Using the MultiRAE

Firmware v 3.21A

PROTECTION THROUGH DETECTION

Training Agenda

- MultiRAE features
- Turning on the MultiRAE
- Recommended Daily Start-up Procedure
- User displays
- Alarm modes
- Programming displays
- Calibration

RAE SYSTEMS

PROTECTION THROUGH DETECTION

MultiRAE Features: Easy Sensor Access

- New innovative casing design
- Easy access to sensors with penny, nickel, or dime

RAE SYSTEMS

PROTECTION THROUGH DETECTION

MultiRAE Features: External Filter

- Always use the external filter
- Replace when it is any color other than white
- Replace when MultiRAE is in pump alarm with the filter on and you can clear the pump alarm with the filter off.

MultiRAE Start-up: Turning On

- Unplug MultiRAE from charger
- Hold “MODE” Key to turn on
- Alarm will beep once
- Watch display screen for messages such as:
  - Sensors installed & their warranty expiration
  - Alarm limits
  - Last calibration date
  - User/Alarm/Datalog modes
- Warm-up will take approximately 90 seconds

MultiRAE Start-up: Warnings

- Acknowledge with the “Y/+” key
- Once warm-up has completed, set clock
- Battery has gone dead and the MultiRAE has defaulted to 1996

Multi Start-up: Fresh Air Calibration

- After 90 sec. warm-up, the MultiRAE will ask to perform a fresh air calibration
- If you are in clean, fresh air, press “Y/+”
- The sensors will be zeroed

Multi Start-up: Check Sensor Zero

- If there is no alarm, and the sensor readings are in the range shown above, then the MultiRAE is ready for use.

MultiRAE Start-up: Lamp Alarm

- After warm-up you may get a “Lamp” alarm which indicates that the PID lamp has failed to light
  - This can occur if the lamp is old and has not been used or if the weather is cold
- Press “Y/+” key to clear alarm, if it clears MultiRAE is ready for use

MultiRAE Start-up: Lamp Alarm

- If the alarm does not clear, turn off unit, wait a minute and restart
- If after restart “Lamp” message disappears, MultiRAE is ready for use
- If after restart “Lamp” message remains, the PID Lamp needs service or replacement

MultiRAE Start-up: Pump Alarm

- It is important to check pump flow
- Block the filter on the pump inlet
- Reset pump alarm by pressing the “Y/+” key
- If pump does not go into alarm, check for loose/cracked filter or service pump

RAE SYSTEMS

PROTECTION THROUGH DETECTION

3 Display Modes

- **Text Mode:** 3 screens and has password to get into programming (default mode)
- **Display Mode:** 7 screens and has password to get into programming
- **Advanced Mode:** 11 screens for most advanced users

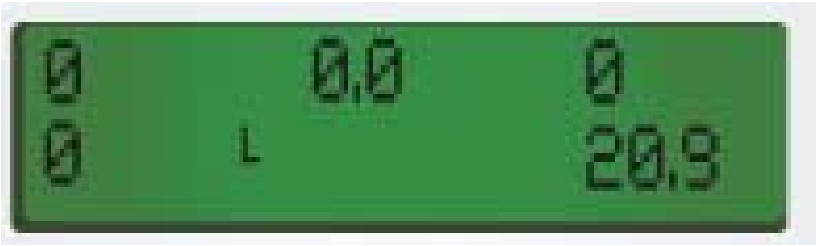
Comparison of Display Modes

Advanced	**Display**	**Text**
Sensor ID	Sensor ID	Sensor ID w/OK
PEAK	PEAK	Battery
MIN	MIN	PC Comm
STEL	STEL	
TWA	TWA	
Battery	Battery	
Time/Date/Temp/Time unit has been on	PC Comm	
Start Datalog*		* Will not show if no datalogging option or auto datalogging
LEL Gas		
VOC Gas		
PC Comm		

Instantaneous Reading (Main Display)

- This screen alternates between the instantaneous reading and the sensor name approximately every 3 seconds

