

Owner's Manual

*RCS 2.2 MINI Preamplifier /
Dynamic Room Correction System*



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WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



The lightning with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of "Dangerous Voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to a person.


Important Safety
Instructions

1. Read these instructions entirely before installing or operating this equipment.
2. Keep these instructions.
3. Heed all warnings.
4. Do not use this equipment near water or allow it to become wet.
5. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat; doing so may damage the unit and present a fire hazard.
7. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. If the provided plug does not fit into your outlet, consult an electrician for replacement of the outlet to one that is polarized. To protect against electrical shock, match the wide blade of the polarized plug to the wide slot in the outlet and fully insert the plug.
8. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit the equipment. Do not use this unit with a damaged cord or plug.
9. Only use attachments/accessories specified by the manufacturer.
10. Unplug this equipment during lightning storms or when unused for long periods of time.
11. Refer all servicing to qualified service personnel.

Cleaning and
Maintenance

1. Always unplug the unit from the electrical outlet before cleaning.
2. Do not use abrasive cleaners. Simply wipe the exterior with a clean soft cloth. A small amount of nonabrasive cleaner may be used on the cloth to remove excessive dirt or fingerprints.



The >note<  symbol indicates information very useful or essential to daily operation.

Acknowledgments

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The information contained in this document is subject to change without notice.

Registration

IMPORTANT!

Please record your serial number here for future reference. You will need this for future upgrades or should you ever require service on your RCS 2.2 MINI Preamplifier.



RCS 2.2 MINI serial number: _____

UNPACKING THE RCS 2.2 MINI

Carefully remove the RCS 2.2 MINI and accessory kit from the carton and visually check for shipping damage. Contact both the shipper and Tact Audio immediately if the unit shows any sign of damage from rough handling. All Tact Audio equipment is carefully inspected before leaving our factory.

KEEP SHIPPING CARTON AND PACKING MATERIALS for future use or in the unlikely event that the unit needs servicing. If this unit is shipped without the original packing, damage could occur and void the warranty.

Accessories

You should find the following items in the accessory kit:

- 1 AC mains cord
- 1 RJ11 data cable
- 1 RJ11-to-RS232 adapter
- 1 15' RS232 cable
- CD-ROM with RCS software
- Measurement microphone
- Remote control
- 2 AAA batteries
- This manual

Operating voltage

The RCS 2.2 MINI is designed with an automatic switching power supply. It will operate on 65-265 volts at 50-60 Hz. No external settings are required.

The RCS 2.2 MINI has three operating modes:

OFF AC mains power is cut off, either via the rear panel mains switch, or by unplugging it from the wall outlet.

STANDBY The unit is powered but all outputs are muted and the display is off. The unit uses very little current and is "idling" or "sleeping". Use the remote or front panel "STANDBY" button to toggle between ON and STANDBY.

ON Everything is powered and ready to go.

INTRODUCTION

Congratulations on the purchase of your RCS 2.2 MINI. You have now acquired one of the most advanced stereo Preamplifier / Room Correction System ever developed!

Room Correction System

The RCS 2.2 MINI has extremely low noise and distortion, yielding amazingly transparent accurate sound. Every effort has been made to make this preamplifier the best that money can buy. Add to this the latest evolution of Tact Audio's room correction technology and the result is absolutely staggering.

Tact room correction technology has been praised by the press all around the world. Comments like "Wholesale improvement in sound quality" have become a standard phrase for reviewers describing the results that can be achieved with Tact's room correction. Now we have taken room correction technology even further, not only in terms of processing power, but also in terms of the measurement and correction systems. The measurement is now done with a triple pulse for each acquisition. This increases the measurement resolution in both the time and frequency domains.

Separate Subwoofer Control

One of the most exciting features of the RCS 2.2 MINI is its separate subwoofer output. The RCS 2.2X P can be used with one or (preferably) two subwoofers. An electronic crossover can be set with a frequency between 40 and 500 Hz and a slope between 12 dB/octave and 144 dB/octave to split the audio signal between the main and subwoofer outputs. The correction software aligns the sub-woofer(s) with the main speakers in the time domain and in the frequency domain, for completely seamless integration surpassing even the best single-box systems.

With the RCS 2.2 MINI, you can add subwoofers to an existing High End speaker system for substantial sonic improvements. Preferably, the subwoofers should be placed in the corners behind the main speakers. Corner placement of the subwoofers will yield much higher efficiency with significantly reduced low-frequency distortion. But more importantly, the transfer of energy from the sub to the listening position will be much more direct, resulting in vastly improved impulse response. The room correction system will easily compensate for the frequency response variations of the subs introduced by corner placement. It will delay the main speakers for perfect time alignment to within 1/8 of an inch.

True Upgradeability

The front-panel and DSP's are 100% software driven, and improvements or new features can be loaded through the RS232 port with firmware upgrades. *It is our policy to offer software upgrades at no cost, and we therefore encourage you to fill out and submit the enclosed registration card by fax or email (info@tactaudio.com).*

DYNAMIC ROOM CORRECTION

Dynamic Room Correction (DRC) ® is new technology developed by Tact Audio Inc. over past two years. This groundbreaking brings the science and art of Room Correction, and specifically Tact room correction products, to yet another level.

When we introduced our first RCS system (the Tact-2.2 in the late 90's) we were fully aware that we were embarking on a long term research process in the new exciting field of room acoustics correction. As a result of this research effort we brought to the market products such as Tact-2.0 S two channel RCS preamp, the Tact-2.2 X two channel preamp with RCS on two main and two subwoofer channels, and the TCS MKII ten channel theater correction system. All these systems offer RCS technology not found in any other product on the market. Our continued research combined with enormously valuable feedback from our customers has resulted in this new technology that we named Dynamic Room Correction (DRC)®.

Why do we call it Dynamic Room Correction (DRC)?

The reason we call it DRC is that the target curve used to compute correction filters dynamically changes with the master level control. In another words, for every 0.1 dB of level change the system uses a new target curve to compute room correction filters. What makes this dynamic is that all computations and adjustments are done on the fly without any interruption to the music you listen to.

