

## Audio590

### Audio Management for the TS-590SG and TS-590S

#### User Guide

by Ian Wade, G3NRW  
[g3nrw-radio@ntlworld.com](mailto:g3nrw-radio@ntlworld.com)

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#### Introduction to Audio590

One of the many features of the Kenwood TS-590SG and TS-590S transceivers is their adaptability in handling different sources and types of audio.

For all types of audio, including voice and digital, you can set up tailored “audio profiles” in the radio. Each profile contains the settings for a particular audio source (MIC, ACC2 or USB), and includes such variables as level settings, LoCut/HiCut audio filter settings, equalizer selection (HB1, HB2 etc), VOX gain and delay settings, and many more.

Audio590 is a Windows program that lets you set up and manage audio profiles easily, using a simple interactive control panel. See Figure 1. You can read settings from the radio (either via the TS-590 USB Virtual COM port or the RS-232 serial COM port), make adjustments to the settings, and save them to disk. Having built up a library of such profiles, you can then load them from disk and write them back to the radio as required.

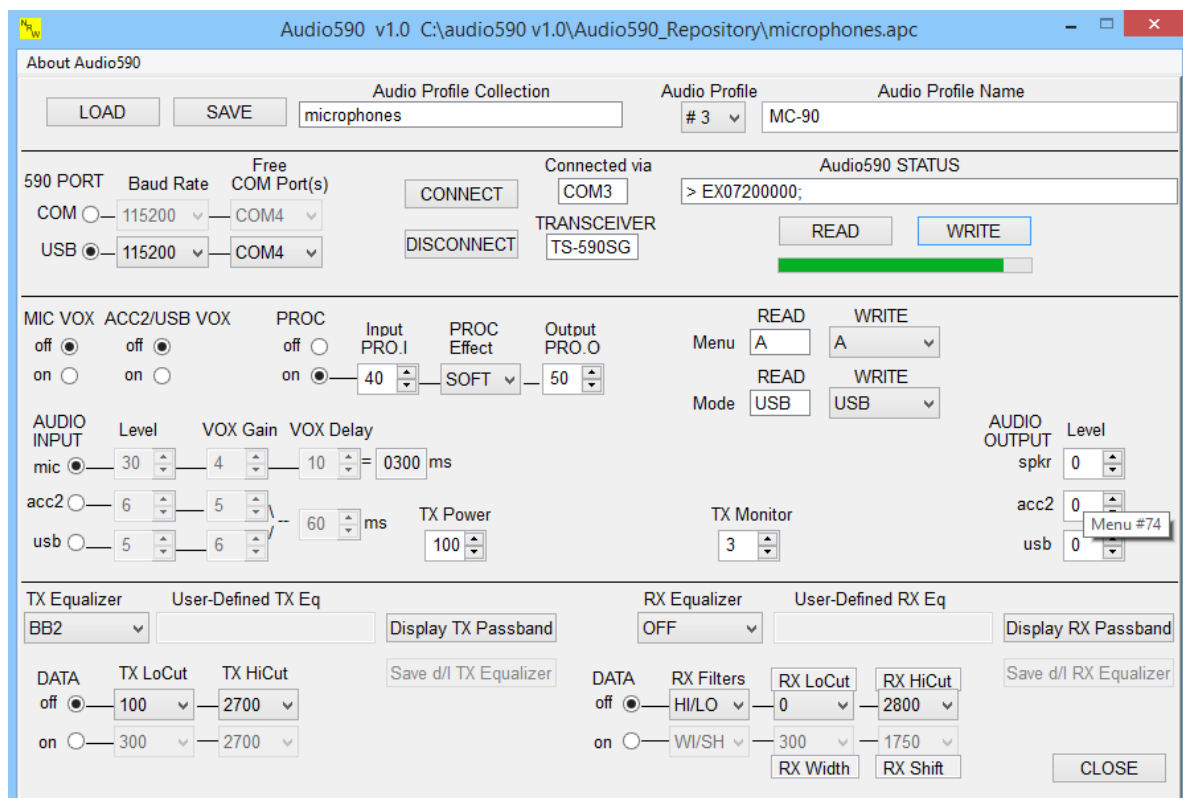


Figure 1: The Audio590 Control Panel

Audio590 is “bilingual”: it works with both the TS-590SG and the TS-590S, and automatically recognizes each of them.

Audio590 is a compact stand-alone program (around 150 kB) that runs under any version of Windows XP, Windows 7 and Windows 8.<sup>1</sup> The program is written in BBC Basic for Windows (BB4W) [1].

## Scope

This User Guide describes:

- How to download and install the Audio590 software.
- How to configure audio profiles using the Control Panel.
- How to read/write profiles from/to the radio.
- How to save profiles on disk and retrieve them.
- Data storage formats in the Audio590 Repository (Appendix A1).
- Selecting Menu A/Menu B in the TS-590SG and TS-590S (Appendix A2).
- TX and RX built-in equalizer characteristics (Appendix A3).

Audio590 currently handles the management of audio and audio-related information for USB and LSB mode. Later versions will support AM and FM as well. The program does not handle CW or FSK modes, and there are no plans to do this.

The term “audio” has a wide meaning. It includes the conventional voice modes, plus any digital modes that send and receive AFSK signals; for example, RTTY<sup>2</sup>, PSK31, Olivia, WSJT-X, SSTV, digital voice (DV) and many more – even MCW.

## User Guide Conventions

The Guide uses the following conventions:

- “TS-590” refers generically to the TS-590SG and TS-590S.
- Front panel menu settings show the menu number for each radio (TS-590SG first, TS-590S second).  
For example: “Menu #36/30” means Menu #36 in the TS-590SG and Menu #30 in the TS-590S.
- “ARCP-590” refers to both ARCP-590G (for the TS-590SG) and to ARCP-590 (for the TS-590S).
- “U” equalizers are the user-defined TX and RX equalizers, as configured in ARCP-590.
- “Built-in” equalizers are the seven pre-configured audio TX/RX equalizers: OFF, HB1, HB2, FP, BB1, BB2, C (TX) and FLAT (RX).

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<sup>1</sup> Almost certainly Audio590 will also run under Windows 10, but this has not been tested yet

<sup>2</sup> AFSK RTTY, not FSK RTTY.

## Audio590 Installation

Installation of Audio590 is straightforward:

1. Create a folder for Audio590 (for example, **C:\audio590**).  
(Do *not* create this folder below a Windows folder, such as **C:\Program Files**. If you do, you may encounter Windows access permission issues).
2. Go to the “TS-590 Family Resources Page” [2].
3. Click on the magenta **AUDIO590** button.
4. Download and unzip **audio590\_v1.2.zip** into the folder created in step #1. The zip file contains the Audio590 executable, some supporting files, and this User Guide.
5. Read the User Guide.
6. Run **audio590\_v1.2.exe** to display the Audio590 Control Panel.

## Upgrading from Audio590 v1.0 or v1.1

If you have already created audio profiles under Audio590 v1.0 or v1.1, you can continue to use them with v1.2. Just unzip v1.2 into the same folder where you installed v1.0/v1.1, and then run v1.2 in the same way as before. Details of the changes to the program are listed at the end of this Guide.

## Running Audio590 the first time

**Note:** If you plan to use the RS-232 serial COM port with Audio590, you need to connect the TS-590 to the PC using a “straight-through” serial cable with all the necessary connections included – that is, at least TXD, RXD, RTS, CTS and GND.

When you start the program the first time:

- Audio590 automatically loads the files **\_Default\_APC.apc** and **\_Default\_Equalizers.acpeq**. These provide a starting point for defining your own audio profiles and user-defined TX/RX equalizers.
- Audio590 does not know whether you have a TS-590SG or a TS-590S – it does not discover which you have until you press the **CONNECT** button. The default files just mentioned assume the radio is a TS-590S. If this is not the case, the message in Figure 2 appears.

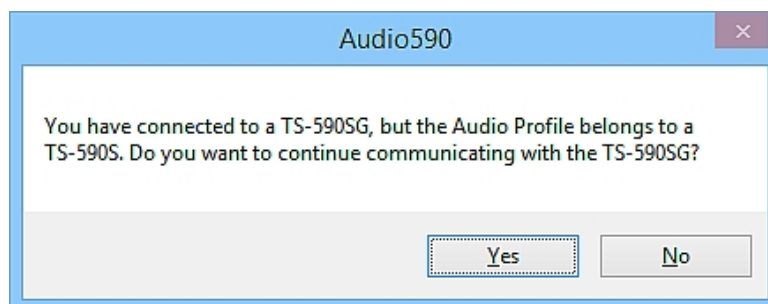


**Figure 2: Message warning of connection to an unexpected radio**

In this case, just click on **Yes** to continue.

- It reads and saves the 7 pre-configured built-in TX and RX equalizer settings from the radio. These settings are needed if you decide to define a user equalizer that is based on a built-in equalizer.

## Uninstalling Audio590

To uninstall Audio590, delete the folder you created in step #1 above.

## Examples of Audio Profiles

To illustrate some of the many possibilities in setting up audio profiles, the next few pages contain examples of different scenarios, including:

1. different microphones
2. using one microphone under different conditions (for example, ragchewing and DX operation)
3. several people sharing one microphone (for example, in a multi-operator contest)
4. many different digital packages (for example, FLDIGI, WSJT-X)

Audio590 handles all of these in the same way; it does not distinguish between different types of audio.

### 1. Different microphones

You may have a collection of different mics, each with its own characteristics. See Figure 3. The yellow boxes show some of the relevant audio profile parameters. In this example:

- the headset is connected to a PC, which feeds the audio to the radio's USB port.
- the desk mic uses the radio's MIC socket.
- the studio mic uses the radio's ACC2 port.

For each of these mics, the audio gain level, audio processor, Lo/Hi Cut filters, TX equalizer and other settings will be different. Some of these settings will be made on the TS-590 front panel, others through menus.

Clearly, if you have several mics, each requiring its own audio profile, the number of adjustments you need to make each time you swap to a different mic rapidly becomes unmanageable.

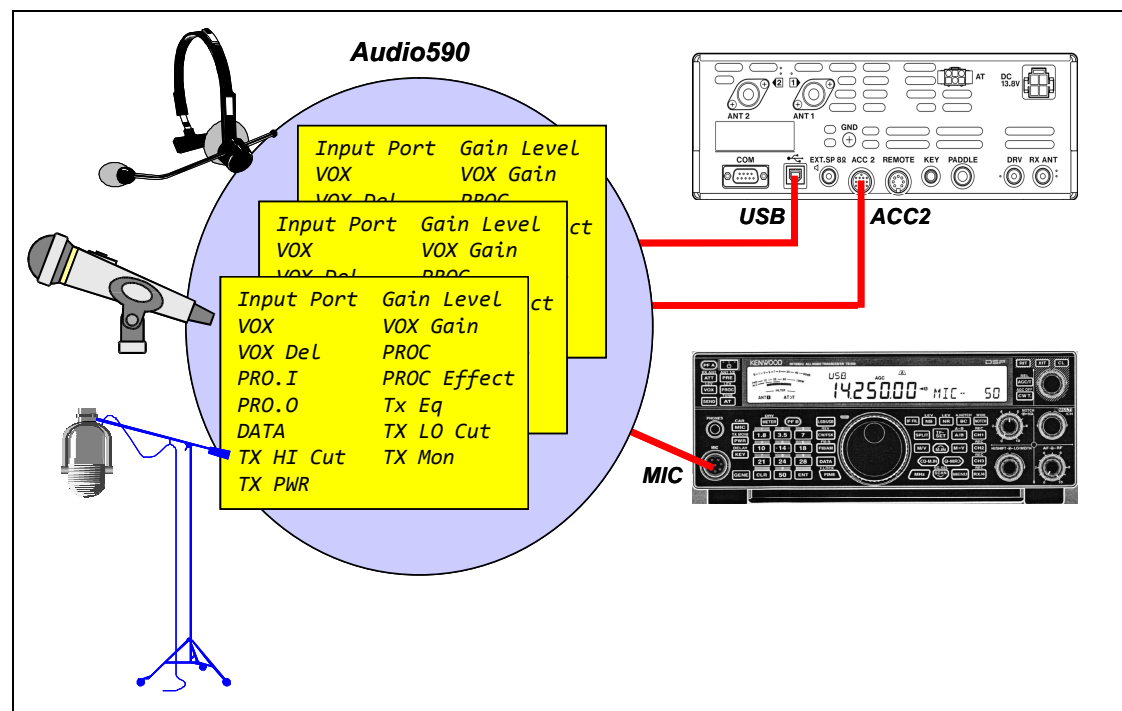


Figure 3: Audio profiles for different mics

## 2. Different profiles for the same mic

Even if you only have one mic, it's possible to set up several audio profiles. See Figure 4.

