

FT8-Helper WSJT-X v2.6.1

The FT8-Helper and JTDX-Helper share the most part of the source code. On this reason the manuals were merged. The WSJT-X and JTDX specific parts are marked accordingly. On this occasion the version numbering of the software has been changed. The first part of the number identifies the matching WSJT-X/JTDX version, the number following the “-” shows the actual version of the Helper.

The current version for WSJT-X is FT8-Helper-2.6.1-4, JTDX-Helper-159-2 for JTDX. Please check the latest available version on www.github.com/dg5lp.

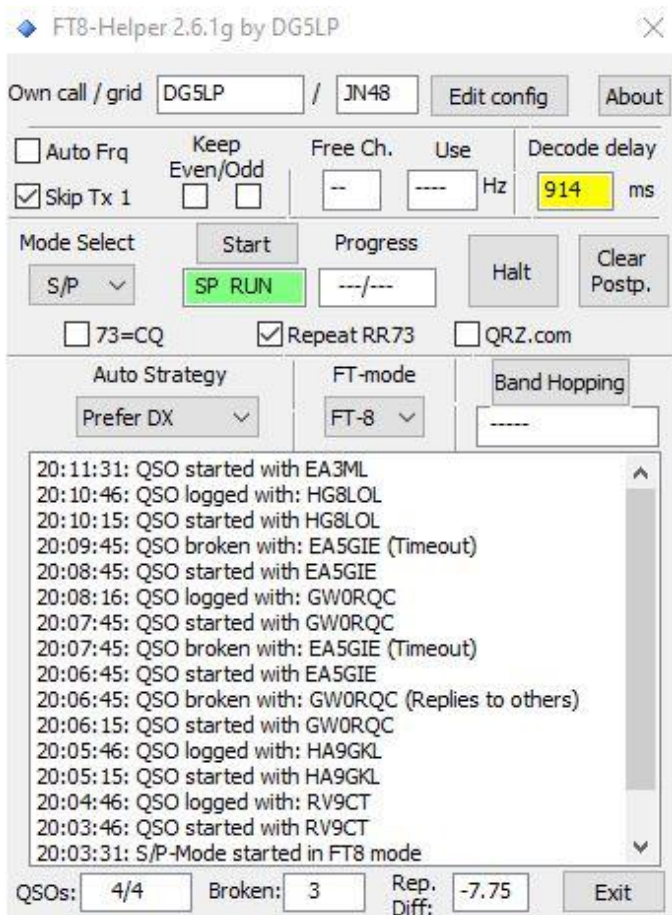
Further in this document both “JTDX-Helper” and “FT8-Helper” will be represented by “FT8-Helper” or simply “Helper”. WSJT-X represents JTDX-too, if the functionality is the same.

The Helper program was developed as macro extension using the Quick-Macros program. The Helper interprets the received messages of WSJT-X and acts according to the own pre-programmed QSO strategy. The delivered EXE file contains the licence for Quick-Macros. The license of QuickMacros for executing the Helper is included in the Helper.

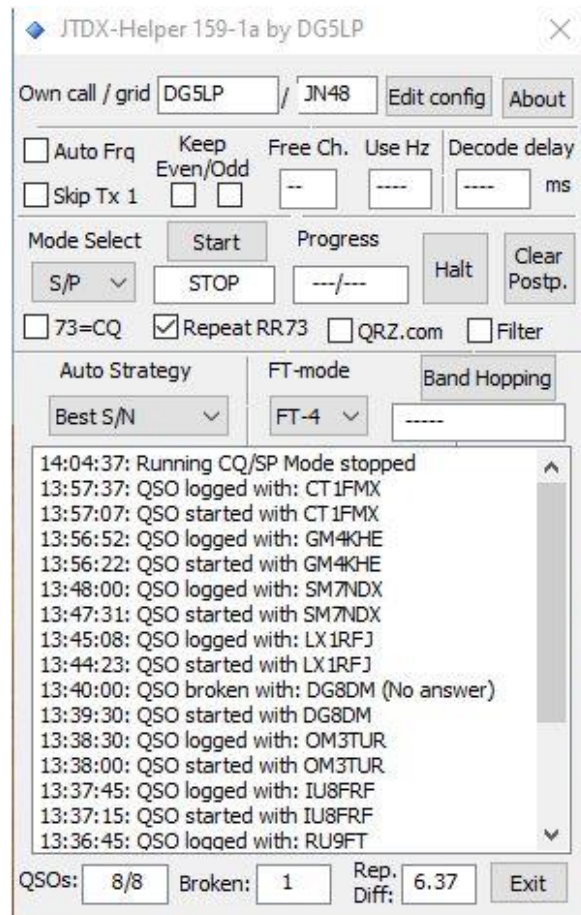
The Helper controls WSJT-X via virtual mouse- and keyboard commands. When the Helper is running, you should not use your computer for other applications, as the mouse focus will be caught by FT8-Helper every 7.5 or 15 sec depending on the Mode FT4/FT8.