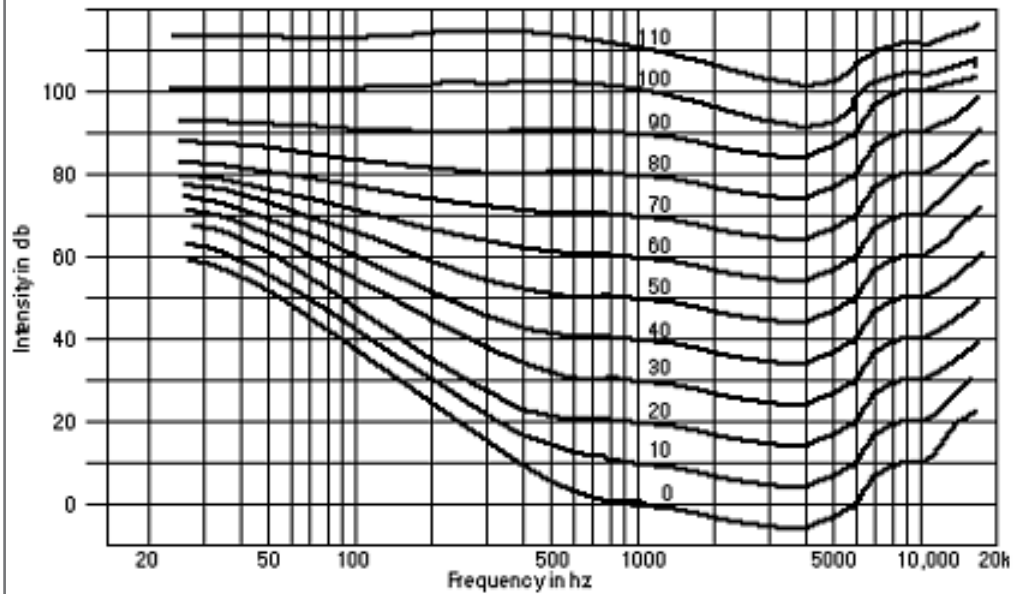
Why do we need Dynamic Room Correction (DRC)?

It is well known fact that humans do not here all frequencies at the same level. It is also known that our ears are more sensitive to frequencies between 2000 and 5000 Hz than to frequencies bellow 2000 Hz and above 5000 Hz. In addition to this our hearing sensitivity changes with sound pressure level (SPL). This human hearing property was first discovered and experimentally confirmed by Fletcher and Munson at Bell Laboratories in 1933 and later refined by Robinson and Dadson in 1956. Their work resulted in a family of equal loudness curves (contours), widely known as Fletcher-Munson equal loudness curves. A sample of Fletcher-Munson loudness curves is shown in the figure bellow.

On the graph there are 12 curves numbered from 0 to 110. These numbers represent the loudness level in phons. A Phon is a unit used to describe the loudness level of a given sound. The reason for introducing the loudness unit is that two sounds with the same SPL (dB) do not necessarily have the same perceived loudness. Phon is equal to SPL in decibels at 1000 Hz. For example, 80 phons means as loud as 80 dB, 1000 Hz tone.

Equal loudness curves represent the SPL that different frequencies need to have in order to be perceived as two tones of equal loudness. For example, a 200 Hz tone at SPL of 50 dB will have the same perceived loudness as a 1000 Hz tone at SPL of 40 dB. In this case both 200 Hz and 1000 Hz tones have a loudness of 40 phons, and they both belong to the 40 phons equal loudness curve.

As it can be seen from the graph, in comparison to frequencies between 2000 and 5000 Hz, it is intrinsically harder for us to hear very low frequencies (below a few hundred Hz) and to a lesser extent very high frequencies (above 7000 Hz). At higher listening levels this difference gradually becomes smaller and smaller and curves become flatter.



Traditional Tact room correction systems use one target curve that allows for full range 20-20,000 Hz room corrections. Once selected, the same target curve (same set of correction filters) was used at all listening levels. This approach did not take in account the fact that our sound perception, as described by Fletcher-Munson curves, is frequency and level dependent. Many of our customers have realized this fact and they have used the nine correction presets (available on all our RCS products) to program 2.0 S, 2.2 X and TCS MKII with nine different target curves each corresponding to a different listening level. In this way they were able to take into account the equal loudness curve effect by switching to new target curves as the master level changes.

Thus for a number of reasons it is clear that we need a room correction system that will perform room acoustics correction and at the same time dynamically change the target curve (correction filters) as the system listening level changes.

How does it work?

Dynamic Room Correction (DRC) offers a very sophisticated way of handling a multi target curve approach to solving equal loudness curve problem. The system is based on one reference target curve and eight additional target curves called dynamic target curves. The reference target curve is used to perform basic reference room correction. Dynamic target curves are labeled 0, -6, -12, -18, -24, -30, -36 and -42 dB and are combined with the reference target curve to obtain the final target curve used to calculate correction filters.

For example, if the master level reads -10.3 dB (89.6 on the relative readout) the system will use the -6 dB and the -12 dB dynamic target curves and by interpolation will calculate a target curve corresponding to -10.3 dB. After that the system will combine the 10.3 dB target curve with the reference curve to obtain the final target curve that is then used to calculate the correction filters. New correction filters are loaded into the signal path as the music is playing and the new correction takes effect in a split of a second. The same process repeats again for any new master level setting.

RCS 2.2 MINI CONNECTIONS

Digital input

The RCS 2.2 MINI has 5 digital inputs:

- 4 S/PDIF (RCA)
- 1 Optical (TosLink)

All of the digital inputs support PCM audio data with sampling rates from 32 kHz to 96 kHz /16-24 bits. RCA/coaxial input also support 192 kHz. Optical input supports sampling frequencies up to 96 kHz /16-24 bits.



Digital output main channels

The RCS 2.2 MINI has 2 digital outputs for the main channels:

- 1 S/PDIF (RCA)
- 1 AES/EBU (XLR)

All outputs support 24-bits at 44.1, 48, 88, 96 or 192 kHz sampling rates. The output sampling rate is set in the "DOUT-FS" menu.

The main channel output is used for your main speakers or for Mid/High-frequencies when used with subwoofers. Connect one of these outputs to a Tact digital amplifier or external DA converter.



Digital output subwoofers

The RCS 2.2 MINI has 2 digital outputs for subwoofer(s) :

- 1 S/PDIF (RCA)
- 1 AES/EBU (XLR)

All outputs support 24-bits at 44.1, 48, 88, 96 or 192 kHz sampling rates. The output sampling rate is set in the “DOUT-FS” menu.

The sub output is for your subwoofer(s) and can be configured for either mono or stereo. Use the “MODE” menu to set the appropriate output mode 2.0, 2.1, or 2.2. Connect one of these outputs to a Tact digital amplifier or external DA converter.



Analog output main channels

The RCS 2.2 MINI has 2 stereo analog outputs for the main channels.

- 1 analog stereo single ended (RCA)
- 1 analog stereo balanced (XLR)



Analog output subwoofer(s)

The RCS 2.2 MINI has 2 analog outputs for subwoofer channels.

- 1 analog stereo single ended (RCA)
- 1 analog stereo balanced (XLR)



Microphone input

Connect the supplied measurement microphone to the “Mic Input” connector when taking a room measurement for dynamic room correction.