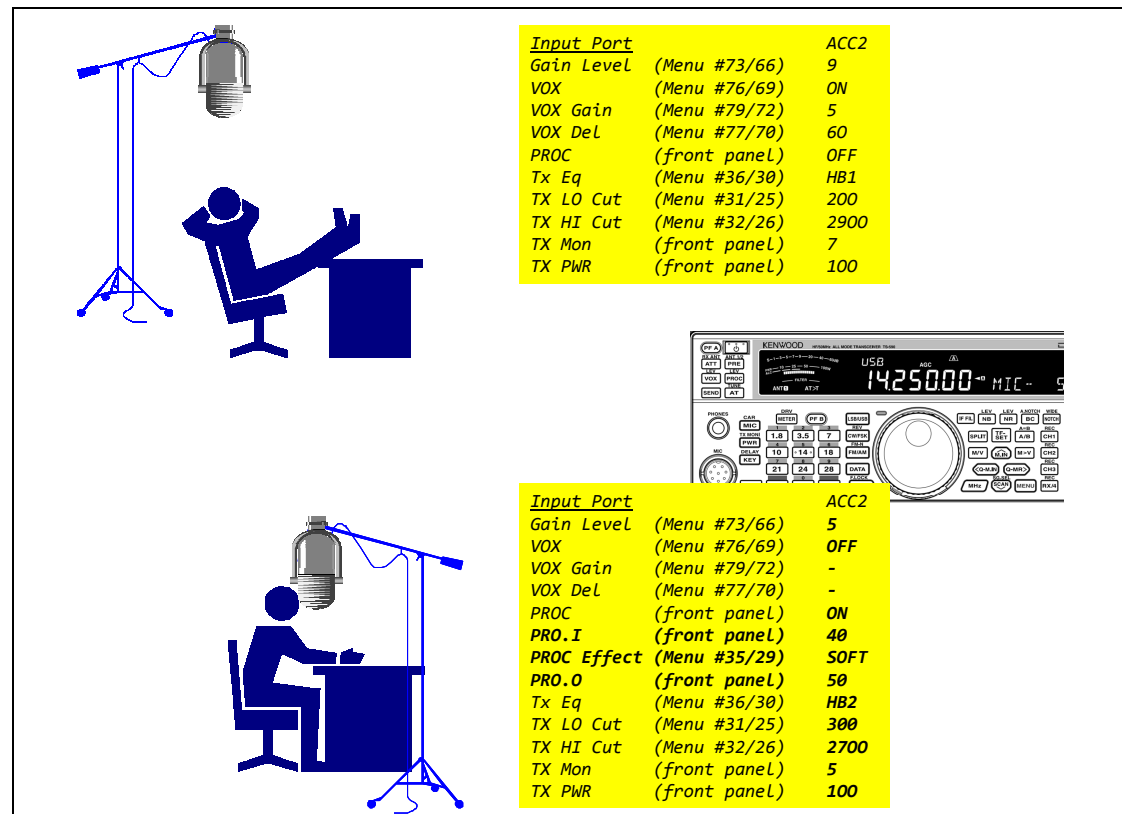


Figure 4: Audio Profiles for one mic, used in different ways

You may set up one profile for laid-back roundtable chats (top of Figure 4). Here, since the mic is positioned some distance from the mouth, the mic gain is quite high, VOX is turned on, and the audio processor is turned off.

The situation is quite different when you are chasing rare DX (bottom of Figure 4). Now you are almost eating the mic (so you need much lower audio gain), VOX is turned off and the processor is turned on. Also, because you are much nearer to the mic, you need to reduce the low frequency response by increasing the LoCut frequency, and you need to switch to TX equalizer HB2 to further emphasize the higher frequencies.

## 3. Multiple operators sharing the same mic

Now consider the audio profile requirements when, say, three people take part in a multi-operator contest, sharing the same mic. See Figure 5.

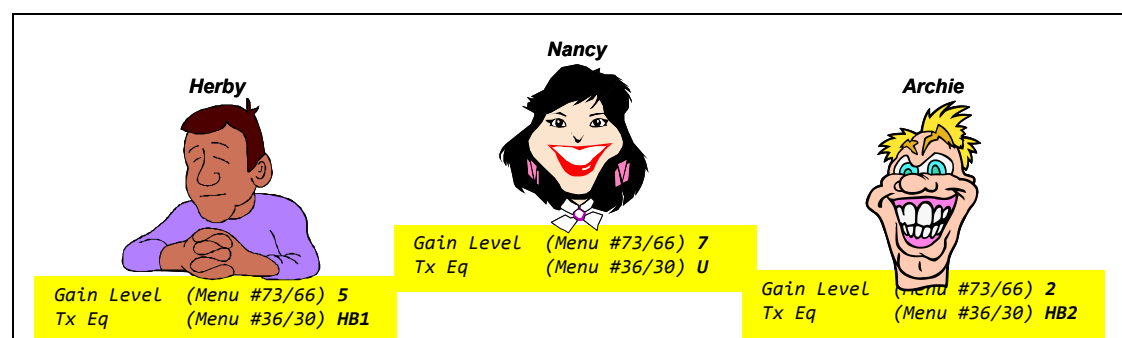


Figure 5: Multi-operator profiles

The operators' voices are quite different:

- Herby's voice is "average", so the appropriate mic gain level is in the middle of the range, and the HB1 TX equalizer is the best for him.
- Nancy is softly spoken, so she needs a higher mic gain, and also needs a user-defined equalizer (U) to compensate for her high-pitched voice.
- Archie bellows unbelievably, so the appropriate settings for him are different again.

#### 4. Digital applications

If you are interested in digital transmission, the number of audio profiles could escalate to a dozen or more. See Figure 6.

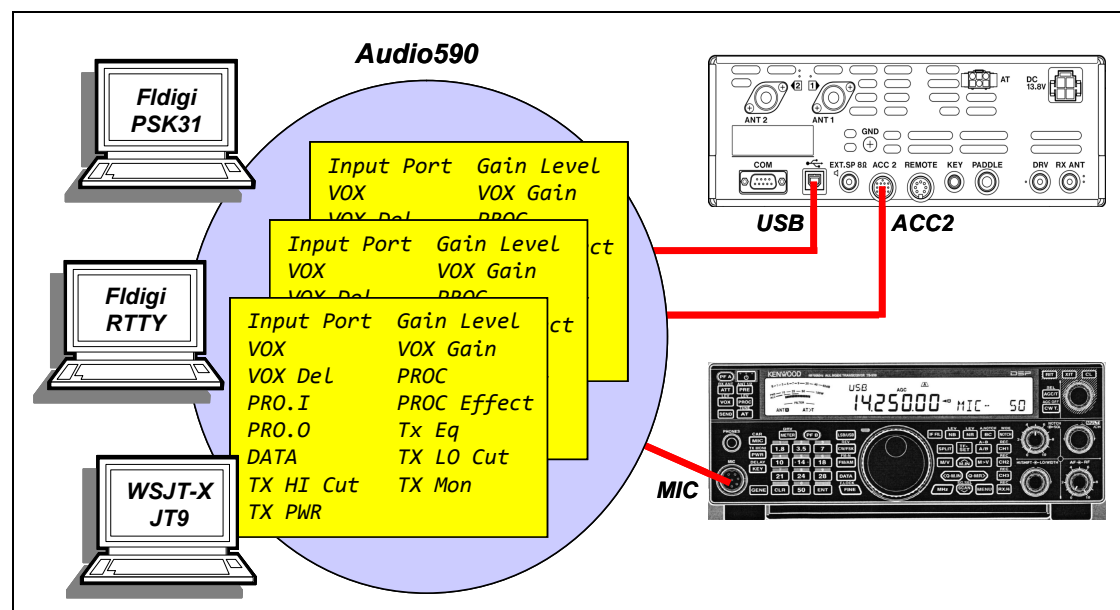


**Figure 6: Audio Profiles for digital transmission**

For example, if you are running Fldigi, you may decide that each mode requires a different profile:

- PSK31 is essentially a low power mode, so you could set the TX power to 5 watts.
- When transmitting RTTY you will probably want to run 100 watts.

Also, for most digital modes you will undoubtedly wish to select USB, and turn PROC off (to avoid distortion).

You may require yet further audio profiles if you run SSTV or digital voice.

#### A Further Consideration

The audio output levels of digital software packages can vary over a wide range. This can make it a fiddly process to get the levels right, because you have to adjust both the Windows audio output level *and* the TS-590 audio input level.

Audio profiles can simplify this process considerably, whereby you can optimize the Windows output level for best performance for each package, then specify in Audio590 the corresponding TS-590 audio input level you need for the package.

### Saving Related Audio Profiles in Audio Profile Collections

The examples in Figures 3 to 6 contain no fewer than 11 different audio profiles, and it's conceivable you may need many more to cover all your operating scenarios.

Audio590 lets you collect related audio profiles into an Audio Profile Collection (APC), in any way you want, and using any name you want. You can save 15 audio profiles in each APC.

For example, you could:

- collect 15 microphone profiles into an APC called **"microphones"**.
- collect 15 contest operator profiles into an APC called **"contest ops"**.
- collect 15 Fldigi PSK profiles into an APC called **"fldigi psk"**.
- collect a further 15 Fldigi profiles into an APC called **"fldigi other"**.
- collect 15 SSTV profiles into an APC called **"sstv"**.

... and so forth. See Figure 7. There is no limit to the number of APCs you can save.

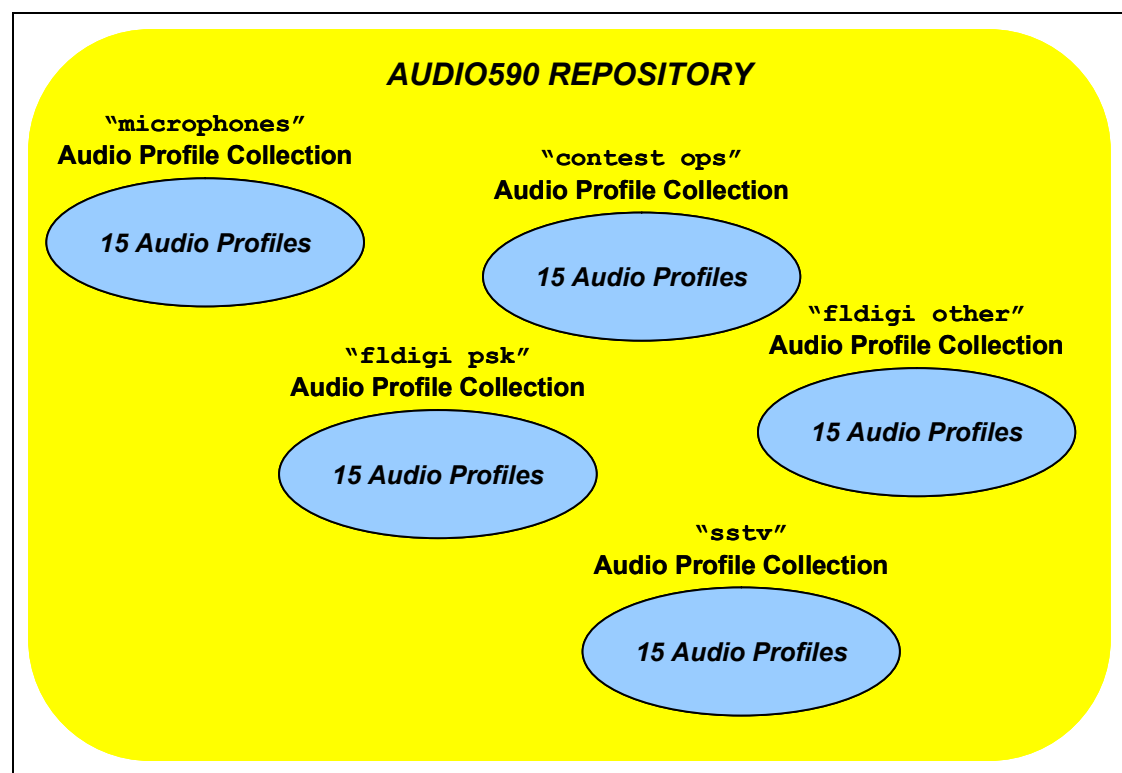


Figure 7: Audio Profile Collections (APCs) each contain 15 Audio Profiles

Appendix A1 provides some detail on how Audio590 stores APCs in the Audio590 Repository.

### Using ARCP-590 to save Audio Profiles?

The question then arises: Can I set up and save all these profiles with Kenwood's ARCP-590 program?

The answer, unfortunately, is no. ARCP-590 has two shortcomings:

- ARCP-590 does not store all of the settings that you need for a complete profile – in particular, it does not save several of the TS-590 front panel settings.
- ARCP-590 can only store five U equalizers at a time. In some instances this may not be adequate.

These shortcomings in ARCP-590 led to the development of Audio590.

