with 4 different key policies available.

Vector Diversity Reception

The DCR822 technology with Lectrosonics Vector Diversity (an advanced version of true diversity) minimizes dropouts in situations where multi-path reflections can cause serious problems. Traditional true diversity or ratio diversity methods work well for FM and Hybrid systems but fall short of the ideal for today's digital receivers. The DCR822's Vector Diversity subsystem delivers clean, artifact-free performance by combining the two receiver signals via a unique phase-matching system for maximum RF signal to noise.

RF Frequency Tracking Front-End and Mixer

In addition to the extremely high IP3 capability of the receiver, to significantly reduce unwanted interference and intermodulation problems, the DCR822 has a frequency selective front-end section that tracks and tunes to the desired signal frequency and rejects unwanted interfering signals. The low noise high current RF amplifier was designed with feedback regulation for stability and precise gain in order to handle stronger RF signals without output overload. This produces a robust front-end that is as selective as fixed single frequency designs and is suitable for use in close proximity to other receivers and transmitters commonly used in field production bag systems.

Smart Noise Reduction (SmartNR™)

The DCR822 has been meticulously designed using the best available low noise components and techniques. Nonetheless, the wide dynamic range of digital and Hybrid transmission technology, combined with flat response to 20 kHz, makes it possible to hear the

-120 dBV noise floor in the transmitter's mic preamp, or the (usually) greater noise from the lav microphone itself. (To put this in perspective, the noise generated by the recommended 4 k bias resistor of many electret lavalier mics is -119 dBV and the noise level of the microphone's electronics is much higher.) In order to reduce this noise and thus increase the effective dynamic range of the system, the DCR822 is equipped with a selectable Smart Noise Reduction algorithm, which removes hiss without sacrificing high frequency response.

The Smart Noise Reduction algorithm works by attenuating only those portions of the audio signal that fit a statistical profile for randomness or "electronic hiss". Desired high frequency signals having some coherence such as speech sibilance and tones are not affected.

The Smart Noise Reduction algorithm has three modes - **OFF/NORMAL/FULL** - selectable from a user setup screen. When switched **OFF** (the default setting for digital compat modes) no noise reduction is performed and complete transparency is preserved. All signals presented to the transmitter's front end, including any faint microphone hiss, will be faithfully reproduced at the receiver. When switched to **NORMAL**, (the factory default setting for Hybrid modes) enough noise reduction is applied to remove most of the hiss from the mic preamp and some of the hiss from lavalier microphones. The noise reduction benefit is dramatic in this position, yet the degree of transparency maintained is exceptional. When switched to **FULL**, enough noise reduction is applied to remove most of the hiss from nearly any signal source of reasonable quality, assuming levels are set properly at the transmitter. This additional noise reduction comes at the cost of some transparency for low-level room noise, yet the algorithm remains undetectable under most circumstances.

Audio Output Level

A setup screen is provided for adjusting the audio output level in 1 dB increments from -50 to +7 dBu using the front panel SEL Up and Down buttons.

Test Tone

To assist in matching the audio levels of equipment connected to the DCR822, a 1 kHz audio test tone, adjustable from -50 to +7 dBu in 1 dB increments, is available at the outputs.

Batteries

The DCR822 operates on four disposable, 1.5VDC AA Lithium batteries (recommended). Alkaline is not advised.

Power Supply

The DCR822 may be operated from an external DC power source (see Specifications & Features section for allowed voltages.) The receiver has a built-in Poly-Fuse to protect the unit. This fuse automatically resets if the power supply is disconnected for about 15 seconds. The power section also has protection circuits that prevent damage to the receiver if a positive ground power source is applied.

OLED Display

The display has four primary windows. Pressing the Front Panel MENU button steps through each of these windows.

After power is turned off and back on again, the unit defaults to the Main window and to the most recent frequencies, audio level, transmitter battery condition, and other user settings. These settings are retained even if the batteries are removed. The display illumination can be set to time out in 5 seconds, 30 seconds, or never.

Recorder Function

The DCR822 has a built in recording function for use in situations where the absolute minimum equipment is necessary, or as a backup to the main recorder system.

The recorder samples at 48kHz rate with a 24 bit sample depth. The micro SDHC card also offers easy firmware update capabilities without the need for a USB cable or driver issues.

Clock Function

The DCR822 has a built-in calendar and clock that are saved with power down. If the batteries are removed from the unit, the DCR “remembers” where it left off and resumes time and date counts from that point.

Power Off

When the Front Panel Power/Back button is pressed for several seconds, the audio output is instantly muted (squelched) and the message “POWERING OFF...” is displayed briefly before the receiver switches off.

Compatibility with microSDHC memory cards

Please note that the DCR822 is designed for use with **microSDHC memory cards**. There are several types of SD card standards (as of this writing) based on capacity (storage in GB).

SDSC: standard capacity, up to and including 2 GB – **DO NOT USE!**

SDHC: high capacity, more than 2 GB and up to and including 32 GB – **USE THIS TYPE.**

SDXC: extended capacity, more than 32 GB and up to and including 2 TB – **DO NOT USE!**

SDUC: extended capacity, more than 2TB and up to and including 128 TB – **DO NOT USE!**

The larger XC and UC cards use a different formatting method and bus structure and are NOT compatible with the recorder. These are typically used with later generation video systems and cameras for image applications (video and high resolution, high speed photography).

ONLY microSDHC memory cards should be used. They are available in capacities from 4GB to 32GB. Look for the Speed Class 10 cards (as indicated by a C wrapped around the number 10), or the UHS Speed Class I cards (as indicated by the numeral 1 inside a U symbol). Also note the **microSDHC** Logo.

If you are switching to a new brand or source of card, we always suggest testing first before using the card on a critical application.

The following markings will appear on compatible memory cards. One or all of the markings will appear on the card housing and the packaging.

Speed Class 10



UHS Speed Class 1



UHS Speed Class I



Stand-alone



UHS Speed Class I

Accompanying
microSDHC logo

microSDHC Logo is a trademark of SD-3C, LLC

Front Panel Controls and Functions

MENU/SEL Button

The MENU button accesses the available menus and selects the desired setting.

Power/Back Button

The Power ON/OFF button is used to turn the receiver on and off. When browsing menus and making changes to settings, press back to return to previous menu.

Up/Down Arrow Buttons

The Up/Down arrow buttons are used to scroll the various options within each menu selection.

IR (infrared) Port

Settings can be transferred between transmitter and receiver or receiver and receiver.

microSDHC Memory Card Port

Antenna Port (2)



Rear Panel Features

XLR Audio Output Jacks

This is a standard XLR configuration with pin 2 “positive” with reference to hand-held and plug-on transmitters. With lavalier microphones and belt-pack transmitters, however, phase will vary with different types of microphones (2-wire vs. 3-wire for example). The audio output is balanced but not floating, so an unbalanced signal is available using pin 1 as ground and pin 2 as signal, leaving pin 3 open.

