CHAPTER 3 SENDING MESSAGES ON CW

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3.0 CHAPTER 3, TRANSMITTING MESSAGES ON CW, INTRODUCTION

CW (continuous wave radiotelegraphy) message sending is a skill dating back to the very beginning of radio communication, and, in fact, carries forward disciplines developed during the land-line telegraph and semaphore eras. CW is the first three level digital code; dots, dashes, and spaces.

CW traffic handling has an advantage over voice in getting through interference and noise due to the narrower bandwidth requirement. CW provides automatic spelling of all word groups resulting in less overhead in transmitting. CW transmitting dispenses with the problems of speech perception, group introductions and phonetic spelling for clarity.

This chapter presents the basic methods of transmitting messages on CW. The chapter is organized so that each section prepares the operator for the next section. Basic tools, sending the single message and books, getting fills, and interacting with other stations are the main section subjects. It is assumed that the operator has become familiar with the ARRL standard message format presented in chapter 1. This chapter is limited to sending and receiving messages on CW. CW net operations are an integral part of chapter 4, NET OPERATIONS.

3.1 TOOLS

Message format for CW traffic is the same as for voice with respect to the rules about content, punctuation, etc. These matters are addressed at the time of original creation of the message discussed in chapter 1. A properly formatted message is suitable for transmission on all modes. In fact, it is correct to regard the message format rules presented in chapter 1 as having been developed to suit the telegraphic transmission methods. Prosigns and abbreviations on CW are selected to avoid conflict with message parts, and vice versa.

Prosigns and abbreviations are listed in section 3.6, "Q signals" in section 3.7.

3.1.1 SENDING

* SPEED: Sending speed for pencil and paper copied traffic handling is usually limited to about 25 words per minute since writing a message on paper above that speed becomes difficult. Operators using typewriters (mills) or computers can copy traffic at speeds above 40 wpm if the sending is properly done. Believe it or not, even an experienced traffic handler enjoys copying messages sent with a good fist by a beginner at low speed. Assume paper and pencil copy unless advised otherwise.

 Honor QRS (slow down) requests. It is crucial to understand the need for the sending station to slow down to the speed at which the receiving station can copy comfortably as a function of his skill and radio conditions. Sending any faster is counterproductive, resulting in inaccurate message transmission or wasted time in requesting "fills" and repeats. There is a customary practice of replying to, and sending traffic to, a station at its sending speed.

* FIST: As important as sending speed is a good "fist". Clear character formation, with proper dot to dash ratio and proper weighting, and extra care in proper spacing between elements, characters and groups is the key to good copy (pun intended). Farnsworth spacing sometimes used in training is not recommended for traffic handling.

The dot element consists of 1 unit of time followed by a space of 1; a dash 3 units followed by a space of 1; letters spaced 3 units, words 5 (as a minimum).

Group (word), spacing is crucial. This can not be overemphasized. Proper, and even enhanced, word spacing greatly lends to clear and accurate copy at any speed. Pauses are used to accentuate parts of the message and prosigns. Pauses and spaces are the "third elements" of CW sending in addition to the dot and dash.

When letters or groups are "run together" the copy degrades quickly, and accuracy suffers.

* CONDITIONS: Speed should always be adjusted for conditions. It is very effective to slow down when fading (QSB), interference (QRM), and static or noise (QRN) are severe, or signals are weak. As the receiving operator narrows his receiver bandwidth speed may be lowered to enhance copy. In some cases higher speed can be better than slow, or used to squeeze information between bursts of interference. Repeating message groups more than once (QSZ 2 or 3) can also enhance successful copy. In bad conditions adjust your speed and/or repeat groups.

Generally the most effective technique is to send at the speed best matched to the receiving station's capability and use QSK (full break-in) to permit interruptions between your elements, characters and groups. The receiving operator can then interrupt on a real-time basis and recover from lapses in copy caused by conditions. This gives both operators feedback on the copy conditions and permits adjusting with speed or repeating whenever needed. See QSK, next section.

3.1.2 BREAK-IN, QSK
In addition to the large signal-to-noise advantage CW has over phone (voice), the use of full break-in (QSK) is a powerful tool. When using QSK, listening between your own dots and dashes, you can hear interruptions by the receiving station or interference. Full QSK provides essentially full duplex operation and is virtually indispensable for efficient traffic work.

The receiving operator can interrupt the sender at any time to ask for repeats or fills. When the receiving station interrupts the sender it may send the last group, or fragment, received, and the sender will simply resume with the next group, or the group containing the fragment, respectively.

If the interruption group sent is incorrect, the sender corrects the group immediately.

If a radio does not have full break-in, the operator should consider using CW VOX keying with minimum drop-out delay, or use a manual PTT switch to engage the transmitter which will force immediate receiver recovery when released. (Most radio mike PTT circuits permit this. A foot switch can be used for hands-free operation.).

Another option to consider is the use of a second receiver, operating on a separate antenna, with fast or no AGC (AVC), which permits QSK. The operator also can tune the second receiver around without affecting the transmitter, and receiving on two separate antennas with two receivers (diversity reception) can aid in copy with QSB (fading).

Most traffic handlers on the CW nets use full break-in. "QSK" is sent before "NR" when beginning to send the message to alert the receiving operator of the capability.

3.1.3 PROSIGNS, OPERATIONAL SYMBOLS AND ABBREVIATIONS
These special groups are used in CW sending as a form of shorthand in much the same way as prowords, operational words, and introductory words are used in voice sending. They inform the operator to begin and end copy, mark parts of the message, indicate actions such as repeating or requesting fills, and give other operational information.

* <CONCATENATED LETTERS>:
Unique code characters used as prosigns are shown in this manual as concatenated letters bracketed by a less-than sign (<) and a greater-than sign (>) (Also known as angle brackets and referred to here as prosign brackets.). For example: <AA> stands for the element group (.-.-), the carriage return line feed prosign; and <BT> stands for (-...-, the "="), the "break" starting and ending the text. Such groups are sent by sending the bracketed letters without a space between them. (Di-dah-di-dah, and dah-di-di-di-dah.)

* CAPITALIZED LETTERS:
A group of capitalized letters, without the prosign brackets, is transmitted as a group of normal letters with normal spacing between them, as in NR, (-. .-.).

* NO EXTRANEOUS WORDS OR CHARACTERS:
No extraneous words, characters or symbols should be sent during transmission of the record copy message. The receiving operator will recognize the prosigns, abbreviations, and operational symbols presented here. Any other characters sent will be assumed to be part of record copy of the message.

See the SENDING EXAMPLES.

3.1.3.1 PUNCTUATION
Punctuation such as the comma (--..--), question mark (..--..), period (.-.-.-), etc., are not permitted in the record copy of ARRL formatted messages. The query (..--.., ?) has a special use operationally as "I say again." (see the section below on prosigns). The following characters are permitted as explained in chapter 1:

"/" Slash, (-..-., <DN>), used generally to separate characters within groups;
"X" Initial X is used as a substitute for the period in the text, and is used as a separate group. (The "X" is never formatted as the last character in a text.)
"R" Initial R used as a decimal point in figure groups.
* Other punctuation, such as DASH or QUERY, is spelled out.

3.1.3.2 Q-SIGNALS
Operators should become familiar with the International "Q Signals" used for both traffic handling, net operations, and conversation. They are used to ask questions and give instructions using a three letter shorthand. They should not be used on voice nets.

The ARRL "QN_" signals are special signals to be used on CW nets only. They should not be used on voice nets. Other meanings that may be used in other services do not apply. CW traffic nets make frequent use of the QN signals in normal operations.

The use of essential Q signals shall be explained as the examples of traffic sending are presented in this chapter. QN-signals used in net operating will be presented in the chapter on Net Operating.

See the lists of Q and QN signals, reproduced from the ARRL "Pink Card", FSD 218, included at the end of this chapter.

A few often used Q-signals are given in the next section.

3.1.3.3 ESSENTIAL PROSIGNS AND ABBREVIATIONS
The following are used in sending the message, generally in the order encountered. (See the complete list of Prosigns and Abbreviations and Q-signal lists at the end of the chapter.)
* "Fill Request" abbreviations are shown in the next section.

\<AA\>	Used as a line-end symbol after the addressee, address, city/state/zip, and after the telephone figures if an OP NOTE follows, else the \<BT\> is used there.
\<AR\>	Ends record copy for a single message; and is followed by additional message quantity characters; N, B, B1, or 1.
\<AR\>	In BOOKS; ends record copy of the last message of a book before "END BOOK", which is then followed by \<AR\> and characters; N, B, B1, or 1.
ARL	Before check if ARRL Numbered Radiograms in text, and before each Numbered Radiogram in the text.
\<AS\>	Wait, standby.
B	Indicates more messages to follow. ("\<AR\> B"). See N.
B1	Indicates one more message to follow. ("\<AR\> B 1")
1	A shortened form of B1 used to indicate one more message to follow. ("\<AR\> 1").
BOOK OF (#)	Signals the beginning of record copy of the fixed parts of a book, where the (#) is the quantity of messages in the book, spelled out as a word. ("BOOK OF TWO...")
\<BT\>	Marks the start and end of the Text (not counted in the Check). If QSK is NOT being used, the \<BT\> at the start of the text is a mandatory breakpoint to listen for fill requests.
\<BT\>	\<BT\> separates fixed and variable parts of a book. The \<BT\> before each book variable part and variable text is a mandatory listening point as above.
C	Yes, Affirmative.
END BOOK	Signals the end of record copy for a book.
K	Go ahead. Over. Invitation to transmit.
N	No, Negative. Also indicates no more messages to follow, as in ("\<AR\> N").
NR	Signals the beginning of record copy with the first group following NR for each single message or variable part of a book (equivalent to "number" on voice).

OP NOTE	Used to introduce address or signature operator notes.
QRV?	Are you ready (to copy)?
QRV	I am ready. (to copy)
QSK	Indicates full break-in operation, sent just before NR (or BOOK) in the exchange sequence only once for any number of messages in a series.
QSL	Acknowledge receipt. All messages received, acknowledged.
QSM	Repeat last message sent.
QSZ __	Send each word group twice, or ____ times.
R	Received and understood. (Does NOT mean yes or affirmative!)
"?"	I say again, used to repeat group(s) for clarity.
"?"	I say again, used to repeat group(s) for correction, where the operator goes back to the last correctly sent group or prosign and resumes transmission with that group.
"?"	Used following a Q-signal outside the written message to ask the question.

3.1.3.4 FILL REQUESTS
Used to request repeats of groups or parts specified. They may be preceded by the groups "IN (part)" to indicate the location of the requested groups within the message where ambiguity would otherwise result, otherwise they are omitted. The optional "[IN (part)]" limiter, sent before or after the request, refers to the PBL, ADR, TXT, SIG, or book message #, etc., as needed.
* [IN (part)] WA ___: Word After.
* [IN (part)] WB ___: Word Before.
* [IN (part)] AA ___: All After.
* [IN (part)] AB ___: All Before.
* [IN (part)] BN __ ES __; (or BN __ ? __): range of groups.
* (part): Request for a specific message part to be repeated, as in PBL, ADR, TXT, SIG, etc.
* CFM ___: Confirm; request to confirm if group is correct.

Note that the "?" is implied and thus omitted when making fill requests.

See the section on THE MESSAGE EXCHANGE, FILL REQUESTS, and in ASKING FOR FILLS IN BOOKS for details and replies.

3.1.3.5 EMAIL, PACKET, INTERNET ADDRESSES
Properly formatted addresses, as indicated in chapter 1, are sent as written.

3.2 RULES FOR SENDING MESSAGES
The proper use of style, speed, fist, adapting to conditions, prosigns, and break-in permits very effective and efficient CW traffic handling---and it is fun. In today's world of packet, high speed automatic digital backbone file transfer and mail systems, CW still plays a vital role in traffic handling, and it is a very personal experience with interactive real-time operator contact.

