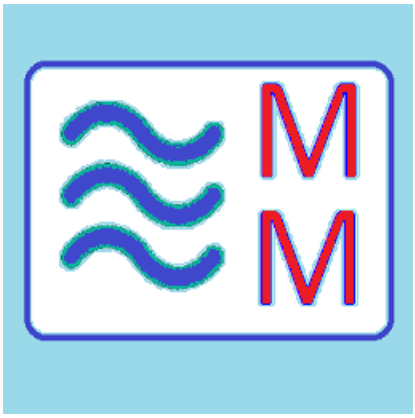
MESSAGE MACHINE

OPERATOR INSTRUCTION MANUAL

UPDATED - 4 JUNE 2017



"MESSAGE THROUGH!"

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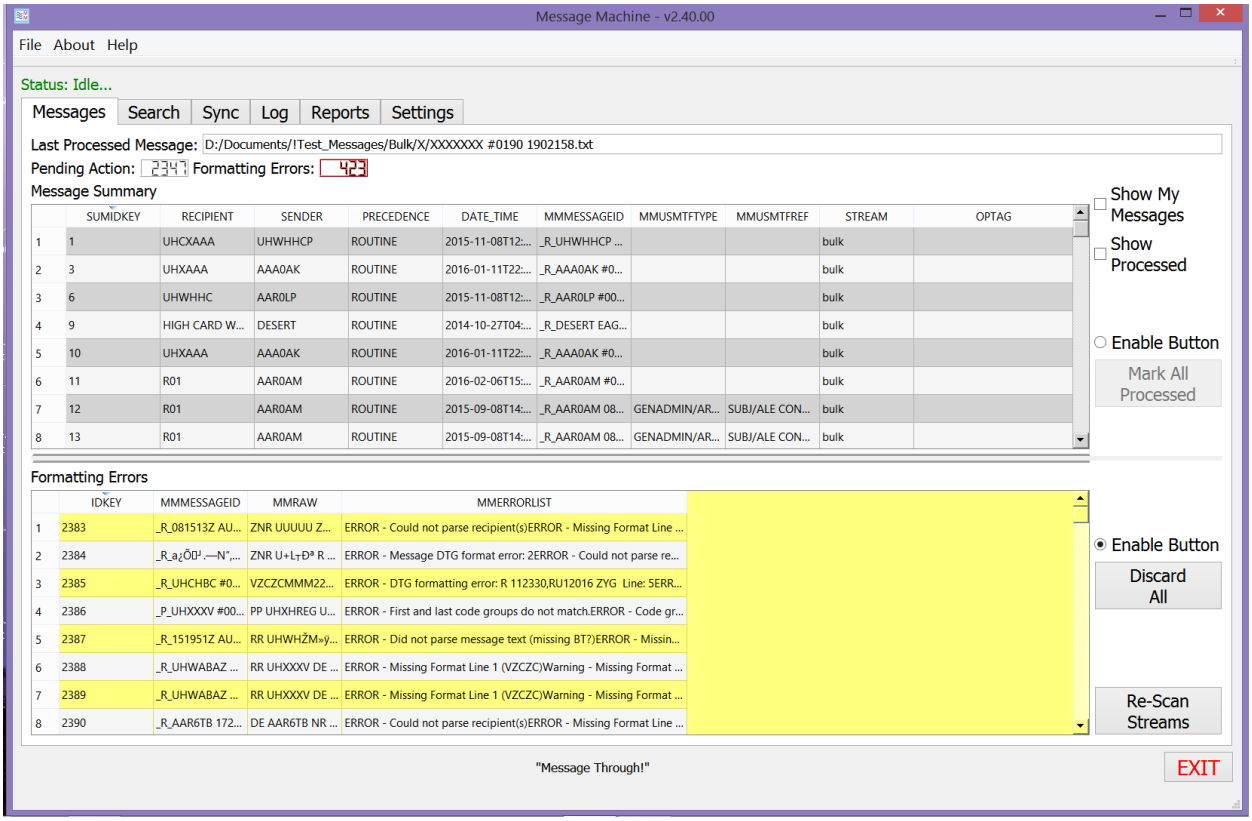

WHAT'S NEW IN VERSION 2.40.00

- Message Machine user manual (this document) has been **heavily revised and new content added** – please give it a thorough re-read
- Added Sync/Remote Sync Function to sync messages between two Message Machines
- Added USMTF Type and Reference fields to the database
- Added extra search features for USMTF type messages
- Greatly reduced MM GUI size - minimum supported screen resolution 1024x768
- Added configuration option to allow machine mode only on CT circuit – in lieu of authentication
- Added UHXAAA, UHXPPP to ACK and Accept messages function so they no longer need to be added to the Guarded RI block
- Using proper version numbers as per the User Manual Xx.Yz.Zz
- Fixed bug in format of MessageID - should be _R_SENDERCALL_SOMEDATE, where _R_ is the precedence of the message

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MINIMUM SYSTEM REQUIREMENTS

- Windows 7 or above – XP/Vista are not supported by our development tools and not supported by Microsoft
- Running on Linux under Wine is not supported. If you get it to work great, but the next release may break
- Any modern processor of 1GHz or higher speed
- A multi-core and higher speed processor if running alongside MS-DMT (not recommended)
- 1024x768 min screen resolution

PURPOSE

- Message Machine (MM) is a tool for the MARS Operator who handles digital ACP-126 and ACP-127 messages.
- It is developed in Qt (http://www.qt.io), a cross platform application development tool, and compiled for Windows (32bit), Ubuntu (32 and 64bit), and MAC OS X (Mountain Lion 64bit). While Qt can also create Android and other mobile platform applications, MM is not designed to run on those platforms.
- While all the functions of MM can be performed manually using any methods the operator desires, having the ability to accomplish all the procedures in message handling in one application enhances efficiency.
- The primary use for MM is as a message digest used for message handling. Using MM the operator immediately visualizes message traffic in the pending action queue that is awaiting processing. The operator can take a cursory glance at the list of messages and decide if he needs to perform some action on the messages.
- Once the determination has been made that the operator does need to act on the message, MM can be used to perform those actions. Such actions may be to fix errors in a message and re-process it in the digest, re-transmit the message to another station, or if the message is addressed to the operator themselves to decode the message and/or read it.
- Once the operator has completed his actions on the message, or if the operator has no action to take on the message, the message can be marked as processed and it is no longer visible on the pending action queue.
- MM can also perform SQL like searches on the messages in the database. This makes finding messages painless and fast. The operator can almost instantly know if they have received a message already.
- MM includes a Machine Mode that makes operation of the MARS Messaging Station semi-automated. Remote stations will be able query MM to see if there are any messages for them or for any Relay or Gateway station and ask MM to send them those messages.
- Machine Mode enables automated acknowledgment of received messages which will allow the sender to know the condition of the received message. The sender can then decide if they need to resend the message or lower transmission speeds.
- MM optionally includes routing capabilities. Based on the user defined ruleset messages received and processed will be routed to an outbound stream. To enable the routing feature, an unlock code associated with your call sign needs to be entered in the Routing settings tab.

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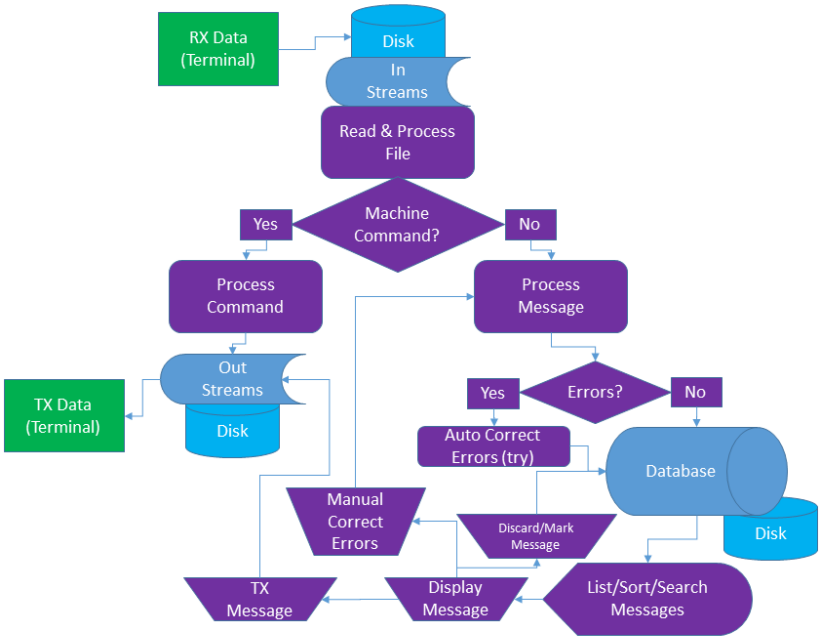
HOW IT WORKS

MESSAGE MACHINE PROCESSING FLOWCHART



(Fig. 1) Process Flowchart

MESSAGE PROCESSING FLOW

- Once your streams are configured and the changes applied, MM will begin to scan the watched folders. Depending on the number of folders and files located in those folders this scanning process could take a while as each message is read and parsed for information and then stored in a database. After each folder/sub-folder is scanned the message lists on the Message tab are updated with the newly processed files.
- Any message deposited in any of the input stream folders will be processed by MM immediately and if the message is not a duplicate it will be added to the Message Summary and or Error lists. If the acknowledge messages checkbox is the settings tab AND the stream the message was received on is also has it's acknowledge message checkbox checked then MM will create a response message and send it to the output stream folder.
- Once MM has finished processing the watched folders all the messages that could be parsed will be displayed in the Message Summary list and any messages that have formatting errors will be displayed in the bottom list.
- All responses and messages sent to the output stream folder (AUTOSEND or SENDNOW folders) are immediately sent by the terminal application (Station Manager or Crypto Comm) to the modem/radio and transmitted over the air. Once the file is sent to the modem it is moved to the sent folder by the terminal application.

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MAINTAINING MESSAGE MACHINE PROCESSING SPEED (RESPONSIVENESS)

- Every time MM is started or when a new message is received, MM scans the incoming stream(s) for new files. It checks each file in the RECEIVED folder(s) to see if that file has been processed before. This check, though faster than processing a new file, takes a certain amount of time.
- If there are a large number of messages in the database and a large number of files in the RECEIVED folders, MM will take a while to process the new file. Depending on the speed of the computer, and if your Database Settings are set to Mark/Purge/Reindex, this may delay the time that the acknowledgement message is sent.
- In order to speed up this check, files in the RECEIVED folders should be periodically cleared out. We recommend the files be moved to a subfolder in the RECEIVED folder called OldFiles or similar. This way if the database needs to be rebuilt you can set the Include Subfolders option in each of the streams and these older messages will also be processed. Once the database is rebuilt, uncheck the Include Subfolders so these old messages will not continue to be scanned.
- You should also periodically delete old messages from the OldFiles folder as there is no sense keeping messages after a certain time and especially reprocessing them into the database each time it is rebuilt.
- If you insist on keeping old message files, move them to an archive folder where they won't be scanned by MM before you rebuild the database.
- The database should also be purged of old messages and re-indexed periodically. The timeframe to keep messages may be set by your region or state. Set your Database Settings appropriately.
- To create a fresh clean database, first move all the files from the RECEIVED folders to OldFiles or archive them. Then follow instructions on rebuilding the database.

MULTIPLE MESSAGE MACHINES ON A FIXED FREQUENCY

- While MM was originally designed to run on an ALE system, if proper etiquette is followed MM can operate well on a fixed frequency.
- Multiple operators running MM on the same frequency with acknowledgements turned on can cause undue interference.
- Only one instance of MM should be running on a single frequency with ACK ALL turned on.
- If the frequency is a region frequency then the instance of MM should be the only instance with ACK ALL turned on in the region.
- If the frequency is a statewide frequency then only one instance of MM should have ACK ALL turned on in the state.
- If multiple instances of MM need to be running then turn ACK ALL off on all but one instance.
- The only way to have multiple instances with ACK turned on and not cause undue interference is to have all instances only ACK messages for their respective call sign.

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THREADING

- Threading allows the operator to use MM while it is processing a large quantity of messages in the background. Even so, to help MM speed up processing, messages should be cleared out of the incoming message stream(s) periodically. This period will be determined by your volume of message traffic. (See Maintaining Message Machine Processing Speed, above.)
- NOTE! While it is safe to exit MM while scanning (blue status) and processing (red status), there is a very rare stability issue when exiting MM while it is working on any watched folder changed signals. You will know this is happening because it starts with no user intervention and the status color is orange. To be sure that MM closes properly and the GUI does not block and hang on exit, let MM complete this process. Depending on the number of watched folders and number of messages contained therein, this may take a second to several seconds. Once idle is continually displayed in the status (green) it is safe to exit MM.

VERSIONING

- The versioning scheme used by MM is as follows: Xx.Yy.Zz(ab)
- The Xx is the major version number. It may be a single or double digit number. The number increments when a major change to the application has been made or a programming milestone has been met.
- Yy is the minor version number and it increments when there is a minor change or addition.
- Zz is a hotfix version and it increments when a bug has been squashed. You should always download the version with the largest hotfix number than yours. If the fix was for a major bug like a crash bug or a bug that provided erroneous data, the previous versions will be deleted from the repository.
- (ab) indicates either an alpha or beta release. Alpha releases are the first of a pre-release that are distributed to a small group of testers who have either programming knowledge or knowledge that is useful to the development of MM. Beta releases are distributed to a larger group of volunteers that use MM in their daily operations and report bugs back to the programmers.
- An official release will not include (ab) after the version number. Official releases are intended for all MARS Membership for operational use.

