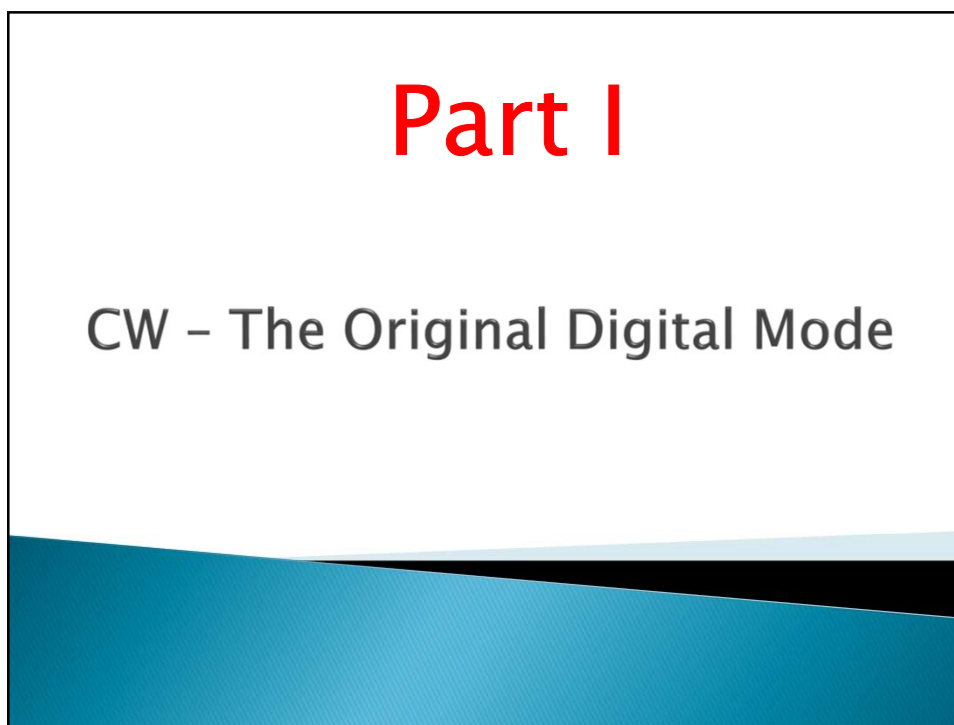


1



2

Why CW?

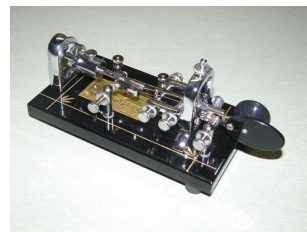


- ▶ Original digital mode
- ▶ Gets through when other modes (including some digital) can't
 - Less susceptible to QRN, QRM
 - Often used for moonbounce, UHF DX record, etc.
- ▶ Less crowded bands
- ▶ Fewer LIDS, more patient polite ops
- ▶ QSO with hams with limited English
- ▶ More fun

3

Why the Elmers

- ▶ First, we all love CW and want to see more CW on the bands
- ▶ You will have to put in the time/effort to become proficient
 - The Elmers can:
 - Explain how CW works – protocols, procedures
 - Provide practice opportunities
 - Track your progress



4

What is CW – It is more than a code

- ▶ Morse Code is a really a language
 - Kids learn more easily than adults
 - It has it's own vocabulary (in addition to Q codes)
 - DSW – good by
 - i i i – mistake
 - es – and
 - gg – going
 - Lots more
- ▶ Recognize letters and numbers by sound, not pattern
 - Hence Farnsworth method



5

CW Expectations

- ▶ If you don't know any code, you will use online programs or recordings to learn the letters, numbers, and punctuation (. , / -)
- ▶ You will NOT become proficient "overnight"
 - But it won't take over your life either
 - Consistency is key
 - Regardless of whether you are just starting or can copy 15 words per minute, try to practice at least 15 minutes a day



6

CW Expectations

- ▶ You should plan on regular practice once you've reached your proficiency goals to prevent "backsliding"



7

CW Myths

- ▶ You must be able to copy 25 WPM to take part in a CW contest
 - Not true – the contest exchange is "proscribed" (call sign and report)
 - You know what's coming
 - If answering a CQ, the other station has sent his call (and often his report) several times
 - You only need to be able to recognize your call "on the fly"
 - You can always respond more slowly if wish. Many stations do.



