DX ENGINEERING

RF-KIT POWER AMPLIFIER

Operating and Installing-Instructions

.–. ..–. –....– –.– .. – .––. ––– .–– . .–. .– –– .––. .–.. .. ..–. .. . .–.

Dear customer,

Congratulations on your purchase of a RF-KIT linear amplifier!

RF-KIT devices offer innovative and reliable technology, functionality and appealing design.

If, in spite of our careful quality control, you have any reason to complain or have a question about the device, please contact the dealer you trust or even directly to RF-KIT.

vy 73 es gd dx de

RF-KIT Reinhard Förtsch
Heuleithe 14 · 91322 Gräfenberg
Germany

Tel.: 0049 9192 99 66 89
www.rf-kit.de · mail@rf-kit.de

DX Engineering
1200 Southeast Ave.
Tallmadge, OH 44278 USA
www.dxengineering.com

Table of contents

1. Explanation of symbols, Environment protection

1.1 Explanation of symbols

Warnings

Warnings are marked by a warning triangle.
In addition, signal words indicate the nature and severity of the consequences if the measures to avert the hazard are not followed.

The following signal words are used in this document:

- **NOTE** means that property damage may occur.
- **WARNING** means that serious or even life-threatening personal injury may occur.
- **DANGER** means that serious or life-threatening personal injury will occur.

Important information without danger to people or property is marked by the adjacent symbol. These informations are boanded by lines above and below the text.

1.2 Important informations

Symbol	Meaning
▶	Instruction
➔	Reference to a position in the document
●	Enumeration/List entry
-	Enumeration/List entry (2^{nd} level)

1.3 Environment protection

Disposal of packaging

The packaging protects the device against damage during transport. The packaging materials are selected according to environmentally friendly and disposal-related aspects and thus recyclable.

The return of the remaining packaging parts, such as packaging straps, PE bags, etc., into the material cycle saves raw materials and reduces waste.

If you plan to dispose of the packing by yourself, please locate the nearest recycling center.

2. Safety informations

Read these operating and installation instructions carefully and completely before attempting to install and operate the device!

Keep these operating and installation instructions carefully. These operating instructions contain important safety and operating instructions for the use of the RF2K-S linear amplifier.

When selling the device hand this document to the new owner.

There are dangerous voltages inside the device! Before opening the device:

- ▶ Switch off the device by pressing the power switch **On/Off (1)** at the front of the device and wait until all cooling fans stop.
- ▶ Disconnect the power cable from the **Power jack (9)**.

Follow the instructions of a note to avoid damage to the device!

Follow the instructions of a warning to avoid serious injury!

Please use this linear amplifier only according to the instructions in this manual.

The device is designed only for operation on frequencies of the amateur radio service. For legal operation you need a valid amateur radio license.

This device is NOT a TOY. It must not be handled by children or placed within reach of children or even been operated.

The unit should only be opened or serviced by a qualified technician.

This device generates high frequency energy. Use the device with due care regarding the system configuration.

When connected to an antenna, this linear amplifier can generate high-frequency electromagnetic fields, which must be evaluated according to applicable national laws. All measures must be taken to ensure the necessary insulation regarding human exposure (observe minimum distances!).

The radio frequency energy generated by this device may interact with some electronic devices such as pacemakers and defibrillators.

Refer to the manufacturer instructions of a pacemaker or defibrillator for precautions in the vicinity of a radio frequency transmitter.

Immediately stop an ongoing transmission if malfunction or interference with a pacemaker or defibrillator is suspected!

DANGER - HIGH TENSION!
NEVER connect an antenna or remove an antenna socket while the unit is transmitting!
This can cause electric shock or burns!

DANGER - HIGH TENSION!
NEVER operate the device without properly mounted cover.
This can cause electric shock or burns!

DANGER - HIGH TENSION!
NEVER apply mains voltage before the linear amplifier is Grounded.
Touching the linear amplifier in this case can cause an electric shock!

WARNING!
NEVER operate the device with a mains voltage other than the recommended 110-240 V mains voltage.
This could cause a fire or destroy the device!

WARNING!
NEVER operate the device together with an extension cord or multiple socket.
This could cause a fire or electric shock!

WARNING!
NEVER allow pieces of metal, wires or other objects to touch the internal parts or connectors on the back of the device!
This can cause electric shock or burns!

WARNING!
NEVER leave children alone with the device ready for use!
Risk of injury due to electric shock!

WARNING!
The device is intended only for indoor use. NEVER expose the device to liquids and NEVER operate it in a humid environment!
This can cause electric shock, burns and destroy the device!

WARNING!
The device gets hot during prolonged transmission operation!

NOTE:
Avoid using or installing the device in environments with temperatures below -10 ° C (+ 14 ° F) or above + 40 ° C (+ 104 ° F).
Avoid the exposition to direct sunlight onto the device and operation in extremely dusty environment.

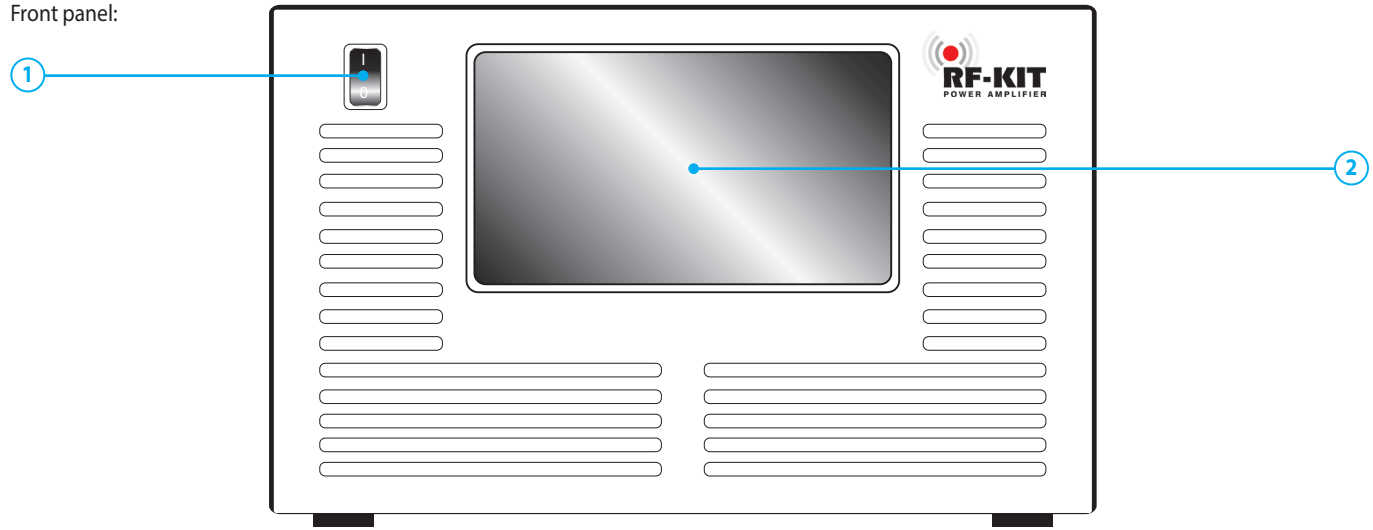
NOTE:
Place the device only at a well-ventilated place! Make sure that no objects are placed on the device or near the ventilation openings, which will hinder the heat dissipation.

3. Control elements and connections

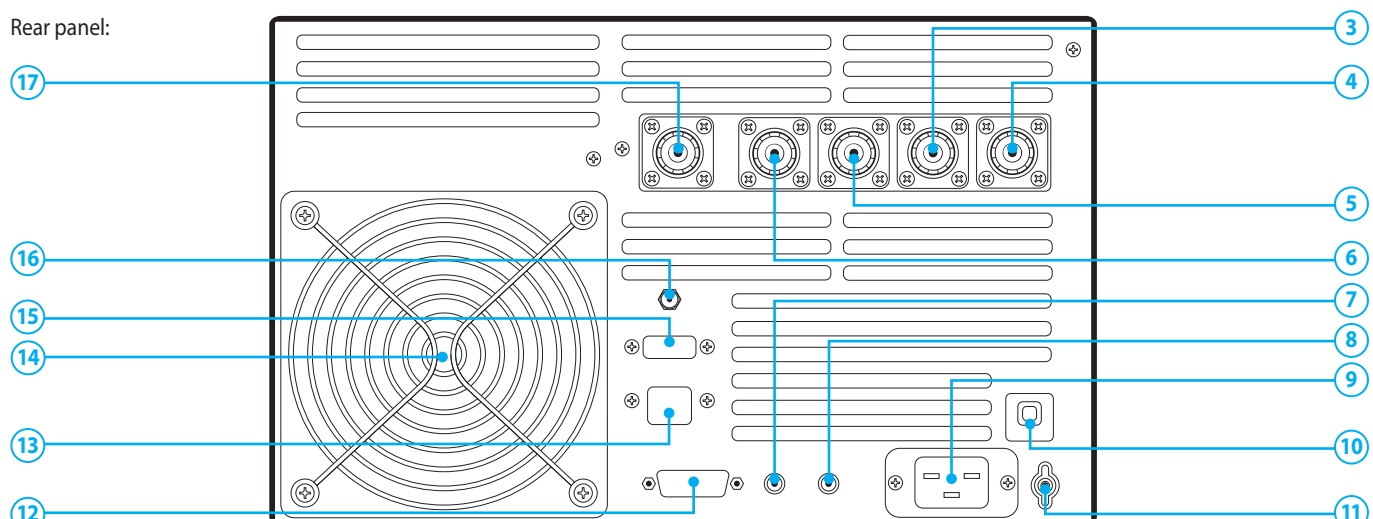
3.1 Panel description

1 **On/Off**
2 **Touch screen**
3 **ANT 3**
4 **ANT 4**
5 **ANT 2**
6 **ANT 1**
7 **PTT**
8 **Power On Extern**
9 **Power jack**
10 **Fuse**
11 **Ground connector**
12 **Multifunction connector**
13 **LAN**
14 **Cooling fan**
15 **CAT USB**
(USB-port is provided by the **Raspberry Pi®**)
16 **-55 dB output**
17 **Exciter input**

Front panel:



Rear panel:



3.2 Control elements and connections

1 Power switch **On/Off (1)** (main switch)
This rocker switch switches the device on / off.

2 **Touch screen** - GUI
This Touch screen controls the device in all operating states.
Also you receive context-related information about the operating status of the device.