CAUTION: To avoid damage through static discharge, we strongly recommend that you turn off the RCS 2.2 MINI via the rear panel mains switch before connecting the microphone.



RS232 interface ports

The RCS 2.2 MINI has two RS232 interface ports:

- INPUT
- AUX

Use the "INPUT" port for communication with your personal computer.

Use the "AUX" port to connect to Tact digital amplifiers or to daisy chain with multiple RS232 components.



AC mains input & mains switch



Connect the RCS 2.2 MINI to the AC mains wall socket. Use the mains switch to turn power ON or OFF.

CAUTION: Use the supplied IEC mains cable, or a 3-prong grounded cable



FRONT PANEL CONTROLS

The front panel controls on the RCS 2.2 MINI will allow you to access and control all menu settings.



Standby

Use the "STANDBY" button to toggle between Standby mode and ON. The display will indicate Standby mode by displaying a small green light on the right side of the display.

Volume control

The master volume is controlled by using UP-Down volume controls. The green digits on the right side will change as you push volume control buttons.

Use the "MUTE" button to mute or un-mute during playback. The volume level indicator will switch to "--" in Mute mode. You can still adjust the master volume while the unit is in Mute mode.

Input selector

Press the "INPUT" button to select the digital input. This is a toggle switch, and by pressing it multiple times it will toggle through all of the five digital inputs. The selected input will be displayed in the input display portion of the display.

Menu

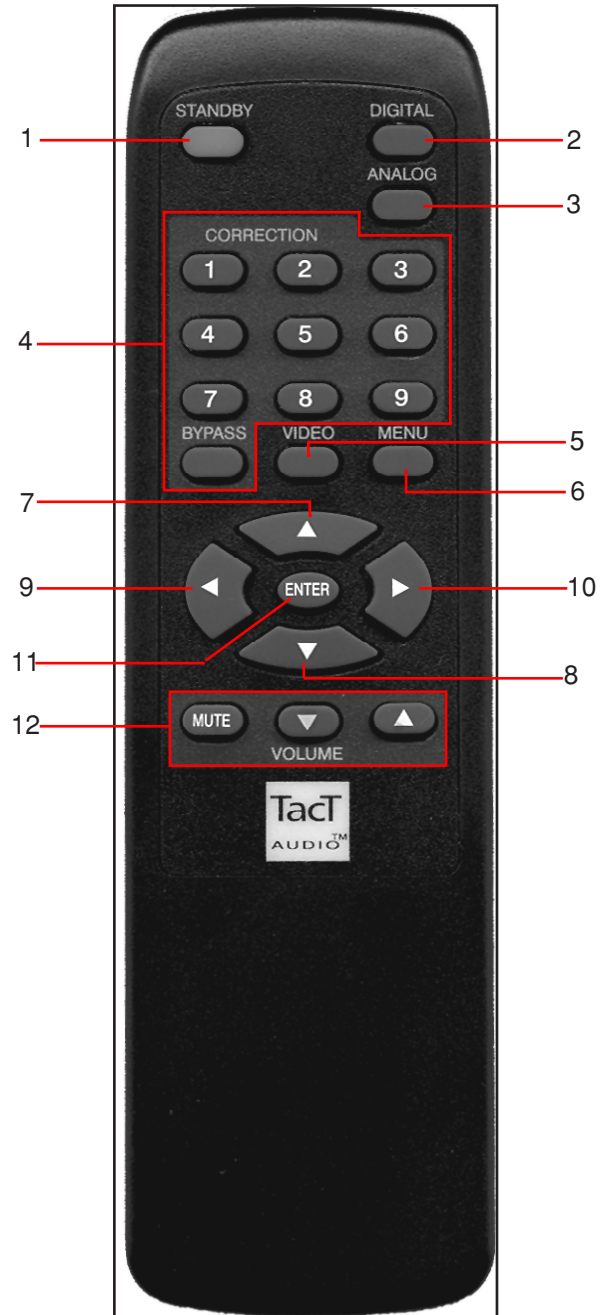
Press the "MENU" button to access the front panel menu system.

Navigation/Enter

Use the navigational buttons to navigate the options and select with the middle "Enter" button .

REMOTE CONTROL

The remote control is used to access the front panel display controls and menus.



1 - STANDBY

The STANDBY button will either turn the RCS 2.2 MINI on or will place it into standby mode. When in standby mode, the unit is placed into a low power “idling” state.

The standby button is also used to save changes that were made in the menu parameters. By placing the unit into standby mode the current menu settings are

2 - DIGITAL

The DIGITAL button will scroll sequentially, allowing for selection of one of the 5 digital inputs.

3 - ANALOG

The ANALOG button will scroll sequentially, allowing for selection of one of the 4 analog inputs.

4 - CORRECTION block

The CORRECTION block consists of 10 buttons. The buttons are numbered from 1 to 9 and one BYPASS. Pressing the BYPASS button will place room correction into bypass mode – no correction. Pressing any of the remaining nine buttons will engage the corresponding room correction preset.

5 - MENU

The MENU button will switch the front panel display from the status screen to the MAIN menu screen.

6. VIDEO

The VIDEO button is inactive with this unit.

7. UP

The UP navigation button is used to select menu options and/or change their values.

8. DOWN

The DOWN navigation button is used to select menu options and/or change their values.

9. LEFT

The LEFT navigation button is used to select menu options and/or change their values.

10. RIGHT

The RIGHT navigation button is used to select menu options and/or change their values.

11. ENTER

The ENTER button will select the menu option currently marked by the blinking cursor or will enter an edited parameter.

12. VOLUME Block

The VOLUME block consists of three buttons.

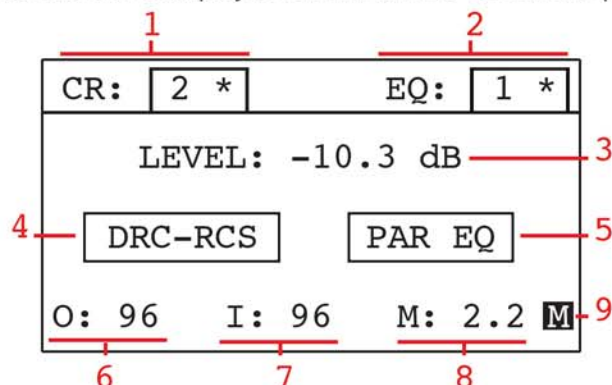
The “MUTE” button will mute/un-mute all enabled channels.

The “UP” button will increase the master volume level.

The “DOWN” button will decrease the master volume level.

FRONT PANEL DISPLAY

The main screen is displayed when the RCS 2.2 MINI is powered on.