8

CW Myths

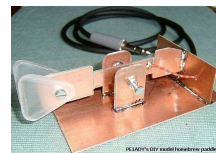
- ▶ During a rag chew good, CW Ops copy everything perfectly
 - Not true – Most of the time we're only getting the "gist" of what's being sent, not every word.
- ▶ Good CW ops answer a CQ at the same speed as the calling station
 - True
 - In any case, you can also send QRS to ask the other station to slow down (or QRQ to speed up)
- ▶ There are informal sub-bands in the band plan reserved for slow CW
 - True



9

Preparation

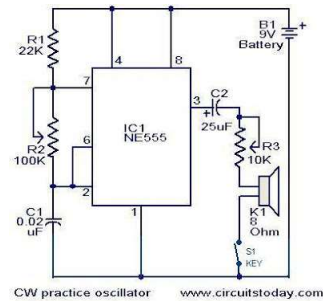
- A notebook to copy code in so you can monitor your own progress.
- A good pen – don't want to run out of ink or break a pencil point while practicing.
- A reliable source of practice code such as a CD or a program for computer or phone – some program that was designed to learn from, not just practice. I would suggest the K7QO cd – we can make this available.
 - Demonstrate K7QO technique
- Practice time – every day – at least 15 minutes, preferably 30 minutes.
- A quiet place or headphones to practice.
- A goal – what do you want to accomplish after XX days or weeks.



10

Equipment for Further Growth

- ▶ Code Practice Oscillator
 - maybe this can be a built it project
 - Transceiver can substitute
 - Straight Key, bug, or paddle and keyer
 - CW Transceiver (many have keyers built in)



11

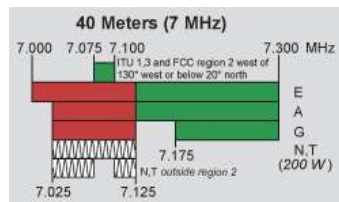
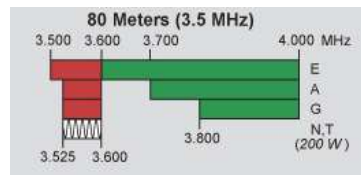
Part II

Your First CW QSO

12

The Band Plan – Where are the CW Stations?

▶ Hint – They're **RED**



KEY

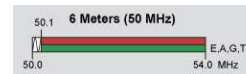
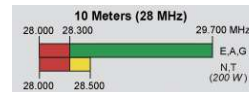
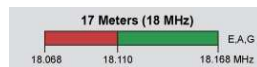
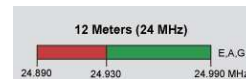
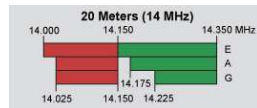
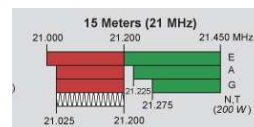
Note:
 CW operation is permitted throughout all amateur bands.
 MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.
 Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems only

E = Amateur Extra
 A = Advanced
 G = General
 T = Technician
 N = Novice

13

The Band Plan – Where are the CW Stations?



14

The Band Plan – Where are the CW Stations?

- ▶ Look Towards the Top of the CW Sub-band
 - Typically 50 to about 70 Khz above band edge
 - Slowest CW
 - Less QRM
- ▶ Stay below the unofficial Data frequencies (RTTY, FT8, etc.)