### Audio590 versus ARCP-590

Some of Audio590's functionality is similar to ARCP-590, but Audio590 goes further. In particular:

- Audio590 saves *all* the required settings.  
(ARCP-590 does not save 15 front-panel settings that are crucial to audio transmission and reception, including DATA on/off, PROC on/off, audio processor settings, MIC gain, MIC VOX gain/delay and others. See Figure 8 below).
- Audio590 lets you save any number of U equalizers, with meaningful names.  
(ARCP-590 only lets you save five user-defined equalizers, with unhelpful names like User1, User2 etc.).
- Audio590 lets you save U equalizers that are based on the standard built-in equalizers (HB1, HB2 etc). This saves time if you only want to make a small change to a built-in.  
(ARCP-590 does not save modified built-in equalizer settings).
- Audio590 lets you display the TX and RX passband of any equalizer, showing graphically the effects of the TX and RX audio cut-off settings.  
(ARCP-590 does not have this functionality).

### The “Missed” Front Panel Controls Backup

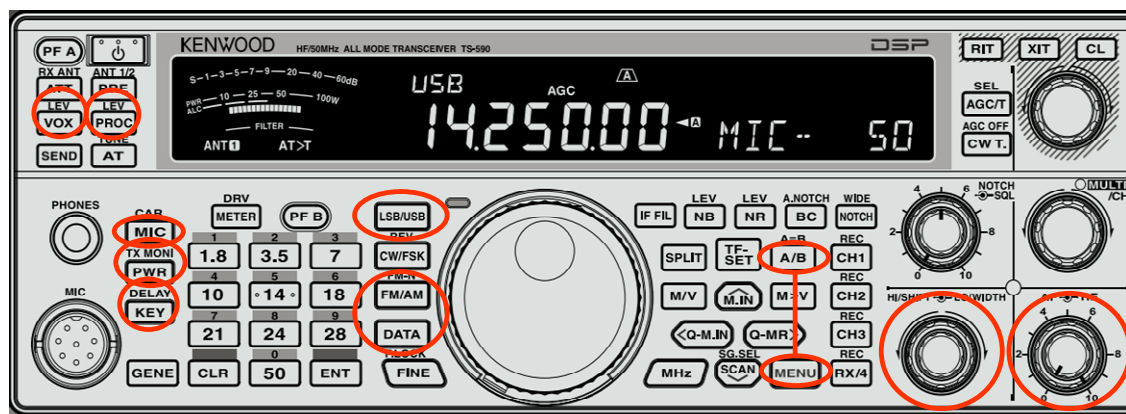


Figure 8: The TS-590 front panel, showing the controls (ringed in red) that Audio590 backs up, but which ARCP-590 does not

In detail, Audio590 backs up these 15 front panel settings:

|    | Control                        | Function                                                                                            |
|----|--------------------------------|-----------------------------------------------------------------------------------------------------|
| 1  | VOX (short press)              | Toggles MIC VOX ON and OFF                                                                          |
| 2  | VOX (long press) = VOX/LEV     | MIC VOX Gain setting                                                                                |
| 3  | PROC (short press)             | Toggles the audio processor ON and OFF                                                              |
| 4  | PROC (long press) = PROC/LEV   | Processor PRO.I setting                                                                             |
| 5  | MIC (short press)              | MIC Gain setting (when the processor is OFF) and Processor PRO.O setting (when the processor is ON) |
| 6  | PWR (short press)              | TX Power setting                                                                                    |
| 7  | PWR (long press) = PWR/TX MONI | TX Monitor setting                                                                                  |
| 8  | KEY (long press) = KEY/DELAY   | MIC VOX Delay setting                                                                               |
| 9  | LSB/USB                        | Toggles LSB/USB                                                                                     |
| 10 | FM/AM                          | Toggles FM/AM                                                                                       |
| 11 | DATA (short press)             | Toggles DATA ON and OFF                                                                             |
| 12 | MENU A/B                       | Selects Menu A or Menu B                                                                            |
| 13 | RX LO/HI Cut                   | RX Lo/Hi Cut filters                                                                                |
| 14 | RX SHIFT/WIDTH                 | RX Shift/Width filters                                                                              |
| 15 | AF GAIN                        | Audio Frequency Gain level                                                                          |

## The Audio590 Control Panel in Detail

Figure 9 shows an example of the Audio590 Control Panel display.

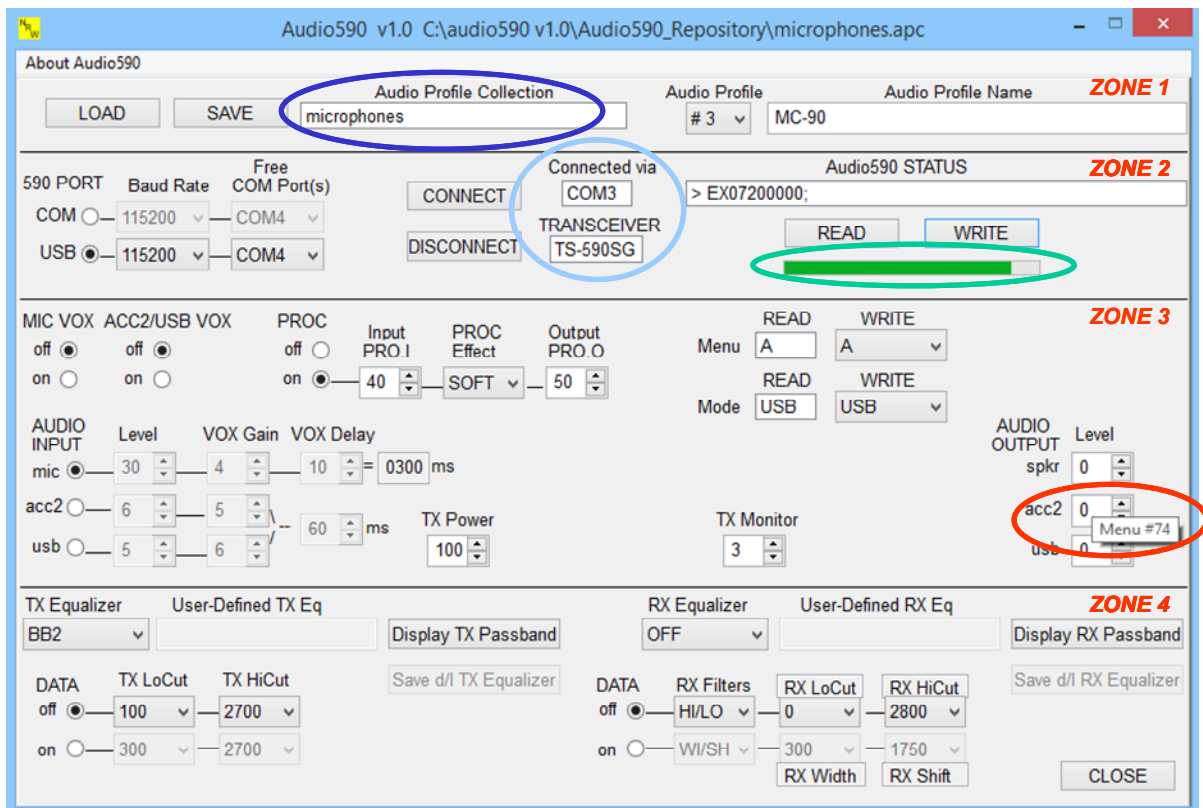


**Figure 9: The Audio590 Control Panel. The panel has four zones (ZONE 1 – ZONE 4), described on the next page.**

In this screen capture:

- The Control Panel is displaying the “microphones” Audio Profile Collection (dark blue ring).
- Audio590 is connected to a TS-590SG via PC USB port COM3 (light blue ring).
- The progress bar (green ring) is displayed whenever settings are read from or written to the radio.
- Tooltips show the TS-590SG menu or front panel control associated with each active Audio590 control – for example, when you hover the cursor over the Audio Output acc2 control, the tooltip (red ring) shows that this is associated with TS-590SG Menu #74

## Control Panel Zones

### Zone 1

- The **LOAD** and **SAVE** buttons, used for retrieving and saving Audio Profile Collections.
- The Audio Profile number selector (#1 thru #15).
- The Audio Profile name.

### Zone 2

- The 590 Port Selector (RS-232 serial COM port or USB Virtual COM port) for communication between Audio590 and the radio, using CAT commands. You can independently select any built-in baud rate for each port.
- A dropdown list of installed COM ports. The list is updated once per second, allowing you to add or remove ports at any time without stopping the program.
- The **CONNECT** and **DISCONNECT** buttons, to make and break the connection between Audio590 and the radio. When Audio590 is connected to the radio, the COM port in use is displayed alongside the **CONNECT** button (and is removed from the list of free ports).
- The Audio590 Status window, showing the current status of all operations.
- The **READ** and **WRITE** buttons, used for reading the radio settings into Audio590 and writing the Audio590 settings to the radio.
- A progress bar, showing the progress of **READ** and **WRITE** operations.

### Zone 3

- The main TX and RX controls required to set up a complete audio profile. Some of the controls are grayed out, indicating that those controls are not operational with the current settings.

### Zone 4

- The controls for selecting and displaying the TX and RX equalizers.

The **Display TX Passband** and **Display RX Passband** buttons let you display the selected equalizers, superimposed with the current Lo/Hi Cut and Shift/Width audio filter settings. See Figure 10 for examples.

## Tooltips

The Control Panel is supplemented by tooltips that show the TS-590 Menu number or front panel setting that is associated with each control. For example, in Figure 9, when you let the cursor hover over the Audio Output acc2 control, you will see that this control relates to TS-590SG Menu #74.

## TX and RX Equalizer Passbands

The TS-590 features a number of TX and RX audio equalizers. Each equalizer has 18 300 Hz wide “sliders”, covering an audio frequency range from 0 Hz to 5100 Hz. The equalizers include:

- The seven pre-configured built-in TX/RX equalizers: OFF, HB1, HB2, FP, BB1, BB2, C (TX) and FLAT (RX). The characteristics of these equalizers are shown in Appendix A3.
- A TX user-defined equalizer and an RX user-defined equalizer. Each slider can be set to one of 31 levels, in the range +6 dB to -24 dB, using ARCP-590.

In Audio590, you can display the passbands for the currently selected TX and RX equalizers. The 18 equalizer settings are color coded:

- Red: Built-in TX equalizer
- Green: Built-in RX equalizer
- Yellow: User-defined TX equalizer
- Blue: User-defined RX equalizer

The passband display includes fine red lines showing the extent of the usable passband. The legend along the bottom of the display shows the filter name, DATA setting, Hi/Lo Cut and Shift/Width settings. See Figure 10.

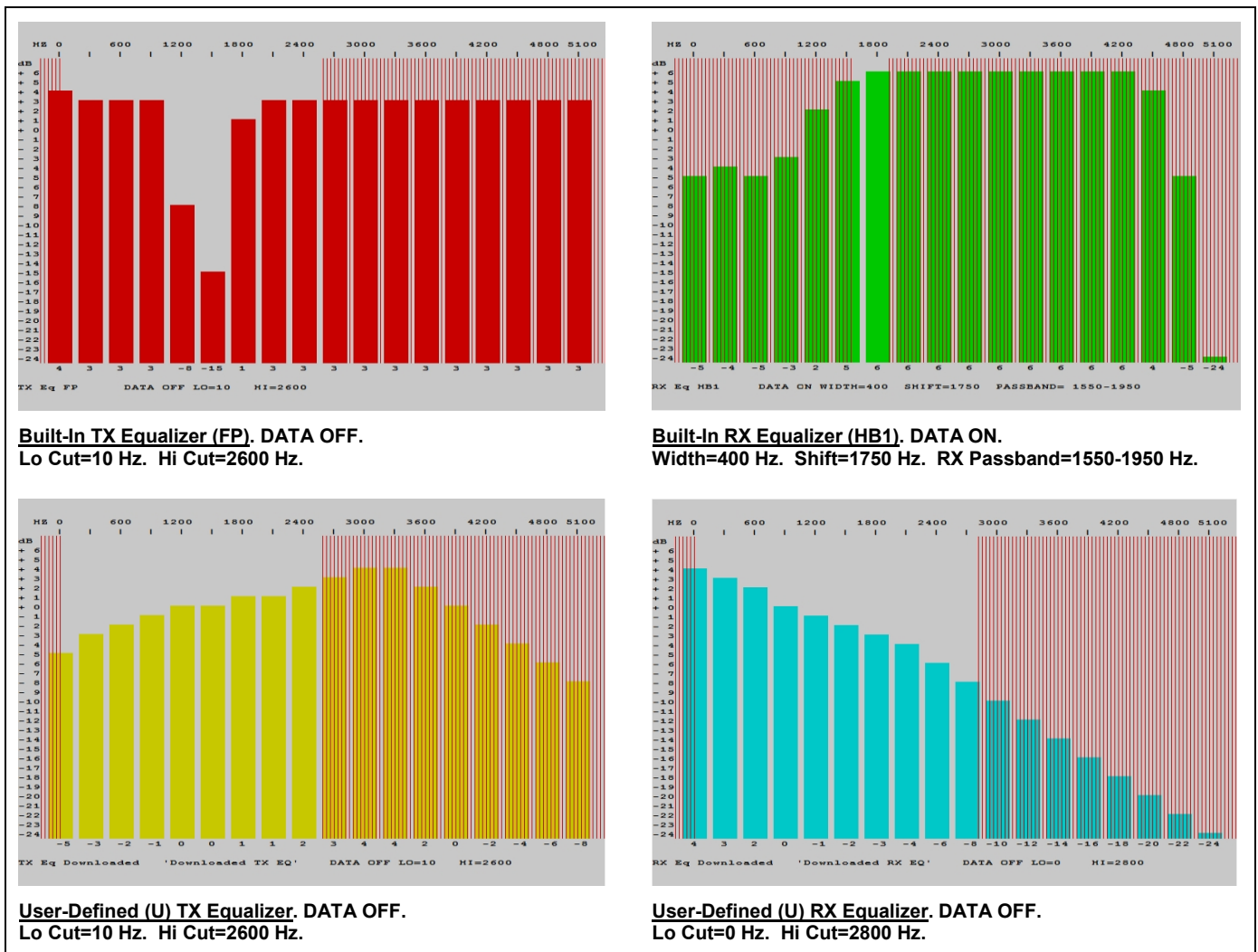


Figure 10: Examples of TX and RX passbands. The fine red shaded lines indicate the extent of passband filtering

## Audio590 in Use

Figure 11 illustrates the main functions of Audio590.

