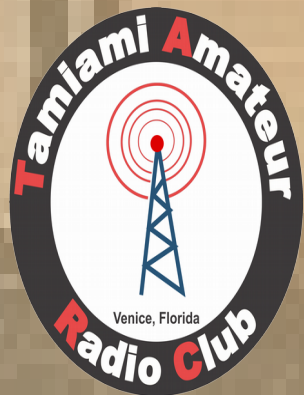


FCC Technician License Course

2014-2018 FCC Element 2
Technician Class Question Pool



Presented by:
Tamiami Amateur Radio Club (TARC)

W E L C O M E

- To the third, 3-hour classes presented by TARC to prepare you for the FCC Technician Class Amateur Radio Service license test.
- Today we will cover Chapters 5 and 6 of the ARRL Ham Radio License Manual, 3rd Ed.
- Everything you need to know is in this manual

Meet Your Instructors



Andy Durette
KB1HIP
Extra Class



Paul Nienaber
KN4BAR
General Class

- Click to add Text

VENICE, FLORIDA

Course Outline

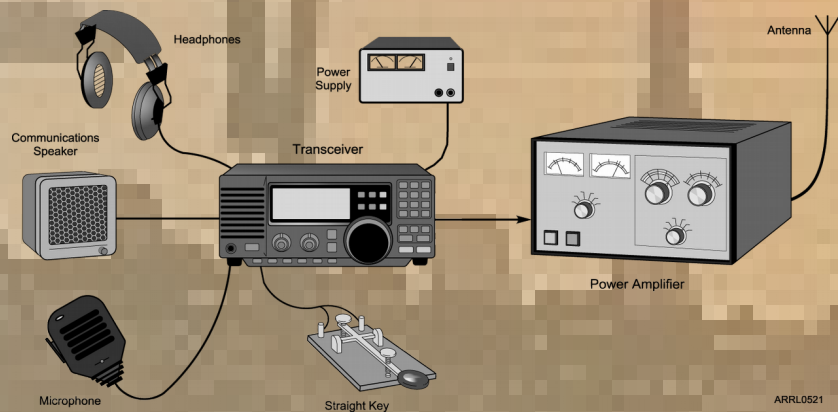
- **Welcome to amateur radio**
- **Radio and Signals Fundamentals**
- **Amateur Radio Equipment (HT & 2M, 70cm)**
- **Electricity, Components and Circuits**
- **Propagation, Antennas and Feedlines**
- **Communicating with other hams**
- **Amateur Radio Equipment (HF)**
- **Licensing regulations**
- **Operating regulations**
- **Safety**
- **Test preparation and review**

Chapter 5 – HAM Equipment

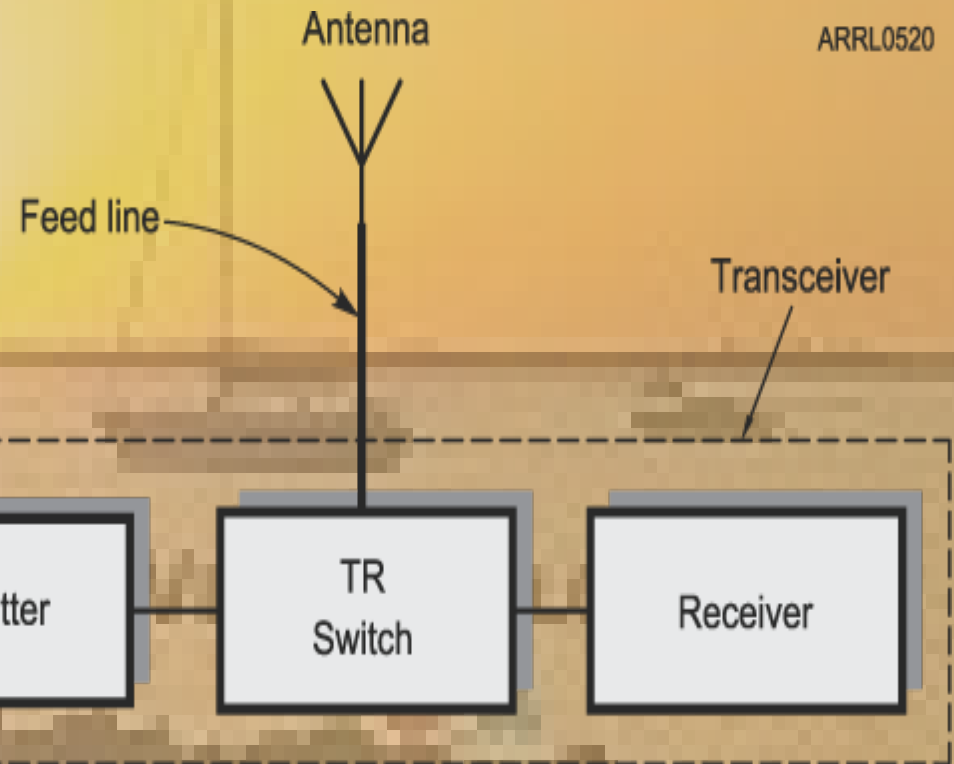
- **Transmitters and Receivers**
- **Transceivers**
- **Vocabulary**
 - **RF = Radio Frequency**
 - **RX = Receiver**
 - **TX = Transmitter**
 - **VFO = Variable Frequency Oscillator – a frequency control**