Power Input Jack

The power input jack can accept 9-17 VDC - the center pin is positive and sleeve is ground. The input is diode protected to prevent damage if the power is applied with reversed polarity, but the unit will not work until the reversed polarity condition is fixed. The unit is sent with a locking plug.

USB Port

The USB port can be used to connect the DCR822 to the Lectrosonics Wireless Designer software (pending).

Battery Compartment

Four AA batteries are installed as marked on the side panel of the receiver. The battery door is hinged and remains attached to the housing.



Main Window (LCD)

The Main Window displays information concerning the RF levels at each antenna per channel, the condition of the Pilot Tone (Hybrid) or Link (digital), and battery conditions for both the receiver and the associated transmitters. It is also the access portal to menu selections for setting up the receiver and searching for clear frequency channels. (See Menu Selections from Main window and Frequency Scan Mode.)



Navigating the Menus

From the Main Window, press MENU/SEL to enter the menu, then navigate with the UP and DOWN arrows to highlight the desired setup item. Press MENU/SEL to enter the setup screen for that item. Refer to the menu map on the following pages.

Replacing the Batteries

Lift the battery door to unlatch, push slightly forward and open it.

Observe the battery contacts inside the compartment. The larger contact is the neg. (-) terminal and the smaller contact is the pos. (+) terminal.

Insert the contact end of the battery first, making sure the large terminals are aligned with the large contacts in the compartment.

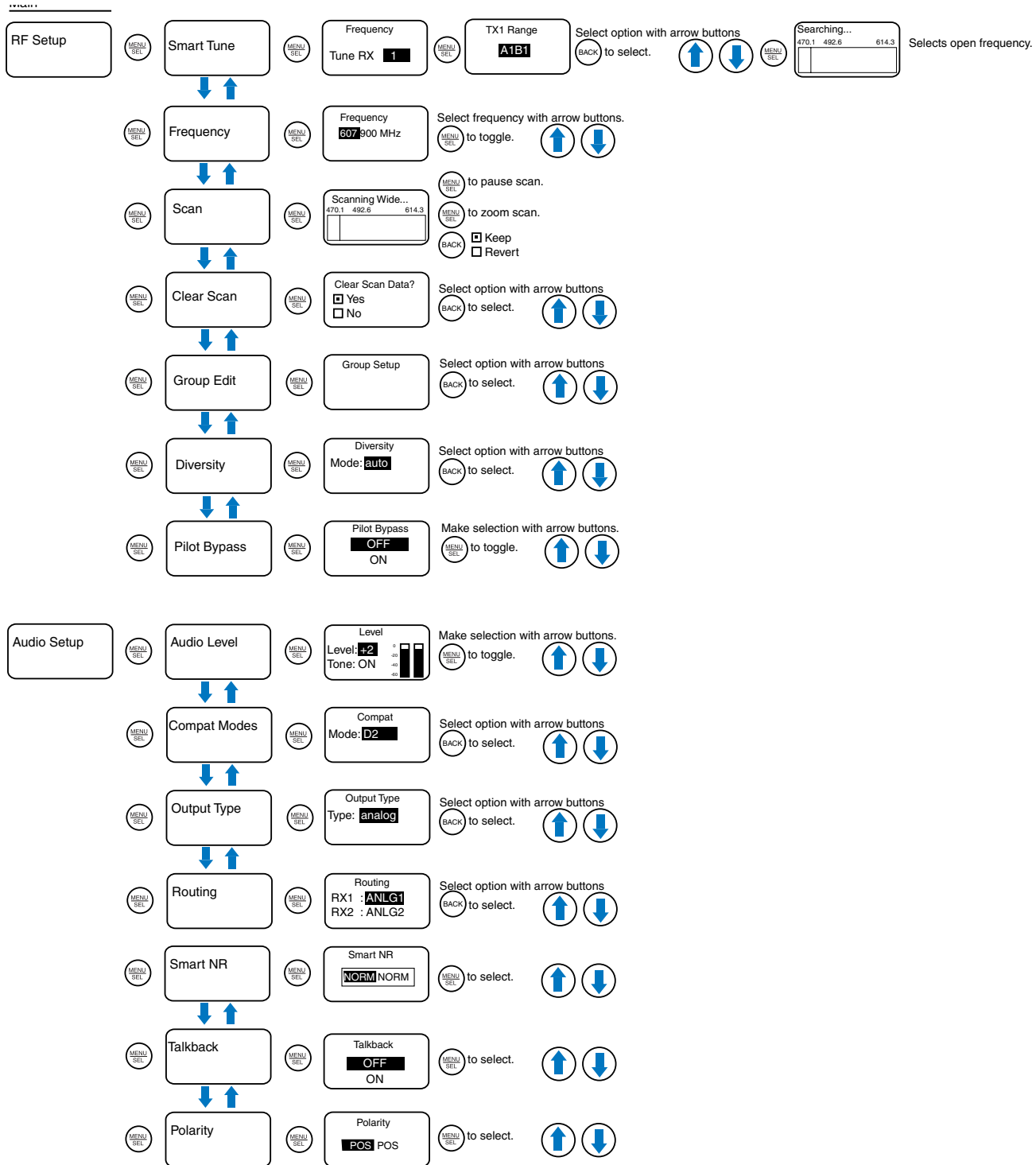
Depress the batteries slightly to allow the door to close, then push slightly forward to latch shut. The battery contacts are spring loaded to maintain constant pressure. The door will snap into place when it is fully closed.

CAUTION: Lithium batteries will expand and swell if allowed to go into a deep discharge. Be sure to remove lithium batteries as soon as possible after they are depleted. If lithium batteries are allowed to fully discharge while still inside the battery compartment, they will be very difficult to remove.