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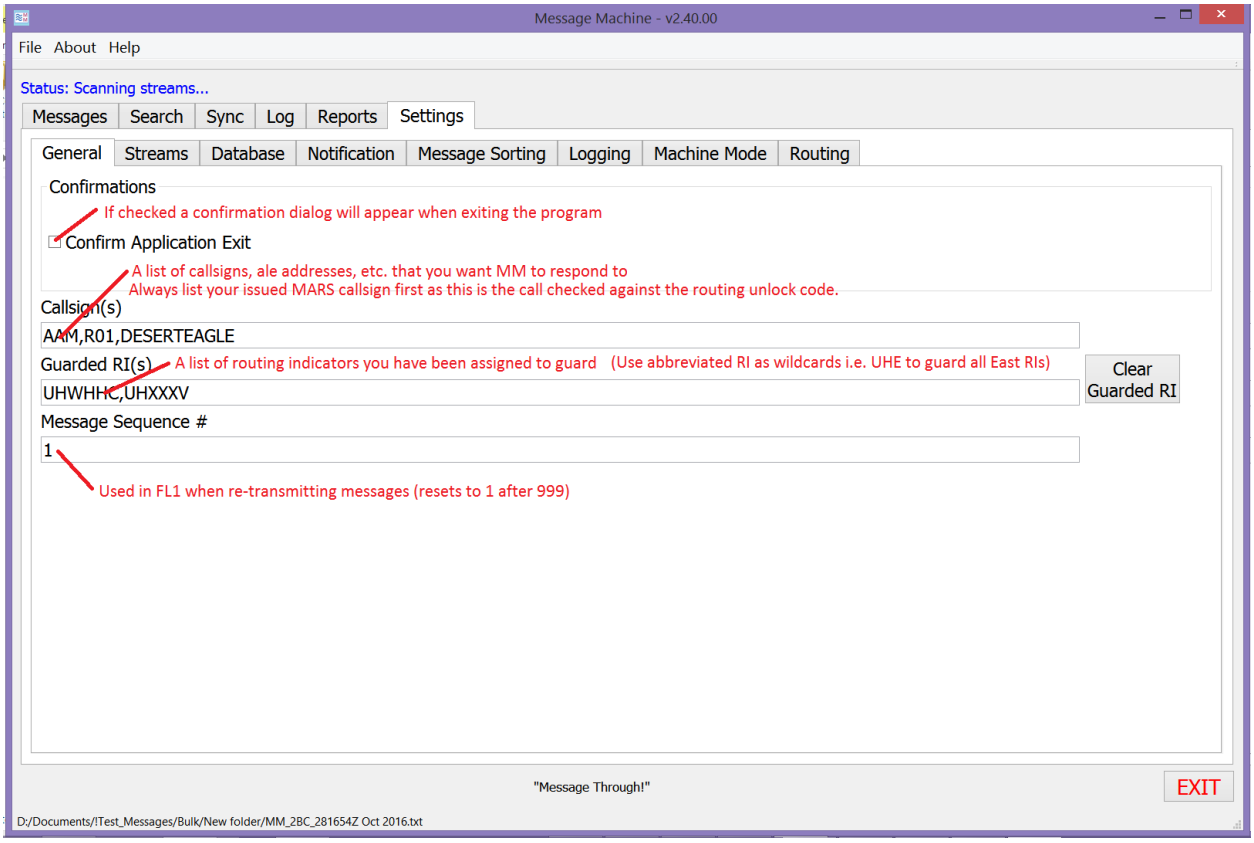
HOW TO SETUP - A WALK THROUGH

SETTINGS

GENERAL



- Confirm Application Exit – Enables or disables exit application confirmation dialog.
- Call sign – Enter your call sign. It is used in machine mode when filtering incoming messages. Multiple call signs can go here, separated by commas. This will allow multi call Machine Mode. If you have a routing unlock code make sure the call sign the unlock code was issued for is listed first.
- Guarded RIs are routing indicators that you are guarding at the moment. These are used when filtering incoming messages in Machine Mode. Billet calls also go here.
- **Do not use wildcard symbols like * or @ as indicated in AM-6!**
- If you want to filter all RIs that match UHW then just enter UHW as the RI. If a message contains UHW in any of the recipient RIs then a match is made.
- Message Sequence Number – Incremental counter used when re-transmitting messages.

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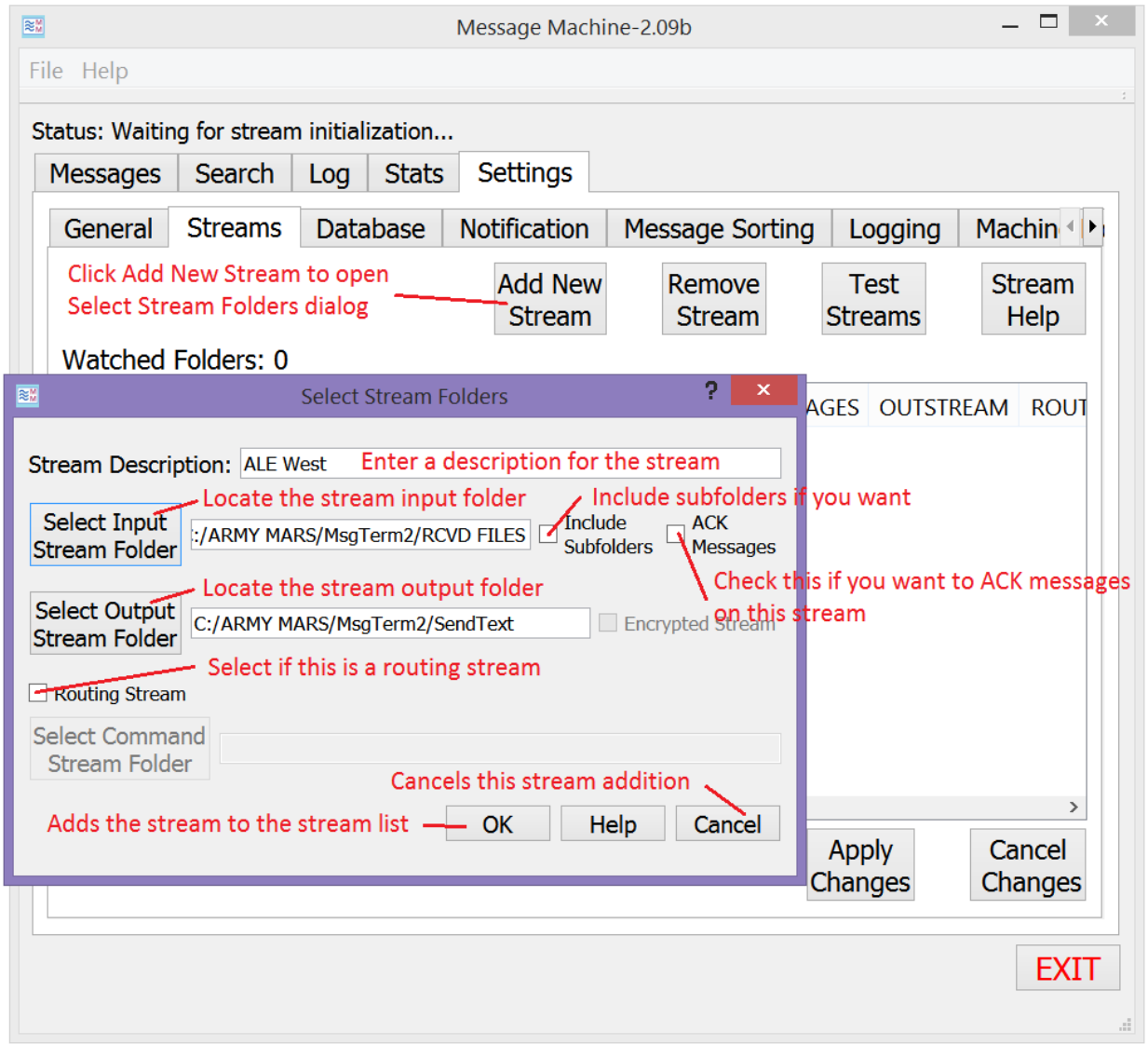
STREAMS

ADD A NEW STREAM



- Streams are used to tell Message Machine (MM) where to watch for incoming messages. Your terminal program, when configured to do so, will save received messages to a specified folder. When configuring MM Streams, set the stream to the same folder where your terminal program saves the message files.
- MM can be configured to watch several folders allowing you to run multiple terminal programs.
- The limit on the number of folders MM can watch will be set by your computers capabilities and available resources which will likely be way more than you need. Remember all subfolders under a stream are considered a separate stream which uses up system resources. **Check the include subfolders checkbox wisely.**
- If your terminal program supports auto sending of message files by placing a file in a specified folder, then an output stream can also be configured and MM will place a message file there when directed and your terminal program will transmit that file.

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- To configure a stream, click on the Settings tab then select Streams.
- To add a new stream:
- Click on the Add New Stream button.
- Add a meaningful description for the stream so you will be able to tell what the stream is from the description.
- Press the Select Input Stream button and a folder selection dialog will appear. Navigate the file system to the folder you want to watch and press Select Folder. If you need to also watch subfolders then check the Include Subfolders box. Be careful with how many subfolders you are going to watch as this could result in running out of system resources and cause MM to not function as expected and even cause your computer system to act erratically.
- If you also wish to re-transmit messages, and your terminal program supports it, you can configure an output stream and point it to the Send Text folder as configured in your terminal program.
- Once you are happy with the current stream settings, press the OK button. The streams location is tested and if no problems are found a green connected status will be displayed along with the stream description and locations.
- Once you have added all the necessary streams and are happy with the results, press the Apply Changes button to permanently save your stream configuration. Message Machine will now start scanning your streams input folders.

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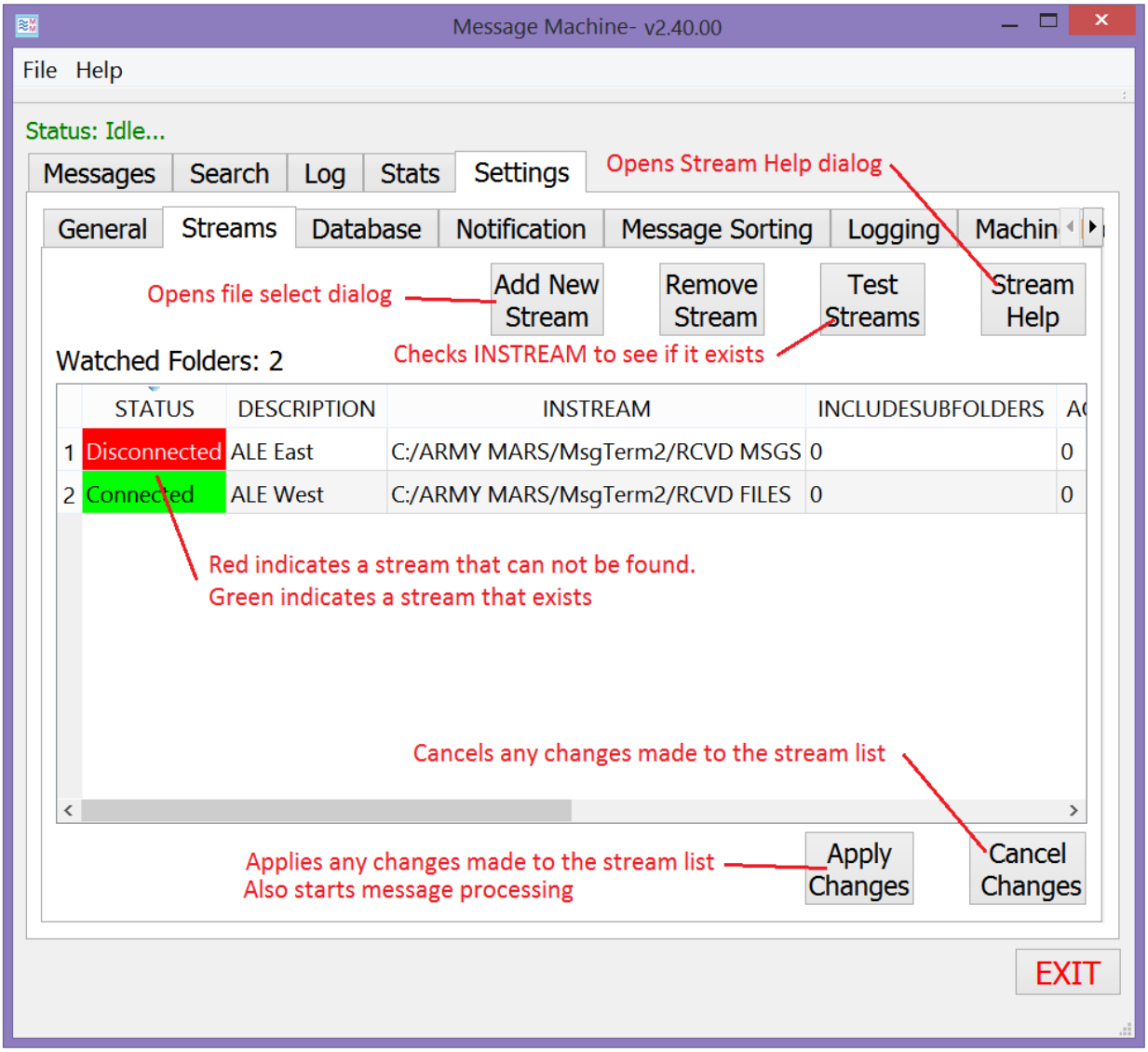
STREAM LIST DESCRIPTION



EDITING STREAMS

- To edit a stream double-click on the stream you want to edit.
- Change the desired information.
- Click OK.
- Press the Apply Changes button.

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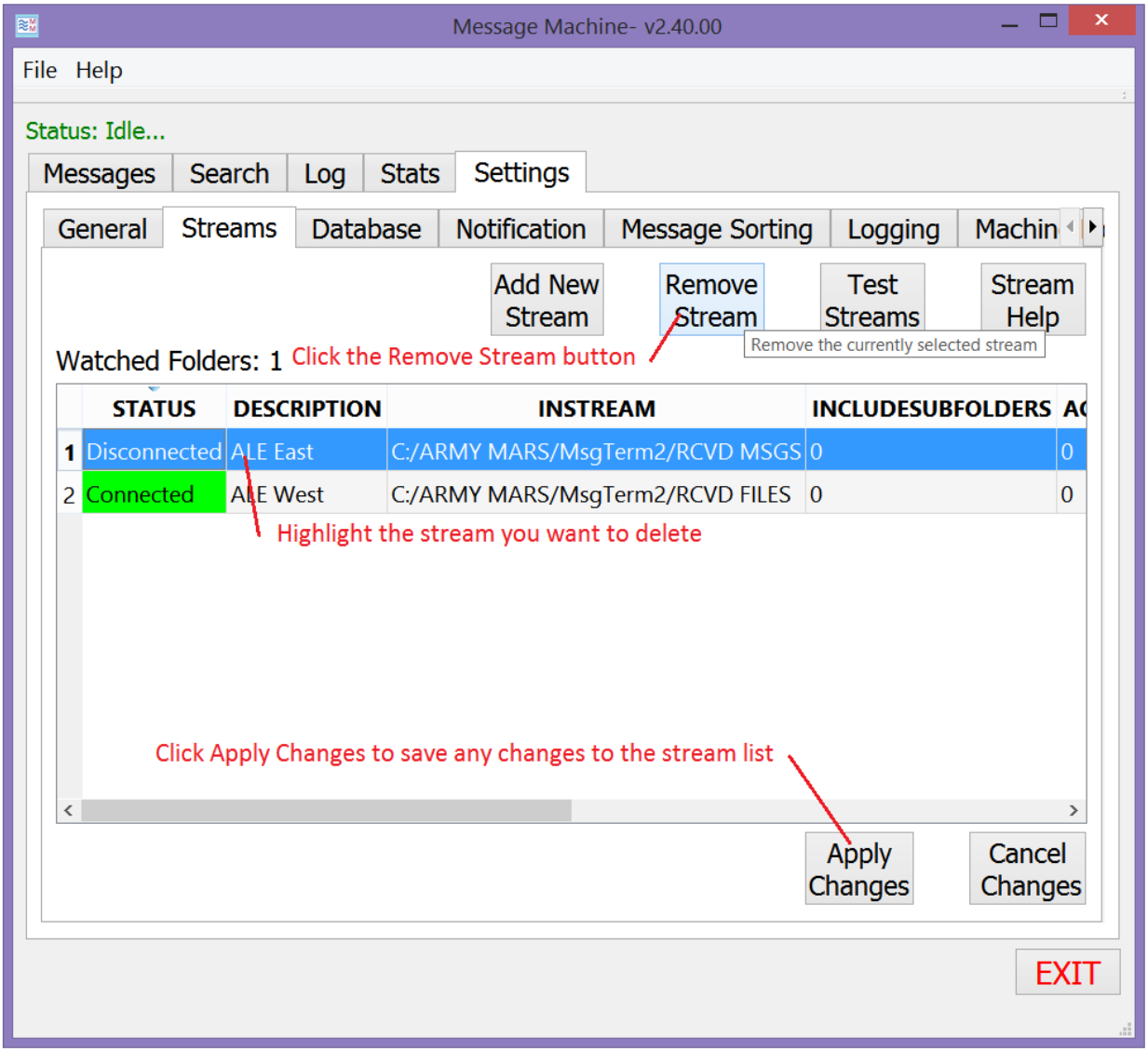
DELETING A STREAM



DELETING STREAMS

- Select the stream you want to delete.
- Press the Remove Stream button.
- Press the Apply Changes button.