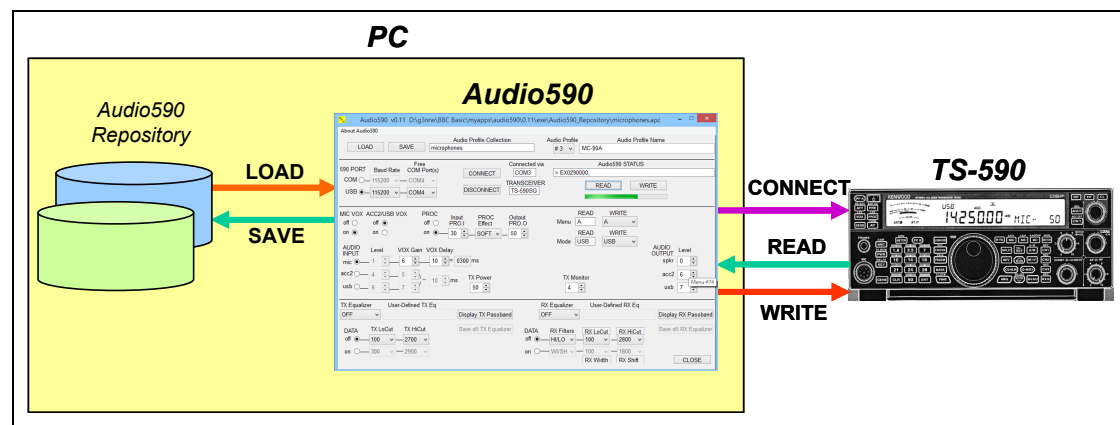


**Figure 11: The main functions of Audio590**

After you **CONNECT** the Audio590 program to the TS-590, you can **READ** the radio's current settings. The settings are then displayed on the Audio590 Control Panel.

At this point you can accept the downloaded settings as they stand, or you can modify them on the Control Panel if you wish. At any time you can **WRITE** the settings back to the TS-590, to ensure they are the same as in Audio590.

Finally, you can **SAVE** the settings in the Audio590 Repository on disk for future use. Thereafter you can **LOAD** the settings back into Audio590, in preparation for writing them back to the radio.

**Note: Audio590 only sends and receives profile settings to and from the radio when you click on the WRITE and READ buttons. This is different from ARCP-590, where any changes in settings (either in ARCP-590 or in the radio) take effect immediately. In other words, Audio590 is not an interactive radio control program like ARCP-590.**

## Different Ways of using Audio590

There are basically two different ways you can use Audio590:

- To build new audio profiles, or edit old ones.
- To write audio profiles to the radio prior to use on air.

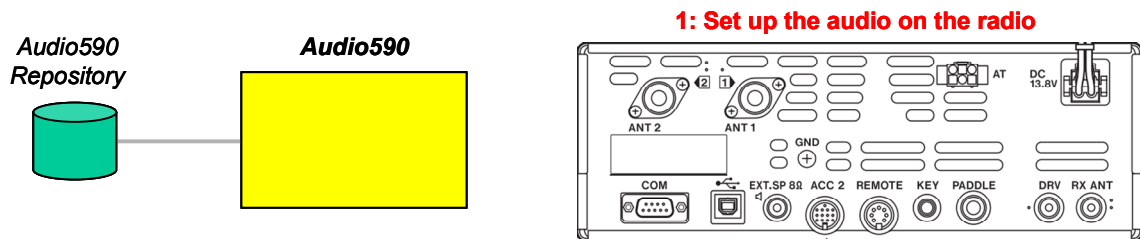
## Building/Editing Profiles

Before you can use audio profiles on the air, you need to create or edit them. The simplest way to do this is to:

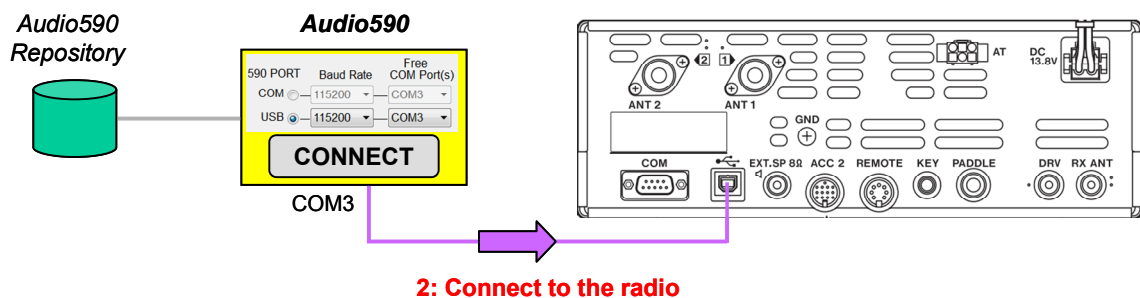
1. Configure the radio with all the required settings, and test them either on the air or using a dummy load. During this time, Audio590 is not connected to the radio.
2. When you are satisfied that the radio settings are as you want them, you can start Audio590 and click on **CONNECT** to establish a connection to the radio.
3. In Audio590, select an unused Audio Profile #, and click on **READ** to read the radio settings into Audio590. The settings will be displayed on the Control Panel.
4. After checking the settings (and perhaps modifying them), click on **SAVE** to save the settings in the Audio590 Repository.

These four steps are shown in Figure 12.

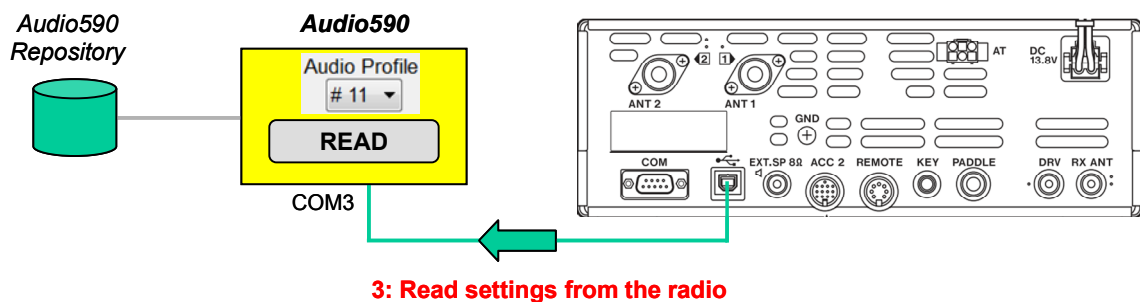
STEP 1: Set up the required audio settings on the radio.



STEP 2: Select baud rate and a free PC COM port, then **CONNECT** Audio590 to the radio.



STEP 3: Select an unused Audio Profile # in Audio590, then **READ** the radio's settings.



STEP 4: Check the settings, then **SAVE** the Audio Profile Collection (APC) in the Audio590 Repository. The saved APC contains the settings for the currently selected audio profile, plus the settings for the remaining 14 audio profiles in the same APC.

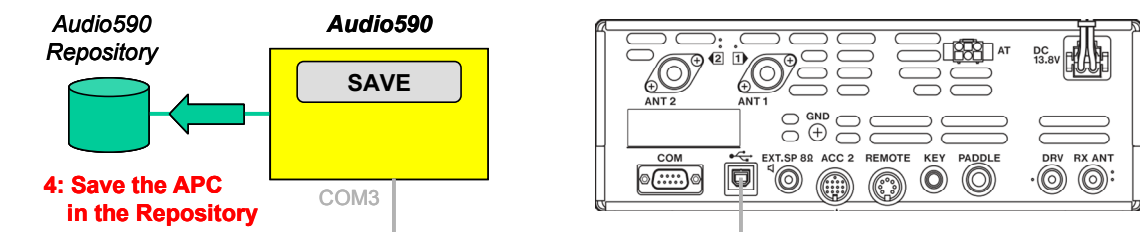


Figure 12: Building and saving audio profiles in the Audio590 Repository

**If READ and WRITE fail**

Sometimes when you click on the **READ** or **WRITE** button, Audio590 will not allow the read/write operation to continue. This can happen in 6 different situations:

|   | <b>Reason for READ/WRITE failure</b>                                                                                                          | <b>Recovery Action</b>                                                                                                                                              |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Audio590 is not connected to the radio                                                                                                        | Click on the Audio590 <b>CONNECT</b> button to connect to the radio, then try to <b>READ/WRITE</b> again                                                            |
| 2 | The radio is displaying a Menu setting                                                                                                        | Press the <b>MENU</b> button on the radio front panel, then try to <b>READ/WRITE</b> again                                                                          |
| 3 | The <b>MULTI/CH</b> control on the radio is backlit, because you have been reading or adjusting the value of one or more front panel controls | Close the control(s) on the radio front panel that you have been reading or adjusting until the <b>MULTI/CH</b> light goes off, then try to <b>READ/WRITE</b> again |
| 4 | The radio is transmitting                                                                                                                     | Switch the radio to RX, then try to <b>READ/WRITE</b> again                                                                                                         |
| 5 | Split operation is selected on the radio                                                                                                      | Turn <b>SPLIT</b> off at the radio front panel, then try to <b>READ/WRITE</b> again                                                                                 |
| 6 | The radio is set to a mode that is not supported by Audio590 (that is, AM, FM, CW, CW-R, FSK or FSK-R)                                        | Set the radio to a mode supported by Audio590 (that is, USB or LSB), then try to <b>READ/WRITE</b> again                                                            |

In each case, Audio590 displays a message giving the reason for failure and a summary of what you need to do to recover from the situation.

Note: If **READ/WRITE** starts successfully and *then* one of the above situations occurs (for example, the radio starts transmitting a digital signal), the **READ/WRITE** operation will continue, but may not terminate as expected. It is best to make sure that the radio is not doing anything else while you are using Audio590.

### Writing Audio Profiles to the Radio

Once you have set up an Audio Profile Collection and saved it in the Audio590 Repository, you are now ready to use the collection in on-air sessions. This involves three steps:

5. Click on the **LOAD** button to fetch the APC from the Audio590 Repository.
6. Select the required Audio Profile # from the APC. The settings for the profile will be displayed on the Control Panel. Then click on the **WRITE** button to write the selected profile to the radio.
7. Click on the **DISCONNECT** button. This will disconnect Audio590 from the radio, and free up the COM port for use by other apps.

These three steps are shown in Figure 13.