3 **ANT 3**
50 Ω antenna socket SO-239 (PL-259)

4 **ANT 4**
50 Ω antenna socket SO-239 (PL-259)

5 **ANT 2**
50 Ω antenna socket SO-239 (PL-259)

6 **ANT 1**
50 Ω antenna socket SO-239 (PL-259)

When device is switched off, **ANT 1 (6)** is looped through.

7 **PTT**
RCA connector for transmit/receive switching

At the center contact (+) of the connector **PTT (7)** +5 V are present.

8 **Power On Extern**
RCA connector for remote control: The device can be switched on remotely by applying + 12V DC (at least 10 V, max 15 V!) to the center contact. The power switch **On/Off (1)** must be switched off ("0"). When DC voltage drops, the PA switches off.

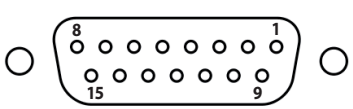
9 **Power jack**
A plug for this power socket is included and can be wired to the user supplied power cord capable of 16 Amps, that meets their countries power plug requirement.

10 **Fuse** - automatic circuit breaker 16 A
If this automatic circuit breaker triggers several times in succession, this usually has a valid reason!

WARNING!
Do not open the device by yourself, contact the manufacturer!

11 **Ground connector**

12 **Multifunction connector** DB-15



(Plugview)

DB-15 Connector Pin Assignments:

1 -	**In A**	Spare
2 -	**In B**	Spare
3 -	**In C**	Spare
4 -	**In D**	Spare
5 -	**Out A**	BCD band data output (Transistor output, max. 15 V / 50 mA from external)
6 -	**Out B**	BCD band data output (Transistor output, max. 15 V / 50 mA from external)
7 -	**Out C**	BCD band data output (Transistor output, max. 15 V / 50 mA from external)
8 -	**Out D**	BCD band data output (Transistor output, max. 15 V / 50 mA from external)
9 -	**TKEY**	Output / input for tuner control (available soon)
10 -	**TSTR**	Input for tuner control (available soon)
11 -	**RS232 TX**	-
12 -	**RS232 RX**	-
13 -	**GND**	-
14 -	**GND**	-
15 -	**OUT 15 V**	Max. 500 mA if device is switched on; can be used for external controls (e.g., remote control relay control).

13 **RJ45 LAN Connector**
Here you can connect your RF2K-S to your home network for remote control by LAN-cable.
Note: Alternatively you can use the build-in Wi-Fi to connect the RF2K-S to your local Wi-Fi network.

14 **Cooling fan**
The high-performance fan is temperature-controlled and ensures reliable cooling of the power electronics with minimal noise, even during maximum continuous load (contest operation!).

15 **CAT USB** - USB 2.0 connector "CAT"
Band data import / export between exciter and PA.

16 **-55 dB output**
SMA connector for adaptive predistortion of the exciter signal along with SDR transceivers.

17 **TRX -** 50 Ω SO 239 connector
Input exciter (transceiver) signal.

4. Preparing for operation

4.1 Unpacking

- ▶ After unpacking, inspect the device for shipping damages.
- ▶ Report any damage immediately to the delivering freight forwarder or dealer. Keep the shipping box.

4.2 Scope of delivery

1x RF2K-S Power Amplifier
1x 120 V AC line cord
1x 240 V AC line cord
1x Short coaxial cable with 1x SMA connector (“Pigtail“)
1x Micro SD-Card for operating system

4.3 Selecting a location

Because of its weight the device must be situated on a stable surface.

- ▶ Select a location for the device that ensures adequate air circulation (at least 10 cm of free space in front of and behind the PA are neccessary).
- ▶ Avoid locations with extreme heat or cold, high humidity and vibrations.

Avoid operation near TV sets, television antennas, radios and other electromagnetic sources.

4.4 Grounding

WARNING!
NEVER connect the **Ground connector (11)** to a gas or power line, as this may cause an explosion or a electric shock!

To prevent electric shock, television interference (TVI), radio interference (BCI) and similar problems:

- ▶ Ground the device via the **Ground connector (11)** at its back.
  For best results, use a copper wire with large cross-section to connect to a copper rod, as long as possible, buried in conductive soil.
- ▶ Keep the length of this copper wire as short as possible!

4.5 Connecting exciter

- ▶ Connect the antenna socket of the exciter (a transceiver in general) to the connector **TRX (17)** of the PA via a coaxial cable.

4.6 Connecting PTT-cable

- ▶ Connect the PTT connector of the exciter (a transceiver in general) to the connector **PTT (7)** of the PA via a RCA cable.

At the center contact (+) of the connector **PTT (7)** +5 V are present.

4.7 Preparing LAN connection

- ▶ Connect a ethernet cable to the **LAN (13)** socket.
- ▶ Connect the ethernet cable to the router / switch of your local area network.

4.8 Connecting antenna(s)

Do NOT transmit without an antenna or dummy load connected! Select one or more 50 Ω antennas or dummy load with 50 Ω lead and more than 2 kW rated power.

- ▶ Connect 1-4 antenna(s) to the desired 50 Ω antenna socket using suitable coaxial cable with as little loss of power as possible, and professionally mounted SO-239 plugs to connector **ANT 1 (6), ANT 2 (5), ANT 3 (3), ANT 4 (4)**.

ANT 1 (6) is looped through as long as device is “off“.

4.9 AC Line cord connection

The device works with mains voltages between 90 and 290 V AC. We recommend the use of 200-240 V / 50-60 Hz AC to ensure the full performance of the device.
If the device is operated at 110 V, the maximum output power drops from approximately 2000 W to approximately 900 W.

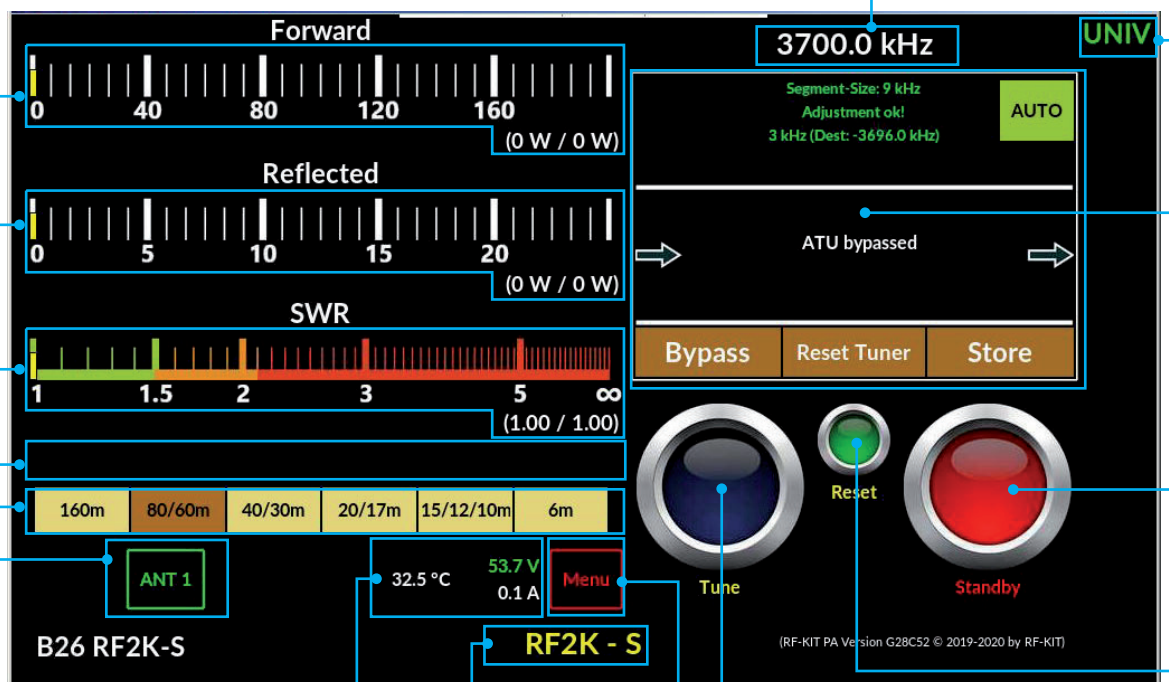
- ▶ Connect the device with the included line cord via **Power jack (9)** to a properly installed power outlet.