NETWORKED STREAMS

- When adding a stream located on a networked computer, make sure the shared folder of the remote computer is **mapped to a drive letter** on the computer that MM is running on.
- To map a networked shared folder, locate that folder, right click on the folders icon and select Map network drive…
- Choose a drive letter that has not been assigned and make sure the Reconnect at login box is checked.

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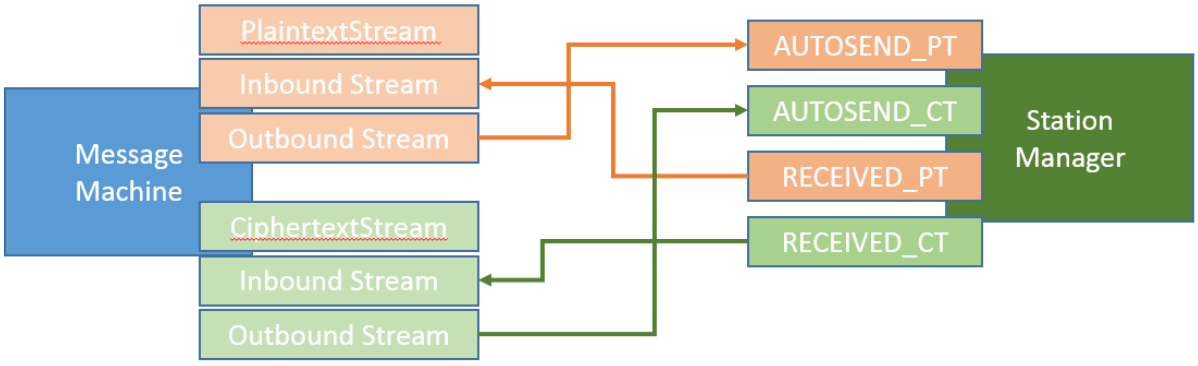
- Then click the Finish button.
- Now go add your stream to MM using the **Drive letter** of the shared folder you just mapped.

PLAINTEXT AND CIPHERTEXT

Before Message Machine transmits any message it first looks for the ZNY operating signal on FL4. If it finds ZNY then it will not send a message out a stream unless that stream is marked as an Encrypted Stream.

STATION MANAGER

For Station Manager Streams, point the inbound and outbound streams to the respective folders as shown.



(Mark Ciphertext Stream as Encrypted Stream)

For plaintext streams, point the inbound and outbound streams to the Received and AutoSend PT folders respectively.

For ciphertext streams, point the Inbound and Outbound streams to the Received and AutoSend CT folders respectively.

CRYPTOCOMM

For CryptoComm (CC) Streams, there are three options: SENDNOW, SENDNOWPT, and SENDNOWCT.

SENDNOW will use the current processing chain as set by an incoming message. If a message was received plaintext then assuming the message being sent does not contain ZNY the response message will go out plaintext.

If ZNY exists in the response message and the outbound stream is NOT marked as an Encrypted Stream then Message Machine will not send the response.

If a response to a received plaintext message is marked ZNY and the output stream is marked as an encrypted stream, CC will also check any outgoing messages for ZNY and ensure the transmission is encrypted. For instance, a ZEE machine command arrived plaintext, the response messages is marked ZNY, the output stream is marked as an encrypted stream, CC will transmit that message with the currently configured key.

If a routing rule is configured with a key OPSIG (ZYG/ZYS etc.), then when MM saves a message to the AUTOSEND/SENDNOW folder with the OPSIG in the filename. Now the terminal will encrypt the circuit with that key, providing the key exists and the terminal can find it.

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If the message arrived in ciphertext then CC will send the response in ciphertext using the same key used to decrypt the message.

SENDNOW should be the go to outbound folder when creating streams for CC. Because CC checks each message for ZNY and that the specified key exists before it sends a message, it is safe to mark SENDNOW as an Encrypted Stream.

SENDNOWPT will send the response in PT unless the message is marked ZNY. Use this for general PT BROADCASTS. If you configure this folder as an output stream, DO NOT mark it as an encrypted stream.

SENDNOWCT will send the message in the default Tx key as configured in CC Settings/Encryption tab. Use this folder for general CT BROADCASTS using a specific key. A ZNY and key check are performed to make sure a message is not sent using the incorrect key. It is safe to mark this output stream as an encrypted stream.

Since CC has only one incoming folder (RECEIVED) only one of the above outbound folders should be configured (SENDNOW).

In all cases, SENDNOW, SENDNOWCT, and SENDNOWPT, CC checks the message for ZNY before deciding if it is OK to send the message over the air. If no ZNY is found the message goes out. If ZNY is found then a key check is made by looking in the filename for the key OPSIG. If the key is available the message goes out ciphertext. If the key cannot be found the message does not go out.

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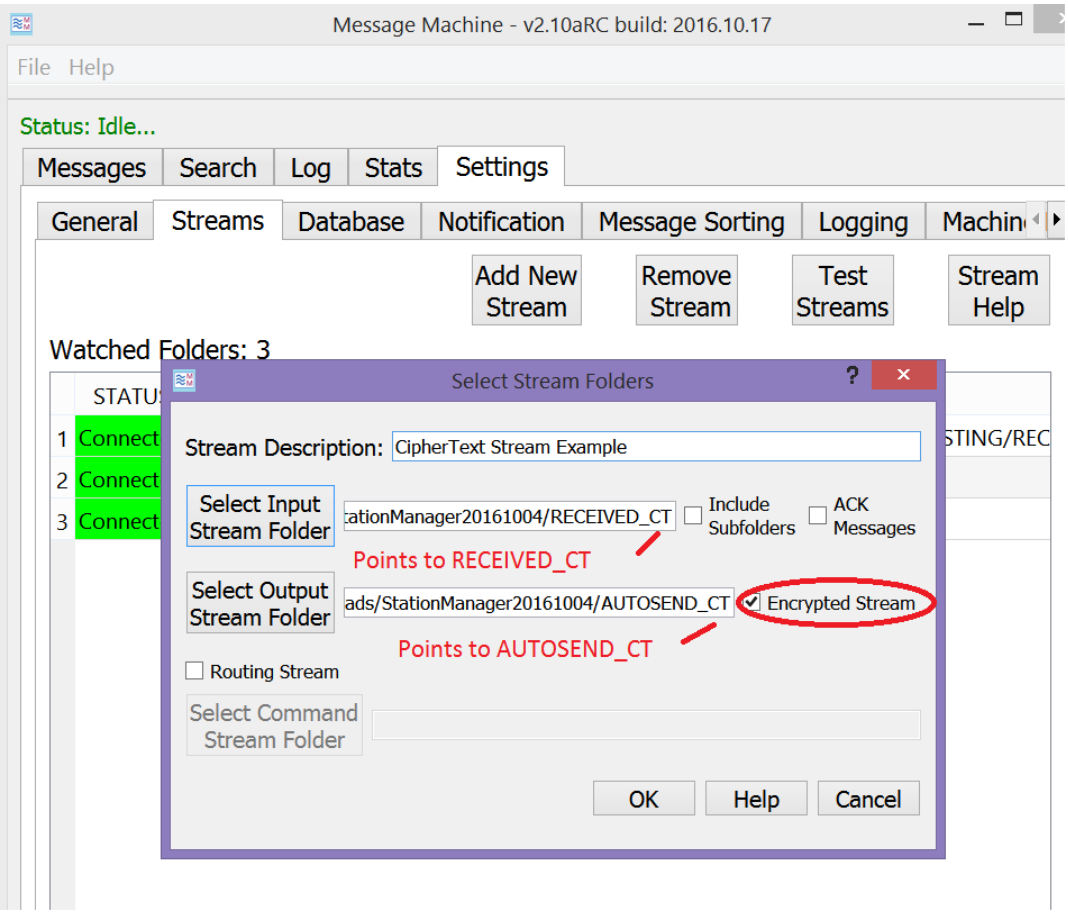
MESSAGE MACHINE CT STREAM EXAMPLE



For Ciphertext streams ensure the Encrypted Stream checkbox is checked.

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DATABASE SETTINGS

Database (dB) maintenance helps keeps the SQL database lite and fast. Every message that is received and processed is compared to each message in the database to check for duplicate message. On a large data base this takes time. Purging unnecessary messages from the database will help message machine be more responsive when acknowledging a message.

Another important factor to consider along with dB maintenance is keeping the terminal application received folders cleared of old messages. Every time a new message is received a signal is emitted that a stream has changed. MM then scans the stream folder and compares all files to files stored in the database looking for any new files. This can also take some time if there are a lot of messages in the received folder. If you must keep old message text files then create a subfolder in the received files folder and periodically move the old messages into it. By doing this we keep Message Machine responsive but still allow a full restore of the database if we need to by checking the Include Subfolder checkbox in the stream settings. Once the database has been restored don't forget to uncheck the Include Subfolder checkbox to again keep MM responsive.

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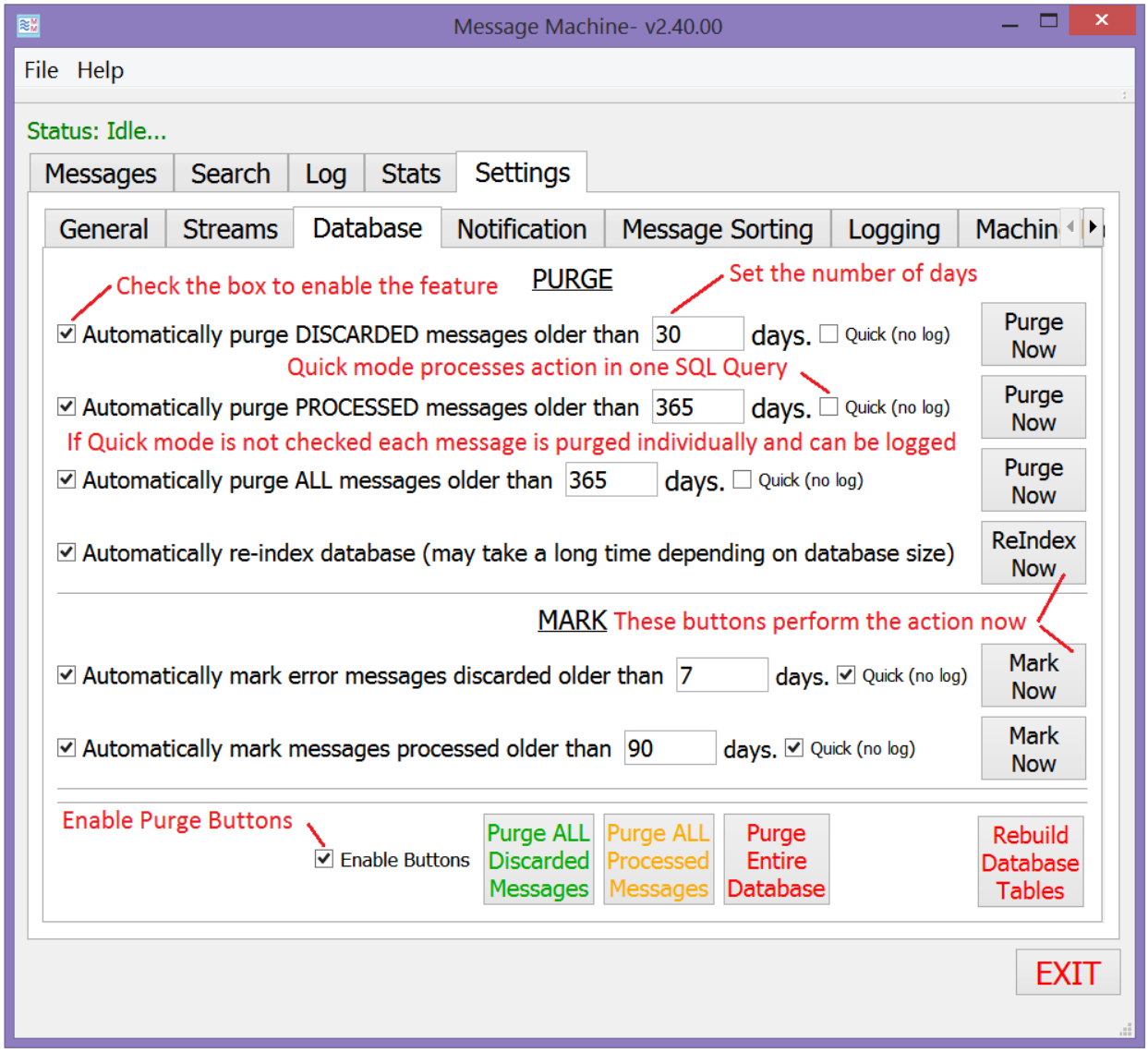

- Automatically purge DISCARDED messages older than XXX days will check at program start and when an inbound folder changes for DISCARDED messages to purge. This is checked after every Stream, including subfolders, has been scanned.
- The Quick checkbox purges messages from the database in one SQL query. This is very fast, however no log of what messages were purged can be made. If Quick is not checked each message is purged individually and a record of the purge is recorded in the log. Naturally this takes much longer.
- The Now buttons will perform the action to the left of the button when safe to do so.
- Automatically purge PROCESSED messages older than XXX days will check at program start and when an inbound folder changes for PROCESSED messages to purge. This is checked after every time a stream, including subfolders, has been scanned.
- Automatically purge ALL messages older than XXX days will check at program start and when an inbound folder changes and automatically purge ALL messages older than XXX. This is checked after every stream, including subfolders, has been scanned.

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- Automatically re-index database will make the IDKEY of the SUMMARY and MMMASTER tables consecutive. **There is no Quick method for re-indexing the database.** Depending on how large the database is and where the consecutive numbering starts the length of time to re-index the database may take a considerable amount of time. Having a consecutive IDKEY index is not required, but depending on how large the IDKEY index number gets you might want to re-index once in a while. If you are only handling a small number of messages per day and have all the auto-MARK and auto-PURGE checks marked then auto-REINDEX should be quick and painless if used from the start. This is checked after every Stream, including subfolders, has been scanned.
- Automatically MARK error messages discarded will mark messages in the Formatting Errors list on the Messages tab as discarded if they are older than XXX days. Discarded messages then can be auto-purged if the meet the date requirements of the auto-purge DISCARDED day's block. This is checked after every Stream, including subfolders, has been scanned.
- Automatically MARK messages processed will mark messages in the Message Summary list on the Messages tab as processed if they are older than XXX days. Processed messages then can be auto-purged if the meet the date requirements of the auto-purge PROCESSED day's block. This is checked after every Stream, including subfolders, has been scanned.
- Purge ALL Discarded Messages will purge ALL messages marked as DISCARDED regardless of how old they are.
- Purge ALL Processed Messages will purge ALL messages marked as PROCESSED regardless of how old they are.
- Purge Entire Database will purge ALL **Message and Processed Files Tables** but not delete the actual database tables. If you press the ReScan Streams button on the Messages tab then all the streams will be rescanned and the message files reprocessed and stored again in the database. Use this when you want to rescan all your incoming streams like they were being scanned for the first time.
- Rebuild Database Tables will delete all the database tables except for the Stream tables. A restart of MM will rebuild the deleted tables. Use this when the database becomes corrupt or you are upgrading to a version of MM that is not compatible with the current database.

REBUILDING THE DATABASE

- If your database is not compatible with the current version of MM, or the database gets corrupt, messages will not show up in the Message Summary, Formatting Errors and/or Search lists. When this happens you will need to rebuild the database.
- Rebuild Database Tables will delete all the database tables except for the stream tables. This is the same as deleting the database file except you now do not have to re-configure your stream settings.
- You only need to rebuild the database when Message Machine has an upgrade that requires a dB wipe due to a new field being added to the database, if the database file becomes corrupt or if you want to start with a fresh new database.
- After pressing the OK button Message Machine will close and the database tables will be rebuilt when MM is restarted.

