

FX-4C SDR Transceiver Manual

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English

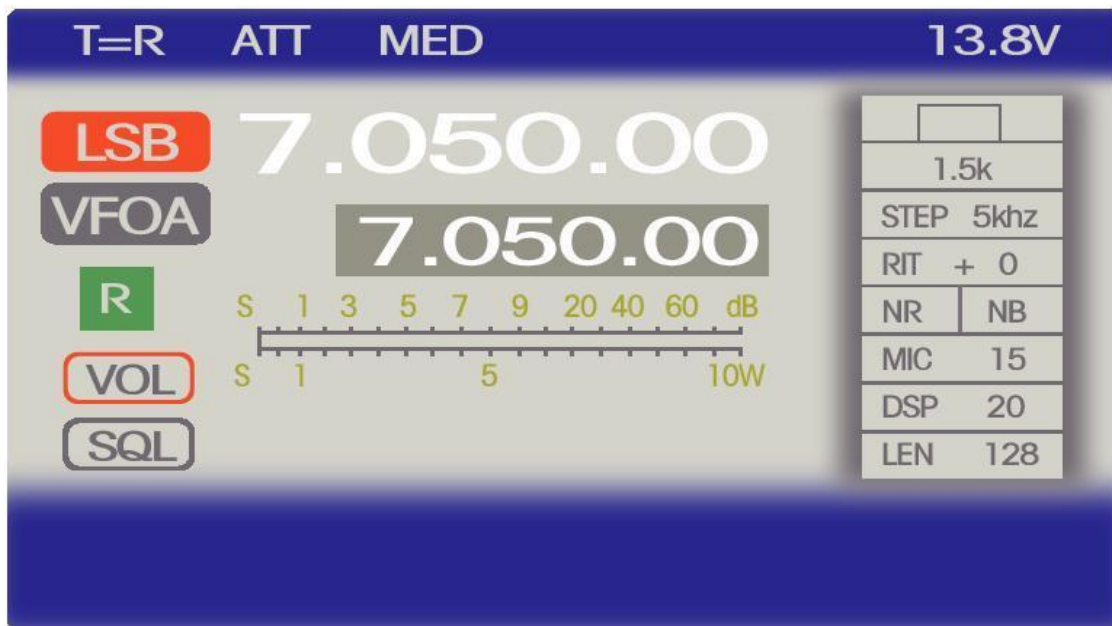
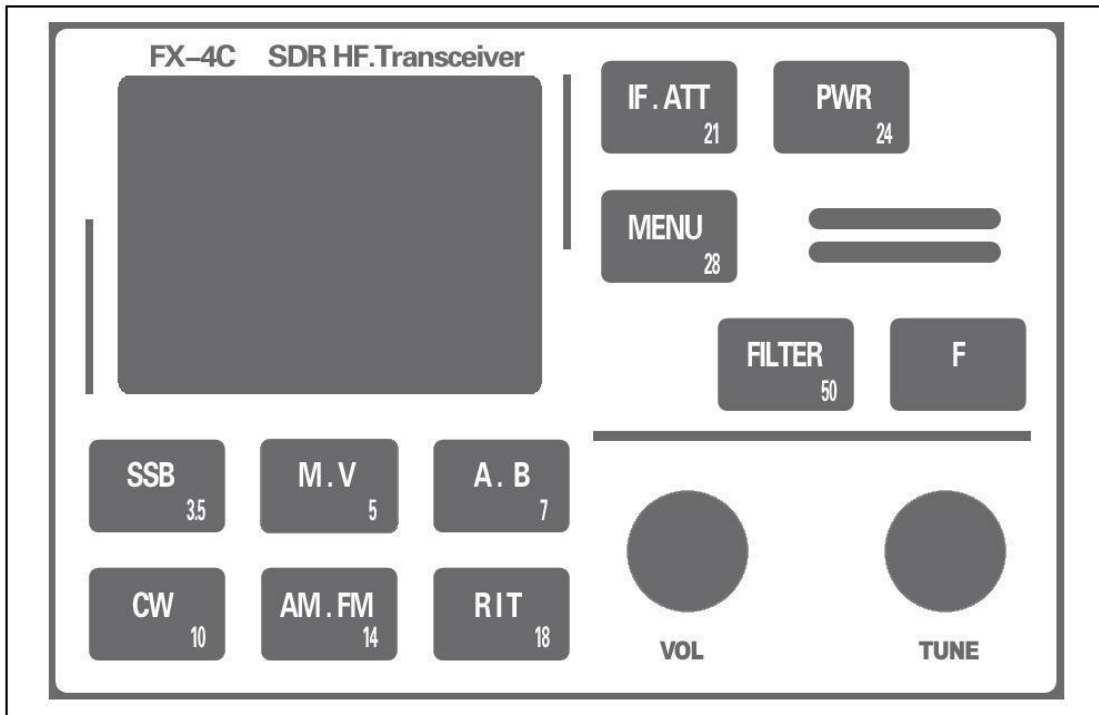
User Manual

v1.00

FX-4C SDR Transceiver Manual

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I . Specifications

Transmission frequency range: 3.5 - 29 MHz frequency range of amateur radio

Receiving frequency range: 465 kHz - 50 MHz

Operating Modes: USB, LSB, CW, AM, FM

Frequency Steps: 10 Hz, 100 Hz, 1 kHz, 5 kHz, 10 kHz, 100 kHz, 1 MHz

Antenna impedance: 50 Ohm

Operating temperature range: -20 - +40°C

Voltage range: DC 9 V - 18 V (please keep the maximum voltage below +16 V for long-term operation: About 14 V is recommended)

