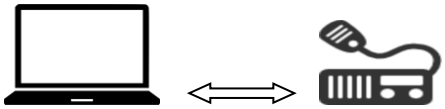
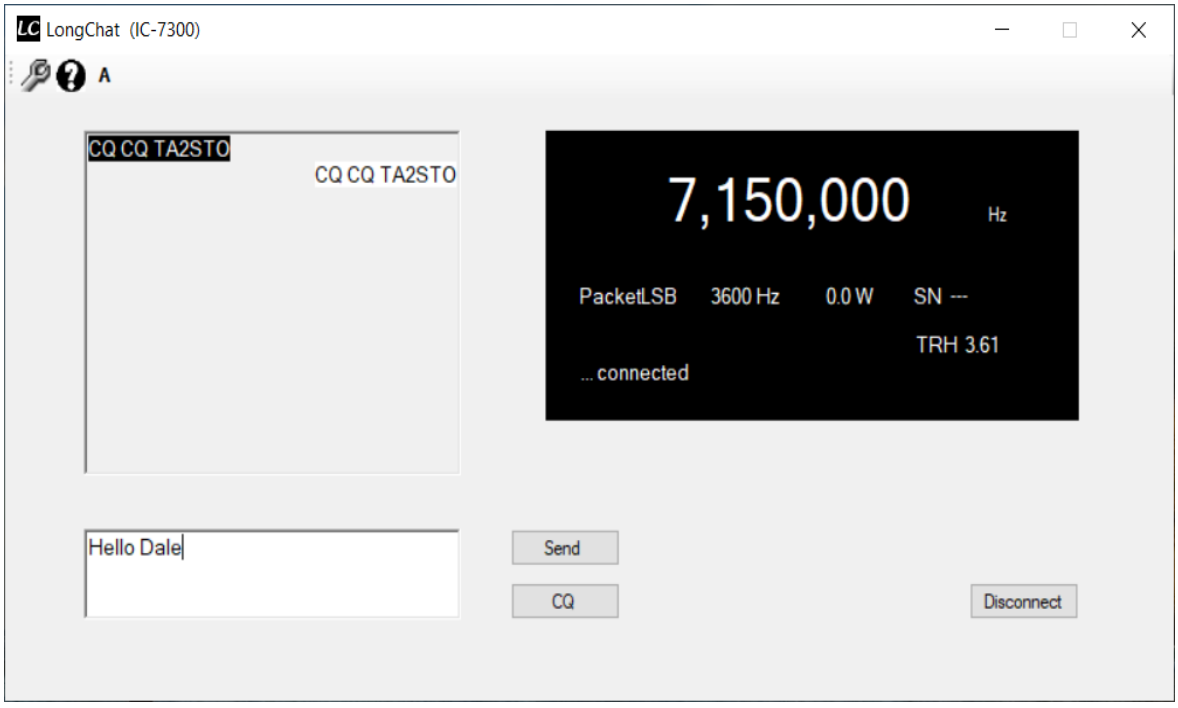
1. **Introduction**
2. **General Instructions and Installation**
3. **ICOM IC-7300 Instructions and Settings**
4. **ICOM IC-705 Instructions and Settings**
5. **YAESU FT991A Instructions and Settings**
6. **Troubleshooting**





1. Introduction

1.1. LongChat is a low-power (QRP) / low bit-rate **text chat program** over the ham radios connected to a PC.

1.2. Forward error correction codes are used to correct messaging errors.

1.3. Usable data rate (net user data) is 7 ASCII characters per second at -13 dB signal to noise ratio.

1.4. Eb/No (Energy per Bit to the Spectral Noise Density) is 5 db.

1.5. Chirp symbols with an audio bandwidth of 2400 Hz (300-2700 Hz) are generated on the PC side for encoding the messages.

1.6. Baseband audio signal is then transferred from PC to ham radio for modulation at the selected mode. SSB, FM and other types of modulation modes can be used.