When operators are properly trained and experienced, they are able to anticipate much of what the other station is going to do. Much information is exchanged with just a few abbreviations or prosigns, full QSK, signal to noise advantage, character for character transmission, and low overhead. Throughput on CW is often higher than on voice for this reason.

3.2.1 TRANSMITTING NOTES, SPEED AND CLARITY
A few reminders:

The transmitting operator must send clearly and at a speed which will allow the receiving operator to copy perfectly without rushing. Use pauses to frame groups clearly. Properly formed and spaced characters and groups are key to accuracy.

* Assume the receiving operator is copying with pencil and paper unless advised otherwise.

* It always takes less time to send a message correctly the first time than it takes to negotiate repeats and fills of missing or uncertain parts. Send at the receiver's speed.

* Clear group spacing is essential to accurate copy, and may even be exaggerated a bit for emphasis. Extra spacing between characters in unusual groups may be used with good effect.

* Use no extraneous words or prosigns during the transmission of the message written record. An experienced operator copies everything heard except for those prosigns and abbreviations which trigger a special response. Do not transmit anything else you do not want copied.

Sending properly formatted messages with a good fist and proper use of group spacing and prosigns leads to efficient operation with the receiving operator locked in sync.

Traffic handlers operate mostly in an "open loop" mode, i.e., there is seldom direct feedback as to the accuracy of relayed radiograms. The old party joke rule applies. It takes a concerted effort to assure that the accuracy of messages is preserved from origination to delivery. Where practical to do so, it may be worth the trouble to make arrangements to test the system from time to time by sending relayed messages back to the originator to check for errors that creep into the process. Scrupulous attention to clear and proper sending and careful honest receiving is the routine quality control.

3.2.2 RECEIVING NOTES
The receiving operator must develop certain skills and disciplines to assure accurate copy and efficient operation. These skills are complimentary to those involved in transmitting the message. Passing the message from one station to the next is covered in the section on the MESSAGE EXCHANGE.

Additionally the receiving station has several important and ethical responsibilities. It must:

3.2.2.1 TRANSCRIBE THE MESSAGE EXACTLY
The message copied should be an exact replica of the message held by the transmitting station... letter for letter, group for group.

3.2.2.2 TRANSCRIBE THE MESSAGE WITHOUT MODIFICATION
No part of the message may be altered, even when it appears necessary, except for appending corrections to the check value. If part of a message appears to be in error, confirm the part with the sending station. If it is correctly received, leave it alone. OP NOTES may be used to pass words to the next operator regarding problems.

3.2.2.3 BE SURE OF EVERY GROUP RECEIVED
Do not assume that you have copied a group correctly. If you miss part of a group avoid guessing about the missing part. Check each group to see that it fits the context and makes sense. If the sending speed is too fast, ask for reduced speed (QRS). If QRM is present, ask for a shift in frequency if possible. Ask for a repeat or confirmation if you have any doubt. Only you know for sure that you have copied every group with certainty.

Do not acknowledge the message until you are certain you have it copied it completely and accurately.

3.2.2.4 ASK FOR FILLS OR CONFIRMATION
If interference or static is present, or you make a copying mistake, mark the groups or parts of words which might be in error (underline). If the sending station is using QSK interrupt with the group or segment. The sender will repeat. Otherwise, mark (underline, circle, etc.) groups you are not sure about as you go along. You can ask for "fills" formally after the <BT> at the start of the text or at the end of the message. Read the message to check for questionable context. Ask for "fills" or confirmation until you are certain that you have all of the message correctly copied. Do not be afraid to ask or worry about taking the extra time. Other operators will respect your care.

Do not acknowledge the message until you are certain you have it copied it completely and accurately.

3.2.2.5 ACCEPT MESSAGES THAT YOU CAN RELAY OR DELIVER
You should accept only messages that you can forward or deliver in a reasonable time. Sometimes you may be asked to do otherwise as a liaison station or for "store and forward".

If you accept a message, and are unable to pass it on promptly, try to find another station to accept it and keep it moving. There are many ways to move a message along. Phone a fellow amateur to take custody if you can not handle it properly. Mailing, personal delivery, telephoning neighbors of the addressee, etc., are alternative methods to direct telephone delivery. See the chapter on Delivering Messages. Service messages promptly when necessary. Ask fellow amateurs for help if you have difficulties.

Messages should be delivered within 48 hours if possible.

3.2.2.6 TAKE RESPONSIBILITY FOR MESSAGES ACCEPTED
Once you acknowledge a message, it is your message to handle. Do not go back to the station from whom you received it with delivery problems, or change your mind about accepting it. It is reasonable, in some circumstances, to find the station from whom the message was received and confirm the message content, but it is your responsibility, not his, to service the message.

If you can not move a message, relay it to another station that can.

If you have an insoluble problem, send a service message back to the station of origin. Explain the problem and put enough information in the service message to allow the station of origin to find the original message and evaluate, at the same time, the accuracy of the information you received. (Repeat key items in service messages!).

3.2.2.7 EMERGENCY MESSAGES

Emergency messages should be handled by the fastest path available, on or off radio. Notices regarding death or serious illness or injury are often better delivered by relief agencies or public safety officials experienced in such matters.

3.2.2.8 HONOR ALL HANDLING INSTRUCTIONS

HX codes regarding delivery, progress and replies are part of the job. Failure to honor these requests is as bad as not delivering the message at all. If a reply is requested by HXE from the addressee, and no reply is forthcoming, send a service message back and say so. In these type messages, the "ball is in play" until the originating station receives his expected response. An "ARL SEVEN" reply request in the text is an option for the addressee to approve.

3.2.2.9 DO NOT GENERATE MESSAGES WITHOUT PERMISSION

To originate a message for a third party without their permission is a fraud and forgery. (Strong words!) Generating messages about a third party without their permission is also considered very poor practice.

Do NOT service back changes of addresses, phone numbers, or other personal information about the addressee without their permission. The original message might be intended to pry into the private affairs of the recipient. Respect privacy.

3.2.2.10 MAKE NO COMMENTS REGARDING CONTENT

It is not proper to comment on the content of a message on the air, (legality excepted), or allow such a judgment to affect how a legal message is handled. The originator and the addressee deal with the content of messages.

Any legal message placed in play in the traffic system should get the same good service. Even an apparently pointless message is at least giving the system some practice, and it is improper to assume that the message is pointless to the originator or addressee.

3.2.2.11 ACCEPT ONLY MESSAGES WHICH MEET FCC RULES

Accept only messages in which the content and purpose comply with the FCC regulations in force regarding third party traffic, the prohibition of "business" traffic, encryption, and other rules regarding prohibited communications. It is difficult to examine a message and conclude with certainty what purpose or meaning is in the content in all cases. If in doubt, it is not mandatory to accept the message. Refuse it.

If you know by some other means than content that a message is business related, or otherwise illegal, do not handle it. If you wind up with such a message, and do not wish to send it along, send a service message to the originating station.

You are the licensee held responsible by the FCC. Handling messages is a voluntary service.

3.3 THE MESSAGE EXCHANGE

The following sections present the technique for exchanging the message, including examples and notes regarding syntax and operational handshaking.

3.3.1 READY TO COPY, QRV
In the examples the TX station is the message sender, the RX station the receiving station.

It is customary on CW and Phone alike to formally check that the receiving station is "ready to copy" before beginning the message. The inquiry "QRV?" and affirmative reply "QRV" are used on CW for this purpose. See also STATION OPERATIONS.

3.3.1.1 QRV, NEW FREQUENCY, OFF NET
Long method:
RX: "QRL?", the RX station checks the frequency, if no response, then:
RX: "W3TX W3RX" (makes the call)
TX: "W3TX QRV?"
RX: "QRV"
TX: "[W3TX]..." (sends the message(s))

Short method:
RX: "QRL?", the RX station checks the frequency, if no response, then:
RX: "W3TX W3RX QRV" (makes the call)
TX: "[W3TX]..." (sends the message(s))

3.3.1.2 QRV, ON A NET, RX CALLED TO RECEIVE MESSAGE(S)
RX: "W3RX QRV", (announces presence and ready to copy)
TX: "[W3TX]...", (sends the message(s))

3.3.1.3 QSZ (RX), REQUESTING
At the start or at interruption opportunities the RX station may request that the TX station send each word group 2 or more times:
RX: "W3TX W3RX QSZ QRV" (two times), "... QSZ (#)", 3 or more times.

3.3.1.4 QSK, QUANTITY (TX), ANNOUNCING
At the start (after QRV) the TX station may advise the RX station if it is operating QSK. It may also advise the quantity of messages to be sent when sending multiple messages.

TX: "QSK", or "QTC 4 QSK", and then sends the message(s).

Most traffic handlers use QSK with today's modern radios.

3.3.2 SENDING EXAMPLES
The following message will be used for demonstrating the sending methods below:

3.3.2.1 EXAMPLE 1, BASIC MESSAGE

1 R W1AW 13 NEWINGTON CT JUL 1	(PBL)
DONALD R SMITH	(ADDEE)
164 EAST SIXTH AVENUE	(ADR)
RIVER CITY MD 00789	(CITY, ST, ZIP)
301 555 3470	(TEL)

THANKS	FOR	MESSAGE	X	HOPE	(TEXT)
TO	SEE	YOU	AT	HAMFEST	(TEXT)
8/10	X	73			(TEXT)
DIANA					(SIG)

The message exchange is as shown below. Refer to the prosign and abbreviation list as needed. TX is the sending station, RX the receiver---on net frequency per the dispatch. Items in brackets [ ] are optional.

NCS   W3RX W3TX HR RIVER CITY [1], (or RC 1, dest. abbreviated, qty. optional)
RX   W3RX QRV; [or W3RX QSZ [#] QRV]
TX   W3TX...; or simply QSK..., or [W3TX QSK...], or simply begin the message
         NR 1 R W1AW 12 NEWINGTON CT JUL 1 (short pause)
                DONALD R SMITH <AA>
                164 EAST SIXTH AVENUE <AA>
                RIVER CITY MD 00789 <AA>
                301 555 3470 <BT> (/.../)*
                    THANKS FOR MESSAGE X HOPE
                    TO SEE YOU AT HAMFEST
                    8/10 X 73 <BT> DIANA <AR> N
RX   QSL W3RX; (or QSL 73 W3RX, etc.)
TX   W3TX; (or TNX 73 W3TX, etc.)   (Transaction complete.)

* (/.../) denotes release of the PTT for the mandatory listening pause if not using QSK.
* The short pause after the preamble is one extra word space long, and is optional, primarily to allow a brief instant for a carriage return, return key stroke, or pencil movement to address line. No prosign is used for this purpose at this location in the message. The date figures are the cue to the beginning of the address. Note the <AA> line ending prosigns used in the address section. Optional greetings, names and farewells are omitted in the examples in this manual but may be used before the statement ending ID or key words.

3.3.2.2 EXAMPLE 2, SVC, HX CODE, FILING TIME, OP NOTES

Sample message:

(PBL)	SVC 65 R HXC N3XYZ ARL 20 CATONSVILLE MD 1800Z JUL 24
(ADR)	JOHN A HAM W3XYZ
	107 HOOK ROAD APT 21A
	PHILADELPHIA PA 19034
	215 555 2345 OP NOTE CALL AFTER 6PM
(TXT)	ARL SIXTY FIVE 11PM JULY/29
	USAIR/354 TELL N3ZZZ THANKS FOR
	THE GREAT MEAL X NEW
	TELEPHONE 410 555 2008 REGARDS
(SIG)	BILL OP NOTE PKT AT 145R09 WB3FFV 21228 MD

Sent as follows on the net frequency:

NCS   W3RX W3TX HR PHILADELPHIA [1], (or PHILA 1, qty. optional)

RX   W3RX QRV; [or W3RX QSZ [#] QRV], etc.

