RK2040

USER GUIDE

RK2040 Diversity Rack System

The RK2040 is a true diversity rack system housed in a compact 1U high 19-inch rack frame and can be configured as a minimum two receiver rack system with the capability of expansion to a four receiver rack system. The rack has built-in active, filtered, RF distribution amplifiers, with two auxiliary RF outputs to enable another RK2040 rack to be fed from a single pair of antennae.

All receiver and rack parameters can be set from the simple, intuitive menu structure via four tactile buttons beside each of the individual backlit LCD displays allowing comprehensive monitoring of RF levels, Audio level and transmitter battery status.

The RK2040 also has four transformer balanced line outputs as well as an adjustable headphone output.

The RK2040 has a built-in RS485 PC interface allowing the receiver parameters to be set-up and remotely monitored up to 1000 metres away.

The Racktop™ application, supplied free of charge with the RK2040 allows up to 12 fully loaded racks to be remotely monitored via the RS485 PC interface.
Racktop™ can set the individual parameters for the receivers and also has scan and plot signal functions incorporated into the software.

The RK2040 can be powered from an external DC source between 10-18 volts. A mains powered DC power supply is supplied with the RK2040.

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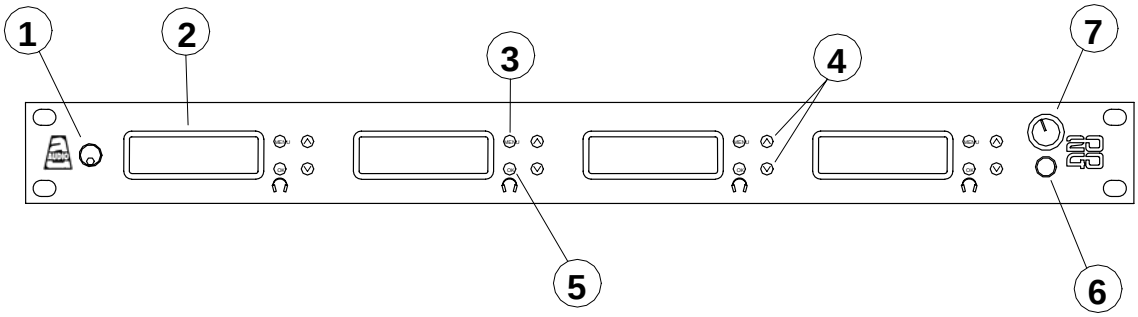
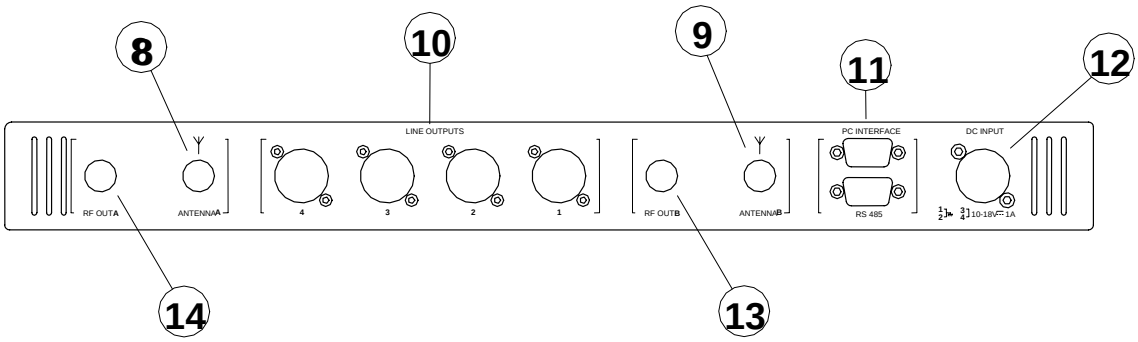
Controls Displays and Connectors



1. ON/OFF power switch
2. Backlit LCD Display screen
3. Menu button
4. Up/Down scroll buttons
5. OK button
6. ¼ inch Stereo jack socket
7. Headphone level control



8. BNC antenna input A
9. BNC antenna input B
10. 4 x Transformer balanced XLR outputs
11. 2 x RS485 9-pin D-type interfaces
12. 4-pin XLR male DC Power socket
13. RF output B
14. RF output A

Setting up the RK2040

Connect power
Connect power to the RK2040 using the AC to DC power supply unit provided with the RK2040. Plug the four pin XLR connector into the power socket (**12**) on the rear panel. The RK2040 requires a DC supply in the range 10 – 18VDC, with a maximum current of 1.5A.