Main Features of FT8-Helper-2.6.1-3:

- Automatic operation in both "CQ" and "S/P" mode.
- Automatic find of free frequency in CQ-mode
- MIX-Mode: (former CQ+SP) mode. If no CQ-calling stations are available, the Helper starts calling CQ.
- Automatic changes between CQ and S/P mode with programmable intervals, depending on band activity.
- In S/P-Mode can call stations sending 73 or RR73.
- Various strategies in S/P-Mode.
Call stations with:
 - Best Priority according the WSJT-X "Colors" and JTDX "Notification" settings
 - Best S/N
 - Only DX
 - Prefer-DX
 - Most distance
 - Prefer Wanted (according to wanted lists)
 - Only Wanted (according to wanted lists)
 - Exclude stations, prefixes and DXCC-entities according to exclude lists
- Strategy settings are also regarded for incoming calls in S/P, CQ-, XCHG- and MIX-Mode
- Band-Hopping
 - Programmable on daily basis
 - Two time ranges per day can be programmed
 - Operating band, mode, and strategy can be selected.
- Comfortable set-up of all parameter
- Easy installation
- WSJT-X can be started with the argument -r and rig-name.
- Opens the QRZ.com page of the QSO-partner when starting a new QSO
- Automatic control of the "Filter" feature (only for JTDX)



Main Window of the FT8-Helper



Main Window of the JTDX-Helper

The Main Window - human interface:

Own call / grid:

Your callsign and grid location, should be entered using the “Edit config” dialog.

Edit config:

Opens configuration dialog. The configuration is stored in the “config.txt” file in the installation folder. See more details below in text.

About:

Shows the current version and the copyright information (Freeware)

Auto Frq:

If “Auto-Frq” checked in “CQ”-mode, a free frequency will be searched and the transmitting frequency will set to the found free frequency between 500 and 2800 Hz. The transmitting frequencies of all received stations are logged in four subsequent 7,4/15 sec. cycles. From this data the FT8-Helper calculates the most usable free channel. If Auto-Frq is used the settings in the Wide-Graph session must be set up as follows:

- Start 500 Hz
- Bins/Pixel = 3
- The width of the Wide-Graph must not be changed

Please note that only valid FT8 or FT4 signals will be regarded when searching a free frequency. On this reason it can happen that the frequency is set to a non-FT8/FT4 signal, e.g. noise, RTTY, MFSK or any other signal.

Skip Tx-1:

If selected In “S/P” mode, CQ-calling stations are called with reports instead of QRA-grids. The Skip-Tx1 checkbox in WSJTX must be selected too. If selected during Band-Hopping, the function will be applied to all cycles.

Keep Even/Odd:

If this checkbox selected, the Helper calls CQ only in the selected even/odd cycle. Otherwise it starts always at the next possible cycle. This setting is inactive S/P-mode. (This function should be useful for 6m DX-work)

Free channels / Use:

If "Auto-Frq" is selected in CQ-mode, this field shows the number of free channels and the selected frequency. If no channels could be bound, it shows "—" and "-----"

Decode Delay (Lag time):

In most cases WSJTX cannot decode all messages within 15/7,5 sec. This value shows how long WSJTX needs to decode the messages in the next Cycle. Set the decoding depth in WSJTX so, that this value remains below 500ms. As this delay determines the answer delay, values over 1000 msec can prevent remote stations to decode our messages.