TX   W3TX...; or simply QSK... , or [W3TX QSK], or simply begin the message
NR SVC 65 R HXC N3XYZ ARL 20 CATONSVILLE MD 1800Z JUL 24
(short pause)
      JOHN A HAM W3XYZ <AA>
      107 HOOK ROAD APT 21A <AA>
      PHILADELPHIA PA 19034 <AA>
      215 555 2345 <AA> OP NOTE CALL AFTER 6PM <BT>(/.../)*
          ARL SIXTY FIVE 11PM JULY/29
          USAIR/354 TELL N3ZZZ THANKS FOR
          THE GREAT MEAL X NEW
          TELEPHONE 410 555 2008 REGARDS <BT>
              BILL <AA>
              OP NOTE PKT AT 145R09 WB3FFV 21228 MD <AR> N

RX   QSL W3RX

TX   W3TX   (Transaction complete.)

* (/.../) denotes release of the PTT for the mandatory listening pause if not using QSK.

* Short pause after preamble is one extra word space long. Optional greetings, names and farewells omitted.

Additional examples demonstrate placement of prosigns with various components:

3) MULTI-LINE SIGNATURE

NR	PREAMBLE	
	ADDRESSEE	<AA>
	ADDRESS	<AA>
	CITY, ST, ZIP	<AA>
	TELEPHONE FIGS	<BT>
	TEXT	<BT>
	SIG	<AA>
	ADDRESS	<AA>
	ADDRESS	<AR> N

4) MESSAGE WITH OP NOTES:

NR	PREAMBLE	
	ADDRESSEE	<AA>
	ADDRESS	<AA>
	CITY, ST, ZIP	<AA>
	TELEPHONE FIGS	<AA>
	OP NOTE ____	<BT>
	TEXT	<BT>
	SIGNATURE	<AA>
	OP NOTE ____	<AR> N

5) NO TEL, LONG ADDRESS

NR	PREAMBLE	
	ADDRESSEE	<AA>
	INSTITUTION	<AA>
	ADDRESS	<AA>
	CITY, ST, ZIP	<AA>
	TELEPHONE FIGS	<BT>
	TEXT	<BT>
	SIGNATURE	<AA>
	OP NOTE ____	<AR> N

6) SHORT ADR, NO ZIP

NR	PREAMBLE	
	ADDRESSEE	<AA>
	CITY, ST *	<BT>
	TEXT	<BT>
	SIGNATURE	<AR> N

* If the addressee is a known ham, and the address is simply a call sign, the <BT> follows that call sign.

3.3.2.3 KEY POINTS

* QSK: Before the NR, indicates that the station is using full break-in. It is sent only once at the start when sending one or more messages to one station.
* NR: Before the message number begins copy thereafter.
* PREAMBLE: No prosign at the end; slight extra pause.
* PRECEDENCES: Sent as written; R, P, W, but EMERGENCY is spelled out.
* HX_: See notes after HX code list re multiple HX codes.
* ARL: Followed by a space is sent before the check if one or more ARRL numbered radiograms are in the text.
* ARRL NUMBERED RADIOGRAMS: Numbers are preceded by "ARL" in the text and the numbers are always sent spelled out; "ARL" in the text IS counted in the check.
* <AA>: Is always used at the end of each address line, and after signature and address lines, if any, except after the last line. If no zip code is present in the message, <AA> is still used between the state and the telephone figures.
* TELEPHONE FIGURES: Are written in three groups, area, prefix, and number, each separated by a word space. Foreign telephone numbers are sent as grouped in the formatted message. The group series is preceded by <AA>, followed by <BT> (or <AA> if an OP NOTE is used). Note that no hyphens are used between telephone figure groups.
* ZIP CODES: Are sent as written, the groups following the state, followed by <AA> (or <BT> if no tel figures or op note).
* NINE DIGIT ZIPS: Are formatted with the word "dash" which is sent as an extra group. Foreign zips may contain letters and figures and spaces.
* <BT>: Is always used at the start and end of the text, including in booked message sending; the <BT>s are NOT COUNTED in the check.
* LISTENING PAUSE: (for VOX or PTT operation) is mandatory after the <BT> at the start of the text, and after <BT> before NR in each booked message's variable parts.
* X: Used for a period. It IS counted for the check; it is never used as the last text character.
* R: Used as a decimal in figure groups.
* <AR>: Is always used at the end of the message copy, or end of book copy, being equivalent to "END" to stop copy on voice.
* QUANTITY TO FOLLOW LETTER(s) always follow <AR>:
  N, indicating NO MORE messages to follow,
  B1, or 1, indicating ONE MORE message to follow,
  B, indicating MORE messages to follow;
* <AS>: "Wait", may be sent by a station needing an extended pause during the transaction.
* OP NOTE(s): Limited to end of address section and end of signature section, are preceded by <AA> and introduced with the words "OP NOTE". The <AA> after the tel figures in the address may seem unnecessary, OP NOTE being sufficient, but is used to be consistent with use after the signature where ambiguity may result.

*   SPACES (pauses): Spaces are important when transmitting on CW. They separate and thereby define the word groups for meaning and for counting the check. Keep the spaces between elements and letters clear, and pauses between groups clear and noticeably longer than those between letters. Avoid inserting group spaces where there are none by irregular sending (GLENWOOD vs. GLEN WOOD---two different places.)

*   CHECK COUNT: Is the number of groups of letters-/-figures without internal spaces, each group with a space on the left and a space on the right, in the text; not counting the <BT> prosigns.

EXCEPTIONS OF NOTE

*   :K: Go ahead, is not used at the end of the quantity letters. The prosign <AR> means "end of message", the quantity-to-follow letters alert the receiving operator to go ahead; Likewise, "K" is not necessary in the contacting calls at the beginning of the exchange.

FIGURE ZERO: Some operators will send a "T", or long "T" (long T = zero, after the old telegraph fashion), for a ZERO, where no ambiguity would result---mainly in time figure groups. Remembering this will help avoid surprises. Experienced operators use this technique to save transmission time, particularly in net reports; as in "T 3 T T Z" for 0300Z. The T's are usually sent with a little extra spacing to accentuate their use for this purpose.

3.3.2.4 REPEATS, FOR CLARITY ("?", I say again)

Repeating group(s) for clarity, or to better the chance of correct copy, is done by sending the character "?" after the group or phrase then repeating the group or phrase. Unusual words or names may be repeated in this fashion, as in:
"... BARSCZC ? BARSCZC...".

Telephone numbers may be repeated when radio conditions are poor. Garbled telephone groups can disable a radiogram when that number is unlisted. Example:
"...MD 00789 <AA> 301 555 3470 ? 301 555 3470 <BT>..."

3.3.2.5 REPEATS, FOR CORRECTION ("?", I say again)

A transmission error is corrected by sending the character "?", then repeating the groups beginning with the last group or prosign sent correctly.
"RIVER CITY MD 00780 ? MD 00789"; or
"<AA> 304 ? <AA> 314 OAK STREET <AA>..."; going back to <AA>.

The formal prosign symbol used for denoting an error is <HH> (........), often shortened to two i's (.. ..), in conversational or operational CW. These are not recommended for marking errors in transmitting messages. Use the "?", meaning "I say again".

3.3.2.6 NO EXTRANEOUS WORDS

No extraneous words, symbols or characters are used in transmitting the message.

The experienced traffic handler knows what part of the message comes next from the sequence of words. Extra words, such as "CK", fully spelled month, date out of order or with year included, "TEXT", "SIG", etc., are confusing and counterproductive. An experienced operator writes down

everything he hears except for those prosigns and abbreviations which trigger a special response. Do not transmit anything else you do not want written down.

* FORMAT DISCREPANCIES: It is controversial, but sending along improperly formatted groups (such as a date in the PBL of "7/13" if received that way), is often done to avoid altering the message. It may be acceptable to do so as long as the incorrect format does not violate the group or syntax content rules. Sending a preamble month fully spelled out (AUGUST vs. AUG) is another example. A fully spelled state in the address, on the other hand, is simply unconventional, but not disallowed. The time to fix these problems is at formatting time! Technically the receiving operator is not obligated to accept an improperly formatted message.

3.3.2.7 MAKING NOTE OF WORDS IN DOUBT
When you are copying a message, any group(s) received about which you have doubt should be marked by underlining, or some other convenient means. It is amazing how much you can forget after copying another five or ten words. If you can not interrupt for a repeat immediately, underline or otherwise mark the group, phrase, address, etc., so that you remember to go back at the end of the message and clear it up.

If the sending station is using QSK you may interrupt at any time for a repeat of a group just sent. If an earlier group is needed wait for a break point or the end of the message and request a fill or confirmation.

3.3.3 JUMPING AHEAD
There are occasions when the receiving station may wish the sender to jump ahead, i.e., skip a known or already received part of a message.

* RECEIVING STATION, SENDING STATION WITH QSK:
A receiving operator asking for a repeat of a message part, such as the preamble, or addressee, might not need all of that part. When it copies what it needs the station will then send the specific group or part where the sending station should resume transmission.

A receiving operator, upon recognizing the addressee, may tell the sending station to go directly to the text by sending <BT>. The sender transmits <BT> and sends the text. If, however, there is an address op note, the sending operator should send that op note before continuing with <BT> and the text.

A receiving operator, recognizing a "standard message" from an originator might interrupt the sending with "SIG" as soon as the address is received and the text is recognized. The sending operator skips the text, sends <BT>, and follows with the signature. If the receiving station interrupts with a QSL as soon as the text is recognized it is indicating it knows both the text and signature, however the sending operator should send the signature and signature op note, if present, when the op note is not "standard" for that message. If in doubt the sending operator should at least confirm the receiving station has the op note.

* SENDING STATION
When the sending station encounters an address, such as a known amateur on the net or local delivering area, or is sending a message directly to an amateur recipient, it may abbreviate the address to simply the call sign and continue, or ask the receiving operator if more information is

needed before continuing, even if the address is written out in full. This can save time in transmitting the message. With great care, other addresses may be so abbreviated. This may save transmission time when handling repeated messages to a particular addressee, for example, but assumptions should be carefully avoided. Sending the full message is the formal treatment.

In similar fashion the sending station may ask the receiving station if it already has a standard message text and/or signature when there is no doubt about accuracy.

Experienced operators often use these shortcuts to avoid duplicate transmission of message information repeated or well known. Booking, when possible, is a more formal treatment.

3.3.4 INTERRUPTIONS, WITH QSK
When the sending station is operating full break-in (QSK), the receiving operator can interrupt at any time.

The receiving operator sends the last group copied, or a fragment sufficient to identify a group, and the sending operator will resume with the next group, or the group containing the fragment, respectively.

3.3.4.1 Examples, QSK
(Transmissions indented to convey timing.)

1) Continuing after group sent:
TX: ... TO SEE YOU AT
RX: YOU (interrupts after "AT")
TX: AT HAMFEST... (continues after "YOU")

2) Repeating group containing fragment:
TX: ... TO SEE YOU AT HAMFEST
RX: HAM (in middle of word)
TX: HAMFEST... (repeats "HAMFEST".)

3) Repeating group containing fragment:
TX: ... TO SEE YOU AT HAMFEST
RX: HAM (at end of word)
TX: HAMFEST... (repeats whole word)

4) Correcting and continuing:
TX: ... TO SEE YOU AT
RX: YOUR (error in the request)
TX: YOU AT HAMFEST... (corrects error)

3.3.4.2 QSK Tips
The QSK interrupt method should be used immediately when copy of a group is missed.

If there is some other reason for interrupting, the receiving station may send <AS> (wait). When ready, a specific group(s) to begin with may be sent (from anywhere in the message), in which case transmission is resumed after the specified group(s). The receiving station may also send a

message part name (PBL, ADR, TXT, SIG, etc.) in which case transmission resumes with that part.

When using QSK it is generally considered good practice to interrupt immediately at the point where copy was missed, or otherwise wait until the next breakpoint or the end of the message to request fills. In other words, it is considered less desirable to interrupt at various times and force the sending operator to back up to earlier parts of the message for fills. When done, however, some receiving operators will ask for the fills (using formal fill requests), then use "K" to ask the sending station to resume where it left off. Better to use a specific group, part, or prosign to indicate the resumption point. It is the more consistent and reliable method.