1.7. Current version supports ICOM-7300 and ICOM-705 radios. Other radios will be added later.

1.8. Future improved versions will support higher data rates or lower S/N ratios.

1.9. Software is written in C# (Microsoft.Net Framework version 4.7.2)

1.10. Since the software is continually improved and data structures may have changed, latest version needs to be used for compatibility with all users. To ensure this, software will remind you to download and use the latest version when a new version is ready.

2. General Instructions and Installation

2.1. LongChat Installation file "LC-Installer.msi" file can be downloaded at https://drive.google.com/drive/folders/1G5DnKJXxJhi33GzugZ-eHWpfGYjEVhSI?usp=sharing Once downloaded, double click the file to start installation.

2.2. Ham radio USB driver software provides a "USB Virtual Com Port" for PC communications with the radio. It also provides an Audio Codec/driver for exchanging audio data over the USB.

2.3. Follow the instructions at the manufacturer web sites for download and installation.

2.4. Once the driver is installed on your computer, connect the USB cable to USB (B) at the back of the radio. And also make a note of the installed virtual COM port number from the "Windows device manager-->Ports" menu. This will be the port to be selected in the LongChat software ("Setup->Port")

2.5. Your PC sound output device will be set to Speakers(USB Audio Codec) of the ham radio

2.6. Your PC sound output device will be set to to Microphone (USB Audio Codec) of the ham radio.

2.7. Radio RX and TX filters need to be both set at 100-3000 Hz for SSB modulation.

2.8. HF SSB digital mode is tested extensively and works fine. SSB mode does not work at UHF and sometimes at VHF due to RX-TX frequency mismatches. Use FM mode for UHF. FM modes are not tested extensively. Youu may play with different FM bandwidths to get better performance.

2.9. High TX RF power can affect the USB cable and interfere with data and radio control, even reset the radio in some cases. Use ferrite choke/rings with the USB cable to filter RF intereference.

2.10. Always use least amount of power necessary. Do not work on voice channels.

2.11. **In the "Setup menu->rig" enable "Rx While Tx". This allows LongChat to receive audio codec signal while transmitting. Without requiring a second radio, you may use this feature to test LongChat. After the test, disable this feature to prevent echoe messages being received.**

2.12. Follow the instructions below for the specific radio models.

3. ICOM IC-7300 Instructions and Settings

3.1. Latest version 1.30 of the **IC-7300** USB driver can be downloaded at the ICOM Japan website at IC-7100/IC-7200/IC-7300/IC-7410/IC-7600/IC-7610/IC-7850/IC-7851/IC-9100/IC-9700/IC-R8600 | Firmware / Software | Support | Icom Inc. (icomjapan.com)

3.2. Once the driver is installed on your computer, connect the USB cable to USB (B) on the back of the radio. And also make a note of the installed virtual COM port number from the “Windows device manager-->Ports” menu. This will be the port to be selected in the LongChat software (“Setup->Port”)

3.3. **DATA Mod:** Default is ACC: **Set to USB** (Menu->Set->Connectors->Data Mod)

3.4. **USB Serial Function:** : **Set to CI-V** (Menu->Set->Connectors->USB Serial Function)

3.5. **Modulation**: **Set to LSB-D** (SSB->LSB->DATA) using touch screen or via LongChat

3.6. **TBW (Transmission bandwith SSB-D): Set to 100-2900** (Menu->Set->Tone Control/TBW->TX->SSB-D->TBW)

3.7. USB-D receive bandwidth can be left at FIL1 default value of 3.6Khz. However, adjusting the bandwidth of FIL1 to 2.9 Khz will decrease the noise and improve the performance.

3.8. Displaying Audio Scope can help you view the modulation waveforms (Menu->Audio)

3.9. If you can not hear the transmitter modulation sounds, make sure MONI is ON (Function Button->MONI->ON) . While MONI is on , you can also test LongChat with one radio only. For this, you need to enable “ Rx While Tx” property from the Setup->Rig menu .