On/Off Switch
A two position toggle switch (**1**) provides the facility to turn on the RK2040 rack by switching the toggle switch to the down position.

Antenna Inputs
Connect the antennae to the BNC sockets marked A (**8**) and B (**9**) on the rear panel.

RF Outputs
Two BNC connectors RF Out A (**14**) and RF Out B (**13**) provide the facility to link two RK2040 racks together provided the frequency range of the two racks are compatible.

Headphone Output
The headphone output socket (**6**)allows any combination of receivers to be monitored via a standard ¼ inch stereo jack socket (wired as mono).

Headphone Level Control
The headphone output level is controlled via the level control (**7**).

Audio Outputs
Four 3 pin XLR connectors (**10**) provide transformer balanced line level outputs.

RS485 PC Interface

Two standard 9 pin D-type connectors (**11**) provide a link to a PC. Multiple racks can be cascaded together via the D-type connectors with only one cable required to link to a PC.

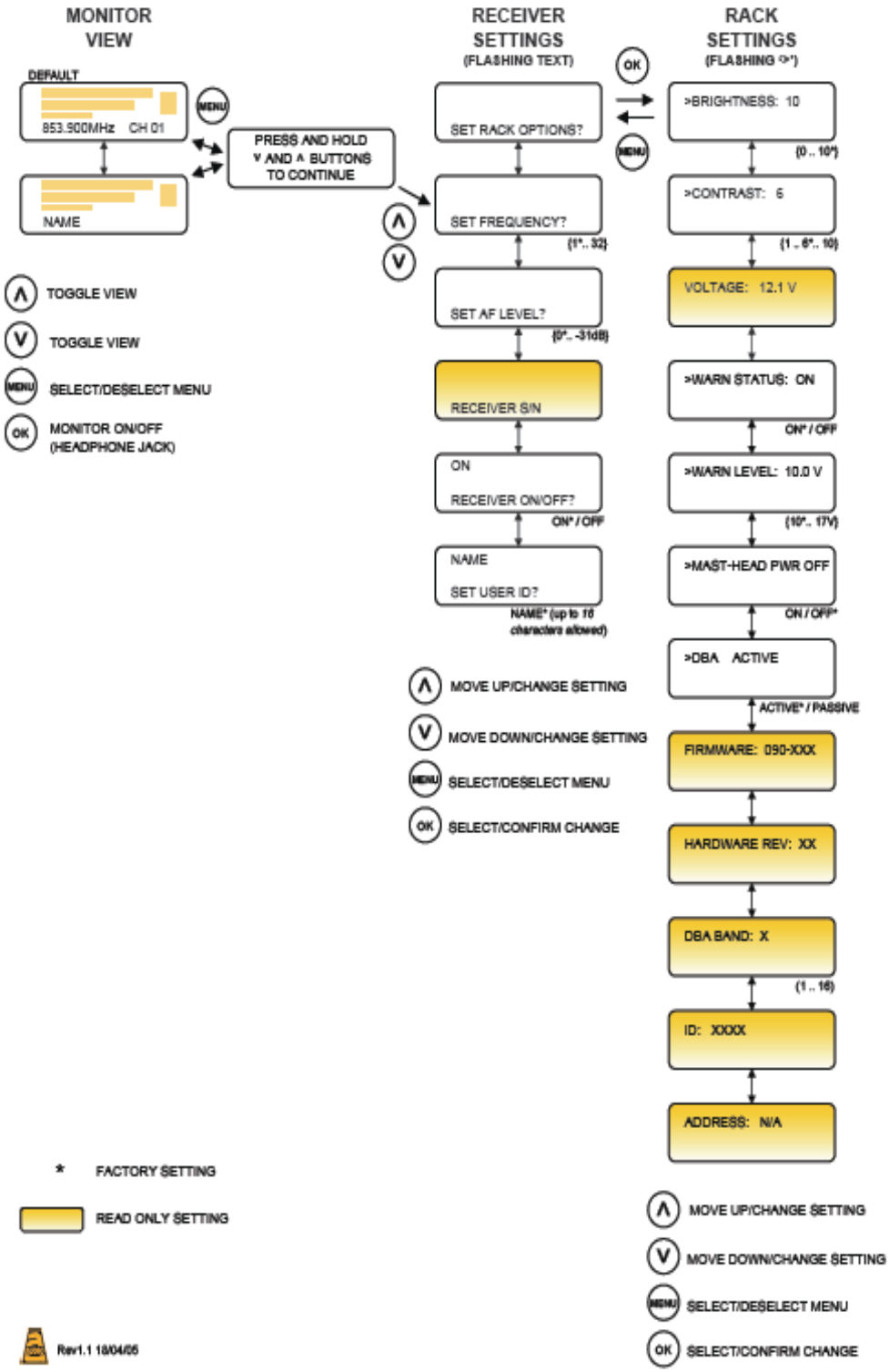
LCD Display

Four backlit LCD display screens (**2**) display the RF and Audio levels, TX battery status, frequency of receiver, name of artist and a host of other rack and receiver parameters.

RK2040 & Receiver setting Switches

Menu, Up, Down and OK switches (**3, 4, 5**) set all parameters for the rack and receivers through a simple and intuitive menu.

RK2040 Quick Menu Guide



THE DISPLAY SCREENS

The diagram below shows the various features that may be displayed on the screens in the normal operating mode (receiver not in set-up mode).

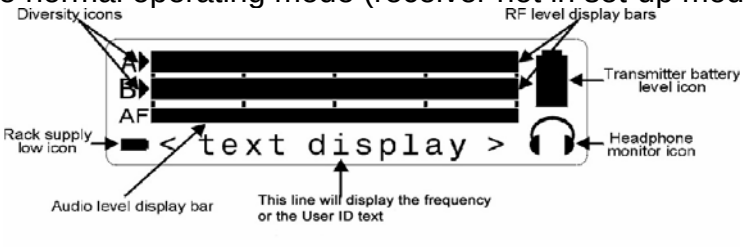


Fig:1 THE PARTS OF THE NORMAL DISPLAY SCREEN

The RF Level Bars
The two upper bars display the RF signal strength for the two diversity channels, labelled
A and B.

The Diversity Icons
Following the labels, to the left of these bars, are the diversity icons. One of these will normally be displayed, indicating which RF signal is being used. If the receiver squelch is active, the diversity icons are replaced by a single rectangular block.

The Audio Level Bar
Below the RF bars is the audio level indicator bar, labelled AF.

The Transmitter Battery Status Indicator