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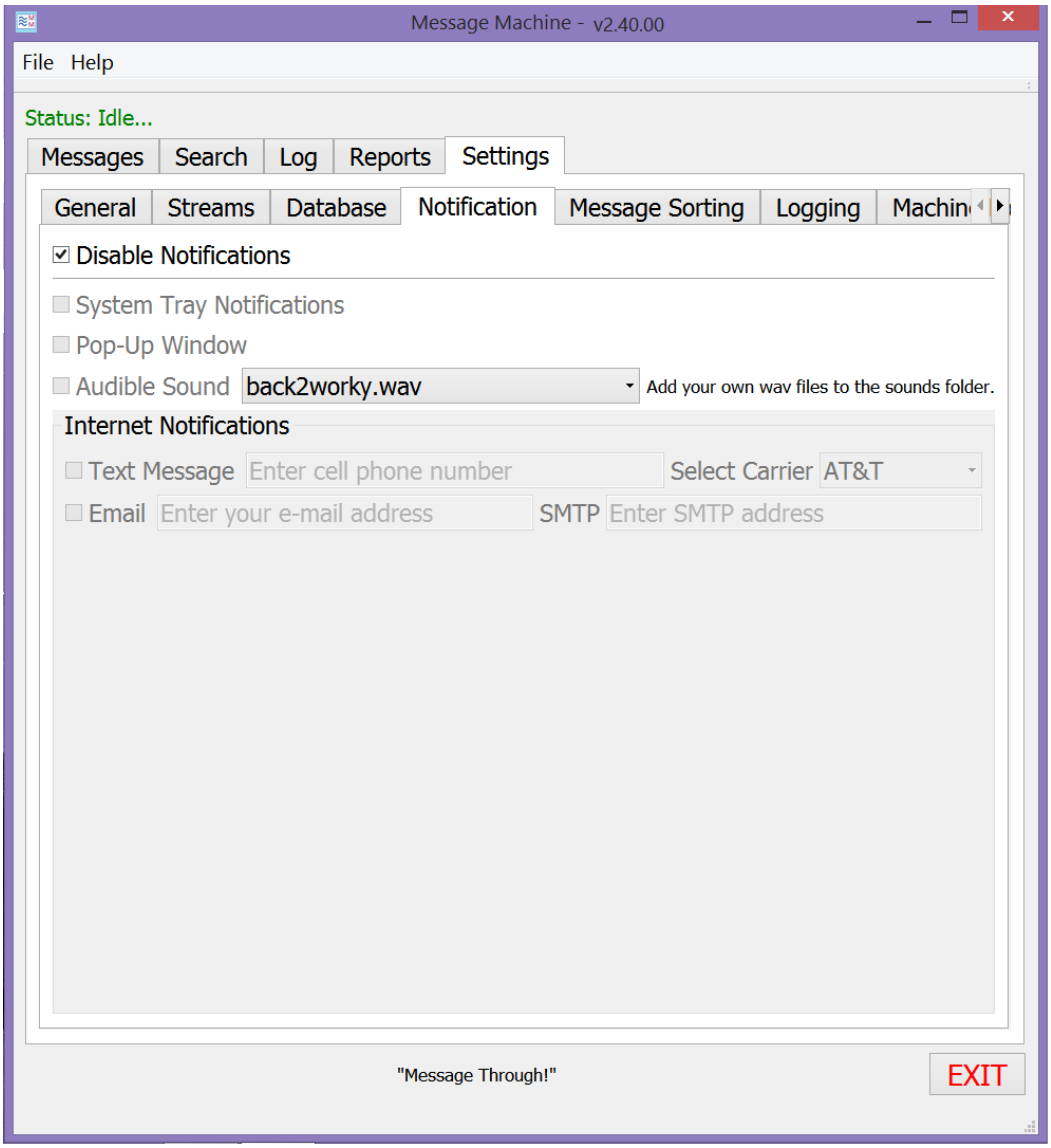
NOTIFICATIONS



- Disable Notifications – Disables all notifications
- System Tray Notifications – Enables System Tray Notifications
- Pop-Up Notifications – Enables PoP-Up Notifications
- Audible Sound – Enables an audible sound
- You can also add multiple wav files to the sounds directory and chose which sound file to use for announcements.

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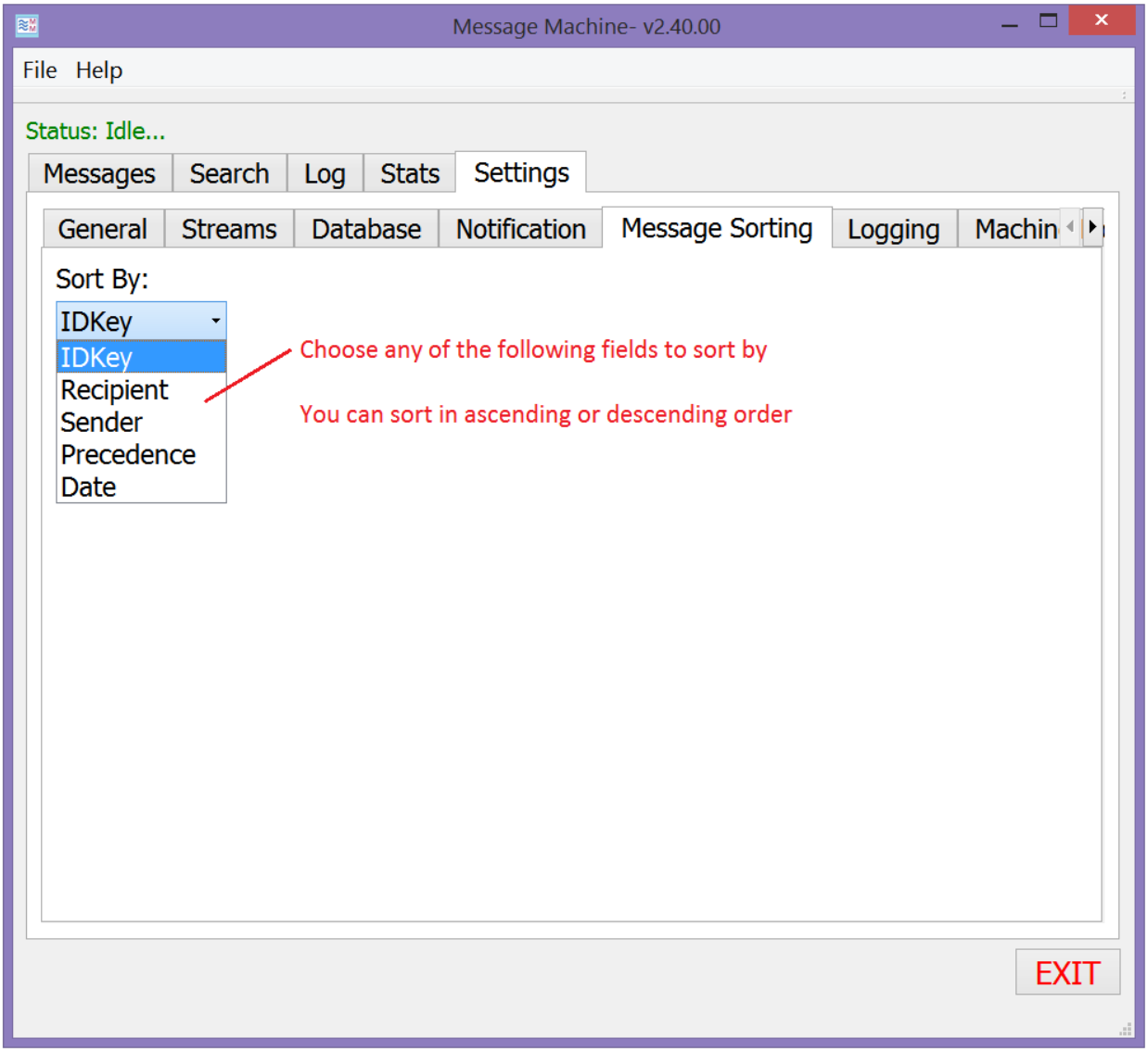
SORTING SETTINGS



- Sort By – Chose a field (column) to sort by. Will sort the Message Summary list in the main window.
- Sort Order – Chose Ascending or Descending order.

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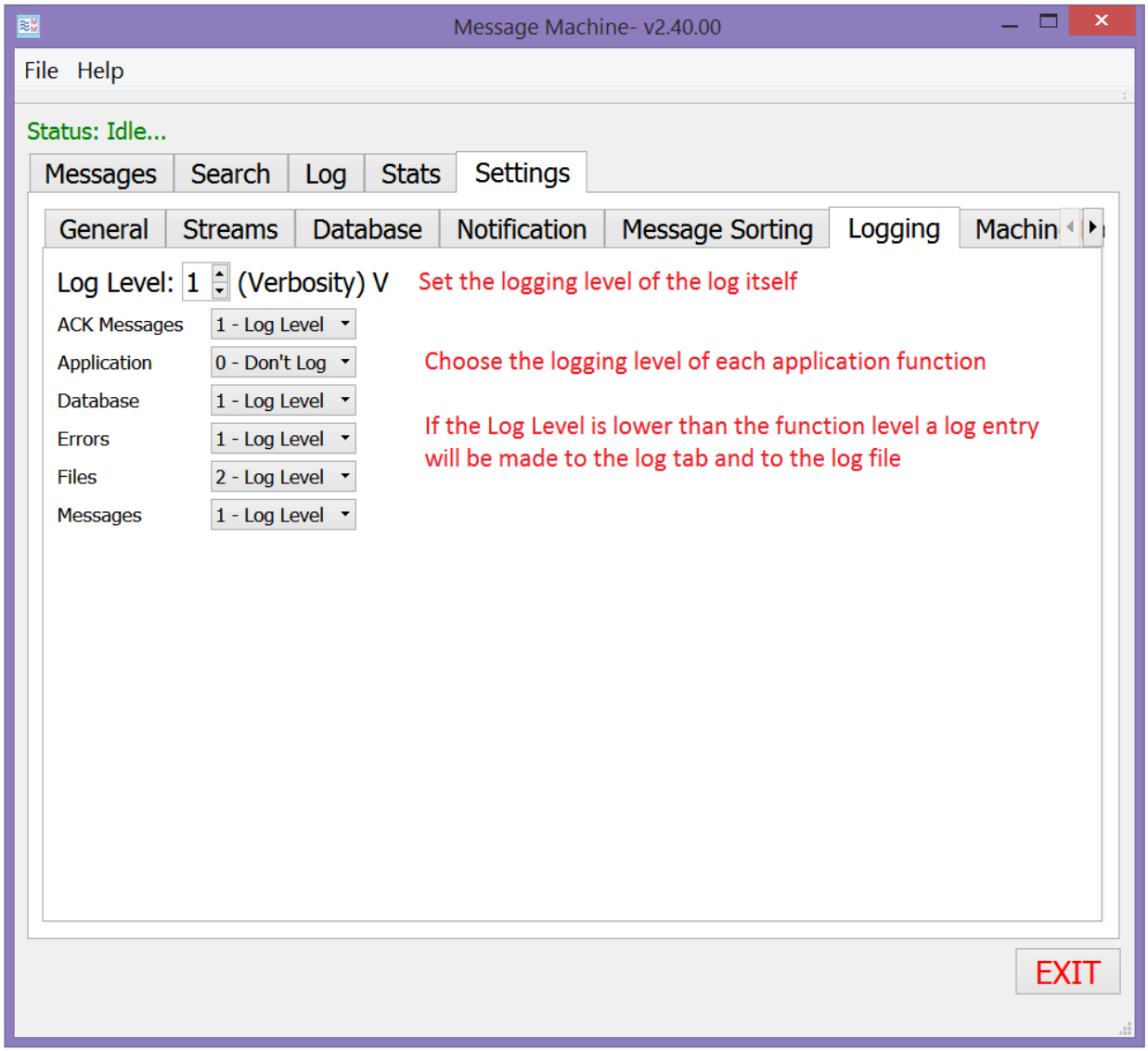
LOG SETTINGS



- Log Level sets the desired verbosity level of the logging function.
- Each function listed allows the operator control over what level they want the function to be logged at.
- For reporting bugs please ensure all function levels are less than or equal to the Log Level and the function level is not set to 0 (Don't Log) so the log file contains as much information as possible.
- Adjust log levels to your region requirements or if none to your desired levels.

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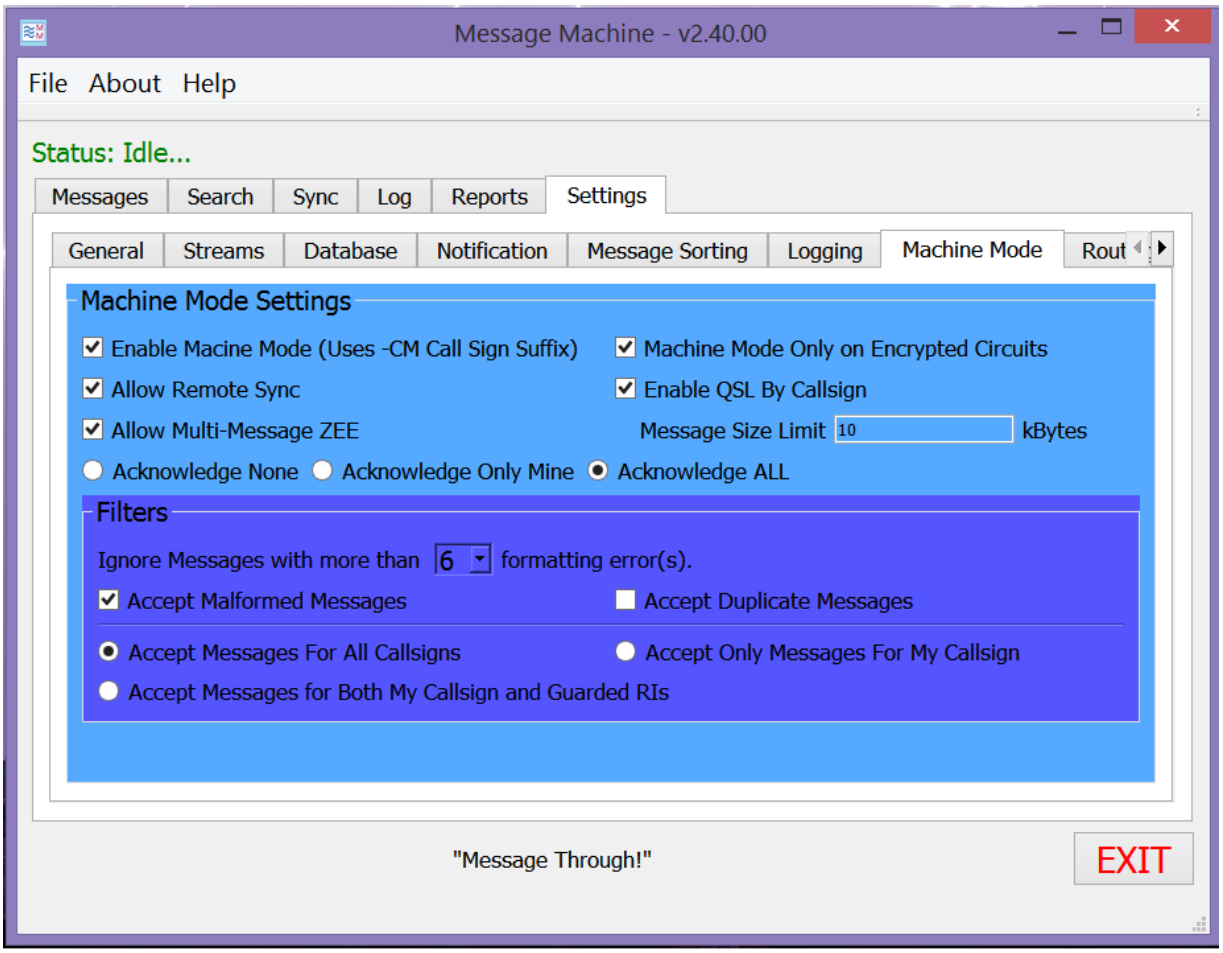
MACHINE MODE SETTINGS



MESSAGE SETTINGS

- Enable Machine Mode – Turns on semi-automated message retrieval function. Currently supports QRU, ZEE, ZDK, QSL, and VER commands.
- Machine Mode Only on Encrypted Circuit – When enabled (default) machine commands will only be acted upon if Machine Mode is enabled and the machine command message arrived in Ciphertext (CT). If the machine command arrived in Plaintext (PT) then an error message is generated and transmitted.
- Allow Remote Sync – Allows distant end to initiate the Sync process on your machine.
- Enable QSL by Callsign will add the remote operator's call sign to be appended to the message digest so that it won't show up in subsequent QRU requests. This allows the message to still show up in QRU requests by other stations.
- Allow Multi-Message ZEE – Allows the ZEE machine command to send more than one message per transmission. See Machine Mode Syntax for more information.
- Message Size Limit – This is the size limit of the composite response message to a multi-message ZEE command. Consider current modem baud rate and TX duty cycle of your radio when setting this limit.