To move the cursor indicator use the front panel or remote control navigation buttons. To select an option press the "ENTER" button.

- 1 Correction preset selection
- 2 EQ preset selection
- 3 Master level in dB
- 4 Correction menu option
- 5 Parametric EQ menu option
- 6 Output sampling frequency indicator
- 7 Input sampling frequency indicator
- 8 RCS 2.2 MINI operating mode
- 9 Mono mode indicator.

Correction preset selection

To select one of the nine correction presets or to bypass them use the "LEFT" or "RIGHT" navigation buttons to position the cursor over CR (1). Once the cursor is positioned over CR (1) use the "UP" and "DOWN" navigation buttons to point to the desired correction preset and then press the "ENTER" button.

Once the cursor is positioned over CR (1) you can also select a correction preset by pressing one of the ten buttons located in the block labeled "CORRECTION" on remote control. The 2.2 MINI will display a <*> next to the selected preset indicating that the preset was loaded.

EQ preset selection

To select one of sixteen parametric EQ presets or to bypass them use the "LEFT" and "RIGHT" navigation buttons to position the cursor over EQ (2). Once the cursor is positioned over EQ (2) use the "UP" and "DOWN" navigation buttons to point to the desired EQ preset and then press the "ENTER" button.

This action will engage the selected preset and will display the new selection in the EQ box (2). Once the cursor is positioned over EQ (2) you can also select a correction preset by pressing one of the ten buttons located in the block labeled "CORRECTION" on the remote control. The 2.2 MINI will display a <*> next to the selected preset indicating that the preset was loaded.

Master Level Indicator

This field displays the system master level in dB. It is calculated as relative gain (displayed from 0 to 99.9) minus 99.9 plus GAIN (as set in the OPTIONS menu). For example, if the GAIN option is set to 3 dB and the front panel master level display reads 87.5 dB, this field will display $87.5 - 99.9 + 3.0 = -9.4$ dB.

Correction menu option

Move the cursor to the DRC-RCS (4) option and press the "ENTER" button to enter the main dynamic room correction menu.

Parametric EQ menu option

Move the cursor to the PAR EQ (5) option and press the "ENTER" button to enter the main parametric EQ menu.



Note: An EQ preset must be enabled from the main screen for the PAR EQ menu to be active. If the EQ preset is set to "BP", the PAR EQ controls are disabled.

Output sampling frequency indicator

This displays the currently selected output sampling frequency. The output sampling frequency can be modified in the "OUT-FS" menu option.

Input sampling frequency indicator

This displays the sampling frequency of the currently selected digital input. The RCS 2.2 MINI will automatically detect input signal presence and display its sampling frequency.

RCS 2.2 MINI operating mode

This displays the systems operating mode. The operating mode can be modified from the "MODE" menu option.

MONO mode indicator

When the MONO option in the MODE menu is set to ON, this field displays an 'M'. If the MONO option is set to OFF, this field is not visible.

MAIN menu

The main menu screen lists all of the RCS 2.2 MINI general menus. Access the main menu through the menu button on the front panel or the remote control.

Main Menu		
MODE	POL	DOUT-FS
TEST	COMM	DISPLAY
AMP	LOCK	OPTIONS
INFO		

To highlight a menu option use the navigational buttons. To enter a highlighted option press the "ENTER" button.

MODE menu	sets operation mode for the 2.2 MINI - use to specify 2.2, 2.1, 2.0 modes or the MONO option.
POL menu	use to set the channel polarity as well as the absolute polarity.
DOUT-FS menu	use to set the digital output sampling frequency.
TEST menu	allows for the pink noise output test.
COMM menu	use to set the 2.2 MINI device address.
DISPLAY menu	use to set display timeout feature.
AMP menu	use to enables/disables Tact digital amplifier control.
LOCK menu	allows for locking certain parts of the user interface.
OPTIONS menu	use to set various 2.2 MINI options.
INFO screen	displays firmware version.

MODE menu

Use this menu to set the RCS 2.2 MINI to one of four operating modes.

MODE: STEREO 2.2 M		1
STEREO	2.2	
STEREO	2.1	
STEREO	2.0	
MONO:	OFF	

To highlight an option use the navigational buttons. To enter a highlighted option press the "ENTER" button.

STEREO 2.2	This mode produces 4 output signals. Left, Right, Left SUB, and Right SUB
STEREO 2.1	This mode produces 3 output signals. Left, Right and one SUB signal. In this mode the SUB signal is mono and is output to both the Left SUB and Right SUB outputs.
STEREO 2.0	This mode produces 2 output signals. This is standard two channel stereo mode. In this mode there is no signal at the subwoofer outputs.
MONO	This option can be set to ON or OFF. When set to ON the system will output the same signal for both the Left and Right channels.

POL menu

Use this screen to set individual channel polarity and absolute channel polarity.

Channel Polarity				
Left =	+	Right =	+	
SUB L=	+	SUB R=	+	
ABS POL=	+			

Each channel can be set to “+” (0) or “-” (inverted). To select an option use the “LEFT” and “RIGHT” navigational buttons and to change its value press the “ENTER” button to toggle between a “+” or “-” setting.

If all channel options are set to ‘+’ or all channel options are set to ‘-’, all output signals will come out in phase. If one channel is set to ‘+’ and another channel is set to ‘-’ their respective output signals will be out of phase.

ABS POL option (absolute polarity) will flip the phase on all channels.

DOUT-FS menu

The RCS 2.2 MINI is equipped with a sample rate converter on each digital output. Output sampling frequency can be set to 44.1, 48, 88.2, 96 and 192 KHz. Output sampling frequency is the same for both main and subwoofer output.

Output Sampling FR				
Output Fs= 44.1 KHz				
44.4	48	88	96	192

To set the sampling frequency use the “LEFT” or “RIGHT” navigational buttons to highlight the desired option (44.1, 48, 88, 96, 192 kHz) and then press the “ENTER” button to make the selection.



NOTE: This menu does not affect the analog output sampling frequency and has no effect on the analog outputs.

TEST menu

The test menu is designed to allow for a quick system check. When engaged it will produce pink noise on all selected channels. When a channel is set to "Y" pink noise will be heard from that channel when "Run Test" is selected.

Channel Test			
Left	Y	Right	N
LSUB	N	RSUB	N
Run Test			

To highlight an option use the "UP" and "DOWN" navigational buttons and then press the "ENTER" button to make your selection. After all selections are made, highlight the "Run Test" option and hold down the "ENTER" button to produce the test signal. The test tone will stop when the "ENTER" button is released. Press the "MENU" button to exit this menu.

COMM menu

Use this screen to set the 2.2 MINI device address.

