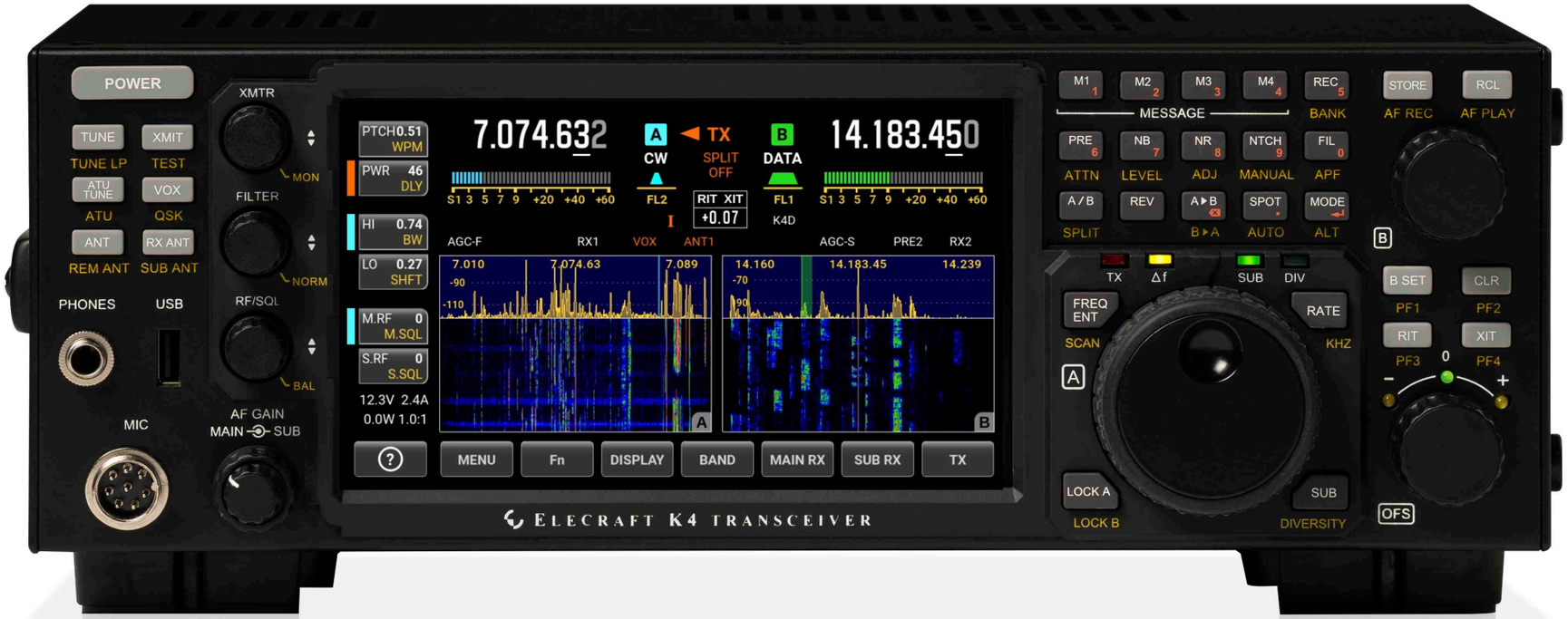

Introduction to the Elecraft K4

Rev. C2, June 8, 2021

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OVERVIEW

This fully illustrated manual is intended as an introduction to the K4, providing the essential information you'll need to get on the air.

Refer to the *K4 Operating Manual* for additional details on all topics. This manual can be viewed directly from the K4 itself, as explained on page 10. You can also view it using any web browser. To be sure you're using the latest version, use this link, then click on K4 Manuals:

https://elecraft.com/pages/manuals-downloads

The Elecraft K4 is a high-performance, direct-sampling software-defined radio (SDR). It covers the 160 ~ 6 m bands, with continuous receive from 100 kHz ~ 54 MHz. 10 W and 100 W models are available. It can be used with internal or external transverters to cover bands above 6 meters.

Among the K4's notable features: Large color touch screen, as well as support for an external high-resolution monitor; extensive, easy to use controls; rich analog and digital connectivity; dual receive (all models); built-in data modes, and wide-range automatic antenna tuner. The K4's compact size and weight, combined with 11-15 VDC operation and low current drain, make it suitable for field, travel, or home station use.

Since the K4 is an SDR, Elecraft can provide updates to its signal processing algorithms with software changes rather than by adding new hardware. This ensures that the K4 can take advantage of new modes, bands, or other features in the future. Since it uses direct sampling, signals are digitized right at the receiver inputs, and the transmitter's amplifier chain is also driven by a digitized signal. Older SDR architectures digitized signals at a low intermediate frequency (IF), resulting in poor suppressions of down-conversion or up-conversion images.

There are three models: the basic K4, with one set of receive filters and one analog-to-digital converter (ADC); the K4D, which adds a second set of receive filters and a second ADC; and the K4HD, which adds a superheterodyne front end that can be enabled when needed to provide even greater dynamic range. The superhet module uses high-performance, narrow-band crystal filters. All K4 models provide simultaneous dual receive on the same or different bands/modes, though the additional receiver module in the K4D and K4HD (KRX4) improves signal handling during dual-receive operation on different bands. The second receiver also permits diversity reception, i.e., the use of different antennas for the two receivers to counteract fading (QSB).

A basic K4 can be upgraded to a K4D by installing the KRX4 option. Similarly, a K4D can be upgraded to a K4HD by installing a KHDR4 module. Other internal options and external accessories work with all models, including a wide-range ATU (KAT4), MH4 microphone, SP4 external speaker (1 or 2).

INSTALLATION

CAUTION: Ground your K4 properly before operation. For suggestions, see www.arrl.org/grounding.

ESD and Lightning Protection: Even though the the K4 has extensive internal protective circuitry, external protection against lightning strikes is strongly recommended, especially in lightning-prone areas. During storms and when the station is not in use for an extended period, disconnect ALL equipment from the radio, including antennas, the power supply, routers or hubs, and computers. Ethernet, USB, and RS232 cables are a frequent source of damaging surge voltages.

Orientation and Air Flow: Provide at least 1" of free space above and behind the K4. Ventilation holes on the bottom and left sides must also not be blocked.

Using the Tilt Stand: If the K4 is placed on a desk or table, deployment of the tilt stand is recommended to facilitate interaction with the touch screen. This will also improve the display viewing angle.

Interfacing to Station Equipment: The illustration on the next page shows the locations of all rear-panel connectors. At minimum you'll need to connect a power supply, antenna, and station ground. (See power supply and antenna recommendations below.) An Ethernet connection is required for software upgrades (see pg. 11). The *K4 Owner's Manual* provides full instructions for interfacing to computers, amplifiers, and other equipment.

Power Supply: A power supply voltage of 13.8 to 14.2 V is preferred. Minimum supply voltage is 11.0 V, while current required is either 6 A max (K4/10) or 25 A max (K4/100). The K4 will automatically reduce power output if the supply voltage is inadequate to maintain good IMD performance. Use the shortest practical length of power cable, with heavy wire gauge to minimize voltage drop. The supplied power cable includes fuses in both legs.