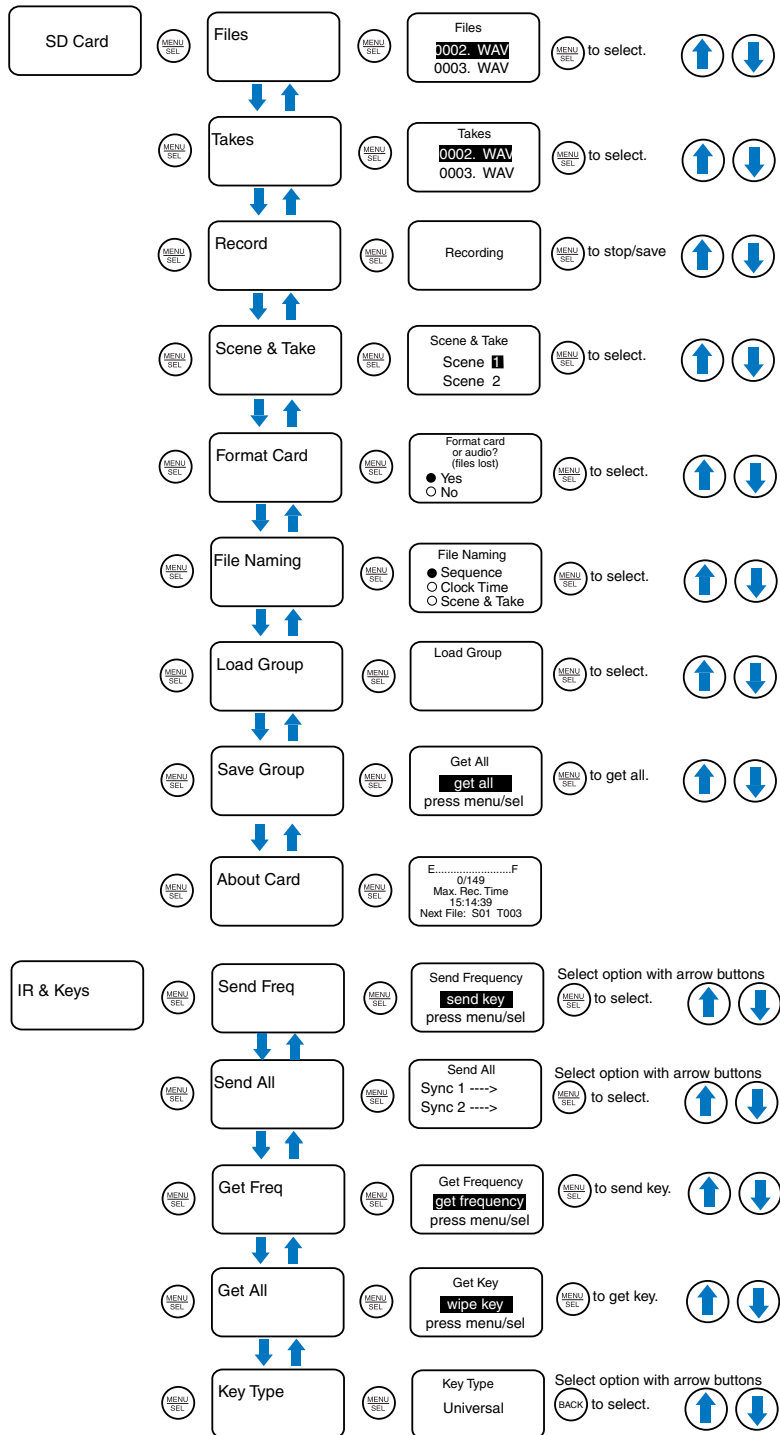
Stuck lithium batteries can be avoided by removing the label wrapping around the battery before use. This will allow the battery to swell but will still leave enough room in the compartment for the battery to fall out normally.

DCR822 LCD Menu Map

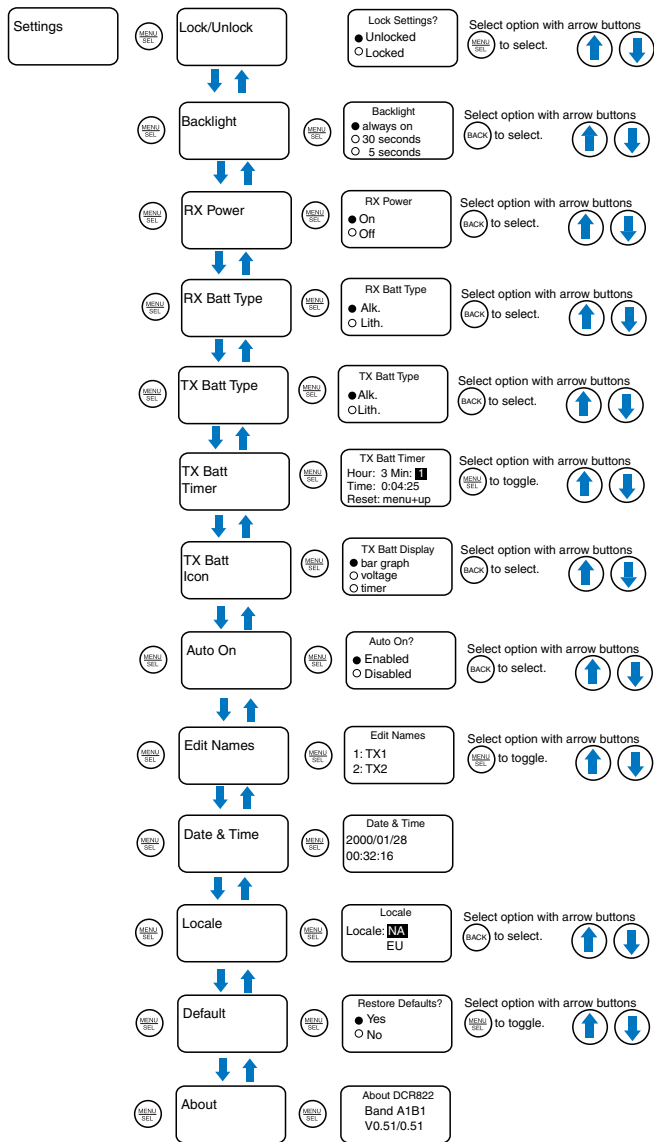
The menus presented on the LCD are arranged in a straightforward manner, with those that are likely to be used more often located at the top of the tree.



DCR822 LCD Menu Map



DCR822 LCD Menu Map



Menu Item Descriptions

IR Sync & Encryption Menu

Encryption Key Management

The DCR822 has four options for encryption keys:

- **Standard:** This is the most basic level of security. The encryption keys are unique to the DCR822 and there are only 256 key instances available to be transferred to a transmitter. The receiver tracks the number of keys generated and the number of times each key is transferred. Once a Standard key has been transferred 256 times, you will be alerted that a new key must be created.
- **Shared:** There are an unlimited number of shared keys available. Once generated by the DCR822 and transferred to a transmitter, the encryption key is available to be shared (synced) by the transmitter with other transmitters/receivers via the IR port.
- **Universal:** This is the most convenient encryption option available. All encryption-capable Lectrosonics transmitters and receivers contain the Universal Key. The key does not have to be generated by the DCR822. Simply set a Lectrosonics encryption-capable transmitter and the DCR822 to Universal, and the encryption is in place. This allows for convenient encryption amongst multiple transmitters and receivers, but not as secure as creating a unique key.
- **Volatile:** This is the most robust encryption option available. If the transmitter is powered off, it must be re-sync'd. If the receiver is powered off, a new key must be generated and sent to the transmitter. In encryption terms, this is the "one time use" key management policy.