Power Consumption:

Transmit: (maximum power) ~ 2 A;

Receive: ~ 220 mA.

Overall size: length 107 mm, width 65 mm, height 43 mm

Weight: (radio only) 0.46 kg

Filter Bandwidth:

SSB: 1.5 kHz, 1.8 kHz, 2.1 kHz, 2.4 kHz, 2.7 kHz, 3 kHz

CW: 50 Hz, 100 Hz, 200 Hz, 300 Hz, 500 Hz, 800Hz

FM: 5 kHz, 10 kHz

AM: 6 kHz, 9 kHz

Power range: 0.1-10 W continuously adjustable

Spurious emission suppression: -43 dB

Carrier suppression: -50 dB

Microphone impedance: 2.2 k Ohm

Audio output power: 1 W

Receiving sensitivity: -120 dBm

Functional Characteristics:

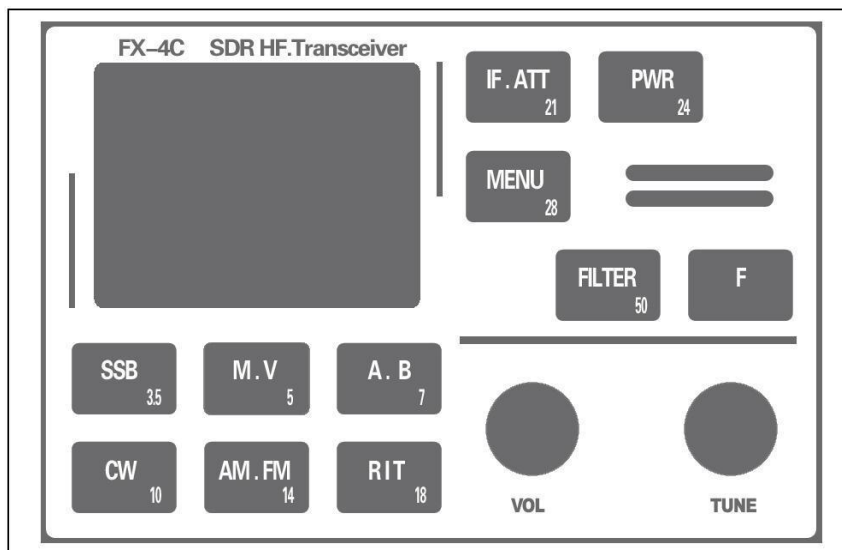
- ☆ 2.0" TFT display screen
- ☆ Spectrum display and waterfall plot
- ☆ Dual VFO operation (VFO A and B) with split mode operation
- ☆ Internal USB sound card with serial communication via USB
- ☆ Adjustable DSP digital noise reduction
- ☆ Ultra wide input voltage: 9 V - 18 V
- ☆ Quick switching among various frequency bands and convenient operation

Included Items

1. Transceiver
2. Hand microphone
3. Power cord
4. USB data cable, instruction manual, packing box

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II. Transceiver Controls:



Control	Primary Functions
VOL	Turn to adjust volume. Press, then turn to adjust microphone gain, and DSP in SSB mode, and CW keyer speed, side tone volume, and side tone frequency in CW mode. Press and hold, then turn to adjust squelch.
TUNE	Turn to adjust frequency. Press and release, or press and turn to adjust tuning step.
F	Press to enter band selection mode. Press and hold to lock keypad.
FILTER 50	Press to change filter bandwidth.
MENU 28	Press and hold to enter menu.
PWR 24	Press, then turn VOL to adjust transmit power setting.
IF. ATT 21	Press to change AGC setting. Press and hold to turn on/off the attenuator.
RIT 18	Press to turn on/off RIT.
AM. FM 14	Press to select AM or FM mode. Press and hold to select wide-range receive mode (RX only).
CW 10	Press to select CW keying mode (iambic/straight). Press and hold to reverse paddle “dit” and “dah.”
A. B 7	Press to switch between VFO A and VFO B. Press and hold to enter Split mode.
M. V 5	Press to switch between VFO and Memory mode. Press and hold to turn on Noise Blanker (NB).
SSB 35	Press to switch to SSB mode. Press to select LSB or USB. Press and hold in SSB mode to turn on DSP Noise Reduction (NR). Press and hold in CW mode to select upper or lower carrier.