On PTT/VOX operation, asking for fills from any previous part of the message is acceptable at the mandatory breaks. See the next section.

3.3.5 INTERRUPTIONS, WITH VOX OR PTT CW
Operation with VOX (receiver turns on following delay after last character sent), or manual push-to-talk transmitters, requires the operator to pause to allow interruptions. Such stations do NOT send QSK ahead of NR at the start of the message. The receiving station must wait for the customary interruption opportunities.

It is mandatory to pause after the prosign <BT> at the start of the text (and after <BT> ahead of NR in the variable parts of books) to listen for requests from the receiving station. The receiving operator will ask for a "fill" using the formal FILL REQUESTS during the pause. These pauses are shown as "(/.../)" in the examples.

If the receiving station needs no "fills" it is not expected to transmit anything during these pauses. If a fill IS required the receiving station should interrupt quickly to seize the gap. If nothing is heard in a few seconds, the transmitting station continues with the message.

The disadvantage of not using QSK is obvious. The receiving operator is forced to go into the formal "asking for fills" mode of operation at the break(s) or at the end of the message.

3.3.5.1 Examples, NON-QSK
TX: NR 1 R W1AW 12 NEWINGTON CT JUL 1 (short pause)
            DONALD R SMITH <AA>
            164 EAST SIXTH AVENUE <AA>
            RIVER CITY MD 00789 <AA>
            301 555 3470 <BT> (/.../) - (first fill opportunity)
RX: CTY ORIG (fill request 1)
TX: NEWINGTON CT
RX: WA EAST (fill request 2)
TX: SIXTH
RX: <BT> (RX sends the prosign for the start of the text as the marker to resume.
            Some operators may say "K" at this point, implying the <BT> where the TX
            station left off at the pause.)
TX: THANKS FOR MESSAGE X HOPE... (resumes with text); or
            <BT> THANKS FOR MESSAGE X HOPE... (optionally including the <BT>)

These fills could have also been requested after the entire message was completed. Many ops will clear fills in the PBL and ADR at the first break, and get any others at the end.

3.3.6 FILL REQUESTS, PRIMARY AND ALTERNATIVES
The receiving operator may use formal FILL REQUESTS for repeats of any prior part of the message received that is in doubt. This may be done at any time, however it is considered good practice to do so only at the required listening pauses or end of the message rather than at random times.

If the transmitting operator is using QSK the receiver can ask for repeats any time during the message transmission using a simple interruption as noted above in Interruptions with QSK and QSK Tips. At any other time the receiving operator should use the formal methods for asking for fills outlined below.

* ABBREVIATIONS USED TO ASK FOR FILLS OR CONFIRMATION:
The optional [IN (part)] prefix limits the search for the fill to a particular part of the message, to limit the range only when ambiguity would otherwise result; as in: PBL, ADR, TXT, SIG, book message number, etc. Alternatively, a specific sub-part name may be requested, such as LAST NAME ADDEE, ST ADR, ZIP, TEL, etc. Abbreviations for message parts are in the Abbreviations and Prosigns List at the end of the chapter.

When there are duplicate groups in the message be specific. Use several groups in the blanks, or limit with the optional [IN (part)] statement. (Which may be placed ahead or after the request. It is shown in this manual ahead, suggesting this makes it easier for the receiving operator to locate the position of the request.)

There are three fill request methods, differing in response only. The first is the shortest and most efficient, suggested as best practice. Examples will use only method 1.

* FILL REQUEST METHOD 1, Responding only with group(s) requested, the [IN (part)] limiter being optional as required (as in IN TXT, IN SIG, IN ST ADR, etc.):

TYPE	CW ABBREVIATION
WORD AFTER:	[IN (part)] WA ___; Respond only with group requested, within limits;
WORD BEFORE:	[IN (part)] WB ___; Respond only with group requested, within limits;
ALL AFTER:	[IN (part)] AA ___; Respond only with all groups after group given, within limits;
ALL BEFORE:	[IN (part)] AB ___; Respond only with all groups before group given, within limits;
BETWEEN, a range of groups.	[IN (part)] BN ___ ES ___; ("ES" = "and"), or [IN (part)] BN ___ ? ___ ; Respond only with all groups between those given, within limits.
CONFIRM:	[IN (part)] CFM ____; Respond CFM (or C) if group(s) correct, otherwise send correct group(s), within limits; [Archaic option: Send N (to flag error), pause, then send the correct group(s).]
PART:	(part); (NR, PBL, ST ADR, TEL, SIG, etc.) Respond by re-sending the requested part; as in: **RX:** SIG (no query required); **TX**: BILL SMITH.

* Note that there is no "?" used after the requests. The interrogatory is implied.
* <AR> or K is not sent after the requests or replies (even though some operators will use <AR> if the fill response is long or complicated. The pause at the end of a request or response is usually sufficient signal.

* FILL ALTERNATIVES, differing only in the responses:

* METHOD 2, Responding with the FLANKING GROUPS:
WORD AFTER: [IN (part)] WA ___;
Respond with group given, word after, & next group;

WORD BEFORE: [IN (part)] WB ___;
Response: go back two groups, give that group, the requested group, and the group given;

ALL AFTER: [IN (part)] AA ___;
Respond with all groups, starting with group given;

ALL BEFORE: [IN (part)] AB ___;
Respond with all groups up through, and including, the group given;

BETWEEN (group 1) AND (group 2), (The "ES" = "and"):
[IN (part)] BN ___ ES ___ ;
[IN (part)] BN ___ ? ___ ;
Respond with first group given through, and including, the second group given;

CONFIRM and PART requests as in METHOD 1 above.
---
* METHOD 3, Responding with the REQUEST (seldom used on CW):
WORD AFTER: [IN (part)] WA ___;
Respond with WA ___, then word after;

WORD BEFORE: [IN (part)] WB ___;
Response: WB ___, then group requested;

ALL AFTER: [IN (part)] AA ___;
Response: AA ___, then all after;

ALL BEFORE: [IN (part)] AB ___;
Response: AB ___, then all before;

BETWEEN (group 1) AND (group 2), (The "ES" = "and"):
[IN (part)] BN ___ ES ___ ;
[IN (part)] BN ___ ? ___ ;
Response: BN ___ ES ___, then groups between those given;

CONFIRM and PART requests as in METHOD 1 above.
-----

* REMINDER: Abbreviations to be used carefully and literally:

C:	Yes, affirmative; and optionally the affirmative reply to CFM (group(s)).
CFM:	(group(s)), request: Receiving station request to confirm if group(s) are copied correctly.
CFM:	reply, the affirmative reply to CFM (group(s)); sometimes simply "C" is used;
N:	No, negative;
R:	Received and understood. (Does NOT mean C or CFM)
73:	Best regards (plural, 73's is redundant).

3.3.6.1 EXAMPLE OF FILL REQUESTS AND RESPONSES
In the message sent as:

7 R W3TX 12 COLLEGE PARK MD JUL 1		(PBL)
JOHN R SMITH <AA>		(ADDEE)
164 EAST SIXTH AVENUE <AA>		(ADR)
RIVER CITY MD 00789 <AA>		(CITY, ST, ZIP)
301 555 3470 <BT> (/.../)		(TEL)

THANKS	FOR	LETTER	X	SEE	(TEXT)
YOU	AT	MEETING	NEXT	WEEK	(TEXT)
X	73	<BT>			(TEXT)
HUGH W3TX <AR> N					(SIG)

REQUEST	**RESPONSE**
WA FOR	LETTER
WB LETTER	FOR
WB FOR	THANKS
IN TXT AA WEEK (limited range)	X 73
AA WEEK (unlimited range)	X 73 <BT> HUGH W3TX
IN TXT AB SEE (limited range)	THANKS FOR LETTER X
AB SEE (full range)	NR 7 R W3TX...(through)...FOR LETTER X
BN SMITH ES AVENUE	<AA> 164 EAST SIXTH; (The <AA> is within the requested range. Such prosigns in range are included in the response.)
BN RIVER ES TEL	CITY MD 00789
WA JOHN	R
WA HUGH	W3TX
SIG (requesting a part)	HUGH W3TX
CFM LETTER	CFM (or "C"); (confirming single group)
CFM NEXT WEEK X 73	CFM (or C); (confirming several groups)
CFM LETTERS	LETTER, (singular); or [N LETTER]* (response to error)
CFM WEEK 73	WEEK X 73, (missing X); or [N WEEK X 73]*; (response to error) * These options using N (negative) are archaic but functional.

3.3.7 VERIFYING THE CHECK
When receiving traffic, it is customary to copy text five or ten groups to a line to enable a quick count of the groups. Doing this will enable you to anticipate the end of the message without having to stand by to count. A surprise indicates a probable check error.

Since every operator verifies the group count, a check discrepancy can flag both sending and copying errors.

Make a quick check of the text to find obvious possibilities such as words that could have been sent as either one or two groups. The importance of the use of clear separation between groups when sending can not be overemphasized. (The "GLENDALE" vs. "GLEN.. DALE" case.) Clear sending will reduce such errors.

Ask for fills using the fill request guidelines. "CFM ___" may be used for likely items. Often a check discrepancy results from missing an "X" or some other simple error.

DO NOT SPEND A LOT OF TIME FISHING FOR THE PROBLEM. The discrepancy may be found sooner or later by fishing, but only after trial and error and the expenditure of much time.

Wise operators using QSK go directly to the QTB method to save time wasted searching group by group. The QTB method involves sending the first initials of each group in the text with the other station interrupting as soon as the discrepancy is detected. Either station may initiate the QTB sequence.

If the RX station is confident it copied the transmitted check correctly, but it has a different group count, RX may immediately begin the QTB series. The TX station will interrupt when the initial sequence error is detected.

If the RX station is not sure it copied the check correctly it may ask "CFM CK ##". The TX station will either confirm with "CFM" (or "C") or send the correct check. If a corrected check matches the count, the problem is fixed.

If the check still disagrees with the count the RX may ask "CK ##?" (its count), in which case the TX station will no doubt make a quick verification of its count, amend the check, or begin the QTB series to the RX station. The RX station will interrupt when the initial sequence error is detected.

The process is slightly different in each case. See the QTB section following.

Notes:
Do not re-send entire messages or parts of messages in an attempt to find errors unless the receiving station makes specific requests for parts or fills, or QSM.

Do not send entire messages or parts of messages back to the sending station unless specifically requested to do so.

3.3.7.1 FIRST INITIALS, QTB
         The following text is sent with a check of 13:
TX: THANKS FOR THE LETTER X
         SEE YOU AT MEETING NEXT
         WEEK X 73

         With the text copied incorrectly with a check of 12 (note "THE" is missing.):
(RX)   THANKS FOR LETTER X SEE
         YOU AT MEETING NEXT WEEK
         X 73
The exchanges would go as follows, indents reflect timing;

1) If the RX station is confident it copied the transmitted check correctly, but it has a different group count, the RX station may initiate the QTB sequence:

RX:	QTB T F L	(the incorrect sequence);
TX:	FOR THE	(TX interrupts to add THE)
RX:	QSL 73 W3RX	(the count now agrees).

Note that the TX station will back up a sufficient number of groups to be able to send a unique and unambiguous series of groups to correct the copy.

2) If the RX station is not sure it copied the check correctly it may ask "CFM CK ##". Note this is simply a verification of the copied check.

RX: CFM CK 13

TX: CFM (or C), (since the check IS 13 on the original);

The receive station now knows there is either a sending or a receiving error (or a miscount check error on the original). It may begin a QTB series at this point as above, or;

3) The RX station may ask for a verification of the count:

RX: CK 12?; or COUNT 12?, (using the received group count);

The TX station will make a quick check of the count. (Note that the query is not a normal fill request, and ends with a question mark.)

If TX finds an error on its copy, it will amend the check and inform the RX station of the amended check, as in CK 13/12. The amended check now becomes part of the message.