15

How to Initiate a Contact

- ▶ CQ CQ CQ CQ DE W2XYZ W2XYZ K
 - Number of repeats is up to the operator
- ▶ Answer at calling station's speed or slower
 - **Not Faster**
 - Send his/her call once "DE" your call twice then "K"
- ▶ If you call the CQ, first send "QRZ DE K2OID" to be sure the frequency is clear
 - I suggest CQ CQ CQ DE K2OID repeated twice then "K"
 - Ideally you want only 1 answer



16

The Initial Exchanges

- ▶ The call:
 - CQ CQ CQ DE W2XYZ K
- ▶ My Answer:
 - W2XYZ DE K2OID K2OID K
- ▶ His/Her reply:
 - K2OID DE W2XYZ - RR ES TNX FER THE CALL - UR RST IS 569 569 ES QTH IS NR BINGHAMTON, NY NR BINGHAMTON, NY - NAME IS GEORGE GEORGE - SO HW? AR K2OID DE W2XYZ K



17

OK. I recognize some of this. What does it mean in English?

18

The Initial Exchanges

- ▶ The call:
 - CQ CQ CQ DE W2XYZ K
- ▶ My Answer:
 - W2XYZ DE K2OID K2OID K
- ▶ His/Her reply:
 - K2OID DE W2XYZ - RR ES TNX FER THE CALL - UR
 - RST IS 569 569 ES QTH IS NR BINGHAMTON, NY NR
 - BINGHAMTON, NY - NAME IS GEORGE GEORGE - SO
 - HW? AR K2OID DE W2XYZ K

Annotations:

- Anyone want a contact? (points to CQ CQ CQ)
- From (points to DE)
- Back to you (points to K)
- Roger Roger and thanks for (points to RR ES TNX FER)
- your (points to UR)
- Signal Report (points to RST)
- how copy (points to HW?)
- That's it for this go around (points to AR)
- and (points to DE)
- Location (points to BINGHAMTON, NY)
- near (points to NR)

19

The Initial Exchange

- ▶ The call:
 - CQ CQ CQ DE W2XYZ K
- ▶ My Answer:
 - W2XYZ DE K2OID K2OID K
- ▶ His/Her reply:
 - K2OID DE W2XYZ - RR ES TNX FER THE CALL - UR
 - RST IS 569 569 ES QTH IS NR BINGHAMTON, NY NR
 - BINGHAMTON, NY - NAME IS GEORGE GEORGE - SO
 - HW? AR K2OID DE W2XYZ K

You repeat your call twice in your first call as insurance that the other station has your call correct.

Note that dashes are used in place of periods to separate "sections"

20

The Initial Exchanges

- ▶ The call:
 - CQ CQ CQ DE W2XYZ K
- ▶ My Answer:
 - W2XYZ DE K2OID K2OID K
- ▶ His/Her reply:
 - K2OID DE W2XYZ – RR E RST IS 569 569 ES QTH IS BINGHAMTON, NY – NAME IS GEORGE GEORGE – SO HW? AR K2OID DE W2XYZ

He/She sends K2OID DE W2XYZ so that:

- You know he/she has your call correct
- That W2XYZ is actually in QSO with you, not someone else

21

The Initial Exchanges

- ▶ The call:
 - CQ CQ CQ DE W2XYZ K
- ▶ My Answer:
 - W2XYZ DE K2OID K2OID K
- ▶ His/Her reply:
 - K2OID DE W2XYZ – RR ES TNX FER THE CALL – UR RST IS 569 569 ES QTH IS NR BINGHAMTON, NY NR BINGHAMTON, NY – NAME IS GEORGE GEORGE – SO HW? AR K2OID DE W2XYZ K

Before anything else you will hear your signal report sent twice because he/she has no idea how well you are copying his/her signal

22

Interpreting the QSO so far

- ▶ The Signal Report or RST
 - Readability (Scale from 1 – 5)
 - Most of the time it will be “5” (perfectly readable)
 - 4 means some difficulty (perhaps interference (QRM) or static/noise (QRN))
 - 3 (rare) means significant difficult
 - 2 (even more rare) means barely copyable
 - 1 means no copy
 - Strength (Scale from 1 – 9)
 - More or less follows your S-Meter reading
 - I give 9 to very strong signals, 7 or 8 to strong signals, 5 or 6 to average signals, 3 or 4 to weak signals, and 1 or 2 to very weak signals