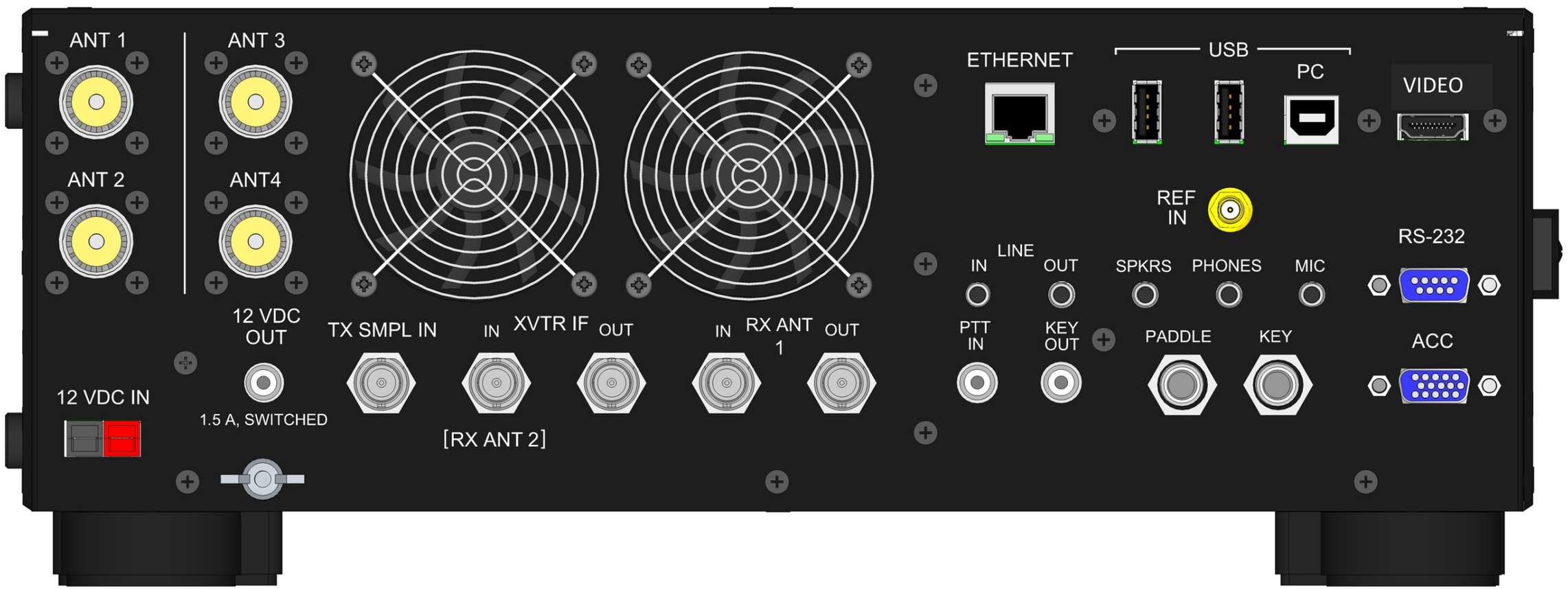
Antennas: If your K4 includes the KAT4 ATU option, you can match a wide variety of loads to the transceiver by tapping the ATU TUNE switch. If not, you'll need to use matched antennas (nominally 50 ohms) or an external antenna matching device.

REAR PANEL CONNECTORS

ANT1/2/3	HF-6M (used with KAT4 ATU)
ANT4	Supplied with internal XVTR option
12 VDC In	11-16 V; 6 A (10W) / 25 A (100 W)
12 VDC Out	Switched accessory supply
TX SMPL In	For use with compatible amplifiers
XVTR IF	XVTR I/O; XVTR IF IN doubles as RX ANT 2
RX ANT	RX ANT IN 1, and RX ANT OUT (for filter)

ETHERNET	Connect to router or modem
USB A (x2)	Type A (keyboard, mouse, K-Pod)
USB B (PC)	Type B (for ctrl/dig. AF/PTT/KEY/FSK)
VIDEO	External monitor
REF IN	10 MHz external reference input
LINE IN/OUT	600 ohms (nominal), analog audio
SPKRS	1 or 2 ext. speakers (e.g., SP4)

PHONES	Rear headphones (in addition to front)
MIC	Rear mic, 3.5 mm
RS232	See RS232
PTT IN	Push-to-talk line (foot switch, etc.)
KEY OUT	For keying external amps, etc.
PADDLE/KEY	For CW paddle / hand key or keyer
ACC	Accessory signals (see ACC)

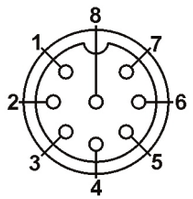


CONNECTOR PINOUTS

MIC (Front Panel)

An Elecraft MH4 or other K4/K3S/K3-compatible mic can be used with the front panel mic jack (see pinout below).

To select the front- or rear-panel mic, turn bias or preamp on/off, or enable/disable mic buttons, tap **TX** on the LCD, then use **MIC SEL** and **MIC CFG** (also see MICROPHONE CONFIGURATION). Bias must be turned **on** for electret mics (e.g. MH4, MH2, MD2, Proset). It must be **off** for dynamic mics (e.g. Heil mics using HC4 or HC5 elements).

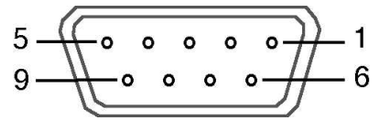


Pin #	**Description**
1	Mic audio, low-Z (~600 ohms)
2	PTT *
3	DOWN button *****
4	UP button *****
5	FUNCTION button *****
6	8V (10 mA max)
7, 8	Ground

***** Use **TX** > **MIC CFG** enable or disable mic buttons.

RS232 (DE9)

This jack provides a true RS232-level interface for use with PC serial ports.



Pin #	**Description**
1	Not used
2	RXD IN (data **to** PC **from** K4)*
3	TXD OUT (data **to** K4 **from** PC)*
4	DTR (see PTT, KEYING, and FSK, below)
5	Ground
6	Not used
7	RTS (see PTT KEYING, and FSK, below)
8	Not used
9	Not used

* These signals are labeled **from the perspective of the PC**. per industry convention.

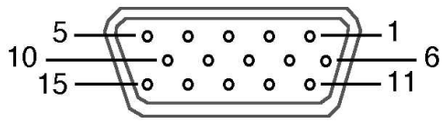
PTT, KEYING and FSK

The RS232 port's RTS and DTR signals can be used to emulate the PTT IN and KEY inputs. The DTR signal can also be used as an FSK input. Refer to the Serial I/O menu entry entries.

ACC (DE15)

⚠ The ACC jack is not a VGA video connector

The ACC interface provides signals that are most often used to control an Elecraft KPA-series linear amplifier and/or KAT500 ATU via a 15-wire control cable. It can also be used with band decoders, transverters, or other devices. See table at right.