Station Equipment

- Simple “**block diagram**”
- “**Transceiver**” is the norm today
- Most radios need a separate “**power supply**” (AC to DC)
- Commonly called a “**rig**”



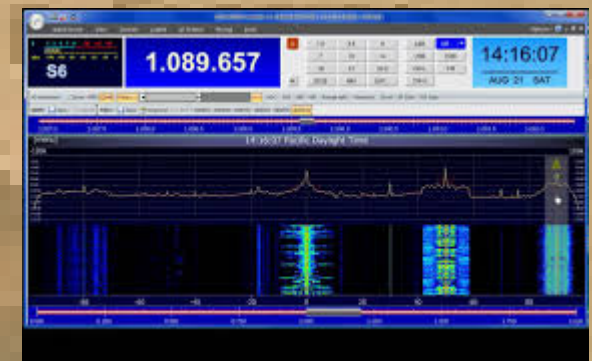
ARRL0521



ARRL0520

HF Radios are Evolving Rapidly

- Design trend is away from buttons and knobs
- Large display screens give rise to screen menus
- Computer Aided Tuning (CAT) is popular
- Software Defined Radios (SDR) are just a black box
- SDR control is done on your computer screen !!



HF Radios are Getting Smaller

- **QRP** – 10 W or less
 - National Parks Online
 - Florida State Parks Online
 - Just for fun!
- Mobile – 12 vdc car battery



Transceiver Controls & Functions

- Usually need a “Power Supply”. 110 VAC to 12 VDC at xx Amps. Match supply to radio specs.
- Main tuning dial (both TX and RX). Controls the frequency selection via the Variable Frequency Oscillator (**VFO**)
- Could be an actual dial or **key pad** or programmed channels from **memory**.
- **Mode** Selector
 - AM/FM/SSB (LSB or USB)
 - CW
 - Data (RTTY)

Transceiver Controls & Functions

- Reception and Transmission **Meter**
 - In transmit indicates output power or SWR or ALC
 - In receive indicates signal strength in “S” units S1 through S9, with S9 the strongest
- Microphone (Audio) control. Too much gain or compression can cause problems
- **ALC** - Automatically limits transmitter drive (output level) to prevent problems associated with too much gain or compression
 - **Splatter**
 - **Over-deviation (FM)**
 - **Over-modulation (AM/SSB)**

Transceiver Controls & Functions


- Microphone Jack and Transmission on/off (not power)
- Push-to-Talk (**PTT**)
- Voice-Operated Transmission (**VOX**)
 - VOX Gain (threshold)
 - VOX Delay (return to receive)
- CW Key Jack (straight key, semi-automatic, electronic)
- **AF Gain** or volume controls the audio level to the speaker or headphones
- **RF Gain** or sensitivity controls the strength of radio signal entering the receiver's detector
- Automatic Gain Control (**AGC**) automatically limits the incoming signals during signal (voice) peaks

Transceiver Controls & Functions

- **IF Filters** (Intermediate Frequency)
 - Around 2.4 kHz for SSB signals
 - Around 500 Hz for CW signals
- **Squelch Control** – mutes AF output to block “noise”
- **RIT** (Receiver Incremental Tuning) can change Rx frequency without changing Tx frequency
- **DSP** (Digital Signal Processing) use a micro computer to provide:
 - noise reduction
 - variable signal filtering
 - tailoring of AF response