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I II . Transceiver Operation:



Power On:

Connect 9 - 18 V DC to the power jack and switch ON/OFF switch to “ON”

Volume Adjustment:

Turn the “VOL” knob to adjust the audio volume. Volume setting from 0~99 will display below the signal meter.

Band Selection:

Press  momentarily to enter the band selection menu. Select a band by pressing the button containing the button on the transceiver with the desired band on the lower-right corner of the button, or rotate the “Tune” knob to select the operating band. Press  again to exit the band selection menu. If no keys or knobs are pressed or turned, the transceiver will exit the band selection menu automatically after approximately 8 seconds.



Frequency Selection:





Turn the “TUNE” knob to adjust the frequency. Press “TUNE” knob to cycle through 10 Hz, 100 Hz, 1 kHz, 5 kHz, 10 kHz, 100 kHz, or 1 MHz tuning steps, or press and turn to select tuning step increment.

Press is to make stepping adjustment. Hold down and rotating left and right can also adjust the stepping. When pressing 「F」to enter the band selection interface, rotate left and right to select the band. Press 「F」key to exit. When it is in channel mode, press and rotate to adjust the channel number; Rotate left and right to adjust the corresponding channel frequency; the frequency will be automatically stored in this channel; Cooperate with the menu key to adjust the menu option parameters: (see "MENU" for details).

Mode Selection and Settings:


Selected mode is shown on upper-left side of display.

SSB: Press  momentarily to select SSB mode. Press  momentarily in SSB mode to switch between LSB, DIG_L, USB, and DIG_U. Use LSB and USB to operate using phone on lower and upper sideband. Use DIG_L and DIG_U modes for digital mode operation. In DIG_U and DIG_L, the speaker is muted and the filter is set to 3.0 kHz.

CW: Press  momentarily to select CW mode. Press  momentarily in CW mode to switch between Iambic (automatic keying “CW A”) and Straight Key (manual keying “CW M”) operation. Press and hold  for 2 seconds to invert “dit” and “dah” paddles. While in CW mode, press and hold  to switch between upper and lower carrier operation which can be helpful to avoid interference on nearby frequencies. In CW mode, press “AF” encoder then rotate to adjust keyer speed (KEYSP), press again to adjust sidetone frequency (SITON), and press again to adjust sidetone volume (SIVOL).

AM/FM: Press  momentarily to select AM mode. Press  again to select FM mode.

Filter Bandwidth:

Press  to change between filter bandwidth options within each mode.



SSB: 1.5 kHz, 1.8 kHz, 2.1 kHz, 2.4 kHz, 2.7 kHz, 3 kHz

CW: 50 Hz, 100 Hz, 200 Hz, 300 Hz, 500 Hz, 800Hz

FM: 5 kHz, 10 kHz

AM: 6 kHz, 9 kHz

DSP Noise Reduction (NR):

Press and hold  for 2 seconds until “NR” is highlighted in red on the display. Press and hold  again to turn of DSP. Adjust DSP strength by pressing “AF” until DSP is highlighted on the display, and turn the knob. NOTE: DSP may be unstable in some scenarios. If the noise reduction system crashes, reset it by powering the


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unit off and back on again, then turn DSP back on.

Noise Blanker (NB):

Press and hold  for 2 seconds until “NB” is highlighted in red on the display. Press and hold  again to turn off NB.


Automatic Gain Control (AGC):

Press  to cycle between “SLOW,” “MED,” and “FAST” AGC to adjust how quickly the transceiver will adjust to strong received signals. The selected AGC mode is indicated at the top-center of the display.


Squelch:

Press and hold “AF” knob until “SQL” is highlighted in red, then turn the “AF” knob to adjust squelch. Wait approximately 4 seconds, or press and hold “AF” knob again to exit squelch adjustment.


RF Attenuator (ATT):

Press and hold  for 2 seconds to turn on RF signal attenuation. When ATT is turned on, the "ATT" indicator at top of the display is highlighted.



VFO and Memory Mode:

Press  momentarily to switch between VFO mode and memory channel mode. VFO mode allows tuning across the bands by rotating the “TUNE” knob. In memory mode, press and rotate the “TUNE” knob to select a channel from 1-99. Set the frequency by rotating the “TUNE” knob, and the channel will automatically save to the selected channel.



VFO A / VFO B:

Press  momentarily to switch between VFO A and VFO B in VFO mode, and to switch CH A and CH B in channel mode.



Split Mode Operation:

Press and hold  for 2 seconds until “T≠R” appears in the upper left corner of the display to enter split mode. In split mode, the main frequency display indicates the transmit frequency while transmitting and switches to the receive frequency while receiving. The auxiliary frequency indicates the selected transmit frequency while in receive mode, and the selected receive frequency while transmitting. Cross-band operation is possible in split mode. To exit split mode, press and hold  for 2 seconds until “T=R” appears in the upper left corner of the display.