RS232	
Speed	: 57600
Address	: 1
Current Speed : 57600	

This menu has only one option, Address. Address can be set to any number between 1 and 255. This parameter is used by PC programs to identify the 2.2 MINI. This feature allows for multiple Tact units to be controlled by the same RS232 link. The RS232 speed is set to 57.6 Kb.

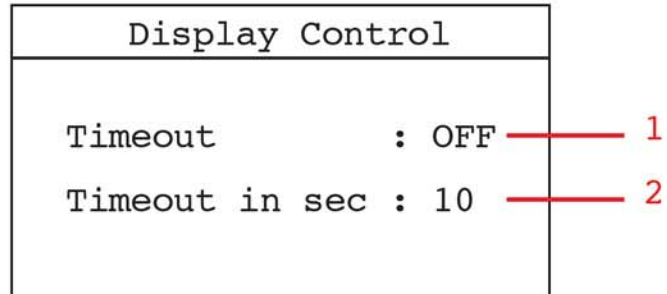
Use "LEFT" and "RIGHT" navigation buttons to select desired system address. The RCS 2.2 MINI is shipped with the default address set at 1.



NOTE: If you change the device address make sure that you select the appropriate device address in the RCS 2.2 MINI Room Correction software.

DISPLAY menu

The display menu allows for control over the front panel display appearance.



To select an option use the "UP" or "DOWN" navigation buttons and then use the "LEFT", "RIGHT" and "ENTER" buttons to change the value.

1. Timeout

This option is used to turn the front panel timer "ON" or "OFF". When this option is "ON" the front panel timer will count the number of seconds specified by the "Timeout in sec" option, and then display the screen saver.
2. Timeout in sec

This option is used to set the number of seconds that the display will remain on before turning the screen saver on. This parameter can be set to a value from 3 to 30 seconds. For example, if it is set to 15 seconds the front panel timer will count to 15 seconds and then will turn the screen saver on.

AMP menu

The AMP menu is designed to allow the RCS 2.2 MINI to interface with the Tact line of digital amplifiers. The RCS 2.2 MINI can control multiple digital amplifiers. This setting should be ENABLED only if you have a Tact digital amplifier attached to the RCS 2.2 MINI.

Digital AMP Control	
L & R	: DISABLED
SUB L & R	: DISABLED

To change the settings use the “UP” and “DOWN” navigational buttons to highlight the option and then press the “ENTER” button to change the setting.

If the L & R option is set to DISABLE, the Left/Right channel will operate in normal mode. The master level control will affect both the digital and the analog output signal.

If the L & R option is set to ENABLE, the master level control has no effect on the Left/Right analog or digital output signal. The Left and Right channel signal will output the maximum signal level, which is equivalent to the 99.9 setting on the volume display. The front panel master level information (relative read out, 0-99.9) will be broadcast to all digital amplifiers connected to the RS232 AUX connector. In this case, volume control is implemented in Tact digital amplifiers.

The same applies to the SUB L & R option.

For example, one amplifier can be used for main left and right channels and the second one can be used for the left and right subwoofer channels. If two Tact digital amplifiers are connected, both options should be set to ENABLED. If one Tact digital amplifier is connected only one option should be set to ENABLED and the other one should be set to DISABLED. Enable should only be set for the output that uses Tact digital amplifiers.



NOTE: When a Tact digital amplifier is controlled by the RCS 2.2 MINI, all of the amplifier's front panel and IR controls are disabled. Use the RS232 port and/or daisy chain to link the components.



CAUTION: The AMP setting should only be set to ENABLED if you have Tact amplifiers connected to the RCS 2.2 MINI. When the AMP option is set to ENABLED both the analog and the digital outputs will output a full level signal regardless of the RCS 2.2 MINI master volume setting. If you do not have Tact amplifiers connected to your system you will not be able to control the output level from the RCS 2.2 MINI volume control. The output is sent at its maximum level and can result in damage to your speakers.

LOCK menu

Use this screen to lock certain areas of the front panel user interface.

System Lock Options		
LOCK MENU	: NO	1
LOCK DRC RCS	: NO	2
LOCK PAR EQ	: NO	3

To select an option highlight it using the “UP” and “DOWN” navigational buttons.
To modify a selected option use the “LEFT” and “RIGHT” buttons.

- | | |
|-----------------|---|
| 1. LOCK MENU | When this option is set to YES all Main Menu options except LOCK and INFO are disabled |
| 2. LOCK DRC-RCS | When this option is set to YES the user can not change current correction presets and can not enter the DRC-RCS screen. |
| 3. LOCK PAR EQ | When this option is set to YES the user can not change current ParEq presets and can not enter the PAR EQ screen. |

OPTIONS menu

The options menu allows for control of the systems maximum signal level, signal detection threshold (SDTH), remote control and gain control.

Options	
Max Level	: 0.0 dB
Detection	: 6.0 dB
Remote	: ON
GAIN	: 0.0 dB

To select an option highlight it using the “UP” and “DOWN” navigational buttons. To modify a selected option use the “LEFT” and “RIGHT” buttons.

Max Level This option controls the system’s maximum signal level. For example, if this option is set to -3.0 dB, the volume control can not go above -3.0 dB. The minimum value is -99.9 and the maximum value is equal to the value of the GAIN parameter.

Detection This option sets the signal detection threshold. If the absolute value of the Left or the Right channel signal goes above this threshold the red signaling dot will be displayed on the front panel below the master volume display. This feature can be used to indicate signal presence on either channel or to indicate near clip condition. To use it as a signal presence indicator set the Detection to a value close to -90.0 dB. To use it as near clip indicator set the Detection to a value close to 0.0 dB. This parameter can be set anywhere from -99.9 dB to 0 dB. One step above 0 dB will turn this feature OFF.



NOTE: This light does not indicate clip condition. When the parameter is set to below 0 dB and the red LED on the front panel turns on, it is only an indication that the input audio signal has reached the threshold level. It does not indicate input or output signal clipping.

Remote This option enables and disables the remote control. Once the remote control is disabled the unit can only be controlled from the front panel.

GAIN Use this option to add digital gain to input audio signal. This option can be set to a value from 0 to 18 dB in with resolution of 0.1 dB. This option should be used to add some gain to CDs that are not fully modulated.