That is NOT the case in this example,

4) therefor the TX station may initiate the QTB sequence:

TX:	T F T...	(the correct sequence)
RX:	WA FOR	(interrupting with a formal fill request)
TX:	THE	(responding with the next group);
RX:	QSL 73 W3RX	(the check now agrees).

In either case, if the stations were operating slow VOX/PTT the stations would wait until the end of the message. The station copying the QTB would listen to the full sequence and RX would make the "WA FOR" request, or TX would send the correction, at the end of the sequence.

3.3.7.2 QSM, QSZ, ALTERNATIVES

As a last resort in very difficult or confused copy, the receiving station my request "QSM" (repeat the last message sent), and may additionally request QSZ (#). The TX station repeats the message (or part).

As in a fill request, the receiving operator may ask "QSM TXT", although "TXT" is sufficient, or may ask "TXT QSZ (#)".

3.3.7.3 AMENDING THE CHECK

If the sending station and receiving station eventually agree that they have the same text, and the check is in error, the CHECK may be amended by adding a slash followed by the corrected number as in 12/13, which is sent as 12/13.

TEXT OR CHECK IS NEVER CHANGED TO FORCE AGREEMENT!

The original check value is preserved throughout the life of the message as it moves through the system. An amended check becomes part of the message to be carried on through to delivery.

The sending station should have caught the discrepancy before sending the message, and amended the check. If you fail to catch a check discrepancy and inadvertently acknowledge the message, and can not reach the sending station, you can only amend the check for future reference. If the error has fatally flawed the message, a service message back to the originating station may be the only recourse.

If such errors are encountered with a message already having an amended check, only the amended value may be changed once the text is verified. An omitted "ARL" can be added to the amended part. Multiple amendments are not used, i.e., 12/13/14 would be 12/14.

An OP NOTE may be added if there is a particular suspicion about the nature of the error.

3.3.7.4 ACKNOWLEDGING RECEIPT
Use QSL. When the receiving station is certain that it has copied the message(s) correctly, and accepts same, the response to the sending station is "QSL" for all messages received; one message, several messages, a book of messages, or any mix thereof.

Acknowledgments such as "QSL NR ##" (the message number) are considered poor practice.

See Station Operations section for examples of acknowledging and terminating the exchange with proper ID. QSL [DE] W3RX.

3.3.8 BOOKING, TIME SAVING OPTION, SPECIAL EVENTS
Considerable time can be saved in sending two or more messages with fixed parts, such as fixed addressees, fixed texts, etc., by "booking" the messages as they are sent. Booking is usually done in the head of the sending operator, and it is done at the option of the operators and is not mandatory. The economy of booking is based mainly upon the size of parts that would otherwise have to be repeated.

There are many permutations of booking depending on the fixed and variable parts. Booked messages can have fixed preambles (except for message number), fixed addressees, fixed texts, fixed signatures, or various combinations of each.

3.3.8.1 BOOKING IS OPTIONAL
Choosing to book is an option of the sending operator and is not mandatory. Booking should not be used if the receiving operator objects.

Booking two messages with only a fixed signature is hardly worth the effort. Booking 12 messages with a fixed 25 word text is another matter. The text would be sent only once.

The decision to book is made based on the amount of time and effort to be saved and the wishes of the stations involved.

3.3.8.2 SENDING THE BASIC BOOK
The basic book with a common text and variable address and signature would be formed as
follows during transmission:
BOOK OF THREE R W3FT ARL 3 BALTIMORE MD JAN 15
<BT> (/.../)* ARL FORTY SIX <BT> (/.../)*
NR 1 (addressee) <BT> (signature) <BT> (/.../)*
NR 2 (addressee) <BT> (signature) <BT> (/.../)*
NR 3 (addressee) <BT> (signature) <AR>
END BOOK <AR> N
(Using <AA> at the end of each of the address lines, of course.)
* The (/.../) denotes the expected listening pauses when not using QSK.

3.3.8.3 NOTES ON BOOK STRUCTURE
The book is introduced by sending "BOOK OF (#)...", (where "#" is the quantity of messages
booked, spelled out as a word) followed by the fixed parts, then the variable parts. Parts of the
book are separated by <BT> until the end of the last message which ends with <AR>. The book
is closed by sending "END BOOK", followed by the customary <AR> N (or <AR> 1, <AR> B,
where more follow). Generally:

* The PREAMBLE is kept intact except for the message number and sometimes the check or
date. The message # is a variable part.

* The ADDRESSEE, ADDRESS, and OP NOTE are usually kept together.

* The TEXT is kept intact as a fixed part or a variable part, except for blanks in a fixed text to be
filled-in within a variable text part. The associated check stays in the same part of the book
except when a fixed text has blanks to be filled in within variable parts using variable length
additions. There the check moves to the variable parts.

* <BT>: If the fixed parts include a text, <BT> is still used to mark the start and end of the text.
If the fixed parts include no text, a single <BT> is inserted between the fixed address and
signature. If the text is the last fixed part, only one <BT> is used to separate it from the NR of the
first variable part. If the fixed part contains only a signature it is preceded by a <BT> to
distinguish it from a stand-alone address, and is of course followed by the <BT> to begin the
variable parts.

* Each variable part begins with transmission of NR (#), the message number associated with
that part, followed by any variable parts of the preamble (identified by part name), and then the
address, text and/or signature of the variable parts, each separated by a single <BT>.

* In other words, the variable parts of the book are separated from each other, and from the fixed
parts, by the SINGLE prosign <BT>. No double <BT> is ever required.

*The SIGNATURE, and its OP NOTE are kept together.

* A message with a very long text may be originated as two or more separate messages and easily
sent as a book. The variable parts would simply be: NR (#) CK (#) <BT> (text part) <BT>.

* In summary, the purpose of the booking format is to combine all fixed parts of several messages into one block to be sent first, followed by all the variable parts, sent next, all in such a way that exact replicas of the individual messages may be reconstructed by the receiving station at a later time.

 Rules for book transmission are generally the same as for single messages except for the opening and closing references to the book, and the need to identify variable parts of the preamble when separated from the main preamble. (See examples below.)

* No extraneous words such as "fixed parts", or "variable parts", etc., are required during transmission. They are considered poor practice.

* The sending station does not stop sending the book for acknowledgment until the book is completed unless sending individual book parts each to different stations on a single frequency. In that case each station may be excused when its part(s) are received and acknowledged.

* Messages are usually booked when relaying them as a batch to another single station for relay or delivery. That station must "un-book" any messages which are to be relayed to separate stations later, or group them in smaller batches as needed. The operator should be practiced at both booking and un-booking visually on the fly when sending message traffic.

3.3.8.4 BOOKS TO A SINGLE STATION
When sending a book to a single station it is customary to send the book continuously from start to end. Stopping for acknowledgment after each variable part takes extra time.

Full QSK permits interruptions at any time.

On slow VOX/PTT it is customary to listen after the mandatory <BT> at the start of a text, and between <BT> and NR at the start of each variable part. These are the points where the receiving operator expects a listening opportunity. Nothing is sent by the receiving operator until the end unless it has fill requirements.

3.3.8.5 EXAMPLE 1, Fixed PBL and TXT, to one station

Given the 3 messages:

2 R W3VPR ARL 15 ANNAPOLIS MD JAN 1
    JIM SMITH
    13 OAK LANE
    BOSTON MA 01033
       ARL SIXTY ONE X HAVING
       A WONDERFUL TIME HERE X
       HOPE TO SEE YOU SOON   BETTY AND JOHN
3 R W3VPR ARL 15 ANNAPOLIS MD JAN 1
    BILL JONES
    4 CEDAR RD
    BALTIMORE MD 21228
    410 555 3434
       ARL SIXTY ONE X HAVING
       A WONDERFUL TIME HERE X
       HOPE TO SEE YOU SOON   HARRY OP NOTE REPLY MDD
4 R W3VPR ARL 15 ANNAPOLIS MD JAN 1
    CHUCK K3FT
    C/O BTN 146R67
    BALTIMORE MD
       ARL SIXTY ONE X HAVING
       A WONDERFUL TIME HERE X
       HOPE TO SEE YOU SOON   GEORGE

They are sent as follows, assuming contact has been made:

"BOOK OF THREE   R W3VPR ARL 15 ANNAPOLIS MD JAN 1
       <BT>(/.../)*   ARL SIXTY ONE X HAVING
               A WONDERFUL TIME HERE X
               HOPE TO SEE YOU SOON <BT>(/.../)*
NR 2   JIM SMITH <AA>
       13 OAK LANE <AA>
       BOSTON MA 01033 <BT> BETTY AND JOHN <BT>(/.../)*
NR 3   BILL JONES <AA>
       4 CEDAR RD <AA>
       BALTIMORE MD 21228 <AA>
       410 555 3434 <BT> HARRY <AA>
       OP NOTE REPLY MDD <BT>(/.../)*
NR 4   CHUCK K3FT <AA>
       C/O BTN 146R67 <AA>
       BALTIMORE MD <BT> GEORGE <AR>
END BOOK <AR> N"

* The (/.../) denotes the expected listening pauses when not using QSK.

* Note the fixed parts of the book never contain a message number, the variable parts of the book all contain a unique message number, and where a text is included the text is begun and ended with a <BT>. A <BT> separates the address from the signature where no text is present.

* <BT> always separates each variable part before the prosign "NR", and implies a listening pause for non-QSK.

3.3.8.6 EXAMPLE 2, Fixed PBL and ADDEE, to 1 station
Given the two messages:
```
 3 R W3XYZ 10 CROWNSVILLE MD JAN 5
        BOB W3BOB
              TWO OPERATORS ARRIVED AT BWI
              TO OPERATE PACKET X THANKS
                    JIM N3EI
 5 R W3XYZ 11 CROWNSVILLE MD JAN 5
        BOB W3BOB
              NEED SIX MOBILES WITH TWO
              METERS FOR SEARCH TEAMS X
              ADVISE
                    BRIAN N3QXW
```
They are sent as follows, assuming contact has been made and the stations are ready to copy with special requests made:
```
"BOOK OF TWO R W3XYZ CROWNSVILLE MD JAN 5
      BOB W3BOB <BT>(/.../)*
NR 3 CK 10 <BT>(/.../)*     TWO OPERATORS ARRIVED AT BWI
                           TO OPERATE PACKET X THANKS <BT>
                                 JIM N3EI <BT>(/.../)*
NR 5 CK 11 <BT>(/.../)*     NEED SIX MOBILES WITH TWO
                           METERS FOR SEARCH TEAMS X
                           ADVISE <BT>
                                 BRIAN N3QXW <AR>
END BOOK <AR> N"
```
* (/.../) fill opportunity is shown for non-QSK operation only.

Note the use of <BT> to separate the parts, and CK to introduce the variable checks.

Note the lack of a <BT> between the PBL and "BOB W3BOB", thus indicating that the line is an address, shortened for this example, not a signature. A fixed-signature-only book would set the signature apart with a <BT> before, and then <BT> after to end the fixed parts. Note the economy of this booking is minimal unless the address is full length, but still saves some time, particularly with large books. The PBL and address is only sent once.

3.3.8.7 EXAMPLE 3, Fixed PBL, TXT and SIG, to 1 station
```
"BOOK OF TWO R W3XYZ 10 BALTIMORE MD MAR 10
            <BT>(/.../)*     WELCOME TO FISTS CW CLUB
                           X ENJOY YOUR MEMBERSHIP 73 <BT>
                                 KJ3E <BT>(/.../)*
NR 2     JOHN A SMITH
         (address lines) <BT>(/.../)*
NR 3     HARRY J JONES
         (address lines) <AR>
END BOOK <AR> N"
```
* (/.../) fill opportunity is shown for non-QSK operation only.

3.3.8.8 EXAMPLE 4, Fixed PBL and TXT except ARL blank
Used in holiday traffic solicitations, for example.
"BOOK OF TWO R W3XYZ ARL 3 ANNAPOLIS MD MAR 5
   <BT>(/.../)* ARL SIXTY BLANK <BT>(/.../)*
NR 1 JOHN A SMITH
   (address lines) <BT>(/.../)*
   CHRISTMAS <BT> BARBARA <BT>(/.../)*
NR 2 HARRY B LEVIN
   (address lines) <BT>(/.../)*
   HANUKKAH <BT> BOB AND JUDY <AR>
END BOOK <AR> N"
* (/.../) fill opportunity is shown for non-QSK operation only.

