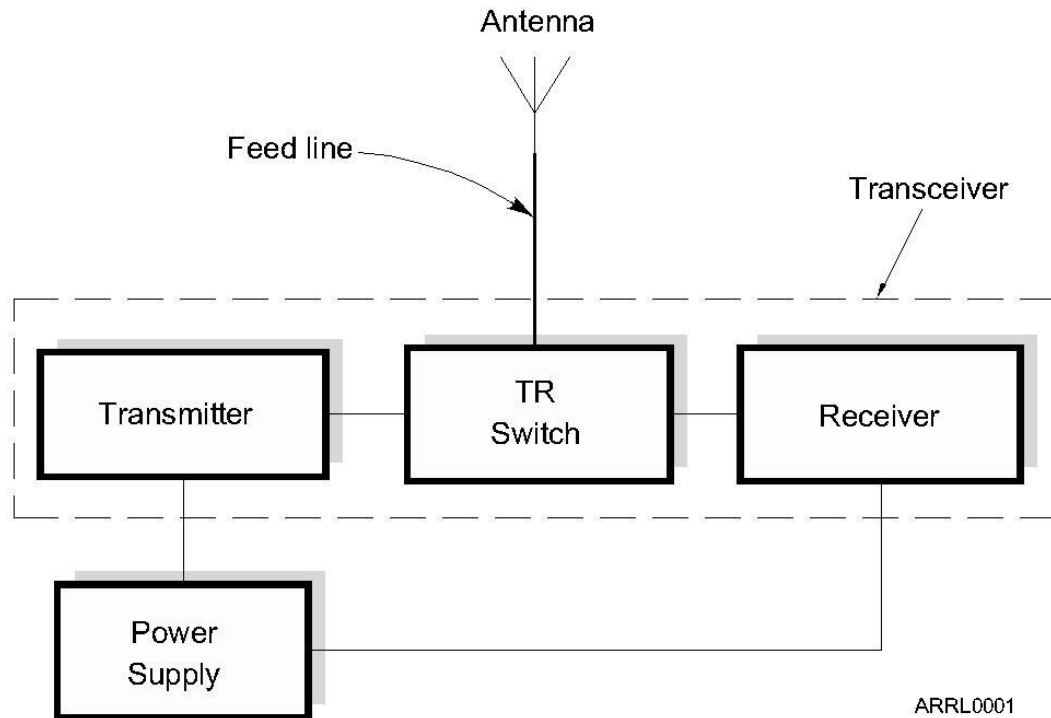


Technician License Course
Chapter 3.3
Types of Radios and Radio Circuits

Module 7

The Basic Radio Station



Basic Station Organization

- Station Equipment
 - Receiver
 - Transmitter
 - Antenna
 - Power Supply
- Accessory Station Equipment
- Repeaters

Transmit/Receive (TR) Switch

- If the station **antenna is shared** between the transmitter and receiver, the **TR switch** allows the antenna to be switched to the transmitter when sending and to the receiver when receiving.
 - In a **transceiver**, this **TR switch is inside** the unit and requires no attention by the operator.

What Happens During Radio Communication?

- Transmitting (sending a signal):
 - **Information** (voice, data, video, commands, etc.) **is converted** to electronic form.
 - The information in electronic form is attached or embedded on a radio wave (a carrier).
 - The **radio wave is sent out from the station antenna into space.**