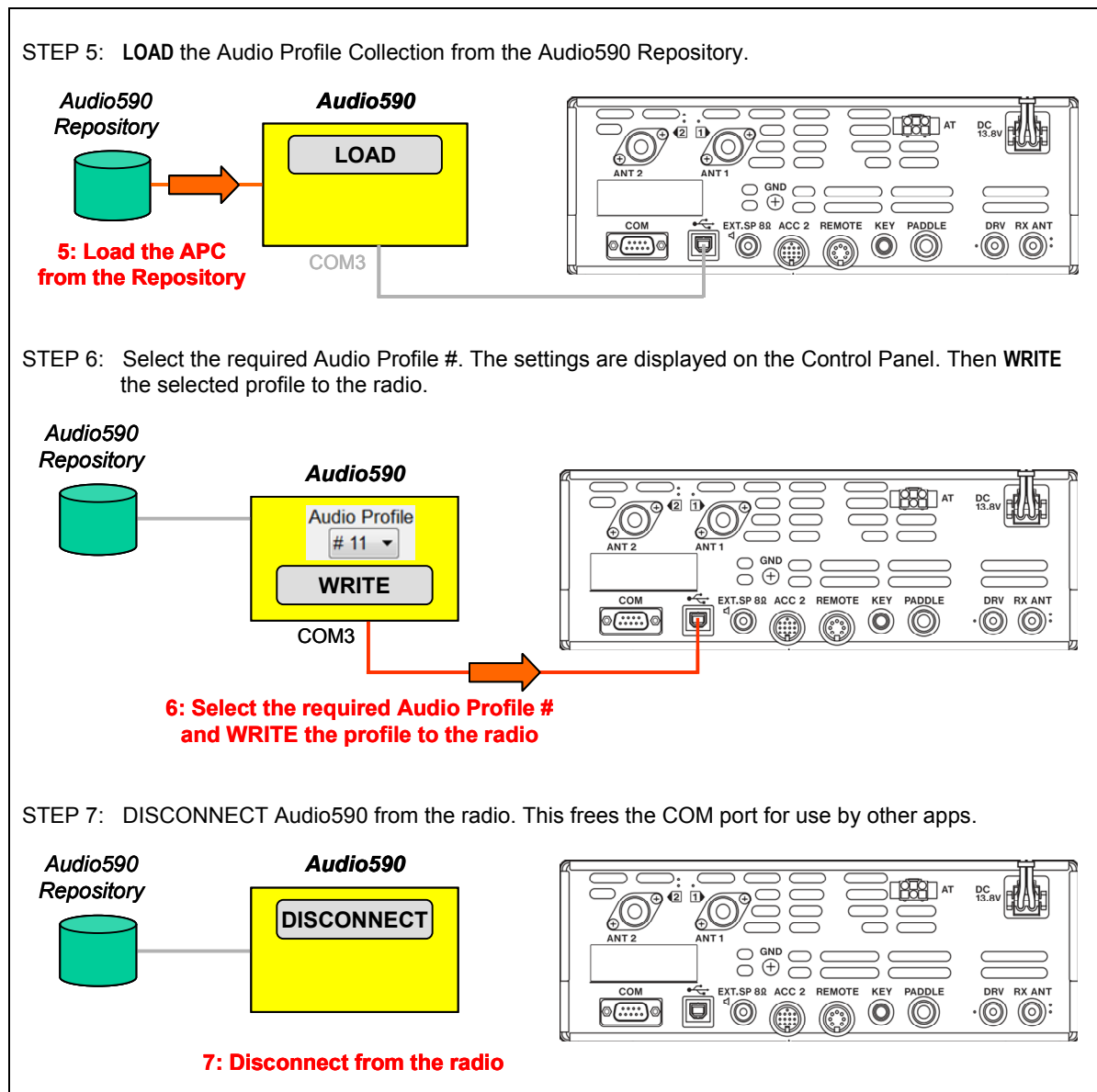


Figure 13: Writing an audio profile to the radio for use on air

### Menu A and Menu B in the TS-590SG and TS-590S

The TS-590SG and the TS-590S have the ability to switch between Menu A and Menu B, allowing you to switch quickly and easily between two different environments, depending on the operational requirement at the time. However, Kenwood's choice of the terms "Menu A" and "Menu B" is rather unfortunate, because "Menu A" and "Menu B" are not actually menus at all – they are groups of menus.

Specifically:

- In the TS-590SG, the "Menu A Group" consists of 100 individual menus, numbered 00-99, and the "Menu B Group" likewise consists of 100 individual menus, numbered 00-99.
- In the TS-590S, the "Menu A Group" consists of 88 individual menus, numbered 00-87, and the "Menu B Group" likewise consists of 88 individual menus, numbered 00-87.<sup>3</sup>

In both radios, Menu A is independent of Menu B. You can set different values for each numbered menu – for example, in Menu A you can set the display brightness to 1, and in Menu B you can set it to 2.

See Figure 14.

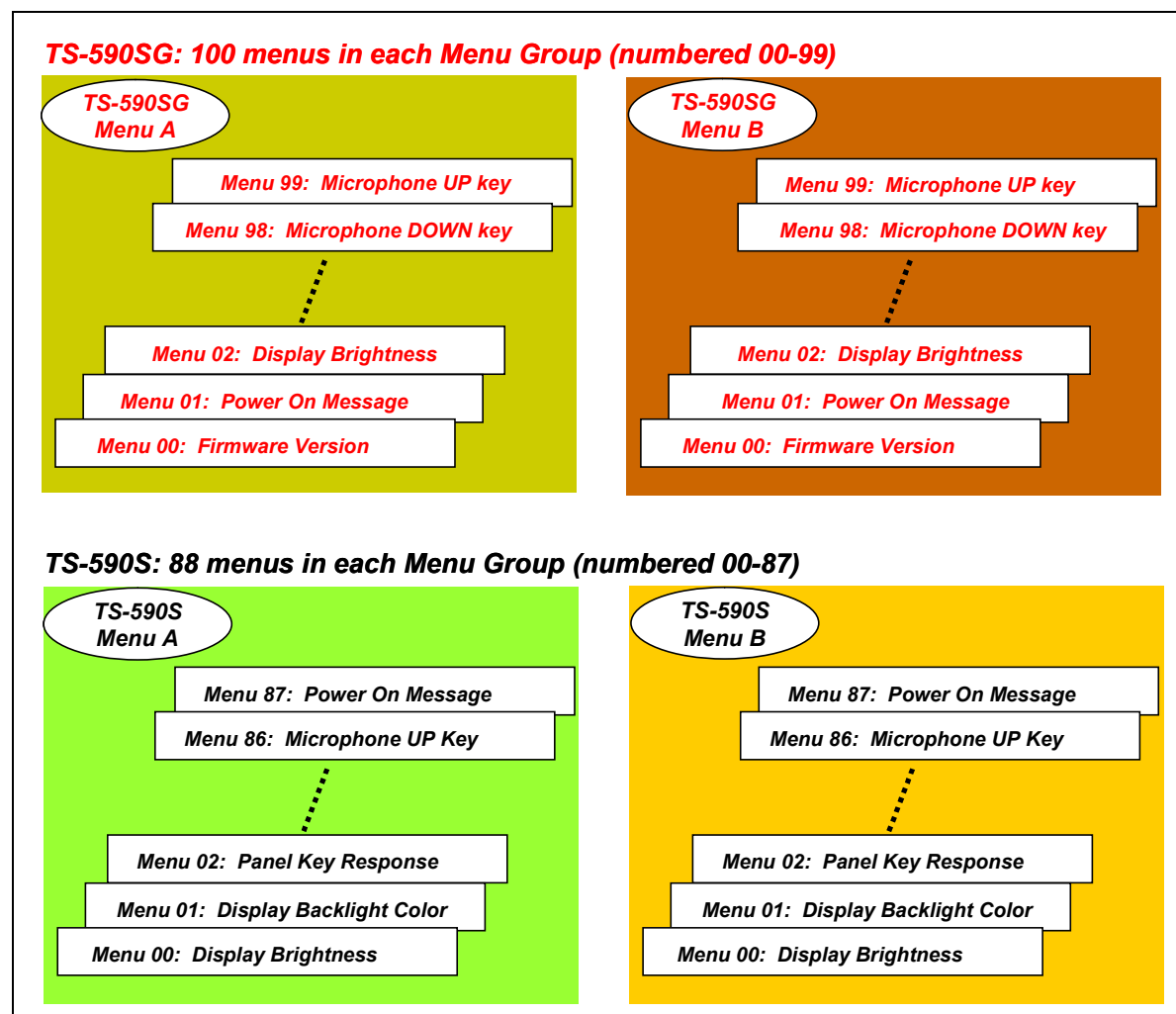


Figure 14: Menu A and Menu B in the TS-590SG and TS-590S

<sup>3</sup> Again unfortunately, although most of the menus in each radio have essentially the same functions, Kenwood chose to re-allocate the menu numbers when they released the TS-590SG. This has a major implication for any third-party software that reads and sets menu values. [3]

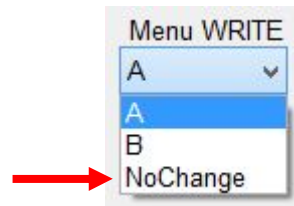
Several of the numbered menus are used in configuring the audio – for example, Menu #36/30 lets you select a TX audio equalizer.

Appendix A3 explains how to switch between Menu A and Menu B.

### Menu A and Menu B Handling in Audio590

It is important to understand that there is nothing special about the way Audio590 handles Menu A and Menu B. When you **READ** the current settings from the radio, Audio590 discovers that the radio is set to, say, Menu A, and displays the letter **A** in the **Menu READ** box on the Control Panel. You then know that the rest of the downloaded values apply to Menu A in the radio.

When you are ready to **WRITE** to the radio, you can choose to write the displayed menu settings to Menu A in the radio, or to Menu B in the radio, or you can select **NoChange** (arrowed). When you select **NoChange**, the menu settings are written back to the Menu from which they came originally.

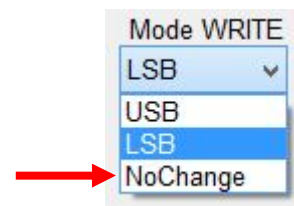


### Reading and Writing TX Mode

When you **READ** from the radio, Audio590 displays the radio's mode setting in the **Mode READ** box.

When you **WRITE** to the radio, you can select either of the supported modes (USB or LSB), or **NoChange** (arrowed)

**NoChange** means that the original mode setting that was read from the radio is written back to the radio unchanged. This is useful where you don't want to explicitly set the radio to USB or LSB – you just want to leave the sideband unchanged.



Note that when you **WRITE** to the radio, there may be a short beep at the beginning and end of the **WRITE** process. This is normal.

### TX Power

For all modes you can change the power setting in increments of 5 W or 1 W, depending on the setting of TS-590 Menu #54/48 (Power fine: Off/On). Audio590 silently reads this setting each time you **READ** from the radio, and sets the TX Power control increment accordingly.

## RX Filter Handling in the TS-590SG and TS-590S

Although the RX LoCut, RX HiCut, RX Width and RX Shift filters in the TS-590SG and TS-590S are almost identical,<sup>4</sup> the method of selecting them in each radio is quite different.

## TS-590SG

The TS-590SG has two RX filter menus, namely:

- SSB Filter (TS-590SG Menu #28). Applicable when DATA is OFF.
- SSB Data Filter (TS-590SG Menu #29). Applicable when DATA is ON.

You can set each of these menus to:

- 1 = HiCut/LoCut (default for Menu #28), or
- 2 = Width/Shift (default for Menu #29).

All the possible filter selections of Menu #28, Menu #29 and DATA ON/OFF are shown in Figure 15 below. (Green represents DATA OFF, amber represents DATA ON).

|              | SSB Filter<br>(Menu #28) | DATA  | RX FILTER |              | SSB Data Filter<br>(Menu #29)                                                         | Audio590 Settings                                                                         |
|--------------|--------------------------|-------|-----------|--------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Default >>>  | 1<br>(HI/LO)             | OFF   | LoCut     | HiCut        | 2<br>(WI/SH)                                                                          | DATA off <input checked="" type="radio"/> RX Filters HI/LO #28 RX LoCut 100 RX HiCut 4000 |
|              |                          | ON    | Width     | Shift        |                                                                                       | DATA on <input type="radio"/> RX Filters WI/SH #29 80 1750 RX Width RX Shift              |
|              | 2<br>(WI/SH)             | OFF   | Width     | Shift        | 1<br>(HI/LO)                                                                          | DATA off <input checked="" type="radio"/> RX Filters WI/SH RX Width 80 RX Shift 1000      |
|              |                          | ON    | LoCut     | HiCut        |                                                                                       | DATA on <input type="radio"/> RX Filters HI/LO 200 3000 RX LoCut RX HiCut                 |
| 1<br>(HI/LO) | OFF                      | LoCut | HiCut     | 1<br>(HI/LO) | DATA off <input checked="" type="radio"/> RX Filters HI/LO RX LoCut 100 RX HiCut 2800 |                                                                                           |
|              | ON                       | LoCut | HiCut     |              | DATA on <input type="radio"/> RX Filters HI/LO 0 5000 RX LoCut RX HiCut               |                                                                                           |
| 2<br>(WI/SH) | OFF                      | Width | Shift     | 2<br>(WI/SH) | DATA off <input checked="" type="radio"/> RX Filters WI/SH RX Width 250 RX Shift 1000 |                                                                                           |
|              | ON                       | Width | Shift     |              | DATA on <input type="radio"/> RX Filters WI/SH 50 1750 RX Width RX Shift              |                                                                                           |

**Figure 15: RX filter settings in the TS-590S. Note that in Audio590 the legend above and below each pair of filters changes according to the settings of Menu #28 and Menu #29**

The possible settings for all four filters in the TS-590SG are as follows:

|                |      |      |      |      |      |      |      |      |      |      |      |      |                      |      |                      |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|----------------------|------|----------------------|
| <b>HiCut :</b> | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3400 | 4000                 | 5000 | <b>H<sub>z</sub></b> |
| <b>LoCut :</b> | 0    | 50   | 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  | 1000 | <b>H<sub>z</sub></b> |      |                      |
| <b>Width :</b> | 50   | 80   | 100  | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 1000 | 1500 | 2000                 | 2500 | <b>H<sub>z</sub></b> |
| <b>Shift :</b> | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1750 | 1800 | 1900 | 2000 | 2100                 | 2210 | <b>H<sub>z</sub></b> |

You can choose any appropriate setting for any of these filters – they are all independent of each other.

