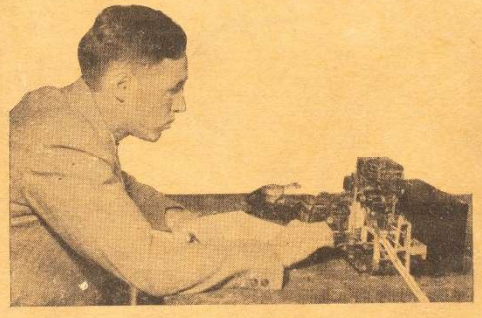
N. E. Chaney

SCIENTIFIC CODE COURSE



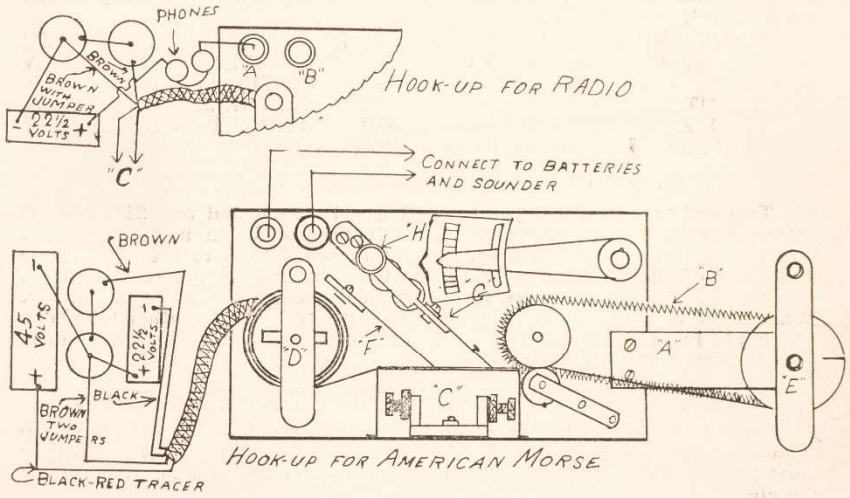
MAKING RECORD ON TELEPLEX

TELEPLEX

76 CORTLANDT STREET, NEW YORK CITY, U.S.A.

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO OPERATE MASTER TELEPLEX

When you unpack the machine first check over and be sure that you have the following items: Radio tube, recorded tapes, blank tapes, winding handle, one empty tape spool, ink, medicine dropper for filling inkwell, extra supply of ink wicks, sending key trunion, bracket "A", headphones (if you have ordered Radio Course) American Morse Sounder (if you have ordered American Morse Course).



HOW TO ASSEMBLE AND HOOK UP MACHINE

Attach bracket "A" with two screws as shown in above cut and tighten securely. Put spring belt "B" on grooved pulleys as shown in diagram. Place sending key trunion on the key base "C". Adjust set screws so that the contact point on the trunion is in proper relation to the contact point on the key base. In making this adjustment the set screws should be turned up tight and then turned back a quarter to a half revolution, the lock nuts should then be securely fastened. The adjusting screw at the rear end of the trunion should be adjusted so that there is an up and down motion of the key knob of about 1/16 of an inch. The spring tension screws near the middle of the trunion should fit into the key tension spring.

The cover is hinged at the back. It may be turned back by inserting a screw driver or other thin instrument near the winding crank hole in the top and raising the cover slightly so that it will slide over the winding shaft. When closing the cover again be certain that it does not pinch any of the wires. The radio tube should be inserted in the tube socket. For instruction in Radio any of the following tubes may be used: 201A, 112 or 230. If 230 is used only one cell of A battery should be used as this is a two volt

tube but will work satisfactorily on one 1½ volts. For instruction in American Morse an R C A 171A or Cunningham 371A is used. The proper tube for your use has been sent to you. After the tube has been inserted the battery should be hooked up as shown in the above diagram.

CAUTION

In connecting the battery as outlined below great caution should be exercised to guard against the A battery wires coming in contact with the binding posts or battery clips on the 22½ and 45 volt battery. If this happens the filiment of the tube will be burned out. In these instructions A battery means the two 1½ volt standard No. 6 dry cells. C battery means the 22½ volt battery.

WHEN THE INSTRUMENT IS NOT IN USE THE BROWN WIRE WITH THE JUMPER SHOULD BE DISCONNECTED FROM THE A BATTERY. WHEN THIS WIRE IS DISCONNECTED IT SHOULD NOT BE PERMITTED TO COME IN CONTACT WITH THE 22½ OR 45 VOLT BATTERY AS IT WOULD CAUSE A SHORT CIRCUIT AND DESTROY THE BATTERY IN A VERY SHORT TIME.

HOOKUP FOR INSTRUCTION IN RADIO

Two ordinary No. 6 dry cells of 1½ volts each and one 22½ volt C battery are necessary. Arrange the batteries as shown in the diagram. Connect the brown wire with the jumper attached to it to the center pole (positive) of the A battery. Continue the jumper to negative C battery. Connect the other brown wire to the outside pole (negative) of A battery. Connect one of the telephone tips to 22½ C positive and the other telephone tip should be inserted in tipjack "A" of the TELEPLEX. This hookup is for receiving signals from the tape.

TO PRACTICE SENDING WITHOUT MAKING TAPE

To send signals into the headphones from the key the telephone tip should be removed from tipjack "A" and inserted in tipjack "B", also tape must be inserted so that an ink mark comes under the pickups to complete the circuit.

TO MAKE TAPES

To operate the pen and record signals on the tape disconnect the two brown wires and connect the two wires marked "C" to the A battery. One of these wires is black and the other is black with a red tracer. They are not polarized and may, therefore, be connected to either terminal of the A battery.

The following instructions are for American Morse hookup and Radio students will not have to read them but should skip to the paragraph headed "GETTING STARTED".

AMERICAN MORSE HOOKUP

The following batteries will be necessary: One 45 volt, one 22½ volt and two standard No. 6 dry cells of 1½ volts each. In addition batteries will be necessary to operate the sounder. The sounder that we furnish is designed to work on three volts or two standard dry cells. However, you may use any battery such as the local battery in a telegraph office, a storage battery or any other arrangement to operate a sounder that you may now have. If no such battery is available it will then be necessary for you to procure the two dry cells.

