SUBELEMENT T4

Amateur radio practices and station set up

2 Exam Questions - 2 Groups

T4A –
Station setup: connecting microphones; reducing unwanted emissions; power source; connecting a computer; RF grounding; connecting digital equipment; connecting an SWR meter

Just as in consumer electronics, every ham radio manufacturer does things differently.

Concerning the microphone connectors on amateur transceivers, some connectors include push-to-talk and voltages for powering the microphone.

This is to accommodate some microphones that actually have electronic circuitry built in. The electronics require some sort of voltage source.

T4A01

Which of the following is true concerning the microphone connectors on amateur transceivers?

A. All transceivers use the same microphone connector type

B. Some connectors include push-to-talk and voltages for powering the microphone

C. All transceivers using the same connector type are wired identically

D. Un-keyed connectors allow any microphone to be connected

T4A01

Which of the following is true concerning the microphone connectors on amateur transceivers?

B. Some connectors include push-to-talk and voltages for powering the microphone

Ham radio equipment is very sensitive. Using a 12 volt battery usually provides a very stable power source.

However, it is more convenient for ham equipment at home to be powered by a power supply.

A power supply converts 117 AC Voltage from the common household electrical box to 12 volts DC commonly used by ham radio transceivers.

The power supply cannot be just any design though. **Preventing voltage fluctuations from reaching sensitive circuits** is a good reason to use a regulated power supply for communications equipment.

When looking for a power supply to run your “rig” from home, look for a regulated power supply of the proper voltage and enough amperage to run your equipment.

Speaking of power supplies, all equipment including power supplies, radios, and accessories need to be grounded.

A **Flat strap** conductor is best to use for RF grounding. This flat strap should run to your closest grounding point.

T4A03

Which is a good reason to use a regulated power supply for communications equipment?

A. It prevents voltage fluctuations from reaching sensitive circuits

B. A regulated power supply has FCC approval

C. A fuse or circuit breaker regulates the power

D. Power consumption is independent of load

T4A03

Which is a good reason to use a regulated power supply for communications equipment?

A. It prevents voltage fluctuations from reaching sensitive circuits

T4A08

Which type of conductor is best to use for RF grounding?

A. Round stranded wire

B. Round copper-clad steel wire

C. Twisted-pair cable

D. Flat strap

T4A08

Which type of conductor is best to use for RF grounding?

D. Flat strap

At one time or another, hams need to deal with interference issues. Most of these issues are easy to resolve. Help is as close a the nearest radio club.

Ham Radio transmitters are designed to operate on one selected frequency at a time.

Sometimes due to poor engineering design, poor grounding, or just an improper station set up, a transmitter may transmit on one of its harmonic frequencies.

A harmonic frequency is simply an even multiple of the designed transmit frequency. For example, the second harmonic of 7.100 MHZ is 2 X 7.100 = 14.200 Mhz.

Many hams install a filter between the transmitter and antenna to reduce harmonic emissions.

In dealing with TV interference, A band-reject filter should be connected to a TV receiver as the first step in trying to prevent RF overload from a nearby 2 meter transmit

Hum in the Speaker or distorted transmit audio caused by RF flowing on the shield of a microphone are the result of not keeping RF out of your station cables.

You could use a ferrite choke to reduce RF current flowing on the shield of an audio cable.

T4A04

Where must a filter be installed to reduce harmonic emissions from your station?

A. Between the transmitter and the antenna

B. Between the receiver and the transmitter

C. At the station power supply

D. At the microphone

T4A04

Where must a filter be installed to reduce harmonic emissions from your station?

A. Between the transmitter and the antenna

T4A09

Which of the following could you use to cure distorted audio caused by RF current flowing on the shield of a microphone cable?

A. Band-pass filter

B. Low-pass filter

C. Preamplifier

D. Ferrite choke

T4A09

Which of the following could you use to cure distorted audio caused by RF current flowing on the shield of a microphone cable?

D. Ferrite choke

When installing a mobile radio, precautions must be taken to provide a good sounding setup.

A mobile radio power negative connection should be made at the battery or engine block ground strap.

The positive connection should be made at the battery and not through an accessory socket. Not doing so can cause what is called alternator whine.

The alternator is the source of a high-pitched whine that varies with engine speed in a mobile transceiver audio.

Two fuses, one for the negative side and one for the positive side of the voltage cable should be used at the battery.

If another operator reports a variable high-pitched whine on the audio from your mobile transmitter then Noise on the vehicle's electrical system is being transmitted along with your speech audio.

T4A10

What is the source of a high-pitched whine that varies with engine speed in a mobile transceiver's receive audio?

A. The ignition system

B. The alternator

C. The electric fuel pump

D. Anti-lock braking system controllers

T4A10

What is the source of a high-pitched whine that varies with engine speed in a mobile transceiver’s receive audio?

B. The alternator

T4A11

Where should the negative return connection of a mobile transceiver's power cable be connected?

A. At the battery or engine block ground strap

B. At the antenna mount

C. To any metal part of the vehicle

D. Through the transceiver’s mounting bracket

T4A11

Where should the negative return connection of a mobile transceiver's power cable be connected?

A. At the battery or engine block ground strap

T4A12

What could be happening if another operator reports a variable high-pitched whine on the audio from your mobile transmitter?

A. Your microphone is picking up noise from an open window

B. You have the volume on your receiver set too high

C. You need to adjust your squelch control

D. Noise on the vehicle's electrical system is being transmitted along with your speech audio

T4A12

What could be happening if another operator reports a variable high-pitched whine on the audio from your mobile transmitter?

D. Noise on the vehicle’s electrical system is being transmitted along with your speech audio

Ham Radio has something for everyone. Want to communicate like one does on an internet chat site? Then the Ham Radio digital modes may be for you.

Using digital modes, one uses the keyboard of the computer to send messages back and forth.

The digital modes are a benefit during emergency communications because the operators can be assured, assuming no operator typo, that what is on the screen is the correct information.

Packet Radio is a very common digital mode used by Technician Class hams.

A terminal node controller would be connected between a transceiver and computer in a packet radio station. The computer simply acts like a dumb terminal.

Hams love computers. Many hams have spent untold hours writing programs that create new and exciting digital modes.

In fact, it is no longer required to have a terminal node controller to use the packet digital mode. There are many digital modes to choose from when using a program designed for digital communications.

The sound card provides audio to the microphone input and converts received audio to digital form when conducting digital communications using a computer.

If you already own a computer and radio, one may get on digital very cheaply.

Computers have many uses as part of an amateur radio station:

- For logging contacts and contact information
- For sending and/or receiving CW
- For generating and decoding digital signals
- All of these choices are correct

T4A06

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

T4A06

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

C. Terminal node controller

T4A07

How is a computer's sound card used when conducting digital communications using a computer?

A. The sound card communicates between the computer CPU and the video display

B. The sound card records the audio frequency for video display

C. The sound card provides audio to the microphone input and converts received audio to digital form

D. All of these choices are correct

T4A07

How is a computer's sound card used when conducting digital communications

C. The sound card provides audio to the microphone input and converts received audio to digital form

T4A02

How might a computer be used as part of an amateur radio station?

A. For logging contacts and contact information

B. For sending and/or receiving CW

C. For generating and decoding digital signals

D. All of these choices are correct

T4A02

How might a computer be used as part of an amateur radio station?

D. All of these choices are correct

SWR will be discussed in the antenna section of this study guide. An SWR meter would be connected in series with the feed line, between the transmitter and antenna.

T4A05

Where should an in-line SWR meter be connected to monitor the standing wave ratio of the station antenna system?

A. In series with the feed line, between the transmitter and antenna

B. In series with the station's ground

C. In parallel with the push-to-talk line and the antenna

D. In series with the power supply cable, as close as possible to the radio

T4A05

Where should an in-line SWR meter be connected to monitor the standing wave ratio of the station antenna system?

A. In series with the feed line, between the transmitter and antenna

T4B –

Operating controls: tuning; use of filters; squelch function; AGC; repeater offset; memory channels

Amateur Radio operators can adjust certain features of their radio either by external switches and knobs or by an internal software based menu system.

Many of these adjustments affect how well the radio works, or even the quality by which it transmits and receives.

If a transmitter is operated with the microphone gain set too high, the output signal might become distorted.

It is very important to have your microphone gain set properly. There is no such thing as a "power mic" in ham radio.

One can change frequencies on a ham radio in one of two ways. **The keypad or VFO knob** can be used to enter the operating frequency on a modern transceiver.

With the VFO Knob, you can actually “tune” through a frequency range.

Using a keypad on your hand held or your mobile microphone, the frequency you wish can be entered directly.

While ham radio is not channelized the way FMRS, Business Band, or CB radios are, quick access to a favorite frequency on your transceiver can be done by storing the frequency in a memory channel.

Most hams store favorite repeater and simplex frequencies into the memory of their radios.

T4B01

What may happen if a transmitter is operated with the microphone gain set too high?

A. The output power might be too high

B. The output signal might become distorted

C. The frequency might vary

D. The SWR might increase

T4B01

What may happen if a transmitter is operated with the microphone gain set too high?

B. The output signal might become distorted

T4B02

Which of the following can be used to enter the operating frequency on a modern transceiver?

A. The keypad or VFO knob

B. The CTCSS or DTMF encoder

C. The Automatic Frequency Control

D. All of these choices are correct

T4B02

Which of the following can be used to enter the operating frequency on a modern transceiver?

A. The keypad or VFO knob

T4B04

What is a way to enable quick access to a favorite frequency on your transceiver?

A. Enable the CTCSS tones

B. Store the frequency in a memory channel

C. Disable the CTCSS tones

D. Use the scan mode to select the desired frequency

T4B04

What is a way to enable quick access to a favorite frequency on your transceiver?

B. Store the frequency in a memory channel

Nobody likes listening to noise all day long. The purpose of the squelch control on a transceiver is to mute receiver output noise when no signal is being received.

If not for the squelch control, one would have to listen to noise whenever monitoring a frequency, even when a signal was not present.

The squelch control basically disables the speaker during times when there is no signal present.

The squelch control is mainly used when operating the FM voice mode.

Many mobile radio installations suffer from noise from the ignition system. Turning on the noise blanker would reduce ignition interference to a receiver.

One problem with the SSB voice mode is that even when the frequency is correctly adjusted, the audio being received may sound weird.

Too high pitched, or even too low pitched. Some like the higher or lower pitch. To allow operators to adjust the receive frequency without affecting transmit frequency, an RIT or Receiver Incremental Tuning is used.

The receiver RIT or clarifier control could be used if the voice pitch of a single-sideband signal seems too high or low.

There is a control on some transceivers that help save the operators ears. Especially when wearing earphones.

The function of an automatic gain control or AGC is to keep received audio relatively constant.

T4B03

What is the purpose of the squelch control on a transceiver?

A. To set the highest level of volume desired

B. To set the transmitter power level

C. To adjust the automatic gain control

D. To mute receiver output noise when no signal is being received

T4B03

What is the purpose of the squelch control on a transceiver?

D. To mute receiver output noise when no signal is being received

T4B05

Which of the following would reduce ignition interference to a receiver?

A. Change frequency slightly

B. Decrease the squelch setting

C. Turn on the noise blanker

D. Use the RIT control

T4B05

Which of the following would reduce ignition interference to a receiver?

C. Turn on the noise blanker

T4B06

Which of the following controls could be used if the voice pitch of a single-sideband signal seems too high or low?

A. The AGC or limiter

B. The bandwidth selection

C. The tone squelch

D. The receiver RIT or clarifier

T4B06

Which of the following controls could be used if the voice pitch of a single-sideband signal seems too high or low?

D. The receiver RIT or clarifier

T4B07

What does the term “RIT” mean?

A. Receiver Input Tone

B. Receiver Incremental Tuning

C. Rectifier Inverter Test

D. Remote Input Transmitter

T4B07

What does the term “RIT” mean?

B. Receiver Incremental Tuning

T4B12

What is the function of automatic gain control or AGC?

A. To keep received audio relatively constant

B. To protect an antenna from lightning

C. To eliminate RF on the station cabling

D. An asymmetric goniometer control used for antenna matching

T4B12

What is the function of automatic gain control or AGC?

A. To keep received audio relatively constant

Many transceivers meant for SSB and CW have selectable bandwidths for receive. The bandwidth of an SSB signal is much greater than a CW signal.

The advantage of having multiple receive bandwidth choices on a multimode transceiver is that it will permit noise or interference reduction by selecting a bandwidth matching the mode.

2400 Hz is an appropriate receive filter to select in order to minimize noise and interference for SSB reception.

500 Hz is an appropriate receive filter to select in order to minimize noise and interference for CW reception.

The difference between the repeater's transmit and receive frequencies is the repeater offset frequency.

While plus or minus 600 KHz offset is standard for 2 meters and plus or minus 5 MHz is standard for 70 cm, all FM radios can be set to different offsets to accommodate some repeaters with what are called "odd offset" frequencies.

T4B08

What is the advantage of having multiple receive bandwidth choices on a multimode transceiver?

A. Permits monitoring several modes at once

B. Permits noise or interference reduction by selecting a bandwidth matching the mode

C. Increases the number of frequencies that can be stored in memory

T4B08

What is the advantage of having multiple receive bandwidth choices on a multimode transceiver?

B. Permits noise or interference reduction by selecting a bandwidth matching the mode

T4B09

Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for SSB reception?

A. 500 Hz

B. 1000 Hz

C. 2400 Hz

D. 5000 Hz

T4B09

Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for SSB reception?

C. 2400 Hz

T4B10

Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for CW reception?

A. 500 Hz

B. 1000 Hz

C. 2400 Hz

D. 5000 Hz

T4B10

Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for CW reception?

A. 500 Hz

T4B11

Which of the following describes the common meaning of the term "repeater offset"?

A. The distance between the repeater’s transmit and receive antennas

B. The time delay before the repeater timer resets

C. The difference between the repeater’s transmit and receive frequencies

D. Matching the antenna impedance to the feed line impedance

T4B11

Which of the following describes the common meaning of the term "repeater offset"?

C. The difference between the repeater’s transmit and receive frequencies