Band Outputs

The ACC jack's BAND0-BAND3 lines are open-drain with internal pull-up resistors to 5 V. Band data is based on the frequency of the transmit VFO (VFO A in non-split, VFO B in split). The table below applies to HF; for historical reasons, 60 m uses 0000. On external transverter bands, the transverter band number is used (1 - 12, or 0000 - 1100).

Band	BAND3	BAND2	BAND1	BAND0
160 m	0	0	0	1
80 m	0	0	1	0
60 m	0	0	0	0
40 m	0	0	1	1
30 m	0	1	0	0
20 m	0	1	0	1
17 m	0	1	1	0
15 m	0	1	1	1
12 m	1	0	0	0
10 m	1	0	0	1
6 m	1	0	1	0

Pin	Signal Name	Description
1	FSK IN	Direct keying input for use with FSK data mode. TTL-compatible; pulled up to 5 V. (For FSK keying at RS-232 voltage levels, use the DTR pin on the RS-232 connector.)
2	AUXBUS	See Elecraft KRC2 Controller and XV-Series Transverter instruction manuals. 5 V, bidirectional.
3	BAND1 OUT	Open-drain band selection outputs with internal pullup resistors to 5 V. See Band Outputs table at left. Used with KPA500 and KPA1500 amplifiers and KAT500 ATU.
4	PTT IN	Functionally equivalent to MIC PTT button. TTL input pulled up to 5 V.
5	Ground	Ground
6	DIGOUT0	Open-drain output asserted when an external transverter is in use (0V); otherwise hi-Z.
7	TX INHIBIT	5 V logic input. Configure for active-low or active-high transmit inhibit using TX Inhibit menu entry.
8	POWER ON	Input (high-Z); pull to ground using an external switch, relay or logic gate to turn the K4 on.
9	BAND2 OUT	Open-drain band selection outputs with internal pullup resistors to 5 V. See Band Outputs table at left.
10	KEYOUT-LP	Open-collector keying output functionally equivalent to the KEY OUT jack. 10 mA max.
11	DIGOUT1	Per-band/per-antenna output for controlling external gear. 0 VDC when asserted, otherwise hi-Z.
12	Ground	Ground
13	BAND0 OUT	Open-drain band selection outputs with internal pullup resistors to 5 V. See Band Outputs table at left.
14	BAND3 OUT	Open-drain band selection outputs with internal pullup resistors to 5 V. See Band Outputs table at left.
15	EXT ALC	See EXTERNAL ALC. Input, -10 V to 0 V DC.

POWER ON/OFF

Note: In this document, “switch” refers to a physical switch, while “button” refers to a labeled touch control on the LCD. Yellow arrows are used to indicate controls being described, such as POWER switch, below.

- Tap the POWER switch to turn the K4 on. The logo screen will appear while module self-tests are performed.
- Always use the POWER switch to turn the K4 off. Before turning off the power supply, wait until all of the K4’s LEDs have turned off (about 4 seconds).

DISPLAY

- The K4 has a full color, 7” LCD screen. Capacitive touch capability allows convenient, intuitive access to on-screen controls. A mouse can also be used.
- Each VFO has a large numeric display, mode indicator, S-meter, filter passband graphic, and full set of receive icons.
- The main RX is always associated with the frequency of VFO A. When the sub RX is turned on, it is always associated with VFO B, except in diversity mode.
- The RIT/XIT offset box (in white) and transmit icons (in orange) are located between the two VFOs.
- Transmit icons include SPLIT on/off, VOX, transmit antenna name/number (in this case, “2:YAGI”), ATU in-line, and QSK.
- The remainder of the display is used for the panadapter, multifunction control buttons (at left), and 7 primary function buttons (lower edge).

BUILT-IN OPERATING MANUAL

- Tap the “?” button on the K4 front panel (identified by a yellow arrow, below) to bring up the built-in operating manual.
- To see information on the controls most recently used, tap the LAST CTRL button one or more times.
- Use the VFO A knob to scroll through text. Navigate using underlined links and the forward/back arrow buttons.
- Tap the table of contents or magnifying glass buttons to search by topic.
- A button is provided to select either the small manual format (shown here) or a larger format—using the entire screen—to reduce the need for scrolling.

SOFTWARE UPDATE

K4 software can be updated right from the front panel. An Ethernet connection is usually required, though you can also update from a pre-configured flash drive plugged into any of the K4's USB jacks. To do an update:

- Tap the Fn button (see previous page), then hold UPDATE. This will bring up the software update screen shown below.
- Select a release type from the pulldown menu. The default is Production Release.
- Tap Check for Updates. This will download (but not install) any updated software components, displaying them in the large text box.
- Optionally tap Release Notes to preview what has changed. If you're ready to proceed, tap Install. Tap Exit after the update completes.

VFO A CONTROLS

The VFO A knob controls the frequency of the main receiver. It is also used to adjust parameters, scroll through menu entries, etc. Switches near the VFO A knob control related functions:

- Tap FREQ ENT to directly enter an operating frequency. Hold SCAN to scan between VFO A and VFO B of the last-recalled frequency memory.
- Tap RATE to select 1 or 10 Hz tuning. Hold KHZ to select a per-mode coarse tuning rate.
- Tap SUB to turn on the sub receiver. Hold this switch to enter DIVERSITY mode. LEDs above the VFO A knob show the status of these settings.
- To lock the VFO A knob, tap the LOCK A switch. A hold of this switch locks VFO B.

BAND SELECTION

- Tap the BAND button to change bands (see arrow). BAND is one of the seven primary function buttons.
- A band button can be tapped multiple times to rotate through recently used frequencies and modes (also known as *band-stacking*).
- The GEN CVG (general coverage) button saves several recently used VFO frequencies/modes; it is not limited to ham bands.
- MEM nnn saves a few of the most recently recalled frequency memories (via the RCL switch).
- The XVTR button is used to access transverter bands (see page 14).

TRANSVERTER BANDS

There are 12 programmable transverter band displays for use with external or internal transverters. With a K4D, two external transverters can be used simultaneously on receive by selecting RX ANT 1 for one and XVTR IN/RX ANT 2 for the other. External transverters are driven from the XVTR OUT jack.

- Before using a transverter band, it must be configured using the XVTR menu entries. The first of these, MENU: XVTR Band # Select, specifies which transverter band is selected for the remaining XVTR menu entries: I.F., Mode, Offset (to correct for oscillator errors), Power, and R.F. (lower band edge).
- From the HF band group, tap XVTR to access transverter bands. To return to the HF bands, tap HF (right-hand yellow arrow below).
- For complete transverter band setup details, refer to the K4 Operating Manual.

MODE SELECTION

- Tap the MODE switch to bring up the mode button group. This group can also be displayed by tapping in the ID/mode icon area for either VFO.
- Tap a mode button once to select it, and second time to select an alternate mode (e.g., LSB and USB are alternates, as are CW and CW-reverse).
- The ALT switch can also be held to select these alternate modes.
- Tap the dismiss button (with curved white arrow) to exit mode selection.
- Extended-bandwidth SSB (ESSB) can be enabled by tapping TX, then ESSB ON|OFF.