Arrange the battery as shown in the diagram and make the connections as follows: connect the brown wire with two jumpers to the center pole (positive) of A battery. Continue one jumper to 22½ volt positive, the other jumper to 45 volts negative. Connect the other brown wire to the outside pole (negative) of A battery. Connect black wire to 22½ volt negative and black wire with red tracer to 45 volt positive. Connect sounder with batteries in series to wires leading from the two binding posts of TELEPLEX.

With the connections made as above tape will operate the relay or signals may be recorded from the sending key on the base of the TELEPLEX. For practice in sending by hand on the sounder the key and sounder should be disconnected from the TELEPLEX and hooked up in the regular way.

RELAY ADJUSTMENT

For instruction in American Morse MASTER TELEPLEX is equipped with a sensitive relay which closes and opens in accordance with the dots and dashes on the tape. Wires from the points of the relay lead to the two binding posts on the instrument panel. This relay is mounted immediately behind tape bracket "D". The adjustment screw is located near the big gear of the motor. To adjust the spring tension insert a screw driver in the slot of the perpendicular adjustment screw. Turning to the right increases the spring tension and to the left decreases. This relay was properly adjusted before the instrument was sent to you and it is unlikely that any further adjustment will ever be necessary. Do not under any circumstances change the adjustment unless absolutely necessary.

GETTING STARTED

AS YOU READ THE FOLLOWING STOP AND LOCATE ON THE INSTRUMENT THE PARTS AS THEY ARE MENTIONED

Insert the recorded tapes on bracket "D" so that the tape unwinds from underneath and not over the top. Refer to the diagram and note that the tape unwinds from the bottom of the spool. You will also note that there is a long slot cut in the sides of the spool. On bracket "D" this slot should always be to the outside. Place an empty spool on bracket "E" with the long slot to the rear so that it engages the small cross member of the shaft.

In placing the spools on brackets "D" and "E" the spool retaining member should be pulled out until it clears the shaft and then moved to one side, after the spools have been put in place the retaining member should be pulled back to position so that the end of the shaft extends through the hole in the retaining member. Wind the motor to 65 turns. Slide the end of the tape along the tape guide and underneath the pickup "F" and pen "G". In doing this a penknife or other sharp instrument should be used to catch the tape near the end and force it under the pickup and pen. Do not forcibly lift up the pickup and pen for this purpose. The tape should now be pulled between the pressure rollers and the end inserted in the small slot in the face of the empty spool on bracket "E". You will also note in the above diagram that the tape winds up from underneath and not over the top of spool on bracket "E".

ADJUSTING THE PICKUPS

The ink or conducting fluid contains an element that is a conductor of electricity. When a dot or dash comes in contact with the points of the pickup "C" an electrical circuit is completed by current flowing through the ink mark. Each tape has two rows of characters. The one that will be used is the outside one or the one nearest to you. The pickups "C" may be adjusted by moving them forward or backward. They should be adjusted so that the back contact rides directly over the center line of the tape while the outside contact rides only on the dots and dashes. They should be adjusted so that the outside contact is about 1/32 of an inch away from the heavy center line. If it is closer than this the signals will be too heavy and if it is further out the signals will be too light. In shifting the pickup pressure should be applied to the bakelite piece. The small screws attaching the bronze pieces to the bakelite should never be touched.

With a little experimenting you will quickly find the best position for the pickup.

THE MOTOR

The motor may be started, stopped and the speed regulated by moving the speed indicator up or down.

If the motor fails to start when the speed regulator is moved upward it can be easily started by removing the pressure from the bottom roller simply by pushing it down, also a slight turn on the large top roller will start the motor. It is not expected that you will have any difficulty in this respect, however, a new motor of this type does not always start freely.

After the tape has passed through the instrument and the full roll is on bracket "E" it should be removed, placed on bracket "D" with the long slot on the outside and the empty spool placed on bracket "E".

MAKING RECORDS

Fill the inkwell full of the conducting fluid. Saturate the wick with ink, using the medicine dropper for this purpose. Do not have the barrel of the medicine dropper full of ink but merely dip it into the inkwell. Continue to apply to the wick until it is fully saturated from the pen to the inkwell. In the same manner apply a small quantity of the ink on the pen from the wick down to the point. Start the motor and begin operating the key.

The flow of the ink may be controlled by raising and lowering the inkwell.

When making records do not wind the tape up but permit it to run off on the floor. For this purpose the instrument should be placed near the edge of a table. When one side of the tape has been recorded start from that end again to record the other side. Do not start both recording from the same end but one side from one end and the other side from the other end. Two records may be put on each side of the tape.

The swing of the pen should be adjusted at set screw "H" so that it moves slightly less than the width of the end of the pen.

Do not expect to make a perfect tape on your first attempt. It may require some little practice before you can record the tapes properly. You will very likely spoil a few rolls before you can successfully make the tapes. However, we have furnished you extra blank rolls for this purpose.

The ink should flow in such quantity that it will dry before the tape reaches the floor but it should not dry under about 15 inches. If an insufficient amount of the ink is deposited on the tape there will be very little if any current passed through it from the pickup. On the other hand too much ink will blot and spoil the tape. The best condition is to get the heaviest deposit on ink possible without blotting or running the characters together.

Be certain that there is no unnecessary slack in the wick between the pen and the inkwell. Also observe carefully that no ink runs down the side of the inkwell from the wick. Should that occur the side of the inkwell should be cleaned off thoroughly using a blotter or old woolen cloth for the purpose. Also be certain that the loose end of the wick does not extend over the top of the inkwell as it will syphon out all of the ink very rapidly.

We would suggest that to start with you use some ordinary writing ink for practice in sending where you do not intend to repeat the signals. The conducting fluid that we furnish you is very expensive and should not be wasted.

Great caution should be used against mixing any ordinary ink with the conducting fluid. After ordinary ink has been used the inkwell should be cleaned thoroughly by syphoning out all of the ink possible and then cleaning the inkwell with a blotter or old woolen cloth.

The conducting fluid should be immediately removed from the inkwell when you have finished recording tapes. It should be syphoned out with the medicine dropper and put back into its container and securely closed. Never add any water or anything else to the conducting fluids.

An extra supply of wicks was sent to you. However, we do not anticipate that you will need to change the wick except in case it accidentlly becomes torn in which case you should insert a new one. A new wick should be tied securely with two knots around the stud of the pen and then the short end clipped off very close.