The icon displayed in the top-right corner of the screen shows the status of the transmitter battery. This icon indicates the battery status as 1 of 6 levels.

The Audio Monitoring Icon
When the 'headphones' icon is displayed in the bottom-right corner of the screen, this indicates that the audio output from that receiver is routed to the front-panel monitoring socket. Any combination of the four receiver outputs may be simultaneously monitored.
In normal operating mode, alternate presses of the 'OK' button to the right of the screen will add or remove the receiver audio output to the monitor channel.

The Rack Supply Low Icon
If the power input to the rack falls below the pre-set level, the rack supply low icon will be displayed in the bottom-left corner of the screen. This icon will blink periodically. The input level which causes this warning to be displayed is adjustable by the user via the set-up menus. This warning facility can also be turned on or off via the set-up menus.

The Text Display Line
A line of text is displayed at the bottom of the screen. This line can display up to sixteen characters and the contents may be selected from two sources by the user.
Text Display Option 1:

Fig:2 DISPLAYING THE USER ID TEXT.
The contents of the receiver User ID field are displayed. Within the rack, this feature may typically be used to label the channel source.

Text Display Option 2:

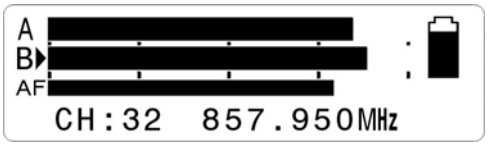


Fig:3 DISPLAYING THE CHANNEL AND FREQUENCY.
The currently selected channel number and frequency for the receiver are displayed.

The Set-up Menu.

The parameters of the individual receivers and of the rack may be changed by the user. To do this, a set-up menu system has been incorporated.
To enter the set-up menu, press the '**MENU**' button when in normal operating mode.
Pressing the menu button displays a screen which prompts the user to press and hold the up and down buttons for 1 second to continue. At the end of this time, the **'set frequency'** screen will appear.
If the rack is being controlled by Racktop, access to the menu functions may be reduced. Typically, only read-only parameters and display setting will be enabled.

A display similar to the following display will appear:-

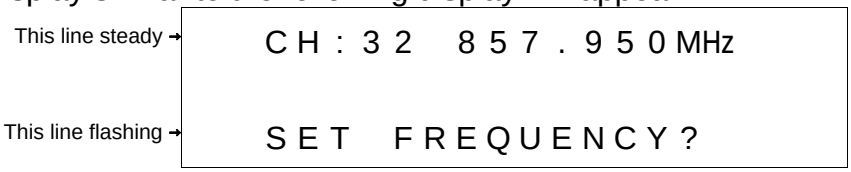


Fig:5 SET-UP MENU, OPTION #1.
The first option offered in the set-up menu is to set the receiver frequency.
The line "SET FREQUENCY?" will be flashing (where text is flashing, it is indicated in this document to the left of the line).
To exit from the set-up menu back to normal operating mode, press the '**MENU**' button.

To scroll the menu to see the other options, press the '∧' or '∨' buttons.
To accept the displayed set-up option, press the 'OK' button.
The various set-up options will now be described in turn, in the order in which they appear in the menu.

SET FREQUENCY?

If the 'OK' button is pressed while 'SET FREQUENCY?' is flashing, the set-up sequence will enter the frequency setting mode. The set-up option will stop flashing and the currently selected frequency will flash instead, as shown below:-

Fig:6 FREQUENCY SETTING SCREEN.

Press the '∧' or '∨' buttons to scroll through the available frequency table.
When the desired frequency is displayed, press the 'OK' button to select it.
Once the 'OK' button has been pressed, the displayed frequency will be entered into the receiver's internal memory. The top line of the display will stop flashing and the SET FREQUENCY? line will commence flashing again.
You can either press the 'OK' button to change the frequency again or press the '∧' or '∨' buttons to scroll through the other available set-up options.
If the 'MENU' button is pressed while the top line is still flashing, the set-up mode will be cancelled, the display will be returned to normal operating mode and the previous frequency setting will be restored.

SET AF?

Pressing the '∨' button while SET FREQUENCY? is flashing will move to the second set-up option screen, shown below:-

Fig:7 SET-UP MENU, OPTION #2.

If the 'OK' button is pressed while 'SET AF?' is flashing, the set-up sequence will enter the AF attenuator setting mode. The set-up option will stop flashing and the currently selected attenuator setting will flash instead, as shown below:-

Fig:8 AF ATTENUATOR SETTING SCREEN.

Press the '∧' or '∨' buttons to scroll through the available attenuator settings.
When the desired setting is displayed, press the 'OK' button to select it.
Once the 'OK' button has been pressed, the displayed setting will be entered into the receiver's internal memory. The top line of the display will stop

flashing and the SET AF? line will commence flashing again. You can either press the '**OK**' button to change the setting again or press the '^' or 'v' buttons to scroll through the other available set-up options.
If the '**MENU**' button is pressed while the top line is still flashing, the selection will be cancelled, the display will return to the set-up menu (Fig:7) and the previous AF setting will be restored.
If the rack is being controlled by Racktop, the AF level may display MUTED. This can only be cancelled from the front panel if Racktop has not disabled menu access.

SERIAL No

Pressing the 'v' button while SET AF? is flashing will move to the next set-up option screen, shown below:-

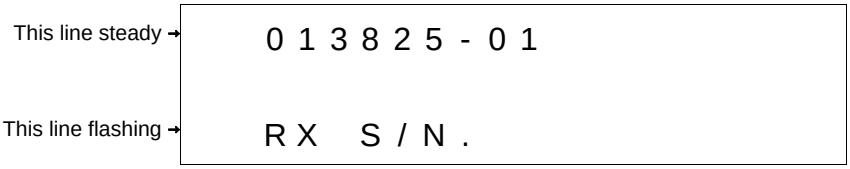


Fig:9 SET-UP MENU, OPTION #3.

Notice that there is no ? following 'S/N.' on the bottom line. This is because there is no option to change this parameter. The serial number is set into the receiver during manufacture and cannot be changed. Wherever the set-up option is *not* followed by ?, the parameter cannot be changed.
Press the '**MENU**' button to exit the set-up menu or press the 'v' button to move to the next set-up option screen, shown below:-

ON/OFF?

Fig:10 SET-UP MENU, OPTION #4.

This menu option allows you to turn off the power to the receiver. Press the '**OK**' button to change to the power control screen. The display will change as shown below:-

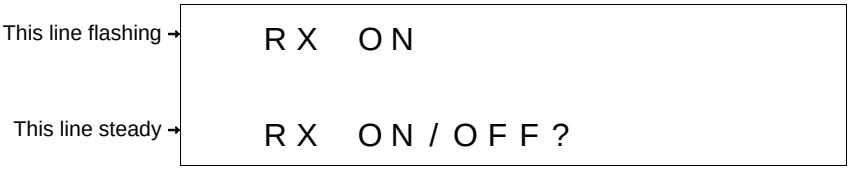


Fig:11 RX POWER CONTROL SCREEN.

Pressing the '^' or 'v' buttons will alternate between RX ON and RX OFF.
In the normal operating mode, when a receiver is turned off, the screen will only display the word OFF on the bottom line.
To restore power to the receiver, press the '**MENU**' button to enter set-up mode. This will take you directly to the RX POWER CONTROL SCREEN (Fig:11).

SET USER ID?

Pressing the '∨' button when the screen is displaying set-up option #4 (Fig:10) displays the next option, which is SET USER ID? This screen offers the user the opportunity to edit the text (if any) in the receiver's User ID text space.

The display will change as shown below: -

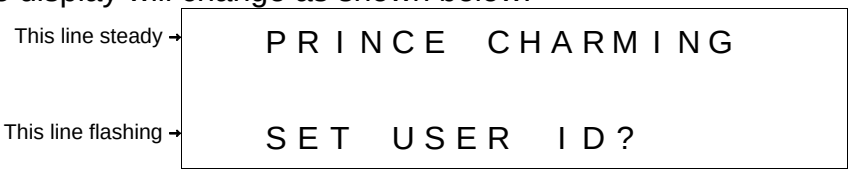


Fig:12 USER ID EDIT (CURSOR POSITIONING) SCREEN.

The top line will display the current contents (if any) of the receiver's User ID space.

Press the 'OK' button to enter the User ID text editing mode. The screen will change as shown below: -

Fig:13 USER ID EDIT (CURSOR POSITIONING) SCREEN.

Press the '∧' or '∨' buttons to move the character position cursor forwards or backwards along the text line. The '∧' button moves the cursor to the right, the '∨' button moves it to the left. Holding down either arrow key will cause the cursor to step continuously. When the cursor is at either end of the 16-character line, further presses will cause it to 'wrap-around' to the other end of the line.

If the 'MENU' button is pressed while the cursor is flashing, the display will return to the set-up menu screen (Fig:10).

The character (or empty space) above the current cursor position will be selected for editing when the 'OK' button is pressed. The cursor will then stop flashing and the indicated character will be displayed alternately normal and reversed, as indicated in Fig:14 below:-

Fig:14 USER ID EDIT (CHARACTER CHANGING) SCREEN.

Press the '∧' or '∨' buttons to scroll through the available character set. Holding down either arrow key will scroll continuously through the character set. When the desired character is displayed, press the 'OK' button to select it. Once the 'OK' button is pressed, the character will be replaced in the text string stored in the receiver and the display will return to the cursor positioning screen (Fig:13).

If the '**MENU**' button is pressed while the character is flashing, the display will also return to the cursor positioning screen but the character at the selected position will not have been changed.
When you have finished editing the User ID text, press the '**MENU**' button while the cursor is flashing (cursor positioning screen) to return to the main set-up menu (Fig:10). From this screen, you can access the final set-up option by pressing the '∨' button. Note that the set-up option menu is circular. If you continue pressing the '∧' or '∨' buttons once you reach the end of the set-up option list, the menu will wrap-around back to the first or last option.

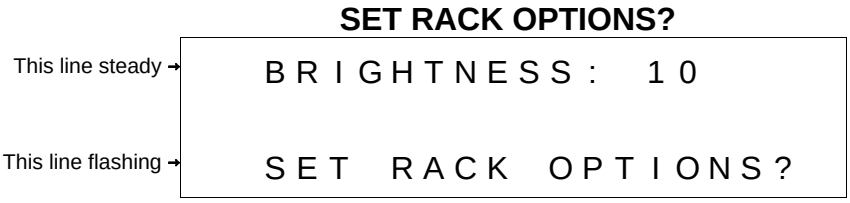


Fig:15 SET-UP MENU, OPTION #5.

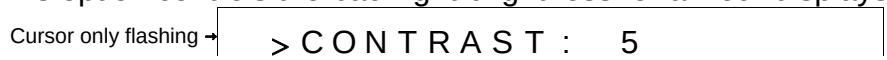
This is the final set-up option. Selecting this option by pressing the '**OK**' button will enter the rack settings sub-menu. The top line displays the rack settings, along with their current value.

Press the '**OK**' button to change to the rack options menu selection screen, as shown below:-

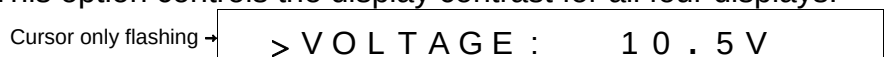
Fig:16 RACK OPTIONS MENU.

In this screen, pressing the '∧' or '∨' buttons will scroll through the available rack options, in the same manner as for the main set-up menu. The available options are tabulated below:-

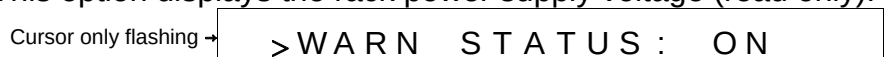
This option controls the backlight brightness for all four displays.



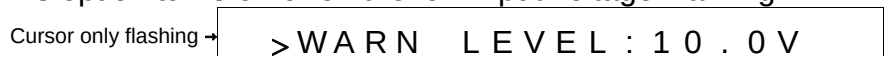
This option controls the display contrast for all four displays.



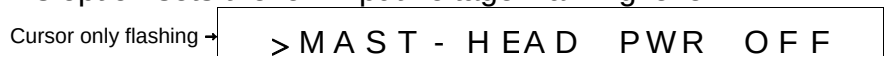
This option displays the rack power supply voltage (read only).



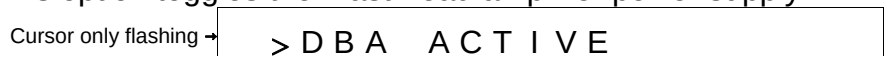
This option turns on or off the low input voltage warning.



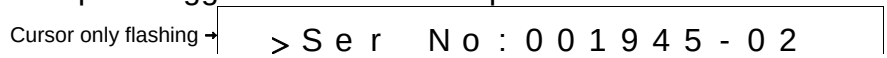
This option sets the low input voltage warning level.



This option toggles the mast-head amplifier power supply.

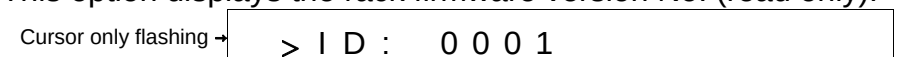


This option toggles the DBA active/passive mode.



This option displays the rack serial No. (read only).

This option displays the rack firmware version No. (read only).



This option displays the rack embedded ID No. (read only).

This option displays the rack bus address. (read only).

Fig:17 **TABLE OF RACK OPTIONS**.

Having used the '^' or 'v' buttons to select the desired option, press the '**OK**' button to change to the rack option edit screen, as shown below:-

Fig:18 RACK OPTIONS MENU.

The various options will now be described:-

BRIGHTNESS

This parameter can be varied over a range of 0 to 10. Level 0 is off, level 10 is maximum brightness. As the level is changed, it will immediately affect the backlight intensity, so that you can set the desired brightness.
If the '**MENU**' button is pressed in the brightness setting screen, the display will revert to the rack settings menu screen and the original brightness level will be restored. To keep the selected brightness level, press the '**OK**' button. If the rack is being monitored by the Racktop program, the brightness will also then be changed on all other connected racks.

CONTRAST

This parameter can also be varied over a range of 0 to 10. Level 0 is minimum, level 10 is maximum contrast. As the level is changed, it will immediately affect the LCD contrast, so that you can set the desired level. To keep the selected contrast level, press the '**OK**' button. Within the normal temperature range, the display should remain readable over the entire range of settings but at low temperatures, the lowest setting may become unreadable.
If the '**MENU**' button is pressed in the contrast setting screen, the display will revert to the rack settings menu screen and the original contrast level will be restored. To keep the selected contrast level, press the '**OK**' button. If the rack is being monitored by the Racktop program, the contrast will also then be changed on all other connected racks.

RACK INPUT

This is a read-only screen that displays the present voltage of the rack power input.