Digital Communications

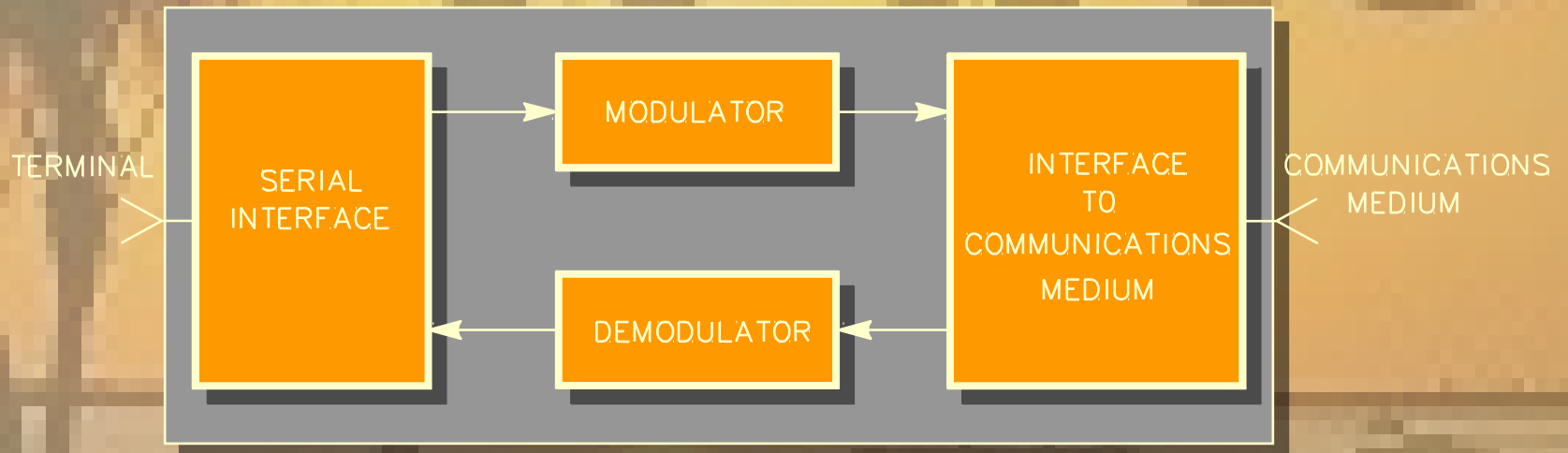


- Many different combinations of protocols, codes, and modulation methods. Requires some type of **MODEM** (modulation – demodulation) device
 - Allow **keyboard to keyboard** communications
 - CW is a type of digital mode on AM
 - Requires a **TNC** (terminal node controller) as hardware or a computer soundboard w/software
 - Various digital modes and the list keeps growing!
- 

Data and RTTY

- ❖ RTTY (radio teletype) was the forerunner of all modern digital mode transmission.
- ❖ Today, amateurs use many kinds of intelligent on air networking modes. Collectively, the FCC refers to these intelligent modes as “Data.”
 - PSK31, Packet (A.25), MFSK, JT65, FT8, etc.
 - Winlink – send/receive emails by RF
- ❖ Both Data and RTTY require an interface between the Data or RTTY device and the transceiver.

TNC



The "Terminal Node Controller" (TNC) interfaces your computer to your transceiver.

TNC and Sound Modems



Packet Networks

A **digipeater** is a packet-radio station capable of recognizing and selectively repeating packet frames.

By the use of digipeaters, a packet can be reliably sent error free over great distances.

Local Digital Frequencies

APRS: 144.390 MHz

Digipeter: W4CEM

Winlink Gateway:
N4SER-10

Primary: 144.950 MHz

Alternate: 144.910 MHz

Question

Which of the following would be connected between a transceiver and computer in a packet radio station?

- A. Transmatch
- B. Mixer
- C. Terminal node controller
- D. Antenna

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- A. Its signal occupies more bandwidth
- B. Its output power increases
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Which type of modulation is most commonly used for VHF and UHF voice repeaters?

- A. AM
- B. SSB
- C. PSK
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What can you do if you are told your FM handheld or mobile transceiver is over deviating?

- A. Talk louder into the microphone
- B. Let the transceiver cool off
- C. Change to a higher power level
- D. Talk farther away from the microphone

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• HF/Single Sideband (SSB) Operations

- When trying to find a clear frequency, ***LISTEN FIRST***, then ask, “Is this frequency in use? <call sign>.”
- If the frequency is clear, then call “CQ” 3 x 3 - Call CQ three times followed by your call sign phonetically three times, listen, repeat.
- When calling another station, always give the other station’s call sign first, then yours.
- ID every 10 minutes and at the end of the QSO, you need not ID after every exchange.
- Give stations you contact honest signal reports.

• The RST Reporting System

The RST system is a quick way amateurs use to describe a received signal.

Readability 1 = Poor 5 = Good

Signal Strength 1 = Poor 9 = Good

Tone (CW only) 1 = Poor 9 = Good

Note: Do not use the RST system on repeaters.



• Q-signals

Q-signals are a kind of “short-hand” hams use to communicate quickly, especially via Morse Code.

Most Q-signals can be used as a question or a statement:

“Can you QSY to 7.250?” (change/move)

“I will QSY to 7.250” (change/move)

•Q-Signals

QRM - Is my transmission being interfered with?/Something is causing interference

QRN - Are you troubled by static/noise?/I am troubled by static/noise.

QRO - Shall I increase transmitter power?/I am running high power.

QRP - Shall I decrease transmitter power?/I am running low power.

QRQ - Shall I send faster?/Please send faster.

QRS - Shall I send slower?/Please send slower

QRT - Shall I stop sending?/I am going off the air.

QRZ - Who is calling me?

QSB - Are my signals fading?/Your signal is fading.

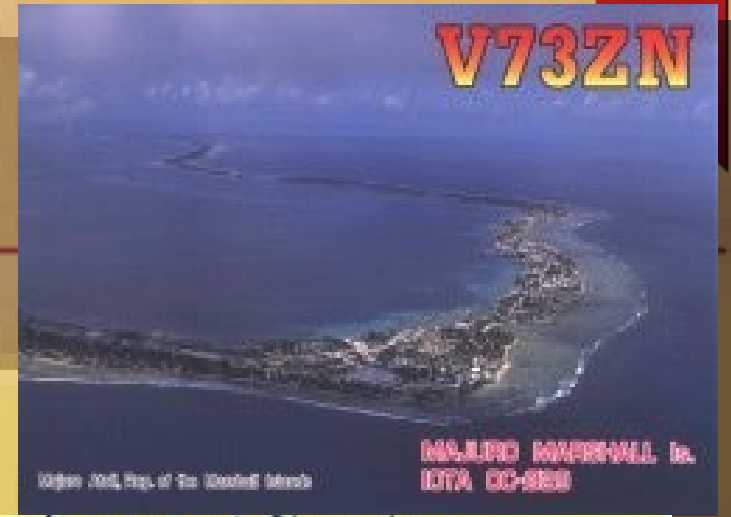
QSL - Can you acknowledge receipt?/I received the message.

QSO - Can you communicate with _____ direct?/I will communicate with _____ directly.

QSY - Shall I change frequency?/I am changing frequency to _____.

QTH - What is your location?/My location is _____.

• QSL Cards



United States of America

WAZH - AAN4JS

Escambia County Grid: EM60
TSA-MARS-AAN4JS-GMDSS-RADAR-GROL

Jeff Smith
3519 Gatewood Drive
Pensacola, FL 32514
mvpco@yahoo.com

PSE QSL _____ TNX QSL _____

CONFIRMING QSO WITH	DAY	MONTH	YEAR
UTC	MHz	FST	MODE

A QSL card is a written confirmation of contact between two amateur radio stations.

• ITU Phonetic Alphabet

A Alpha	H Hotel	O Oscar	V Victor
B Bravo	I India	P Papa	W Whiskey
C Charlie	J Juliet	Q Quebec	X X-ray
D Delta	K Kilo	R Romeo	Y Yankee
E Echo	L Lima	S Sierra	Z Zulu
F Foxtrot	M Mike	T Tango	
G Golf	N November	U Uniform	

• ITU Phonetic Alphabet

- Used for accurate copy when band conditions are noisy or crowded.
- Always use the proper words, they were carefully selected so no two sound alike.
- Avoid being cute.
- Generally not needed on repeaters.

•Some No-No's

- **Don't use CB slang or 10-codes!!!!**
 - Don't interrupt conversations (QSO's) in progress.
 - Don't tune up on the air, use a dummy load.
 - Avoid subject matter that could be offensive.
 - Don't forget your manners – be polite.
 - Don't whine and complain.
 - Don't forget that the whole world can hear you!

End of Class



QUESTIONS ?

VENICE, FLORIDA