Encryption Keys

The DCR822 generates high entropy encryption keys to sync with encryption-capable transmitters. The user must select a key type and create a key in the DCR, and then sync the key with a transmitter.

1. Begin by selecting a key type.
2. The DCR822 will then display a warning to indicate that there is **NO KEY!** Select **CREATE KEY** to generate a new key.

NOTE: When Universal Key type is selected, there is no prompt to create key.

3. A message will pop up on the screen warning the user that all transmitters will need a new key. Select OK. The creation of a new key is confirmed.
4. Sync new key with transmitter (see **Sync Key**). The transmitted audio will then be encrypted with the new key.

Sync Settings

Allows sending or retrieving setup data, including frequency, name and talkback settings, via the IR port. There are two ways to initiate a sync.

Sync options: Choose to send frequency, send all settings, retrieve (get) frequency or retrieve (get) all settings from a transmitter. Use the **UP** and **DOWN** arrows to select a function and **MENU/SEL** to initiate sync.

Choose Transmitter: Choose one of four Rx channels by using the **Channel Selector Buttons**, 1, 2, 3 or 4. Hold and press the Channel Selector Button to initiate sync.

NOTE: You must position the transmitter's IR port directly in front of the DCR822 IR port, as closely as possible, to guarantee a successful sync. A message will appear on the DSQD if the sync was successful or failed.

Sync Key

Send or retrieve (get) encryption keys.

RF Settings

Lock/Unlock:

Once enabled, the front panel buttons are disabled until Unlock is deselected.

Backlight:

Selects the length of time the backlight on the LCD remain turned on: Always on, 30 seconds, and 5 seconds.

Rx Power:

Allows user to turn off power to each receiver independently, while still allowing unit to function as a whole.

RxBat Type:

Allows the user to select the type of batteries used in the DCR822, giving the battery status indicator increased accuracy.

TxBat Type:

Allows the user to select the type of batteries used in the transmitter connected with the DCR822, giving the battery status indicator increased accuracy.

TxBat Timer:

Gives user two timers, one for each transmitter with alerts, to avoid signal drop under sudden loss of power.

TxBat Icon:

Choices between: Voltage, Bar Meter, or Time. Allows the user to customize the interface of each receiver.

Auto On:

Allows the user to enable/disable the feature of the unit turning automatically when batteries are inserted or A/C is connected.

Edit Names:

Allows user to rename each receiver to their preference.

Date & Time:

Allows user to set current date and time, useful for labeling scenes and takes.

Locale:

Allows user to set location as either North America(NA) or European Union(EU).

Default:

Allows user to reset the unit to factory settings.

About:

Gives details about the unit including: Band, microprocessor software version number, and FPGA software version number.

Audio Settings

Audio Level:

Allows user to set Audio Level per channel. Also allows user to enable 1kHz audio tone for level setting.

Compat Mode:

Allows user to set compatibility mode per channel. Choose from: D2, JA Hybrid, NU Hybrid, EU Hybrid, NA Hybrid, DCHX on both channels, DCHX on channel 1 or 2, Duet on both channels, Duet on channel 1 or 2.

Output Type:

Allows user to choose output of each channel, analog or AES3

Routing:

Allows user to choose where to send RX1 and 2, to either output channel or both.

Smart NR:

Allows user to enable Smart Noise Reduction on either channel or both

Talkback:

Allows user to enable Talkback function on either channel or both.

Polarity:

Allows user to set audio polarity of each channel as either positive or negative.

SD Card Settings

Files:

Allows user to access file list saved as .WAV format. Selecting a specific .WAV file will display date, time, and length of recording.

Takes:

Lists files on the SD card in the Scenes and Takes format. Files are listed in the form of SXX TXXX. Selecting a file will display date, time, and length of recording.

Record:

Starts the DCR822 in recording mode, using the specified format in Settings>SD Card>File Naming. Record will change to Stop once recording has begun.

Scene & Take:

Allows user to set scene and take file naming starting point. Subsequent starts and stops of recordings will increment the take number.

Format Card:

Prompts user for confirmation of erasing files and preparing card for recording of audio files.

File Naming:

Allows users to set the naming format of file between:

- Sequence
- Clock Time
- Scene&Take

Load Group and Save Group:

The tuning groups feature allows groups of frequencies to be created, stored and used to constrain tuning. When a tuning group is assigned, the frequency control is limited to the frequencies contained in the tuning group. The groups are created using Lectrosonics DCR822 receiver or via Wireless Designer, then the groups are shared with the via IR sync or microSDHC Memory Card transmission.

Use UP and DOWN arrows to toggle and MENU/SEL to save group

Save Tuning Group

Use UP and DOWN arrows to toggle and MENU/SEL to save group.

Recovering an Interrupted Recording

Recordings can be reliably recovered even if the microSDHC memory card is accidentally removed or the battery dies while a recording is in progress. If a recording is interrupted, all of the audio is present on the card and can be easily recovered by the DCR822. The DCR keeps track of the length of the most recent recording so it can supply a good suggestion for the length to recover. If the length is ever unknown or the DCR's suggestion seems incorrect, it is always possible to override the suggested length. If in doubt, specify the maximum length possible, in which case the entire remainder of the card is recovered. All of the interrupted recording will be present, followed by extra contents which might be random noise or audio from previously deleted recordings.

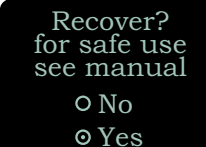
NOTE: A good battery or external power supply is required to begin the recovery process. If recovery is attempted with a weak battery, a message will appear saying that a fresh battery will be required.

Once a fresh battery has been installed, power on the DCR and insert the card with the interrupted recording. The DCR will detect the interrupted recording and display:



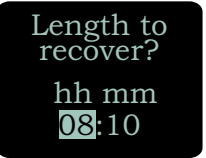
INTERRUPTED
RECORDING
FOUND

And then:



Recover?
for safe use
see manual
☐ No
☒ Yes

If “No” is chosen, nothing is done to the card and the DCR will not use the card. If “Yes” is chosen”, a prompt appears asking for the length of the recording to recover, specified as a number of hours and minutes. The default suggestion will be the approximate length of the most recent recording. It is always safe to recover a longer recording than was made. To specify the recovery time, use the MENU/SEL button to navigate and specify the hours and minutes fields.