When it is desired to stop the flow of ink temporarily this may be done by pushing the inkwell down until the top of it is even with the tape guide.

BLANK ROLLS OF TAPE

The blank rolls of tape should be kept securely in a dry place. They should not under any conditions come in contact with oil or grease. Be certain that your hands are clean when handling them and do not handle them unnecessarily.

Two rows of sending may be put on each side of the tape. On the tapes that we have sent you sending is only on one side. This is in order to prevent you from becoming confused until you get well acquainted with the instrument.

COMMIT THE CODE TO MEMORY

Refer to the alphabet chart and commit to memory the dots and dashes composing the alphabet. You should not think of the characters in terms of dots and dashes but as dits and dahs. Thus A is dit dah, B dah dit dit dit, C dah dit dah dit, etc.

The chart shows both the Continental and American Morse code. You should, of course, concentrate only on one code. In the chart the Continental code is given before the character and the American Morse immediately following the character. The code can best be memorized by not following

it alphabetically but rather by taking groups of letters similar to each other. Think of them as reverse to each other such as dit dah A, dah dit N, dah dit dit D, dit dit dah U, dah dit dah dah Y, dah dah dit dah Q.

INSTRUCTIONS FOR BEGINNERS IN RADIO

First side of tape No. 1 is divided into three sections. The first section has the following letters: E T A N I S H M O. The second section: U V D B K C W J P. The third section: R L F G Z X Y Q. These letters are repeated over and over many times but not necessarily in the order given above. These characters are repeated over and over indiscriminately on the reverse side of sections 1 and 2. The 3rd section of the reverse side contains all of the numerals, period and comma. The numerals may be easily and quickly committed to memory by thinking of 1, 2, 3 and 4 as 1, 2, 3, 4 dits respectively, 5 as 5 dits and 6, 7, 8 and 9 as 1, 2, 3, 4 dahs respectively, and 0 as 5 dahs.

INSTRUCTIONS IN AMERICAN MORSE

American Morse tape No. 1 is divided into three sections. The first section contains the following letters: E T A N I S H P L. The second section: U V D B W G K J M. The third section: R C O Z Y Q F X.

ALL FURTHER INSTRUCTIONS APPLY TO BOTH RADIO AND AMERICAN MORSE

You should continue to run No. 1 tape through the instrument concentrating closely on the sound, writing down each character that you are able to interpret until you can copy both sides of the tape without a single error. After you have reached the point where you think that you can do this you should write down both sides of the tape and then repeat it, observing your copy to see if you have made any errors. You should not form the habit of looking at the characters on the tape but interpret them from the sound. In practicing with tape No. 1 the speed regulator should be about in the middle position. Also this is the proper position for recording tapes.

It frequently happens that certain students have difficulty with a few particular characters. If you have such difficulty you should practice sending these characters and if possible work them into a series of words. Write the words out with those characters predominating and spend a good deal of time sending them. If that does not overcome your difficulty please advise us the characters that you are having trouble with and we will furnish you a special tape that will overcome the difficulty.

Tape No. 2 contains all the characters, they are repeated indiscriminately. After you have successfully mastered tape No. 1 you should then go to tape No. 2 and thoroughly master it but before going to tape No. 3 you should increase the speed of No. 2 slightly. Make a test as outlined above to determine whether or not you can accurately interpret every character on tape No. 2.

Tape No. 3 contains short simple words that take in as far as possible all of the letters of the alphabet. It also contains five letter code groups and groups of figures which can never be memorized. You should continue to copy this tape until you can write all of it down accurately at 15 words per minute. You may determine your speed by observing the time it takes you to copy the tape or a certain section of the tape and then count the

number of words. In copying tape No. 3 you should think of the characters as forming words, especially the plain English words. Form the habit of writing them down in complete words and not as separate letters.

It is of the utmost importance at all times for you to write down every character that you are able to interpret. Do not become discouraged if you can only interpret one character in ten for the first few weeks. Remember learning the Code is only a matter of practice. Anyone can master it.

Please bear in mind that we are just as much interested in your success as you are and do not hesitate to advise us of any difficulty you may have. However, we would suggest that it is far better for you to make a strenuous effort to overcome your difficulties yourself before asking for our help.

After you have mastered tape No. 3 as outlined above you should be able to make your own tapes and exchange tapes with other students for your further progress. However, if you find that you require more tapes advise us and we shall be glad to furnish them. Also if you are not getting satisfactory tapes from other students advise us.

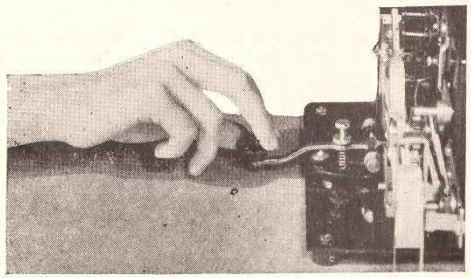
EXCHANGING TAPES

When you have advanced to the stage where you are confident that you can send readable signals you should submit to us a short tape containing about 100 words. We will test the sending and if we find that the signals are plainly readable we will give you the names of other students with whom you may exchange tapes. In making tapes for exchange purposes you should put your number on them. Your number will always be the number stamped on the MASTER TELEPLEX that you have. This number should be put at the beginning and end of each tape. This number should also be put on the tapes that you submit to us. Numbering the tapes will serve the purpose of identifying the student from whom you receive tapes. In making tapes for exchange purposes you should not use the data given in this book but make up your own tapes. Such tapes should consist of a mixture of straight reading matter, code groups and groups of figures. Also disconnected sentences make excellent practice material. For this purpose the data may be taken from a newspaper or a book using indiscriminately one line then jump to another line regardless of whether there is continuity of thought. Also straight reading matter with a code group of from 5 to 10 characters put in about every 10 or 15 words is also good practice. Another suggestion is to take from a newspaper or book any reading material and go backwards through it. This will usually make up good code group practice.

When you want to exchange a tape simply pack it up by putting a little cardboard around it, wrap it securely and send it to any of the names that we furnish you. The tapes may be sent anywhere in the United States by parcel post for 3c.