Receiver Incremental Tuning (RIT):

Press  momentarily to turn on RIT. “RIT” will be highlighted in red when active. Rotate the “TUNE” knob to adjust the receiver offset. Press the tune knob to select the frequency step. Press  momentarily again to turn off RIT.

Transmit Power:



Press  momentarily to enter power selection mode. The current power setting will appear on the display surrounded by a red box. Turn the “AF” knob to adjust power setting from 0.1 to 10 W. Press the  again to exit, or wait 4 seconds.

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Microphone Gain:

Press "VOL" knob momentarily to enter microphone gain adjustment mode. "MIC" will be highlighted in red. Turn "VOL" knob to adjust microphone gain. Press "VOL" knob again to exit, or wait 4 seconds.



Receive-only Mode:

Press and hold  for 2 seconds until "RX" appears in the upper-left corner of the display to enter receive-only mode. In this mode, additional receive bands can be selected in the band selection mode, but transmitting is blocked. To return to transceiver mode, press and hold  for 2 seconds until "T=R" appears in the upper-left corner of the display.

Key Lock:

Press and hold  for 2 seconds until "LOCK" appears at the top of the display. In "Lock" mode, only ATT button will function. Other buttons will be locked out. Exit "Lock" mode by pressing and holding  again for 2 seconds until "LOCK" disappears.

Menu:

Press and hold  to enter the menu. Press the menu button or turn the volume knob to cycle through menu options. Turn the "TUNE" knob to change the selected menu item value. Press and hold  again to exit the menu, or wait for the menu to time out and exit automatically.

Menu Options:

0 MENU: Adjusts the time delay for automatic exit from the menu.

1 STIF 1: The frequency setting for the first intermediate frequency. The first intermediate frequency of the device is 90.000000MHz (depending on the center frequency of the selected crystal filter).

2 STIF 2: The frequency setting for the second intermediate frequency. The second intermediate frequency of the device is 24.000KHz (the adjustment of this item is invalid)

3 TCXO: The actual frequency setting of the temperature compensated crystal oscillator. User may fine tune of this value to calibrate the transceiver frequency. Note setting prior to adjustment.

4 SQL: Adjusts the squelch threshold.

5 CW_VOL: Adjusts CW sidetone volume.

6 CW_SI: Adjusts CW sidetone pitch in Hz..

7 CW_SP: Adjusts CW automatic keyer speed in words per minute.

8 CW_DELAY: Adjusts time delay from CW transmit to receiving after keying in * 10 mS.

9 POW: Adjusts the transmit power setting in tenths of a watt ("15" = 1.5 W).

10 AGC_BIAS: This item is the adjustment of AGC minimum control voltage. The larger the value is, the higher the AGC minimum voltage is, and intermediate frequency gain lowers; (this function is basically not used). Adjusting this item can calibrate the field strength display, which is the main function: (In case that the antenna interface is open or short circuited, adjust this item so that the display bar in the second grid on the left of the field strength table just disappears)

11 AGC_STARE: This item adjusts the AGC starting threshold: (this adjustment will affect the display accuracy of the signal meter! The signal meter should be calibrated when the value of this item is 33).

12 AGC_ZERO: This item adjusts the midpoint of AGC detection circuit. This setting is adjusted in calibration, and user adjustment is not recommended.

13 MIC_GAIN: This item is the microphone sensitivity adjustment:

14 NR_STRONG: This item is the adjustment of DSP noise reduction intensity, with a value of 10~55. The default value is 15; adjust this item carefully. The larger the value is, the more significant the noise reduction will be. There will be large strange sound if the value is too large. It is not used to listen and should be avoided as far as possible; In addition, this item should be used in combination with the following two items: "15 NR_BUFLN".

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This item adjusts the length of DSP noise reduction delay array:

16 NR_NUMTAPS: This item adjusts the number of coefficients of DSP noise reduction filter with the default value 96: recommended for DSP noise reduction: NR_BUFLLEN (80~96), NR_STRONG (15~25), adjust NR_BUFLLEN and stop when the noise is significantly reduced.

17 NOT_STRONG: (To be developed)

18 NOT_BUFLLEN: (To be developed)

19 NOT_NUMTAPS: (To be developed)

20 RITATT_PTT: Allows use of keypad buttons as PTT to use the transceiver's internal microphone.


0: No keypad PTT.

1: RIT functions as PTT.

2: IF.ATT functions as PTT.

21 ALC: Select 0 for ALC on, and 1 for ALC off. ALC automatically controls microphone and input audio gain for best performance.