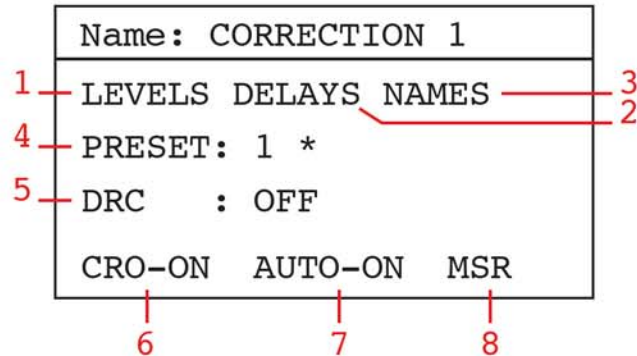
INFO menu

Use this screen to verify the versin of firmware that is installed on your RCS 2.2 MINI. This screen also provides Tact Audio's web address and phone number. Pleae feel free to contact us should you require any furthe information from us - we would love to hear from you!

Tact Audio inc.
www.tactlabs.com
Tel: 201-440-9300
ver: v1.0 060203

CORRECTION menu

Access the CORRECTION menu by selecting DRC-RCS from the RCS 2.2 MINI first screen.



To highlight a menu option use the navigational buttons. To enter a highlighted option press the “ENTER” button.

- | | |
|------------------|---|
| 1. LEVELS menu | Use to set individual channel level. |
| 2. DELAYS menu | Use to set individual channel delay time and the AUTO/MANUAL delay option. |
| 3. NAMES menu | Displays the correction preset symbolic names and allows for name based correction preset selection. |
| 4. PRESET option | This option allows for correction preset selection. Place the screen cursor over this option and use the UP DOWN buttons to display the desired preset. Press the ENTER button to make a selection. The active preset has a <*> displayed next to it. |
| 5. DRC option | Use this option to turn dynamic room correctin ON or OFF. When this option is changed the 2.2 MINI will recalculate and engage new correction based on the selection of this parameter. |
| 6. CRO menu | This menu is used to set 2.2 MINI crossover parameters. |
| 7. AUTO-ON menu | Use this menu option to turn auto correction ON/OFF and set auto correction parameters. |
| 8. MSR menu | Use this menu option to perform room response measurement. |

LEVELS menu

Use this menu to set individual channel level settings.

Levels Corr. : 1	
LEFT :	0.00 dB
RIGHT :	-2.1 dB
SUB L :	-1.2 dB
SUB R :	0.00 dB
ALL :	0.00 dB

Use the UP and DOWN buttons to place screen cursor on desired option and then use the LEFT and RIGHT buttons to adjust individual channel level settings. Use ALL menu option to change the level of all for outputs.

Each output signal level is determined by the channel level, as set in this menu, ALL level, the master level control, and system GAIN as set in OPTIONS menu.

DELAYS menu

Use this menu to set individual channel delay settings.

Delays Corr. : A — 1	
LEFT :	0.00 msec
RIGHT :	1.23 msec
SUB L :	0.56 msec
SUB R :	0.00 msec

Use the UP and DOWN buttons to place screen cursor on desired option and then use the LEFT and RIGHT buttons to adjust individual channel level settings.

Place screen cursor over field (1) and press ENTER to switch between AUTO and MANUAL delay time setup. When AUTO is selected the delay time is determined by the measurement algorithm during the measurement process. Measured delay time is saved with each measurement in the selected measurement file. These values can be manually changed but once the correction preset is re-selected, changes made to the delay time will be lost.

To use manually set delay times set the field (1) to M. Tact-2.2 MINI keeps track of delay times set for both AUTO and MANUAL delay option.

NAMES menu

Use this screen to view the symbolic names assigned to each preset number.

Cor	Name	[2]
BP:	BYPASS	
1:	CORRECTION	1
2:	CORRECTION	2
3:	CORRECTION	3
4:	CORRECTION	4

Use the UP and DOWN buttons to place the screen cursor on desired option. Press the enter button to engage the selected correction preset.

To edit symbolic correction names use computer interface and supplied 2.2 MINI software.

CRO menu

Use this screen to set RCS 2.2 MINI crossover parameters.

Crossover Corr Pr: 2		7
1	LP: 12 order 300 Hz	2
3	HP: 12 order 300 Hz	4
	CRO: ON SET	
	5	6

To highlight a menu option use the navigational buttons. To select a highlighted option press the "ENTER" button.

1. Use this option to set low-pass filter order. This option can be set from 1 to 24.
2. Use this option to set the low-pass filter cutoff frequency. Minimum frequency is 40 Hz and maximum frequency is 500 Hz.
3. Use this option to set the high-pass filter order. This option can be set from 1 to 24
4. Use this option to set the high-pass filter cutoff frequency. Minimum frequency is 40 Hz and maximum frequency is 500 Hz.
5. Place the cursor on this option and press the ENTER button to turn the crossover filters ON or OFF.
6. Click on this option to engage selected crossover filters.
7. Displays the current correction preset.

**PARAMETRIC EQ
menu**

This menu is used to control the 12 band parametric equalized. This menu is accessed through the PAR EQ option on the RCS 2.2 MINI first screen.

If Par Eq preset is set to BP - bypass the following screen will be displayed:

Parametric EQ	
TABLE :	
LINK :	---
PRESET:	BP *
LOCK :	NO
Active Preset:	BQ

In this screen only two options are enabled: PRESET and LOCK.

PARAMETRIC EQ menu

When a Par Eq preset other than BP is selected this screen can have two forms: one with the LINK option set to YES and the other with the LINK option set to NO.

When the LINK option is set to NO the following screen is displayed

Parametric EQ	
TABLE :	LEFT RIGHT
LINK :	NO
PRESET:	1 *
LOCK :	NO
Active Preset:	1

When the LINK option is set to YES the following screen is displayed

Parametric EQ	
TABLE :	LEFT & RIGHT
LINK :	YES
PRESET:	1 *
LOCK :	NO
Active Preset:	1

To highlight a menu option use the navigational buttons. To select a highlighted option press the "ENTER" button.

1. TABLE menu option. To enter the TABLE menu screen highlight and select either the LEFT & RIGHT or the LEFT or RIGHT selections and press ENTER button. The available selection is determined by the setting of the LINK option as explained below.
2. LINK menu option. This option determines if the left and right channels are linked to the same EQ filters. If NO is selected the channels are not linked and each channel has a separate set of EQ filters. If YES is selected the channels are linked and there will be only one set of filters used for both the left and right channels. To change the LINK setting highlight the current LINK selection and press ENTER button to toggle between the YES and NO selections.
3. PRESET menu option. This option allows for EQ preset selection. The <*> character indicates the current preset. To select a new preset highlight the PRESET option and use the UP and DOWN buttons to scroll through the available presets. When the desired preset is displayed press the ENTER button to select it.
4. LOCK menu option. This option is used to lock the current parametric EQ preset. When set to YES the parametric EQ preset cannot be changed. To change the LOCK setting highlight the current LOCK selection and press the ENTER button to toggle between the YES and NO selections.
5. Active Preset display. This displays the preset that is currently loaded into the system. This is not a selectable menu option.