VFO B CONTROLS

- There are many dedicated controls for VFO B/sub receiver, including the VFO B knob, SUB AF gain, and touchable icons in the vicinity of the VFO B display. The RF/SQL knob can also be set up to directly control RF gain or squelch for the sub receiver.
- Tapping the B SET switch (indicated by an arrow at right) places additional functions into their VFO B/sub receiver context.
- The example below shows the effect of a B SET switch tap, bringing up the green “B SET” indicator between the two VFOs.
- When the MODE button group is displayed, as shown below, it now pertains to VFO B. VFO B’s mode can also be changed by tapping its mode icon.
- Normally the FILTER knob adjusts the main receiver passband. In B SET mode, this knob targets VFO B/SUB as shown by its green selector (arrow at left).

MULTIFUNCTION CONTROLS

There are three multifunction knobs located to the left of the LCD. Each of these knobs controls a related group of functions (see arrows):

- XMTR: Power output, VOX delay, and two per-mode parameters (WPM and PITCH, or MIC and CMP). Press and hold the knob to set MONitor level.
- FILTER: Receive filter passband width (BW) and shift (SHFT), or high-cut (HI) and low-cut (LO). Press and hold the knob to NORMalize the passband.
- RF/SQL: Main receiver RF gain (M.RF) or squelch (M.SQL), and sub receiver RF gain (S.RF) or squelch (S.SQL). Press and hold the knob to adjust BALance.

Tap a knob to alternate between the associated two buttons on the LCD. Tapping the button itself alternates between one of its two functions.

RECEIVER CONTROLS AND ICONS

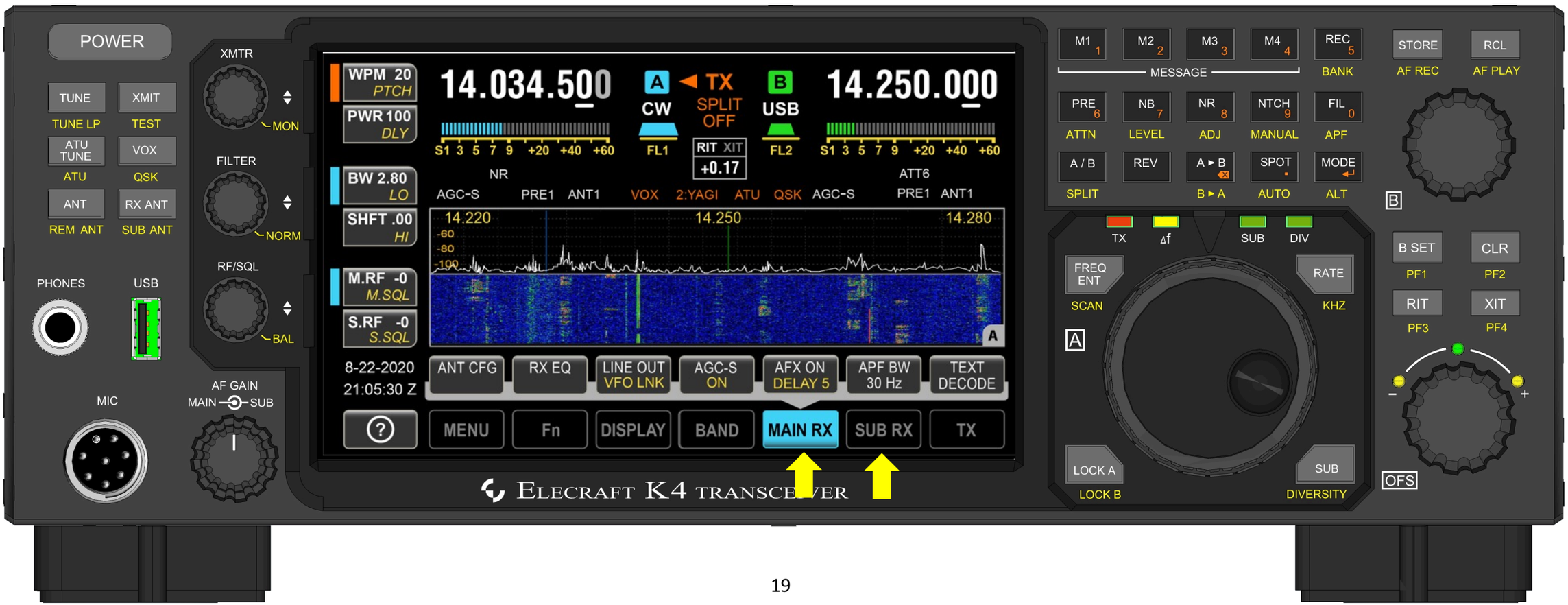
In the image below, all possible RX icons are turned on. Typically most icons are off at a given time. Arrows identify switches used to control the receivers:

- Tap PRE to rotate among preamp off/1/2 for the main receiver (or, in B SET mode, for the sub receiver). Hold ATTN to set attenuation in 3 dB steps.
- Tap NB, NR, or NTCH to turn on these functions with their last-used settings. Hold these switches to adjust their settings.
- Tap FIL to rotate through per-mode passband presets (FL1/2/3). Hold APF to turn the audio peaking filter on/off (applies only in CW mode).
- The “K4D” icon (near RIT/XIT box) shows that the 2nd RX (KRX4 option) is in use. This occurs when the receivers are on different bands or antennas.
- The blue and orange circular icons to the left of the RIT/XIT box (arrow) show DVR receive record or DVR transmit playback, respectively.

MAIN AND SUB RECEIVER CONFIGURATION

- Tap MAIN RX or SUB RX to bring up a collection of frequently used receive configuration controls. Below, MAIN RX has been selected.
- These buttons are color coded to match other elements: blue for MAIN RX, green for SUB RX.
- Some configuration controls change based on the operating mode. In this example, the APF and TEXT DECODE functions pertain to CW.

NOTE: You can customize K4 programmable switch functions to quickly set up any combination of receive functions, such as bandwidth, preamp, RF gain, AGC, etc. See MACROS, page 44.