Mode Select and Start:

Prior start, select the required mode (CQ/SP/XCHG/MIX) by means of the "Mode Select" roll-down-menu. Pressing the "Start" button starts the selected mode.

The selected Mode can only be changed if the running operation is stopped.

CQ-Mode:

In „CQ-mode“ the FT8-Helper calls CQs continuously. Successfully completed QSOs will be logged automatically. After completing or aborting a QSO due to timeout, it restarts calling CQ again. The Helper manages its own timeouts and repetition limits. If no answer, or not the expected answer is received after the third attempt, the QSO will be indicated as "broken". If no call received after the predefined number of CQ calls, FT8-Helper goes into a "sleep" period. At the end of the sleep period it starts calling CQs again. The number of maximum allowed CQ calls and the number of "sleep" cycles can be defined in the "Edit Config" dialog (see later in this document). Incoming calls are accepted during the sleep period. If the "Sleep" value is 0, no sleep cycles are inserted.

S/P-Mode:

In „Search and Pounce“ mode the Helper selects the highest priority station from the stations calling CQ. The highest priority is calculated from the "Auto-Strategy" strategy setting and the priority settings in the "Colors" page of the WSJTX parameter settings, respectively the "Notification" settings in JTDX. QSOs will be executed automatically and successful QSOs will be logged automatically. S/P mode sets automatically "No-split-mode".

Stations calling DX are ignored if the distance calculated from their QRA-grid is less than the specified minimum DX-distance in the Helper's configuration. Stations calling directional CQ (e.g. "CQ EU" or "CQ JA") are only regarded if the CQ-extension matches to one of the "My Location" entries in the Helper's configuration.

For Both CQ- and S/P-Mode:

QSOs will be broken if the called station returns to another station or does not answers for the predefined number of repetitions. The limit of repetitions can be set in the "Edit Config" dialog (see below).

- Max. call repeats - waiting for first answer
- Max. repeats in QSO – waiting for R-Report or RR73
- Max. repeats at the end of the QSO – waiting for closing 73

Stations with broken QSOs are postponed for approx.5 minutes (2,5min. for FT4) to allow making QSOs with other stations.

XCHG Mode:

In XCHG mode the Helper switches between CQ and SP-Mode automatically. It starts with SP and reaching the predefined number of unsuccessful QSO attempts it changes to the other mode. At the end of CQ cycle it starts again with SP. This function can be selected for Band-Hopping. The maximum number of QSO attempts can be set up in the "Edit config" dialog (see below).

- „Max. broken QSOs in CQ-cycle“ for CQ-Mode
- „Max. broken QSOs in S/P cycle“ for S/P –Mode

The "Progress" field shows the current- and maximum number of QSO-attempts.

MIX- Mode: (former CQ+SP Mode):

When starting MIX-Mode, it starts calling CQ. If no answer is received, the FT8-Helper is looking for CQ calling stations. If available, the highest priority station is called according to the selected "Auto-Strategy". After completing the QSO it remains in S/P-Mode as long CQ-calling stations are available. If no station available, it starts to call CQ. In MIX-Mode frequency the "split mode" is set automatically. The "MIX-"Mode is selectable for Band-Hopping.

Progress:

During Band-Hopping and in XCHG-Mode it shows the progress of the program. E.g. the text "CQ 2/7 means, that in this CQ-cycle already 2 unsuccessful QSOs happened. Reaching 7 the next program will be started. In CQ-Mode (not during Band-Hopping"), it shows the CQ/Sleep progress and the "Seek" cycles when searching for free frequency.