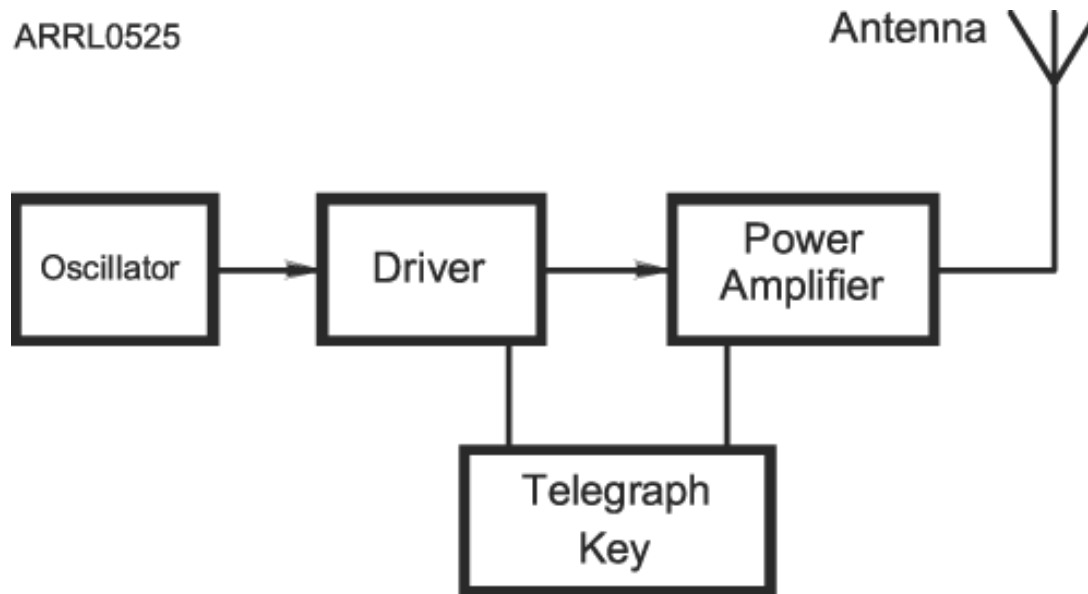
What Happens During Radio Communication?

- Receiving end:
 - The radio wave (carrier) with the **information is intercepted by the receiving station antenna.**
 - The **receiver extracts the information** from the carrier wave.
 - The **information is then presented to the user** in a format that can be understood (sound, picture, words on a computer screen, response to a command).

What Happens During Radio Communication?

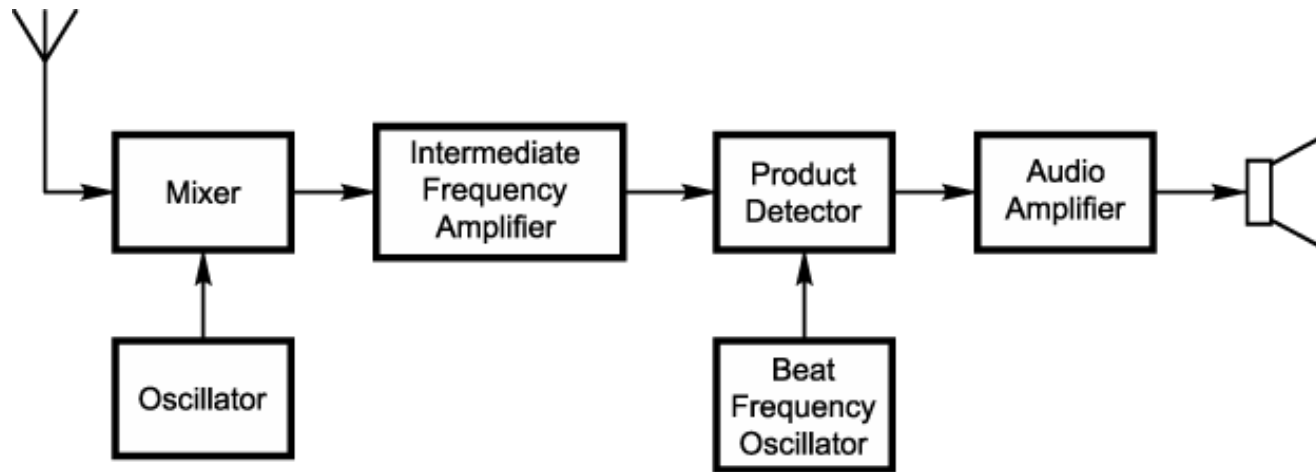
- This sounds pretty simple, but it in reality is pretty complex.
- This complexity is one thing that makes ham radio fun...learning all about how radios work.
- Don't be intimidated. **You will be required to only know the basics**, but you can learn as much about the “art and science” of radio as you want.