23

Interpreting the QSO so far

- Strength (Scale from 1 – 9) Cont'd
 - Be honest about strength, don't just repeat what the other station sends
 - In contests most stations just send “599” as in:
 - UR 599 – PSE RPT ALL
 - Besides QRN and QRM, a common “add” is QSB or signal fading e.g. 599QSB
 - If there is QSB, I give a signal report based on the strongest it has been
 - Tone (Scale from 1 – 9)
 - This is a hold over from the spark and vacuum tube days. It should be 9 unless the other signal is truly bad (e.g. 60 Hz hum or chirp)

24

The Initial Exchanges


- ▶ The call:
 - CQ CQ CQ
- ▶ My Answer:
 - W2XYZ DE K2OID
- ▶ His/Her response:
 - K2OID DE W2XYZ - RR ES TNX FER THE CALL - UR RST IS 569 569 ES QTH IS NR BINGHAMTON, NY NR BINGHAMTON, NY - NAME IS GEORGE GEORGE - SO HW? AR K2OID DE W2XYZ K

- QTH and Name
- After the RST, the QTH is sent first
 - I generally send "NR ROCHESTER, NY" twice
 - Your name is the final information on the first exchange (again sent twice)
 - Note that many stations have computers with QRZ.com, so they have your information

25

The Initial Exchanges

- ▶ Your typical response
 - W2XYZ DE K2OID - FB GEORGE - NICE TO MEET U - UR RST IS 579 579 ES QTH IS NR ROCHESTER, NY NR ROCHESTER, NY - NAME IS BOB BOB - RIG HR IS FLEX 6300 AT 100 W TO A DIPOLE AT 50 FT - WX IS CLDY WID SNOW - HW? AR W2XYZ DE K2OID K



26

The Initial Exchanges

▶ Your typical response

- W2XYZ DE K2OID - FB GEORGE - NICE TO MEET U - UR RST IS 579 579 ES QTH IS NR ROCHESTER, NY NR ROCHESTER, NY - NAME IS BOB BOB - RIG HR IS FLEX 6300 AT 100 W TO A DIPOLE AT 50 FT - WX IS CLDY WID SNOW - TEMP IS 28F - HW? AR W2XYZ DE K2OID K

fine business

watts

you

cloudy with

temperature

here

weather

27

The Initial Exchanges

▶ Your typical response

- W2XYZ DE K2OID - FB GEORGE - NICE TO MEET U - UR RST IS 579 579 ES QTH IS NR ROCHESTER, NY NR ROCHESTER, NY - NAME IS BOB BOB - RIG HR IS FLEX 6300 AT 100 W TO A DIPOLE AT 50 FT - WX IS CLDY WID SNOW - HW? AR W2XYZ DE K2OID K

▶ His/Her typical reply

- His rig
- His weather
- Perhaps a question or comment for your response

28

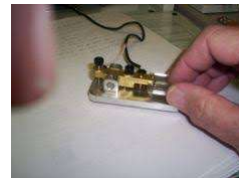
The Initial Exchanges

- ▶ Some possible rag chew topics
 - How long a ham
 - Age
 - Equipment
 - Been to your QTH
- ▶ Some QSOs are very short while others can last hours

29

Hints and Tips

- ▶ Always begin your transmission with feedback on copy
For example:
 - FB GEORGE - SOLID COPY
 - QRM TT TIME BUT GOT MOST
 - QTH AGN PSE BK
- ▶ If the other station is sending too fast for you don't hesitate to QRS
For example:
 - I AM NEW TO CW - PSE QRS
- ▶ **Abbreviations are optional!!!**



30

Hints and Tips

- ▶ Never hesitate to have something you missed repeated.
- ▶ Remember that you are in the low speed sub-band.
 - It is expected that less experienced CW ops (“not show offs”) will be found there.
- ▶ Dashes (-) are often used in place of other punctuation