5. Using the device locally

5.1 Turning device on

► Turn on the device using power switch **On/Off (1)**.

The **Touch screen (2)** lights up and shows the user interface:



Indication area **Forward Power** (analog PEP and digital Minimal / Maximal)

Indication area **Reflected Power** (analog PEP and digital Minimal / Maximal)

Indication area **SWR** (analog PEP and digital Minimal / Maximal)

Indication area **Error Messages**

Indication area **Choosen band**

Switching area/Indication area **Actually Choosen Antenna**

Indication area **Operating Parameters**
(selected interface, end transistor supply voltage, output stage temperature, output stage current consumption)

Indication area **Personalization Text**
An individualization text to be edited in the user menu (e.g. call sign) is displayed here

Indication area
Frequency TRX

Switching area
Interface

Switching area/
Indication area
Antenna Tuner

Switching area
Standby
Switching between
"Standby" (red)
"Operate" (green)

Switching area
Reset PA
If the PA switches off due to an error, it is reactivated after actuating this switching area; the error message (e.g. "zu hohes SWR" vanishes)

Switching area **Tune**
Touching this switching area triggers a tuning process

Switching area **Menu**
Touching this switching area activates the user menu

5.2 User menu

▶ Touch the switching area **Menu**.

The **Touch screen (2)** changes to the user menu and displays the screen shown to the right. The following submenus can be selected:

5.2.1 Settings

- **Personalization Text**

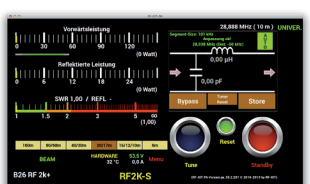
▶ Click the text box, highlight and change the personalization text by using mouse and PC keyboard.

- **Display**

▶ During remote operation, it makes sense to turn off the **Touch screen (2)** (Touch screen (2) activated "On" / deactivated "Off")

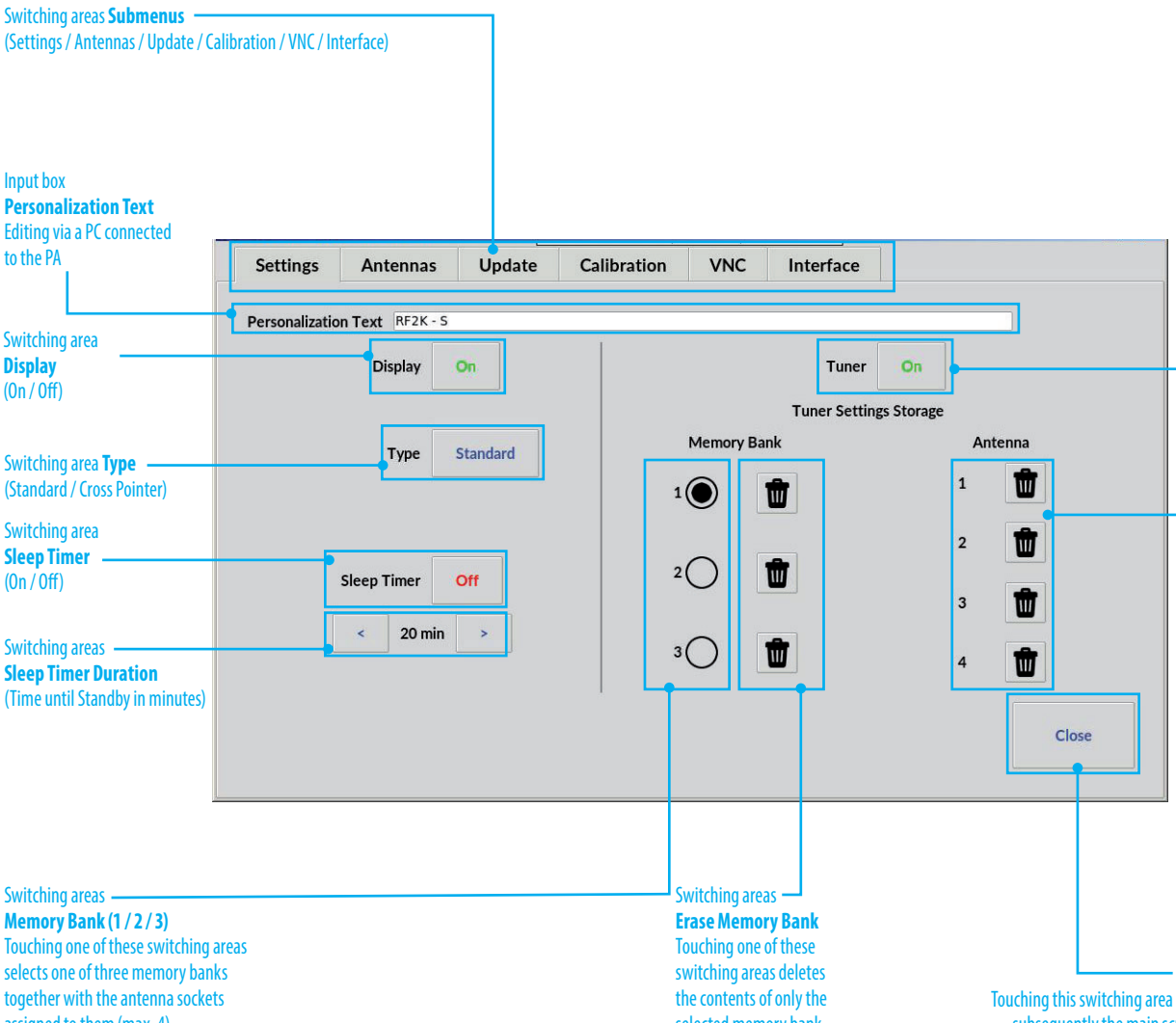
- **Type**

▶ Choose a GUI which you like (Standard / Cross Pointer):



Standard

Cross Pointer



- **Sleep Timer**

► The **Sleep Timer** is activated/deactivated by (multiple) touching this switching area (**Sleep Timer** activated "On" / deactivated "Off")

- **Sleep Timer Duration**

► By touching the switching areas **"<"** or **">"** the **Sleep Timer** can be adjusted.

If there is no operation during the set duration, the unit switches to stand-by mode **(Stand By)** after the set duration has expired. Each activity via the **Touch screen (2)** resets the **Sleep Timer** to the set duration and the countdown to **Stand By** starts again.

- **Memory Bank**

Only one **Memory Bank** can be activated at a time.

► Select the currently active **Memory Bank** by clicking on one of the three circular fields. The currently active **Memory Bank** is indicated by a filled circle field.

A **Memory Bank** contains the number and all determined setting data of the **Antennas** assigned to it. Clearing a **Memory Bank** only clears the antenna tuner setting data determined in connection with this specific **Memory Bank** for all **Antenna Sockets** assigned to the **Memory Bank**. The contents of the other two **Memory Banks** remain untouched.

- **Erase Memory Bank**

► By clicking on one of the three circular fields, the contents of the corresponding **Memory Bank** are deleted.

NOTE!
Contents are deleted in any case and regardless of whether the corresponding memory bank is currently activated.

- **Tuner**

► The **Antenna Tuner** is activated/deactivated by (multiple) touching this switching area
(**Antenna Tuner** activated "On" / deactivated "Off")

- **Clear Antenna**

Clears the **Antenna Tuner Setting Values** of an **Antenna Socket** within a currently active **Memory Bank**.

► Deleting the **Antenna Tuner Setting Values** of an **Antenna Connector** by touching the switching area **Garbage Can**.

Further submenus are:

- **Antennas**
- **Update**
- **Calibration**
- **VNC**
- **Interface**

5.2.2 Antennas

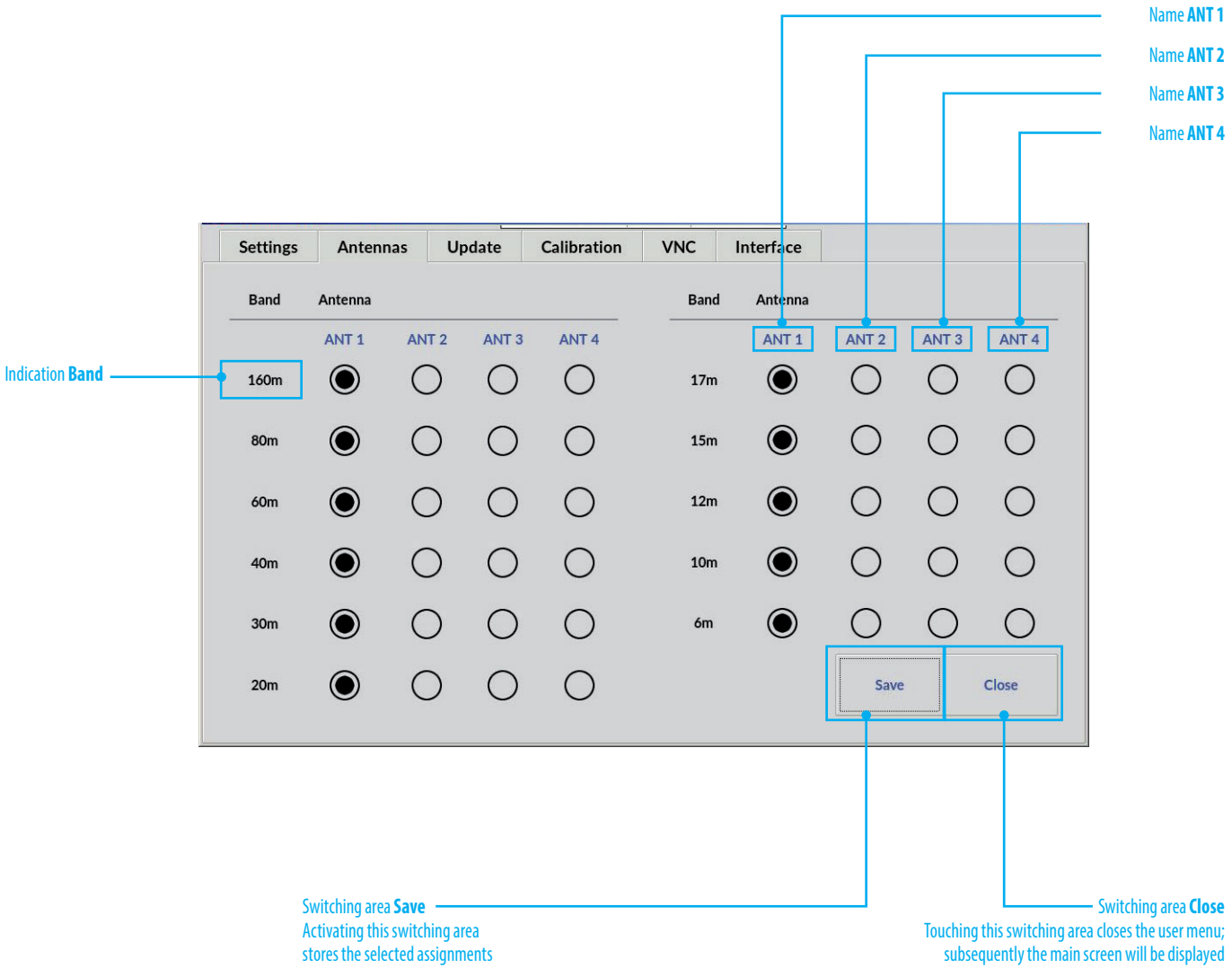
For each band an **Antenna Socket** can be assigned to, which is selected by default when changing bands.

To assign an **Antenna Socket** to a band:

▶ Tap the circle field in the corresponding column/row.

The circle field is now displayed in black and thus indicates the current antenna assignment for the respective band.

▶ Tap the switching area **Save** to store the selected assignments as the default when changing bands.

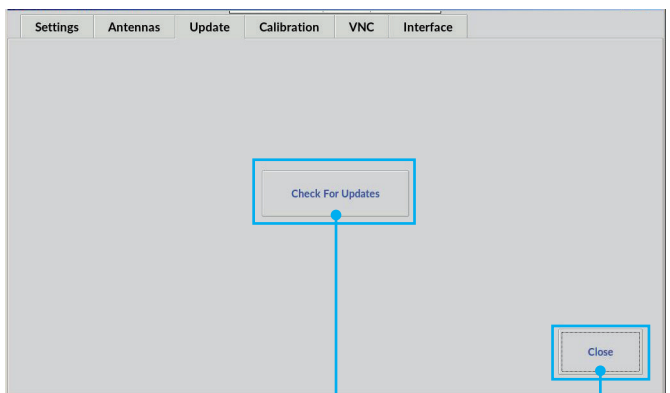


5.2.3 Updates

The graphical user interface (GUI) and the controller firmware are constantly being further developed. We therefore recommend that you check for available **Updates** from time to time.

If the device is connected to the Internet, you can search here for updates for the graphical user interface (GUI) and the controller firmware of the PA. If newer versions are available, they can be installed quickly and easily.

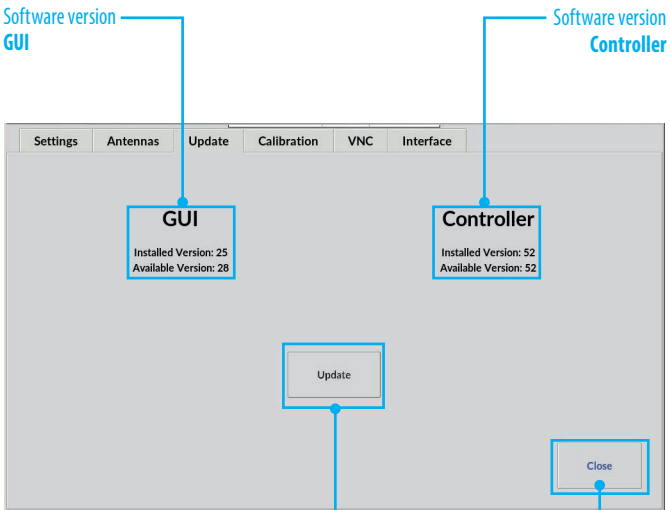
► Tap the switching area **Check for Updates** to check for the availability of updates.



Switching area
Check for Updates
Touching this switching area checks whether updates are available

Switching area **Close**
Touching this switching area closes the user menu; subsequently the main screen will be displayed

► Tap the switching area **Update** to start the update process.



Switching area
Update
Touching this switching area starts the update process

Switching area **Close**
Touching this switching area closes the user menu without performing an update; subsequently the main screen will be displayed

5.2.4 Calibration

This menu item is divided into 3 submenus:

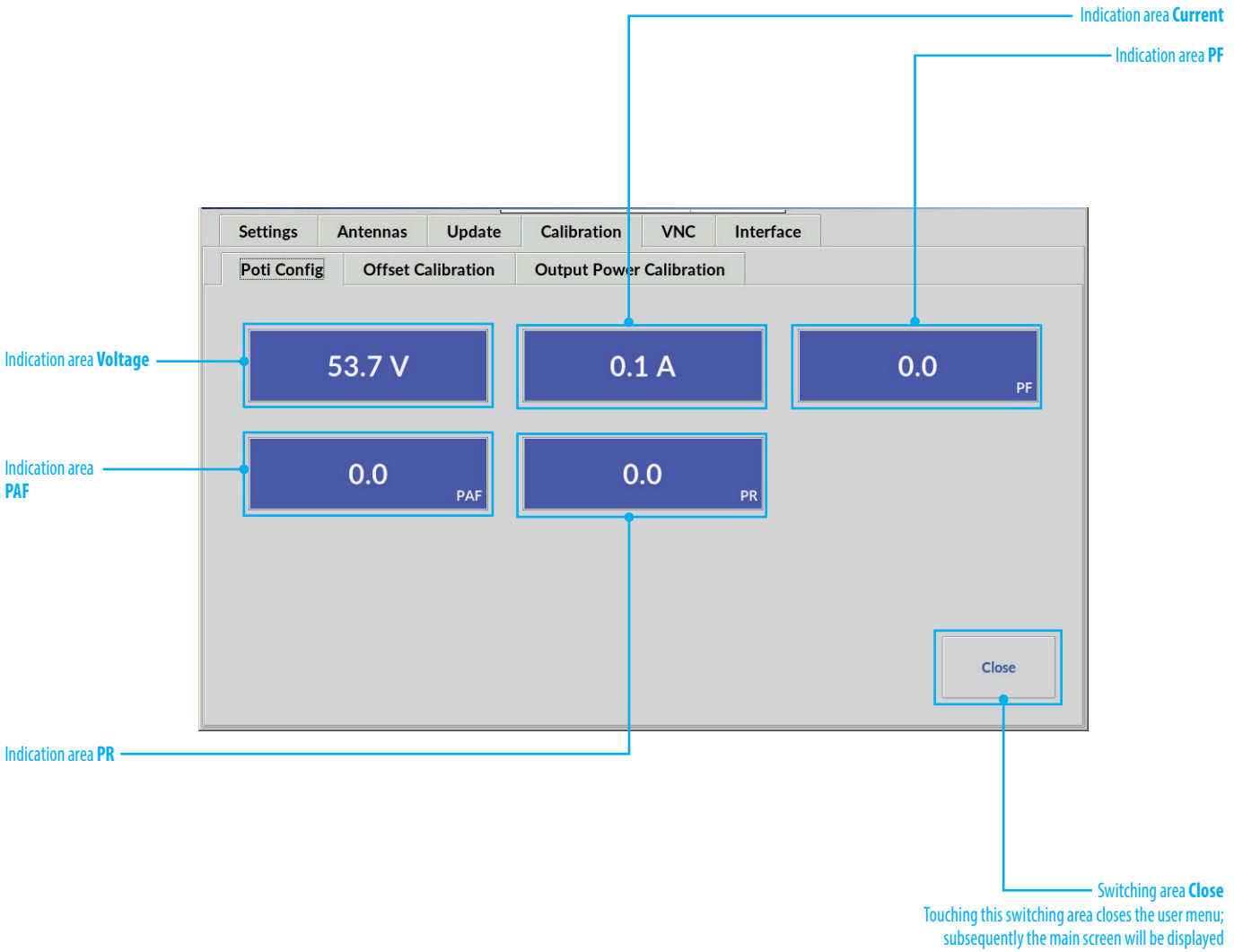
- **Poti Config:**
  Indication area operating data
- **Offset Calibration:**
  Calibration of the internal power measurement
- **Output Power Calibration:**
  Band specific power matching

- **Poti Config**

Before the device can be used after installation, some necessary adjustment work must be carried out!