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- Acknowledge Incoming Messages – Acknowledge None will not ACK any messages, ACK Only Mine will only ACK messages for the configured call signs and Guarded RIs while ACK All will ACK all incoming messages.
- Ignore message with more than X formatting errors – Messages containing more than the selected number of formatting errors will be completely ignored. They will not be acknowledged or added to the database. This is regardless of how Message Acknowledgment or Message Acceptance are set.
- Accept Malformed Messages when checked will save messages with procedure or garble to the database. If not checked and a message is malformed and if Acknowledge Incoming Messages is checked, an acknowledgement message will be sent indicating the errors and that the message was NOT accepted or stored.
- Accept Messages radio buttons is useful when monitoring frequencies for random traffic. Instead of intercepting all messages you can filter to just your call sign or your call sign and any RIs you may be guarding. If you are using MM for your individual station then filtering is recommended. If you are operating as a relay or gateway then filtering is not recommended.

MACHINE MODE SYNTAX

- In order to communicate with Message Machine remotely the operator must use commands. These commands tell MM what you want it to do. For MM to understand what you want the commands must follow a specific syntax.
- VZCZC/NNNN are no longer required for machine commands unless the remote station is using a terminal application that requires them to save the message to disk. Station Manager and CryptoComm do not require VZCZC/NNNN for machine commands, only for ACP 126/127 messages.
- **MM will match patterns in the QRU command**, so **QRU UHW** will return a list of all messages with UHW in any of the intended recipients.
- The QRU response message includes ---> CALLSIGN ROUTING INDICATORS after each listed message ID. **This indicates the intended message recipients**. If your call sign or a specific RI you are guarding for is not listed then the message **does not concern you** and there is no need to waste resources retrieving it.
- Machine Mode syntax is as follows:

  (5 spaces CR/LF)

  CALLSIGN-CM DE MYCALL (CR/LF)

  COMMAND [PARAMETER] (CR/LF)

  K (CR/LF)

- Where ***COMMAND*** is either ***VER***, ***QRU***, **ZEE, ZDK** *or* ***QSL***.
- The ***VER*** command will return the version of MM.
- The syntax is as follows:

  AAM-CM DE MYCALL

  VER

  K

- In the case of the ***QRU*** command the ***PARAMETER***, another call sign, is optional.

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- In the case of the ***ZEE*** command the ***PARAMETER***, the line number(s) or messageID of the message you want, is required.
- For example, to request a list of messages for your call sign:

  AAM-CM DE MYCALL
  QRU
  K

- To request a list of messages for another call sign or routing indicator:

  AAM-CM DE MYCALL
  QRU OTHERCALL
  K

- To request a list of all messages for UHW in the RI/Call:

  AAM-CM DE MYCALL
  QRU UHW
  K

- To request a list of all messages for multiple RIs or call signs:

  AAM-CM DE MYCALL
  QRU UHEAA,UHEAB,MYCALL
  K

- The response for no messages waiting is:

  1257Z
  DE AAM-CM
  QRU
  AR

- The response if there are messages waiting for your call sign might be:

  1257Z
  DE AAM-CM
  QTC 2
  1 - 8 SOMECALL #012 0971007
  2 - 10 SOMECALL #013 0971010

- The response if there are messages waiting for the requested call sign might be:

  1257Z
  DE AAM-CM

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QTC 2 OTHERCALL

1 - 5 SOMECALL 0019 0450900

2 - 21 SOMECALL 0035 0461455

- To retrieve a message just request the **line number** of the message you want as follows:

AAM-CM DE MYCALL

ZEE 1

K

- The preceding request would return the **first** message on the list (**line 1**)
- **It is highly recommended you use line numbers for all machine commands that accept them.**
- To retrieve a message just request the **message ID** of the message you want as follows:

AAM-CM DE MYCALL

ZEE SOMECALL 0019 0450900

K

- To retrieve a composite message of multiple messages just request the **line numbers** of the messages you want as follows:

AAM-CM DE MYCALL

ZEE 1,2,4,6

K

- To QSL a message just QSL the **line number** of the message as follows:

AAM-CM DE MYCALL

QSL 1

K

- **Again it is highly recommended you use line numbers especially for QSL since the ID or partial ID may match a different message and the correct message will not be marked QSL.**
- You can also QSL a message by the **message ID** of the message as follows:

AAM-CM DE MYCALL

QSL SOMECALL 0019 0450900

K

- If the Mark Messages Received checkbox is checked the message just sent would be marked as sent. This way it will not show up in another QRU request.
- If you did not receive the message intact, then **before** you request another QRU, ask for that same message again as the current QRU request list is still valid until it is over-written by the next QRU request.

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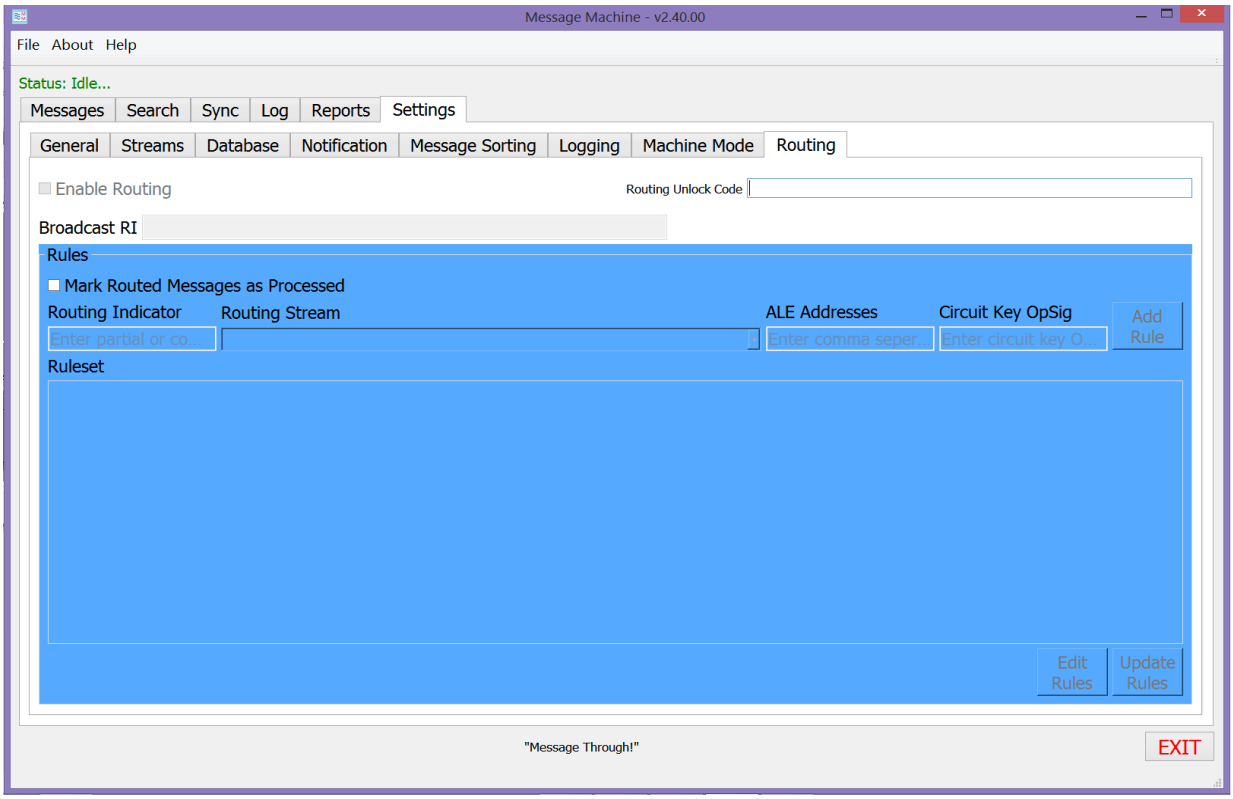
ROUTING SETTINGS



- Routing of messages using an ALE network can be a complicated process and the ruleset can get a little confusing. Misconfigured routing rules can be detrimental to the ALE network and as a precaution the routing feature has been locked.
- Not every MARS operator will need the routing function. If your station will be providing automated relay of messages (routing) you will be issued an unlock code. This code is unique to your call sign.
- Once a valid unlock code has been entered the routing feature will be unlocked.
- Enable Routing turns on the routing function. When enabled, the routing function looks at a message that was just received and based on the routing rules will retransmit the message out the stream associated with the recipient RI.
- You must have one or more outbound streams configured as a routing stream for routing to work.
- Optionally a Circuit Key OPSIG can be assigned to the rule. This will allow MM to tell the terminal application which key to use to send the message. If the terminal does not have this key then the message will not be transmitted.

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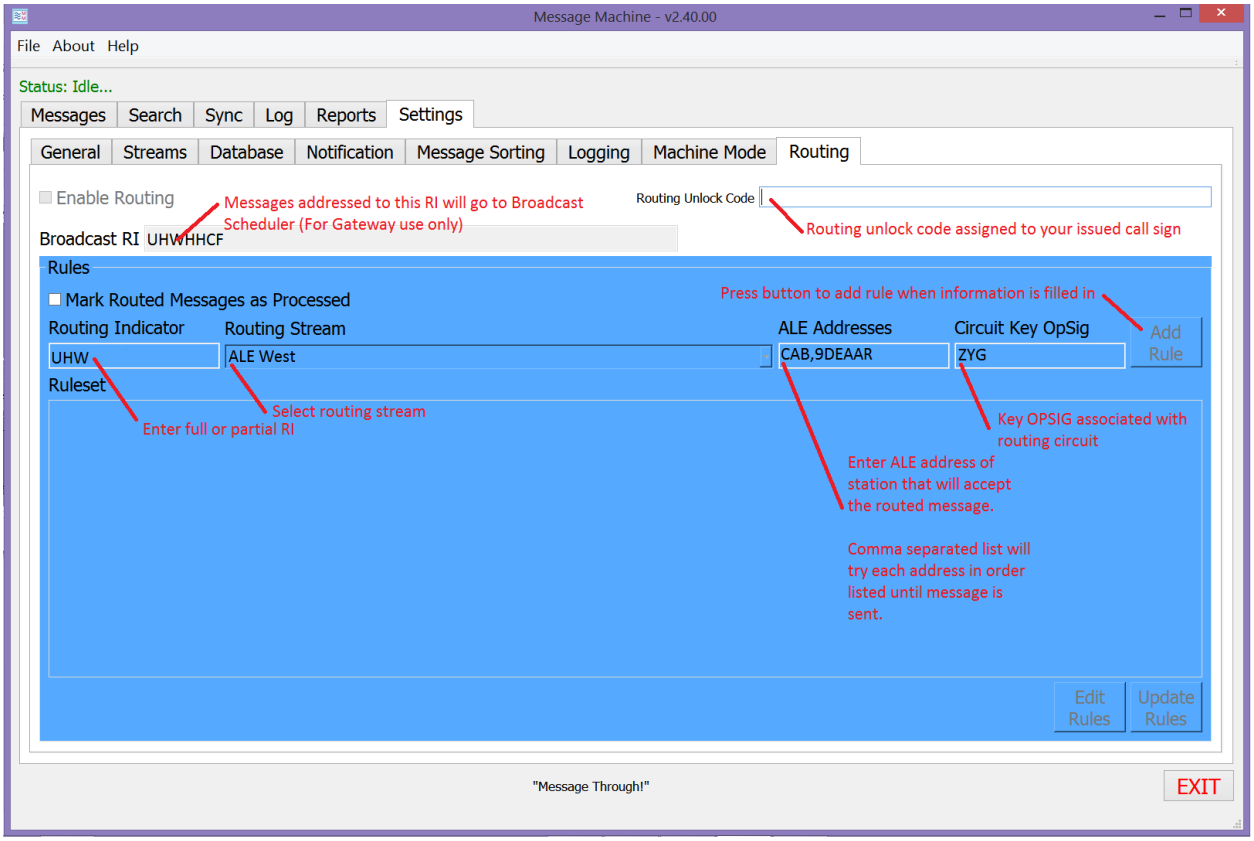

- The Routing Indicator (RI) is a partial or full RI that will be matched against the RIs in the received message. If a match is made in the routing rules the message will be sent out the associated stream.
- The stream is selected from the list of outbound streams configured as routing streams in the Settings/Streams tab. If no outbound streams are configured as routing streams the stream list in the Routing tab will be blank.
- The ALE Address is used if you have a compatible ALE system (currently Harris PRC-150, Icom F8101 in progress) otherwise it is ignored. If you have a compatible ALE system an ALE CALL will be made to the addresses in order until the message is passed. This requires a separate application that communicates with the radio to perform the ALE CALL.
- Example ruleset:

  UHE-->ALE East Route-->EAB

  UHC-->ALE South Route-->CAB

  UHW-->ALE West Route-->WAB

  UHEA-->ALE East Route-->EAB

  UHEB-->ALE East Route-->EAB

  UHXAAA-->ALE East Route-->EAB

  UHXAAA-->ALE West Route-->WAB

  UHXAAA-->ALE South Route-->CAB

- UHE matches any RI that starts with UHE and will route to the outbound stream associated with ALE East Route.

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- If a compatible ALE system is in place an ALE CALL to EAB will be initiated. If a link is established the message to be routed will be transmitted.
- If not using a compatible ALE system the message will sit in the outbound folder until handled by compatible software.