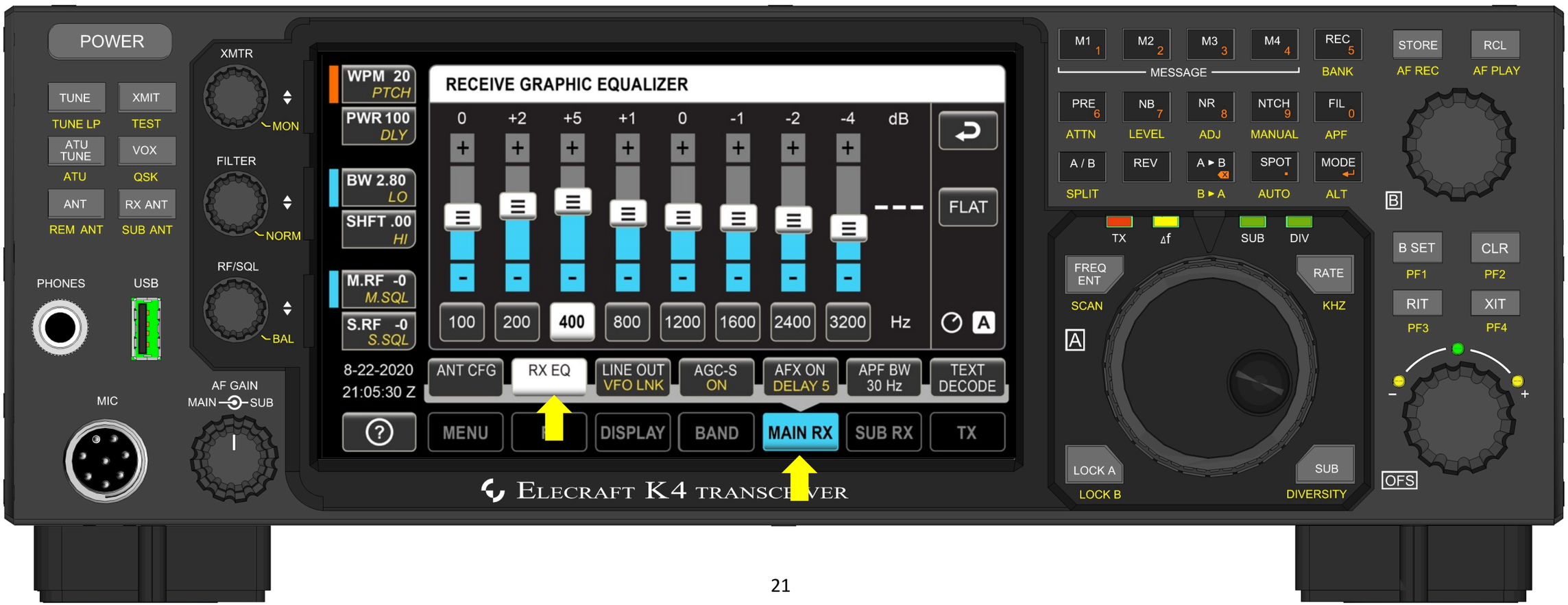
PARAMETER ADJUSTMENTS

- Some parameters are adjusted using the VFO A knob. These include NB LEVEL, NR ADJ, ATTN, MANUAL notch, and DISPLAY controls.
- The example below shows manual notch adjustment. VFO A or the +/- buttons change the value. An on/off is also provided within the control.
- Exit controls like this one by tapping the dismiss button (curved arrow).

NOTE: You can customize K4 programmable switch functions to set the panadapter to a specific spans, frequencies, etc. See MACROS, page 44.

RX AND TX EQ

- The receive graphic equalizer is displayed by tapping MAIN RX (or SUB RX), followed by RX EQ.
- EQ values can be adjusted by tapping +/- (at the ends of the sliders), by moving the sliders, or by rotating the VFO A knob.
- The target pitch for VFO A knob adjustment can be selected by tapping one of the Hz buttons, or by adjusting a slider.
- If FLAT is tapped, all sliders are centered and all EQ values become 0 dB.
- TX EQ is similar, accessed by tapping the TX primary function button, followed by TX EQ.



TX METERING

- As shown below, up to four TX bar graphs (in orange: RF output, SWR, ALC, and CMP) are all displayed continuously during transmit. (See arrow.)
- TX bar graphs are displayed below VFO A in non-split, and under VFO B in split. This shift in position ensures operator awareness of the SPLIT setting.
- The CMP (compression) meter is only shown in voice modes.
- The status area (see arrow) shows date and time or other information in RX mode; during transmit it shows supply voltage, current, power, and SWR.

PANADAPTER SETTINGS

- To adjust panadapter settings, tap DISPLAY (see arrow). This brings up a row of 7 buttons. Above these is another row, discussed on the next page.
- In this example, REF LVL is selected for adjustment. AUTO-reference is enabled, which automatically positions the panadapter noise floor at the baseline.
- The button labeled “PAN=A” can be tapped to select single panadapter mode (A or B), or dual (A+B). This is covered in a later section.
- WTRFALL sets the height of the waterfall. WTR CLRS sets the palette of colors used in the waterfall as signal strength varies.
- NB controls the panadapter noise blanker function. If the panadapter NB mode is AUTO, it will be turned on/off along with the receiver noise blanker.
- The remaining DISPLAY controls are described in both the built-in operating manual and the *K4 Owner’s Manual*.

DISPLAY AND PANADAPTER SELECTION

Above the panadapter settings row is another row with three sets of controls (see arrows below):

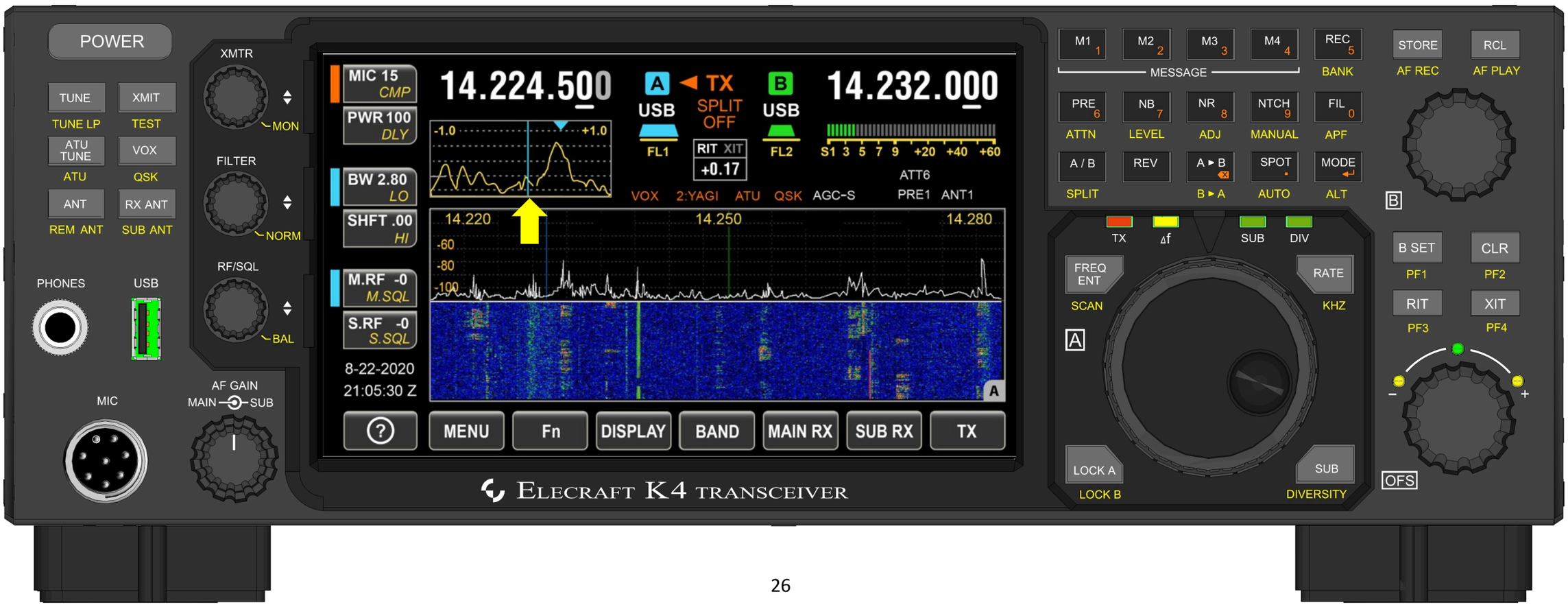
- The left-hand controls (LCD/&/EXT) are used to specify whether the target for parameter adjustment is the LCD, external monitor (if applicable), or both.
- The middle controls (A/&/B) select a panadapter as the target for adjustment: VFO A/main RX, VFO B/sub RX, or both.
- The right-hand controls are used to adjust the selected panadapter.
- In the example below, the target monitor is the LCD, while the target panadapter is VFO A/main RX.