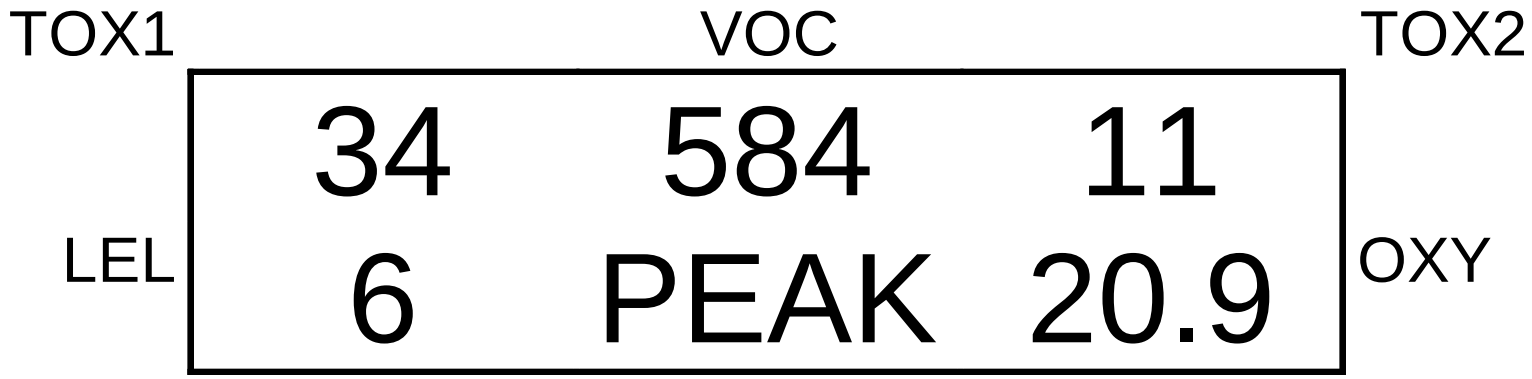
Datalog Mode Display



- A small “L” is displayed in the left center of the MultiRAE screen indicates datalogging
- Will datalog 20,000 points (80 hrs, 5 channels, 1 min interval)
- User can choose one of 4 datalog modes (Manual, Automatic, Periodic & Scheduled in ProRAE Suite)

Peak Reading Display

This screen is deleted in Text Mode



- Holds Highest reading since MultiRAE was turned on
- Press “Y/+” key to clear peak/min
  - Screen will prompt: “Are you sure?”
  - Press “Y/+” to confirm peak clearing
- Tap “MODE” key to proceed to next screen

Minimum Reading Display

This screen is deleted in Text Mode

- Holds Lowest reading since MultiRAE was turned on
- Tap “MODE” key to proceed to next screen

STEL Display

This screen is deleted in Text Mode

- Short Term Exposure Limit (average for the past 15 minutes)
- Displays “***” until MultiRAE has been on for 15 minutes
- STEL only is calculated for VOC & toxics
- Tap “MODE” key to proceed

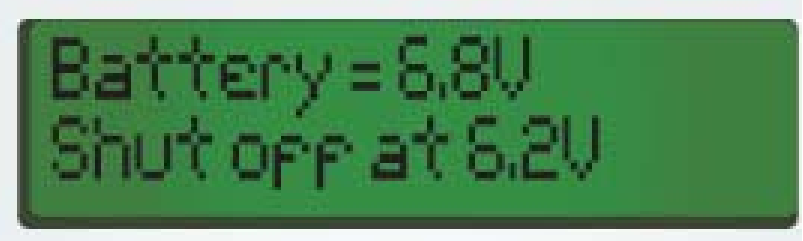
TWA Display

This screen is deleted in Text Mode

- Time Weighted Average is the accumulated reading of gas concentration divided by 8 hours since the MultiRAE was turned on
- TWA only is calculated for VOC & toxics
- Tap “MODE” key to proceed to next screen

Battery Voltage Display

This screen is deleted in Text Mode



- MultiRAE shuts down when battery voltage drops below 4.2 volts
- Normal Full Charge is over 4.8 volts
- Tap “MODE” key to proceed to next screen