Digital Mode Operation (FT8/WSJT-X specific, other modes similar):

1. Connect USB cable to transceiver and computer and turn on transceiver.
2. Verify computer detects USB cable. Note COM port used by computer.
3. Set rig to preferred band of operation and then change mode by pressing  until "USB" and "DIG_U" appear at the top of the display. The speaker should mute, and the filter will be set to 3.0 kHz. Tune to the standard frequency for the chosen mode and band.
4. Leave ALC menu item 21 set to 0 (on). Note: You can also manually control microphone gain, but using ALC is much easier and provides more consistent results with the FX-4C.
5. Set computer audio output volume to 50%. Set rig "Volume" to 3 by turning "AF" encoder knob.
5. Open digital mode software and adjust settings. If using WSJT-X go to File->Settings->Radio. Select "None" for "rig". Select the correct COM port for the USB connection. Choose "RTS" mode for PTT and test PTT . CAT control does not work at this time.
6. Open "Audio" settings and select the USB audio sources for input and output under "Soundcard" settings. Exit WSJT-X settings.
7. Monitor WSJT-X waterfall to verify FT8 signals are visible. If WSJT-X is not decoding successfully, check computer time synchronization. Check received audio strength using the dB meter at the lower left of the main WSJT-X display. Adjust "AF" knob until it reads approximately 60 dB.
8. Select an open frequency on the band to transmit, and begin transmitting. Monitor power meter while transmitting. Adjust mic gain to achieve power output close to selected power setting in power menu. Make note of mic gain and power settings for each band for easy setup next time.

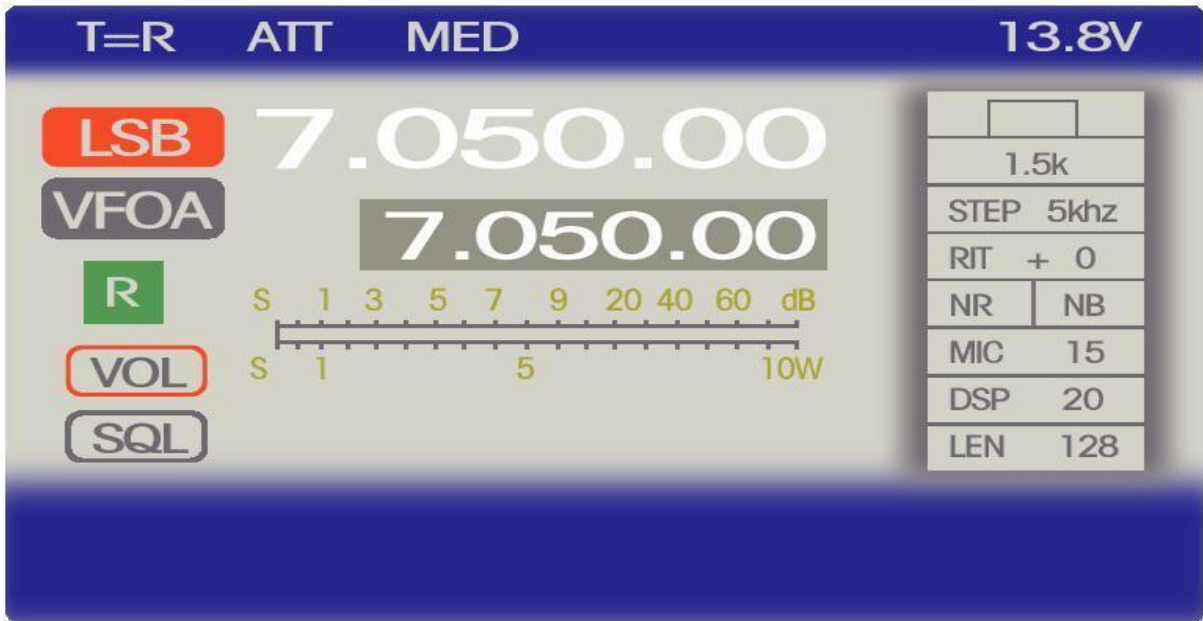
Have fun and make lots of contacts!

CAUTION: Monitor SWR and power output when operating digital modes, particularly when running higher power supply voltages. Running higher power settings with elevated SWR can damage the radio, particularly when running high duty-cycle digital modes.