<sup>4</sup> The TS-590SG has a 1750 Hz RX Shift filter setting, whereas the TS-590S does not. Otherwise, the filters are the same in both radios

### TS-590S

The TS-590S does not have an SSB Filter menu or SSB Data Filter menu. This means that the only possible settings are as shown in Figure 16.

Only possible >>> settings

| DATA | RX FILTER |       | Audio590 Settings                            |                     |                |                  |
|------|-----------|-------|----------------------------------------------|---------------------|----------------|------------------|
| OFF  | LoCut     | HiCut | DATA<br>off <input checked="" type="radio"/> | RX Filters<br>HI/LO | RX LoCut<br>0  | RX HiCut<br>1000 |
| ON   | Width     | Shift | on <input type="radio"/>                     | WI/SH               | 50<br>RX Width | 1000<br>RX Shift |

**Figure 16: RX filter settings in the TS-590S. The RX Filters controls are grayed out because you cannot change these settings**

In this case, the only filters you can select in Audio590 are:

- DATA OFF: LoCut and HiCut
- DATA ON: Width and Shift

The possible settings for all four filters in the TS-590S are as follows:

|                |      |      |      |      |      |      |      |      |      |      |      |      |           |           |           |
|----------------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|-----------|-----------|
| <b>HiCut :</b> | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3400 | 4000      | 5000      | <b>Hz</b> |
| <b>LoCut :</b> | 0    | 50   | 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  | 1000 | <b>Hz</b> |           |           |
| <b>Width :</b> | 50   | 80   | 100  | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 1000 | 1500 | 2000      | 2500      | <b>Hz</b> |
| <b>Shift :</b> | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2210      | <b>Hz</b> |           |

You can choose any appropriate setting for any of these filters – they are all independent of each other.

### Reading User-Defined Equalizers

When you **READ** the radio's settings, Audio590 checks if you have selected a TX and/or RX user-defined equalizer. If so, Audio590 sets the TX/RX Equalizer selection to "Downloaded", and the equalizer name box is shown as "Downloaded TX/RX EQ".

For example:

Then, to save the equalizer, click on the **TX Equalizer** button, select an equalizer from **UT-A** to **UT-N**, and enter a meaningful name for the equalizer.

For example:

Then click on the **Save d/I TX Equalizer** button.

## ARCP-590 and Audio590

As noted earlier, ARCP-590 and Audio590 communicate with the radio in different ways. See Figure 17.

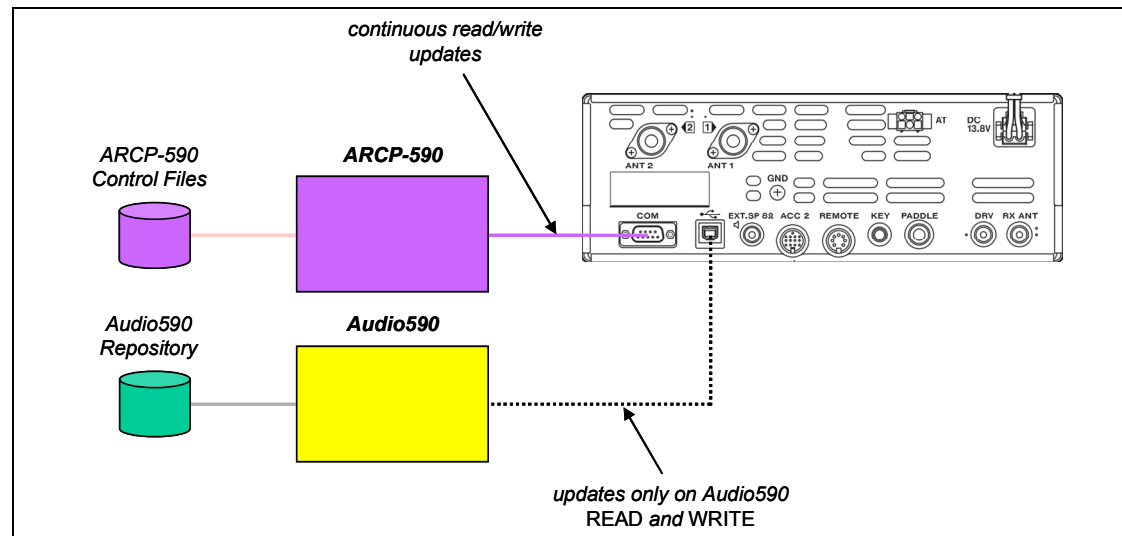


Figure 17: ARCP-590 and Audio590. ARCP-590 is an interactive radio control program, where any changes in ARCP-590 settings or radio settings take immediate effect. With Audio590, changes only take effect when the READ or WRITE button is clicked

**Note: If you want to run ARCP-590 and Audio590 at the same time, they must use different PC COM ports. You cannot use a shared port (by using a port splitter program such as VSPE, for example).**

ARCP-590 and Audio590 each has its own sets of data control files, and there is no interaction between them – ARCP-590 has no knowledge of the existence of Audio590, and vice versa.

## Handling User-Defined Equalizers

You need to use ARCP-590 to configure user-defined TX and RX equalizers, in the usual way. Once you have set them up, you can then **READ** them into Audio590. See Figure 18.

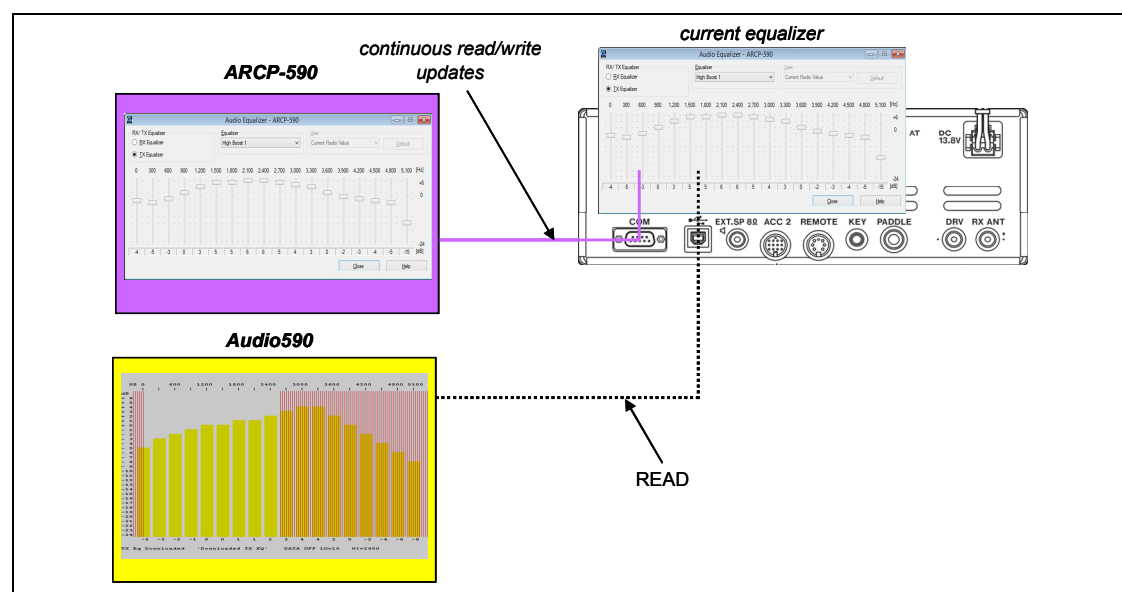


Figure 18: Configuring user-defined equalizers

## User-Defined Equalizers based on Built-In Equalizers

An additional feature of Audio590 is the ability to create user-defined equalizers that are based on the existing built-in equalizers. This can save time when the required equalizer profile is almost the same as a built-in profile – you just want to make a few small changes.

There are 8 steps involved in creating a user-defined equalizer based on a built-in equalizer. Steps 1 and 3 are manual. The remaining steps are automatic, requiring no manual intervention. Audio590 and ARCP-590 both need to be running at the same time.

1. In ARCP-590, select a built-in equalizer that is close to the profile you want (for example, HB1), then change one or more equalizer settings as required.
2. As you modify the equalizer settings, ARCP-590 automatically sends the changes to the radio, thus keeping the radio up to date.
3. When you have configured the equalizer as you want it, click on the **READ** button in Audio590.
4. Audio590 compares the modified HB1 equalizer with the default built-in equalizer profile, and recognizes they are different. (Audio590 builds the Default Built-In Equalizer file the very first time you connect to the radio, by reading and saving all 7 built-in TX equalizer profiles and all 7 RX built-in profiles).

See Figure 19.

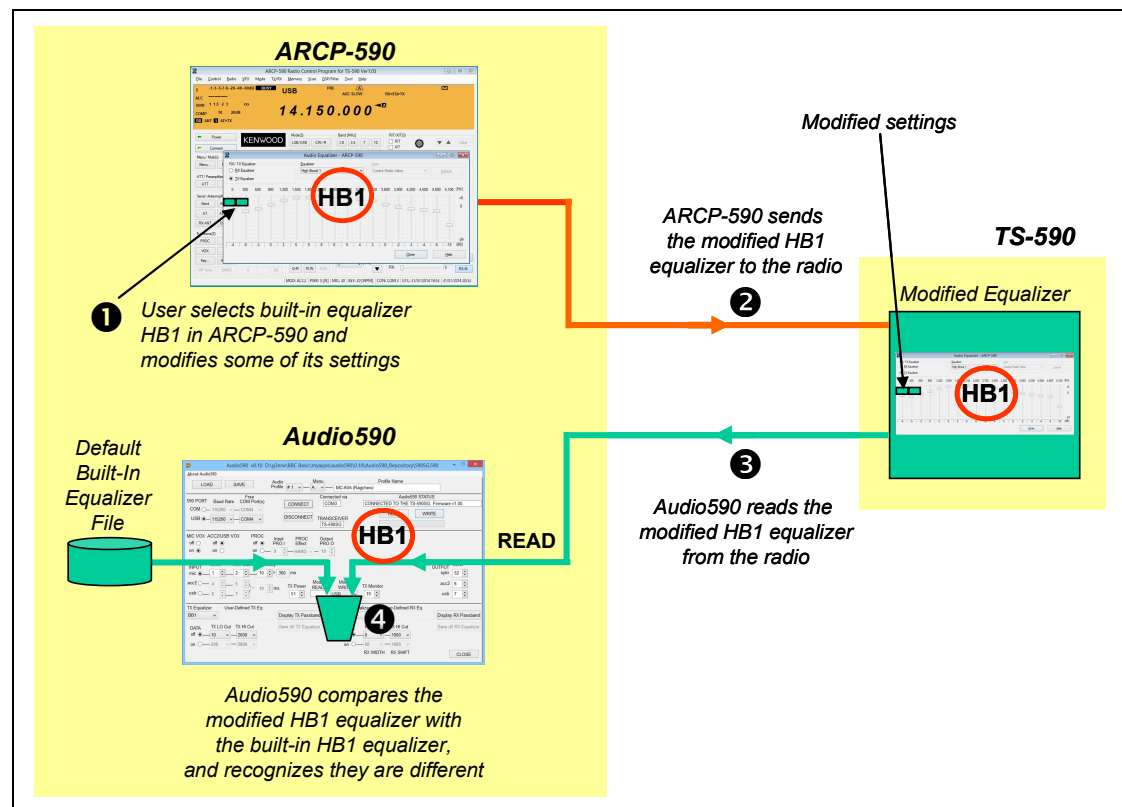


Figure 19: The first 4 steps in creating a user-defined equalizer based on a built-in equalizer

The remaining steps in creating a user-defined equalizer based on a built-in equalizer are:

5. Having detected that the downloaded equalizer is a modified built-in, Audio590 automatically changes the equalizer type to user-defined (U).
6. Audio590 automatically writes the user-defined equalizer to the radio.
7. ARCP-590 reads the new user-defined equalizer.
8. ARCP-590 updates the new equalizer.

See Figure 20.