Date/Time/Run Time/Temp. Display

This screen is deleted in Display & Text Mode

- Date, Time of day
- Accumulated time in hours and minutes since the MultiRAE was turned on
- Internal Temperature in Centigrade or Fahrenheit (operating range from -20-45oC, -4-113oF)
- Tap “MODE” key to proceed

Datalog Mode Display

This screen is deleted in Display & Text Mode

- Automatic: this screen is deleted and unit logs data as soon as it is turned on (default)
- Manual: logs if “Y/+” key is pushed now
- Entering programming pauses datalogging

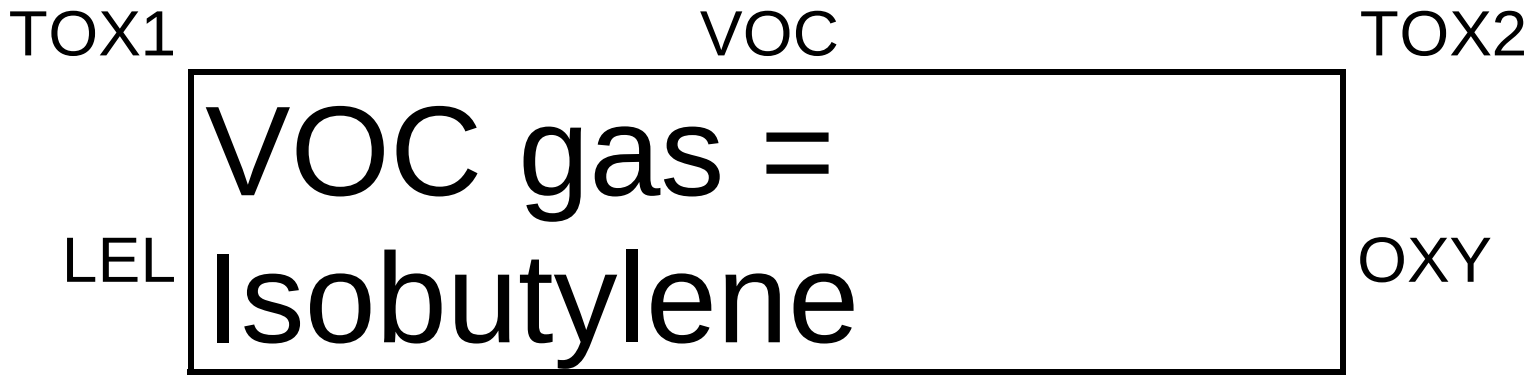
LEL Units Display

This screen is deleted in Display & Text Mode

- Target Gas for LEL displayed here (MultiRAE is currently measuring %LEL in units of methane)
- Correction Factor can only be changed in programming mode
- Tap “MODE” key to proceed to next screen

VOC Units Display

This screen is deleted in Display & Text Mode



- Target Gas VOC is displayed here (MultiRAE is currently measuring VOC in units of isobutylene)
- Correction Factor can only be changed in programming mode
- Tap “MODE” key to proceed to next screen

Communicate with PC Display

- If “Y/+” key is pushed then MultiRAE will display “Monitor will Pause. OK?”
- If “Y/+” key is pushed again the MultiRAE will display “Ready...” until the “MODE” key is pressed.
- Tap “MODE” key to proceed

Communicate with PC Display

- ***When the MultiRAE is in this communication standby mode it stops monitoring gas concentrations and stops datalogging.***
- Datalogging must be manually restarted when exiting Programming Mode unless automatic datalogging is in use.