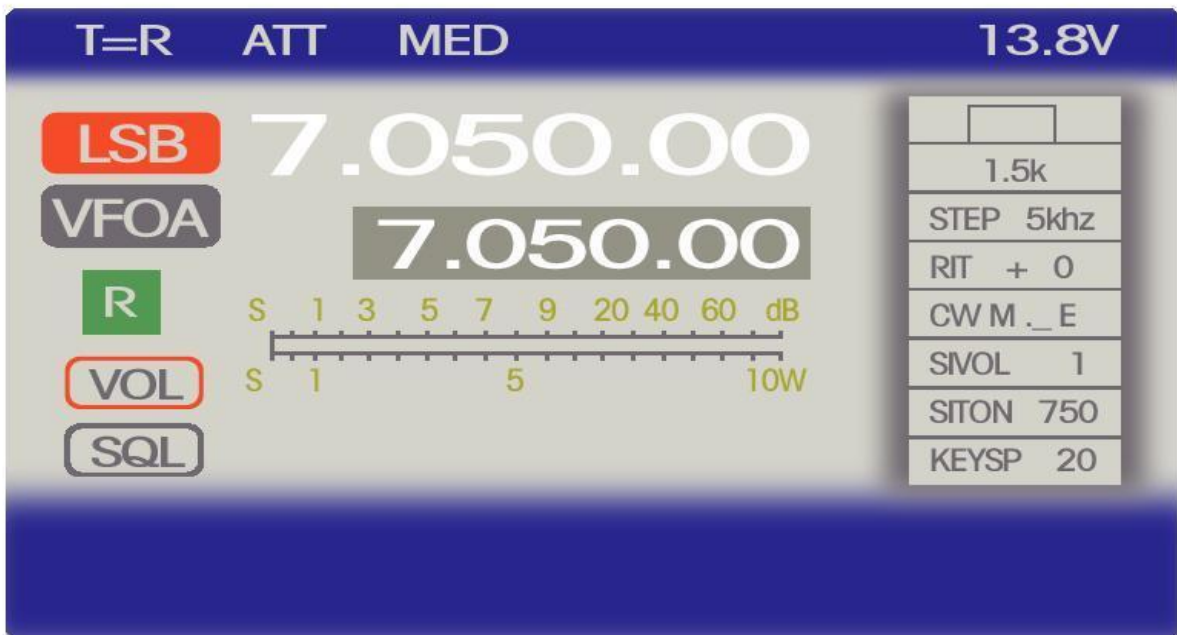
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IV Display Interface

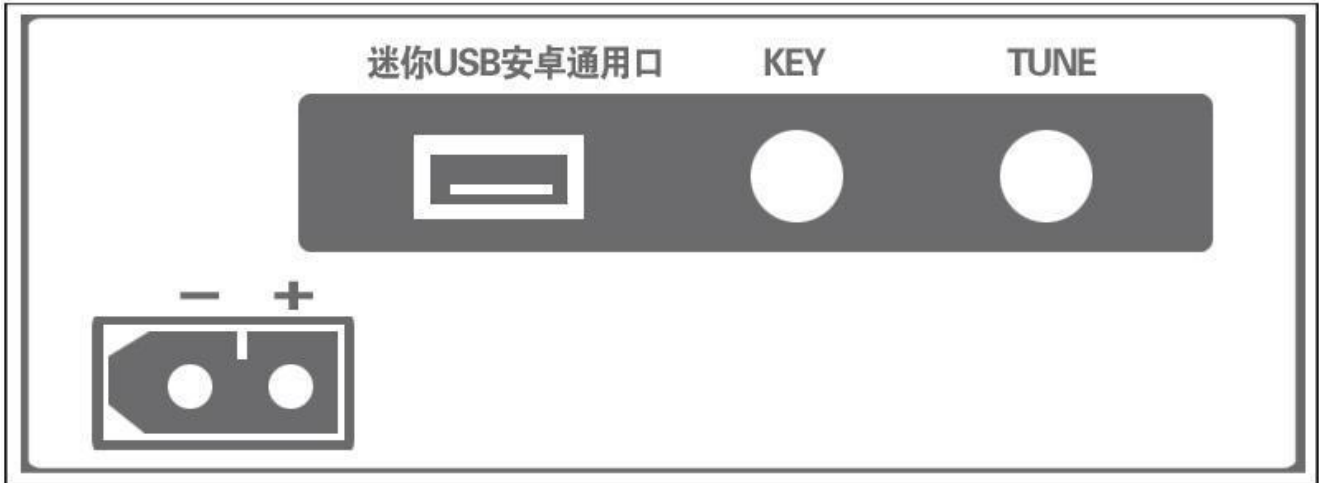


"T=R": TX=Transmission: RX=Receiving	"ATT": receiving attenuation	"MED": AGC speed
"13.8V": Display of current voltage	"LSB": Current mode	"R": Transmission indication
"AF": Volume	"SQL": Squelch	"1.5K": Current bandwidth display
"STEP 5khz": Current stepping frequency	"RIT+0": RIT frequency shift	"NR": Digital noise reduction
"NB": Elimination of spark pulse interference (not available temporarily)	"MIC": Microphone gain	"CW M": Selection of automatic and manual key
"SIVOL": CW sidetone: volume	"SITON": CW sidetone: volume	"KEYSP": Automatic key: key speed
"DSP": Digital noise reduction: depth	"LEN": Noise reduction array length	