31

Hints and Tips

- ▶ Signing “KN” rather than “K” means “no breakers”
 - Used most often during rag chew with DX or a rare state
 - Otherwise you are welcomed to “break in” between exchanges
 - Useful when going after that “new one”



32

Tying the Ribbon

- ▶ When it's involuntary (e.g. QRN, QRM, QSB)
 - On your turn say some thing similar to:
SRI - NO CPY CUZ QRM - 73 ES TNX QSO - HPE CU
AGN - SK W2XYZ DE K2OID CL
- ▶ When you have other commitments, say so:
 - XYL CLG ME TO DINNER
 - MUST CATCH SOME ZZ
- ▶ More commonly:
 - TT IS ALL FROM HR - QRU?

33

Tying the Ribbon

This is my last transmission (also "Silent Key" e.g. deceased)

Sorry - no copy because of QRM

- ▶ When it's involuntary (e.g. QRN, QRM, QSB)
 - On your turn say some thing similar to:

Wife calling

SRI - NO CPY CUZ QRM - 73 ES TNX QSO - HPE CU

Thanks for the contact - Hope to see you again

AGN - SK W2XYZ DE K2OID CL
- ▶ When you have other commitments, say so:
 - XYL CLG ME TO DINNER
 - MUST CATCH SOME ZZ
- ▶ More commonly:
 - TT IS ALL FROM HR - QRU?

Sleep

Station is closing down (or clear for this QSO)

That's all from here - do you have anything more for me?

34

Confirming a contact (QSL)

- ▶ If you want a confirmation (or QSL) now is the time to ask for it. For example:
 - PSE QSL or PSE QSL VIA BURO
 - Answer will probably be QSL SURE

- ▶ Note: QSL also means "I heard you", more or less synonymous with RR. "QSL?" means "did you copy what I just sent?"



35

Confirming a contact (QSL)

- ▶ If you want a confirmation (or QSL) now is the time to ask for it. For example:
 - PSE QSL or PSE QSL VIA BURO ARRL QSL Bureau
 - Answer will probably be QSL SURE
- Please
- ▶ Note: QSL also means "I heard you", more or less synonymous with RR. "QSL?" means "did you copy what I just sent?"

36

The Final Exchange

- ▶ The final exchange for both sides ends with an “SK” then the call signs and finally “CL”.
For example:
- ▶ TNX NICE QSO – GE – SK AR W2XYZ DE K2OID
CL



37

The Final Exchange

- ▶ The final exchange for both sides ends with an “SK” then the call signs and finally “CL”.
For example:
- ▶ TNX NICE QSO – **GE** – SK AR W2XYZ DE K2OID
CL

Good evening

38

...But wait! There's More

- ▶ Final flourishes
 - After the “final” transmissions (the CLs) there is often a “CW goodbye handshake” without call signs
 - Technically against the rules but everyone does it
 - Example:
 - GE BOB E E (two spaced dits)
 - GE GEORGE E E



39

Final Remarks

- ▶ CW is really both a shorthand and a language
 - For us English speakers it is relatively easy to master
 - It has English syntax
 - Most abbreviations are of English origin
- ▶ Once you get on the air, you will quickly pick up the way things work
- ▶ You'll see why many of us think of it as the most elegant and enjoyable operating mode

40

CW Abbreviations

Below are some CW abbreviations that I use

73	Best Regards
88	Love & Kisses
A	Number 1
ABT	About
AGN	Again
ANT	Antenna
B4	Before
BCNU	Be Seeing You
BK	Back or Break
BURO	QSL Bureau
CL	Closing Station Down (or Clear in final transmission)
CLDY	Cloudy
CLR	Clear
CONDX	Conditions
CONGRATS	Congratulations