Length to
recover?
hh mm
08:10

Once set as desired, use MENU/SEL to navigate to the “GO” soft button and press the DOWN arrow button to begin the recovery process. Recovery is nearly instantaneous. When completed, the display will show:



RECOVERY
SUCCESSFUL

Antenna Use and Placement

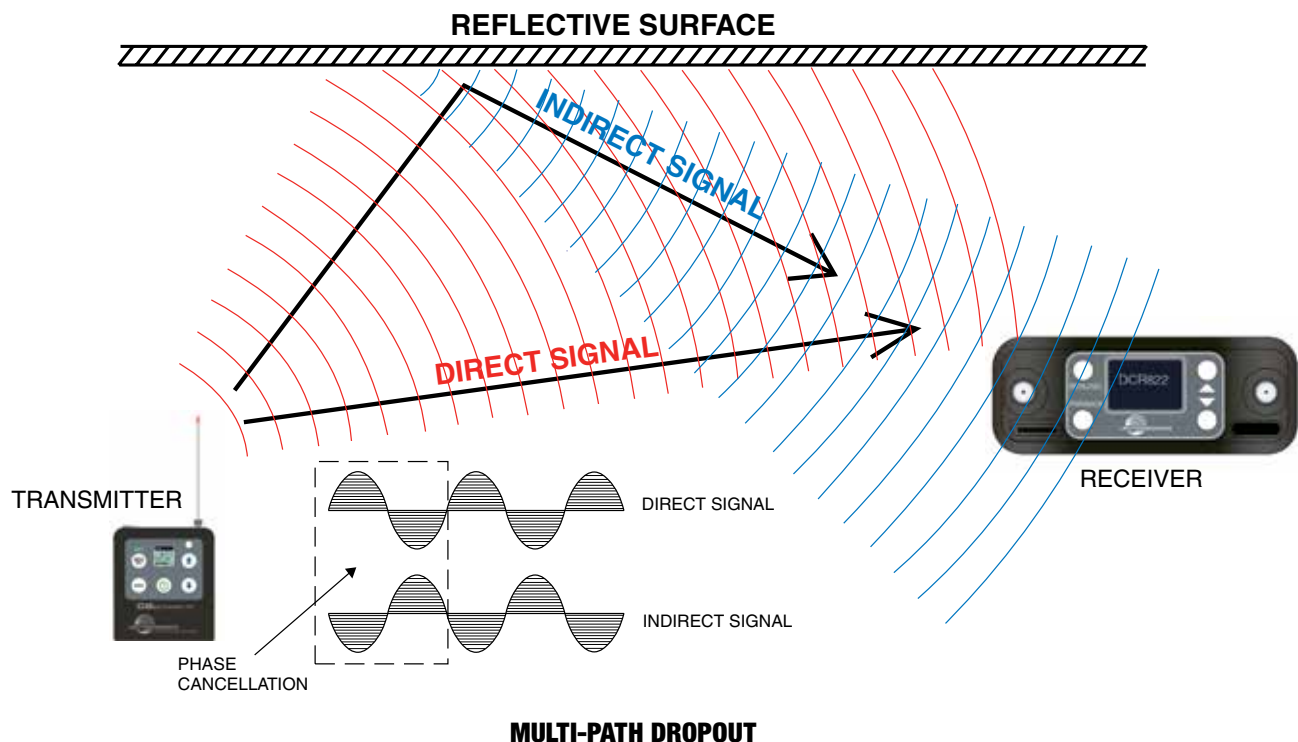
The receiver is supplied with two elbowed SMA-mount whip antennas. In some circumstances remote antennas may be useful for improving reception. Position remote antennas at least three or four feet apart and at least three or four feet from large metal surfaces. If this is not possible, try to position the antennas so that they are as far away from the metal surface as is practical. It is also good to position the receiver so that there is a direct "line of sight" between the transmitter and the receiver antenna. In situations where the operating range is less than about 100 feet, the antenna positioning is much less critical.

Note: Be careful about the length of cabling from antenna to receiver. Long cable runs can have serious signal loss. Lectrosonics has in-line RF amplifiers suitable for compensating for long cable runs. Contact your dealer or the factory for more information.

A wireless transmitter sends a radio signal out in all directions. This signal will often bounce off nearby walls, ceilings, etc. and a strong reflection can arrive at the receiver antenna along with the direct signal. If the direct and reflected signals are out of phase with each other a cancellation may occur. The result would be a "dropout." A dropout sounds like either audible noise (hiss), or in severe cases, may result in a complete loss of the carrier and the sound when the transmitter is positioned in certain locations.

The receiver offers a sophisticated diversity design which overcomes dropout problems in almost any situation. In the event, however, that you do encounter a dropout problem, first try moving one of the remote antennas at least 3 or 4 feet from its original location (or move the receiver if the antennas are attached directly to it). This may alleviate the dropout problem at that location. If dropouts are still a problem, try moving the antennas to an entirely different location in the room or moving them closer to the transmitter location. Or, do a new scan and choose a frequency in a more clear area of the available RF spectrum.

Lectrosonics transmitters radiate power very efficiently, and the receivers are very sensitive. This reduces dropouts to an insignificant level. If, however, you do encounter dropouts frequently, call the factory or consult your dealer. There is probably a simple solution.



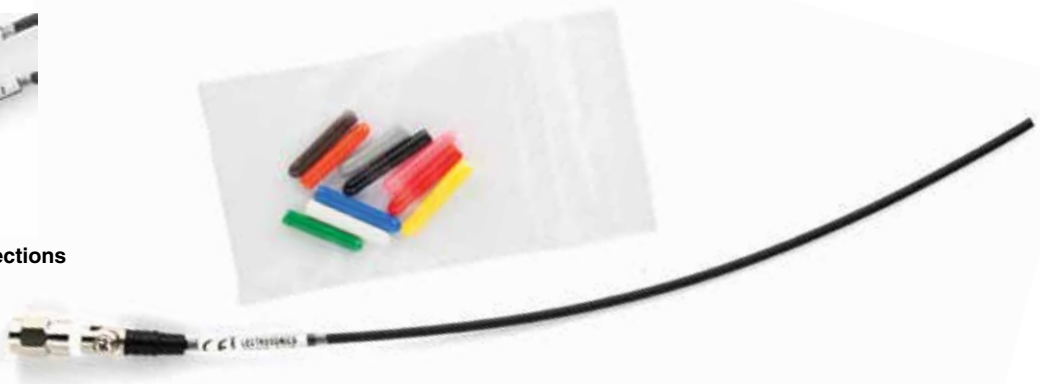
Antenna/Block Reference Table

The two AMJ UHF whip antennas supplied with the receiver are factory cut to specific frequency blocks as shown in the table below. A colored cap and label are used on blocks 20 through 23, and a black cap and label are used on the other blocks to denote the frequency range of each model.

The chart is useful for fabricating an antenna from coaxial cable or other materials, or for identifying the frequency of an antenna that is not marked. The lengths shown are specifically for the AMJ whip antenna with a SMA connector, as determined by measurements with a network analyzer. The optimal length of the element in other designs will likely be different than those shown in this table, but since the bandwidth is typically wider than the specified block, the exact length is not critical for useful performance in whip, dipole and coaxial designs.