DUAL PANADAPTERS

- The panadapter can be single (A or B) or dual (both A and B) as shown below.
- The display can be customized in various ways. For example, the vertical scale can be calibrated in S-units or dBm (MENU: Spectrum Amplitude Unit).
- An identifying icon (A or B) appears in the bottom right-hand corner.
- To select dual-pan, tap DISPLAY, then tap the PAN=A button, which also has settings of PAN=B and PAN=A+B (dual).
- When dual panadapters are used, the mouse target icon shows which panadapter is selected for mouse-wheel tuning. In the example below, the mouse icon appears on panadapter B, near its ID icon.

MINI-PAN TUNING AID

- The *mini-pan* (see arrow) is a tuning aid that shows signals near the VFO frequency. Mini-pan spectrum is resampled at a narrow bandwidth, not just magnified. This ensures excellent resolution even when the main panadapter is configured for a wide span.
- The solid vertical line indicates the carrier frequency in CW/AM/FM/PSK modes, suppressed-carrier frequency in SSB mode, and the *mark* tone in FSK mode. In FSK mode a dotted line is added to indicate the *space* tone frequency.
- There are two ways to bring up the mini-pan: (1) tap the S-meter on the applicable receiver, which keeps the mini-pan displayed until this area is tapped again, or (2) HOLD your finger or mouse on a signal of interest, then slide it left or right to fine-tune using the mini-pan.



TEXT DECODE/ENCODE

- Text decode/encode is supported in CW, PSK, and FSK modes. An example window in CW mode is shown below.
- This feature is turned on by tapping MAIN RX (or SUB RX), followed by TEXT DEC.
- The upper portion of the text window shows 1 or 3 lines of received text. The lower portion shows one line of transmitted text, which can be entered with either a keyboard or keyer paddle.

The example below shows the flexibility of the K4's symmetrical user interface, with both dual panadapters and dual text decode selected. The operator can send/receive text in the same or different modes on both VFOs.

To select a transmit VFO, the operator can go in and out of SPLIT mode (arrow).

MENU

- Tap MENU to bring up the menu window. 5 entries are shown, with one highlighted. To scroll, use the VFO A knob or tap the up/down arrows.
- Most menu functions are locked, as shown, to prevent unintended changes. Tap the lock symbol before editing.
- To edit the parameter, tap the field to the right of the menu entry name. The up and down arrows will become +/- buttons.
- Tap NORM to restore the default value. If the parameter already matches the default, NORM will be highlighted.
- For quick access to a frequently use menu entry, locate the menu entry of interest, then assign it to any of PF1-PF4 by holding that switch. (PF1-PF4 can also be fully customized to execute any sequence of K4 control commands; see MACROS, page 44.)

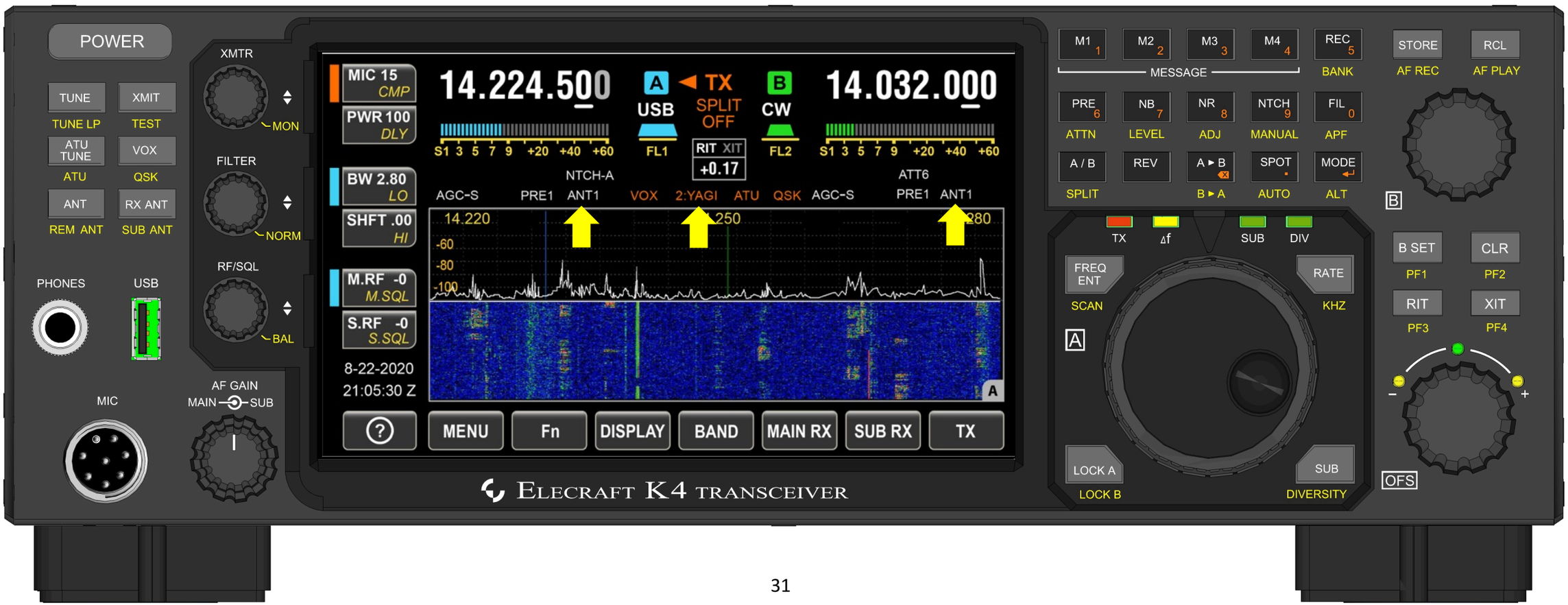
ANTENNA SELECTION

There are four switches to the left of the LCD for antenna selection (see arrow):

- ANT: Selects the **transmit** antenna (ANT1/2/3 on the KAT4 ATU). By default, both receivers are configured to also use this antenna. The ANT switch can be configured to alternate between only two of the three ATU antennas by tapping TX, followed by ANT CFG.
- REM ANT: Reserved for future use in setting up remote antennas, rotators, etc.
- RX ANT: Selects the antenna for the **main receiver** (associated with VFO A).
- SUB ANT: Selects the antenna for the **sub receiver** (associated with VFO B).