FT-Mode:

Switches between FT-8 and FT-4. It controls the FT-mode of WSJTX. If the FT-mode is changed in WSJTX, it does not synchronise with the FT8-Helper. On this reason, on each start of "CQ" or "S/P" the FT-mode consistency is checked. If the check fails, an error message is indicates the inconsistency and the selected mode will not start. The selected FT-Mode can only be changed if the running operation is stopped.

Halt (Stop):

Stops running "CQ", "S/P" or Band-Hopping activities. First pressing the "Halt" button initiates a "graceful" shutdown and waits for completing the running QSO. If an immediate stop is required, a second "Halt" stops immediately.

73=CQ:

If the checkbox "73=CQ" is selected, the Helper can call in S/P and MIX-mode stations sending 73 or RR73. The Helper will call only stations, from those a CQ was received previously in the current session. This should prevent from calling local station calling CQ-DX or CQ-JA (if you are not in JA). It should also avoid, occupying the frequency if the called station is not owner of the QRG.

One exception: If a station is on the "Wanted-List" and the call is full matching. In this case the station will be called without receiving CQ previously. Be sure that the station works on a fixed frequency (which is mostly true in case of rare stations). To increase the probability of a QSO with such rare stations, select a free frequency manually and change WSJT-X/JTDX to split mode.

Repeat RR73:

If this feature selected, the FT8-Helper repeats RR73 at the end of the QSOs if no closing 73 received from the station.

Filter: (only for JTDX)

If selected, it activates the Filter feature of JTDX at the beginning of the QSOs and deactivates it at the end of the. JTDX will decode only the messages in the selected area around the receiving frequency. It helps to reduce the answer delay.

QRZ.com:

When checked, it opens the QRZ.com page of the station at the beginning of the QSOs. The URL is opened in the "default" browser of your Windows system.

Auto-Seq. Strategies:

The selected Strategy can only be changed if the running operation is stopped.

- **Best-S/N:**

The highest priority messages are called first. The lowest priority is "New Call in Band", the highest priority is "New CQZ". Please note, that only selected items (colours) in the WSJTX "Colors" dialog will be regarded. If more than one message is received with the same priority, the message with the best S/N ratio will be called first. In JTDX the configuration the "Notification" menu has the same function.

In case of incoming calls the station with the best S/N called at first.

- **DX-only:**

When selecting "DX-Only", only DX stations will be called. Stations are considered as "DX", if the calculated distance between the own grid, and the grid of the calling station increases the specified "Minimum DX-distance" in the "Edit config" dialog. If the grid is missing in the call (e.g. calling with report), the estimated distance is calculated from the middle of country.

- **Prefer-DX:**

As with "DX-only", but if there are no DX-stations, non-dx stations are called according to the "Best-S/N" rules. If more than one DX stations are calling, the station with the best S/N value is selected.

- **Most-distance:**

Stations with the largest distance (based on the distance of the grid locations) are called first. If the station does not send his QRA-grid, the estimated distance is calculated from the station's country. Please note, that in case of big countries the calculated distance can differ from the real distance.

- **Prefer-wanted:**

Wanted DXCC prefixes can be entered into the "Wanted DXCC" field of the Helper's configuration. Only the prefixes listed in the "List of type-1 prefixes" of WSJTX are regarded. For wanted continents the continent identifier preceded by "*" can be entered. Allowed entries are: *EU, *AF, *NA, *SA, *AS and *OC.

For grid chasing, wanted grids can be entered into the "Wanted Grids" field of the Helper's configuration. Two and four character grids can be entered.

Wanted call-signs can be entered into the "Wanted Calls" field. Partly defined call-signs and prefixes are also accepted. Full matching call-signs will be handled special manner: even if the stations country is excluded, the listed stations can be worked.

Stations matching to one of the specified entries in the wanted lists are called with higher priority. This works also for incoming calls too.

Please note: An example e.g. "JA" in the "Wanted DXCC field" affects all JA prefixes, JA, JH, JI etc. The same entry in the "Wanted Calls" affects only call-signs beginning with "JA". Here you can entry e.g. JA1 or any partly specified call-sign.