The hinged joint pivots in both directions

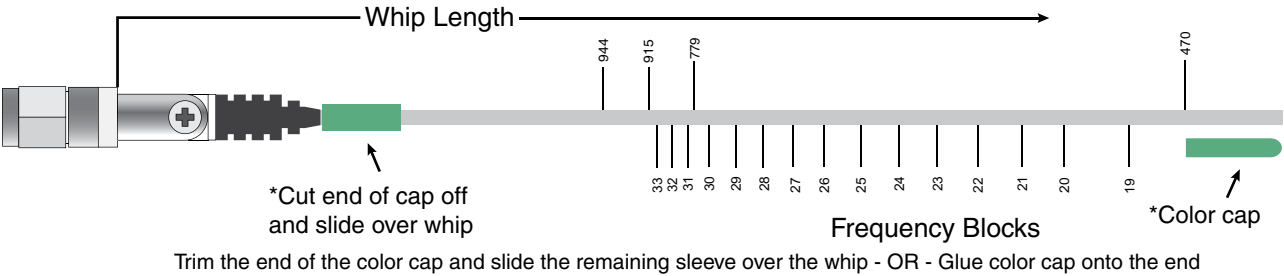


BLOCK	FREQUENCY RANGE	CAP COLOR	ANTENNA WHIP LENGTH	
470	470.100 - 495.600	Black w/ Label	5.47"	141.2 mm
19	486.400 - 511.900	Black w/ Label	5.19"	133.9 mm
20	512.000 - 537.500	Black w/ Label	4.95"	126.2 mm
21	537.600 - 563.100	Brown	4.73"	119.6 mm
22	563.200 - 588.700	Red	4.47"	113.8 mm
23	588.800 - 614.300	Orange	4.23"	108.5 mm
944	944.100-961.975	Black w/Label	2.53"	64.3 mm

Note: Not all Lectrosonics products are built on all of the blocks covered in this chart.

CUTTING TEMPLATE

Lay uncut antenna on this template and cut to length for the desired frequency block



Note: Check the scale of your printout. This line should be 6.00 inches long (152.4 mm).

Installation and Operating Instructions

1. Install a fresh battery or connect an external power source to the DCR822 and attach the antennas.
2. Unless frequency settings have been previously assigned, scan for an open frequency and set both the receiver and transmitter to that frequency. (See Finding Clear Frequencies.)
3. Connect the audio cable to the Receiver Audio Out XLR jack.
4. Set the Power ON/OFF switch to ON and verify that the LCD panel activates.
5. Adjust the transmitter gain.
THIS IS PERHAPS THE MOST IMPORTANT STEP IN THE SET UP PROCEDURE. Refer to your transmitter manual's Operating Instructions section for details on how to adjust the transmitter gain. In general, adjust the transmitter gain so that the voice peaks will cause the audio modulation indicators on the receiver and transmitter to show full modulation on the loudest peak audio levels. Normal levels should cause the DCR822's audio level icon to fluctuate fully. This will result in the best possible signal to noise ratio for the system.

Important:

- Adjust the transmitter gain **before** you adjust the receiver output level.
 - When the transmitter is fully modulated, its limiter will prevent any further increases in level.
 - The receiver output circuitry is set to run at full output, and the level control is simply an attenuator. There is no difference in signal to noise ratio across the entire adjustment range of the receiver output level. The transmitter input gain is the critical adjustment that will affect the signal to noise ratio.
6. Adjust the Audio Output according to the type of input on your equipment. Use the LEVEL menu and adjust the level with the SELECT Up and Down buttons.

The input levels of different cameras, mixer/recorders, and PA equipment vary, which may require that you adjust the AUDIO OUT to an intermediate position. Try different settings and listen to the results. If the output of the receiver is too high, you may hear distortion or a loss of the natural dynamics of the audio signal. If the output is too low, you may hear steady noise (hiss) along with the audio. The DCR822 audio output is designed to drive any audio input device from microphone level to +7dBu line level.

Note: The test tone output is especially useful for an exact level match. With the test tone running, adjust for the maximum desired peak level using the metering on the connected device.

Scan Function

The Scan function is initiated by pressing Menu, then RF Setup, then selecting Scan.



This screen indicates no RF activity.



The RF activity will be indicated by a vertical marker in the Scan Graph, as shown circled.



Scanning can be paused by pressing Menu. The problem interference can be found by pressing the UP or DOWN arrows to move the marker to the interference.

The scan can be exited by pressing the BACK button

The scan can be cleared by highlighting CLEAR SCAN and pressing MENU SELECT.

Locking and Unlocking the DCR822 Front Panel Controls

The front panel controls can be "LOCKED" to prevent accidental changes being made during operation and handling.

To LOCK or UNLOCK the DCR822, choose MENU/SEL, then SETTINGS. Use the arrow buttons to toggle front panel controls. Choose MENU/SEL to save the setting.

Note: The unit cannot be powered off if LOCKED. Unlock first to power off.

Firmware Update

Firmware updates are made using a microSDHC memory card. Download and copy the following firmware update files to a drive on your computer.

- **dcr822 vX_xx.hex** is the firmware update file, where “X_xx” is the revision number.

In the computer:

- 1) Perform a **Quick Format** of the card. On a Windows-based system, this will automatically format the card to the FAT32 format, which is the Windows standard. On a Mac, you may be given several options. If the card is already formatted in Windows (FAT32) - it will be greyed out - then you do not need to do anything. If the card is in another format, choose Windows (FAT32) and then click “Erase”. When the quick format on the computer is complete, close the dialogue box and open the file browser.
- 2) Copy the **dcr822 vX_xx.hex** and **dcr822_fpga_vx_xx.mcs** files to the memory card, then safely eject the card from the computer.

In the DCR822:

- 1) Leave the DCR822 turned off and insert the microSDHC memory card into the slot.
- 2) Hold down both the UP and DOWN arrow buttons on the recorder and turn the power on.
- 3) The device will boot up into the firmware update mode with the following options on the LCD:
 - **Update** - Displays a scrollable list of the program files on the card.
 - **Power Off** - Exits the update mode and turns the power off.

NOTE: If the unit screen shows **FORMAT CARD?**, power the unit off and repeat step 2. You were not properly pressing UP, DOWN and Power at the same time.

- 4) Use the arrow buttons to select **Update**. Use the UP and DOWN arrow buttons to select the desired file and press MENU/SEL to install the firmware. The LCD will display status messages while the firmware is being updated.
- 5) When the update is complete, the LCD will display this message: **UPDATE SUCCESSFUL REMOVE CARD**. Open the battery door and remove the memory card.
- 6) Power the unit back on. Verify that the firmware version was updated by opening the Power Button Menu and navigating to the **About** item.