MultiRAE Alarm Signals

- The MultiRAE will provide audible and visual alarms to alert users to unsafe states
- The MultiRAE also has the ability to run silent, with audible alarms turned off
- It is extremely important to note that during the following conditions the alarm signals are disabled:
  - *When entering the "Communicate with PC?" standby mode.*
  - *When entering the "Calibrate Monitor" menu*

MultiRAE Alarms: High

- “High” display along with 3 beat/second audible/visible alarm and flashing display backlight indicates that VOC sensor (PID) has exceeded high alarm setpoint (100 ppm VOC default).
- Press “Y/+” key to clear if latching alarm

MultiRAE Alarms: Low

- “Low” display along with 2 beat/second audible/visual alarm and flashing display backlight indicates that Oxygen sensor has gone into low alarm (less than 19.5% Oxygen default)
- Press “Y/+” key to clear if latching alarm

MultiRAE Alarms: STEL

- "STEL" display along with a 1 beat/second audible/visual alarm indicates that VOC sensor has exceeded STEL alarm setpoint (25 ppm VOC default)
- ***This alarm will only clear after 15 minutes in clean air or the MultiRAE is turned off!***

MultiRAE Alarms: TWA

- "TWA" display along with a 1 beat/second audible/visual alarm indicates that VOC sensor has exceeded the TWA alarm setpoint (10 ppm VOC default)
- ***This alarm will only clear after moving to clean air and then turning off the MultiRAE***

Alarms: LEL OFF

- “OFF” display along with a 3 beat/second audible/visual alarm indicates that LEL sensor has been exposed to too much gas and has shut off to protect the sensor.
- Move the meter to clean air and press the “Y/+” key to reset.

Alarms: NEG

- "NEG" display along with a 1 beat/second audible/visual alarm indicates that VOC sensor has drifted negative (below zero) because the sensor was zeroed in an area containing VOCs.
- ***Perform "Fresh Air Calibration" in an area clear of all VOCs.***

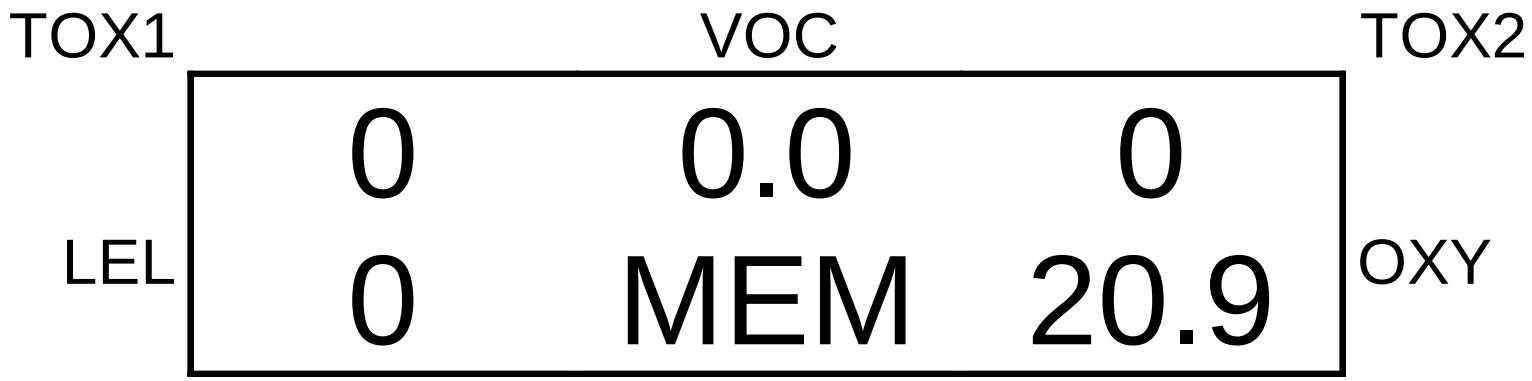
MultiRAE Alarms: Pump

- “Pump” display along with 3 beep audible alarm indicates that pump has stopped due to line clog
- This is a latching alarm
- Clear line/filter and press “Y/+” key to clear alarm and restart pump

MultiRAE Alarms: Low Battery

- A flashing “Bat” display along with a 1 beep alarm every 10 seconds indicates that the battery voltage has dropped below 4.35 V and it will shut down in 20-30 minutes
- Quickly complete confined space entry and charge MultiRAE or install alkaline battery

MultiRAE Alarms: Memory Full



- A flashing “MEM” display along with a 1 beat/second audible/tactile/visual alarm indicates that the datalog memory is full.
- Clear datalog in “Change Datalog?”
- If you get this alarm you might want to consider changing “Select memory full type?” to “Wrap around.”