When you have received a tape from another student you should immediately send him one in exchange. If you find it is not convenient to send one in exchange at once receipt of the tape should be acknowledged by letter and you should advise the student when he may expect a tape. Naturally you are going to want to get the tape from the other student and you will want to get them promptly. This can best be accomplished by being prompt yourself.

The provision of exchanging the tapes constitutes one of the most important parts of this course. It gives you unlimited practice material. However, the most important thing is that it gives you practice in receiving various different sending. Do not complain if you find that some of the tapes are rather poor sending as later on the practice thus received will be of great value to you.



INSTRUCTIONS IN SENDING

The above photograph shows the correct position of the hand on the key. TELEPLEX should be placed far enough back so that your elbow has room to rest on the table. The wrist should clear the table by one or two inches. Place your fingers and thumb on the button of the key as indicated in the above photograph. Hold the key firmly but do not grip it. Hold your arm and wrist firm but not rigid. These instructions are general. You should follow them as closely as possible but at the same time take an easy position. You may raise your wrist somewhat more than two inches or somewhat less than one inch but do not permit it to rest on the table. The characters are made by moving the wrist up and down, not in a nervous and jerky manner but slowly and firmly.

You should begin by making the letters E and T. T should appear on the tape as three times as long as E. Practice sending I and M alternately. Then follows with I S H repeating each character many times. Then T M O or 1, 2, 3 dashes. (Of course, the three dashes in American Morse will be the digit 5). Make A as a dit dah having a space between the dot and dash equal to the space of the dot. If a greater space is made between the dot and dash the character would become not an A but E T. Follow this principle in making all of the characters.

Line 7 in tape chart shows the alphabet in the Continental Code. Line 8 shows the errors most commonly made by beginners. In practicing you should endeavor to imitate as nearly as possible the characters as shown in line 7. Avoid spacing the dots and dashes constituting the character as indicated in line 8. Practice sending the entire alphabet then compare your sending with that on the chart by placing your tape immediately below line 7 on the chart where it will be easy to compare the characters that you make with those correctly made.

Considering one dot as one unit, a dash will be three units and the space between the dots and dashes will be one unit. The space between letters is four units and the space between words or groups is eight units. This, however, is not a hard and fast rule but that general principle should

be followed out. For very slow sending the space separating words and groups may be somewhat greater and at fast sending this space will be less. However, the space between dots and dashes forming a single character should always be as stated above. That is, E is one unit, T 3 units, A 5 units, C 11 units. Thus, it will be seen that if this ratio of units is carried out the length of a character will not alter it. That is, the dot and dash of the letter A may be of any length so long as the proper ratio between the dot, dash and space is maintained.

You should practice sending the letter H. This will give you the proper rhythm. Count 1, 2, 3, 4 as you make the character, leave a space equal to 1, 2, 3, 4 then repeat H again. You should continue this practice for 10 or 15 minutes at a time. You should also practice sending U and V in the same manner. When making a dash do not exert additional pressure on the key. Simply close it firmly and hold it for a short interval. You should make a record of your sending for this purpose, compare your characters with that on the chart and when you are certain that you can make it correctly then practice sending on the headphones without recording by the pen.

ANALYZE YOUR SENDING

Practice making duplicates of the tapes we sent you. Then compare the two tapes. Pay particular attention to the spacing. Most poor sending is on account of improperly spacing between the characters and the groups. Do not run the letters too closely together, nor the words or groups too close. Strive for uniformity. DO NOT ATTEMPT TO SEND FAST. STRIVE FOR ACCURACY.

GAINING SPEED IN RECEIVING

Make up a tape of straight reading matter of two or three hundred words. Copy this tape at the highest speed possible with no errors. KEEP A RECORD OF THE TIME REQUIRED TO COPY IT. ENDEAVOR TO SHORTEN THAT TIME EVERY DAY. You will very quickly memorize this tape, BUT CONTINUE TO COPY IT. THIS WILL BE THE MOST IMPORTANT TAPE THAT YOU WILL HAVE. All operators can read the signals faster than they can put them down. This will give you practice in fast writing.

COPYING BEHIND THE SENDING

No operator can be said to be first-class unless he can copy several words behind the sender in straight reading matter and four or five letters in code groups. Use the tape with straight reading matter. Start it and wait until several words have been sent before you start writing it down. Do not try to catch up with the sending. You will soon memorize this tape so that you will be free to concentrate principally on your writing. You must, however, listen to the signals. After a little practice in this manner you will be astounded at the ease with which you can copy several words behind. Use a tape with code groups, start several characters behind and practice until you can stay four or five characters behind, making no errors. The writer has watched an operator copy two ten character code groups behind at thirty words per minute. That is extraordinary but it serves to illustrate that the average TELEPLEX trained operator can be reasonably expected to copy several words behind on straight reading matter. YOU CANNOT SPEND TOO MUCH TIME ON THESE TWO TAPES FOR GAINING SPEED AND COPYING BEHIND.

RECORD OF PERFORMANCE

When you can read seven or eight words per minute or more observe the time required to copy the two tapes mentioned above. Divide the number of words by the minutes to find the number of words you can copy per minute. In making this computation allow five characters to the word. In Continental Code count each digit as two characters, thus: AG7E3, would be counted as seven characters. AG7E3, R2Q29, these two groups would be counted as three words. This does not apply in American Morse where the digits are counted as one character only. KEEP A RECORD ON THE PERFORMANCE SHEET of the time required to copy these two tapes. Frequently change to other tapes having similar material. Number your tapes for this purpose. Make this test for the PERFORMANCE SHEET every two weeks.

Please remember that your progress will be entirely in your own hands. If you will follow these instructions diligently, there is practically no limit to the high speed you can reach.

DATA FOR PRACTICE IN SENDING

The following data is for practice in sending for all students. You should send and listen on the headphones for periods of 15 to 30 minutes. You should occasionally make a record of your sending and then examine it carefully to see if the characters are properly spaced and also the groups properly spaced.

