



NEWSLETTER-AMSAT-EA

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Translation by Fernando EC1AME



URESAT, URE's satellite

URESAT, URE's sat project will be launched, if everything goes as planned, in the month of october 2022 aboard a Falcon9 launcher from SpaceX. This project is managed by AMSAT-EA. We are very excited about this project. With this project we realize that we can carry out high-end projects technology within URE, since we have the people capable of such task. Of course that not imply that all the work has to be done within the URE itself. That would be impossible!. The important thing is that from URE we can manage this type of projects and make them come true.

Designing, building and launching a satellite into space is a process that is not easy although sometimes it may seem so. It's the people, companies and universities behind it that make it look easy, but it is a very big challenge. Many disciplines are required simultaneously (project management, aerospace, electronics, information technology, materials...) and many times it is not easy to find them. Everything we can do directly, will be done, what not, we will ask for help from companies, universities and professionals, but the important thing is that URE will be, under its satellite branch, taking care of managing the project.

The first thing we might want to know is what kind of satellite is going to be build and launch. Since it is a satellite to be used by hams and not a simple telemetry transmitter like many of the satellites up there, it will be equipped with a FM voice repeater. The technology to be used derives from the GENESIS, EASAT-2 and Hades missions, but with the improvements that have been identified in these projects. Apart from the FM repeater, non-regenerative data can also be relayed (the satellite will act as a "dummy" signal repeater). We hope it can be able to repeat FSK, AX.25 and APRS frames at 2400 bps and possibly higher.

You will also be able to repeat data by regenerating it but at a lower speed, something yet to be determined. There will also be telemetry with the health status of the satellite and of course CW. There will be room for a payload, but it's not yet defined. It could be a SSTV camera or a thruster as in previous missions, but it is still open.

The format of the satellite will be a pocketQube 1.5P, that is, 5x5x8 cm and will have VHF uplink and UHF downlink. The expected orbit is about 525 km and polar inclination.

Stay tuned to the blog for more information, including many technical details.

<https://uresat.ure.es/>

¡RETORNANDO A LOS SATELITES!

EA8TL - Jorge

I used to work satellites many years ago, maybe around 2000. And it's never late to get back to it. Satellites is something that hooks you up!

PORTABLE STATION

After about 1 year doing sats from my QTH, I decided to purchase a new dual-band transceiver to use on /M.

Among the models on the market, it was clear to me that my new "toy" would have to be "full duplex" and, if possible, with a built-in recorder, among other features.



After consulting with some satellite colleagues, I opted for the YAESU FTM-300DE as it complied with the two mentioned requirements and as until now I did not own a C4FM, it seemed that was the right rig to buy. (thanks EA8FO, EA8AB, EA8CXN, EA8AJC, EA8RH, EA1CIU for the C4FM tips).

So I contacted WWW.HAMBUY.ES and my good friend Juanma had this model in stock.

THE AUTONOMY

Being at home one day I thought, why don't I try to go out to the field and do sats as portable?. But I was missing a battery that might be able to power those 13.8v. Again I pulled the agenda and contacted another good friend, EB4FMT, to whom I proposed what I wanted and he quickly got down to work, making me a personalized lithium battery.

AND THE ANTENNA?

Waiting for a beam antenna for portable "made by EA8NC" (my friend Manolo, a handyman when it comes to building antennas), I chose to use my current mobile vertical antenna.

THE APPROACH

I just told Yeitzy, my xyl, and she thought it was fun to go out to the field, a new experience for someone who is not a radio amateur, and at same time an activity that we could combine with doing some



sport, because on many occasions you have to reach the chosen locators on foot.

THE CHOSEN PLACE

IL17PX, locator relatively close to my qth and unusual ON AIR because almost all the locator is over the ocean (see photo)

AND THE DAY CAME

The morning of January 30 was chosen, Yeitzzy took care of the food (thanks sweetie) and I took care of the technical part.

THE MOMENT OF TRUTH

After 25 minutes by car and about 20 minutes of walking, we finally arrived at IL17PX, it was a day with a lot of “Calima” (suspended dust from the African continent) but luckily it was not windy, considering that it is an area where it blows pretty hard almost every day of the year, we were able to ride the station with relative ease.

Personally, I must say that I had doubts to get a good result because as everyone knows, a portable directional antenna will give better results than a dual band vertical that I have been using for many years in my VW T4.

At the end I managed to make about 17 QSO's that I recorded in my log (see photo), all EA's, thanks go to all for being there. Happy with the results obtained and satisfied for having facilitated a new “grid” for some.

THE FUTURE?

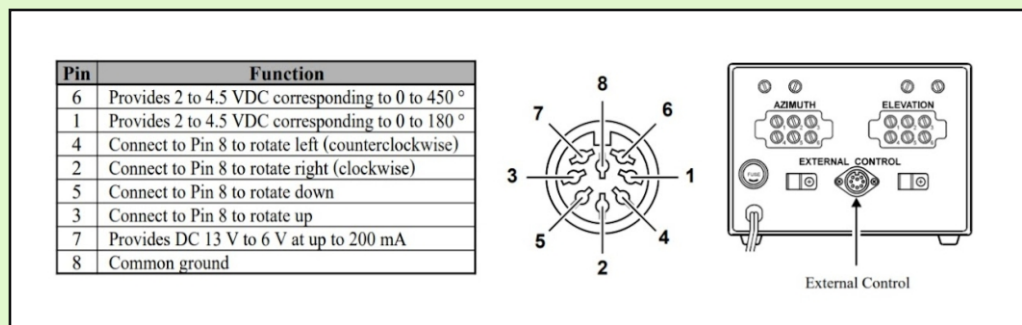
I think we will do better if we order the super portable beam made by my friend EA8NC, and perhaps very soon, our another sponsor, HAMBUY, can collaborate with an ICOM 9700 in order to also be QRV on SSB satellites. In short, enjoy this great hobby, the nature, at the same time do some sport and even better with the help of my girlfriend taking care of the logistics.