The indication areas inform you about some of the relevant values in this context.

- **Voltage**
  Current voltage at the Power MOS-FETs
- **Current**
  Current consumption of Power MOS-FETs
- **PF**
  HF-Output
- **PAF**
  HF-Output at the PA module
- **PR**
  Reflected (returning) HF-power



- **Offset Calibration**

The unavoidable frequency-dependent deviations of the linearity of the directional coupler used for internal power measurement can be minimized for each bandpass range.

The adjustment should be carried out at an output power of 1 kW.
Use your preferred reference wattmeter for the adjustment.

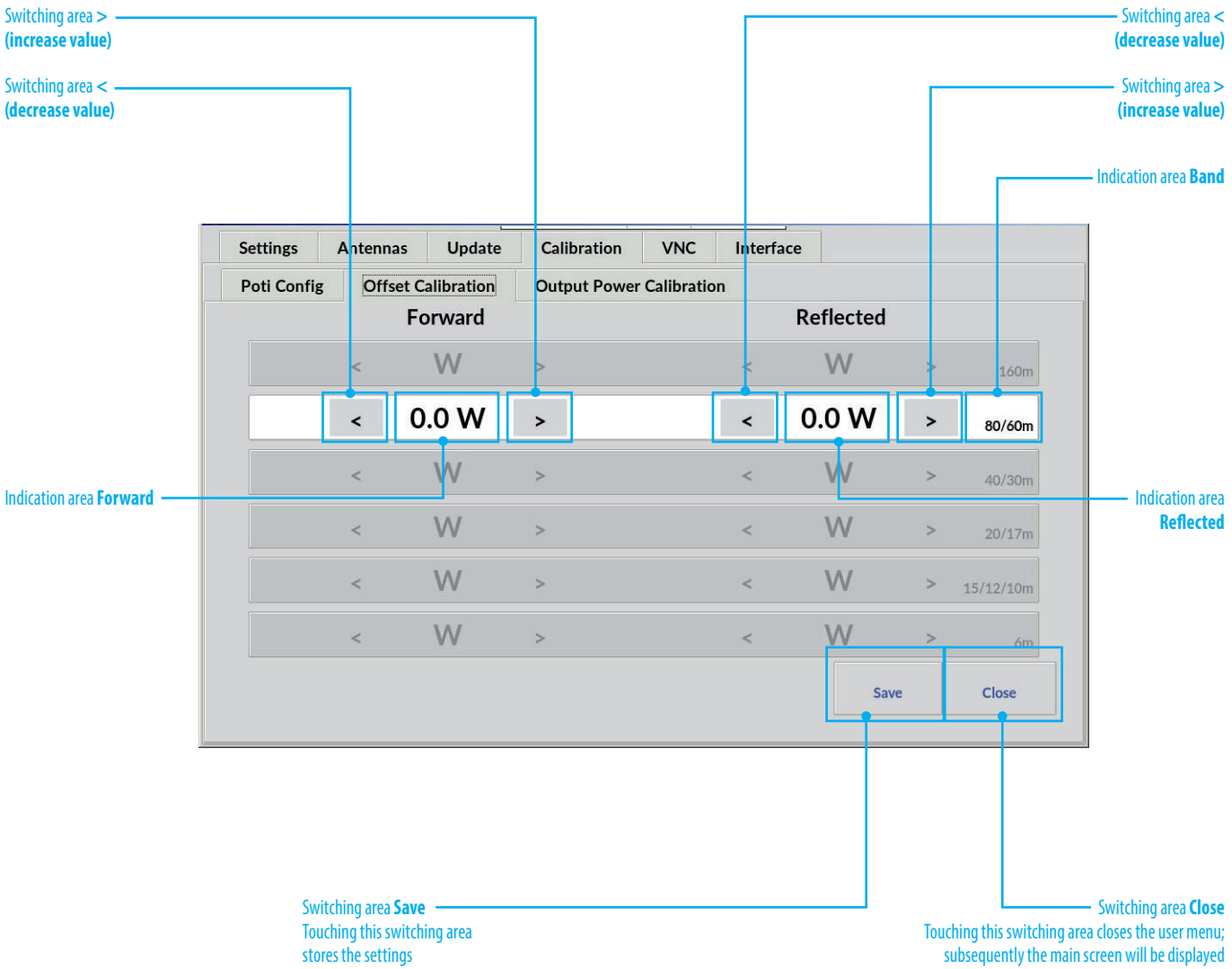
Selection of the bandpass range is done automatically during transmission. The detected band is highlighted.

▶ Adjust the internal power display by pressing the buttons **> (increase value)** respectively **< (decrease value)**.

Brief actuation changes the value in the indication area **Forward** by 0.1 W. Longer actuation changes the value continuously.

▶ Press the switching area **Save** to store the settings.

▶ Repeat this procedure for each bandpass range to be adjusted.



- **Output Power Calibration**

The output power generated at a given control power can be adjusted optionally within certain limits for each bandpass range.

The 6 m band requires a higher control power than the other frequency ranges and should therefore always be set to “100“.

Selection of the bandpass range is done automatically during transmission. The detected band is highlighted.

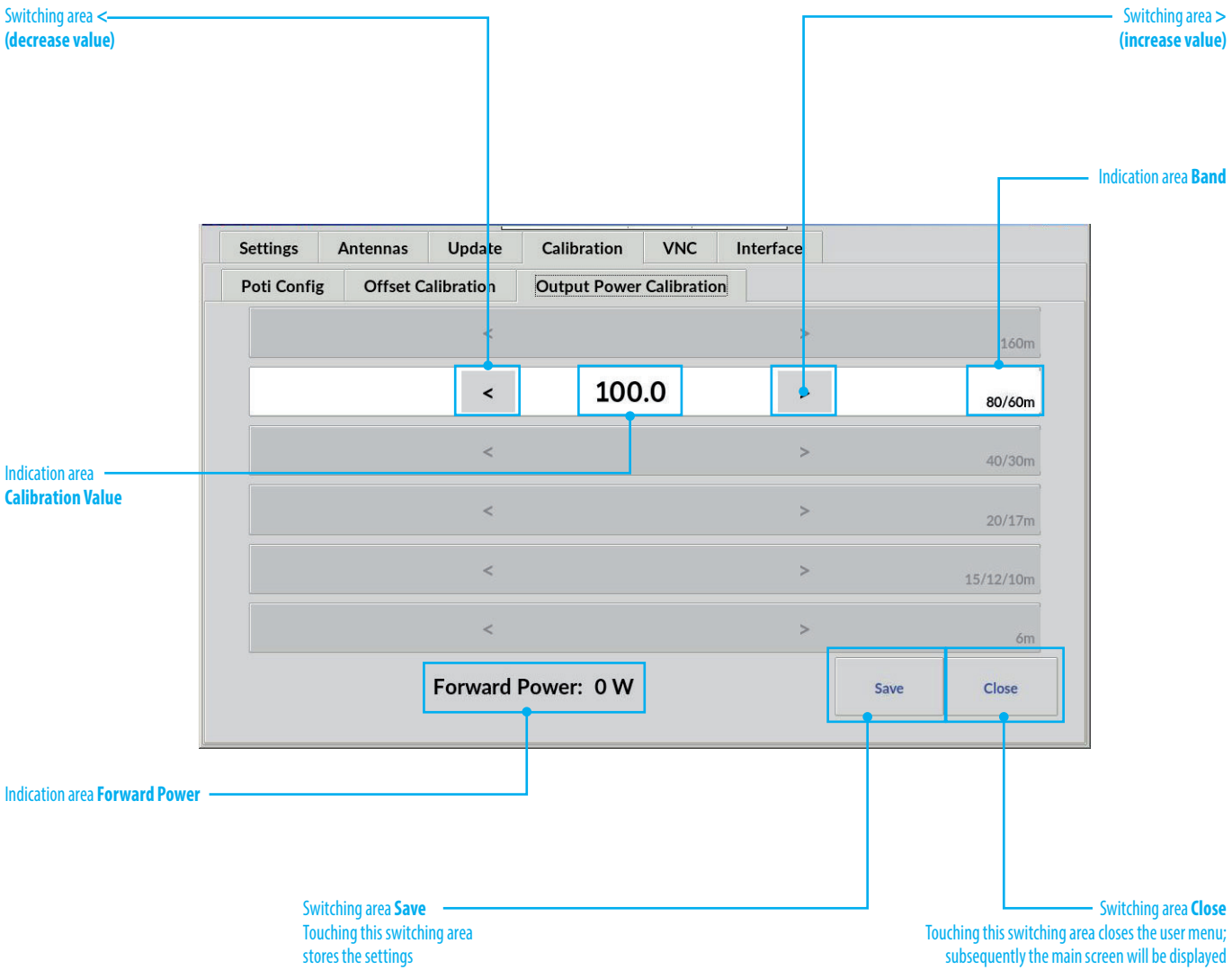
▶ Adjust the Forward Power by pressing the buttons **> (increase value)** or **< (decrease value)**.