Getting Into Programming

- *Hold "MODE" and "N/-" keys for 5 sec. to get in Programming Mode*
  - *Default password is 0000*
- If MultiRAE asks a question "?"
  - Answer "Y/+" or "N/-"
- To Accept or Escape
  - Use "MODE" Key
  - repeatedly pushing the "MODE" key will always eventually return user to main display

Programming Menus

- Calibrate Monitor?
- Change Alarm Limits?
- Change Datalog?
- Change Monitor Setup?
- Change Sensor Configuration?

Choose (Y/+) to accept or (N/-) to move on

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Calibrate Monitor?

- Fresh Air Calibration?
  - *Make sure air is clean!*
- Multiple Sensor Calibration?
- Single Sensor Calibration?
- Modify Span Gas Value?
- Change LEL/VOC Span Gas?
  - *Choose (Y/+) to accept or (N/-) to move on, (MODE) to escape*

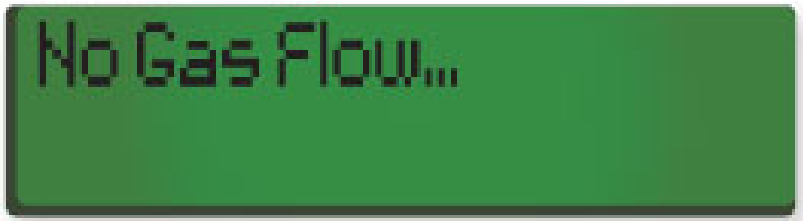
Multiple Sensor Calibration

- At “Multiple Sensor Calibration” press “Y/+” key
- For CO/H2S/LEL mixed gas calibration the next screen should appear as above

Multiple Sensor Calibration

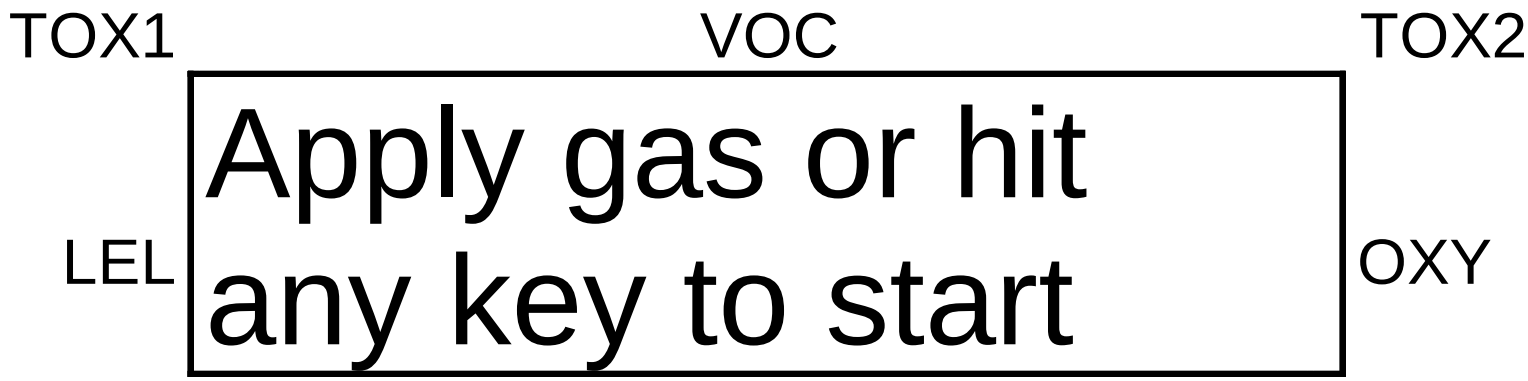
- Press “Y/+” key to display this screen
- Attach calibration gas regulator to mixed gas cylinder
- Turn on calibration gas
- Attach calibration hose to MultiRAE
- Follow instructions on screen