Simple CW Transmitter Block Diagram



Exam Diagram T4

The Superheterodyne Receiver Block Diagram



Exam Diagram T6

ARRL0529

What is the function of a product detector? (T7A01)

- * A. Detect phase modulated signals
- * B. Demodulate FM signals
- * C. Detect CW and SSB signals
- * D. Combine speech and RF signals

What is the function of a product detector? (T7A01)

- * A. Detect phase modulated signals
- * B. Demodulate FM signals
- * **C. Detect CW and SSB signals**
- * D. Combine speech and RF signals

What type of receiver is shown in Figure T6? (T7A02)

- * A. Direct conversion
- * B. Super-regenerative
- * C. Single-conversion superheterodyne
- * D. Dual-conve

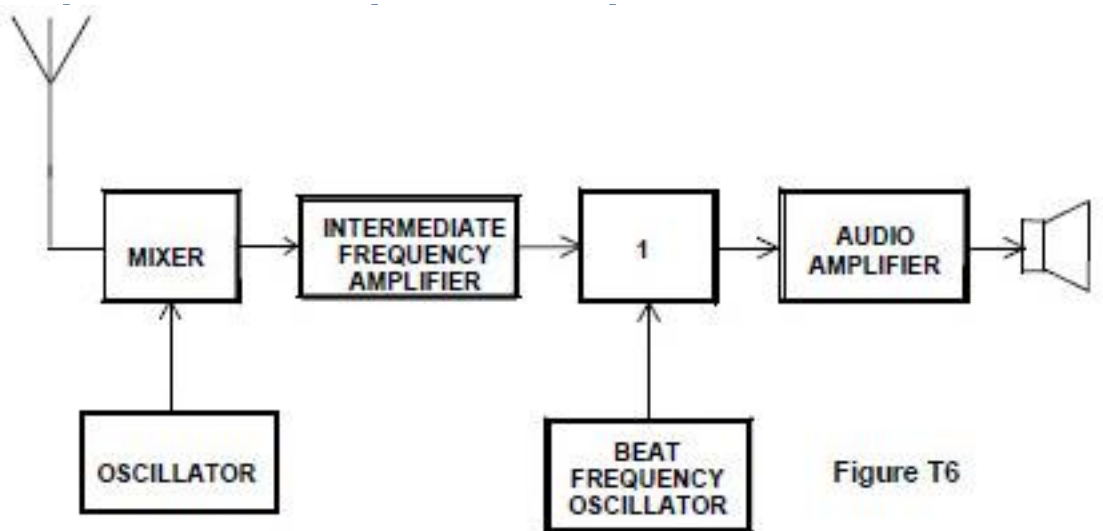


Figure T6

What type of receiver is shown in Figure T6? (T7A02)

- * A. Direct conversion
- * B. Super-regenerative
- * **C. Single-conversion superheterodyne**
- * D. Dual-conve

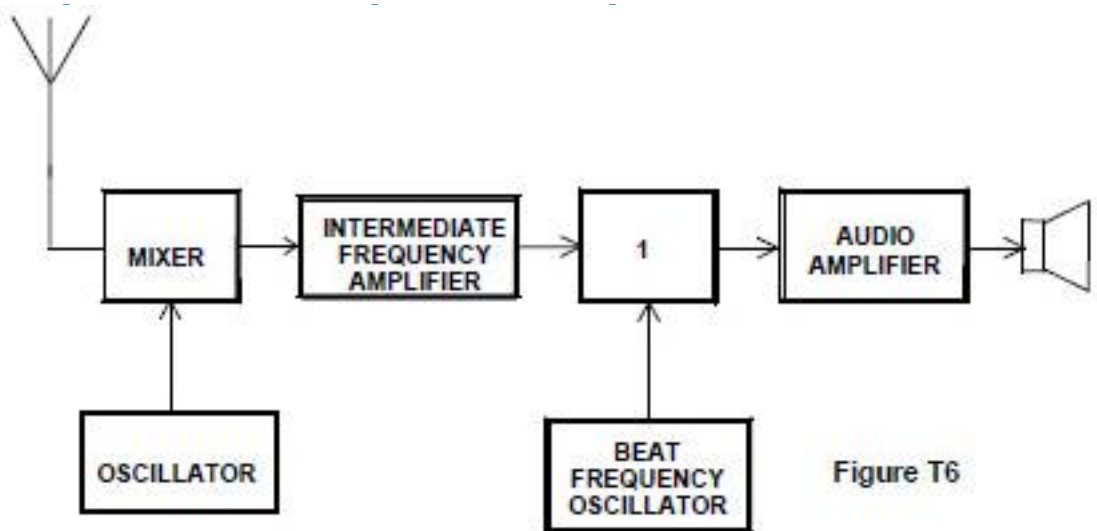


Figure T6

What is the function of a mixer in a superheterodyne receiver? (T7A03)

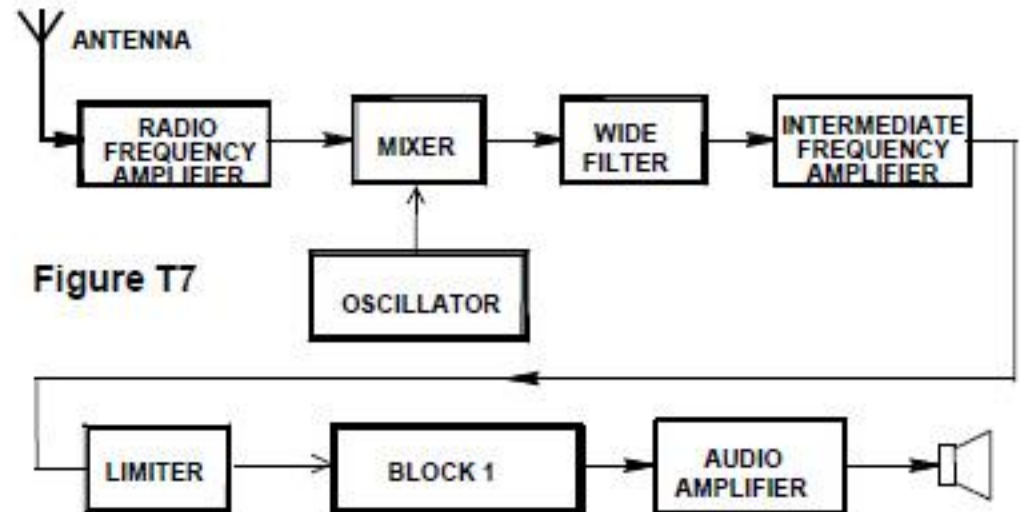
- * A. To reject signals outside of the desired passband
- * B. To combine signals from several stations together
- * C. To shift the incoming signal to an intermediate frequency
- * D. To connect the receiver with an auxiliary device, such as a TNC

What is the function of a mixer in a superheterodyne receiver? (T7A03)

- * A. To reject signals outside of the desired passband
- * B. To combine signals from several stations together
- * **C. To shift the incoming signal to an intermediate frequency**
- * D. To connect the receiver with an auxiliary device, such as a TNC

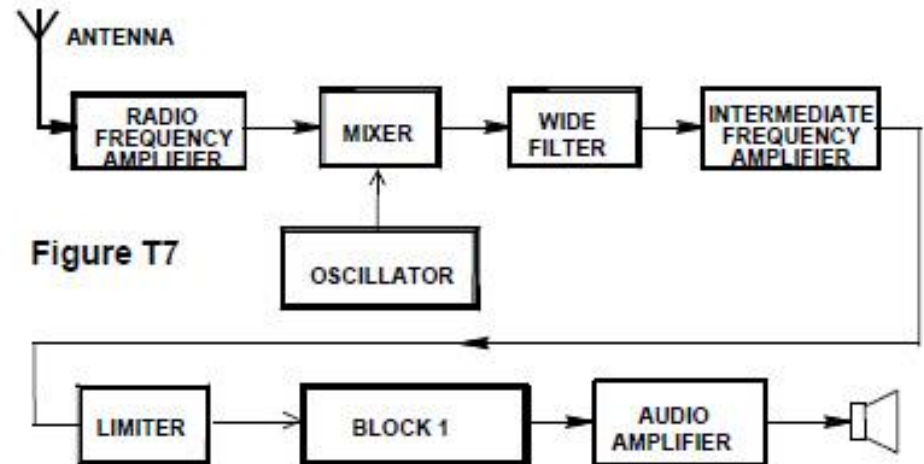
What circuit is pictured in Figure T7, if block 1 is a frequency discriminator? (T7A04)

- * A. A double-conversion receiver
- * B. A regenerative receiver
- * C. A superheterodyne receiver
- * D. An FM receiver



What circuit is pictured in Figure T7, if block 1 is a frequency discriminator? (T7A04)

- * A. A double-conversion receiver
- * B. A regenerative receiver
- * C. A superheterodyne receiver
- * **D. An FM receiver**



What is the function of block 1 if figure T4 is a simple CW transmitter? (T7A05)

- * A. Reactance modulator
- * B. Product detector
- * C. Low-pass filter
- * D. Oscillator

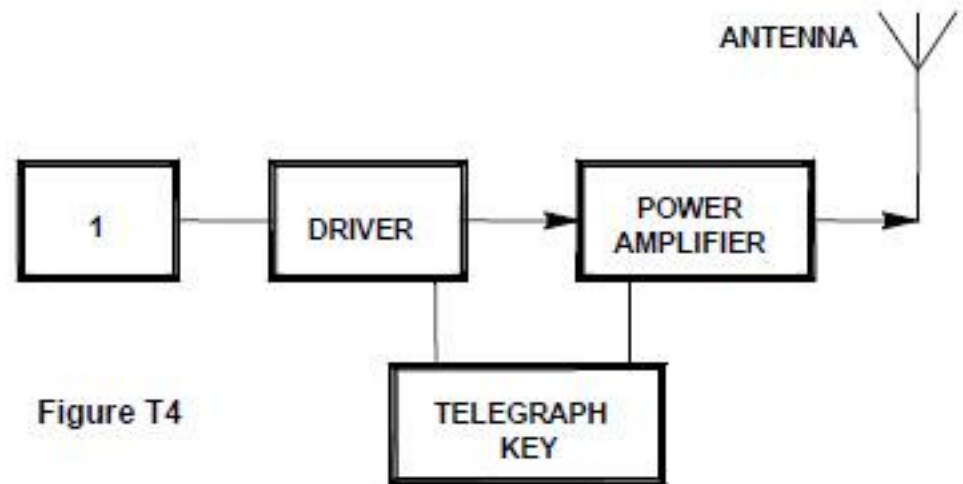
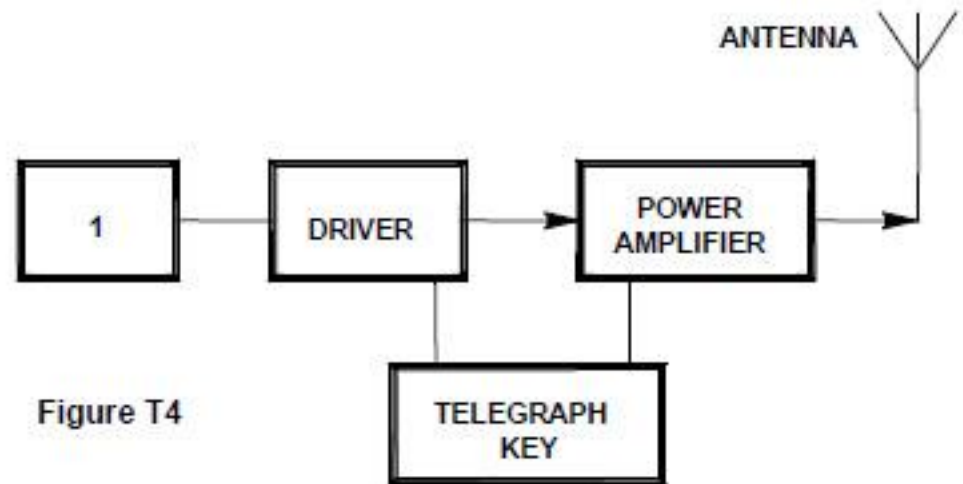


Figure T4

What is the function of block 1 if figure T4 is a simple CW transmitter? (T7A05)

- * A. Reactance modulator
- * B. Product detector
- * C. Low-pass filter
- * **D. Oscillator**



What device takes the output of a low-powered 28 MHz SSB exciter and produces a 222 MHz output signal? (T7A06)

- * A. High-pass filter
- * B. Low-pass filter
- * C. Transverter
- * D. Phase converter

What device takes the output of a low-powered 28 MHz SSB exciter and produces a 222 MHz output signal? (T7A06)

- * A. High-pass filter
- * B. Low-pass filter
- * **C. Transverter**
- * D. Phase converter

If figure T5 represents a transceiver in which block 1 is the transmitter portion and block 3 is the receiver portion, what is the function of block 2? (T7A07)

- * A. A balanced modulator
- * B. A transmit-receive switch
- * C. A power amplifier
- * D. A high-pass filter