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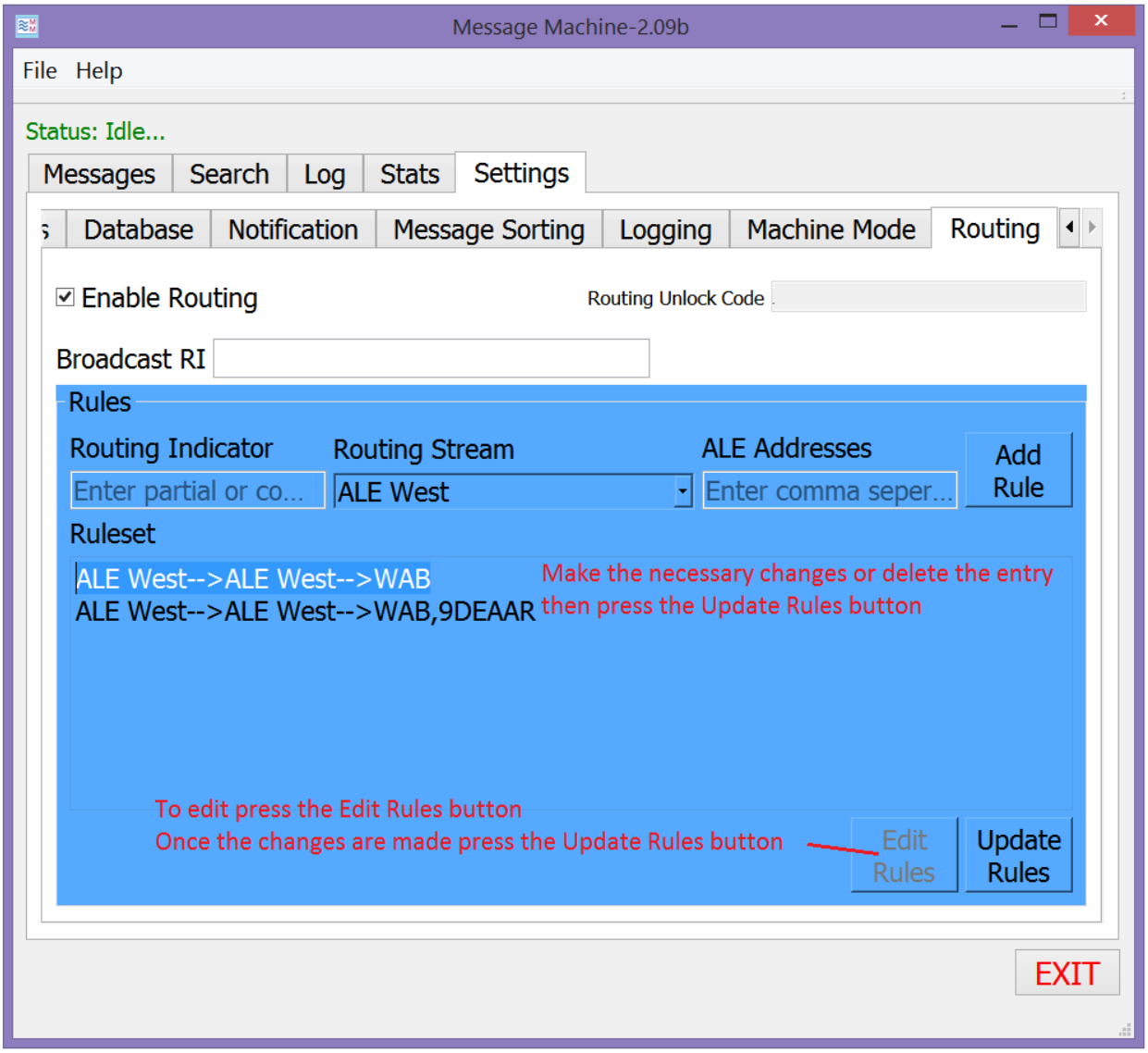

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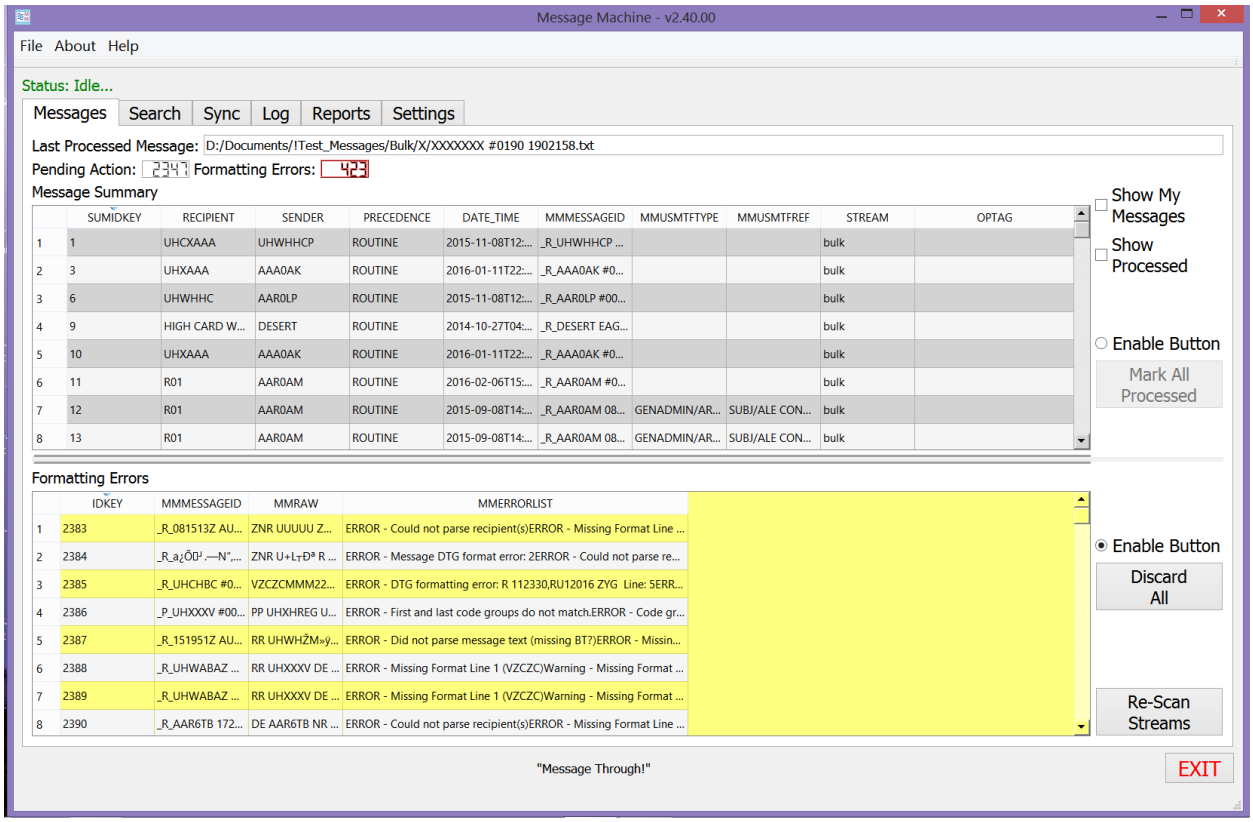
THE TABS

MESSAGES TAB



- This is where the messages that are awaiting operator intervention are displayed. The message summary list displays all the unprocessed messages. The Formatting Errors list displays messages that have errors and are not marked as discarded.
- At the top of the tab above the message lists, the last processed message is displayed along with the number of messages pending and that have errors are shown.
- If you want to display only messages for your call sign and any RIs you are guarding then check the Show My Messages box.
- If you want to display messages that have been marked as processed by the operator check the Show Processed box.
- If you want to processes all the messages in bulk then select the Enable Button and press the Mark all Processed button. Do the same thing with the Discard All button if you want to discard all the messages with errors.
- To view a message in either list, just double-click the desired message line. From the view message dialog window the message can be edited, marked as processed, re-transmitted (if an output stream has been configured), or if the message is too corrupted and can't be repaired the message can be discarded.

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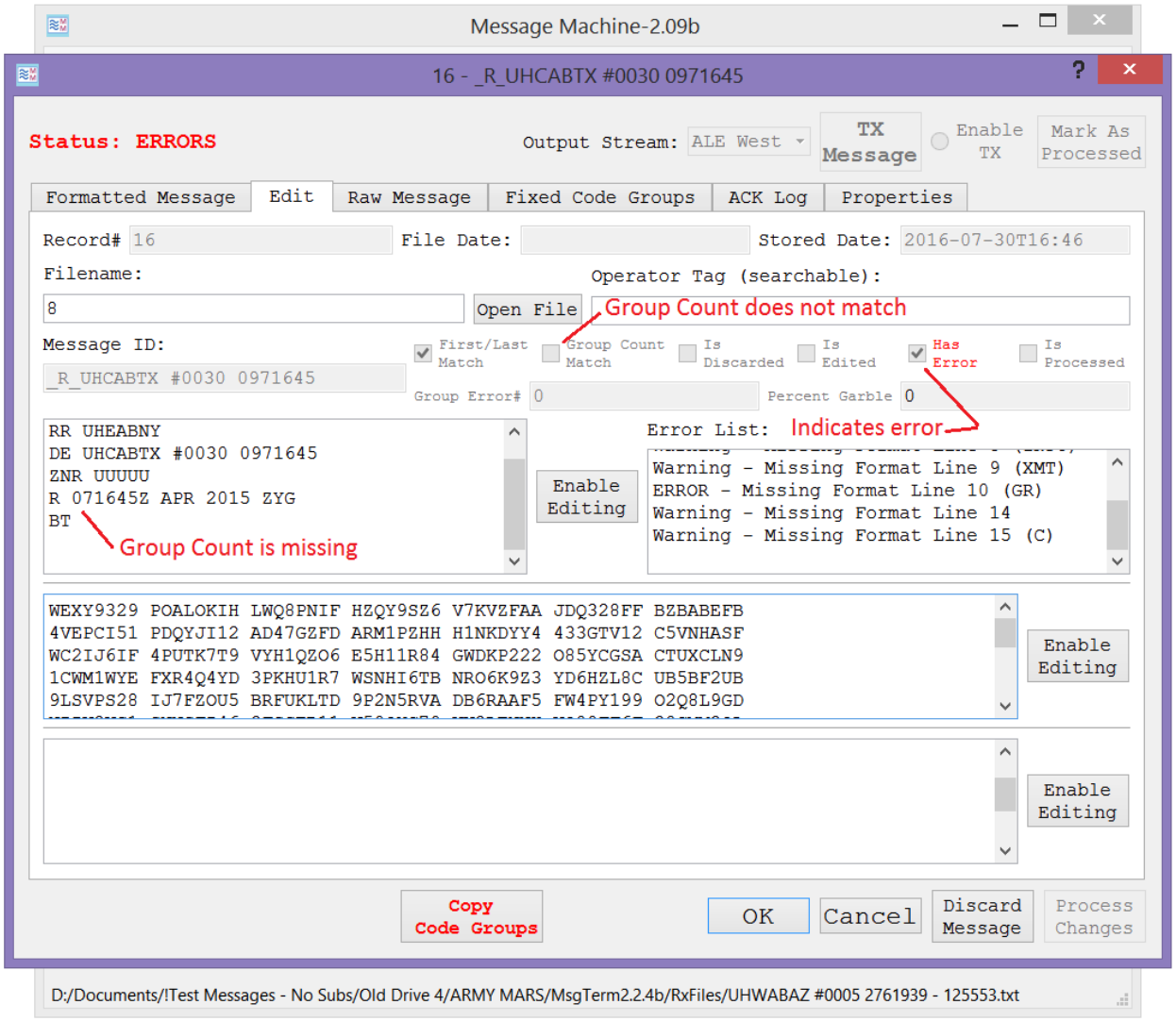
MESSAGE ERRORS



- The Error List in the Edit tab contains errors and warnings.
- Warnings can usually be ignored but are there to remind the operator they may require some other format lines. Warnings will not stop a message from being retransmitted.
- Errors do stop the message from being retransmitted and need to be corrected (if possible) before they can be retransmitted. If the message is not recoverable in itself then ask for the message to be sent again. If the error is the message was received partially garbled then maybe the missing information will arrive in the next transmission.
- If the message is too garbled then it should be discarded. Discarded messages are not deleted from the database and can be found in the search tab by clicking the Show Discarded check box. The result can be further refined with additional search queries. A discarded message can be restored by clicking on the Restore Message button.

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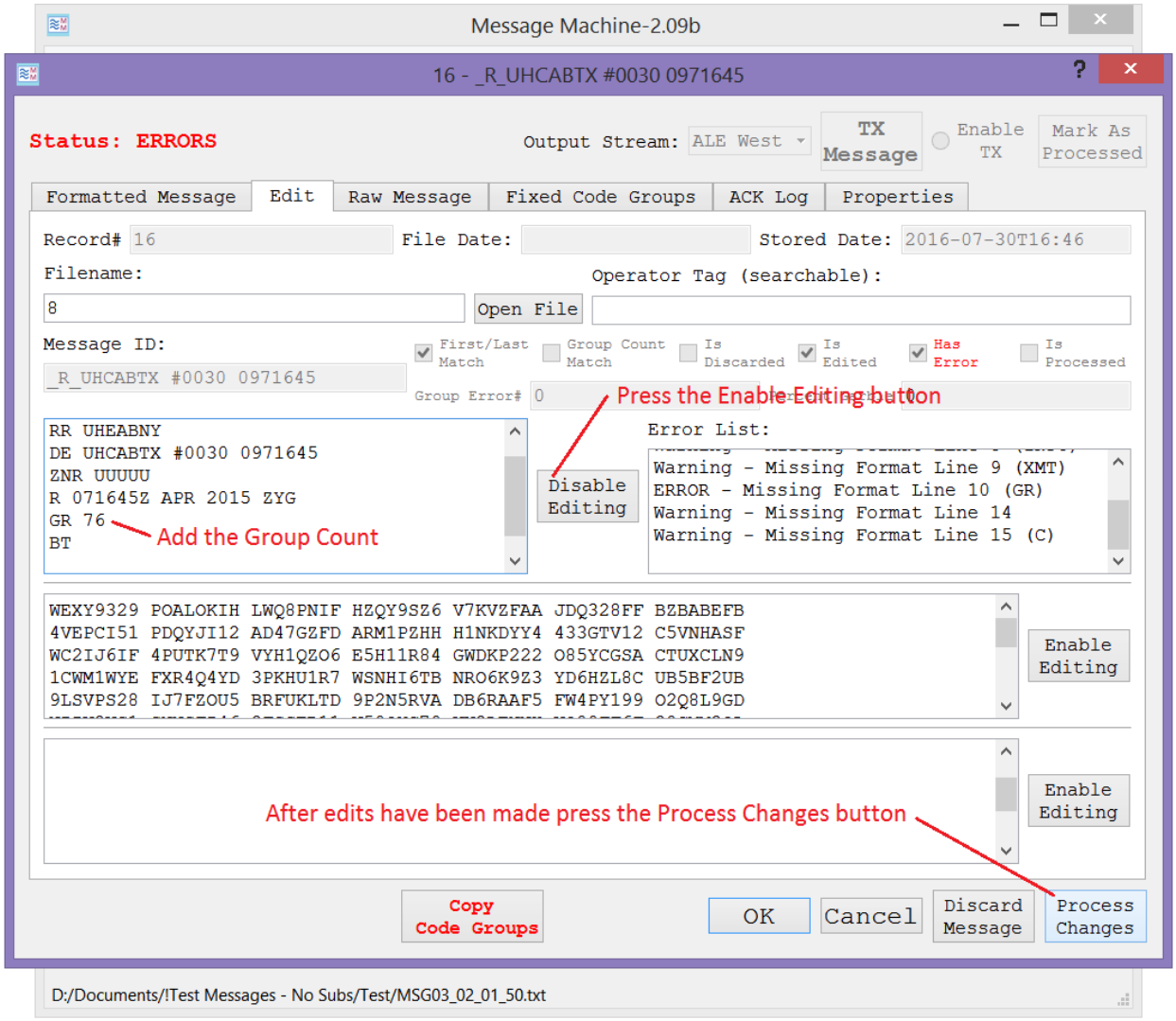
MESSAGE EDITING



- To edit a malformed message, double click on the message in the Formatting Errors list. To edit the message header, body, or ending, click the Enable Editing button to unlock editing mode for that text box.
- If you have major edits to accomplish, you can copy the raw message text and paste it into the header text box, or in notepad, and make the necessary changes, making sure to copy/paste back into the header text box. Make sure you clear out the text and ending boxes if you are making a change to the complete message instead of on a part of it.
- Once you have reformatted the message, press the Process Changes button. If there are no further formatting errors the message will disappear from the Formatting Errors list. If not reedit the message to fix the additional errors.
- Message Machine will process and accept a message without checking pages. However, re-pagination is accomplished when a message is edited and re-processed. Message paging conforms to ACP-127 and is limited to 6 pages. If more than 6 pages are created when a message is re-processed the message will be marked with an error.
- While MM will handle multi-sectional message it does not recognize them as such and does not associate them as such.