Multiple Sensor Calibration



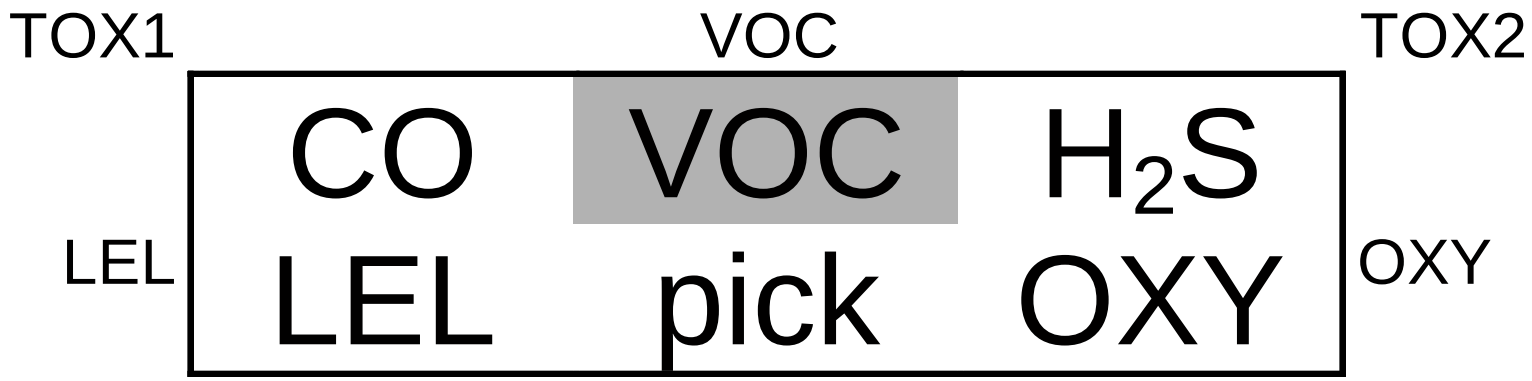
- If you get this screen check for gas flow, the MultiRAE will not perform span calibrations unless it senses calibration gas

Multiple Sensor Calibration



- Try again after you have verified that the gas is correct and it is flowing properly
- Follow instructions on screen
- Disconnect regulator from gas cylinder when complete calibration

Single Sensor Calibration



- VOC can only be calibrated individually, other sensors can be calibrated individually if necessary
- At “Single Sensor Calibration” press “Y/+” key
- Use “MODE” to select VOC

Single Sensor Calibration

- Attach calibration gas regulator to VOC (Isobutylene) cylinder
- Turn on calibration gas
- Attach calibration hose to MultiRAE and make sure it is tight
- With cursor on VOC press “Y/+” key
- Follow instructions on screen
- Repeat if necessary for other gases
- Disconnect regulator

Calibration

- Modify Span Value
  - Allows you to change the calibration gas values to use other cal gases
  - Do not change if you are using the RAE Systems cal gas supplied with your meter
- Change LEL/VOC Span Gas?
  - Allows you to change the calibration gas from methane (LEL) & isobutylene (VOC)
  - Do not change if you are using the RAE Systems cal gas supplied

Change Alarm Limits?

- Change High alarm limit?
  - 3 Beeps per second (“High”)
- Change Low alarm limit?
  - 2 Beeps per second (“Low”)
- Change STEL alarm limit?
  - 1 Beep per second (“STEL”)
- Change TWA alarm limit?
  - 1 Beep per second (“TWA”)

Choose (Y/+) to accept or (N/-) to move on, (MODE) to escape

Change Datalog?

- Clear All Data?
- Change Datalog Period?
- Select Data Type?
- Enable/Disable Datalog?
- Select memory full type?

Choose (Y/+) to accept or (N/-) to move on, (MODE) to escape

Select Memory Full Type?

- **Wrap around (default):** after the memory becomes full the newest data is written over the oldest data (First in First Out or FIFO).
  - *This is an excellent feature to provide "background" datalogging that is only used in case of an incident.*
- **Stop:** datalogging will stop when the memory is full and the "MEM" alarm will sound.