- 7) If you re-insert the update card and turn the power back on for normal use, the LCD will display a message prompting you to format the card:

Format Card? (files lost)

- No
- Yes

If you wish to record audio on the card, you must re-format it. Select **Yes** and press MENU/SEL to format the card. When the process is complete, the LCD will return to the Main Window and be ready for normal operation.

If you choose to keep the card as is, you may remove the card at this time.

The firmware update process is managed by a bootloader program - on very rare occasions, you might need to update the bootloader.

WARNING: Updating the bootloader can corrupt your unit if interrupted. Don't update the bootloader unless advised to do so by the factory.

- **dcr822_boot vX_xx.hex** is the bootloader file

Follow the same process as with a firmware update and select the dcr822boot file.

Diagnostics

Multi-channel System Checkout

Interference can result from a wide variety of sources including TV station signals, other wireless equipment in use nearby, or from intermodulation within a multi-channel wireless system itself. Regardless of how the frequencies were coordinated, a final checkout procedure is always a good idea.

Scanning with the RF spectrum analyzer built into the DCR822 system will identify external RF signals, but it does not address the compatibility of the selected frequencies.

The pre-coordinated frequencies address in-system intermodulation, but obviously cannot take into account RF signals from external sources that may be present in the location where the system will be operating.

In some cases, you can run the scanner to find clear TV channels, then find enough pre-coordinated frequencies in the tuning groups (Grp a through Grp d) to operate on the clear TV channels. Even so, it is still a good idea to go through the check out procedure because you can encounter interference from other wireless, IFB and intercom systems when you get to the production or installation site.

1. Set up the system for testing.

Place antennas in the position in which they will be used and connect to the receivers. Place transmitters about 3 to 5 feet apart, about 25 to 30 feet from the receiver antennas. If possible, have all other equipment on the set, stage or location turned on as well, especially any mixing or recording equipment that will be used with the wireless system.

2. Set all receivers on clear channels.

Turn on all receivers, but leave the transmitters off. Observe at the RF signal strength indicator for each receiver module. If a signal is present, change the frequency to a clear channel where no signal is indicated. If a completely clear channel cannot be found, select the frequency with the lowest RF level indication. Once all receiver modules are on clear channels, go to step 3.

3. Turn each transmitter on one at a time.

Start with all transmitters turned off. As you turn on each one, look at the matching receiver to verify a strong RF signal is received. Then, look at the other receivers and see if one of them is also picking up the signal. Only the matching receiver should indicate a signal. Change frequencies on either system slightly until all channels pass this test, then check again to see that all channels are still clear as done in step 2.

4. Turn each transmitter off one at a time.

With all transmitters and receivers turned on, turn each transmitter off one at a time, in turn, and look at the RF level indicator on the matching receiver module. The RF level should disappear or drop to a very low level. If it does not, change frequency on that receiver and transmitter and try it again. When a clear frequency is found, turn the transmitter on and move on to the next channel.

IMPORTANT: Any time a frequency is changed on any of the systems in use, you must start at the beginning and go through this procedure again for all systems. With a little practice, you will be able to do this quickly and save yourself some "multi-channel grief."

Pilot Tone Bypass

Hybrid compatibility modes (NU Hyb, EU Hyb, etc.) use a supersonic "pilot tone" to control the squelch (audio mute) of a receiver module to keep it silent until a valid signal is received. When a signal with the correct pilot tone is received, the squelch opens and audio is delivered to the output. Pilot tone squelch control also eliminates transients (clicks and pops) when transmitters are turned on and off.

Pilot tone control can be bypassed as a diagnostic tool. Bypass opens the audio output of the receiver unconditionally, allowing you to listen to any signals entering the receiver to help identify their source. Pilot tone bypass will also allow you to use a transmitter that has a defective pilot tone circuit.

CAUTION: When pilot tone is bypassed and the transmitter is turned off, excessive noise will be present. Turn the audio level down before bypassing pilot tone.

Replacement Parts and Accessories

CCMINI

Zip Pouch for Compact Wireless System

55010

Flash Memory Card,
microSDHC memory card to SD Adapter Included

AMJ22

Swivelling Whip Antenna with Standard SMA Con-
nector, Available in Block 19 or 22.

AMJ-XX

Antenna with swiveling SMA connector

21926

USB Cable for Firmware Updates

MLSRXLR

Audio Cable, for SR Receiver, TA3F Plug to XLRM,
18 in.

DCR15/4AU

Power Supply with Universal Socket for DR. 4ADC
100-240V in, 15VDC Regulated Output

21926



MCSRXLRL



CCMINI



55010



AMJ-XX



DCR15/4AU



Troubleshooting

Symptom

Possible Cause

INITIAL POWER ON

Display not active or lit.

External power supply disconnected or inadequate.
Main power supply fuse tripped. Turn the receiver off, remove the cause of the overload and turn the receiver back on.
Wrong polarity power source. The external DC in requires POSITIVE to be on the center pin.
Display has timed out. Press any button to revive.

Version message shows DSP or COM.

This indicates an internal error. Please contact the factory for assistance.

Display indicates CHECK FREQ.

This is a warning that a strong signal is present but it's far enough away from the center of the channel that the audio is likely to be distorted. Try relocating to unused frequencies.
If this doesn't remove the warning message, the transmitter or receiver may need repair.

PILOT TONE SQUELCH (Hybrid modes only)

Pilot Tone indicator (Pilot) present, but no sound

Audio output cable bad or disconnected.
Audio Output level too low. Use the built-in test tone to verify levels.

Pilot Tone Indicator (Pilot) keeps flashing when transmitter turned on

Pilot tone detection can take several seconds. Turn on the transmitter power (and the audio switch on some models) and wait 3 to 5 seconds for the "P" to indicate steadily.
Transmitter and receiver not on same frequency.
Receiver compatibility mode does not match the transmitter in use. (See Menu Selections from Main Window, COMPAT Window.)

Pilot Tone Indicator not present but receiving audio

Pilot tone squelch has been bypassed (Hybrid modes only).

NOTE: In the 400 Series and 200 Series compatibility modes, the PILOT indicator on the front panel shows as a solid "P" to indicate that the audio has been turned on at the transmitter, and that the audio output on the receiver is enabled. When the "P" is on, the audio is enabled. If the "P" is flashing the pilot tone is not detected and the audio will be muted (squelched).

In the other compatibility modes, no pilot tone is used and the "P" is never displayed. Audio is present whenever the receiver detects a sufficiently strong signal.

Regardless of the compatibility mode, activating the "pilot bypass" function causes a lowercase "b" to appear in the pilot indicator position on the main window and forcibly unsquelches the audio.