- **Only-wanted:**

In this mode both "Wanted DXCC" and "Wanted Call" lists are regarded. When selected in S/P mode, only stations are called, matching to one of the specified entries in the wanted lists. Stations with priority "New DXCC" or higher will be treated always as "wanted". Incoming calls are accepted only from the "wanted" stations.

Exclude Lists:

- Stations matching to one of the "Excluded" DXCC entries in the Helper's configuration are ignored in both "CQ" and "S/P-Mode". If the DXCC identifier is preceded by "#", incoming calls are accepted from the given country. Similar to the "Wanted" list, continents can be excluded entering *AS, *NA, *SA etc.
- Not wanted call-signs and prefixes can be entered into "Excluded Calls" field. If the call-sign or prefix is preceded by "#" the exclusion is only for outgoing calls in S/P-Mode. Incoming calls will be accepted.
- Please note that non-existing DXCC items (e.g. "D0" or "D1") can only be excluded entering them into the "Excluded Call" list.

- Additionally, stations with unwanted or invalid endings can be excluded adding “*/” prior to the unwanted ending. E.g. */R will exclude all stations with the ending “/R”.
- Stations with full matching call-sign in the “Wanted-Calls” list are handled with highest priority. This allows DX-expeditions to work with “home stations” or supporters, even if the country or prefix is excluded.

The “Edit Config” Dialog

Configuration Dialog

My-Call My Grid My Locations

Macro Delay (if required) msec Min. DX distance

Max. audio frequency Minimum S/N level accepted

Max. CALL repeats Max. CQ / Sleep /

Max. repeats in QSO Max. broken QSOs in CQ cycle

Max repeats at QSO end Max. broken QSOs in S/P cycle

Oldest accepted call min. Logging level

Excluded DXCCs Excluded Calls

Wanted Grids

Wanted DXCCs

Wanted Calls

Band Hopping parameter

Bands:

Band	From	To	CQ/SP Mode	FT-Mode	Strategy
	<input type="text"/>	<input type="text"/>	<input type="text" value="S/P"/>	<input type="text" value="FT8"/>	<input type="text" value="BEST-S/N"/>

#160:0-2400, S/P, FT8, BEST-S/N
 80:0-2400, S/P, FT8, BEST-S/N
 #60:0-2400, S/P, FT8, BEST-S/N
 40:0-2400, S/P, FT8, PREFER-DX
 30:0-2400, S/P, FT8, PREFER-DX
 20:0-2400, S/P, FT8, PREFER-DX
 #17:0-2400, S/P, FT8, PREFER-DX
 #15:0-2400, S/P, FT8, PREFER-DX
 #12:0-2400, S/P, FT8, PREFER-DX
 #10:0-2400, S/P, FT8, PREFER-DX

- My-Call ; enter your call-sign
- My-Grid ; enter your four character QRA-grid
- MY-Area ; enter your country and continent separated by "space" e.g. K NA USA.
- Macro Delay ; for slow computers enter a value between 10 and 50 for correct operation.
- Min. DX distance ; specify the minimum DX distance
- Km/Mile ; select Km or Miles used for DX distance
- Max. audio freq. ; stations above the specified frequency are ignored.
- Min. S/N level ; stations with S/N value below this value are ignored
- Max. CALL repeats ; maximum number of repeats when calling a station
- Max. CQ/Sleep ; the max. of CQ calls sent before going to “Sleep” / Number of “Sleep” cycles

