September 2025 Fresno County ARES/RACES Monthly Meeting

25SEP2025

Up Coming Events

- California QSO Party - 10/4 → 10/5
- Grizzly Flats Bike Ride – 10/4
  - Contact Tom Reinhart: 559.593.1423 or N6MQG@yahoo.com
- Bass Lake Powerhouse Double Ride - 10/11
- California Great Shake Out - 10/16 @1016 hours
- Winter Field Day - JAN 24 → JAN25/2026
- BEACON Exercise – 4/30/2026
  - https://www.beaconexercise.org/
- CARP Ham-Fest – May 9, 2026

New Business

- K6SIX Repeater
  - 441.350 + PL 107.2
- HR 1094/S 459 Amateur Radio Preparedness Act
  - https://www.congress.gov/bill/119th-congress/house-bill/1094
- This bill limits the adoption and enforcement of private land use restrictions (e.g., rules of a homeowners' association) that prohibit, restrict, or impair the installation, maintenance, or operation of an amateur station antenna on property controlled by an amateur radio operator.
- Private land use restrictions are deemed to prohibit, restrict, or impair the installation, maintenance, or operation of an amateur station antenna if they unreasonably delay, prevent, or increase the cost or difficulty of such installation, maintenance, or operation; or if they prevent or degrade the reception or transmission of a signal acceptable to the operator.
- However, the bill permits certain private land use restrictions, including restrictions that require amateur station antennas (1) to be maintained in a structurally safe condition; or (2) to be installed in compliance with manufacturer specifications, applicable zoning ordinances, amateur radio tower ordinances, and building codes.
- The bill also establishes certain limits on the adoption and enforcement of private land use restrictions that require an amateur radio operator to obtain prior approval before installing an amateur station antenna, and exempts certain categories of amateur station antenna from prior approval requirements altogether.
- Finally, the bill sets forth procedures for the enforcement of these provisions and provides a private right of action for individuals harmed by violations of the provisions

Storage battery terms

Definition of Amp Hour

An amp hour (Ah) is a unit of electric charge that measures the capacity of a storage battery. It indicates how much current a battery can deliver over a specific period, typically one hour. For example, a battery rated at 10 Ah can provide 10 amps of current for one hour before it is fully discharged.

Importance in Battery Capacity

Key Points

- **Charge Capacity**: Amp hours represent the total charge a battery can store and deliver. Higher amp hour ratings mean longer usage times for devices.
- **Applications**: Amp hours are crucial for various applications, including solar power systems, electric vehicles, and portable electronics. They help users determine how long a device can operate on a single charge.

Calculation

- **Discharge Rate**: The amp hour rating can vary based on how quickly the battery is discharged. For instance, a battery may provide more power over a shorter time but less over a longer duration due to efficiency losses.

Common Ratings

BATTERY TYPE	TYPICAL AMP HOUR RATING
AA Battery	2,000 - 3,000 mAh
Smartphone Battery	2,500 - 6,000 mAh
Automotive Starter Battery	50 Ah
Deep Cycle Battery	100 Ah or more

Understanding amp hours is essential for selecting the right battery for your needs, ensuring that it can support your devices effectively.

Definition of Watt-Hour

A watt-hour (Wh) is a unit of energy that quantifies the amount of power consumed or produced over a period of one hour. It is calculated by multiplying the power in watts (W) by the time in hours (h).

Watt-Hour in Storage Batteries

Energy Storage

- **Capacity Measurement**: Watt-hours indicate how much energy a battery can store. For example, a battery rated at 100 Wh can theoretically provide 100 watts of power for one hour.
- **Battery Life Estimation**: Knowing the watt-hour rating helps estimate how long a battery can run a device. For instance, if a device uses 50 watts, a 100 Wh battery would last approximately two hours (100 Wh ÷ 50 W = 2 h).

Importance in Selection

- **Comparing Batteries**: When choosing a battery, watt-hours provide a clear metric for comparing energy storage capacities. Higher watt-hour ratings generally mean longer usage times for devices.
- **Application Suitability**: Understanding watt-hours helps determine if a battery meets the energy needs of specific applications, such as powering appliances, tools, or electronic devices.

In summary, watt-hours are crucial for understanding and evaluating the energy capacity and performance of storage batteries.

General Watt Hour Battery Capacities (with 15 hour discharge at 70 degrees F)

Battery Type	Battle Born Lithium (Full Discharge)		AGM Lead Acid (Assuming 11.8V Cutoff)	
	Voltage			
Capacity	12V	24V	12V	24V
50Ah	650 Wh	1300 Wh	350 Wh	700 Wh
100Ah	1300 Wh	2600 Wh	700 Wh	1400 Wh
200Ah	2600 Wh	5200 Wh	1400 Wh	2800 Wh
500Ah	6500 Wh	13000 Wh	3500 Wh	7000 Wh

Operational Power Efficiency

- The two most important power efficiency “benchmarks” are receive (RX) efficiency and transmit (TX) efficiency.
- Receive Current, or current to run your radio while “monitoring”.
  - May vary based on filters, volume level, noise reduction, etc.
- Transmit Efficiency, or how effectively does your radio (system) convert electrical power to transmitted radio frequency (RF) signal.
  - Effected by: Radio design/circuitry, Transmission mode, Duty cycle.
    - Poorly designed radios waste energy as heat.