* "BLANK" (or "XXX") is used as place holder for additions in the variable parts, or, where there are two ARL blanks, two may be used. Each blank is usually limited to a single group addition. If not, the check should move to the variable part of the message.

* A fixed part check must agree with the final un-booked version of each message. Where blanks are filled with variable length insertions the check would move to the variable parts to agree with the final text for that version.

3.3.8.9 EXAMPLE 5: Fixed PBL and TXT except misc. blank
Used where numerous messages are sent with a variable word or phrase implied by a blank in the fixed text. Note the different checks in the variable parts.
"BOOK OF TWO R W3XYZ ANNAPOLIS MD MAR 5
   <BT>(/.../)* HAPPY BLANK ANNIVERSARY <BT> (/.../)*
NR 1 CK 3 JOHN A SMITH
   (address lines) <BT>(/.../)*
   40TH <BT> MOM AND DAD <BT>(/.../)*
NR 2 CK 4 HARRY B LEVIN
   (address lines) <BT>(/.../)*
   THIRTY FIFTH <BT> UNCLE BILL <AR>
END BOOK <AR> N"
* (/.../) fill opportunity is shown for non-QSK operation only.
* "BLANK" (or "XXX") is used as place holder for additions in the variable parts. The check indicates the variable additions.

3.3.8.10 ASKING FOR FILLS IN BOOKS
It is customary when asking for fills in books to specify the part name or message number limits to help the receiving station find what you are asking for when ambiguity would otherwise result. From the example in the last section (using the "IN NR #" position limiter):

RX REQUEST	TX RESPONSE
IN NR 2 WA HARRY	B
IN NR 1 CK	4
WB BLANK	HAPPY

*(In the fixed text implied since no number was given. "IN FIXED PARTS" may be used to introduce the request if ambiguity would otherwise result.)

3.3.8.11 BOOKS TO MULTIPLE STATIONS

When sending a book of messages with different addressees to different receiving stations on the same frequency it is customary to check each station is ready to copy before starting, and to say the call sign of the station to copy each variable part just ahead of the prosign NR introducing that part. This assures each station knows what to copy. The TX station arbitrates relays.

In a stack of numerous stations copying such a book off net, it is efficient to stop at the end of each station's variable part(s), get fills settled and acknowledgment with that station, and excuse the station from the stack so it may return to the net for other business.

Transmission of books to multiple receiving stations is usually encountered only on Section or Local nets, seldom on Region or higher nets where liaisons are dispatched singly. It requires skill in dispatching, and by the sending station to control the sending process, but it can save considerable net operating time when done properly. It is an optional strategy. It is often used for transmitting widely distributed books or "bulletins" to jurisdiction reps in emergency nets where considerable time can be saved. (See dispatching messages to all stations on net, QNC, Chap. 4.)

Note that the TX station performs like a net control when handling a group of stations receiving parts of a book. If the stations are dispatched from a net, the Net Control Station will assign the messages to each receiving station and the sending station copies along, or the sending station is advised by the NCS which stations will handle which messages at the time of the dispatch. The sending station controls the exchange on the assigned frequency or on the net until the assignment is complete.

Example follows using the messages in example 1.

3.3.8.12 EXAMPLE: BOOK OF 3, TO THREE STATIONS
At the listening points after the first and second messages the receiving stations are called specifically, thus dispensing with the need for listening breaks at those points.

TX:	QRL?...	(off net, no response)
TX:	W3XA W1TX QRV?	(on or off net)
RX1:	QRV	
TX:	XB, or [W2XB] (? not required.)	(TX uses suffixes or tactical calls.)
RX2:	QRV	
TX:	XC	
RX3:	QRV	

TX: BOOK OF THREE   R W3VPR ARL 15 ANNAPOLIS MD JAN 1
                              <BT>(/.../)*   ARL SIXTY ONE X HAVING
                                        A WONDERFUL TIME HERE X
                                        HOPE TO SEE YOU SOON <BT> (/.../)*

RX3:	XB STN ORIG **	
TX:	W3VPR	
RX3:	R	

     ** (W3XB needed a fill. Fixed part fill requests from any RX station are generally accepted here (non-QSK) so all stations can benefit. The suffix ID is optional. This fill sequence may also be done when this station is called later.)

TX: W3XA NR 2   JIM SMITH <AA>   (alerts RX1 to copy next part)
                               13 OAK LANE <AA>
                               BOSTON MA 01033 <BT> BETTY AND JOHN <BT>

	W3XA	(checking the receiving station for acknowledgment)
RX1:	QSL W3XA	(station automatically excused from the stack)

TX: W3XB NR 3   BILL JONES <AA>   (alerts RX2 to copy next part);
                               4 CEDAR ROAD <AA>
                               BALTIMORE MD 21228 <AA>
                               410 555 3434 <BT> HARRY <AA>
                                 OP NOTE REPLY MDD <BT>

	W3XB	(checking with receiving station)
RX2:	WA 4	
TX:	CEDAR	
RX2:	QSL W3XB	(station excused from the stack)

TX: W3XC NR 4   CHUCK K3FT <AA>   (alerts RX3 to copy next part)
                               C/O BTN 146R67 <AA>
                               BALTIMORE MD <BT> GEORGE <AR>

	END BOOK <AR> N	
RX3:	QSL W3XC	
TX:	73 W3TX	(EXCHANGE COMPLETE)

* Note: (/.../) = customary listening points for NON-QSK. QSK interrupting is done at any time.Each station is excused from the stack when done.

* A receiving station can ask for fills for any part of the message before acknowledging its particular parts. Fills can be requested by interruption if the sending station is so equipped, otherwise requests are accepted at the customary break points or when the TX station calls directly. Late arriving recipients wait until the book is finished to engage the TX station.

When sending bulletins (QNC), all stations are polled after the message for acknowledgment. (See Chapter 4.)

3.3.8.13 SPECIAL EVENT BOOK SOLICITATIONS
When sending continuing books, as in holiday solicitations where one huge book may be transmitted all day long, the book will usually have a fixed preamble except for the number and possibly the check. The text may be one of several choices, or contain a basic fixed text with a blank or blanks to be filled in based on choices of the originators. The sending station may transmit new messages sporadically during the event time, calling the receiving station(s), announcing the continuing book, and sending the new message number, check, address, text choice or blank information for the variable text, and signature.

One or a team of receiving stations may complete the messages for transmission as books or singles on later nets. Generally, only messages with one text choice, even if there is a blank to be completed in the variable text parts, are booked for transmission throughout the NTS. Messages with variable texts are permitted, of course, but are usually an economy only for a large number of messages to one addressee.

Traffic may be presorted by NTS Region or local delivery areas to facilitate handling through the Section and higher nets.

The stations may agree in advance that the text will be sent from the originating station as "TEXT 1", or "TEXT 2", etc., each with its own check The receiving station would enter the appropriate text and check in the message(s) to be forwarded. Transmitting such books through the nets may be done in similar fashion although this is seldom if ever done. Normally the forwarding station would book together only those messages with one text version, sending those with different texts in separate books to keep the confusion to a minimum. For stations working together much time can be saved in transmission, as in this example.
BOOK OF TWENTY SIX   R W3FT BALTIMORE MD DEC 20
                                              TEXT 1 CK 15 <BT>(/.../)* (text of 15) <BT>
                                              TEXT 2 CK 18 <BT>(/.../)* (text of 18) <BT>
                                              TEXT 3 CK 22 <BT>(/.../)* (text of 22) <BT>(/.../)*
(The PBL and the texts above could have been sent earlier in the event and omitted here.)
NR 10   JOE SMITH <AA>
                10 OAK DR <AA>
                PODUNK MD 21228 <AA>
                410 555 1234 <BT> (/.../)* TEXT 2 <BT> MARY SMITH <BT>
(... messages 11 through 35 ... <BT>)
NR 36   JOHN DOE <AA>
                24 EAST 16TH ST NW <AA>
                TOWSON MD 21204 <AA>
                410 555 5678 <BT> (/.../)* TEXT 1 <BT> UNCLE JOE <AR>
END BOOK <AR> N   (N for this batch. Stations may resume with variable parts later.)
* (/.../) fill opportunity is shown for non-QSK operation only.

3.4 SENDING MULTIPLE MESSAGES

When transmitting a series of two or more single messages, books, or a mix of singles and books, the following sequence is customary. Transmission of the entire batch is continuous and extraneous exchanges between the stations are minimized.

The receiving station usually is aware of the quantity of messages to be passed. This information is part of the net listing and dispatching information. If the situation warrants the transmitting station may inform the receiver of the quantity at the start of the exchange along with the QSK, as in "QTC 3 QSK...".

If the transmitting station is QSK the receiving station can interrupt whenever a group is in doubt. Otherwise, the receiving station must wait for one of the customary listening pauses after an eligible <BT>.

The transmission of the series of messages is then normally done in one continuous flow without interruption unless a fill is needed. The sending station sends the "<AR> B" or "<AR> 1" statements at the end of each intermediate message, followed by a brief listening pause, and the next message is then begun with "NR" without waiting for a "K" or "T" from the receiving station.

On slow VOX/PTT operation, the sending station should listen during the eligible listening pauses in case the receiving station needs to make a fill request or has a problem, particularly when sending a long series of single messages or long books. The receiving station should not send anything unless a break is needed.

3.4.1 EXAMPLE: Two messages and book of 2, total 4

RX: QRL? (no reply)

RX: W3TX W3RX QRV (or ... QSZ 2 QRV if needed)

TX: W3TX QSK (or W3TX QTC 4 QSK... if needed)

        NR 22 R W1AW 11 NEWINGTON CT DEC 22

            GEORGE SMITH <AA>

            45 OAK DRIVE <AA>

            PODUNK MD 21200 <AA>

            410 555 1234 <BT> (/.../)*

                ADVISE IF YOU RECEIVED MY

                EMAIL DATED DECEMBER 7 X

                73 <BT> STEVE <AR> B (/.../)*

        NR 309 R W3FT ARL 3 BALTIMORE MD DEC 22

            WILLIAM JONES

            13 SLEEPY HOLLOW PKWY

            PODUNK MD 21200

            410 555 2456 <BT> (/.../)*

                ARL SIXTY CHRISTMAS <BT> BUCK <AR> B (/.../)*

        BOOK OF TWO R W3VPR ARL 15 ANNAPOLIS MD DEC 23

         <BT> (/.../)*   ARL SIXTY ONE X HAVING

                      A WONDERFUL TIME HERE X

                      HOPE TO SEE YOU SOON <BT> (/.../)*

        NR 2   JIM SMITH <AA>

                 13 OAK LANE <AA>

                 BOSTON MA 01033 <BT>

                     BETTY AND JOHN <BT> (/.../)*

        NR 3   BILL JONES <AA>

                 4 CEDAR RD <AA>

                 BALTIMORE MD 21228 <AA>

                 410 555 3434 <BT>

                     HARRY <AA> OP NOTE REPLY MDD <AR>

        END BOOK <AR> N

RX: QSL W3RX

TX: W3TX

        (EXCHANGE COMPLETE)

* (/.../) listening pause for fills for non-QSK. Optional greetings and farewells are not shown.

3.5 STATION OPERATIONS

Stations passing traffic individually and on nets should be familiar with message formatting outlined in chapter 1 and sending methods outlined in previous sections in chapter 2. Chapter 4 will present net operating methods. This section presents the common practices of two stations engaged in the traffic exchange, whether on a net, sent off frequency from a net, or meeting by themselves.

The customary practices help the stations know what to expect of each other. Once contact is made the same basic sequence of exchanges is used by all stations when passing traffic, regardless of how they got together.