PARAMETRIC EQ menu

This is an example of the linked parametric EQ filter table. Its display allows for adjustment of all filter parameters: Level, center frequency and filterwidth given in octaves. The filter parameters will be applied globally to both the left and right channels. This screen is accessed through the LINK menu option on the PAR EQ menu screen.

L & R Ch. Preset: 1			
FL	Lev	Fr	Q
1:	0.0	20.0	4.0
2:	-1.1	31.5	4.0
3:	2.3	50.0	4.0
4:	0.0	80.0	4.0

To change a parameter first highlight it and press ENTER button. Then use the LEFT and RIGHT navigational buttons change the parameter value.

1. Indicates that this table is for linked filters
2. Current parametric EQ preset.
3. Filter order. For more filters scroll down the list.

PARAMETRIC EQ menu

The following is an example of an un-linked ParEQ table featuring the left channel parametric EQ filter table. Its display allows for the adjustment of all filter parameters: Level, center frequency and bandwidth and they will be applied independently to the left channel. There is an analogous table for the right channel. You can enter the right channel table from the previous menu, the PAR EQ screen.

Left	Ch. Preset: 1	FL	Lev	Fr	Q
1:			0.0	20.0	4.0
2:			-1.1	31.5	4.0
3:			2.3	50.0	4.0
4:			0.0	80.0	4.0

To change a parameter first highlight it and press ENTER button. Then use the LEFT and RIGHT navigational buttons change the parameter value.

1. Indicates the left or right channel filter table.
2. Current parametric EQ preset.
3. Filter order. For more filters scroll down the list.

APPENDIX A

AUTOMATIC ROOM CORRECTION

Tact-2.2 MINI can now perform room correction automatically from the 2.2 MINI front panel user interface, without the need for an PC software.

The automatic room correction feature is designed to perform the entire room correction process without using a PC interface. The Tact-2.2 MINI has sufficient DSP processing power to perform room measurement, crossover filter design, target curve generation and correction filter calculation. The entire process is controlled from the 2.2 MINI front panel DRC-RCS menu. Target curve and crossover filter adjustments can be made on the fly while the music is playing. Users can, for example, specify a boost at low frequencies or a roll-off at high frequencies. Values of the 'low' and 'high' frequencies can also be adjusted.

PC based room correction requires that the 2.2 MINI is connected to the RS232 port of a PC. PC software is used just as a GUI (graphical user interface) to provide the user with a graphical presentation of the correction process. After the room response measurement is completed, the room frequency response for all measured channels can be displayed on the screen. Crossover filters and actual correction filters can be viewed. The displayed graphs provide valuable information that helps users design their own optimum target curve.

The Tact-2.2 MINI memorizes two sets of target curves: computer generated and automatically generated target curves. When the automatic feature is turned OFF, the 2.2 MINI will use a computer generated set of target curves. When the automatic feature is turned ON, the 2.2 MINI uses target curves generated by the 2.2 MINI front panel automatic correction feature.

When the 2.2 MINI is connected to a PC and the automatic feature is enabled, automatically generated target curves will be uploaded into the RCS/DRC screen. The curves can then be saved or modified. Modified curves can then be loaded back into the 2.2 MINI. However, the uploaded curves will not take effect until the automatic feature is disabled. Any target curve uploaded to 2.2 MINI is saved as a PC generated target curve and takes effect only when the automatic feature is disabled. In another words, if a target curve is to be modified by the PC software, the automatic correction feature has to be disabled.

This following describes the automatic room correction process for all 2.2 MINI operating modes.

2.2 Mode

This operating mode assumes a stereo system consisting of two main channels and two subwoofers. To select 2.2 mode from the main screen, click on the MENU button, and then select the MODE menu. In MODE menu, click on the STEREO 2.2 option. This will select 2.2 mode and will display it on top of the screen (1) Fig.1.

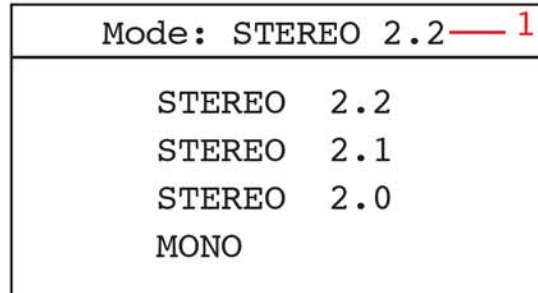


Fig. 1. Mode menu. 2.2 mode selection is displayed in the upper left corner (1).

To perform 2.2 mode automatic room correction go through the following steps:

1. **Correction Bypass.** Place 2.2 MINI in correction bypass mode. You can place 2.2 MINI in bypass mode by pressing on the BP remote control button or by using the front panel controls.

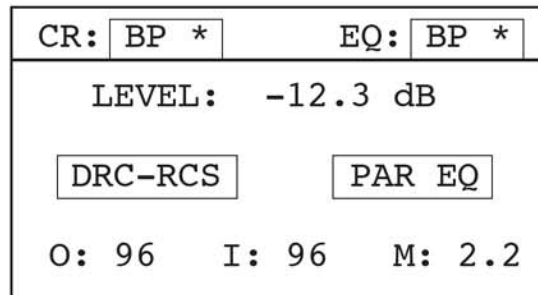


Fig. 2. Tact-2.2 MINI main screen. Note a '*' next to BP. It indicates that BP – bypass mode is selected.

2. **Crossover Filters Off.** Make sure that crossover filter option is set to OFF. It is important that all measurements are performed without any crossover filtering. If your loudspeakers have built in electronic crossover filters, make sure that they are disabled. If crossover filters could not be disabled, set the subwoofer crossover filter to its highest frequency and main channel to its lowest cut off frequency.

To disable crossover filters enter the **RCS-DRC** menu and select the CRO-ON(OFF) option in Fig.3 to enter Crossover screen Fig. 4.

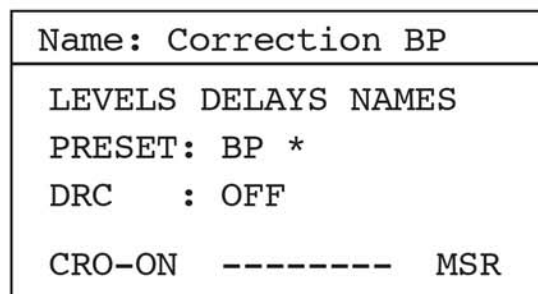


Fig. 3. RCS-DRC screen.