Change Monitor Setup?

- Change Site ID?
- Change ID Mode?
  - *If enabled the MultiRAE will pause on start-up until correct ID is entered*
- Change User ID?
- Change Alarm Mode?
- Change User Mode?
  - “Advanced”
  - “Display”
  - “Text”

Change Monitor Setup?

- Change Real Time Clock?
- Change Backlight Mode?
- Change Password?
- Change Pump Speed?
- Change Averaging Method?
- Change Display Language? (English, Spanish)
- Set Temperature Unit? (C^o or F^o)

Choose (Y) to accept or (N) to move on, (MODE) to escape

RAE SYSTEMS

PROTECTION THROUGH DETECTION

Change Sensor Configuration?

- Change LEL/VOC Gas Selection?
- Enable/Disable Sensor?
- Change Dilution Ratio?
- Change PID Lamp Type?

Choose (Y) to accept or (N) to move on, (MODE) to escape

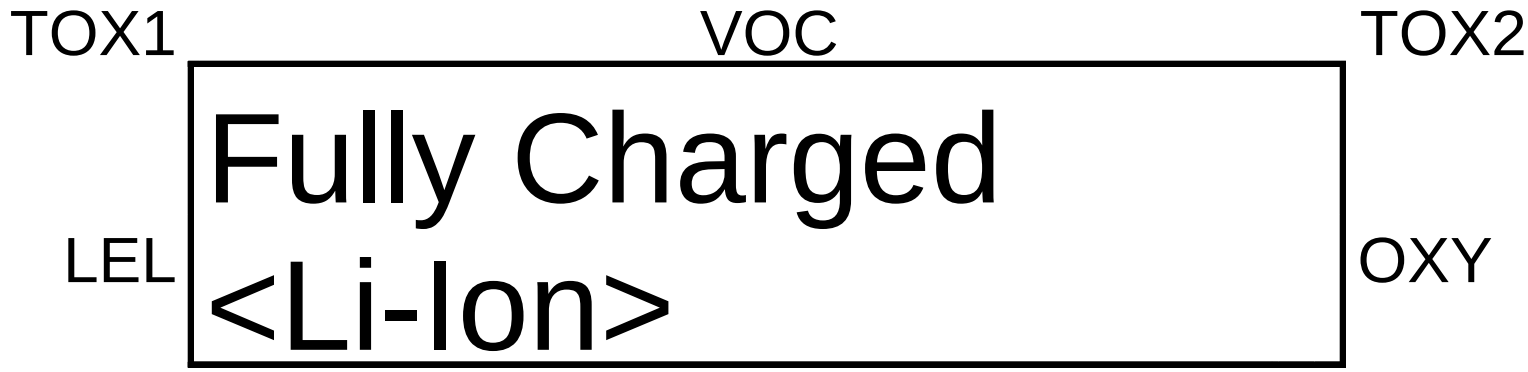
MultiRAE: Power Off

- Hold “Mode” Key for full 5 seconds
- Audible alarm will beep and display will read “Power-down in ...5 seconds”
- Plug 12 VDC charger into MultiRAE charge port when not in use

MultiRAE: Smart Charging

- Li-Ion batteries jump right to this screen
- Nicad batteries will ask for “Deep Discharge” which is recommended about once a month, Li-Ion don’t need discharge
- Full charge can take up to 8 hours

MultiRAE: Trickle Charging



- When fully charged it will switch to trickle charge to maintain the battery
- Turning off and on power to charger will reset charge to high and may burn-out battery if done repeatedly

MultiRAE: Alkaline Adapter

- Accepts 4 AA alkaline batteries
- Provides 12-14 hours of duration
- Make sure that cable runs in groove between batteries or it won't fit
- When reattaching MultiRAE lid, seat it first at back by batteries then push the front down (silver MultiRAE units only)

RAE SYSTEMS

PROTECTION THROUGH DETECTION

Questions?