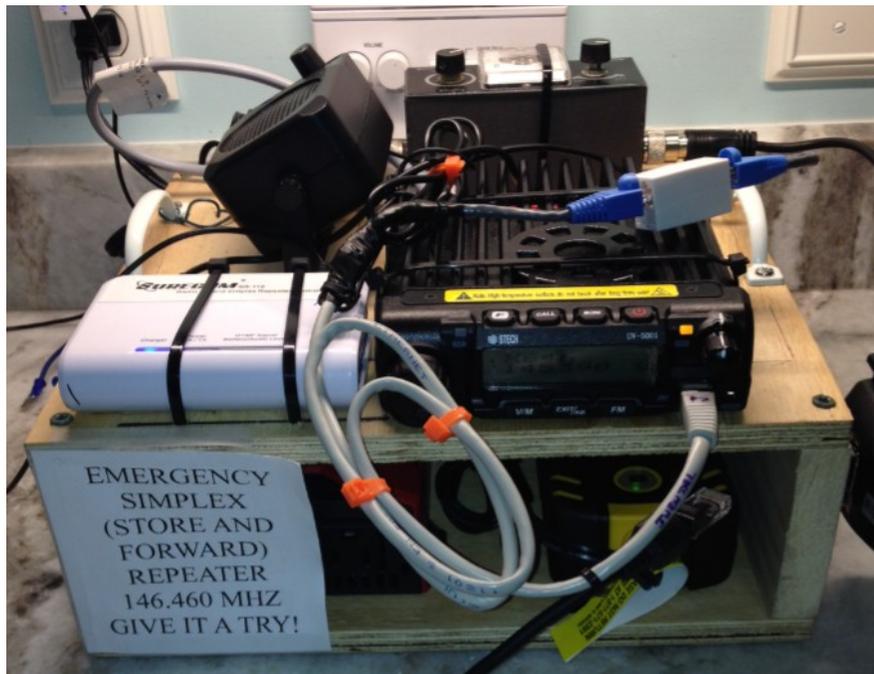


# ALACHUA ARES SIMPLEX REPEATER STATION

## INSTRUCTION MANUAL

VERSION 1.0    MARCH 23 2017



# INTRODUCTION

A simplex repeater is nothing more than a digital tape recorder that listens to an FM simplex transceiver, detects when the squelch is broken and a signal is present, records that signal (in this case for up to 180 seconds) and then plays it back while activating the Push to Talk of the transceiver.

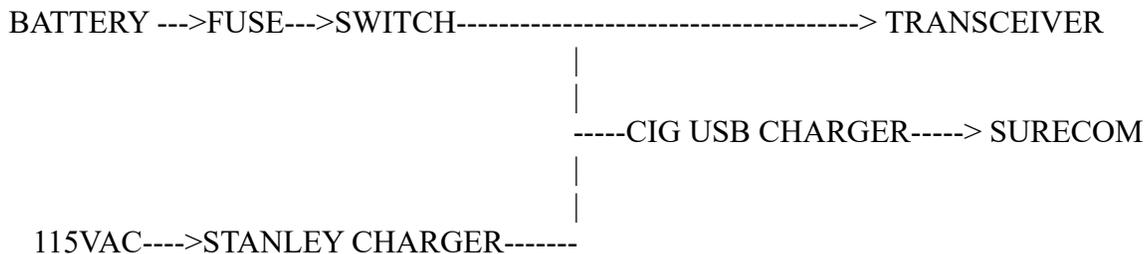
The frequency of operation is determined by the amateur radio transceiver, and is usually set to a simplex channel but might be placed on the output frequency of a downed repeater.

# COMPONENTS

This simplex repeater station consists of:

- Baofeng UV-5001 50 watt transceiver (low power: 5 watts)
- SURECOM SR-122 simplex repeater controller (includes a 900 mAh internal battery)
- 8 Ahr 12VDC gel cell battery (valve regulated, sealed lead acid battery)
- Fuse & ON/OFF switch in battery positive lead
- Stanley 1.5 Amp battery maintainer (120VAC powered)
- USB power cable from SURECOM SR-122
- USB cig. Lighter charger to charge SURECOM SR-122 internal battery (powered by gel cell)
- Microphone for regular voice usage of transceiver
- Mic Cable / External Speaker cable to connect transceiver to the SR-122 simplex repeater controller

A conceptual schematic of the 12V power wiring setup, neglecting the common (negative) 12V power wire, is as follows:



# OPERATION

**STANDBY DISCHARGE OF THE BATTERY:** The Baofeng UV-5001 is a microprocessor-based software defined radio. It draws a small current even in the “off” position, and will generally discharge the 8Ahr gel cell battery within a week if left connected. To avoid this, either:

- (1) Turn OFF the power switch provided (disconnecting the battery) so that the LED in its handle turns dark, or
- (2) leave the Stanley battery maintainer continuously plugged in.