Short actuation changes **Calibration Value** by 1 digit.
Longer actuation changes the **Calibration Value** continuously (factory setting: 100.0).

Indication area **Forward Power** constantly informs you about the currently generated output power.

▶ Press the switching area **Save** to store the settings.

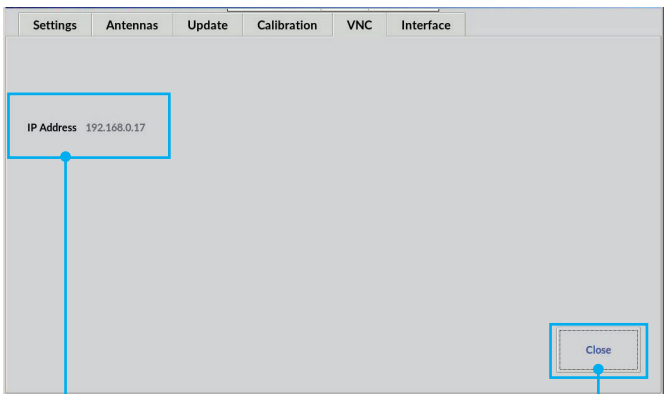
▶ Repeat this procedure for each bandpass range to be adjusted.



5.2.5 VNC

With a VNC (Virtual Network Computing) connection, the device can be remotely controlled and operated from any PC, tablet PC or even smartphone connected to the Internet or local network using VNC software (remote operation).

► Tap in the switching area **VNC** to check the **IP Address** currently assigned to the PA.



Indication area **IP Adress**

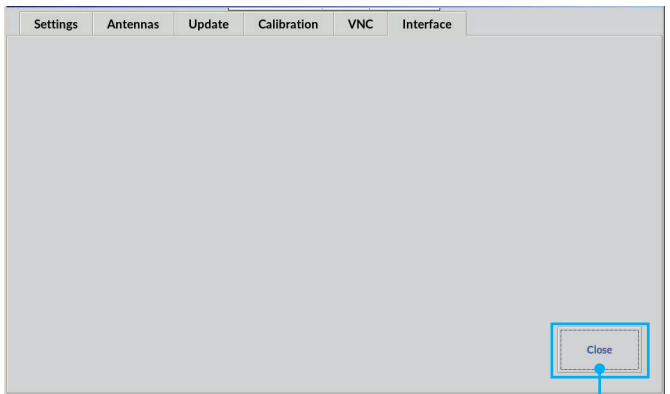
Switching area **Close**
Touching this switching area closes the user menu; subsequently the main screen will be displayed

A VNC configuration will be available in one of the next firmware versions as part of an update.

5.2.6 Interface

IIn future software versions the data connection between control transmitter/transceiver and PA will be configured in this screen mask.

This part of the firmware is currently still under development.



Switching area **Close**
Touching this switching area closes the user menu; subsequently the main screen will be displayed

6. Antenna tuner

6.1. Operation

The LC network in a antenna tuner is to compensate reactive components and to provide power adjustment, so the antenna radiates supplied TX power PEFF via the radiation resistance R.

This requires:

- compensation of reactance jX = j(ωL-1/ωC) of the antenna system

and

- transformation of the effective resistance for power adaptation of the transmitter to the antenna system.

(Antenna system = antenna + impedance transforming feed line).

Available values of C: Minimal 0.0 pF; Max. 1275 pF

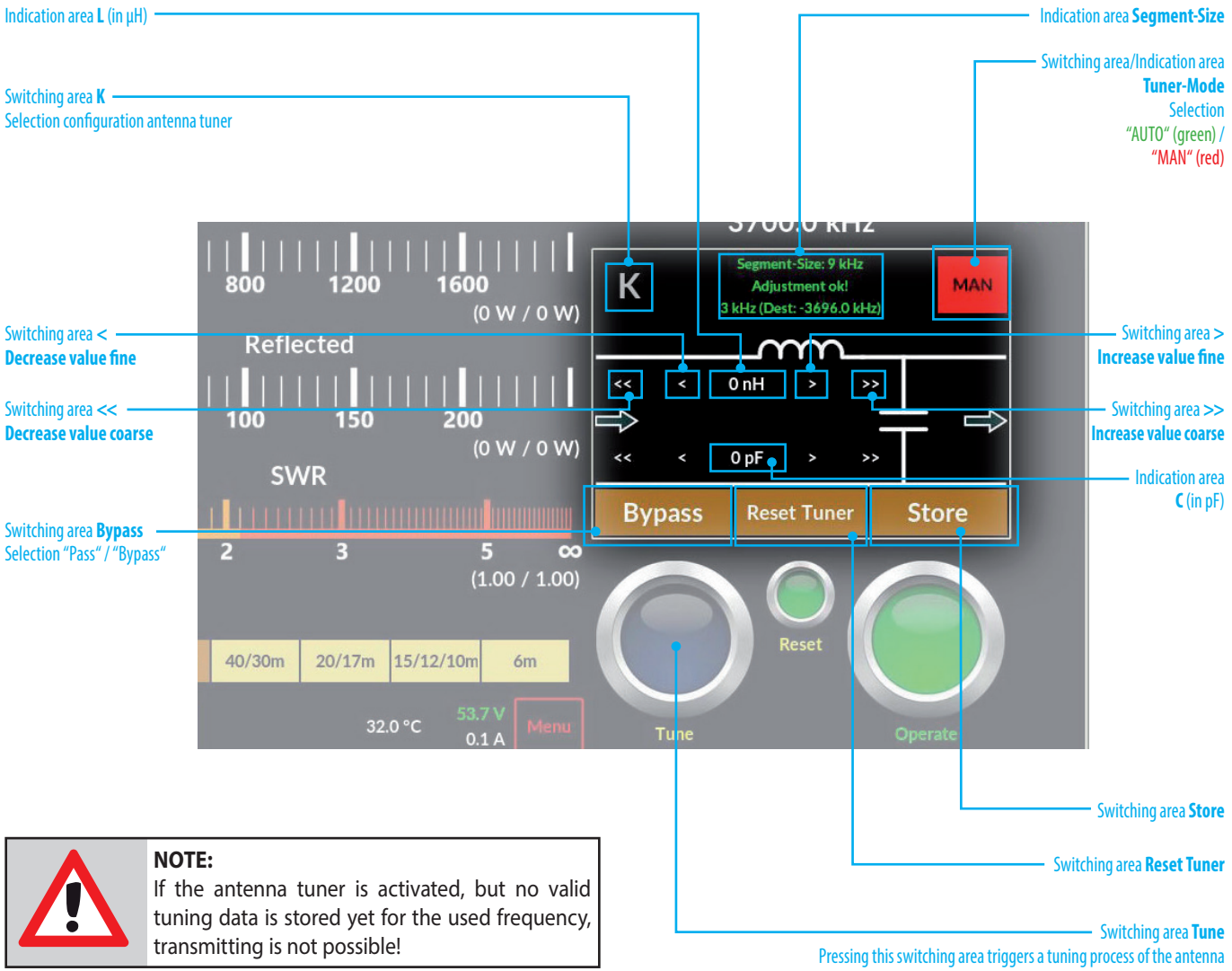
Available values of L: Minimal 0.0 µH; Max. 10,16 µH

The integrated antenna tuner can perform this "at the push of a button" for you automatically (tuner mode "MAN"). In this case, after touching the swichting area **Tune**, the Tuner automatically determines the required configuration and all settings.
Beside of that, you have the option of performing the tuning process manually (tuner mode "MAN") or refine a configuration that has already been determined before.

Regardless how a setting has been determined, all of the values can be stored for later retrieval (tuner mode "AUTO"), so a re-tuning process is superfluous.

A separate database will be created for each antenna socket, in which all already determined settings for this antenna will be stored.

Depending on the currently selected antenna socket, only settings stored for this antenna socket will be considered during operation. The antenna tuner continually checks for the availability of a suitable, already stored setting for the currently selected antenna socket while tuning a frequency.



NOTE:
If the antenna tuner is activated, but no valid tuning data is stored yet for the used frequency, transmitting is not possible!

Deviating from the antenna registered as standard for a respective band (see **5.2.3 Antennas)**, also an another antenna can be choosen by touching switching area **Actually Choosen Antenna**.

Indication area **Actually Choosen Antenna** displays the standard antenna for the current frequency in **green** and each other antenna in **red**.

When changing the frequency, the antenna tuner always uses the setting values determined for the standard antenna first.
If an alternative antenna shall be used for the selected frequency range, choose a corresponding antenna by touching switching area **Actually Choosen Antenna**.
Therefore up to 4 different setups can be stored for the same tuning segment and be called up, according to the number of antennas connected.

6.2 Input Power for tuning

For a automatic tuning process of the antenna tuner, the input power must be in the range between 4 W (min.) and 39 W (max.).
Outside this power range, the switching area **Tune** button is not activated and remains **dark blue** (= tuner inactive)).