K X I V S
I Y J W T
M A K H U
N B L I V
O C M J W

K A Q U G
L G R V H
O D U F J
R C T S R
C S Q E O

G P S C W
H Q R B X
L Z K A Q
M A L B R
Q J N C T

F G D O C
E R P B C
D S A R I
C T B S J
B X G T A

C M W F O
F O X G H
C R H Z K
D S P A L
E T Q G M

P D N Y X
A Z O X Y
M U Y N Q
A N V Z O
N O A M P

H L U B Q
Z G P A M
N D P W N
F K X U P
G L A V Q

P I X Y D
Q G V E F
R G W Y T
T F O P H
M V K L P

G K W O G
H N Z P F
E D R S T
C B A T B
A O N H E

F U R E N
Q V S T O
H W F D P
I E U C Q
J F G B R

P B L V Z
Q C K U R
A X J T B
S D I Y B
T E B X C

H M Z W R
I N Y K X
S B Y O N
J O C H T
A P F I U

O W L J N
Z L J Q A
F L A W S
G M Z B T
H N Y I V

K M W N E
J N Z E C
I O C D E
D E C P G
Z I H Y A

K X E V S
L Y J W T
M A K H U
N B L I V
O C M J W

W F G W E
A Z S M A
B D X N B
C I Y O Z
C O Z P F

B Q G N V
C J R O W
D S E K X
F T D L Y
Z M L T E

J W P N X
Z E T Z M
H G X O E
K Z H R C
L A P S D

A T G X B
J S B T C
K B C F E
Z F R V I
L I T U X

P D N Y X
A Z O X Y
C S P Q E
N F T E I
J U D O P

F H 1 9 A
G A 3 2 B
I 4 B 5 C
J K 6 8 D
R L 7 ø E

Z I 2 U 5
W J 1 W 8
A K 6 X 9
B L 5 7 A
X M 4 6 B

W 9 S 5 W
B L 5 7 A
C 7 U 8 Y
D 5 V 7 Z
R 4 W ø A

M A 8 H 2
K B 9 I 3
J C ø J 4
I Y 4 E 6
K U 5 M 7

V M 9 2 T
W N 1 8 U
X O 7 5 Z
1 Q 5 X R
A 9 1 H F

Y N 3 4 C
C T 7 3 D
D S 1 2 E
E R 9 1 F
G P 2 Y 2

F 6 X 1 C
A 2 Y 4 B
E 1 Z 6 X
G 3 B 4 E
I A 9 3 G

G T 3 B 8
F S 4 C 9
E R 5 D ø
D Q 6 A 2
C P 7 E 5

B 3 2 A G
I C B 5 4
D 8 6 K J
E ø L 7 R
T 2 9 M V

F Q 8 Z 1
H O 3 V 8
5 U 2 I Z
8 W 1 J X
9 W 6 K A

H B 8 5 I
J C 7 6 J
L E 6 3 H
M F 5 1 G
J D 4 2 K

H O 2 F 7
A N 1 G 6
2 H 8 A L
3 I 9 B K
4 J C 5 1

U 8 1 N W
Z 7 5 O X
P Y 4 3 A
R T 5 Q 1
D Y 8 4 S

A 7 5 B L
L 6 4 M X
C 4 3 N Y
D 2 7 T C
E 1 9 S D

K G 3 9 M
X J 1 7 L
Y K 3 8 N
S M 2 3 P
Z P ø 4 Q

O P 2 1 C
8 3 E T O
ø Y 4 V F
H J 9 E 4
8 R 4 S I

F 2 6 R E
1 Z 8 Q R
2 Y 8 P G
6 V 3 O H
9 V I 7 I

W Z 1 8 O
O Y 2 1 R
P R 8 3 T
N T 9 2 S
B O 4 5 Y

K L V J G
J M V K H
I N W N F
H O Z M E
G P C E D

A G Q C J
X I P B K
Y J S A L
B K T D M
D L U E N

E P D Q D
G Q E R S
H R S F C
J T B E G
5 V 5 O E

K U H X Y
M U I Y L
N V J Z M
Q W K A N
1 K 4 X N

P A L K O
Q B M J P
U H K A M
V I L B N
5 P 9 C S

Y X O Z A
C E B I D
O C K D O
W 8 F 3 X
T 9 Q 4 J

BA93C
UCAVZ
GOMEP
J*EWU
U9X4R

X4JW6
14X9R
5NΦLW
4XC3P
1B3W6

VRTZQ
RT1W3
3B6QF
OH7G5
FQ5PE

F11LD
B6QFL
UCAVZ
BA928
NΦLGO

YΦSK2
ΦN5PE
14X9R
N6VRT
M8SDG

8N6B5
DS8GO
T1R9X
ZQΦSK
OM27H

5BA9X
MOG8S
8K8LI
SDA32
12EWQ

C3PEW
DEP5N
9MN42
FGH56
34ASD

U4N6V
ΦLFQ6
BV6N7
JKL16
45TFC

RTZQΦ
9RT14
MT5Y3
PO98L
6YGV7

LF11D
A9VRT
2DCB6
654GH
NHU5L

YKSΦQ
9T1ST
ZX5C4
5BGTU
5KNM9

BNM2W
VCXZ3
BNQS6
PEMJH
KYDS8

5G5H4
BNML8
7GHE2
VA1AC
HJ72Y

7JH77
9KJH6
98HGB
MZXAS
56YT4

8KM63
5GF54
5TV3C
HJKLO
5G7HO

56HBG
231ED
2DX3P
YDLF1
JH2KY

98ΦL5
45GHT
X5V3N
XCVBN
W4SDE

9X41Z
VA1AC
AK1Z9
BL2Y8
CM3D7

HJ72D
7H7G7
KU1H6
KU1H6
LV2I4

BGTHY
BGHYT
T7J3Q
U6I5R
V5H6S

MJH72
DU4CA
6W4ND
M6C1O
L7D2P

72KYJ
WDG65
D5JΦX
C6L2Y
B7K3Z

ΦPOUS
45E1C
W9T1G
QQS8F
R3Z9E

DN4W6
FO5V2
FP6W4
GQ7E3
HR8F5

MW3J5
NX4K1
OY5L8
PZ6M1
QA7N7

W4G9T
X3F8U
Y2E7V
Z1D4W
9Z1KA

K8E3Q
J9A4R
IΦB5S
H4G6T
G1H7J

A1M4N
N2Y5M
O3X6L
P4W1J
Z5V7I

S2R6D
T1Q5H
J4P4C
V6O3B
X5N2A

W4J95	N62KY	AV1ZΦ	B3PO8	Y6R4X	M25NQ
JC24F	T1JCL	PE5NH	JMEP2	72YKO	JOBSD
ΦZ9RT	UC3B5	2K7YS	NDB65	1SET5	EISH5
5H51S	GW4V6	8291Φ	Z1AV3	6BQF5	8KHJE
FQEPH	J71E1	L8K5E	T1SLM	NPCX4	UV4BV
JH72K	YDLF1	TZQΦS	6BV4L	JMEWU	4XC3P
BA9RV	6N82K	SQΦZT	11FLD	YK27H	JMOG8
5PEW3	BYQFU	CAVZ1	4X9RT	IIKIKI	ETSH5
7231D	98ΦWU	K6K75	3XL21	34MQ1	2HGB6
JV46B	AUV45	TMO9Φ	NDB65	AWJ12	4VUAT
AJFFΦ	KLJHG	075ER	E5D92	ZUCXV	123SW
GD76W	Q65NC	E113W	6F4G8	9C2H44	W2F6Φ
3BGDL	TLTLM	S5EP5	R9X41	Φ5PJM	SDEP5
OMB67	REPQ4	5PE5N	POKY5	NΦLPE	4X9RT
5EHSE	EISH5	E5S5H	YMOG8	GJ8SD	MO2JH
3BNQL	456KL	72KYJ	CAVZ1	W34WX	E5P2P
SDYKL	KL45E	NΦLPE	H8JO7	F6Q67	72YKY
OH7G5	K2Y7H	EP5NΦ	2GSDO	VZ1CA	MG528
SDLΦN	G8DS8	W3UCA	DSS82	1IQF2	ΦLN5P
OΦ27K	ΦLW32	ZT743	256DY	LFQ54	EISH5
9QΦ63	W35NΦ	Φ1254	S5HV5	ITR9X	4UCAV
W3B6L	YKGP5	MOGW1	B3WLQ	LΦ6BS	EP5NΦ
1CV14	MO985	Z1FQ6	GOMΦG	YK27H	HJ7YK
1245Q	FQ6B3	LDS8G	4XC3P	OH7G5	BA928
A9ΦWE	456XN	JMEWU	ZQΦSK	YDLF1	I1TR9
NΦLW3	QRCLG	N6VRT	YGOM8	DSLΦN	5PEW3
I-FLD	JH72K	7HJ2K	CAVZ1	4X9RT	I49XT
Y28MO	B6QFU	B6QFU	5B63W	NΦ5PE	D8SGΦ
N525N	YKSΦQ	RV6N8	2K81S	QΦQ2Z	IS9J1