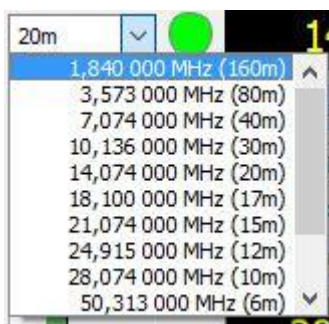
- Max. repeats in QSO ; maximum repeats of reports and R-reports (QSO not yet logged)
- Max. repeats at QSO-end ; maximum repeats of RR73 and 73 at QSO-end (QSO already logged)
- Max. broken QSOs in CQ ; maximum number of QSO attempts in CQ-Mode
- Max. broken QSOs in S/P ; maximum number of QSO attempts in S/P-Mode
- Oldest accepted call ; Stations calling us during a running QSO station are stored and after completing the running QSO the station will be called back, but only if the call did not received before the specified value. 2-3 minutes are appropriate.
- Logging level ; Log is written into the file "\\log\\log-<YYMMDD.txt" in the installation directory;
 - Logging level: NONE ; No logging file written
 - Logging Level: LOG ; Only the content of the log-window of the FT8-Helper is logged
 - Logging level: MSG ; Additionally, all received and transmitted messages are logged
 - Logging level: EXPERT ; Additionally, information for software debugging are logged
- Excluded DXCCs ; List of DXCCs and countries should not be worked, separated by "space".
- Excluded Calls ; List of call-signs or prefixes should not be worked. Entering e.g.*/R or */MM unwanted endings can be excluded.
- Wanted-Grids ; list of wanted grid locations separated by "space". Two or four characters are allowed
- Wanted DXCCs ; list of wanted DXCC items and countries separated by "space"
- Wanted Calls ; list of call-signs and prefixes you want call, separated by "space"

Band-Hopping:

Using with CAT controlled Transceivers "Band Hopping" allows automatic changing between bands, FT-Mode and QSO-Strategy according a free programmable schedule.

When starting, a popup window shows the current schedule. Active bands at this time are marked by "+", the first executable band is indicated by "->". Confirming the schedule pressing "OK" starts the first executable program line. Depending on the program, CQ , S/P or MIX cycle is started. The cycles are stopped if the specified number of QSO attempts is reached. The next program line is examined and if the current time is in the specified time-range, the program is executed. If the time does not match, it tries the next line etc. If no executable program could be found, it goes to the "IDLE" state and remains as long as no executable program could be found. The status field below the "Band-Hopping" button shows the current program.

The "Band Hopping parameter list:



For the default frequency settings in WSJT-X, following entry is required in the „BANDS“ field: 160 80 40 30 20 17 15 12 10 6

If e.g.60m also required, enter 60 between 80 and 40

As only 10 entries are allowed, one of the bands must be removed.

The band order in the BAND-field must be the same as the order in the frequency selection menu of WSJT-X

The schedule list can be entered line by line. First, enter the required band and the time range(s), select the FT-Mode and the QSO-strategy. Pressing "Add line" enters the line into the schedule list. The time ranges must not overlap. If only one time range required, the second field should be left empty. Time values between 0000-2400 are accepted (Example: 0000-0800 and 1600-2400).

Important Notes:

- Local time of the PC is excepted for the time ranges, not UTC !
- Lines in the schedule list can be edited, copied and deleted.
- Lines can be disabled inserting "#" at the beginning of the line.

QSOs:

- The first number is the number of QSOs of the running CQ, S/P or Band-Hopping session.
- The second number is the total number of QSOs from starting the FT8-Helper

Broken (QSOs):

- Counts the started, but not logged QSOs.

Rep Diff:

- Shows the difference between received and sent S/N values. If this value positive, you send obviously with higher power as the average of your QSO partners.

Installation and Initial Setup

Download the FT8-Helper-exe-file from www.github.com/dg5lp , copy it into a directory of your selection. Start WSJTX, then the FT8-Helper. At first start, the callsign and grid fields are empty. Open the "Edit config" dialog and your callsign and QRA-grid of your station. Enter your DXCC and continent abbreviation into the "My Locations" field, e.g. "K, NA, USA" or "G, EU". The "My Location" entries are only used for correct evaluation of directed CQ calls. Do not forget pressing "OK" to store the changes. Now, FT8-Helper is ready to use. Start "CQ" or "S/P" mode.