3.5.1 EXCHANGE ON NET FREQUENCY
The typical net dispatch and exchange is as follows:
NCS: "W3RX W3TX HR (dest. [qty]*)"
* (Quantity is usually only given if there is more than one message assigned to the receiving station and the NCS wishes to have the station send fewer than the total to permit other net business to be injected.)

RX: W3RX QRV
TX: [W3TX] (TX sends the message(s)) <AR> N
RX: QSL W3RX
TX: W3TX (end of transaction) The NCS resumes control of the net.

* Listen to the dispatch carefully in case the NCS specifies a different calling order. The first station call sign in the dispatch usually initiates the exchange. If the TX initiates the exchange it would first ask QRV? Other arrangements are made for relays or to first establish contact, etc. See the NET OPERATING chapter for more information.

3.5.2 MOVING OFF NET FREQUENCY
The art of moving off net frequency and making contact requires a little care and practice.

The first station addressed transmits first when acknowledging being sent off frequency from a net. The NCS will send the two call signs, the assigned frequency, and the traffic destination (plus optional quantity) to be passed. The two stations acknowledge in that order by each saying "T" (or "G", the longer form, "going"); as in:
NCS: W3RX W3TX UP 6 3RN;
RX: "T";
TX: "T"

In some cases the Net Control Station will give the call signs in a different order based on the type of dispatch. Listen to the instructions carefully. Transmitting in the right order will avoid "doubling". The NCS needs to hear that both of the dispatched stations have acknowledged and are "going". Otherwise the NCS will have to call to verify it was heard, wasting net time.

Explanations of dispatching methods and the station responses are outlined in the NET OPERATING chapter.

3.5.2.1 CALLING ORDER, SEARCHING, DIRECTION, TIME
When two stations move off to exchange traffic certain customs of calling and answering are used. These customs help prevent the confusion of two stations calling each other at the same time, or on two different frequencies, or each station thinking the other is going to do the calling.

The receiving station calls first, so the transmitting station tunes around to find it. (The receiving station picks the frequency to be free of interference.)

The receiving station selects the frequency as close as possible to the assigned frequency. It is also customary that any shifts or searches are also done in the same direction, i.e., if stations move down to the assigned frequency, and find the frequency busy, they would move down another 1kHz or so (i.e., away from the net), or to the next available clear frequency. This is not a

hard and fast rule, but moving in the opposite direction should be done in limited fashion since most stations would not be expecting it. Moving too far in the expected direction will usually result in the other station becoming lost as well.

The RX station makes frequent short calls to help the TX station find, and not miss, the calls. If contact is not made in about 30 seconds to a minute, the stations return to the net and report no contact.

3.5.2.2 REPEAT CALLS
The RX station makes the first call:
RX: QRL?, (if no response);
RX: W3TX W3RX QRV, (or if no reply, repeats the call without the QRV)
RX: W3TX W3RX, (repeating until contact is established)
TX: W3TX QRV?
RX: QRV (or QSZ (#) QRV), and the exchange is begun.
(Note that "DE" and "K" or "<AR>" are omitted in the calls. They are not required. Full ID is made after the exchange.)

If unsuccessful the call is again repeated by the receiving station, keeping the calling time short and the listening time short so the other station will not pass by and miss the call.

The process is repeated for usually no longer than thirty seconds to one minute or so. Beyond that time the chance of hooking up diminishes. It is prudent after a reasonable time to go back to the net, all stations reporting "no joy", and let the NCS arbitrate a solution. (See the chapter 4 on NET OPERATIONS.)

3.5.2.3 TWO STATION EXCHANGE
The receiving station calls, long method:
RX: QRL?, (if no response, then)
RX: W3TX W3RX (if no reply, see above)
TX: W3TX QRV?
RX: QRV (or QSZ (#) QRV)
TX: QSK, (or QTC 4 QSK),
TX: (W3TX then begins the exchange with "NR...", or "BOOK OF (#)" ending "<AR> N");
RX: QSL W3RX (or QSL 73 W3RX, etc.); (or settles fills and then acknowledges)
TX: W3TX (or TNX 73 W3TX, etc.)

Experienced stations sometimes use a shortcut as follows, the short method:
RX: QRL?, (if no response, then)
RX: W3TX W3RX QRV, (assumes contact, declares QRV)
TX: [W3TX] (or W3TX QSK, or W3TX QTC 4 QSK)..., and the exchange is begun.
This shortcut is not used if the RX station needs to ask for QSZ. The QRV is omitted forcing the TX station to ask QRV?

* Note that "DE" and "K" or "<AR>" are omitted in the calls. They are not required. Full ID is made after the exchange.

*"QSL" is sufficient to acknowledge the message(s). "R" is also in use, but "QSL" is the less ambiguous choice. Making comments such as "QSL NR (#)", etc., is considered poor practice.

3.5.2.4 RELAY STATION ASSISTANCE
If a relay station is dispatched to aid in the exchange the relay station will usually initiate the contact for obvious reasons. The relay station will initiate an exchange with the sending station then pass the message to the receiving station, often keeping the original holder on frequency for any queries or confirmations.

3.5.2.5 SPECIAL REQUESTS, RX STATION
If the receiving station wished to ask for multiple group transmission or spelling it makes the first call without the "QRV":
RX: W3TX W3RX, the sending station will make contact:
TX: W3TX QRV?, at which point the RX request may be made:
RX: W3RX QSZ QRV
TX: and the exchange is then begun by the TX station.

3.5.2.6 EXPEDITIOUS ASSIGNED EXCHANGES
The assigned traffic is exchanged promptly.

Stations handle only assigned traffic. If other traffic comes up, or some traffic may not be passed, or is refused, the stations return to net and inform the NCS. The NCS may have made other arrangements for other traffic held, and can schedule other changes.

Stations pause briefly to listen for calls from others when their business is concluded, then return to net promptly. Failing to pause can cause missing another station assignment. Chatting with stations is considered poor practice and may keep others waiting. The stations can list "WDS for (call sign)" on the net and be assigned to have conversations, on or off the net frequency.

3.5.2.7 RETURNING TO THE NET
The order of transmitting when returning to a net is not important except that stations should not interrupt ongoing transactions. Receiving-station-first may be exercised when returning if two stations know they are returning together.

* JOB COMPLETED: Stations report back into the net by sending:
STN: "(suffix)" (or number + letter for 2x1's)
NCS: "(suffix)", repeats the suffix to acknowledge.

It is not necessary for the returning station to indicate the traffic passed. The NCS assumes it cleared the dispatched traffic. It is not necessary for a returning station to remind the NCS of its remaining pending business.

*ADDITIONAL BUSINESS:If a returning station has additional business to list, or wishes to report a change in the original dispatched traffic count:
STN:
"(full call) PSE ADD QTC (list) <AR>"; or
"(full call) PSE CORRECT PODUNK 6 TO 5 <AR>"; or

"(full call) PSE QTA LITTLEBURG <AR>"; or
"(full call) PSE QNX <AR>", etc.

Or the station may reply to a specific request from the NCS for a volunteer to take a liaison job or accept listed traffic.
NCS: "(suffix)", repeats the suffix to acknowledge.

* IF UNABLE TO COMPLETE THE ASSIGNMENT: Stations return to the net in less than a minute. All stations report to the NCS when returning that the assignment is incomplete:
STN:
"(full call) NO JOY", or
"(full call) NO (suffix)", (the suffix is that of the station to be contacted when dispatched)

The station may add a brief explanation of the problem encountered, such as no clear frequency, unable to copy, interference, suggest frequency (freq.), etc.
NCS:
"(suffix) <AS>", repeats suffix to acknowledge; or
"(suffix) R <AS>"
(The NCS arbitrates a solution to the problem or dispatches the station for other business.)

* See the chapter on NET OPERATING for details on these moves.

3.5.3 MOVING TO A STACK OF TWO OR MORE STATIONS
A station may be dispatched off net to pass traffic to a particular station already participating in an exchange at a stack (off-net frequency). In some cases there may also be another station waiting in line. The NCS will assign the order of business at the stack. The two stations at the stack control the frequency. The third station is dispatched using the QNQ instruction:
NCS: "W3RX QNQ UP 5 W3TX PODUNK"; (station 3 for the stack)
(W3RX moves up 5 and waits for W3TX to finish its exchange, then calls.)

The fourth station is dispatched with the additional "AFTER (call sign)" instruction (This is seldom done. The NCS will usually wait for a station from the stack to return before dispatching an additional station, limiting the stack total to 3.):
NCS: "W3RX QNQ UP 5 W3TX AFTER W3XX PODUNK"; (station 4+ for the stack)
(W3RX contacts W3TX following the exchange with W3XX, then exchanges Podunk.)

The station moves to the stack frequency, waits for its turn, and then promptly calls its station immediately following the exchange of the station it is to follow. Calls should be made promptly so the assigned station does not escape back to the net. The miss will require repeat dispatching and wasted net time.

* BOOKS FOR MULTIPLE RECEIVING STATIONS (See 3.3.8.11, 12):
On nets below Region and Area level the NCS may dispatch a number of stations to receive particular parts of a book held by one transmitting station. The NCS will either assign the traffic to the receiving stations before the dispatch, or will do so within the dispatch syntax. In either case the transmitting station acts as a temporary NCS to pass the traffic either on the net or off frequency. Off frequency as each station receives its part(s) of the book, the transmitting station

will settle with that station and release that station to return to the net.

(See the chapter on NET OPERATING for more information.)

3.6 PROWORD, PROSIGN AND ABBREVIATION LIST

<AA>	CW PROSIGN (.-.-), END OF LINE, used at end of addressee, institution name, street address, and city/state/zip lines, and after telephone number groups if they are followed by an OP NOTE; used in address and signature sections (they are used like carriage-return/line-feed commands).
AA	CW; All After (used to get fills).
AB	CW; All Before (used to get fills).
ADEE, ADDEE	CW; Addressee, name of person or organization in message address part.
ADR	CW; Address, second part of message as a whole. Also street address within that message part; as in STREET ADR, ST ADR, or simply ADR.
AFFIRM-ATIVE	Yes. Also CHARLIE. "C" on CW.
AFTR	CW short form of "after", and "after" in stack dispatch command.
AMATEUR CALL	Voice introductory word used for amateur call signs.
ANC	Alternate Net Control, backup for NCS.
<AR>	CW PROSIGN (.-.-.), END-OF-MESSAGE. End of written copy.
AREA	Telephone area code.
ARL	Letter group used before ARRL NUMBERED RADIOGRAMS in text, and before figures of PBL check if Numbered Radiograms are present in the text.
<AS>	CW PROSIGN (.-...), Wait, stand by. NCS ack. line ending prosign.
B	CW; More messages to follow, sent after <AR> at end of message. (<AR> B)
B1	CW; One message to follow, often shortened to "1", after <AR>, end of msg.
BACK	Operational word after call sign or suffix on voice; station returning to the net.
BACK-SLASH	Voicing for symbol "\" and formatting email/URL/BBS addresses.
BK	Break, break me; break-in (interrupt transmission on CW). Archaic on tfc nets.
BN, BETWEEN	CW; Between; for getting fills, "BN (group) ES (group)" (ES = and). BTWN
BOOK	A group of messages with some common parts which may be transmitted in a special sequence to save time, the common parts sent only once.
BOOK of (qty)	PROWORDS to begin tranmission of a book of messages, (qty) as a word.
BREAK	PROWORD, voice version of <BT> below. (Quick check or separator on voice.)
<BT>	PROSIGN (-...-) CW BREAK, used at the start and end of the text, and between fixed and variable parts of booked messages. Not counted in CK.