YYKK2	28N6V	2IV43	I1FL6	56789	JTΦG8

ø and Φ indicates cipher or zero.

SENDING MESSAGES

Station WGY has a message for QGY. WGY calls as follows: QGY QGY QGY de WGY WGY WGY. This call is repeated at intervals until QGY answers WGY then proceeds as follows to send the message.

(hr Msg) WGY Nr 1 ck 9 Paid Filed 1130

(fm) S.S. Northern Pass 19
(to) James Smith

275 Broadway New York (Double Dash)

Will arrive Monday (double dash)

William. (ar WGY sk)

HR indicates WGY is going to send, Msg indicates he is going to send a message nr means number ck is check and means the number of paid words in the message fm means from and is followed by the point of origin. Double Dash (refer to code chart) means the address and destination has been completed and the text of the message is to follow. The next double dash means that the text has been finished and that the signature is to follow. Ar means the message has been completed and sk means WGY has nothing further to transmit to QGY. (Ar is one character ditdahditdahdit likewise SK is one character ditdihditdahditdah. Refer to code chart.)

In radiograms the addressee, address text and signature are counted in the check and must be paid for. Groups of figures up to five are counted as one word. In Landline Commercial work only the text of the message is counted, each figure counting as one word. For example 24754 in Landline Commercial message would be counted as five words. In Radiograms it would be only one word.

In transmitting a message over Commercial Landline wires the above procedure would be followed except that instead of double dash a period would be sent. Example:

(hr msg) G No 1 ck 3 Filed 1120AM
(fm) Chicago Ills 19
(to) James Smith

275 Broadway NewYork . (Period)

Will arrive Monday. (Period)
(sig) William.

The characters enclosed in parenthesis are sent by the sending operator but are not written down in the message by the receiving operator. Also parenthesis is not sent, it appears above as indicating only that the characters enclosed are not to be written down.

In Landline messages the word "Paid" is omitted. In the absence of anything to the contrary a message is understood to be paid. Messages may be sent Collect and Deadhead (DH). In Collect messages the word COLLECT is counted in the check but is not paid for.

When the receiving station is unable to deliver a message to the addressee a service message is sent to the station of origin advising that the message is undelivered and giving the reason. Example:

(hr svc) QGY Nr 2

(to) SS Northern Pass. (Double Dash)

Urs date smith sined William undld ukn gba (Double dash)
NewYork (ar QGY sk)

All messages are numbered consecutively between all stations beginning with number one each day. When a message is transmitted the sending station records the number as being sent and the receiving station records it as being received on the Number Sheet. This is to guard against the loss of a message. For example If QGY failed to receive the message Number 1 and later in the day WGY started Number 2 QGY would say "un" meaning your number is wrong. A checkback would then disclose that message number 1 had not been received by QGY and it would be re-transmitted.

Where there is a considerable amount of traffic to be sent the sending operator usually numbers the messages as he sends them. This is done with the left hand as he sends with the right. This is called "Marking Off" and includes the number of the message, time sent and the sending operators personal "sine". Any operator can do this with a little practice, although it seems a little difficult at the start.

Receipt of a message is acknowledged in RADIO by the receiving operator making R, giving his personal sine and station call. In Landline work the receiving operator says "OK" giving his sine and office call. In large offices each operator is assigned a personal "sign" usually called sine as a matter of identity. In small offices the operators usually select their own sines.

"Q" SIGNALS

The "Q" signals are used by amateurs and professional operators throughout the world. They are international and will be understood by anyone, anywhere regardless of language. (A.R.) indicates amateur radio definition.