Required settings of your Windows operating system:

- The FT8-Helper was tested with WIN-10, however with WIN-11 should work as well.
- Desktop resolution of at least 1280 x 1024 pixels is recommended, but it runs also on notebooks with 1280 x 768 pixels in "low resolution" mode with some limitations.
- Application text size must be set to 100%
- Use standard WIN-10 desktop design, especially no "Classic WIN-2000" type window manager will work
- Do not use custom colors or other settings modifying the default color scheme.
- Additional software like JTAlert or log programs can have unexpected impact on the functionality. From my side there is no remedy for such problems.

Required setting in WSJTX

WSJTX main window:

- If possible, Install the required WSJTX-version from scratch
- Be sure that you can make QSOs manually without the FT8-Helper.
- Be sure that the "Menus" checkbox is selected and the roll-down menus "File..." are available
- Deselect the "Spt" and "Wanted" checkboxes.
- Be sure that the full WSJT-X main window on the desktop in its full entirety.
- Set the tiling between "Band Activity" and "Rx-Frequency" windows approx. 50-50%. The tiling will be adjusted automatic when starting CQ or S/P. Do not change it later.
- Select folder "1" in the DX area, so that the messages TX-1 to TX-6 can be selected.
- "CQ only" **must not** be checked, especially if "Auto-Frq" should be used.
- Set the "Decode" parameter according to your computer performance. The "Decode" phase should be completed at the latest 0.5 sec after starting the next cycle. Obtain the "Decode delay" field and the colour of the "Decode" button in the FT8-Helper main menu (see above).
- All other buttons are operated by the FT8-Helper automatically
- Do not change the windows geometry. Both the main WSJTX session and Wide-Graph is set for the correct size at program start.
- Do not move the WSJTX windows so that parts of the windows are outside of the desktop.
- Use the default Font-Sizes in WSJTX as it was set during the installation
- The "Application Font" must be set to "MS Shell Dlg" with Standard Font style and Size = 8
- The "Decoded Font" must be set to "Courier", Normal Font Style and Size = 10

Settings in "General":

General Radio Audio Tx Macros Reporting Frequencies Colors Advanced

Station Details

My Call: My Grid: ☒ AutoGrid IARU Region:

Message generation for type 2 compound callsign holders:

Display

☐ Start new period decodes at top

☒ Blank line between decoding periods

☐ Display distance in miles

☒ Tx messages to Rx frequency window

☒ Show DXCC, grid, and worked-before status ☒ Show principal prefix instead of country name

☐ Highlight DX Call in message ☐ Highlight DX Grid in message

Behavior

☐ Monitor off at startup ☐ Enable VHF and submode features

☐ Monitor returns to last used frequency ☒ Allow Tx frequency changes while transmitting

☐ Double-click on call sets Tx enable ☒ Single decode

☐ Disable Tx after sending 73 ☐ Decode after EME delay

☐ Calling CQ forces Call 1st

☒ Alternate F1-F6 bindings Tx watchdog:

☐ CW ID after 73 Periodic CW ID Interval:

Settings in “Radio”, “Audio” and “Tx-Macros” menus:

No special settings are required.

Settings in “Reporting” menu:

All settings concerning “Reporting” **must be** deselected.

Settings in Frequencies menu:

See the frequency settings in chapter “Band-Hopping” above. It is recommended to remove all not used frequencies so, that maximum 10 entries remain in the band selecting menu in WSJT-X.

Otherwise accidentally moving the vertical scrollbars can use malfunction of the automatic band selection.

In “Colors” folder:

- “CQ in message” (green), “Transmitted messages” (yellow) and “New Call in message” (red) must be selected.
- Additionally at least one color must be selected, typically “New Call on Band”
- Depending on your needs, other highlighting colors can be selected too. If you chasing DXCC, Grids or Zones, the corresponding color should be selected. The higher the line the higher the priority when calling stations in S/P-mode.
- Select “Highlight by Mode” according your needs
- Select “Highlight also messages with 73 and RR73, especially if you want use the 73=CQ option

Correct settings of the Wide-Graph window:

- Bins/Pixel = 3
- Start 500 Hz
- Do not change the size of the window.

This setting is mandatory only if the “Auto-Frq” feature should be used.

Bug reports and observations to:

dg5lp@darc.de