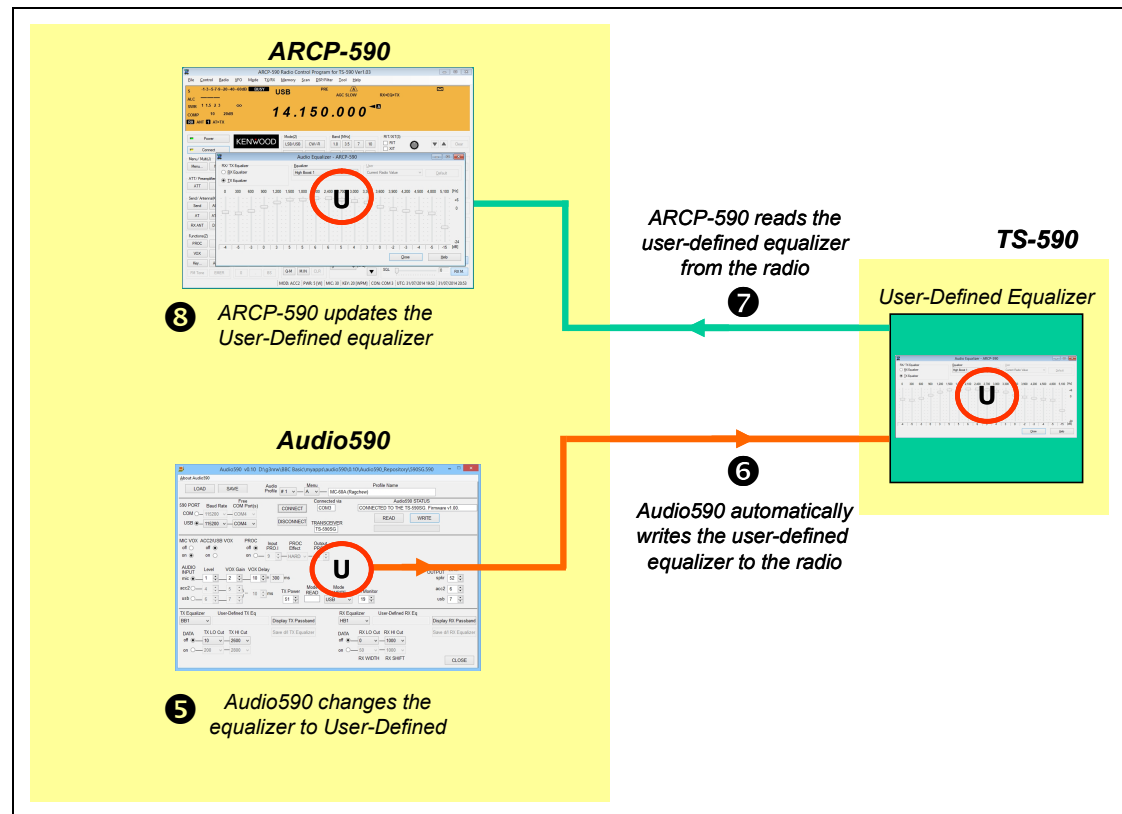


Figure 20: The final 4 steps in creating a user-defined equalizer based on a built-in equalizer

### Retrieval of ARCP-590 User-Defined Equalizers

Audio590 does not access any of ARCP-590's control files, so is unaware of the ARCP-590 User equalizers (**user1**, **user2**, **user3** and **user4**) that you may have stored previously.

If you want to save these equalizers in Audio590, you need to select each one in turn as the "Current Equalizer" in ARCP-590, then read that equalizer into Audio590

## Appendix A1: Audio Profile Repository Organization

Figure A1-1 shows how Audio Profile Collections (APCs) are stored in the Audio590 Repository.

Each APC is contained in two separate files, named generically as **<name>.apc** and **<name>.apceq**, where **<name>** is the APC name entered on the Control Panel. These files are located in the sub-folder **Audio590\_Repository** immediately below the Audio590 root folder.

In each APC, the file **<name>.apc** contains all the settings for 15 audio profiles.

File name **<name>.apceq** contains 14 user-defined TX/RX equalizer settings.

The file **<name>.apc** is created/updated when you click on the Control Panel **SAVE** button. Audio590 automatically adds the **.apc** extension, and silently creates **<name>.apceq**.

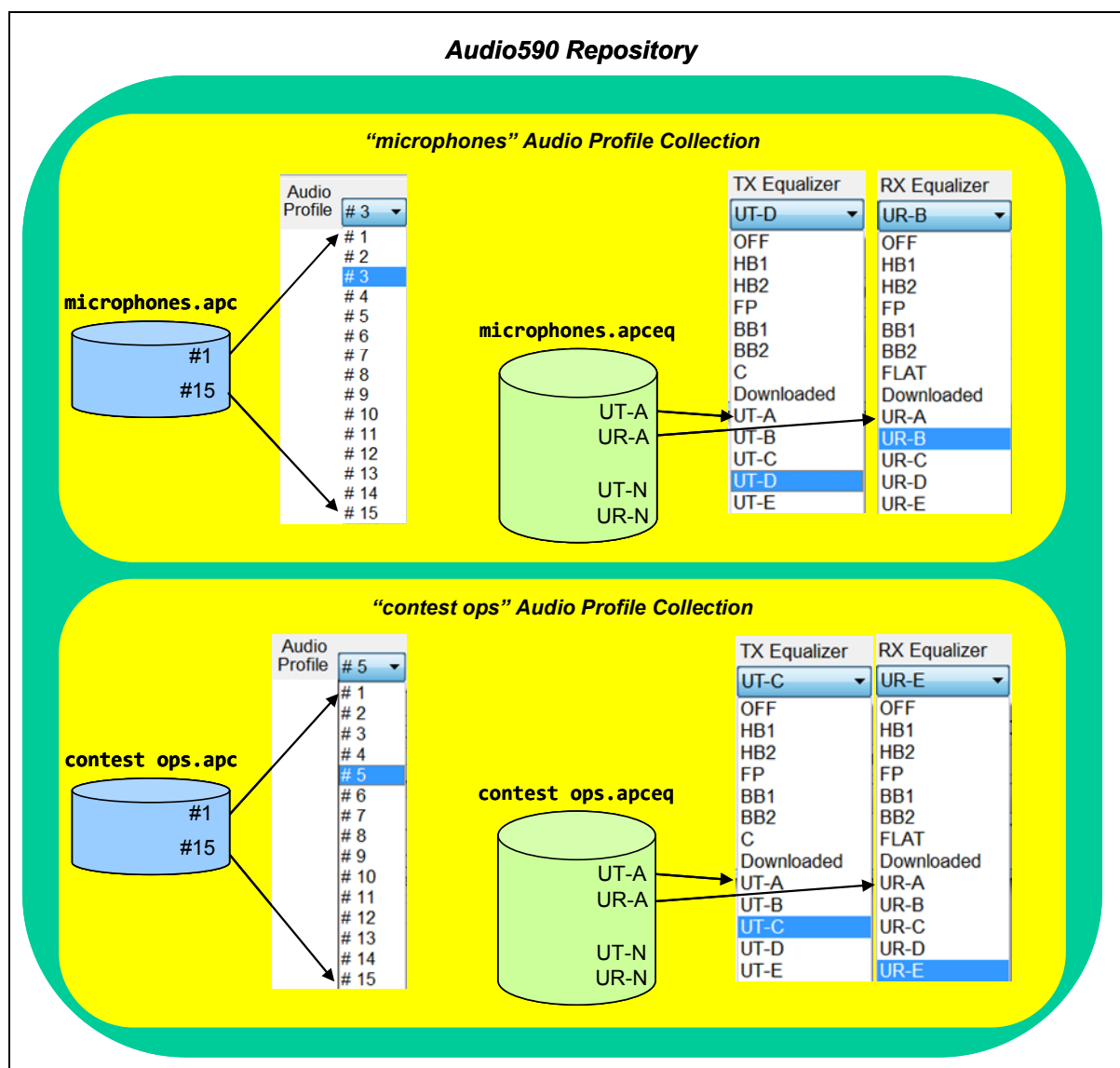


**Figure A1-1: Organization of the Audio590 Repository**

File formats are defined in the headers of **\_Default\_APC.apc** and **\_Default\_Equalizers.apceq**, provided with Audio590. These files are located in Audio590's root folder, and are read-only.

**Note:** Audio590 automatically maintains the files in the Audio590 Repository.

**DO NOT ATTEMPT TO EDIT THESE FILES YOURSELF.**

## Appendix A2: Selecting Menu A and Menu B in the TS-590S

Kenwood makes it harder than necessary to understand how to select Menu A or Menu B. All that appears on the display to indicate which menu is selected is the letter **A** or the letter **B**. Unfortunately the letters **A** and **B** also indicate the VFO in use. This leads to the question: how do you know whether **A** on the display means “Menu A” or “VFO-A”?

The answer lies in whether there is a left arrow symbol to the left of the letter. See Figure A2-1.

- If the **MENU** key has not been pressed, and the frequency appears on the display, there will be a left-pointing arrowhead alongside the letter **A** or **B**. In this case **A** or **B** means “VFO-A” or “VFO-B”.
- If you press the **MENU** key, the frequency display disappears, and a menu setting appears. By toggling the **A/B** key you can switch between Menu A and Menu B. There is no left arrow on the display. You can then select one of the 88 available numbered menus and display or change its value. You can select a different menu value in Menu A and Menu B.
- Once you have set up the required menu values, you press **MENU** again to restore the frequency display.

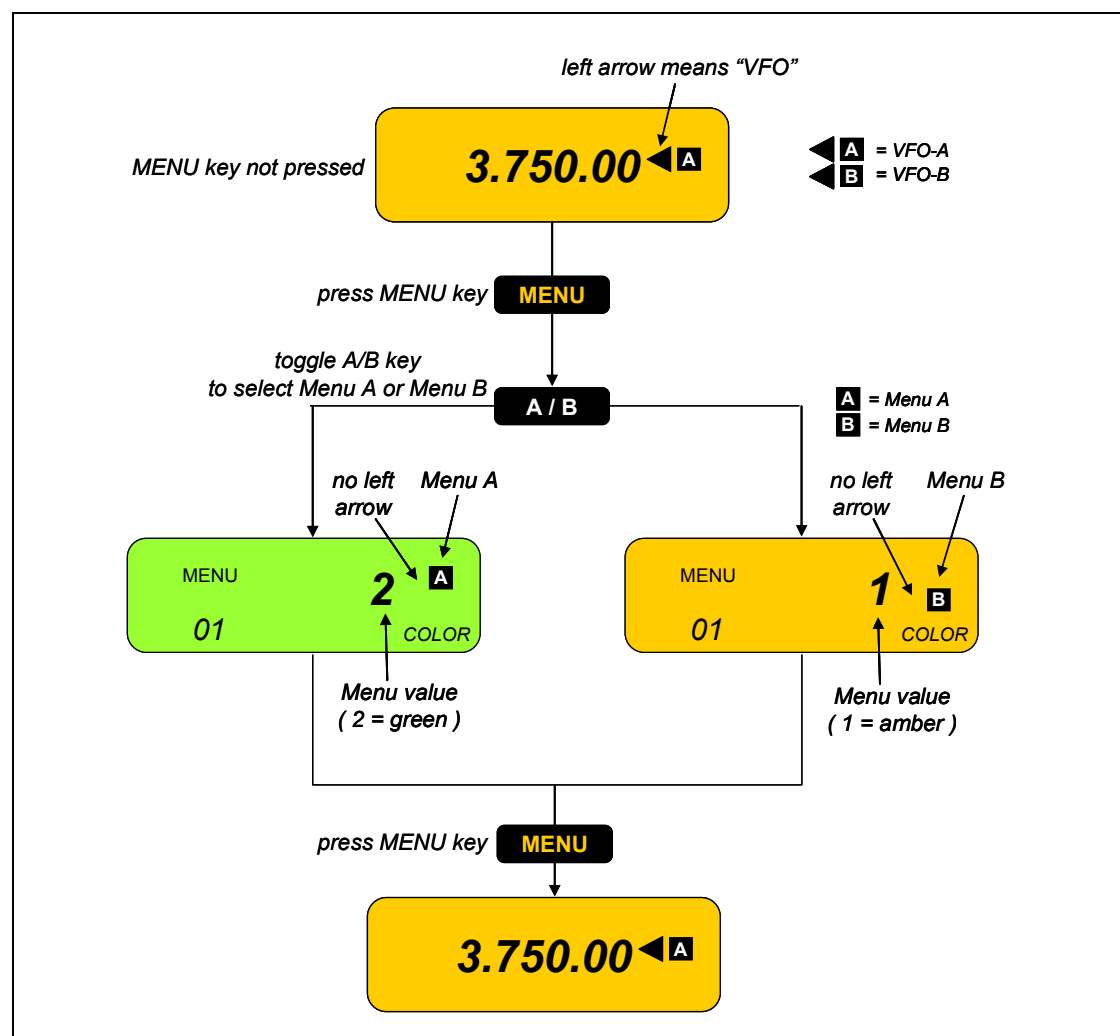


Figure A2-1: Selecting Menu A or Menu B.