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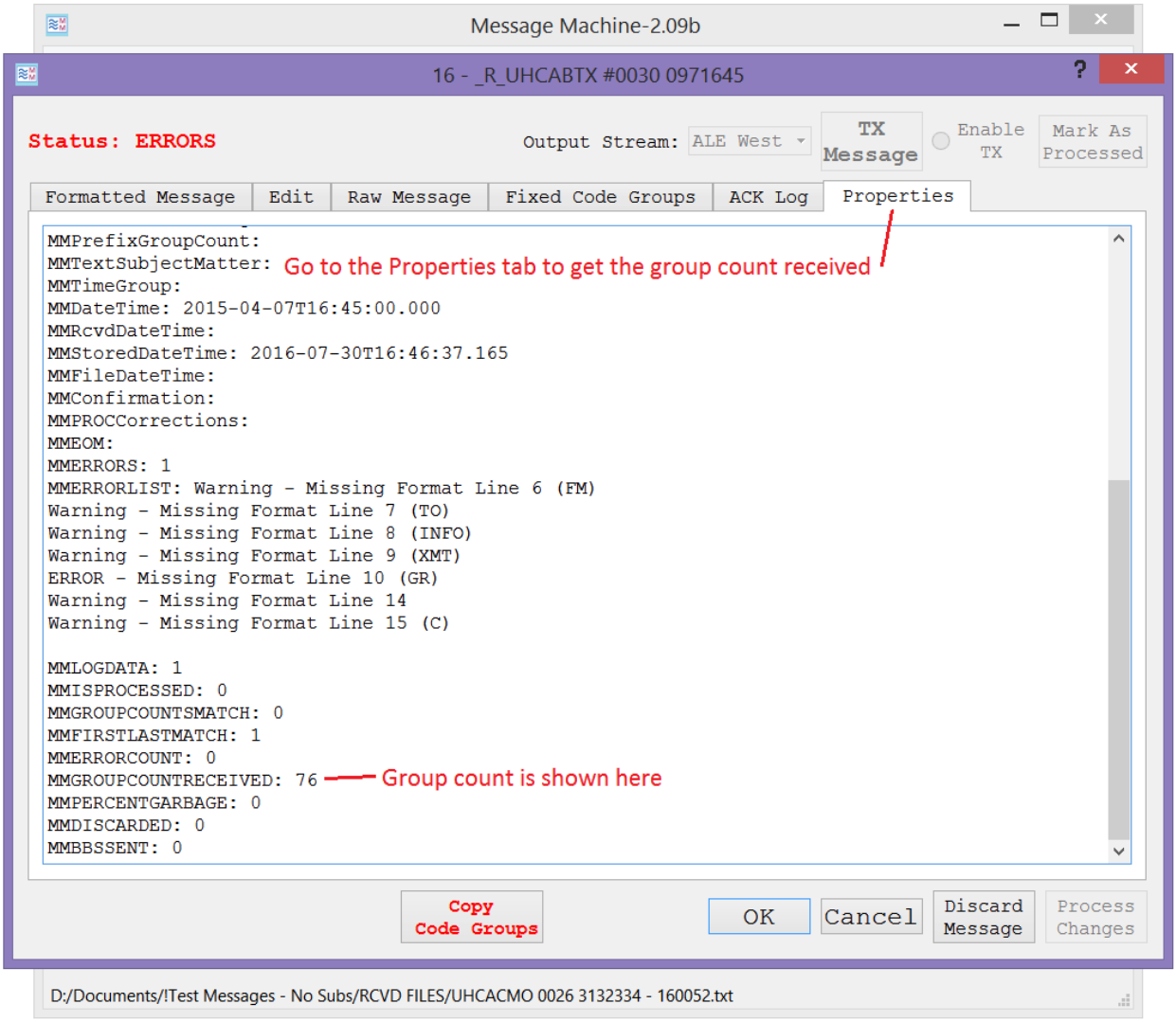
FINDING THE MESSAGE PROPERTIES



FIXING CODE GROUPS

- Code group reassembly is a work in progress and is still in its infancy as it is a rather in-depth procedure.
- If the message was received with code groups intact you can copy the code groups (without the page breaks etc.) by pressing the Copy Code Groups (red) button. You can now paste the clipboard into TRANSEC to decode.
- If the message was received with corrupt code groups, the following steps can be taken to try to fix them.
- **MM will not allow you to re-transmit a message when there are XXXXXXXX code groups**. It is improper procedure to propagate messages containing errors. All codress errors should be fixed before re-transmitting the message. **Accumulation of errors will eventually lead to a message that cannot be decoded**.

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- **In the case where a message was coded in a key that you do not have, you must ask for fills of the corrupt code groups and correct the message before re-transmitting it**.
- While displaying a message, the Fixed Code Groups tab shows the best attempt at garbled code group reassembly. If these code groups look correct (all bad code characters replaced with Xs and proper spacing of the groups) you can press the Copy Fixed Code Groups button and paste the clipboard into TRANSEC.
- If the message decoded, immediately re-encrypt the message and copy the good code groups out of TRANSEC.
- Now edit the message body of the garbled message and paste the good groups over the corrupt groups. Remember to leave the BT (FL13) intact or an error will occur when reprocessing the message.
- Once you have pasted in the new code groups and fixed any other errors that may be present, press the Process Changes button. If all went well then message should have no errors and now contains a fresh set of uncorrupted code groups. This fresh set of code groups will not match the previous set of code groups since the encryption is randomized each time.

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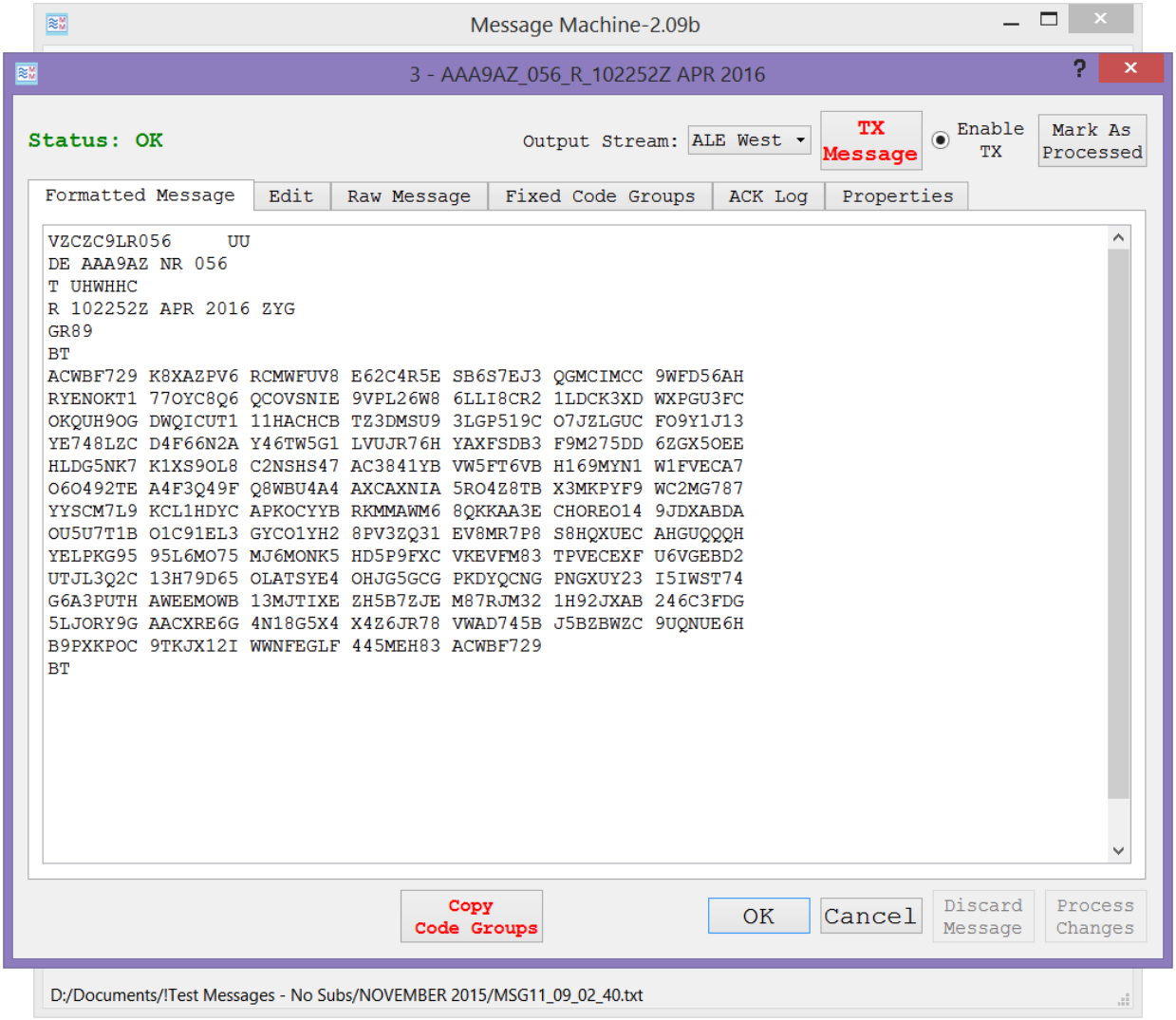
MESSAGE HANDLING



- To re-transmit a received message, open the message from the top list. Select the Enable TX radio button to unlock the TX Message button. If you have configured any output streams they will be available in the Output Stream pulldown menu. Select the appropriate output stream and click on the TX Message button. If you have your message terminal application setup to auto send then the message will automatically be transmitted.
- Once the message has been handled by the operator and does not require any further handling you can mark the message as processed by clicking on the Mark As Processed button and the message will be removed from the Message Summary list.
- If you wish to see all the processed messages click on the Show Processed box and they will be displayed instead in the Message Summary list. Processed messages can also be found in the Search tab by clicking on the Show Processed checkbox. The results can be further refined by additional search queries.

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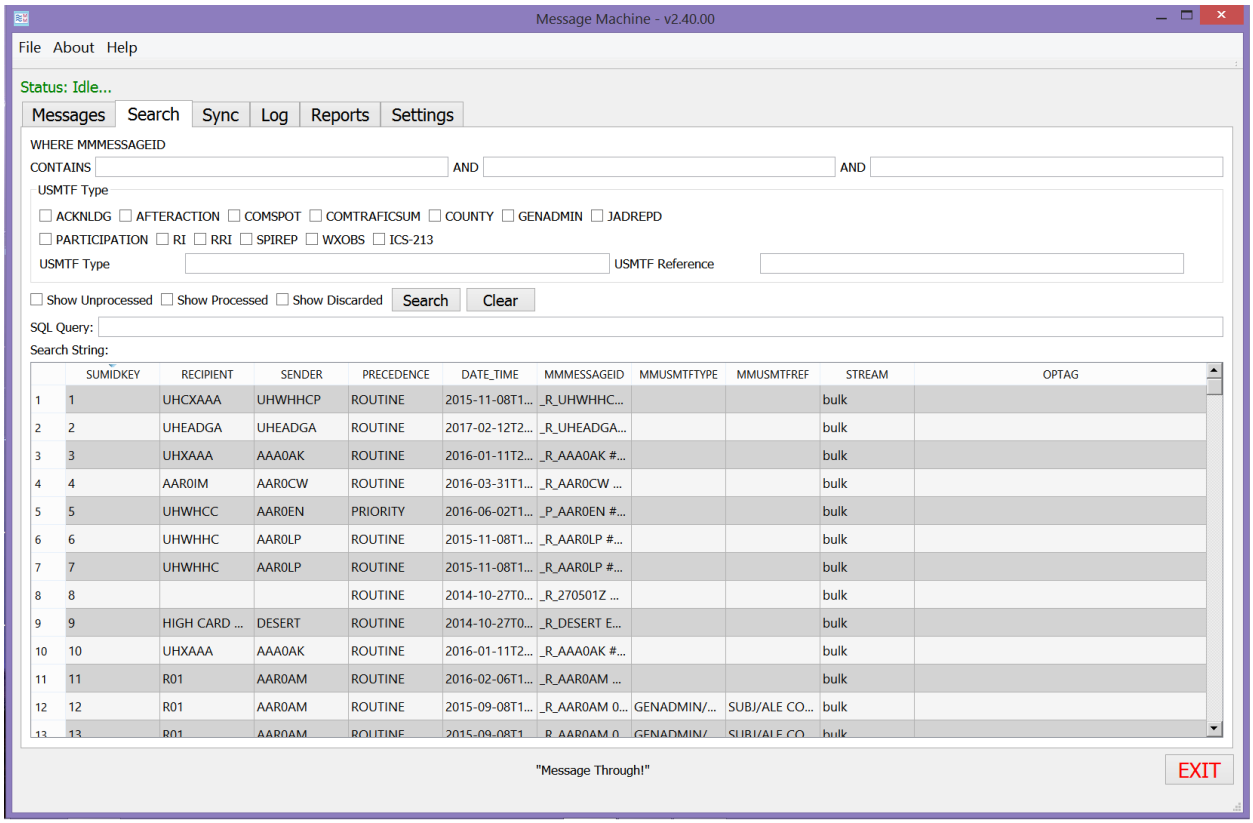
SEARCH TAB

- The Search tab allows the operator to search the database for messages. The search criteria filters the table view of messages to include only messages that match the filters.
- To clear the search criteria press the Clear button.
- To show Processed, and/or un-processed, and/or discarded messages select the appropriate check boxes. These check boxes can be used simultaneously with each other and in conjunction with the Simple or Advanced searches.

SIMPLE SEARCHES



- The simplest search is on the MessageID field. The MessageID field is comprised of the Sender, the message serial number, message precedence and a date/time stamp.
- To search for a certain sender enter the call sign in the first box, then press the Search button. The list of messages will be narrowed down to only messages from that sender. To enter a partial call sign enter the partial call, i.e. AAR9 to find all messages from all AAR9 call signs.
- To narrow the list down even further you can enter a message number in the second box and press the Search button again. This will narrow down the message list to that sender and that message number.
- If you want to narrow the message list down to a specific date, or month, or year, just enter what you are searching for in the first text box and press the Search button. For example to find all messages from the month of AUG in the year 2015 enter 'AUG 2015'. To filter to a specific day, enter ' 21%' in the second text box. The quotes are not entered and there is a space before the 21. The % is a SQL wildcard so any time will be allowed. If you want to further filter the list with a time enter it in the third text box like '%1600Z%'.

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- Search now supports finding messages by USMTF Message Type. To find messages of certain type(s) just select the checkbox for the desired type(s).
- Non-standard types can be searched for if the type is manually entered in the text boxes.
- When using the simple search feature you can see the resulting search string once the Search button is pressed. Use this as an example when creating your own advanced search strings.

