AutoGro manual 6-8-23

General Raspberry Pi setup instructions

To turn on ssh remote access:

sudo raspi-config

To bring Pi software current:

sudo apt update
sudo apt full-upgrade
sudo apt clean

Configure Pi static ip address:

Edit /etc/dhcpcd.conf
Look at examples inside of the file
Wifi adapter is wlan0
Ethernet adapter is eth0
interface wlan0
static ip_address = x.x.x.x
Etc with other values - gateway etc

AutoGro software install and configuration

AutoGro runs as the pi user (default user for Raspberry Pi installs)

Python code should be copied to /home/pi/bin/AutoGro/

AutoGro scripts should be copied to /home/pi/bin/AutoGro/scripts/

All scripts should have the execute bit set
chmod 755 * (inside of scripts directory)

From scripts directory (this sets AutoGro to start automatically at Pi boot time)
cp rc.local /etc/

From scripts directory (this sets a scheduled task to wrap all the logs at midnight)
crontab crontab.pi
crontab -l (this should show a midnight task called wrap)

AutoGro requires a Python library to support the AtoD chip the MCP3008
sudo pip3 install adafruit-circuitpython-mcp3xxx

Description of scripts

clean - ran by user to cleanup / delete all logs
crontab.pi - this is the crontab entry to schedule cleanup of AutoGro logs
go - run by user to start AutoGro in foreground
rc.local - copied to /etc/ to start AutoGro automatically at Pi boot time
start - used by rc.local to start AutoGro automatically
start2 - used by start to restart AutoGro if the main Python task fails
wrap - used to wrap all running logs by crontab (at midnight by default)

Description of Python source files:

AutoGro.py - main AutoGro file, this is the python file that starts AutoGro
AGconfig.py - common functions and configuration parameters
AGsensors.py - main sensor routines. This is started as a thread by AutoGro.py

AutoGro runtime configuration

Basic AutoGro configuration can be done by changing constants at the top of AGconfig.py. Each constant is documed within the source code. Among other configurations is the amount of time between water cycles, how long each cycle runs, etc. AutoGro must be restarted to pick up changes to AGconfig.py

Starting / Stopping AutoGro

AutoGro has no protection from multiple copies running at one time. Unpredictable results will result if more than one copy is running.
ps -ef | grep AutoGro - should only list one running AutoGro

With the above default install, AutoGro is started automatically by rc.local and various scripts.

Since AutoGro is restarted automatically when it is killed or crashes, special actions must be taken to turn AutoGro off for diagnostics or research.

To stop AutoGro, from scripts directory:

mv start .start
Then reboot the Pi
sudo reboot

When the Pi reboots, AutoGro will not be running.
A user can start AutoGro by hand:
From the scripts folder run ./go or python3 AutoGro.py from AutoGro directory

To start AutoGro automatically again, from scripts directory:

mv .start start (the reverse of stopping AutoGro)
Then reboot the Pi
sudo reboot

Description of AutoGro running logs (these are wrapped at midnight with default install)

AGerror.log - All AutoGro runtime errors
AGpump.log - Detailed pump status
AGsensors.log - Detailed sensor status
(TimeStamp, SoilSensor Raw Value, SoilSensor Percent….Water Quality pH)
AGsys.log - Main AutoGro log with brief logging
AutoGroStart.log - By default a copy of AGsys.log via stdout redirect)
sensor_json.log - JSON values being passed to sensor web API
AGpump.csv - CSV file with pump details
AGsensors.csv - CSV file with sensor details
last_start_time - the timestamp on this file indicates when AutoGro was auto started

Viewing logs

AutoGro logs are all plain text files. They can be viewed with any ASCII editor - nano

Logs can be monitor in real-time, from /home/pi/bin/Autogro/
tail -f log name

AGconfig.py parms of note (these are at the top of AGconfig.py source file)

NUM_WATER_VALVES - number of water valves to run
WATER_CYCLE_TIME - how often to run the watering cycle in seconds
WATER_CYCLE_LENGTH - how long to run each water valve in a cycle in seconds
BALANCE_PH - True or False - auto balance pH
IDEAL_PH - the target pH value for auto balance
PH_SPREAD - tolerance level of the pH level (+/-)
WEB_API - True or False - turn on web api reporting
PH_BALANCE_INTERVAL - the minimum amount of time between pH balance attempts
TDS_ENABLE - True or False - turn on water quality measurement
SOIL_DRY - raw value from soil sensors that is considered totally dry
SOIL_WET - raw value from soil sensors that is considered totally wet
NUM_SOIL_SENSORS - number of active soil sensors

Auto pH balance

If enabled, the system attempts to adjust the pH level automatically. If the minimum amount of time has elapsed as defined by PH_BALANCE_INTERVAL (in seconds) since the last auto balance attempt, then auto balance will be attempted after the next water cycle. The system does this after a water cycle to allow the pH adjustment liquid as much time as possible to dissolve in the water before the next water cycle.