Transmitting mode

- Single side band (SSB): Efficient mode, transmits without a carrier.
- FM/AM: Less efficient, continuously transmit carrier (+ power).
- CW & Digital: Highly efficient, lower power for long distance.
  - FT8, JS8, Winlink

Final Stage Efficiency of ICOM IC-7000

The final stage efficiency of the ICOM IC-7000 radio during transmit varies based on the mode of operation. Here's a breakdown of the efficiency for different transmission modes:

Efficiency by Mode

MODE	POWER OUTPUT (W)	EFFICIENCY (%)
AM	1-40	Approximately 50%
FM	2-100	Approximately 60%
SSB (PEP)	2-100	Approximately 60%
CW/RTTY	2-100	Approximately 60%

Additional Information

- The IC-7000 operates across multiple bands, including HF, VHF, and UHF.
- The efficiency can be influenced by factors such as antenna matching and operating conditions.
- Users have reported that the radio can exhibit variations in performance based on the input voltage and load conditions.

This efficiency data is useful for understanding the power consumption and performance characteristics of the ICOM IC-7000 during operation.

The band tested below was not specified.

VOLTAGE	RECEIVE	TRANSMIT	POWER
	CURRENT	CURRENT	OUTPUT
13.84	2.0	17	93
13.49	2.0	17	92
13.01	2.0	17.5	92
12.50	2.0	17.5	90
12.02	2.0	16.0	80
11.50	2.0	14.5	70
11.01	2.0	14.0	60
10.50	2.0	12.5	50
10.00	2.0	11.5	40
9.50	2.0	XMIT FAILED	

Current drain / power consumption:	RX: 1.3 to 1.6 A TX: Max 22 A

Needed Information

- Receive current ($I_{recieve}$)
  - $P_{receive} = I_{receive}$ x 12V — 1.5A x 12V = 18 W (2 x 12 = 24W)
- Transmit current ($I_{transmit}$)
  - $P_{transmit} = P_{RF_{output}}$/RF Final Stage Eff — 50W/.60 = 83.3W (100W = 167W)
  - $I_{transmit}$ = — 83.3W/12V = 6.94 A (100 = 13.8A)
- Transmit duty cycle (%)
- RF Final Stage Efficiency (%) See chart
- Operating time ($T_{operate}$)

How much battery?

- $P_{total} = (P_{receive} \times D_{receive}) + (P_{transmit} \times D_{transmit})$
  - P_{total} = (18W x .8) + (83.3W x .2) = 31.06 W *(100W = 52.6W)*
- Battery Capacity (Ah) = $(P_{total} \times T_{operate})/12V$
  - Battery Capacity (Ah) = (31.06 x **12 hours**)/12 V = **31.06 Ah *(52.6 Ah)***
    - = (31.06 x **48 hours**)/12 V = **124.24 Ah *(210.4 Ah)***

Receive Amperage for ICOM IC-705

General Power Consumption

The ICOM IC-705 is known for its efficient power consumption, especially during receive mode. The receive current draw is approximately **70 mA**. This efficiency makes it suitable for portable operations.

Display Brightness Impact

The current draw can vary based on the display settings. For example, increasing the backlight brightness can raise the current consumption by about **81 mA** from 0% to 100% brightness.

Summary of Current Draw

MODE	CURRENT DRAW
Receive	70 mA
Backlight 0%	70 mA
Backlight 100%	151 mA

This information highlights the importance of managing display settings to optimize battery life during use.

Transmit Amperage for ICOM IC-705

Power Supply Options

The ICOM IC-705 can operate with different power sources, affecting its transmit amperage:

POWER SOURCE	MAXIMUM OUTPUT POWER	MAXIMUM TRANSMIT AMPERAGE
13.8 V DC External	10 W	3 A or less
7.4 V Battery (BP-272)	5 W	2.5 A or less

Current Consumption Details

- **Standby Current**:
  - Approx. 260 mA with external power supply.
  - Approx. 400 mA with battery.
- **Maximum Reception Volume**:
  - Approx. 320 mA with external power supply.
  - Approx. 700 mA with battery.

Summary

The ICOM IC-705 draws up to 3 A during transmission when powered by an external supply at 10 W output. When using the BP-272 battery, it draws up to 2.5 A at a maximum output of 5 W.