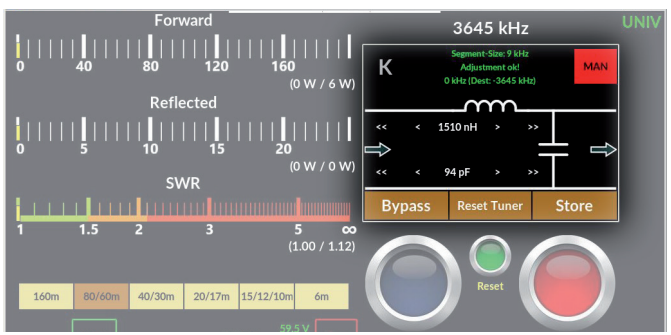
6.3 Manual tuning

To manually detect and save a tuner configuration and settings for a given antenna / frequency combination, proceed as follows:

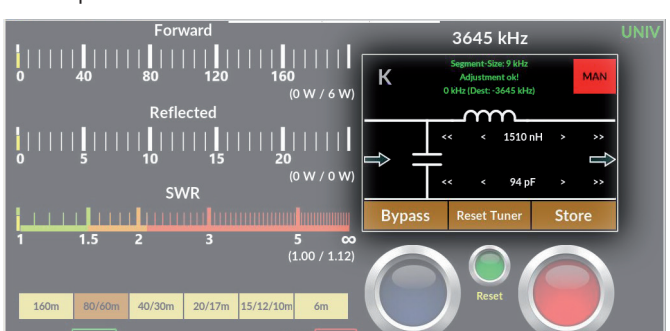
- Tap at switching area **Tuner Mode**, until "MAN" is displayed in **red**.

At manual tuning the antenna tuner can be configured both as high pass and low pass.

- Tap (repeated) at switching area **K** for tuner configuration as a high pass filter:



- Tap (repeated) at switching area **K** for tuner configuration as a low pass filter:



- Adjust input power between minimal 4 W and maximal 39 W.
- Select CW or FM mode on your exciter.
- Start to send.
- Tap at switching area **Tuner Reset**, to reset values for L and C to "zero".
- Tuning of **L** by tapping at switching areas
  - \> **Increase value fine (+0,08 uH)**
  - \>> **Increase value coarse (+0,80 uH)**
  - < **Decrease value fine (-0,08 uH)**
  - << **Decrease value coarse (-0,80 uH)**
- Tuning of **C** by tapping at switching areas
  - \> **Increase value fine (+5 pF)**
  - \>> **Increase value coarse (+50 pF)**
  - < **Decrease value fine (-5 pF)**
  - << **Decrease value coarse (-50 pF)**

The results of the tuning can be seen by the value for SWR displayed in indication area **SWR**.

Finish manual tuning process:

- Stop to send.
- Tap at switching area **Store** to save the settings for the current antenna / frequency combination.

Switching area **Store** flashes 2x briefly to indicate the storing process.

6.4 Automatic tuning

For **automatic** detection and to save a tuner configuration and settings for a given antenna / frequency combination, proceed as follows:

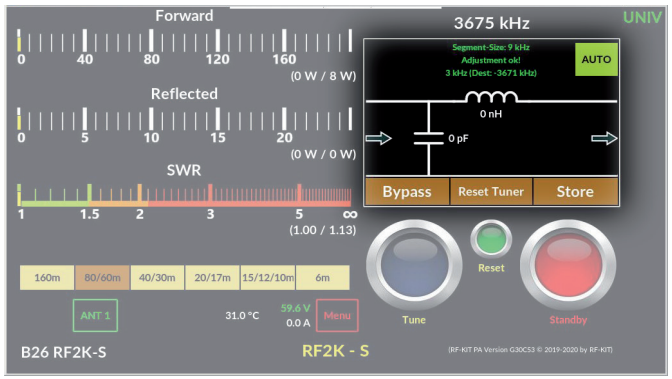
- ▶ Tap at switching area **Tuner Mode** until the the switching area appears **red** and "MAN" will be displayed.
- ▶ If the antenna tuner is bypassed, tap at switching area **Bypass** until "L" and "C" are displayed.
- ▶ Adjust input power between minimal 4 W and maximal 39 W.
- ▶ Tap at switching area **Tune**. The color of the switching area changes from **dark blue** to **light blue**, indicating that the antenna tuner is now active.

A **full tuning process** is triggered by a **longer touch (about 1 s)** of switching area **Tune**:
A completely empty database requires a **full tuning process** that includes all possible values and configurations; this tuning process takes about 28 s.

A **normal tuning process** is triggered by a **tap** at switching area **Tune**:
With already determined settings for frequencies that do not deviate from the current working frequency by more than twice a **segment size**, approx. 8 s are sufficient for a normal tuning process.
(At present, memory segmentation and querying the neighboring segments is not yet possible. The function will be activated in one of the next firmware versions as part of an update).

An automatic tuning process will be performed and the settings of a successful tuning will be stored in a database assigned to the antenna socket used.

The results of the tuning can be seen by the value for SWR displayed in indication area **SWR**.



- ▶ Tap at switching area **Store** to save the settings for the current antenna / frequency combination.

Switching area **Store** flashes 2x briefly to indicate the storing process.

6.5 Indication area Segment-Size

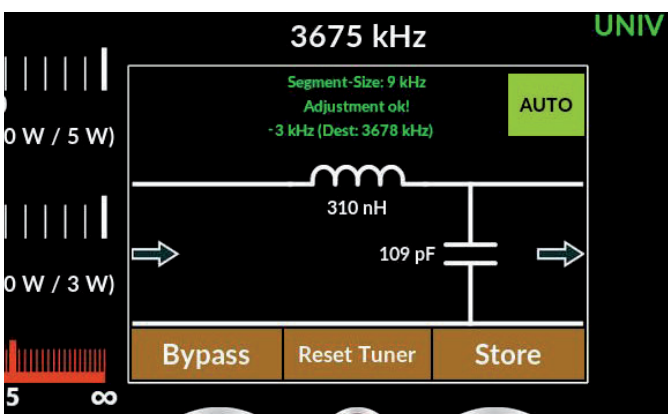
Indication area **Segment-Size** displays the usable segment width for a stored setting in kHz. The term **Segment-Size** describes the frequency range for which a stored setting can be used.

- The lower the transmit frequency, the narrower this frequency range becomes.

- The higher the transmit frequency, the wider this frequency range becomes.

Example:
The tuned frequency is f_0 = 3.675 MHz. For the 80 m band the **Segment-Size** is 9 kHz. A tuner setting already determined for 3.678 MHz therefore applies (rounded) for the frequency range

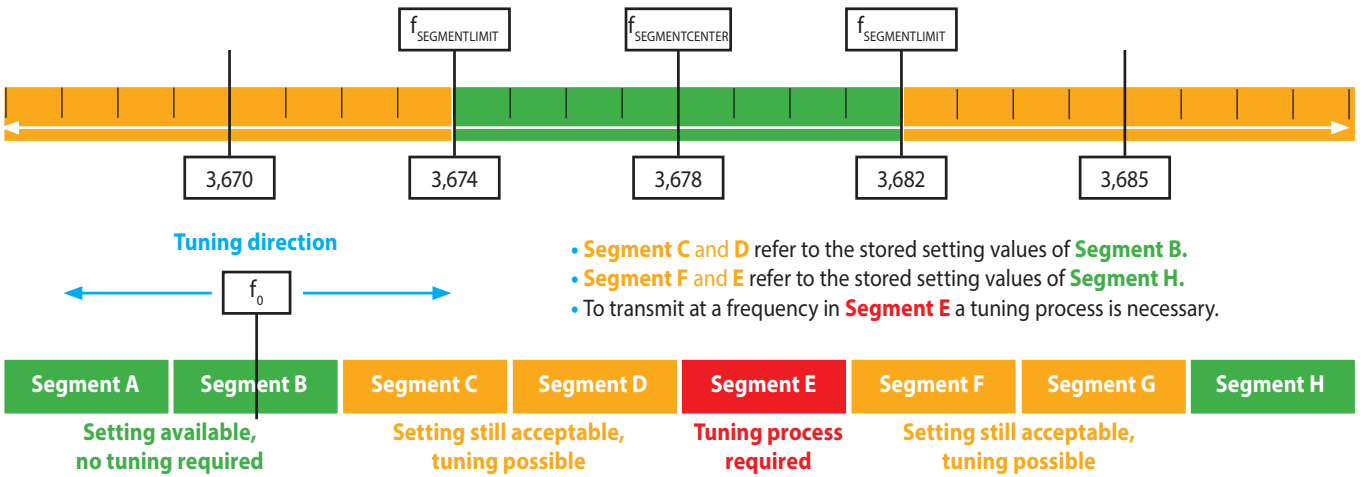
$f_{SEGMENTCENTER}$ = 3.678 MHz ± $f_{SEGMENT\text{-}SIZE}$ /2 = 3.674 - 3.682 MHz.



If you you leave $f_{SEGMENTCENTER}$ = 3.678 MHz and tune your exciter to f_0 = 3.675 MHz, the deviation to $f_{SEGMENTCENTER}$ will be displayed.

The deviation to $f_{SEGMENTCENTER}$ is -3 kHz, as displayed in **(Dist:)** in the screenshot above.

(At present, memory segmentation and querying the neighboring segments is not yet possible. The function will be activated in one of the next versions as part of an update).



A valid tuning process will be confirmed by display of **"Match!"**

If the deviation from the center of the currently used tuning segment is more than $f_{SEGMENTSIZE}$ /2, then the antenna tuner changes to the settings stored for the next available tuning segment in tuning direction.