### Appendix A3: The TS-590 Built-In Equalizers

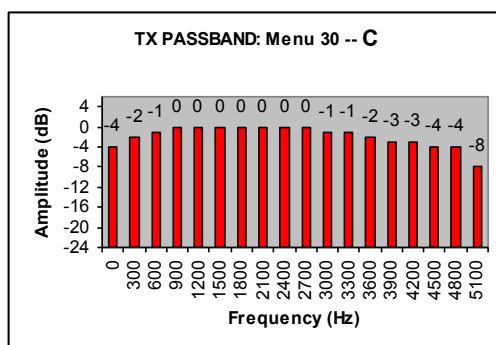
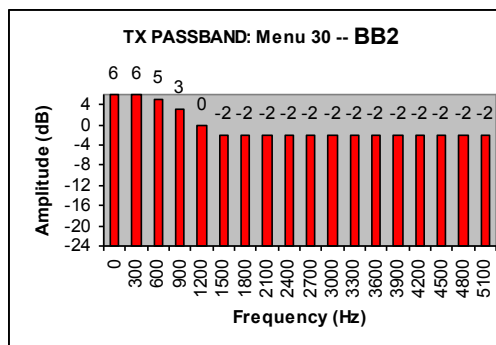
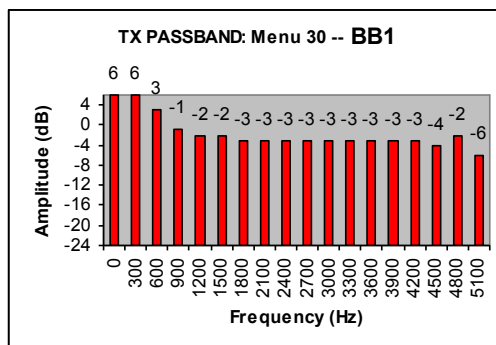
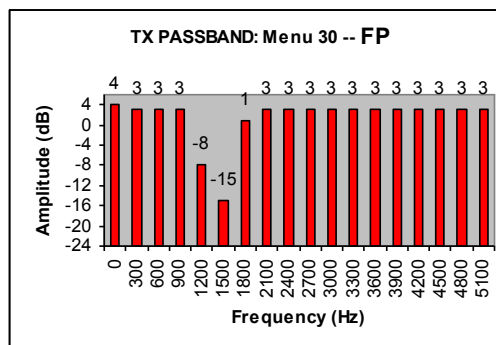
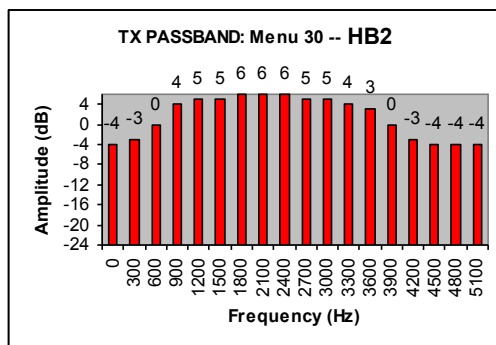
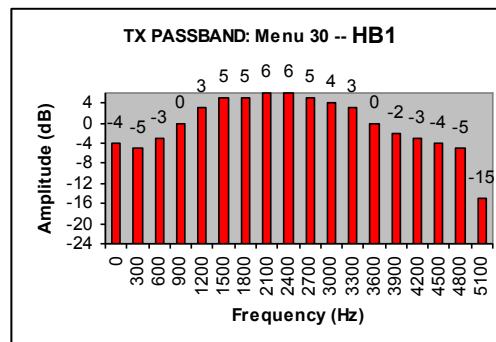
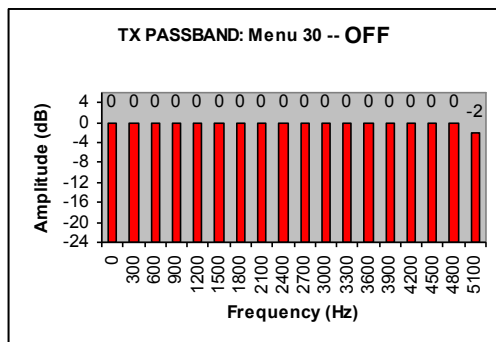
The Menu numbers shown in these pictures are applicable to the TS-590S.

The corresponding Menu numbers for the TS-590SG are:

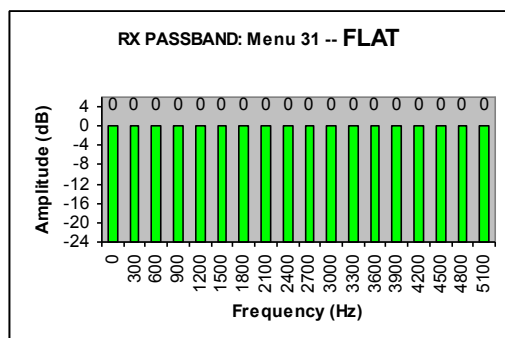
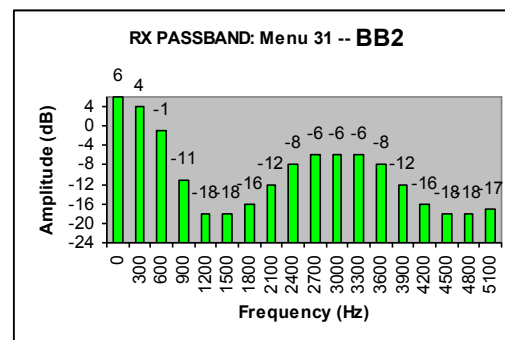
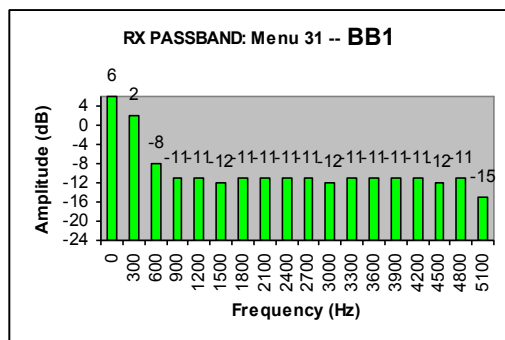
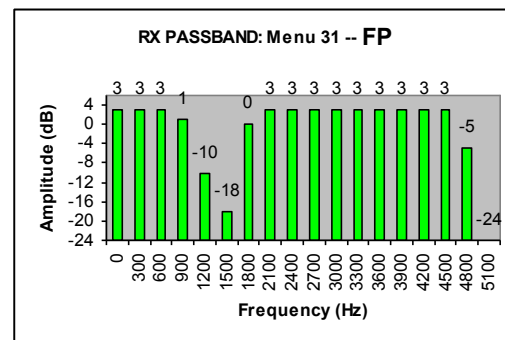
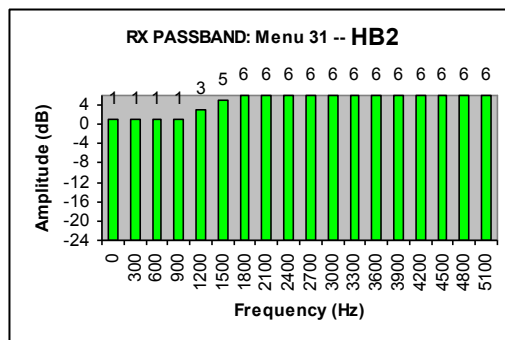
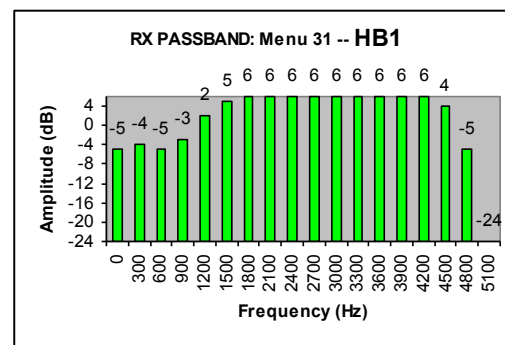
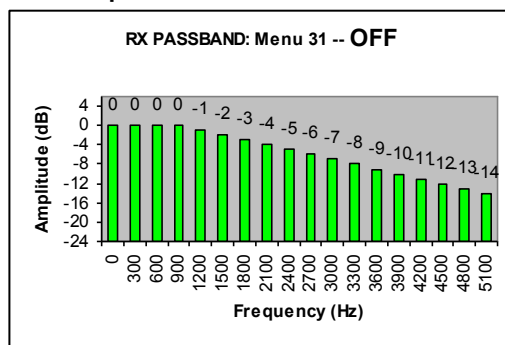
TX Equalizer: Menu #36

RX Equalizer: Menu #37.

#### Transmit Equalizer Profiles



## Receive Equalizer Profiles



## References

| <i>Resource</i>                                 | <i>URL</i>                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] BBC Basic for Windows (BB4W)                | <a href="http://www.bbcbasic.co.uk/bbcwin/bbcwin.html">http://www.bbcbasic.co.uk/bbcwin/bbcwin.html</a>                                                                                                                                                                                                                                             |
| [2] Audio590 software and User Guide            | Go to the "TS-590 Family Resources Page":<br><a href="http://homepage.ntlworld.com/wadei/TS-590.htm">http://homepage.ntlworld.com/wadei/TS-590.htm</a><br>Click on the magenta <b>AUDIO590</b> button.<br>Then scroll down to the audio590 zip file and download it                                                                                 |
| [3] Software Incompatibilities with the TS-590S | Go to the "TS-590 Family Resources Page":<br><a href="http://homepage.ntlworld.com/wadei/TS-590.htm">http://homepage.ntlworld.com/wadei/TS-590.htm</a><br>Click on the green <b>COMMON</b> button, then on the green <b>TECHNOTES</b> button.<br>Then download TechNote # 13:<br>"TS-590SG Whitepaper: Software Incompatibilities with the TS-590S" |

## Acknowledgements

Mike Goldstein, VE3GFN, started the ball rolling with this email to me:

I've adapted my Heil Proset with electret cartridge to the TS590. But I have a problem. The higher output of the electret mic. requires quite different audio settings, for VOX, PROC and MIC, as opposed to the kenwood dynamic mics that I have.

One solution would be to include a voltage divider in the cartridge adaptor, to ensure electret mic. output is the same as the Kenwood mics ... and that is still an option to explore. Alternatively, it seems I should be able to save different configurations of the TS590 in software.

I've tried this initially, using the ARCP-590 utility to save different radio configurations, with different file names, but it doesn't seem to save all the audio settings. Audio settings remain as adjusted most recently, even after writing back data files from the utility to the radio.

I then tried setting up Menus A/B for different audio settings, but again, the audio settings are not changed when I write the alternative menu configuration file back to the radio.

It's tedious, having to re-adjust all the audio settings each time I change microphones. Am I missing something?

We kicked ideas around, and quickly agreed there was much more to saving audio settings than simply keeping a record of the audio gain for every microphone. One thing led to another, and Audio590 was born. Many thanks, Mike, for the stimulus for an interesting software project and your help in getting it on the road.

Several other beta testers then joined the project, and provided many helpful ideas and suggestions for improving Audio590. In last name order, they were:

- Doyle Counterterman, W6OEZ
- Andy Durbin, K3WYC
- Mike Hubbard, G3OVL
- Neil Hubbard, M3NHZ
- Tom Mandell, W3FRG
- Alan Messenger, G0TLK

Thank you all, gentlemen, for your very welcome contributions.

Also, special thanks go to David Wilkins, G5HY, of Kenwood UK for the loan of a TS-590SG to test the program.

**Document/Software Version History**

| <b>Version</b> | <b>Date</b> | <b>History</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| v1.0           | 14 Jan 2015 | First public release                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| v1.1           | 6 Mar 2015  | <p>Audio590 v1.1 continues to be restricted to USB and LSB mode support only. Later versions will support AM and FM as well</p> <p>Serial port handling changed. Audio590 now handles any serial port, including regular hardware COM ports, USB-to-serial ports, VSPE ports and com0com ports. This change also works around possible conflicts with COM ports used in hardware interface units (for example, Navigator)</p> <p>The COM Ports control now lists all the ports that are <i>installed</i> in the PC, whether they are in use by other programs or not. (In v1.0, this control listed all the <i>free</i> ports)</p> <p>Fixed problem with writing User-defined TX equalizers to the radio</p> <p>Changed the default Menu WRITE and Mode WRITE selections to "NoChange"</p> <p>Simplified the working of the "NoChange" option for Menu WRITE and Mode WRITE</p> <p>Fixed the incorrect disabling of the Processor Out (PRO.O) control when the Processor was switched ON</p> <p>Fixed the incorrect beep level settings when switching between Menu A and Menu B</p> |
| v1.2           | 18 Mar 2015 | Fixed the "No such variable" error at line 29985 in v1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |