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# Lesson 9: Base Stations

Preparation for  
Amateur Radio  
Technician Class  
Exam

# Topics

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- Home Stations
- Basic Station Layout
- RTTY and Data Communications
- Station Accessories
- Wavelengths
- Feed Lines
- Impedance-matching & balancing
- Exam Questions for this section

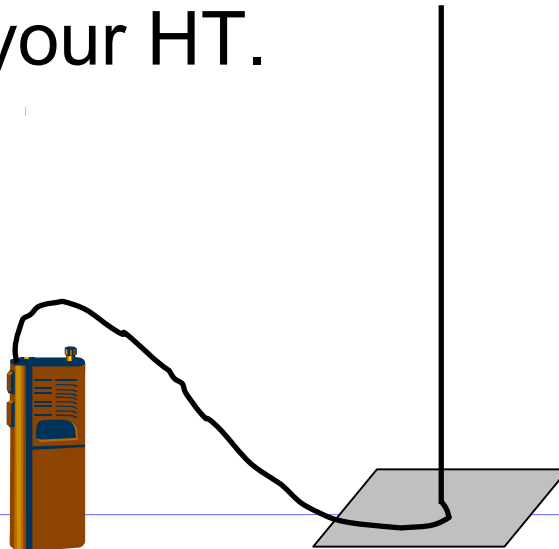
# Reading

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## ➤ Chapter 8 – 8.1-8.19

# Home Station – Your Shack

- Traditionally, the place where we set up our radio station is the “shack”
  - If you just have an HT, your “shack” might be where you charge your radio! You might also have a larger antenna at home to get better range from your HT.



# Home Station – Your Shack

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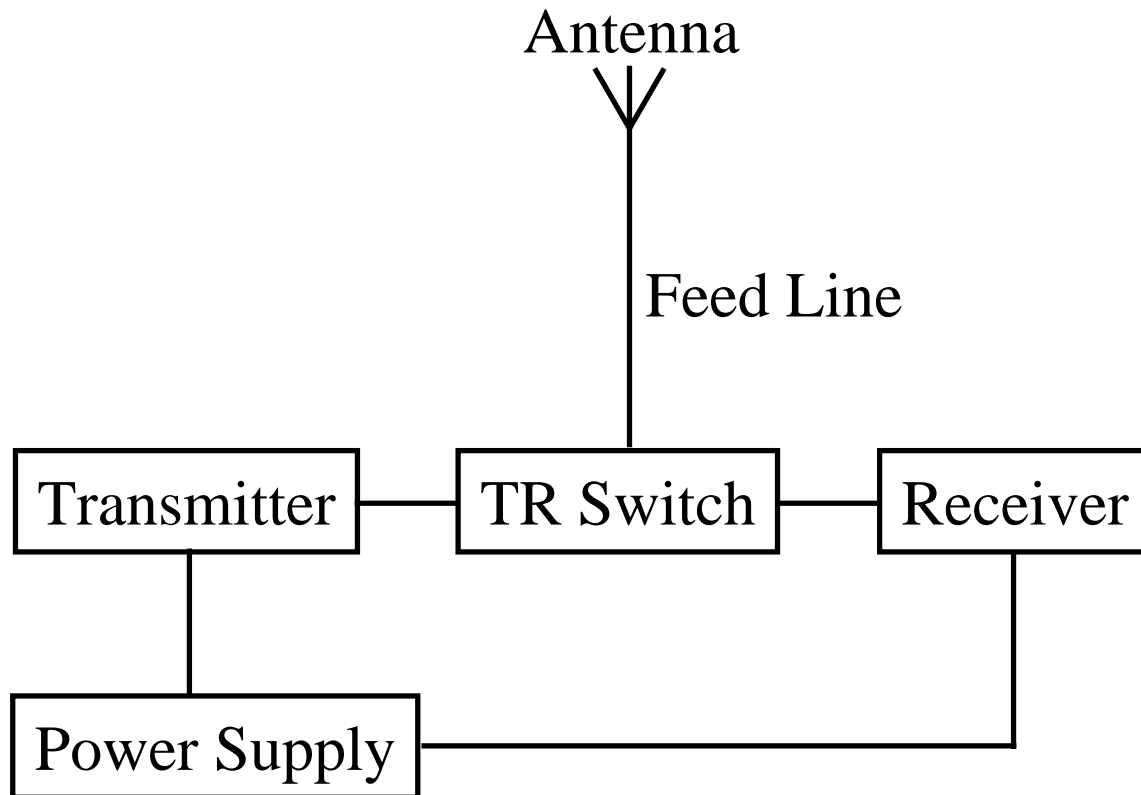
- Your shack should enable you to lock up your gear to prevent unlicensed people from using it when you are not present
  - Many hams have their HTs with them at all times, so don't have to worry about locking them!
  - If your shack is in an area where the radio sounds might bother others, you can get a headset with microphone to use with your radio

# Base Station Layout

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- Any ham radio operator with any license can build and operate their own radio station. In this section we look at the parts of a station that you need to operate
  - Most of these components are built into your HT radios

# Base Station Layout



# Transmitters

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- A transmitter produces RF signals
- The signal from a transmitter is called an RF carrier
- Transmitters have two stages:
  - Oscillator
  - Power amplifier

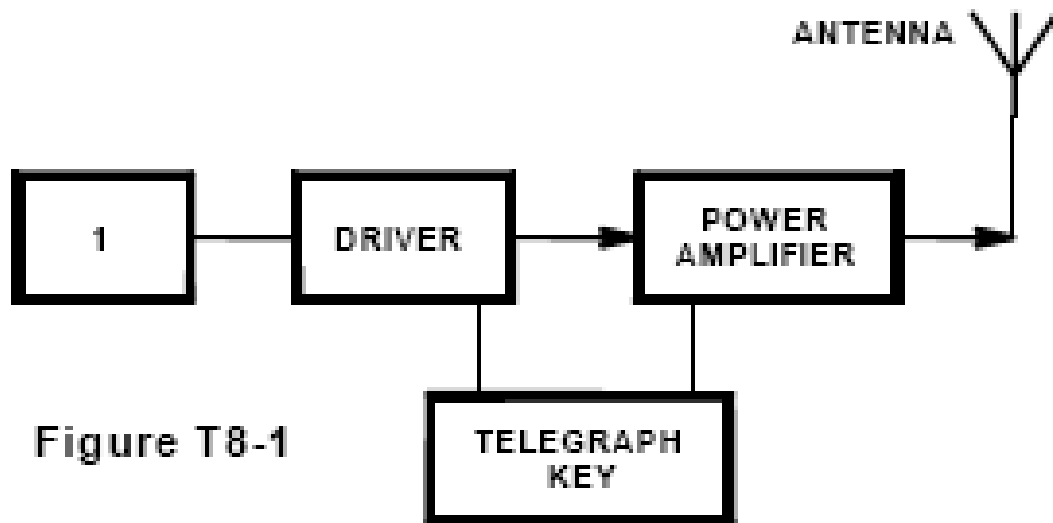


# Transmitters - CW

- To transmit Morse Code the RF signal from a transmitter is turned on and off in a pattern
  - This is a kind of modulation of the RF signal
- The frequency you transmit on can be set in two different ways
  - Crystal oscillator
  - Variable-frequency oscillator (VFO)
- To prevent AC hum from interfering by modulating the CW transmission, be sure the power supply is filtered

# Transmitters - CW

Box 1 in the diagram below represents the oscillator, either crystal or VFO



# Transmitters - FM

- To transmit voice, the RF signal from a transmitter is modified when a circuit called a modulator is used to add voice content to the RF carrier
- FM transmission is popular because it is less affected by interference from static-type electrical noise than the AM modes
- The signal can be modulated by either frequency or phase
  - These are so closely related, that practically they will appear to be the same – only the circuitry varies

# Transmitters - FM

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- The frequency from the oscillator is modulated by a circuit called a reactance modulator, which reacts to the rise and fall of your voice to raise and lower the frequency that is transmitted

# Transmitters - FM

Box 1 in the diagram below represents the reactance modulator

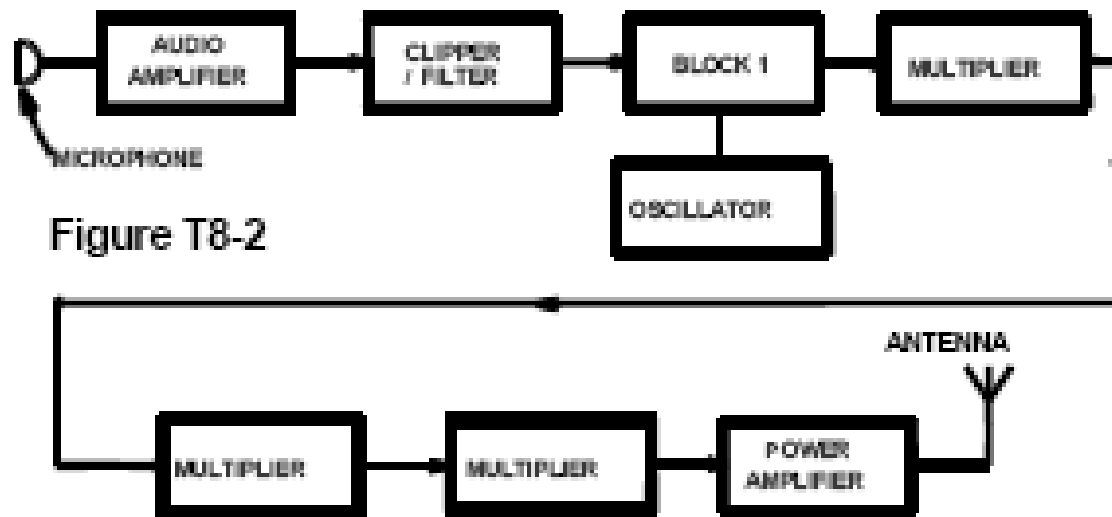


Figure T8-2

# Transmitters - FM

- The voice signal from the microphone is rather weak, so it is boosted by the audio amplifier
  - If the audio amplifier isn't working, the signal from the microphone will be too weak to modulate the signal
- The clipper/filter sets the amplitude of the signal
  - If the clipper/filter is not doing its job correctly, the signal can be over deviated and interfere with transmissions on nearby channels
  - If someone tells you that your radio is over-deviating, try talking software or holding the microphone further away

# Receivers

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- A receiver converts RF energy into an audio-frequency signal
- The heart of the receiver is the detector
  - A detector compares an unmodulated model to an incoming signal to get information
  - Detectors are particular to types of modulation, such as AM, FM, or phase

# Receivers – direct conversion

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- A tuned radio frequency receiver allows you to select the frequencies you will receive
- A direct-conversion receiver uses a mixer to combine an incoming RF signal with a signal from a VFO to convert the signal directly to audio



# Receivers - Superheterodyne

- Like a direct-conversion receiver, the superheterodyne receiver uses a mixer to combine an incoming RF signal with a signal from a VFO
  - But instead of converting the signal directly to audio, the signal is converted instead to an intermediate frequency (IF)
  - This intermediate frequency is amplified and sent to another circuit called a product detector
  - The product detector mixes the signal with another signal from a beat frequency oscillator to produce an audio signal
  - Some radio receivers have several IF filters of different bandwidths because some emission types need a wider bandwidth than others to be received properly

# Receivers - Superheterodyne

Box 1 in the diagram below represents the product detector. This receiver will work with SSB and CW.

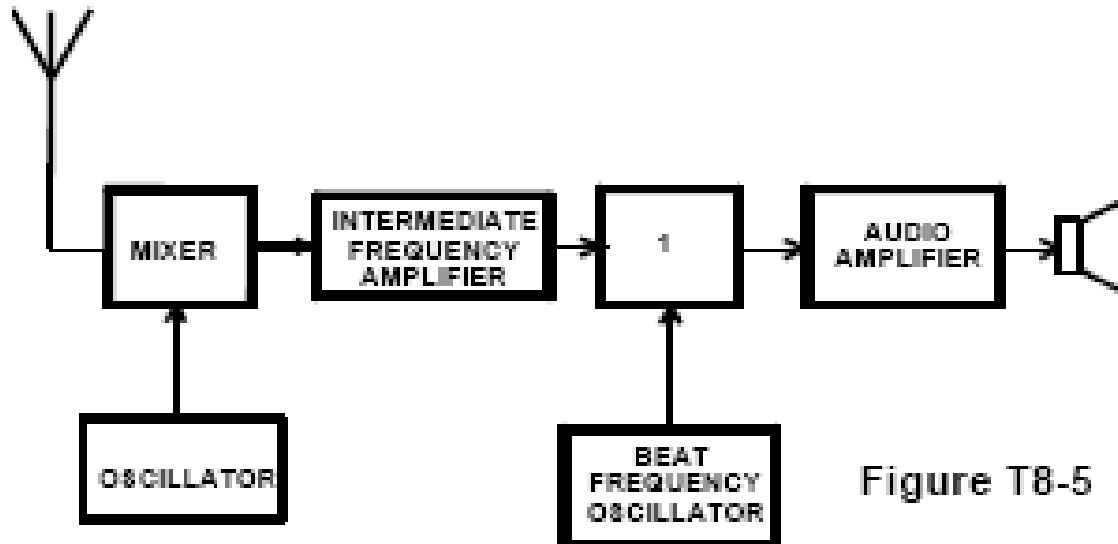


Figure T8-5

# Receivers - Superheterodyne

- To avoid the incoming sound from getting too loud and hurting your ears, most commercial receivers include automatic gain control
- You can use an S meter connected across the automatic gain control line to show relative signal strength
- To determine if your radio is properly calibrated for frequency, you can tune it in to the NIST frequency standard stations WWV or WWVH

# Receivers - FM

- An FM superheterodyne repeater adds more stages
  - It has a different kind of detector called a frequency discriminator
    - With no frequency discriminator, you will have no audio output
  - It also will usually include squelch circuitry
    - This mutes the noise when an FM carrier signal is not present
    - Tune the squelch just until noise is silenced, but you can still hear transmissions

# Receivers - FM

Box 1 in the diagram below represents the Frequency Discriminator.

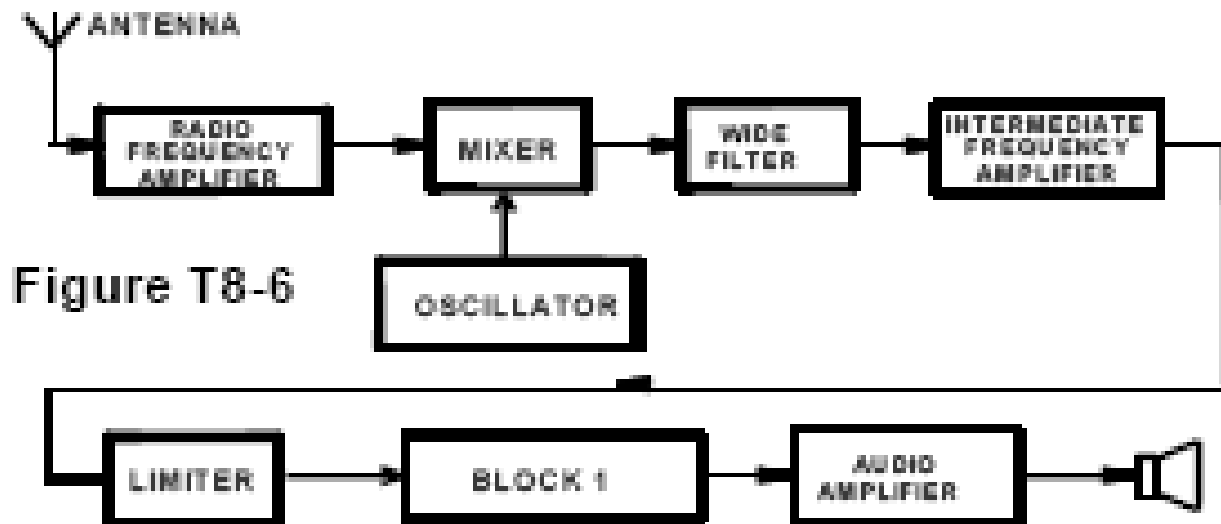
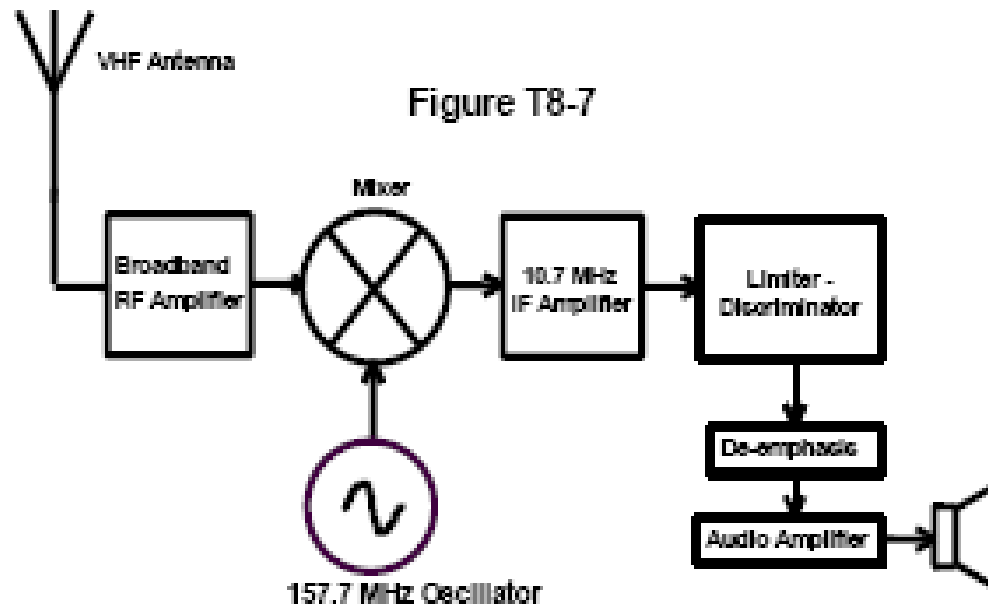


Figure T8-6

# Receivers - FM

This FM receiver might be called a single-conversion superheterodyne receiver – it has one pass of IF filtering. The mixer can add or subtract the oscillator and IF frequencies – so this receiver can receive 168.4 MHz or 147.0 MHz.



# Transceivers

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- A transceiver is a transmitter and a receiver put together in one box
- A mobile transceiver is typically used in the car and is designed to run on 12V DC
  - To use it at home either connect it to a 12V battery, or connect it to a power supply that converts 120V AC to 12V DC

# Trouble-shooting

- Your radio works fine in the car but not in the house:
  - Check the power supply
    - Connect a voltmeter at the 12 V plug on the chassis of the radio when transmitting to see what current it is drawing
    - If there is no voltage, check the fuses
- You hear a whine or clicks when running the radio using DC
  - Filter the power lines for DC as well as RF



# RTTY & Data Communications

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- These are forms of digital communications, often involving direct transfer of information between computers

# RTTY

## ➤ Radioteletype

- You connect the transceiver to a modem that is connected to either a computer or teleprinter
- Data received through the transceiver is output on the teleprinter or computer
- In the VHF/UHF bands, a common method of transmitting RTTY is to modulate a conventional FM transmitter with a modem

# Packet

- Packet uses a terminal node controller (TNC) in place of a modem
  - The sending TNC breaks the data into chunks, called packets, to send information to another TNC
  - A receiving TNC recombines the packets into a signal
- The transceiver is often a VHF or UHF FM transceiver with the squelch control set low enough to receive packets, but high enough to filter out noise that might be mistaken for data

# Station Accessories

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- Antenna Switch
- SWR Meter
- Antenna Tuner
- Telegraph Key (paddle or bug)
- Microphone
- Duplexer
- Power amplifier

# Antenna Switch

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- This connects one transceiver (or transmitter/receiver pair) to several antennas
- The switch determines which antenna the radio is currently using
- Many hams have a switch between an antenna and a dummy antenna

# Antenna Switch

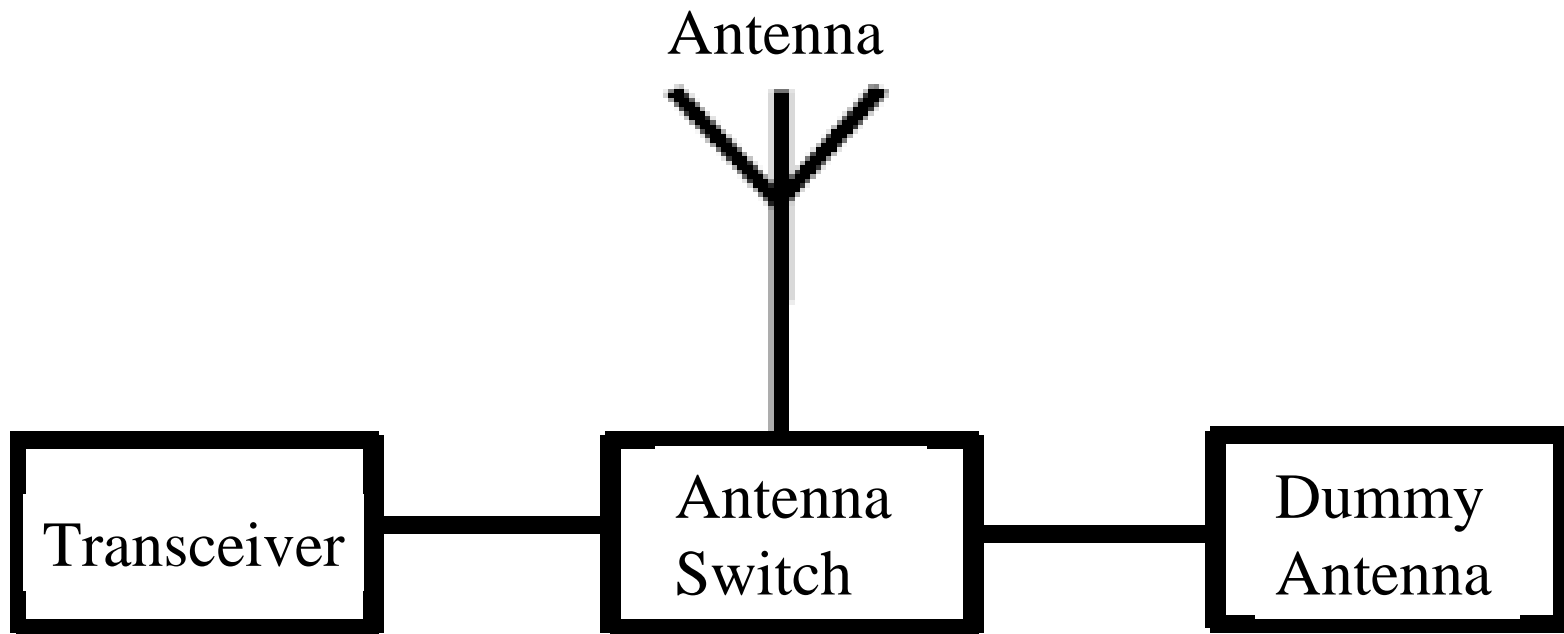


Figure T8-3

# SWR Meter

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- This measures the standing-wave ratio
- SWR indicates how well your antenna system is working
- Connect between the antenna switch and the transceiver, as close to the transmitter output as possible

# Antenna Tuner

- An antenna matches the impedance of the load (antenna and feed line) to the impedance of the transmitter
  - It lets you use the same antenna on several bands, or use an antenna on a band it is not designed for
  - Connect the antenna tuner right where the antenna comes into the station
  - Connect the SWR meter between the antenna tuner and the transceiver when tuning the system



# Antenna Tuner

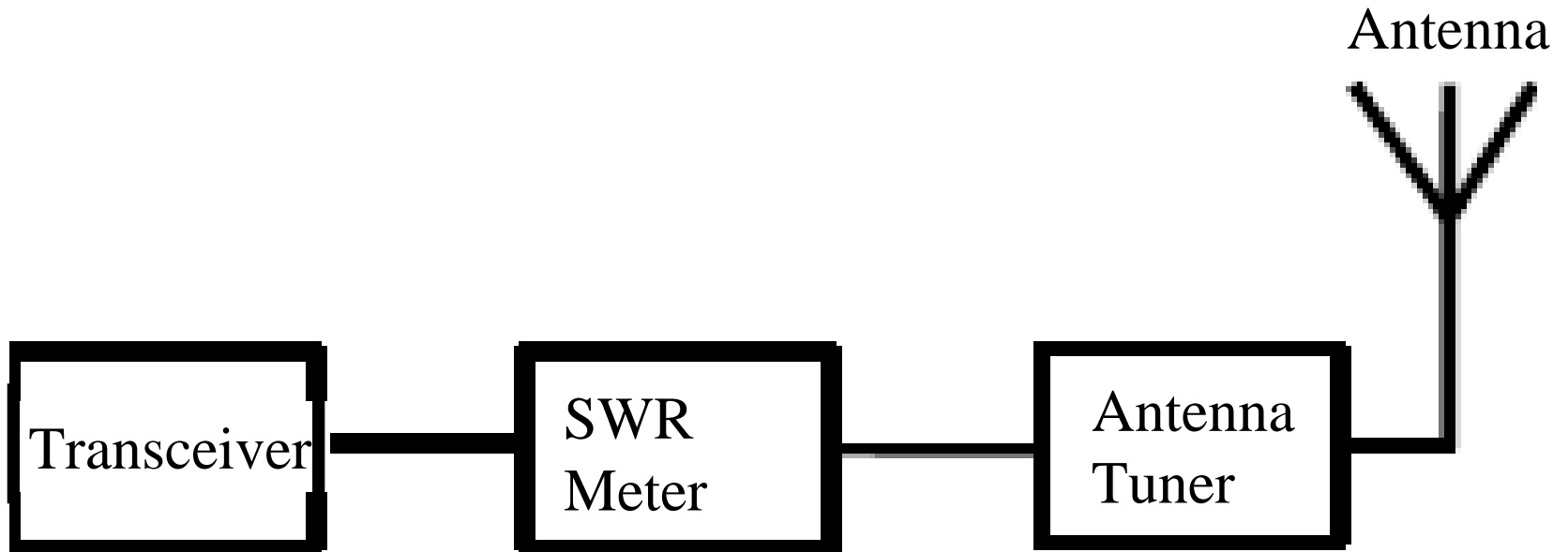


Figure T8-4

# Telegraph Key

- This is a device to send Morse Code
  - It is also called a straight key or bug
- An electronic keyer is another device to send Morse Code
  - It is connected to a paddle
  - It sends dots when you press one side of the paddle and dashes one you press the other side
- Connects directly to the transmitter

# Microphone

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- Used to transmit voice signals
- Connects directly to the transmitter

# Duplexer

- Popular HTs and mobile radios are dual-band or multi-mode
  - A popular combination of frequencies for dual-band radios is 2 meter and 70 cm
  - A multi-mode VHF transceiver could be used for weak-signal VHF communication, or to combine FM phone with weak-signal SSB
- A duplexer in the radio makes sure that the signal on one frequency goes out to the antenna and is not received on the other frequency
  - Similarly it automatically switches the signal received from the antenna to the correct receiver

# Power Amplifier

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- An external power amplifier can be used to boost the power output of your radio
  - These are popular with hams who have low power HT radios that they want to use at home with an outside antenna

# Feed Lines

- A feed line transfers the RF signal from your antenna to your receiver, or from your transmitter to your antenna
- The impedance of the feed line should match the impedance of the transceiver and the antenna
- Types of feed line include:
  - Coaxial cable or coax
  - Open-wire line or parallel-conductor feed line

# Coax

- Has one center wire, inside insulation, inside a metal sleeve
- Typically has a  $50\Omega$  or  $75\Omega$  impedance
  - RG-58, RG-8 and RG-213 are  $50\Omega$  cables
  - RG-59 and RG-11 are  $75\Omega$  cables
- A half wavelength dipole far from other objects has a  $73\Omega$  impedance
- The same antenna near the ground, trees, or buildings has a  $50\Omega$  impedance
- RG-58 and RG-59 cables are thinner in diameter than the others, but have a higher signal loss and handle lower power

# Open-wire transmission lines

- Two parallel wires spaced a constant distance by an insulator
  - Also called parallel-conductor feed line
- Less signal loss than coax
- Operates well with a high SWR
- Cheaper than coax
- Balanced transmission line
  - An unbalanced transmission line has a conductor connected to ground (Coax is unbalanced)



# SWR

- Power traveling from the transmitter to the antenna is forward power
- In a system where there is an impedance mismatch between the transmitter and antenna, power can be reflected from the antenna back to the transmitter. This is reflected power.
- The ratio of the maximum voltage to the minimum voltage on the line is the standing-wave ratio (SWR)

# SWR Meter

- An SWR meter is used to measure SWR
- When the SWR is 1:1, the impedances of the antenna and transmission line match
  - This would be great, but no system is perfect!
  - An SWR of 1.5:1 is actually very good, and 2:1 is quite acceptable
- An SWR of 4:1 indicates a serious mismatch of impedances
- Measure SWR at the antenna feed point, the place where the feed line connects to the antenna

# Wattmeter

- A wattmeter measures power in watts
  - Wattmeters usually operate at  $50\Omega$
- You can use a wattmeter to determine the true forward power in your system
- Measure the forward power and the reflected power and use this formula
  - True forward power = forward power – reflected power

# Balun

- A balanced center-fed antenna has the same current in both halves of the antenna
- A coax cable is unbalanced because one conductor is grounded and one is not
- It is common to connect a balanced antenna to an unbalanced (coax) feed line using a balun (BALanced to UNbalanced)
- Install the balun at the antenna feed point

# Exam Questions

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- The following slides contain questions from the exam pool that are covered in this section of the notes

# T2B18

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- T2B18 What emissions do a transmitter using a reactance modulator produce?
- A. CW
  - B. Test
  - C. Single-sideband, suppressed-carrier phone
  - D. Phase-modulated phone

# T2B19

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- T2B19 What other emission does phase modulation most resemble?
- A. Amplitude modulation
  - B. Pulse modulation
  - C. Frequency modulation
  - D. Single-sideband modulation

# T8A08

- T8A08 Why is it important to provide adequate power supply filtering for a CW transmitter?
- A. It isn't important, since CW transmitters cannot be modulated by AC hum
  - B. To eliminate phase noise
  - C. It isn't important, since most CW receivers can easily suppress any hum by using narrow filters
  - D. To eliminate modulation of the RF signal by AC hum



# T8B02

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- T8B02 How is a CW signal usually transmitted?
- A. By frequency-shift keying an RF signal
  - B. By on/off keying an RF signal
  - C. By audio-frequency-shift keying an oscillator tone
  - D. By on/off keying an audio-frequency signal

# T8B03

- T8B03 What purpose does block 1 serve in the simple CW transmitter pictured in Figure T8-1?
- A. It detects the CW signal
  - B. It controls the transmitter frequency
  - C. It controls the transmitter output power
  - D. It filters out spurious emissions from the transmitter

# T8B04

- T8B04 What circuit is pictured in Figure T8-1 if block 1 is a variable-frequency oscillator?
- A. A packet-radio transmitter
  - B. A crystal-controlled transmitter
  - C. A single-sideband transmitter
  - D. A VFO-controlled transmitter

# T8B05

- T8B05 What circuit is shown in Figure T8-2 if block 1 represents a reactance modulator?
- A. A single-sideband transmitter
  - B. A double-sideband AM transmitter
  - C. An FM transmitter
  - D. A product transmitter

# T8B06

- T8B06 How would the output of the FM transmitter shown in Figure T8-2 be affected if the audio amplifier failed to operate (assuming block 1 is a reactance modulator)?
- A. There would be no output from the transmitter
  - B. The output would be 6-dB below the normal output power
  - C. The transmitted audio would be distorted but understandable
  - D. The output would be an unmodulated carrier

# T8B12

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- T8B12 What is the result of over deviation in an FM transmitter?
- A. Increased transmitter power
  - B. Out-of-channel emissions
  - C. Increased transmitter range
  - D. Poor carrier suppression

# T8B13

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- T8B13 What can you do if you are told your FM hand-held 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

# T8C09

- T8C09 Why is FM voice so effective for local VHF/UHF radio communications?
- A. The carrier is not detectable
  - B. It is more resistant to distortion caused by reflected signals than the AM modes
  - C. It has audio that is less affected by interference from static-type electrical noise than the AM modes
  - D. Its RF carrier stays on frequency better than the AM modes



# T8F14

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- T8F14 What is the minimum FCC certification required for an amateur radio operator to build or modify their own transmitting equipment?
- A. A First-Class Radio Repair License
  - B. A Technician class license
  - C. A General class license
  - D. An Amateur Extra class license

# T8A02

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- T8A02 If your mobile transceiver works in your car but not in your home, what should you check first?
- A. The power supply
  - B. The speaker
  - C. The microphone
  - D. The SWR meter

# T8A09

- T8A09 Why is it important to provide adequate DC source supply filtering for a mobile transmitter or transceiver?
- A. To reduce AC hum and carrier current device signals
  - B. To provide an emergency power source
  - C. To reduce stray noise and RF pick-up
  - D. To allow the use of smaller power conductors

# T8B08

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- T8B08 A mobile radio may be operated at home with the addition of which piece of equipment?
- A. An alternator
  - B. A power supply
  - C. A linear amplifier
  - D. A rhombic antenna

# T8B09

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- T8B09 What might you use instead of a power supply for home operation of a mobile radio?
- A. A filter capacitor
  - B. An alternator
  - C. A 12-volt battery
  - D. A linear amplifier

# T8B10

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- T8B10 What device converts 120 V AC to 12 V DC?
- A. A catalytic converter
  - B. A low-pass filter
  - C. A power supply
  - D. An RS-232 interface

# T8C01

- T8C01 What type of circuit does Figure T8-5 represent if block 1 is a product detector?
- A. A simple phase modulation receiver
  - B. A simple FM receiver
  - C. A simple CW and SSB receiver
  - D. A double-conversion multiplier

# T8C02

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- T8C02 If Figure T8-5 is a diagram of a simple single-sideband receiver, what type of circuit should be shown in block 1?
- A. A high pass filter
  - B. A ratio detector
  - C. A low pass filter
  - D. A product detector



# T8C03

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- T8C03 What circuit is pictured in Figure T8-6, if block 1 is a frequency discriminator?
- A. A double-conversion receiver
  - B. A variable-frequency oscillator
  - C. A superheterodyne receiver
  - D. An FM receiver

# T8C04

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- T8C04 What is block 1 in the FM receiver shown in Figure T8-6?
- A. A frequency discriminator
  - B. A product detector
  - C. A frequency-shift modulator
  - D. A phase inverter

# T8C05

- T8C05 What would happen if block 1 failed to function in the FM receiver diagram shown in Figure T8-6?
- A. The audio output would sound loud and distorted
  - B. There would be no audio output
  - C. There would be no effect
  - D. The receiver's power supply would be short-circuited

# T8C06

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- T8C06 What circuit function is found in all types of receivers?
- A. An audio filter
  - B. A beat-frequency oscillator
  - C. A detector
  - D. An RF amplifier

# T8C07

- T8C07 What is one accurate way to check the calibration of your receiver's tuning dial?
- A. Monitor the BFO frequency of a second receiver
  - B. Tune to a popular amateur net frequency
  - C. Tune to one of the frequencies of station WWV or WWVH
  - D. Tune to another amateur station and ask what frequency the operator is using

# T8C08

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- T8C08 What circuit combines signals from an IF amplifier stage and a beat-frequency oscillator (BFO), to produce an audio signal?
- A. An AGC circuit
  - B. A detector circuit
  - C. A power supply circuit
  - D. A VFO circuit

# T8C10

- T8C10 Why do many radio receivers have several IF filters of different bandwidths that can be selected by the operator?
- A. Because some frequency bands are wider than others
  - B. Because different bandwidths help increase the receiver sensitivity
  - C. Because different bandwidths improve S-meter readings
  - D. Because some emission types need a wider bandwidth than others to be received properly

# T8C11

- T8C11 What is the function of a mixer in a superheterodyne receiver?
- A. To cause all signals outside of a receiver's passband to interfere with one another
  - B. To cause all signals inside of a receiver's passband to reinforce one another
  - C. To shift the frequency of the received signal so that it can be processed by IF stages
  - D. To interface the receiver with an auxiliary device, such as a TNC



# T8C12

- T8C12 What frequency or frequencies could the radio shown in Figure T8-7 receive?
- A. 136.3 MHz
  - B. 157.7 MHz and 10.7 MHz
  - C. 10.7 MHz
  - D. 147.0 MHz and 168.4 MHz

# T8C13

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- T8C13 What type of receiver is shown in Figure T8-7?
- A. Direct conversion
  - B. Superregenerative
  - C. Single-conversion superheterodyne
  - D. Dual conversion superheterodyne

# T8C14

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- T8C14 What emission mode could the receiver in Figure T8-7 detect?
- A. AM
  - B. FM
  - C. Single sideband (SSB)
  - D. CW

# T8C15

- T8C15 Where should the squelch be set for the proper operation of an FM receiver?
- A. Low enough to hear constant background noise
  - B. Low enough to hear chattering background noise
  - C. At the point that just silences background noise
  - D. As far beyond the point of silence as the knob will turn

# T8F09

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- T8F09 What is used to measure relative signal strength in a receiver?
- A. An S meter
  - B. An RST meter
  - C. A signal deviation meter
  - D. An SSB meter

# T8F16

- T8F16 Where would you connect a voltmeter to a 12-volt transceiver if you think the supply voltage may be low when you transmit?
- A. At the battery terminals
  - B. At the fuse block
  - C. Midway along the 12-volt power supply wire
  - D. At the 12-volt plug on the chassis of the equipment

# T8F17

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- T8F17 If your mobile transceiver does not power up, what might you check first?
- A. The antenna feedpoint
  - B. The coaxial cable connector
  - C. The microphone jack
  - D. The 12-volt fuses

# T8A03

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- T8A03 Which of the following devices would you need to conduct Amateur Radio communications using a data emission?
- A. A telegraph key
  - B. A computer
  - C. A transducer
  - D. A telemetry sensor



# T8A10

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- T8A10 What would you connect to a transceiver for RTTY operation?
- A. A modem and a teleprinter or computer system
  - B. A computer, a printer and a RTTY refresh unit
  - C. A data-inverter controller
  - D. A modem, a monitor and a DTMF keypad

# T8A12

- T8A12 What might happen if you set your receiver's signal squelch too low while attempting to receive packet mode transmissions?
- A. Noise may cause the TNC to falsely detect a data carrier
  - B. Weaker stations may not be received
  - C. Transmission speed and throughput will be reduced
  - D. The TNC could be damaged

# T8A13

- T8A13 What is one common method of transmitting RTTY on VHF/UHF bands?
- A. Frequency shift the carrier to indicate mark and space at the receiver
  - B. Amplitude shift the carrier to indicate mark and space at the receiver
  - C. Key the transmitter on to indicate space and off for mark
  - D. Modulate a conventional FM transmitter with a modem

# T8A01

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- T8A01 What two bands are most commonly used by "dual band" hand-held transceivers?
- A. 6 meters and 2 meters
  - B. 2 meters and 1.25 meters
  - C. 2 meters and 70 cm
  - D. 70 cm and 23 cm

# T8A04

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- T8A04 Which of the following devices would be useful to create an effective Amateur Radio station for weak-signal VHF communication?
- A. A hand-held VHF FM transceiver
  - B. A multi-mode VHF transceiver
  - C. An Omni-directional antenna
  - D. A mobile VHF FM transceiver

# T8A05

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- T8A05 What would you connect to a transceiver for voice operation?
- A. A splatter filter
  - B. A terminal-voice controller
  - C. A receiver audio filter
  - D. A microphone

# T8A06

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- T8A06 What would you connect to a transceiver to send Morse code?
- A. A key-click filter
  - B. A telegraph key
  - C. An SWR meter
  - D. An antenna switch

# T8A07

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- T8A07 What do many amateurs use to help form good Morse code characters?
- A. A key-operated on/off switch
  - B. An electronic keyer
  - C. A key-click filter
  - D. A DTMF keypad



# T8A11

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- T8A11 What might you connect between your transceiver and an antenna switch connected to several antennas?
- A. A high-pass filter
  - B. An SWR meter
  - C. A key-click filter
  - D. A mixer

# T8A14

- T8A14 What would you use to connect a dual-band antenna to a mobile transceiver that has separate VHF and UHF output connectors?
- A. A dual-needle SWR meter
  - B. A full-duplex phone patch
  - C. Twin high-pass filters
  - D. A duplexer

# T8B01

- T8B01 Can a transceiver designed for FM phone operation also be used for single sideband in the weak-signal portion of the 2-meter band?
- A. Yes, with simple modification
  - B. Only if the radio is a "multimode" radio
  - C. Only with the right antenna
  - D. Only with the right polarization

# T8B11

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- T8B11 What device could boost the low-power output from your hand-held radio up to 100 watts?
- A. A voltage divider
  - B. A power amplifier
  - C. A impedance network
  - D. A voltage regulator

# T8B14

- T8B14 In Figure T8-3, if block 1 is a transceiver and block 3 is a dummy antenna, what is block 2?
- A. A terminal-node switch
  - B. An antenna switch
  - C. A telegraph key switch
  - D. A high-pass filter

# T8B16

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- T8B16 In Figure T8-4, if block 1 is a transceiver and block 2 is an SWR meter, what is block 3?
- A. An antenna switch
  - B. An antenna tuner
  - C. A key-click filter
  - D. A terminal-node controller

# T8B17

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- T8B17 In Figure T8-4, if block 1 is a transceiver and block 3 is an antenna tuner, what is block 2?
- A. A terminal-node switch
  - B. A dipole antenna
  - C. An SWR meter
  - D. A high-pass filter

# T8B18

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- T8B18 In Figure T8-4, if block 2 is an SWR meter and block 3 is an antenna tuner, what is block 1?
- A. A terminal-node switch
  - B. A power supply
  - C. A telegraph key switch
  - D. A transceiver



# T8D22

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- T8D22 What device might allow use of an antenna on a band it was not designed for?
- A. An SWR meter
  - B. A low-pass filter
  - C. An antenna tuner
  - D. A high-pass filter

# T8E05

- T8E05 What does an antenna tuner do?
- A. It matches a transceiver output impedance to the antenna system impedance
  - B. It helps a receiver automatically tune in stations that are far away
  - C. It switches an antenna system to a transceiver when sending, and to a receiver when listening
  - D. It switches a transceiver between different kinds of antennas connected to one feed line

# T8E06

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## ➤ T8E06 What is a coaxial cable?

- A. Two wires side-by-side in a plastic ribbon
- B. Two wires side-by-side held apart by insulating rods
- C. Two wires twisted around each other in a spiral
- D. A center wire inside an insulating material covered by a metal sleeve or shield

# T8E07

- T8E07 Why should you use only good quality coaxial cable and connectors for a UHF antenna system?
- A. To keep RF loss low
  - B. To keep television interference high
  - C. To keep the power going to your antenna system from getting too high
  - D. To keep the standing-wave ratio of your antenna system high

# T8E08

- T8E08 What is parallel-conductor feed line?
- A. Two wires twisted around each other in a spiral
  - B. Two wires side-by-side held apart by insulating material
  - C. A center wire inside an insulating material that is covered by a metal sleeve or shield
  - D. A metal pipe that is as wide or slightly wider than a wavelength of the signal it carries

# T8E09

- T8E09 (D) Which of the following are some reasons to use parallel-conductor, open-wire feed line?
- A. It has low impedance and will operate with a high SWR
  - B. It will operate well even with a high SWR and it works well when tied down to metal objects
  - C. It has a low impedance and has less loss than coaxial cable
  - D. It will operate well even with a high SWR and has less loss than coaxial cable

# T8E12

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- T8E12 What happens to radio energy when it is sent through a poor quality coaxial cable?
- A. It causes spurious emissions
  - B. It is returned to the transmitter's chassis ground
  - C. It is converted to heat in the cable
  - D. It causes interference to other stations near the transmitting frequency

# T8E13

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- T8E13 What is an unbalanced line?
- A. A feed line with neither conductor connected to ground
  - B. A feed line with both conductors connected to ground
  - C. A feed line with one conductor connected to ground
  - D. All of these answers are correct



# T8E01

- T8E01 What does standing-wave ratio mean?
- A. The ratio of maximum to minimum inductances on a feed line
  - B. The ratio of maximum to minimum capacitances on a feed line
  - C. The ratio of maximum to minimum impedances on a feed line
  - D. The ratio of maximum to minimum voltages on a feed line

# T8E02

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- T8E02 What instrument is used to measure standing wave ratio?
- A. An ohmmeter
  - B. An ammeter
  - C. An SWR meter
  - D. A current bridge

# T8E03

- T8E03 What would an SWR of 1:1 indicate about an antenna system?
- A. That the antenna was very effective
  - B. That the transmission line was radiating
  - C. That the antenna was reflecting as much power as it was radiating
  - D. That the impedance of the antenna and its transmission line were matched

# T8E04

- T8E04 What does an SWR reading of 4:1 mean?
- A. An impedance match that is too low
  - B. An impedance match that is good, but not the best
  - C. An antenna gain of 4
  - D. An impedance mismatch; something may be wrong with the antenna system

# T8E10

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- T8E10 What does "balun" mean?
- A. Balanced antenna network
  - B. Balanced unloader
  - C. Balanced unmodulator
  - D. Balanced to unbalanced

# T8E11

- T8E11 Where would you install a balun to feed a dipole antenna with 50-ohm coaxial cable?
- A. Between the coaxial cable and the antenna
  - B. Between the transmitter and the coaxial cable
  - C. Between the antenna and the ground
  - D. Between the coaxial cable and the ground

# T8E14

- T8E14 What point in an antenna system is called the feed point?
- A. The antenna connection on the back of the transmitter
  - B. Halfway between the transmitter and the feed line
  - C. At the point where the feed line joins the antenna
  - D. At the tip of the antenna

# T8F10

- T8F10 With regard to a transmitter and antenna system, what does "forward power" mean?
- A. The power traveling from the transmitter to the antenna
  - B. The power radiated from the top of an antenna system
  - C. The power produced during the positive half of an RF cycle
  - D. The power used to drive a linear amplifier



# T8F11

- T8F11 With regard to a transmitter and antenna system, what does "reflected power" mean?
- A. The power radiated down to the ground from an antenna
  - B. The power returned towards the source on a transmission line
  - C. The power produced during the negative half of an RF cycle
  - D. The power returned to an antenna by buildings and trees

# T8F12

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- T8F12 At what line impedance do most RF watt meters usually operate?
- A. 25 ohms
  - B. 50 ohms
  - C. 100 ohms
  - D. 300 ohms

# T8F13

- T8F13 If a directional RF wattmeter reads 90 watts forward power and 10 watts reflected power, what is the actual transmitter output power?
- A. 10 watts
  - B. 80 watts
  - C. 90 watts
  - D. 100 watts