Symptom

Possible Cause

ANTENNAS AND RF SIGNAL STRENGTH

RF Level is weak.

Receiver may need to be moved or reoriented.

Antenna on transmitter may be defective or poorly connected - double check antenna on transmitter.

Improper length of antenna, or wrong antenna on transmitter or receiver. UHF whip antennas are generally about 3 to 5 inches long. UHF helical antennas may be shorter, but are often less efficient.

No RF Signal

Make certain frequency settings on transmitter match the receiver frequency settings.

Check battery in transmitter.

AUDIO SIGNAL QUALITY

Poor signal to noise ratio

Transmitter gain set too low.

The noise may not be in the wireless system. Turn the transmitter audio gain all the way down and see if the noise remains. If the noise remains, then turn the power off at the transmitter and see if it remains. If the noise is still present, then the problem is not in the transmitter.

If noise is still present when the transmitter is turned off, try lowering the audio output level on the DCR822 and see if the noise lowers correspondingly. If the noise remains, the problem is not in the receiver.

Receiver output is too low for the input of the device it is feeding. Try increasing the output level of the DCR822 and lowering the input gain on the device the DCR822 is feeding.

Distortion

Transmitter input gain too high. Check and/or readjust input gain on transmitter according to the LEDs on the transmitter and then verify the setting with the audio meter in the main window.

Audio output level too high for the device the DCR822 is feeding. Lower the output level of the DCR822.

Bad frequency response or generally poor audio quality.

Ensure the receiver is set to the compatibility mode that matches the transmitter in use.

Display Not Active or Lit

Ensure that the batteries are fresh and of good quality.

Specifications and Features

Receiver

Operating Frequencies (MHz):

Model A1/B1: 470.100 - 614.375
Model B1/C1: 537.600 - 691.175

NOTE: It's the user's responsibility to select the approved frequencies for the region where the transmitter is operating.

Frequency Selection Steps:	25 kHz
Frequency Response:	25 Hz to 20 kHz (+0/-3 dB)
Frequency Stability:	±0.001 %
Front end bandwidth:	±5.5 MHz, @ -3 dB
Sensitivity:	20 dB Sinad: 0.9 uV (-108 dBm), A weighted 60 dB Quietng: 1.12 uV (-105 dBm), A weighted
AM rejection:	>60 dB, 2 uV to 1 Volt
Modulation acceptance:	85 kHz
Spurious rejection:	85 dB
Third order intercept:	+15 dBm
Diversity method:	Vector Diversity (advanced true diversity)

Antenna inputs:	Dual SMA female jacks; 50 Ohm impedance
Audio output:	Rear panel 2 TA3M connectors; can drive 600 Ohm, adjustable from -50 to +5 dBu in 1 dB steps (into nominal 10 k bal. load)

Audio Performance (overall system):

THD:	0.2% (typical)		
SNR at receiver output (dB):	SmartNR	No Limiting	w/Limiting
	OFF	103.5	108.0
	NORMAL	107.0	111.5
	FULL	108.5	113.0

Note: The dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constants. Once activated, the limiter compresses 30+ dB of transmitter input range into 4.5 dB of receiver output range, thus reducing the measured figure for SNR without limiting by 4.5 dB

Input Dynamic Range:	125 dB (with full Tx limiting)
Overall Latency (time delay):	1.4 ms with digital source, <2.9 sm with Hybrid TX
Audio Test Tone:	1 KHz, -50 to +5 dBu, <1%THD

Controls:

Front Panel:	• LCD display • Menu/Sel, Pwr/Back, Up/Down Arrow Buttons • SD Card Reader • IR Port
Rear Panel:	• Analog/AES audio output jack (2) • External DC input • Battery compartment • USB port

External Power:	Minumum 9 Volts to maximum 17 VDC 2.5 W; 170 mA at 12 VDC
Battery Life:	6 hrs. continuous, w/ 4 disposable, 1.5VDC Lithium AA batteries (recommended)
Weight:	408 grams with batteries (14.4 oz.)
Dimensions:	3.23" wide x 1.23" high x 4.75" deep 82.042 wide x 31.242 high x 120.650 deep mm

Recorder

Storage media:	microSDHC memory card
File format:	.wav files (BWF)
A/D converter:	24-bit
Sampling rate:	48 kHz
Recording modes/Bit rate:	24 bit - 144 kbytes/s per channel (up to 4)

Audio Performance:

Frequency response:	25Hz to 20 kHz; +0/-3 dB
Dynamic range:	110 dB (A), before limiting
Distortion:	< 0.035%

Operating temperature range:

Celsius:	-20 to 50
Fahrenheit:	-5 to 122

Specifications subject to change without notice.

Available Recording Time

Using a microSDHC memory card, the approximate recording times are as follows. The actual time may vary slightly from the values listed in the tables.

Card Size	1 Track Hrs:Min	2 Tracks Hrs:Min	3 Tracks Hrs:Min	4 Tracks Hrs:Min
8 GB	15.30	7.45	5.10	3.53
16 GB	31.00	15.30	10.20	7.45
32 GB	62.00	31.00	20.40	15.30



**microSDHC Logo is a trademark of SD-3C, LLC*

FCC Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this equipment not expressly approved by Lectrosonics, Inc. could void the user's authority to operate it.



Service and Repair

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check the interconnecting cables and then go through the **Troubleshooting** section in this manual.

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working.**

LECTROSONICS' Service Department is equipped and staffed to quickly repair your equipment. In warranty repairs are made at no charge in accordance with the terms of the warranty. Out-of-warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out-of-warranty repairs.

Returning Units for Repair

For timely service, please follow the steps below:

- A.** DO NOT return equipment to the factory for repair without first contacting us by email or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 A.M. to 4 P.M. (U.S. Mountain Standard Time).
- B.** After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the **outside** of the shipping container.
- C.** Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.
- D.** We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Lectrosonics USA:

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Rio Rancho, NM 87124
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Web:

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(877-7LECTRO)
(416) 596-6648 Fax

E-mail:

Sales: colinb@lectrosonics.com
Service: joeb@lectrosonics.com

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, Lectrosonics, Inc. will, at our option, repair or replace any defective parts without charge for either parts or labor. If Lectrosonics, Inc. cannot correct the defect in your equipment, it will be replaced at no charge with a similar new item. Lectrosonics, Inc. will pay for the cost of returning your equipment to you.

This warranty applies only to items returned to Lectrosonics, Inc. or an authorized dealer, shipping costs prepaid, within one year from the date of purchase.

This Limited Warranty is governed by the laws of the State of New Mexico. It states the entire liability of Lectrosonics Inc. and the entire remedy of the purchaser for any breach of warranty as outlined above. NEITHER LECTROSONICS, INC. NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF LECTROSONICS, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF LECTROSONICS, INC. EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.



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