ANTENNA ICONS

- There are separate icons above the panadapter to show the antenna selected for the main receiver (white, below the VFO A S-meter), sub receiver (white, below the VFO B S-meter), and transmitter (orange, below the RIT/XIT box). See arrows.
- If an ATU is available, the ANT switch (TX antenna) will rotate through ANT1/ANT2/ANT3 by default. A subset of 2 transmit antennas can be selected by tapping TX, then ANT CFG.



RX ANTENNA CONTROLS

- Tapping RX ANT brings up the MAIN RX ANT button group, as shown (at far left). Holding SUB ANT (on the same switch) brings up the SUB RX ANT group.
- In this example, “=TX ANT” is highlighted. This indicates that the transmit antenna is selected as the main receiver antenna.
- Names can be assigned to antennas by holding the associated button. This brings up the alphanumeric keyboard.
- The orange dot on the ANT2 button serves as a reminder that this is the antenna presently selected for transmit.
- “=OPP TX” is an advanced setting useful in diversity mode; refer to the *K4 Owner’s Manual*.

RX ANTENNA SWITCH CONFIGURATION

Normally, tapping the RX ANT or SUB ANT switches brings up the receive antenna button group. This behavior can be modified as follows:

- Tap MAIN RX as shown below, then tap ANT CFG. This brings up the RX ANT SWITCH configuration control.
- In this case the user has selected “DISPLAY ALL” (default).
- The other selection (“USE SUBSET”) causes the RX ANT switch to rotate among two or more antennas, without bringing up the selection buttons.

STATUS DISPLAY SETTINGS

Tapping in the status display area (see arrow) brings up the controls shown. Tap to select the desired receive-mode status display. The options are:

- DATE/TIME: Default. Hold the button to **Set** date and time. (If the K4 has an internet connection, date and time will be set automatically.)
- ID/TIME: Shows user's call sign or other text string, along with time. Hold the button to **Edit ID** using the on-screen keyboard.
- TX PARAM: Shows supply voltage, current, power, and SWR (e.g. "13.8V 1.8 A" / "100 W 1.5:1". Hold to show **All Param** (V/I/Temp for all modules).
- SIG LEVEL: Shows dBV signal levels, e.g. "Main +3.5" / "Sub -1.0". Hold to **Set 0 dB** (reset both values to 0 dB relative to current signal level).
- STAT/TIME: Shows overall system status, e.g. (SYSTEM OK). Hold to **Show Stat** (status of all modules).

ON-SCREEN KEYBOARD

An on-screen keyboard appears whenever needed, e.g. to enter your call sign, edit a frequency memory label, etc. Here, a CW message is being entered:

- The shift key (up arrow) has been tapped, so QWERTY keys are capitalized. Punctuation keys show their upper character selected.
- With CW or data messages, some keys are used to enter *prosigns* (such as “BT” and “AR”). EOT inserts an data-mode end-of-text character, which causes RTTY or PSK messages to exit immediately rather than send 4 seconds of idle characters. EOL inserts a CR/LF sequence.
- For editing, use the left/right arrows and backspace/delete key.
- The main-function buttons (MENU, Fn, DISPLAY, etc.) remain accessible, so the user can quickly exit a keyboard operation to respond to a CQ, etc.

SPECIAL FUNCTIONS (Fn)

Tapping Fn provides access to 14 special functions. Some are pre-assigned (see below), while F1-F8 are user-programmable (see **Error! Reference source not found.**, page 44).

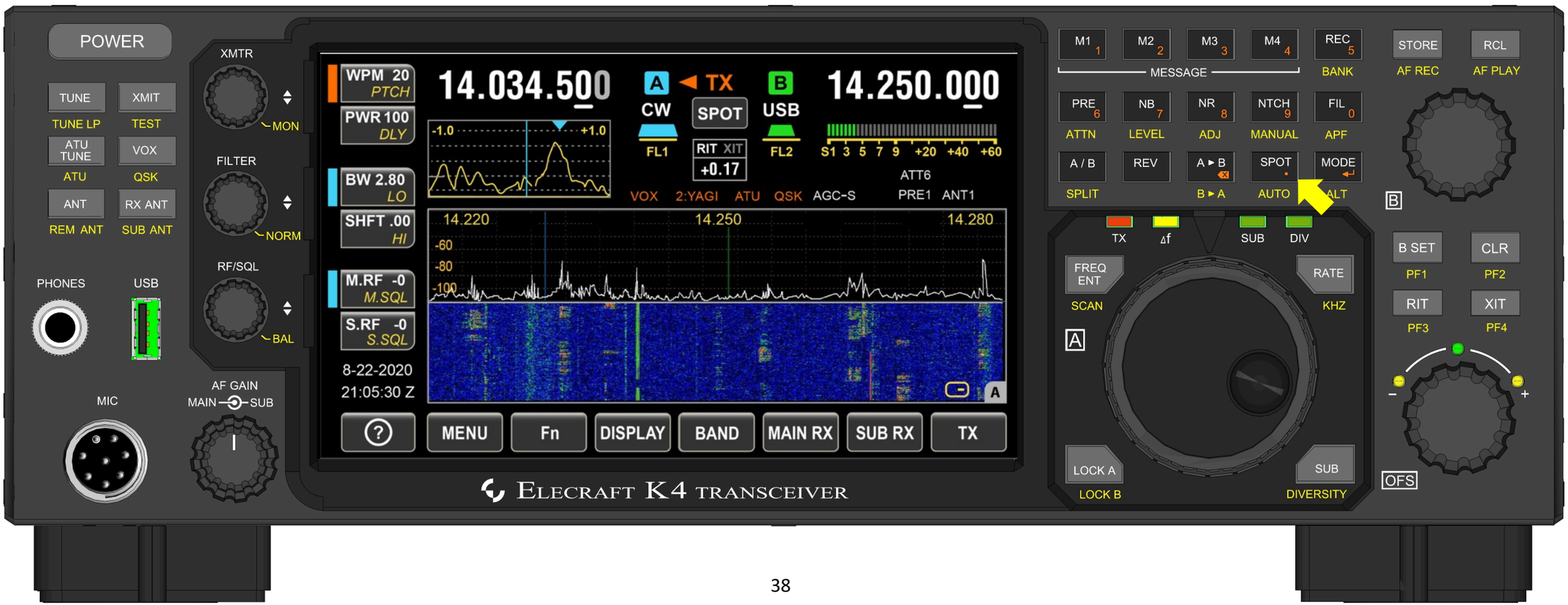
- SCRN CAP captures both the LCD and external monitor contents into separate files (if a USB flash drive is inserted).
- MACROS brings up the macro editor, which allows you to customize PF1-PF4, Fn.F1-F8, REM ANT, and all K-Pod switches.
- SW LIST (tap) shows a list of all installed software revisions.
- UPDATE (hold) displays the software update screen. This can be used to load the latest software, revert to an older revision, etc.
- DX LIST (tap) provides a full list of countries and prefixes (see next page).