C	CW; YES, affirmative. YES, AFFIRMATIVE, or CHARLIE on voice..
CFM	CW; Confirm, used to request confirmation of a group (no "?" needed), or reply in the affirmative to confirm a group. (CFM (group) -- CFM.)
CHARLIE	Yes, affirmative, used on voice.
CITY ORIG	CW; City of origin in PBL; sometimes CTY.ORG. See Place of Origin.
CITY ADR	CW; City in ADR; sometimes CTY; also ADR CITY.
CK	CW abbreviation for CHECK, the group count in the preamble.
CL	CW; Closing station, closed.
CLR	CW; Clear, clear of business or traffic.
CLOSE	Term used to denote a station leaving the air; or to close the net (end QND).
CLOSED	Term used to denote a station off the air, or secured. Also key word to denote the end of the directed net session. (equiv. to CW QNF)
CONFIRM	Query and response to verify a group in a message on voice modes, no query (?) is used. (Equiv. to CFM on CW). (CONFIRM (group) -- CONFIRM.)
CU	CW; See you. Variation of SU. (A farewell.)
CUL	CW; See you later. (A farewell.)
DASH	Written word used as substitute for the hyphen (for zip code extra 4, etc.).
DE	CW; "This is", "From", preceding identifying call sign of transmitting station.
DIRECTED NET	All communications are controlled by the NCS; QND.
DOT	Used in formatting messages as period in email, URL, BBS addresses.
EC	Emergency Coordinator.
EE	CW (dit dit), traditional farewell at end of CW exchanges.
END	PROWORD END ends message copy on voice.
END BOOK	PROWORDS; end copy of a book of messages begun with BOOK OF (qty).
ES	CW; AND. Used operationally, not as substitute for text "and". (BN__ ES__).
EXERCISE	Used as first and last groups in exercise/drill messages. See Test Messages.
FIGURE(S)	Voice introductory group for figure(s) groups.
FORMAL	Formal Traffic. A message in full ARRL standard format.
FREE	Designates directed net termination; "Net is Free"
G	CW; Going, response to net control instruction to go off frequency. Used by multiple stations, or after being excused. Letter T used for routine departures.
GA	CW; Go ahead, continue, or equiv. to CW "K", voice GO AHEAD or GO.
GA,GE,GM,GN	CW; Good afternoon, evening, morning, night.

GO	Short for GO AHEAD, continue; equiv. to ("K"), GA on CW.
GOING	Voice response of station dispatched off net freq., see G.
GROUP	In message text, a series of letters, figures, and/or "/"s, with no spaces between them, taken as a whole with a space before and a space after.
GRP	CW; Abbreviation for group.
<HH>	CW;(........) Error in sending in conversational CW. Also "I I" used: (.. ..). Not to be used during transmission of a formal radiogram. The prosign "?" is used in transmission of a radiogram. See "?".
HX	ARRL Radiogram Handling Instructions, optional part of preamble, [HX_].
<II>	CW; (.. ..), Also HH as above. Error in sending, short form of <HH> in conversational CW. The prosign "?" is used in transmission of a radiogram.
INFORMAL	Net traffic or business other than formal messages; words, announcements.
INITIAL(S)	Voice primary introductory word for single letter or multi-letter abbreviations.
K	CW; Go ahead (over). Reply expected. (Invitation to transmit.)
LAST FOUR	Last four digits of telephone figures. Also TEL LAST 4.
LETTER GROUP	Letters in abbreviations. Equivalent (second choice) to INITIALS for introducing 2 or more letters.
LIAISON	Station carrying traffic between nets.
LIST	The NCS command for a station to list its net business. Also, the traffic list itself.
MGR	Manager. See NM. Also organization manager in personal titles.
MIXED GROUP	Voice introductory words for groups with mixed letters, figures, "/"s, or "R".
MORE	Traffic to follow; END NO MORE (...MORE, ...ONE MORE). See CW N, B
N	CW; No, negative. CW; Used after <AR> to indicate no more messages to follow. (<AR> N)
NCS	Net Control Station
NEGATIVE	No.
NM	Net Manager. See MGR.
NO JOY	The rechecking station's report of no contact or failed exchange off net.
NR	CW; PROSIGN (number), message follows, begins copy. <AR> stops copy. CW; number, also used to refer to the message number or other figure groups.
NUMBER	PROWORD number begins message copy on voice. END stops copy. Number, used to specify the message number in asking for fills on voice.

OP NOTE	Message Part: Notes after ADR or SIG relating to handling station info regarding delivery and replies respectively, introduced "OP NOTE".
OPEN	OPEN the Net; the beginning of directed net operation.
OVER	Operational word for "go ahead". Reply expected. (Invitation to transmit.)
PASS	Pass traffic: exchange traffic with another station.
PBL	CW; Preamble, first line of information in ARRL message format, NR to DATE.
PLC ORIG	CW; Place of origin in preamble (PBL). City of Origin. (Where the signing originator is located --- not necessarily same as Station of Origin location.)
PLS	CW; Please. Variation of PSE.
PREC	CW; Precedence.
PRFX, PFX	CW; Telephone prefix figures. Sometimes PFX, or TEL PFX. Not AREA code.
PSE	CW; Please. Also PLS.
R	CW; Roger, received and understood (Does NOT mean yes!) CW; Used as decimal point symbol in mixed figure groups (146R670).
RELAY	Act as intermediary between stations (QNB on CW). Also, carry traffic between destinations (QSP on CW).
RE-LIST	Place a dispatched message back on the net list.
REP	Net REPresentative, liaison station.
ROGER	Received and understood, on voice. (Does NOT mean yes!).
SEC	Section Emergency Coordinator
SECURED	Station excused from the net, or net closed.
SIG	CW; Signature, last part of message CW; Signal in conversational CW.
<SK>	PROSIGN (...-.-) Out, end of transmissions, no reply expected, from the old telegraph (...-.):3, (---, long dash): 0 = 30, end of shift.
SLASH (/)	Voicing for symbol "/"; also SLANT, SLANT BAR, STROKE, DIAGONAL.
SM	Section Manager
ST	CW; State; specify if in PBL, ADR, TXT, SIG, etc. ST ADR: street address.
STN	Station.
STN ORIG	Station of Origin in message PBL, "Station of Origin" on voice.
STACK	Two stations on a frequency dispatched off the net, possibly other stations waiting to call one when they are done.
STM	Section Traffic Manager
STN ORIG	CW; Station of origin in PBL.
SU	CW; See you, variation of CU.
SVC	Abbrev. for SERVICE, used ahead of message NR for service messages.

T	CW; Going, short form of G, response to net dispatch off frequency.
T (zero)	Letter "T" or long "T" optionally used as zero in figure groups where no ambiguity would result; as in 23TTZ (2300Z), the T's often sent with extra spacing.
TEL	CW; (TEL NR) Telephone figures. (See Area, PFX, Last Four.)
Telephone Figures	Voice introduction for telephone figures when no zip in address.
TEST	Word used to modify the Precedence for exercise messages; TEST R, etc.
TEST MESSAGE	Used in message texts to indicate exercise or drill content. See EXERCISE.
TIME FILED	Time of message filing, 24h-Z unless marked, optional in PBL ahead of date.
TKS, TNX, TU	CW; Thanks, Thanks, Thank You.
TXT, TEXT	CW; Message Text part.
WA	CW; Word after, used to ask for fills.
WB	CW; Word before, used to ask for fills.
X	Period substitute. The CW period (.-.-.-) is not permitted in message sending. "X" is never used as the last message text group.
ZIP	Zip code figures, including extra 4 if present.
1	CW; Short form of B1, indicating one message to follow, after <AR>. (<AR> 1)
33	Hugs farewell.
73	Best regards (73 is singular, meaning best regards, plural) farewell.
88	Love and kisses. (161 = 73+88).
? (prosign)	CW; PROSIGN (..--..), Query, used two ways when sending the formal radiogram on CW: 1) As a symbol meaning ERROR in transmission. Resume with the last group sent correctly. 2) As a symbol for "I SAY AGAIN" for repeating a group for clarity or emphasis. (See also "? - query")
? (query)	Query. Used operationally for the interrogatory after a regular "Q" signal, as in "QSL?", and as the query in conversational CW. See "? (prosign)".
Note 1 (//)	(//), quick pause; (/.../) fill pause; denotes release of PTT switch or listening. These are symbols used in this manual only. They are NOT prosigns.
Note 2	Abbreviations are shown primarily for use on CW. Use appropriate introductory words (initial/initials) for such groups voiced in message texts.
Note 3 Q-sig	Do not use "Q" signals operationally on voice. Say it in words. ("Q" signals in the texts of messages are permissible.) CW QN-signals are special for ARRL nets.

3.7 NET AND INTERNATIONAL Q SIGNALS

ARRL QN SIGNALS FOR CW NET USE

QNA*	Answer in prearranged order.
QNB*	Act as a relay Between _____ and _____ .
QNC	All net stations Copy. I have a message to all net stations.
QND*	Net is Directed (controlled by a net control station).
QNE*	Entire net stand by.
QNF	Net is Free (not controlled).
QNG	Take over as net control station.
QNH	Your net frequency is High.
QNI	Net stations report In.* I am reporting into the net. (Follow with a list of traffic or QRU.)
QNJ	Can you copy me? Can you copy _____?
QNK*	Transmit messages for _____ to _____ .
QNL	Your net frequency is Low.
QNM*	You are QRMing the net. Stand by.
QNN	Net control station is _____ . What station has net control?
QNO	Station is leaving the net.
QNP	Unable to copy you. Unable to copy _____ .
QNQ*	Move frequency to _____ and wait for _____ to finish handling traffic. Then send him traffic for _____ .
QNR*	Answer _____ and Receive traffic.
QNS	Following stations are in the net.* (Follow with list.) Request list of stations in the net.
QNT	I request permission to leave the net for ___ minutes.
QNU*	The net has traffic for you. Stand by.
QNV*	Establish contact with _____ on this frequency. If successful, move to ___ and send him traffic for ___.
QNW	How do I route messages for _____ ?
QNX	You are excused from the net.* Request to be excused from the net.
QNY*	Shift to another frequency (or to _____ kHz) to clear traffic with _____
QNZ	Zero beat your signal with mine.

* For use only by the Net Control Station.

Notes on the Use of QN Signals

The QN signals listed above are special ARRL signals for use in amateur CW nets only. They are not for use in casual amateur conversation. Other meanings that may be used in other services do not apply. Do not use QN signals on phone nets. Say it with words. QN signals need not be followed by a question mark, even though the meaning may be interrogatory.

INTERNATIONAL Q SIGNALS

A "Q" signal followed by a ? asks a question. A "Q" signal without the ? answers the question in the affirmative unless otherwise indicated

QRA	What is the name of your station?
QRG	What is my exact frequency?
QRH	Does my frequency vary?
QRI	How is my tone? (1-3)
QRK	What is my signal intelligibility? (1-5)
QRL	Are you busy?
QRM	Is my transmission being interfered with?
QRN	Are you troubled by static?
QRO	Shall I increase transmitter power?
QRP	Shall I decrease transmitter power?
QRQ	Shall I send faster?
QRS	Shall I send slower?
QRT	Shall I stop sending?
QRU	Have you anything for me? (Answer in negative.)
QRV	Are you ready?
QRW	Shall I tell _____ you're calling him?
QRX	When will you call again?
QRZ	Who is calling me?
QSA	What is my signal strength? (1-5)
QSB	Are my signals fading?
QSD	Is my keying defective?
QSG	Shall I send _____ messages at a time?
QSK	Can you work break-in?
QSL	Can you acknowledge receipt?
QSM	Shall I repeat the last message sent?
QSO	Can you communicate with _____ direct?
QSP	Will you relay to _____ ?
QSV	Shall I send a series of V's?
QSW	Will you transmit on _____ ?
QSX	Will you listen for _____ on _____ ?
QSY	Shall I change frequency?
QSZ	Shall I send each word/group more than once? (Answer, send twice or _____.)
QTA	Shall I cancel number _____?
QTB	Do you agree with my word count? (Answer negative.)
QTC	How many messages have you to send?
QTH	What is your location?
QTR	What is your time?
QTV	Shall I stand guard for you?
QTX	Will you keep your station open for further communication with me?
QUA	Have you news of _____ ? (From FSD-218 (2/91) "Pink Card") ARRL, 225 Main St., Newington, CT 06111