4. ICOM IC-705 Instructions and Settings

4.1. Latest version 1.11 of the **IC-705** USB driver can be downloaded at the ICOM Japan website at IC-705/ID-52A/ID-52E | Firmware / Software | Support | Icom Inc. (icomjapan.com)

4.2. Once the driver is installed on your computer, connect the USB cable to USB (B) on the back of the radio. And also make a note of the installed virtual COM port number from the “Windows device manager-->Ports” menu. This will be the port to be selected in the LongChat software (“Setup->Port”)

4.3. **DATA Mod:** Default is ACC: **Set to USB** (Menu->Set->Connectors->Mod Input->Data Mod)

4.4. **Modulation**: **Set to LSB-D** (SSB->LSB->DATA) using touch screen or via LongChat

4.5. **TBW (Transmission bandwith SSB-D): Set to 100-2900** (Menu->Set->Tone Control/TBW->TX->SSB-D->TBW)

4.6. USB-D receive bandwidth can be left at FIL1 default value of 3.6Khz. However, adjusting the bandwidth of FIL1 to 2.9 Khz will decrease the noise and improve the performance.

5. YAESU FT991A Instructions and Settings

5.1. USB driver can be downloaded at the YAESU Japan website at the FT-991/ SCU-17 USB Driver (Virtual COM Port Driver) from the YAESU website

5.2. Once the driver is installed on your computer, connect the USB cable to USB (B) on the back of the radio. And also make a note of the installed virtual COM port numbers from the “Windows device manager-->Ports” menu. There will be two ports related to this driver one of which has the **enhanced** abbreviation. This **enhanced** port will be the one to be selected in the LongChat software (“Setup->Port”)

5.3. These settings are accessible via MENU(SETUP) button.

MENU	**SETTING**
029 232C Rate	38400
031 CAT Rate	38400
033 CAT RTS	DISABLE
062 Data Mode	OTHERS
064 Other Disp	2000
065 Other Shift	2000

066 Data Lcut Freq	100 Hz
068 Data Hcut Freq	3000 Hz
070 Data In Select	REAR
072 Data Port Select	USB
077 FM PKT PRT SELECT	USB
078 FM TX GAIN	> 0
112 SSB TX BPF	100-3000 Hz

5.4. Following settings are accessible via F(M-LIST) button.

F(M-LIST)	**SETTING**
Width	3000
DT Gain	Less than 50
MONI	Greater than 10

5.5. MONI allows you to listen to transmitted chirp sound. If it's on, you can test the software with one radio only (Enable "Rx While Tx" from the LongChat setup menu)

5.6. I have not totally understood how "064 Other Disp" and "065 Other Shift" menu items work. Setting them to 2000 seem to correctly place the chirp bandwidth with respect to career frequency.

6. Troubleshooting

6.1. Is the frequency at correct setting ? Sometimes one of the chat parties may have touched the frequency knob accidentaly and changed its setting

6.2. Is the modulation mode set correctly ? If one party is at LSB-D and the other at USB-D, it won't work.

6.3. Is the output power sufficient? If SNR is below -12 db, you want be able to receive messages. As a rule of thumb if you can talk over voice at a certain transmitter output level, you should still be able to receive messages even if you decreased that level to one tenth or lower. i.e if you can talk at 10 watts than you should be able to receive messages at 1 watt or lower.

6.4. If you are getting ASCII character errors (indicated by a yellow background at the errored block), check the SNR level. If it's very close to or lower than -12 db, ask the other party to double it's TX power level.

6.5. Is the TX modulation level sufficient? If modulation level is too low, your TX output level will also be low. Set modulation level to at least %50 or more.

6.6. Are Rx and TX filters being all set to 100-3000 Hz for SSB modulation? Lower bandwidth will distort the chirp signal where as higher bandwidths will add more noise.

6.7. Look at your PC sound settings. Did you choose correct input and output devices?

6.8. Look at your PC sound settings. Are your audio input/output being accidentally muted or at very low levels? Make both levels at least at %50 or more.

6.9. At last resort, close the LongChat application, turn off the radio and restart the PC.