DX PREFIX LIST

- In the example below, the Fn button function has been tapped, followed by DX LIST. A small portion of the list is shown here.
- The list can be scrolled using the up/down arrow buttons or the VFO A knob.
- To search, tap the magnifying glass icon, then enter your search text using the on-screen keyboard. If more than one item matches, the magnifying glass and up/down arrows will remain highlighted; navigate among the matches by tapping up/down.

SPOT AND AUTO-SPOT

- Tapping the SPOT switch (see arrow) in CW mode turns on the sidetone, as well as the SPOT icon (above the RIT/XIT box). The VFO can then be adjusted manually to match an on-air signal to the sidetone pitch.
- Holding the SPOT switch engages AUTO-spot. This automatically moves the VFO to a nearby CW signal.
- AUTO-SPOT can also be used in PSK mode, adjusting the VFO frequency for optimal text decode.



FREQUENCY MEMORY STORE / RECALL

- Tap either STORE or RCL (see arrows) to bring up the frequency memory controls. You can also bring up memory recall by tapping VFO MHz digits.
- Scroll to the desired memory using the VFO A knob (in this case, memory #036). To edit the label, tap its field; this brings up the on-screen keyboard.
- To complete the recall operation, tap the RCL button (in the window). This loads the VFO frequencies and modes of the highlighted memory.
- As long as RCL is turned on, you can actively scroll through memories. Tap this button to exit active-scroll mode.
- If STORE had been pressed, the window would have a STO button. Tapping STO would save VFO frequencies in the highlighted memory.
- There are also four quick memories per band. To store or recall a quick memory, tap the STORE or RCL switch, followed by a tap of M1 through M4.

INTERNAL CW KEYER CONFIGURATION

The internal keyer has a range of 8 to 100 WPM. In FSK and PSK modes, characters sent with the internal keyer are converted to RTTY or PSK31/PSK63 signals . This feature is most often used when the K4's built-in text decode/encode feature is turned on.

- To select paddle normal/reverse, tap TX, then PDL NOR|REV.
- To select Iambic keying mode A/B, tap TX, then hold IAMB A|B.
- To change the keying weight, tap TX, then tap WEIGHT (see below).

MICROPHONE CONFIGURATION

The K4 has both front and rear microphone inputs. Voice-mode audio can also be obtained from the LINE IN jack or via the soundcard interface (USB-B jack).

- To select which microphone input to use, tap TX, then MIC INP. Select FRONT, REAR, LINE IN, FRONT+LINE, or REAR+LINE.
- If the front or rear mic has been selected, it can be configured by tapping TX > MIC CFG. You can turn bias on/off or select mic preamp gain.
- For the front panel mic only, you can also specify whether the mic has no buttons, PTT button only, or PTT + UP/DOWN buttons (e.g., Elecraft MH4).
- Mic gain (a XMTR knob function) can be adjusted using TX TEST mode or while on the air. The target for the ALC meter is about 5 bars.

LINE IN CONFIGURATION

There are two possible sources of transmit audio from a computer or other external device: the LINE IN jack (analog), or the digital soundcard interface (USB-B jack).

- To specify which LINE IN source to use, tap TX, then tap LINE IN. This brings up the controls shown below.
- Use the VFO A knob or +/- to adjust the LINE IN level for the desired source.
- When transmitting or in TX TEST mode, adjust LINE IN level for less than 4 bars of ALC.

LINE OUT CONFIGURATION

Stereo receive audio at LINE levels (~600 ohm impedance) is always available at the LINE OUT jack (analog) as well as the (USB-B jack; soundcard/digital). Line-level audio can be used with external software applications, for example in data modes. **Left** line out always corresponds to the main receiver. **Right** line out will be the same as left, unless the sub receiver is turned on; right audio then corresponds to the sub receiver.

- To adjust LINE OUT levels, tap MAIN RX, then LINE OUT (below). You can adjust left or right level independently, using the VFO A knob.
- If you prefer to control both left and right LINE OUT level with one parameter, tap the RIGHT=LEFT button as shown in this example.

MACROS

The K4 and the Elecraft K-Pod controller both provide numerous user-programmable switch functions. These functions can execute a sequences of one or more K4 control commands, or *macros*. To customize switch functions on the K4 or on the K-Pod:

- Tap Fn, then hold MACROS. This will bring up the macro editor shown below.
- Scroll to the target switch (Fn.F1 is selected here). Tap the next field to the right and use the keyboard to create your custom button label.
- Tap the next field to the right to enter macro text. This can include one or more commands as described in the K4 Programmer's Reference.
- The example here shows a macro called "SPLIT+10", which enters split (FT1), copies all of VFO A to VFO B (AB3), and QSYs VFO B up 10 kHz.

SPECIFICATIONS

Frequency Range	RX: 100 kHz - 54 MHz TX: Amateur bands from 1.8 to 54 MHz	**Sensitivity (MDS)** (Typical values, +/- 3 dB; main or sub RX, BW = 500 Hz)	0.1-23 MHz*: Preamp OFF/1/2: -118/-128/-135 dBm 23-54 MHz**: Preamp OFF/1/2/3: -118/-128/-135/-141 dBm * 0.1-1.5 MHz MDS measured at RX ANT inputs. When using RX/TX antenna jacks (ANT 1-3), sensitivity decreases below 1.5 MHz due to intentional high-pass response of T-R switch. ** Preamp 3 is enabled using MENU: Preamp 3 (12/10/6 m).
Frequency Stability	+/- 0.3 PPM typ. (0-50 C). When locked to an external 10 MHz reference: +/- 0.05 to 0.1 PPM typ.	**Audio Output**	2.5 W per channel into 4 ohms; typ. 10% THD @ 1 kHz, 2 W
Modes	USB, LSB, AM, FM, CW, DATA. Built in PSK, RTTY, and CW text decode/display.	**S-Meter**	Nom. S9 = 50 µV for all preamp/attenuator settings
Supply Voltage	11 V min, 15 V max.	**RF Power Output**	1.8-54 MHz amateur bands: 0.1 W –100 W nominal. Suggested max from 51-52 MHz, 85 W; 52-54, 70 W. XVTR OUT (100 kHz-54 MHz): Up to 5 mW (+7 dBm).
Current Drain	RX: 2 – 3 A, TX: 4 – 25 A (typ.)	**Duty Cycle**	Up to 10-min. key-down at 100 W, 25 C ambient. Minimum 1 minute cooling period after 10 min. at full power.
Operating Temp.	0-50 C	**ATU Matching Range**	10:1 on 80-10 m, 5:1 on 160 and 6 m (typ.)
Weight	Approx. 10 lbs. (4.5 kg)	**Transmit SSB Carrier Suppression**	> 50 dB
Size	Enclosure only, 4.5 x 13.5 x 11.0 in. HWD (11.4 x 34.3 x 28.0 cm). With projections, 5.2 x 14.0 x 12.5 in. (13.2 x 35.5 x 31.7 cm).	**Transmit Harmonic and Spurious Outputs**	> 50 dB (> 60 dB on 6 meters)