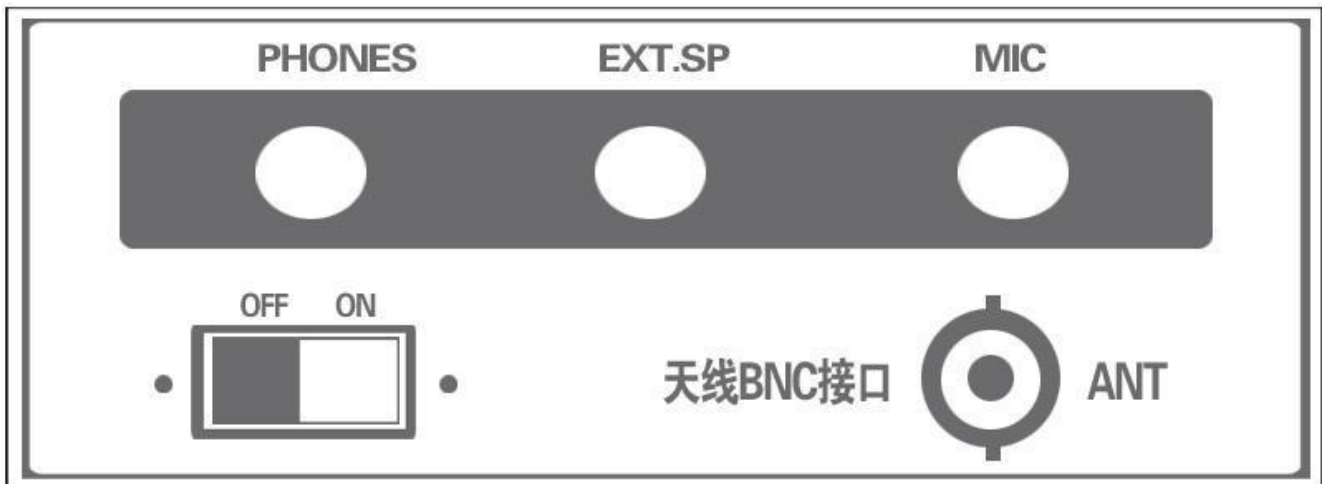


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V Interface of Panel at Two Sides



- "mini USB"** Mini USB Android universal interface
"KEY" CW key connecting interface (support automatic key and manual key)
"TUNE" Tuning interface for external optical-electricity encoder
" DC " XT60H type power interface



- "PHONES"** Earphone port
"EXT.SP" External speaker
"MIC" Interface of hand-held microphone (hand microphone)
" ANT " BNC specification: Antenna interface
" OFF \ ON " Power switch