QRA-	What station is that? (A.R.) What is your address?
QRA	This is ..... (A.R.) My address is .....
QRAR?	(A.R.) Is your call-book address correct?
QRAR	(A.R.) My call-book address is correct.
QRDD?	(A.R.) In what direction are your messages going?
QRDD	(A.R.) My messages are going ..... (north, east, south, or west).
QRFF?	(A.R.) From what station did you receve message Nr.....?
QRFF	(A.R.) Message Nr. ..... was received from .....
QRH?	What is your wavelength in meters?
QRH	My wavelength is ..... meters.
QRHH?	(A.R.) What tune shall I adl just for?
QRHH	(A.R.) Adjust to receive on ..... meters.
QRK?	How do you receive me? (A.R.) How are my signals?
QRK	I am receiving well. (A.R.) Your signals are good.
QRL?	Are you receiving badly? Shall I send . . . - . 20 times for adjustment?
QRL	I am receiving badly. Please send . . . - . 20 times for adjustment.
QRLL?	(A.R.) May I test for ..... minutes?
QRLL	(A.R.) Permission to test granted.
QRM?	Are you being interefered with?
QRM	I am being interefered with.
QRN?	Are atmospherics (static) strong?
QRN	Atmospheres are very strong.
QRQ?	Shall I send faster?
QRQ	Send faster.
QRR	Official A.R.R.L. "land SOS" for emergency use only.
QRS?	Shall I send slower?
QRS	Send slower.
QRT?	Shall I stop sending?
QRT	Stop sending.
QRU	I have nothing for you.
QRV?	Are you ready?
QRV	I am ready. All right now.
QRW?	Are you busy?
QRW	I am busy. Please do not interfere.
QRX?	Shall I stand by?
QRX	Stand by, I will call you when required. (A.R.) Stand by for ..... Example: "QRX 3 min" meaning "Stand by for 3 minutes."
QSL	Please acknowledge. (A.R.) Please mail me confirmation of this transmission.
QSLL	(A.R.) Please acknowledge my signals by card. I will return the favor.
QSO?	Are you in communication with any ship or station? (A.R.) Can you get in communication with ..... soon?
QSO	I am in communication with ..... through .....
QSP?	Shall I nform ..... that I am calling him.
QSP	Inform.....t..... that I am calling him.
QSQ?	(A.R.) I am in communication with .....
QSQ	Is ..... calling me?
QSR?	You are being called by ..... Will you forward the radiogram?
QSR	I will forward the radiogram.
QSRM?	(A.R.) Will you forward message Nr. ..... by mail if you cannot relay by radio at once?
QSRM	(A.R.) I will forward message Nr. ..... by mail if I fail to relay by radio within 12 hrs.
QSS?	(A.R.) Are my signals fading?
QSS	(A.R.) Your signals are fading.
QSSS?	(A.R.) Are my signals swinging?
QSSS	(A.R.) Your signals are swinging.
QST?	Have you received the general call?
QST	General call to all stations.
QSU?	Please call me when you have finished (or at ..... o'clock).
QSU	I will call you when I have finished (or at ..... o'clock).
QSUF	(A.R.) Please call me by wire telephone at once.
QSY?	Shall I send on a wavelength of ..... meters?
QSY	Let us change to the wavelength of ..... meters.
QSYI	(A.R.) I shall shift my transmitting wavelength to ..... meters.
QSYU	(A.R.) Please shift your transmitting wave to ..... meters.
QSZ?	Do you wish me to send each word twice?
QSZ	Send each word twice. I have difficulty in receiving you.
QSZ MSG	(A.R.) Please send each *message* twice. "words once," as I have difficulty in receiving you.

QRZ?	Are my signals weak?
QRZ	Your sgnals are weak.
QSA?	Are my signals strong?
QSA	Your signals are strong.
QSB?	Is my tone bad? (A.R.) How is my tone?
QSB	Your tone is bad. (A.R.) Your tone is .....
QSC?	Is my spacing bad? (A.R.) Is my Morse (sending) bad?
QSC	Your spacing is bad. (A.R.) Your Morse is bad.
QSK?	Is the last radiogram cancelled?
QSK	The last radiogram is cancelled.
QSL?	Did you get my receipt? (A.R.) Will you acknowledge?
QTA	Repeat the last radiogram.
QTB?	Are you in accord with my check? Please repeat first letter or figure of each counted word.
QTB	I am not in accord with you in your statement of the number of words. I repeat the first letter or figure of each counted word.
QTC?	Have you anything to transmit? (A.R.) Have you anything for me?
QTC	I have something to transmit. (A.R.) I have something for you.

HAM ABBREVIATIONS

The following list of abbreviations are commonly used among amateurs as a short-cut in carrying on conversations.

ABL	Able
ABT	About
AC	Alternating Current
ACCT	Account
ADS-ADSD	Address-addressed
AER	Aerial
AGN	Again
AHD	Ahead
AMP	Ampere
AMT	Amount
ANI	Any
ANT	Antenna
ARL	Aerial
AUD	Audible audibility
B	Be
B4	Before
BCL	Broadcast listener
BD	Bad
BI	By
BK	Break, back
BKG	Breaking
BLV	Believe
BN	Been
BND	Bound
BTR	Better
BUG	Vibroplex key, amateur radio "fever"
C	See
CANS	Phones
CHGS	Charges
CK	Check
CKT	Circuit
CL	Call
CN	Can
CNT	Can't, cannot
COND	Condenser, condition
CRD	Card
CD	Could
CUL	See you later
CW	Continuous wave
CY	Copy
DA	Day
DC	Direct current
DFS	Disregard former service
DH	Dead head, service message
DLD	Delivered
DLY	Delivery
DN	Done, down
LTR	Later, letter
MA	Milliampere
MANI	Many
MG	Motor-generator
MGR	Manager
MILS	Milli-amperes
MI	My
MIN	Minute
MITY	Mighty
MK	Make
MO	Month, master oscillator
MSG	Message
MTR	Meter
ND	Nothing doing
NG	No good
NIL	Nothing
NITE	Night
NM	No more
NO	Know
NPR	Night Press Rate
NR	Number, near, no record
NSA	No such address
NT	Not
NTG	Nothing
NW	Now
NZ	New Zealand
OB	Old Boy, Official Broadcast
OFS	Office
OM	Old man
OO	Official Observer
OPN	Operation
OPR	Operator
ORS	Official Relay Station
OSC	Oscillate, oscillations
OT	Oscillation transformer, old timer
PRI	Primary
PSE	Please
PT	Point
PUNK	Poor operator, lid
PWR	Power
PX	Press (news)
R	Are, all right, O.K.
RCD	Received
RCVR	Receiver
RDO	Radio
RDS	Reads
RES	Resistance