41

Common CW Abbreviations

CPY	Copy
CQ	General Call for a QSO (Contact)
CUZ	Because
DE	From (eg... W3AA de W3DF)
DSW	See You Again (Russian)
DWN	Down
DX	Long Distance Contact, or a Rare Station
EL	Element (as in 3 EL Yagi)
ES	And
FB	Fine Business (Ham jargon for very good)
FD	Field Day
FER	For
FIST	Unique characteristic of an operator's sending of CW
FONE	Phone (as in AM or SSB)
FM	From or Frequency Modulation
FREQ	Frequency
GA	Good Afternoon or Go Ahead

42

Common CW Abbreviations

GB	Good Bye
GD	Good or Good Day
GE	Good Evening
GG	Going
GL	Good luck
GM	Good Morning
GMT	Greenwich Mean Time (standard time used by hams)
GN	Good Night
GND	Ground
GP	Ground Plane
GUD	Good
HAM	Amateur Radio Operator
HI HI	Laughter on CW
HNY	Happy New Year
HPE	Hope
HR	Here

43

Common CW Abbreviations

HV	Have
HW, HW?	How, or How Do You Copy Me?
II, II II II	Error
K	Please Transmit
KN	Only the station I am working should transmit
KNW	Know
LID	Poor Operator Don't confuse with "SOLID"
LP	Log Periodic (type of directional antenna) or Long Path
LSB	Lower Sideband
LW	Long Wire (type of antenna)
MGR	QSL Manager
MNI, MANI	Many
MSG	Message
MULT	Multiplier
N	No or the number 9. (599 IS 5NN IN MORSE)
NIL	Nothing Heard or No Copy

44

Common CW Abbreviations

NW	Now
OM	Old Man (Ham jargon for an experienced operator)
OP	Operator, or Name
OPR	Operator or Operate
PSE	Please
PWR	Power
QRL	The frequency is busy Is the frequency busy?
QRM	Your transmission is being interfered with. Is my transmission being interfered with?
QRN	I am troubled by static. Are you troubled by static?
QRO	Increase power. Should I increase power?
QRP	Decrease power. Also a station using low power Should I decrease power?
QRQ	Send faster. Should I send faster?
QRS	Send slower. Should I send slower?
QRT	Stop transmitting. Should I stop transmitting?

45

Common CW Abbreviations

QRUI	don't have anything more. Do you have anything more?
QRV	I am ready. Are you ready? QRX Please standby for ... Should I standby?
QRZ	You are being called by ... Who is calling me?
QSB	Your signal is fading Is my signal fading?
QSK	I can operate break-in Can you operate break-in?
QSL	I acknowledge receipt Do you acknowledge receipt?
QSO	I can communicate with ... Can you communicate with ...?
QSY	I will change my transmit frequency Should I change my transmit frequency?
QTH	My location is ...What is your location?
R, RR	Message Received or Correct, or Roger (affirmative)
RCVR	Receiver
RIG	Equipment
RPRT or RPT	Report or Repeat

46

Common CW Abbreviations

RX	Receiver
SHUD	Should
SIG	Signal
SK	This is my last transmission
SKED	Schedule
SP	Short Path
SRI	Sorry
STN	Station
SWL	Short Wave Listner
T	Short hand for the number Zero
TEMP	Temperature
TEST	Contest
TIL	Until
TKS	Thanks
TCVR	Transceiver
TT	That
TU	Thank You

47

Common CW Abbreviations

TX	Transmitter
TNX	Thanks
U	You
UR	Your
USB	Upper Sideband
UTC	Universal Time Coordinated (same as GMT)
VERT	Vertical Antenna
VFO	Variable Frequency Oscillator
VY	Very
W	Watts
WID	With
WKD station)	Worked (Ham jargon for making a contact with a
WKG	Working
WPM	Words Per Minute (a measure of code speed)
WRK	Work

48

Common CW Abbreviations

WUD	Would
WX	Weather
XCVR	Transceiver
XMTR	Transmitter
XTAL	Crystal
XYL	Wife
YL	Young Lady
Z	Zulu, GMT, or UTC Time (all the same)
ZZ	Sleep