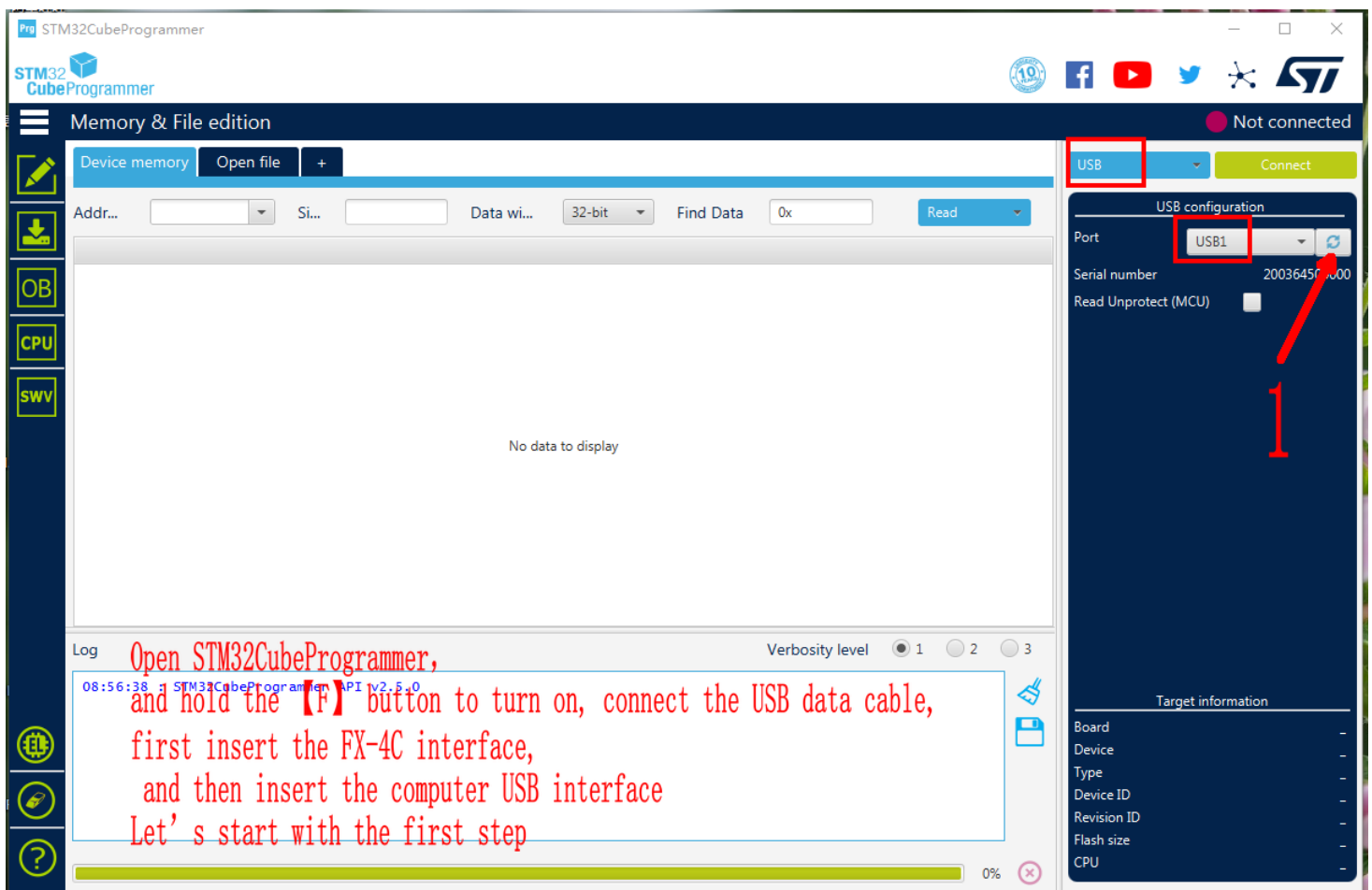
Thank you for your support and purchase

After-sale mailbox: 147178430@qq.com
Pocket elf (technology) QQ group: 830528222
Edit: Snow Wolf / BG2BJI

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V. Firmware Update:

1. Download latest firmware from BG2FX.
2. Download STM32Cube programming software:
<https://www.st.com/en/development-tools/stm32cubeprog.html>.
3. Run STM32Cube.
4. Hold down **F** and turn on FX-4C. Release **F** and screen should remain blank.
5. Plug USB cable into FX-4C, then into computer.
6. Select “USB” in menu at upper-right of STM32 Cube application. Click the “reload” button if necessary, and select port: “USB1.”
7. Click “Connect.”
8. Click “Download” to begin programming.
9. Click “Browse” and select .HEX file for latest firmware.
10. Click “Start Programming” and wait for programming to finish.
11. Once programming is complete, click “Disconnect.”
12. Turn rig power off, then back on again to complete update.



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Memory & File edition

Device memory | Open file | +

Addr... 0x08000000 | Si... 0x400 | Data wi... 32-bit | Find Data 0x | Read

Address	0	4	8	C	ASCII
0x08000000	20015128	08000371	08000385	08000387	(Q. q.....
0x08000010	08007131	0800038B	0800038D	00000000	1q.....
0x08000020	00000000	00000000	00000000	0800038F	.....
0x08000030	08000391	00000000	08000393	08008419	.....
0x08000040	08000397	08000397	08000397	08007521	.....!u..
0x08000050	08000397	08000397	08004805	080048D5	.....H..OH..
0x08000060	08000397	08000397	08000397	08000397	.....
0x08000070	08000397	08000397	08000397	08000397	.....
0x08000080	08002DCD	08000397	08000397	08000397	I-.....
0x08000090	08000397	08000397	08000397	08000397	.....
0x080000A0	08000397	08000397	08000397	08000397	.....
0x080000B0	08000397	08000397	08000397	08000397	.....
0x080000C0	08000397	08000397	08000397	08000397	.....

Log

```

08:57:38 : FW version : 0X011A
08:57:38 : Device ID : 0x0450
08:57:38 : UPLOADING OPTION BYTES DATA ...
08:57:38 : Bank : 0x00
08:57:38 : Address : 0x5200201c
08:57:38 : Size : 308 Bytes
08:57:38 : UPLOADING ...
08:57:38 : Size : 1024 Bytes
08:57:38 : Address : 0x8000000
08:57:38 : Read progress:
08:57:38 : Data read successfully
08:57:38 : Time elapsed during the read operation is: 00:00:00.007
    
```

Verbosity level 1 2 3

100%

USB configuration

Port USB1

Serial number 200364500000

Read Unprotect (MCU)

Disconnect

Target information

Board --

Device STM32H7xx

Type MCU

Device ID 0x450

Revision ID --

Flash size 2 MB - Default

CPU Cortex-M7

Erasing & Programming

Download

File path DAFX-4B\FX-4C程序\2021.10.22.hex | Browse

Start address

Skip flash erase before programming

Verify programming

Run after programming

Automatic Mode

Full chip erase

Download file

Option bytes commands -ob

Start automatic mode

Start Programming

Erase flash memory | Erase external memory

Erase selected sectors | Full chip erase

Select	Index	Start Address	Size
<input type="checkbox"/>	0	0x08000000	128K
<input type="checkbox"/>	1	0x08020000	128K
<input type="checkbox"/>	2	0x08040000	128K
<input type="checkbox"/>	3	0x08060000	128K
<input type="checkbox"/>	4	0x08080000	128K
<input type="checkbox"/>	5	0x080A0000	128K
<input type="checkbox"/>	6	0x080C0000	128K
<input type="checkbox"/>	7	0x080E0000	128K
<input type="checkbox"/>	8	0x08100000	128K
<input type="checkbox"/>	9	0x08120000	128K
<input type="checkbox"/>	10	0x08140000	128K
<input type="checkbox"/>	11	0x08160000	128K

Log

```

08:57:38 : FW version : 0X011A
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