DNT	Do not, don't
DPR	Day Press Rate
DSTN	Destination
DSTC	Delivered subject to correction
DUPE	Duplicate
DX	Distance
EM	Them
ES	And
EVBDI	Everybody
EVY	Every
EZ	Easy
FB	Fine business, excellent
FIL	Filament
FILD	Filed, filing time
FM	From
FR	For
FREQ	Frequency-frequently
GA	Go ahead
GB	Good bye
GBA	Give better address
GE	Good evening
GEN	Generator
GES	Guess
GG	Going
GM	Good morning
GMT	Greenwich Mean Time
GN	Gone, good night
GND	Ground
GQA	Get quick answer
GSA	Give some address
GUD	Good
GV	Give
HA	Hurry answer
HAM	Amateur, brass-pounder
HD	Had, head
HI	Laughter, high
HR	Here, hear
HRD	Heard
HV	Have
HVY	Heavy
HW	How, hot wire, herewith
HWM	Hot wire meter
ICW	Interrupted continuous wave
IMPT	Important
KNW	Know
LD	"Lid", a poor operator, long distance
LITE	Light
RHEO	Rheostat
RITE	Write, right
RPT	Repeat, report
RUF	Rough
SA	Say
SEC	Second
SED	Said
SEZ	Says
SHUD	Should
SIG-SG	Signature
SIGS	Signals
SINE	Sign, personal initials, signature
SITE	Sight
SKED	Schedule
SVC	Service, message
TFC	Traffic
TKS-TNX	Thanks
TNG	Thing
TMW	Tomorrow
TR	There, their, position report
TRI	Try
TRUB	Trouble
TS	This
T	The
TT	That
U	You
UNDLD	Undelivered
UNKN	Unknown
UR	Your, you're
V	Volt
VAR	Variable
VY	Very
WD	Word, would
WN	When
WI	With
WK	Work
WL	Will
WN	When
WO	Who
WT	What, wait, watt
WV-WL	Wave. wavelength
WX	Weather
XMTR	Transmitter
XPLN	Explain
XTRA	Extra
YL	Young lady
YR	Your
73	Best regards
99	Keep out

PERFORMANCE SHEET

If this record is inaccurate you are cheating yourself and gaining nothing.

Tape No.	Date	W. P. M.	Tape No.	Date	W. P. M.	Tape No.	Date	W. P. M.	Tape No.	Date	W. P. M.

RECORD OF PRACTICE

It is of the utmost importance that you have regular practice periods every day. If you miss one day you cannot make up for it by practicing double the time later. KEEP THIS RECORD OF THE TIME (in minutes) that you practice.

Date	Sending	Receiving	Date	Sending	Receiving	Date	Sending	Receiving	Date	Sending	Receiving

MISCELLANEOUS RECORDS

NAME .....Students No.....

Date Course received.....Ability when starting course (in words per minute).....(if beginner so state)

Ability after one month.....After two months.....

Three months.....Four months.....Five months.....

Six months.....Seven months.....Eight months.....

TAPES EXCHANGED WITH

(Give the number of the students with whom you exchange)

Date Tape Received	Student No.	Date Tape Sent	Date Tape Received	Student No.	Date Tape Sent	Date Tape Received	Student No.	Date Tape Sent	Date Tape Received	Student No.	Date Tape Sent

REMARKS:

COMMIT THE CODE TO MEMORY

Continental (Radio) Morse		American Morse
.-	A	.-
-...	B	-...
-.-.	C	.. .
-..	D	-..
.	E	.
..-.	F	.-.
--.	G	--.
....	H	....
..	I	..
.---	J	.-.-
-.-	K	-.-
.-..	L	—
--	M	--
-.	N	-.
---	O	. .
.--.	P	.....
--.-	Q	...-
.-.	R	. ..
...	S	...
-	T	-
..-	U	..-
...-	V	...-
.--	W	.--
-..-	X	-...
-.--	Y	.. ..
--..	Z	... .
.----	1	.--.
..---	2	..-..
...--	3	....-
....-	4	.....
.....	5	---
-....	6	.....
--...	7	-.-.
---..	8	-----
----.	9	.---
-----	0	——

Continental (Radio) Morse			American Morse
.. .. ..	Period	.	.-.-.-
--..--	Comma	,	.-.-
..--..	Interrogation	?	..-..
-.-.--	Exclamation	!	-.-.-
-..-.	Fraction Bar	/	.
---...	Colon	:	KO
-.-.-.	Semi-colon	;	SI
.----.	Apostrophe	'	QX
.-..-.	Quotations	"	QN Starts QJ Ends
-.--.-	Parenthesis	()	PN Starts PY Ends
..--.-	Underline	_	UX Starts UJ Ends
	Dollar Mark	$	SX
.-.	Decimal	.	DOT
	Capital Letter		CX
	Paragraph		----
-....-	Hyphen or Dash	-	HX or DX
-...-	Double Dash	(=)	

Think of the Code in terms of dits and dahs. Not dots and dashes. For example:
A dit dah
B dah dit dit dit
C dah dit dah dit

RADIO CONVENTIONAL SIGNALS

-.-.- Attention Call to precede every transmission
.-.-. End of each message (cross)
.-... Wait (Will resume transmission shortly)
...-. Understood (Or do you understand?)
...- Received (O. K.)
..... Distress Signal

FOREIGN LETTERS. Ä (German) .-.- Á (Spanish) .--.-
CH (German-Spanish) ---- É (French) ..-..
Ñ (Spanish) --.-- Ö (German) ---. Ü (German) ..--

NOTE-This chart shows both the American Morse and Continental Morse Codes. The American Morse is used only in the United States and Canada for landline telegraphy. The Continental Morse is used throughout the entire world for Radio Transmission. Note carefully that the Radio Code is shown before the characters and the American Morse after the characters.

The above chart gives the important Radio Conventional signals. However, more signals are used and a long list of "Q" signals are also used. As these signals are subject to change, we would suggest that you refer to "Q S T" (American Radio Relay League) Hand Book for information in regard to them. This book also contains much valuable information. We would strongly suggest that you read "QST" regularly. In fact, membership in that organization will be a great help to you.

CONCENTRATE ONLY ON THE CODE YOU ARE LEARNING