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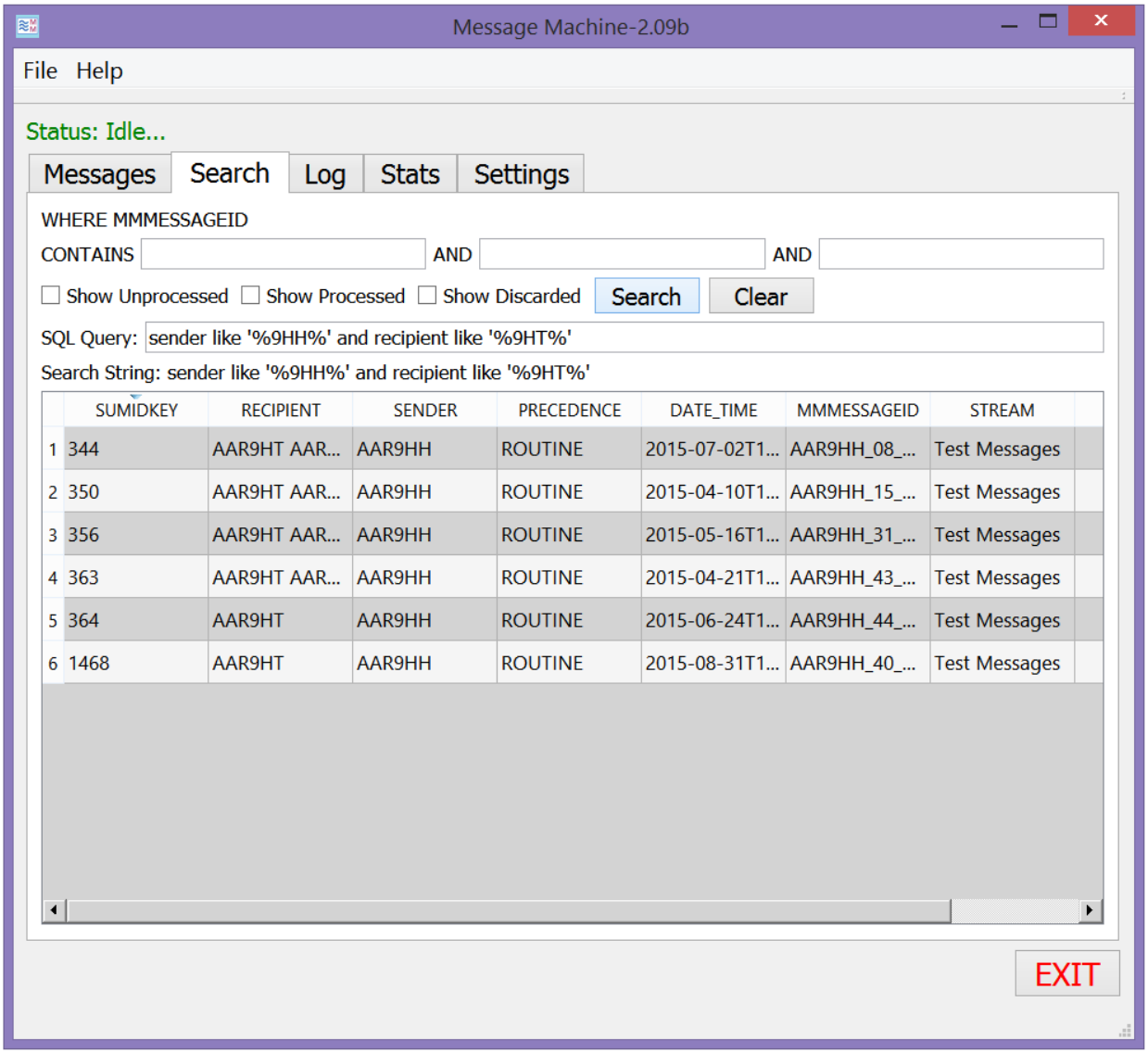
ADVANCED SEARCHES



- SQL like syntax is used for the filter text. SELECT and WHERE are inferred when performing a search so there is no need to add them to the SQL syntax. All that is required is the field name and the comparison text.
- For example to search for all messages from Sender AAR9AZ enter SENDER = "AAA9AZ" in the SQL Query text box and hit the Search button.
- Again if you want to search for all AAR9 call signs then enter SENDER like '%AAR9%' in the SQL Query text box and press the Search button.
- You can do similar searches on the Recipient field.
- Because the database is Relational and date is stored in different tables with links to it from other tables, the table names can get a little cumbersome.
- relTblAl_X.tablename is the naming convention for fields that are related but in another table. The X indicates the table number. For example the MessageID field's actual name in an SQL query is

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relTblAl_5.mmmessageid. I know it's weird, but look at the Search String when doing a simple search on the MessageID field.

- I recommend using the simple search when searching on the MessageID field, but feel free to enter the search string manually in the SQL Query text box if you so wish.
- When using LIKE the search criteria is not case sensitive. When using = or == the search criteria IS case sensitive. For example sender like "aaa9az" is not the same as sender = "aaa9az". It needs to be sender = "AAA9AZ".

SOME EXAMPLE SQL SEARCH STRINGS

- sumidkey = 1 (displays the first record in database. No quotes are needed since the data is an integer and not a string)
- recipient like '%hhcp%' AND sender like '%9hp%' (searches for messages to a certain recipient from a certain sender)
- recipient like '%a9b%' AND sender like '%9hh%' AND date_time like '%2016-04-24%' (searches for messages to a certain recipient from a certain sender on a certain date)
- When doing date range searches do not include the % wildcard symbols, i.e. date_time > '2017-01-01' AND date_time < '2017-01-31'
- stream like '%ALE East%' AND date_time like '%2016-05-12%' (searches for messages received on a certain stream on a certain date)
- sender like '%9hp%' OR sender like '%9hh%' (searches for messages from either sender)
- (sender like '%9hp%' OR sender like '%9hh%') AND date_time like '%2016-03-09%' (searches for messages from either senders on a certain date – notice the parenthesis around the sender search criteria)

FILTERING YOUR SEARCHES

- By default all messages whether marked processed or marked as discarded are shown in the search results.
- To filter your search based on whether the message is marked as processed (or not) or marked as discarded just select the appropriate checkbox.

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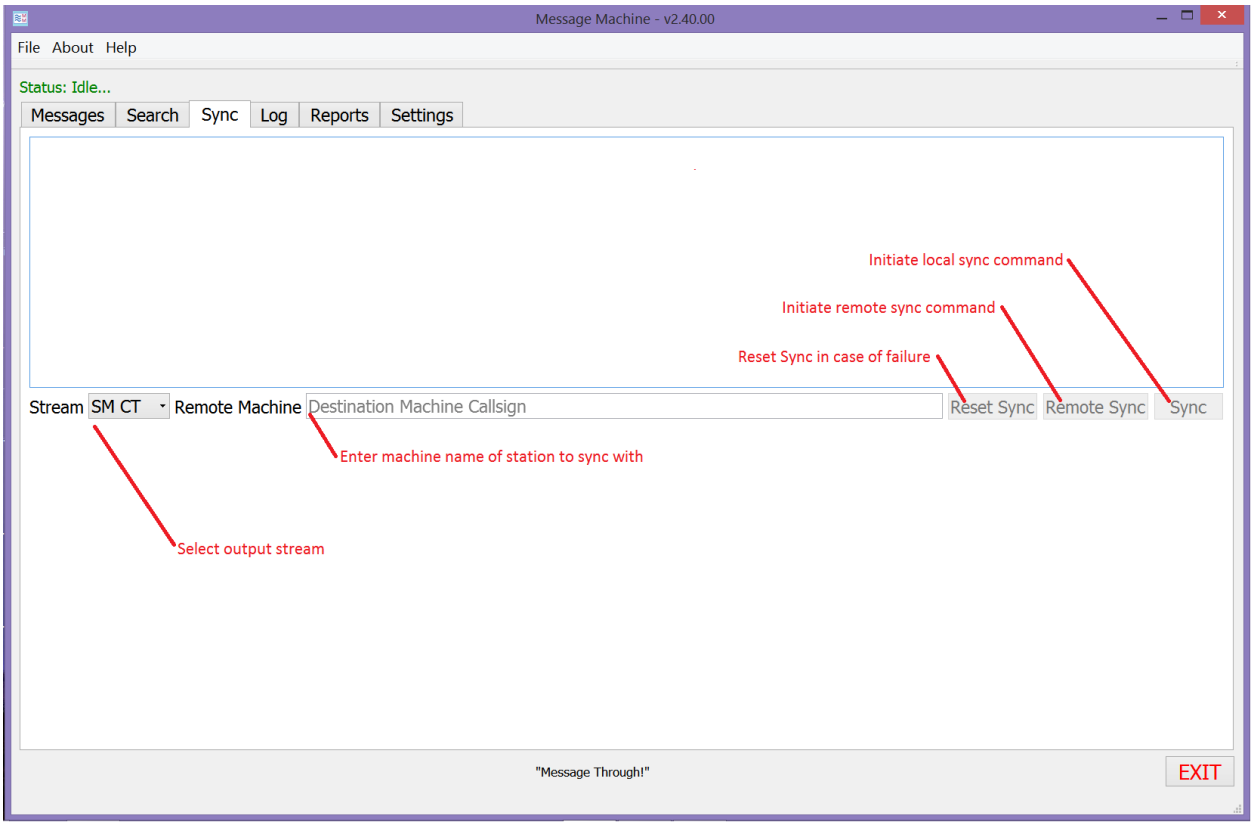
SYNC TAB



SYNCING MACHINES

- The Sync process is a way for machines to ask each other for and exchange messages.
- When the Sync button is pressed a QRU command is sent to the designated remote machine which responds with either a QRU response or a QTC response.
- If a QRU response is received the Sync process is complete.
- If a QTC response is received then a corresponding ZEE command is sent to the remote machine which lists all the messages listed in the QTC response.
- The remote machine then generates a composite message that contains all the messages asked for in the ZEE command.
- The size of the composite message can be set in the Machine Mode settings tab.
- Also Allow Multi-Message ZEE command must be enabled.
- Once Message Machine receives the composite message it processes it and generates a composite QSL message which is sent to the remote machine.
- This completes this iteration of the Sync process.
- Repeat the Sync process until a QRU request returns an empty QRU response.
- If the remote machine allows remote syncing pressing the Remote Sync button will initiate the Sync process from the distant end. Repeat the Remote Sync process until an empty QRU response in generated.

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STREAM

- The Stream selection is where you select which outgoing stream to initiate the sync command over.

REMOTE MACHINE

- The Call Sign of the remote machine. The –CM is added automatically so do not include it in the name.

SYNC BUTTON

- The Sync button will be enabled once a stream and machine name is configured.
- Press the Sync button to begin the Sync process.

REMOTE SYNC BUTTON

- The Remote Sync button will be enabled once a stream and machine name are configured.
- Press the Remote Sync button to begin the Remote Sync process.

RESET SYNC BUTTON

- If a Sync process fails, pressing the Reset Sync button will return Message Machine to normal function.

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LOG TAB

- The Log tab shows the current sessions log information as configured on the Settings/Log Settings tab.
- The log information is also written to a text file (mmLogFile.log) which is rotated every time MM is started. The previous log is renamed with its created date/time stamp.

REPORTS TAB

- Generate COMTRAFSTAT – Will generate a list of all pending messages.
- Generate COMTRAFSUM – Generates a COMTRAFSUM message between the dates selected.

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TROUBLESHOOTING

Here are some tips when something isn't working as it should.

MESSAGES NOT SHOWING UP IN ANY OF THE MESSAGE LISTS

IF THIS IS THE FIRST TIME INSTALLING AND RUNNING MESSAGE MACHINE

1. Make sure your terminal program is saving the messages to a txt file in the appropriate RECEIVED folder.
2. Make sure you have a Stream created that points to the appropriate RECEIVED folder.
3. Check your General Settings to make sure you have all the call signs and routing indicators you are guarding listed.
4. Check Machine Mode settings to make sure your Accept Messages settings are not filtering incoming messages.

IF YOU HAVE JUST UPGRADED AND MESSAGES WERE VISIBLE BEFORE THE UPGRADE

1. You may need to rebuild your database.
2. Did you delete your database? If so then you will need to reconfigure your streams.

MESSAGE MACHINE HAS BEEN RUNNING FINE BUT STOPPED RECEIVING MESSAGES

1. Sometimes MM will not receive the File Watcher Directory Changed signal. Restart MM to reset the File Watchers.
2. Make sure the received message was processed by MM and stored in the database. If not see the troubleshooting step "If this is the first time installing and running Message Machine" above.

MESSAGE MACHINE NOT ACKNOWLEDGING MESSAGES

1. Make sure the received message was processed by MM and stored in the database. If not see the troubleshooting step "If this is the first time installing and running Message Machine" above.
2. Check Machine Mode Settings and make sure Enable Machine Mode is checked.
3. Check the appropriate Stream to ensure an outbound stream is configured.
4. Check the outbound stream to ensure it is associated with the inbound stream.
5. Check the appropriate Stream to ensure ACK Messages is checked.
6. For troubleshooting purposes, in Machine Mode Settings:
    a. Check Acknowledge ALL
    b. Increase Ignore Message with X errors to 9
    c. Check Accept Malformed Messages
    d. Check Accept Messages for All Callsigns
7. Now see if MM will acknowledge a received message.
8. If it does:
    a. One by one, set your Acknowledge and Accept settings back to the desired settings and check to see if MM will acknowledge a received message.
    b. Once it fails to acknowledge a message after a setting change you have found the setting that is affecting the acknowledgements.
    c. Check General Settings to ensure Call Signs and Routing Indicators are appropriate.

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9. If not, double check the above steps.
10. Call your State or Region Subject Matter Expert (SME).

MESSAGE MACHINE WILL NOT SCAN A NEW OR EDITED STREAM

1. Make sure you press the Apply Changes button after adding or editing streams.
2. Make sure the Stream inbound folder is pointing to the appropriate RECEIVED folder.
3. If all the streams are marked green "Connected", press the Test Streams button and see if any turn red.
4. If the Stream is marked with a red "Disconnected" then the inbound folder cannot be found.
    a. If the stream is pointing to a network shared drive:
        i. Ensure the network is operational
        ii. Ensure the network share is mapped to a local drive letter
        iii. Ensure the stream inbound folder is pointing to the mapped drive letter i.e. F: or G: and not a Network Machine Name i.e. \\MACHINENAME
    b. If the stream is pointing to a local folder:
        i. The folder was renamed, moved or deleted and will have to be reconfigured

INDICATIONS THE DATABASE IS CORRUPT

1. When performing an upgrade to MM and new fields have been added to the database in the new version, these fields do not exist in the old database. As a result the messages will not be listed in the Message Summary, Formatting Errors or Search lists. To remedy this see rebuilding the database.
2. When correcting errors or editing a message in MM the changes will not save to the database.
3. New messages are showing as being received but not saving to the database AND IMPORTANTLY all configuration settings have been ruled out as the culprit.

REASONS THE DATABASE BECOMES CORRUPT

1. Computer or Message Machine application crashes during a database write.
2. Multiple instances of the same MM executable running at the same time. SQLite databases can only be operated on by one application at a time. Trying to write to the same database from multiple applications can cause the database to become corrupt or become locked.
3. Exiting MM during scanning or processing is database safe. The hooks to exit the application happen after a message file has been opened, processed, contents written to database and message file closed, but BEFORE the next message file is opened for processing. The database file and configuration (ini) files are closed before MM exits.

I WANT TO START OVER LIKE MM WAS INSTALLED FOR THE FIRST TIME

1. Exit MM
2. Delete the database file, mmDataBase.db
3. Delete the configuration file, Message Machine.ini
4. Restart MM

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