If the following segment has not yet been assigned to a setting, the color of indication area **Segment-Size** changes from **green** to **yellow**.

From a difference of more than twice the segment size to the next segment with valid settings stored, the antenna tuner warns with the note: **"no match found!"**.

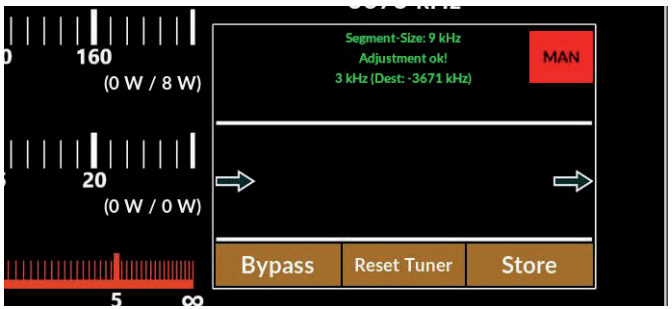
NOTE:
If the antenna tuner is activated, but no valid tuning data is stored yet for the used frequency, transmitting is not possible!

Therefore no transmission is possible without successful antenna tuning process.

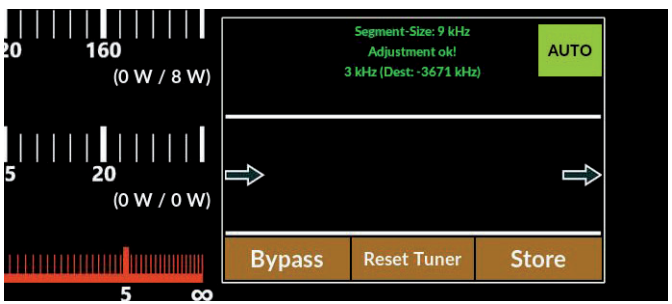
6.6 Bypass the antenna tuner

For testing purposes, or when using resonant antennas or an external antenna tuner, the internal antenna tuner may be taken out of the transmit path.:

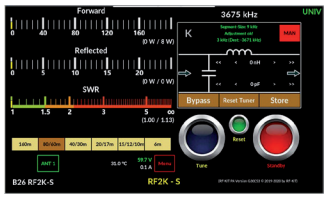
- **Mode "MAN":** Tap at switching area **Bypass** to bypass the antenna tuner.



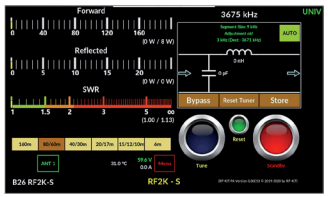
- **Mode "AUTO":** Tap at switching area **Bypass,** to bypass the antenna tuner.



- Tapping again the switching area **Bypass,** inserts the antenna tuner again into the transmit path.



Mode "AUTO"



Mode "MAN"

7. Technical data, characteristics and certifications

7.1 Technical data

- **Frequency range:** 1.8 - 30 MHz and 50 - 54.2 MHz (+0 dB / -0.5 dB)
- **HF-Out:** 1500 W
- **Exciter Drive Level:** 55 W all bands (US Version)
- **Efficiency:** up to 70% (varies by band)
- **TX/RX switching:** < 1 ms (Pin-Diode)
- **Internal Automatic Antenna Tuner** with approximately unlimited memories
- **Connectors (UHF/PL259):** 1x Exciter
4x Antennas
- **Dimensions (W x H x D):** 19.0 x 31.0 x 42.5 cm (7.4 x 12.2 x 16.7 inch)
- **Weight:** 35.2 lbs / 16 kg
- **FCC-ID:** 2AW84RF2K-S

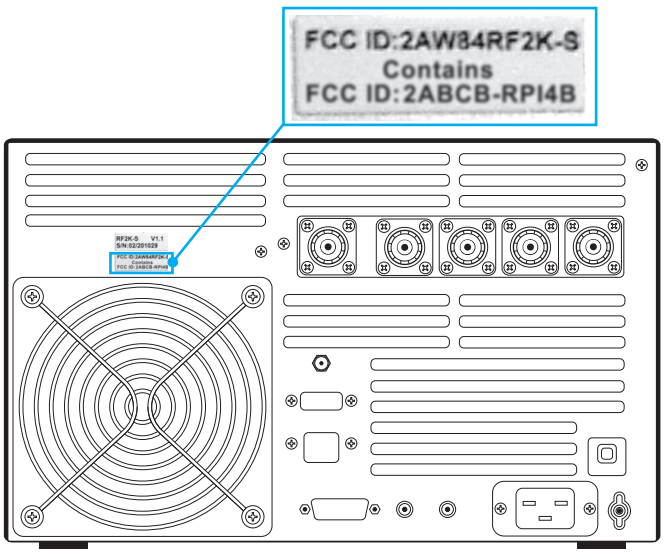
7.2 Characteristics

- **Highest spectral purity** because of **Dual LDMOS transistors,** rated at 3400 W
- **Very silent operation** due to speed controlled low noise fans
- **7"-Color Touch screen**
- **Multiple user selectable displays**
- **-55 dB output** for predistortion
- **Automatic band switch** by frequency measurement
- **YAESU BCD Band Data output** for external devices
- **CAT connectivity** via USB (USB-port is provided by the **Raspberry Pi®**)
- **CAT data** via IP (UDP)
- **LAN** connectivity
- **Wi-Fi** (host- and client mode)
- **Quiet Internal PSU** 90-290 V AC
- **1500 W HF-Output** at 230 V AC
- **800 W HF-Output** at 110 V AC
- **Power meter** (from 1 W up to 2 kW)
- **Software update** via internet
- **Remote Internet operation** via PC, tablet or cell phone. Supports platforms such as Apple IOS, Android, Linux and Windows
- **External power/ON** by applying +12 V

7.3 Certifications

- **FCC-ID:** 2AW84RF2K-S

Below you'll see the position of the FCC ID: 2AW84RF2K-S which is a permanent label:



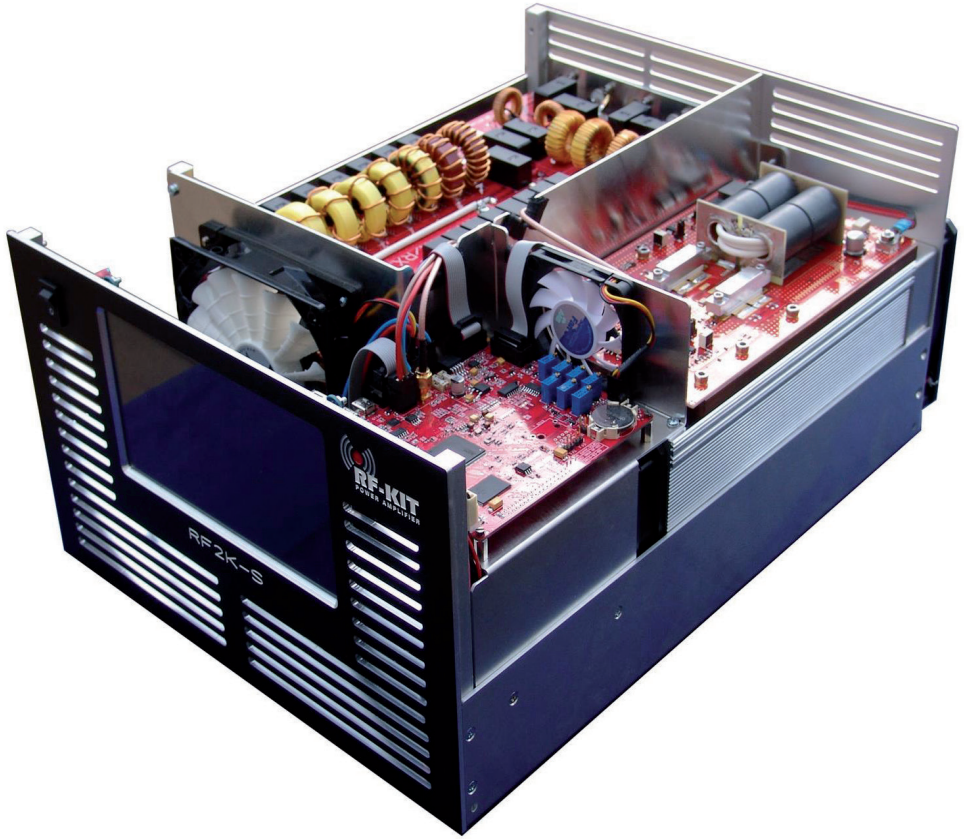
1. **Contains FCC ID: 2ABCB-RPI4B.**

2. **CFR47 §15.19(3) Statement:**
   This device complies with part 15 of the FCC Rules.
   Operation is subject to the following two conditions:
   (1) This device may not cause harmful interference, and
   (2) this device must accept any interference received, including interference that may cause undesired operation."

3. **CFR47 §15.105(b):**
   This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
   These limits are designed to provide reasonable protection against harmful interference in a residential installation.
   This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
   However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

DX Engineering
1200 Southeast Ave.
Tallmadge, OH 44278 USA
www.dxengineering.com



.-. ..-. -....- -.- .. - .--. --- .-- . .-. .- -- .--. .-.. .. ..-. .. . .-.