Before powering up the transceiver, be certain that an antenna or dummy load with an acceptable SWR is connected to avoid damage to the transceiver should it begin transmitting at high power. The HF SWR meter on this assembly is not accurate at VHF frequencies and is included as a relative indicator of power or SWR only.

1. **Connecting the battery:** Verify that the gel cell 8Ahr 12VDC battery is connected at both positive and negative terminals, as it may have been disconnected during non use to avoid battery drain. Turn ON the provided power switch so that the LED in its handle illuminates.
2. **Interpreting the Stanley battery charger green light:** When the Stanley battery maintainer is plugged in and connected to the battery, a fully charged battery is indicated by a BLINKING green light on the battery maintainer. If charging is necessarily continuous (partially or fully uncharged battery) the green light will remain continuously on. If the battery is completely discharged, and the radio is attempting to power up, a no-win loop will occur where the charger begin charging, the radio turns on, then dies, and the charger disconnects presumably due to overcurrent. Disconnect the radio until the battery is more charged in this situation.
3. If the SureCom internal battery is reasonably charge, you probably wish to remove the power plug from the back of the Surecom to reduce RFI into the device. I have seen it spontaneously key the transmitter when powered by the provided USB cigarette lighter charger with the transceiver powered.....this is a lot of RF right next to an inexpensive microprocessor device.
4. Press the power button (rear of the SURECOM SR-122 simplex repeater controller) until the device powers on and goes through a series of LED lights to stabilize.
5. Check to be certain that the audio plug at the rear left of the SURECOM is fully seated. It is labeled “TO RADIO” and if it isn't securely seated there will be no repeating.



6. Press the 1/0 button of the Baofeng transceiver to turn it on, the select either memory or VFO channel and select an appropriate frequency. You may wish to plug in the microphone and use its control and number buttons to assist with setting the frequency as it is much easier.
7. Select HI or LO power (small letter at bottom left of display) using the # key on the microphone or (much more laboriously) by adjusting the Menu Item #2.
8. The Baofeng UV5001 programs & operates basically like a very large Baofeng UV5R, so if you are familiar with the UV5R you'll be right at home.
9. Connect up the audio cables from the SURECOM to the transceiver – the 1/8” plug (receiver audio) must plug into the 1/8” external speaker jack in the rear of the transceiver; the RJ45 mic modular plug must be inserted into the mic jack on the front. There is an attached external speaker which you can optionally use to listen to the transceiver.
10. It is important that the squelch be properly adjusted so that the transceiver squelch is opened only when a received signal is present. This is set in a Menu rather than with a rotary knob. Usually Squelch setting #1 works. If this needs adjustment, adjust the Menu Item.
11. Using another transceiver, verify proper and expected operation of the simplex repeater. **THIS IS EXTREMELY IMPORTANT TO VERIFY PROPER WORKING OF THE SYSTEM AND NO RADIO FREQUENCY INTERFERENCE.**

**AUDIO CABLING IS SET UP LIKE A TNC**

The audio cabling from the SR-112 Repeater Controller is configured to function similarly to standard Alachua County ARES packet wiring, using the standardized RJ45 pinout, so that a TNC could be used in place of the Repeater Controller easily. The wiring is summarized as follows:

SURECOM-----> RJ45 double-female RJ45<-----mic & speaker  
 SR-112 plug 8-wire socket plug connectors

Where the pinout on both RJ45 plugs and double-female 8wire socket is standardized as follows:

Pin	Signal
1	Mic
2	GND
3	PTT
4	Unused
5	RX AUDIO

## UNDERSTANDING THE SR-112 LED LIGHTS



CHARGE LEDS	<i>Single Purpose</i>	
	RED = Charging	
	BLU = FULL	
	FLASH RED = ON	
POWER LEDS <i>dual purpose</i>	<u>When neither receiving nor transmitting</u>	<u>When repeater in use:</u>
	FLASH RED = ON	RED = RX RECORDING
	FLSH BLU = SLEEP	BLU = TX SENDING
LAST TWO LEDS TOGETHER <i>dual purpose</i>	<u>When not receiving indicates rough internal battery charge level</u>	<u>When Receiving, indicates Audio IN signal level:</u>
	RED/BLU RED/BLU = 100% RED/BLU RED RED/BLU OFF RED OFF RED FLASH OFF = near dead	RED/BLU RED/BLU --- too loud RED/BLU RED --- loud RED/BLU OFF --- just right RED OFF --- too soft OFF OFF --- way too low (adjust transceiver audio control if necessary)