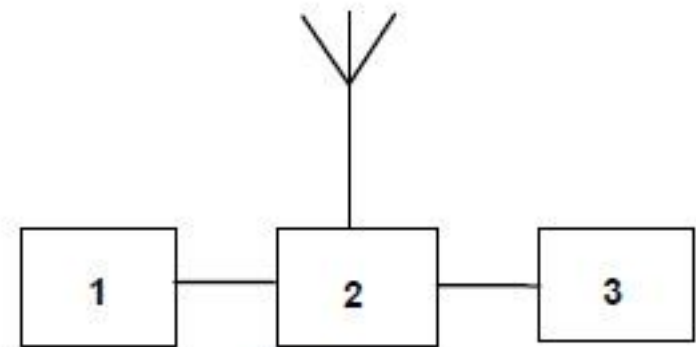


Figure T5

If figure T5 represents a transceiver in which block 1 is the transmitter portion and block 3 is the receiver portion, what is the function of block 2? (T7A07)

- * A. A balanced modulator
- * **B. A transmit-receive switch**
- * C. A power amplifier
- * D. A high-pass filter

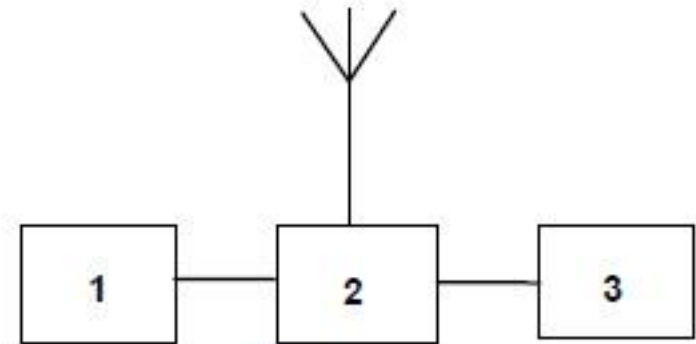


Figure T5

Which of the following circuits combines a speech signal and an RF carrier? (T7A08)

- * A. Beat frequency oscillator
- * B. Discriminator
- * C. Modulator
- * D. Noise blanker

Which of the following circuits combines a speech signal and an RF carrier? (T7A08)

- * A. Beat frequency oscillator
- * B. Discriminator
- * **C. Modulator**
- * D. Noise blanker

Which of the following devices is most useful for VHF weak-signal communication? (T7A09)

- * A. A quarter-wave vertical antenna
- * B. A multi-mode VHF transceiver
- * C. An omni-directional antenna
- * D. A mobile VHF FM transceiver

Which of the following devices is most useful for VHF weak-signal communication? (T7A09)

- * A. A quarter-wave vertical antenna
- * **B. A multi-mode VHF transceiver**
- * C. An omni-directional antenna
- * D. A mobile VHF FM transceiver

What device increases the low-power output from a handheld transceiver? (T7A10)

- * A. A voltage divider
- * B. An RF power amplifier
- * C. An impedance network
- * D. A voltage regulator

What device increases the low-power output from a handheld transceiver? (T7A10)

- * A. A voltage divider
- * **B. An RF power amplifier**
- * C. An impedance network
- * D. A voltage regulator

Which of the following circuits demodulates FM signals? (T7A11)

- * A. Limiter
- * B. Discriminator
- * C. Product detector
- * D. Phase inverter

Which of the following circuits demodulates FM signals? (T7A11)

- * A. Limiter
- * **B. Discriminator**
- * C. Product detector
- * D. Phase inverter

Which term describes the ability of a receiver to discriminate between multiple signals? (T7A12)

- * A. Tuning rate
- * B. Sensitivity
- * C. Selectivity
- * D. Noise floor

Which term describes the ability of a receiver to discriminate between multiple signals? (T7A12)

- * A. Tuning rate
- * B. Sensitivity
- * **C. Selectivity**
- * D. Noise floor

Where is an RF preamplifier installed? (T7A13)

- * A. Between the antenna and receiver
- * B. At the output of the transmitter's power amplifier
- * C. Between a transmitter and antenna tuner
- * D. At the receiver's audio output

Where is an RF preamplifier installed? (T7A13)

- * **A. Between the antenna and receiver**
- * B. At the output of the transmitter's power amplifier
- * C. Between a transmitter and antenna tuner
- * D. At the receiver's audio output