WARN STATUS

This screen allows the low input voltage warning to be turned on or off. For example, if the rack is mains powered, the warning will probably not be required. Use the '^' or 'v' buttons to toggle the warning on or off.
If the 'MENU' button is pressed in this screen, the display will revert to the rack settings menu screen and the original status will be restored. To keep the selected warning status, press the 'OK' button. If the rack is being monitored by the Racktop program, the status will also then be changed on all other connected racks.

WARN LEVEL

This screen is used to set the voltage level at which the rack input voltage warning icon will be displayed in normal operating mode. The level can be set to any value within the voltage range 10.0V to 17.0V in 0.1V steps, using the '^' or 'v' buttons.
If the 'MENU' button is pressed in this screen, the display will revert to the rack settings menu screen and the original warning level will be restored. To keep the selected warning level, press the 'OK' button. If the rack is being monitored by the Racktop program, the level will also then be changed on all other connected racks.

MAST-HEAD POWER STATE

This screen is used to toggle the on/off state of the mast-head amplifier power supply.

DBA ACTIVE/PASSIVE STATE

This screen is used to toggle the active/passive mode of the DBAs. Passive mode is used when a rack is used in a slave configuration, with its antennae inputs connected to the RF outputs of another (master) rack.

VERSION

This screen displays the version number of the control firmware programmed into the rack. This is a read-only screen.

RACK ID

This screen displays the embedded identification number programmed into the rack. This is a read-only screen.

ADDRESS

This screen displays the address number assigned to the rack by the Racktop program. If no number has been assigned, N/A will be displayed. This is a read-only screen.

The 'OK' button has no effect in read-only screens.

Every RK2040 rack lets you access up to 4 receivers. Link up multiple racks and you can monitor up to 48 receivers, all from a PC. Complete control is within reach.

Additional diversity receivers

The RK2040 is a compact 1U, 19-inch rack capable of accommodating up to 4 diversity receivers; the minimum specification unit has two receivers and additional receiver modules can be purchased separately.

Individual LCD displays

Each receiver on the RK2040 has an individual LCD display that shows both sides of the RF, the audio level and the status of the transmitter's battery. The name and frequency used of each artist is also displayed.

32 pre-programmed frequencies

Each receiver on the RK2040 has 32 pre-programmed frequencies.

Increased switching bandwidth

Each receiver on the RK2040 now comes with a switching bandwidth of up to 24MHz.

Built-in active distribution amplifiers

With the built-in active distribution amplifier, only two antennae are needed to supply the signal for up to eight receivers.

Four transformer balanced line level outputs.

With four transformer balanced line level outputs adjustable down to mic level in 1 dB steps, the RK2040 offers great isolation with flexible outputs.

Remote monitoring and control

The RK2040 has a built-in RS485 PC interface for remote monitoring and control from up to 1000m (4000ft) away via Audio's custom-designed PC-based application. Up to 12 racks can be linked together using only one cable, which means up to 48 receivers can be monitored with one PC. The application software is included in the price.

Mains or battery powered

The RK2040 can be mains-powered via an AC/DC adapter. Alternatively, any DC source with voltages from 10 to 18 volts – for example, a car battery – can be used via a four-pin XLR connector.

Headphone monitoring

A quarter-inch stereo headphone jack socket can be found on the front panel of the RK2040 to allow for local monitoring of the audio.

Frequency Range: 470 – 1000MHz

Number of diversity receivers: Up to 4

Active Distribution Amplifier bandwidth: 24MHz,

with phantom powering for Audio Ltd masthead amplifier

Powering: 10 – 18 Volts DC via 4 pin XLR male socket

Antenna inputs: 2 x BNC 50 Ohms

RF outputs: 2 x BNC 50 Ohms

Sensitivity: -98dBm for 40dB SINAD

Audio outputs: 4 x 3 pin XLR

Output level: +14 dBu maximum, transformer balanced

Frequency response: 50Hz – 18kHz ± 1 dB

Headphone output: Standard 6.5mm (1 / 4 inch) jack socket with adjustable level

Display & Controls: Backlit LCD display with comprehensive, intuitive set up of individual receiver parameters via a smiple 4 button interface

PC connection: 2 x RS485 9 pin sub-D type connector. One connector connects to PC via RS485 to RS232 adapter (available seperately). Maximum cable run for twisted pair cable - 1000m. Second connector allows subsequent racks to be daisy-chained

Size: 1 U high 19-inch frame. Depth – 270mm

Weight: 3.45kg