Crossover Corr Pr: BP			
LP:	24	order	300 Hz
HP:	24	order	300 Hz
CRO: OFF		SET	

Fig. 4. Crossover menu. CRO: OFF indicates that crossover filters are disabled

Crossover filters can be turned OFF from the front panel crossover menu (Fig. 4). Place the screen cursor over the **CRO: ON** menu option and then press the enter button (click) until it displays **CRO: OFF**, and then click on **SET** option.. Please note that any change made on this screen does not take effect until you click on the **SET** option.

Click on the MENU button to go back to the DRC-RCS screen, Fig. 3.

3. Measurements. To perform room response measurements, select the MSR menu option to display the measurement screen (Fig. 5).

MSR MIC CAL: ON			
MIC FILE: Mic 004534			
AVG	:	25	DELAY: 5 S
PULSE:	:	60	FILE : 1
Ch:	L	R	LS SR START

Fig. 5. Measurement screen.

The 2.2 MINI is factory configured to measurement parameters as displayed in Fig. 5. The MSR MIC CAL option should be turned ON and the MIC FILE field should display the microphone serial number as printed on your microphone

MSR MIC CAL. When this option is set to ON, the room correction algorithm will apply the microphone calibration file to the measurement data. When this option is set to OFF, the microphone calibration file is ignored.

MIC FILE. This field displays the microphone file name used to perform microphone calibration. The microphone calibration file data is saved in 2.2 MINI internal memory. For more details on how to transfer microphone calibrations file to 2.2 MINI memory, please refer to the Microphone section of the PC software manual.

AVG This is a very important measurement parameter. It equals the number of measurements that are averaged prior to being saved. The averaging process reduces the effects of random environmental noise. Typical Average values go from 10 to 30.

DELAY. If you do not want to be in the room while measurement is in progress, set this parameter to a few seconds to allow you to exit the room. For example, if DELAY = 10 the system will wait for 10 seconds before it starts pulsing.

PULSE. This parameter sets the relative level of the output measurement pulse. Minimum level is 1% and maximum level is 100%.

FILE. Use this option to assign a File number to the measurement you are just about to perform. At the end of the measurement process, the measurement data for all four channels will be saved in the selected File number. Tact-2.2 MINI supports up to seven measurement files. In another words you can save up to seven different measurements in 2.2 MINI internal memory.

Use L, R, SL and SR options to select (enable) a channel for measurement. Channels are labeled as L for left, R for right, SL for subwoofer left and SR for subwoofer right channel. Selected (enabled) channels are marked by a rectangle. To select or deselect a channel place the cursor over desired channel and press ENTER button.

MSR: Mic Calibration	
L = 28.5	R = 27.0
SL = 20.5	SR = 22.5
MIC GAIN = 20.5 dB	
CANCEL	AVG = 1

Fig. 6. Microphone calibration and measurement screen

After the measurements are completed, click on the **EXIT** option and then click on the **MENU** button to go back to the **DRC-RCS** screen (Fig. 3). At any time during the measurement process you can click on the **CANCEL** option to cancel the process. After the measurement is completed or the measurement was canceled, the **CANCEL** option changes its name to **EXIT**

4. Enable automatic room correction. In the **DRC-RCS** screen (Fig. 3), select correction preset 1. Make sure that crossover filters are enabled and proper crossover frequency is selected. Crossover filters can be adjusted at any time even after you enable the automatic feature. Click on the **AUTO-OFF** menu option to enter the Auto Correction screen (Fig. 5). Note that in bypass mode the **AUTO-OFF(ON)** menu option is not displayed.

Auto Correction: ON	
LF: 0 ¹	HF: 0 ² dB
FR: 200	FR: 200 Hz
AUTO-ON	FILE: 1
SET	

Fig. 5 Auto Correction screen.

In the Auto Correction screen click on the **AUTO-OFF** menu option to display **AUTO-ON** and then click on the **SET** option to activate automatic room correction. In a split of a second the 2.2 MINI will calculate target curves based on LF, HF, crossover filter selection parameters and measurement data as saved in measurement file 1.

You are ready to perform your first listening test. Use LF parameters to add gain or attenuation at frequencies below the frequency as displayed in LF parameter block (1). Use HF parameters to add gain or attenuation to frequencies above the frequency as displayed in HF parameter block (2). In this way you can shape target curves to match your specific listening needs.

Please note that changes you make on this screen do not take effect until you click on the **SET** option.

2.1 Mode

This operating mode assumes a stereo system consisting of two main channels and one subwoofer. To select 2.1 mod from the main screen, click on the **MENU** button to enter the main menu screen and then select the **MODE** menu. In the **MODE** menu click on the **STEREO 2.1** option. This will select 2.1 mode and display it on top of the screen (1).

Mode: STEREO 2.1 — 1	
STEREO	2.2
STEREO	2.1
STEREO	2.0
MONO	

Fig. 6. Mode menu. 2.1 mode selection is displayed in the upper left corner (1).

The rest of the procedure is the same as in 2.2 mode. Note the change in the measurement screen in Fig. 7. The Tact-2.2 MINI will automatically select channels for measurements based on the mode selection.

MSR MIC CAL: ON	
MIC FILE: Mic 004534	
AVG	: 25 DELAY: 5 S
PULSE:	60 FILE : 1
Ch:	<input type="checkbox"/> L <input type="checkbox"/> R <input type="checkbox"/> LS SR START

Fig. 6. Mode menu. 2.1 mode selection is displayed in the upper left corner (1).

The rest of the procedure is the same as in 2.2 mode. Note the change in the measurement screen in Fig. 7. The Tact-2.2 MINI will automatically select channels for measurements based on the mode selection.

2.0 Mode

This operating mode assumes a stereo system consisting of two main channels only. To select 2.0 mode from the main screen, click on the **MENU** button to enter main menu screen and then select the **MODE** menu. In the **MODE** menu click on **STEREO 2.0** option. This will select 2.0 mode and display it on top of the screen (1).

Mode: STEREO 2.0 — 1	
STEREO	2.2
STEREO	2.1
STEREO	2.0
MONO	OFF

Fig. 8. Mode menu. 2.0 mode selection is displayed in the upper left corner (1).

The rest of the procedure is the same as in 2.2 mode. Note the change in the measurement screen in Fig. 9. The Tact-2.2 MINI will automatically select channels for measurements based on the mode selection.

MSR MIC CAL: ON	
MIC FILE: Mic 004534	
AVG	: 25 DELAY: 5 S
PULSE:	60 FILE : 1
Ch:	<input type="checkbox"/> L <input type="checkbox"/> R LS SR START

Fig. 9. Measurement screen for 2.0 mode. Note that SR does not have a rectangle around indicating that this channel is not set for measurement.

In 2.0 mode only the Left and Right channels will be measured. At the end of the measurement process the Subwoofer Left and Subwoofer Right measurement data will be set to 0 dB flat response.

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