<https://www.youtube.com/watch?v=NEUv84ys2Ew>



After acquiring a Yaesu G-5500 rotor, I had the need to control it with satpc32 without spending much money. After the good experience with the K3NG azimuth controller, I decided to stick with this code that allows, with few materials, to have a rotor controller Compatible with all current programs.

The G-5500 Rotor Controller has a rear 8-pin DIN connector that allows you to connect different controllers that are on the market: EA4TX,ERC, Fox Delta... In my case I have chosen the same path, take advantage of this connector (External Control) to be able to control the rotor from the pc. the cheapest way possible.



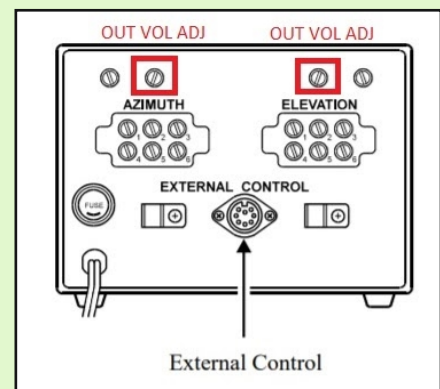
It is important to make sure that pins 1 and 6 do not get more than 5 volts to the Arduino. In my case, by not doing this check, the analog signals inputs from a couple of Arduinos were damaged. The supplied voltages by the Yaesu controller are slightly different from those listed in the previous table:

Voltage between pins 6 and 8:

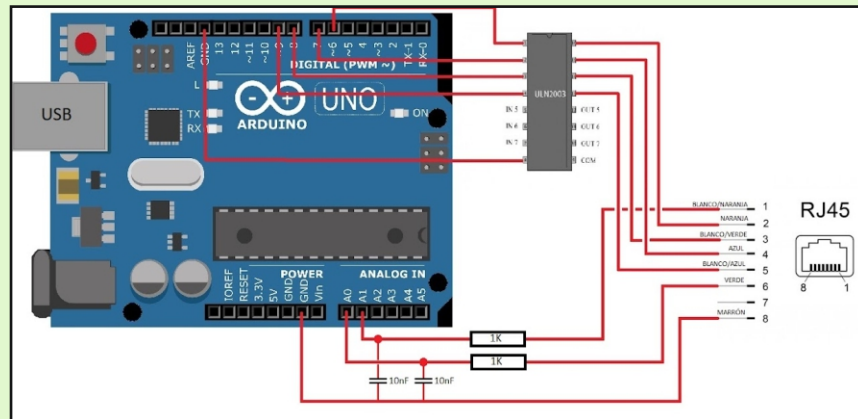
Azimuth 0 degrees = 0 volts
Azimuth 360 degrees = 4.5 volts
Limit switch = 4.9 volts

Voltage between pins 1 and 8:

Elevation 0 degrees = 0 volts
Elevation 180 degrees = 4.5 volts
Limit switch = 4.9 volts



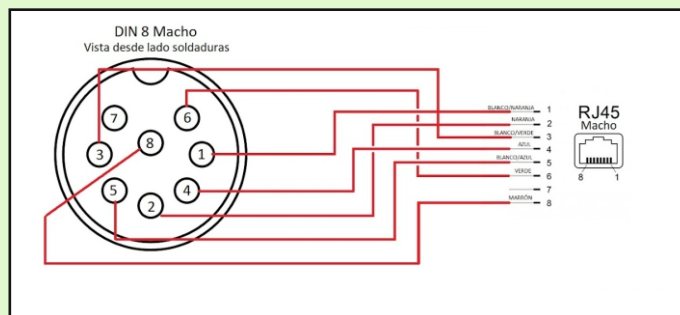
If the maximum voltage exceeds 5 volts, it must be reduced with the "OUT VOL ADJ" potentiometers on the back of the Yaesu controller. These potentiometers allow adjusting the maximum output voltage by pins 1 and 6 that correspond to the information of Azimuth and Elevation, which is interpreted by the Arduino through the analog inputs, they do not accept more than 5 volts.



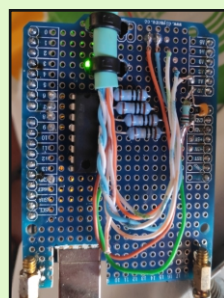
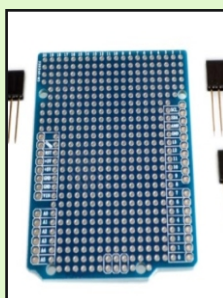
- Because this controller is going to be connected to the yaesu Controller, I chose not to add a keyboard or display and leave it in the simplest way possible. As for the output connector, I took advantage of materials that I had at home. It can be made simpler even if we wire it directly to a DIN 8 Male connector. In my case I have used an output RJ45 connector and later I made an adapter hose from RJ45 to DIN 8

Therefore, the necessary materials are:

- Arduino one
- Driver ULN2003A
- 2 1K resistors
- 2 capacitors 10K (10nF)
- ethernet network cable
- Rj45 Female-Female Adapter
- DIN 8 Male connector



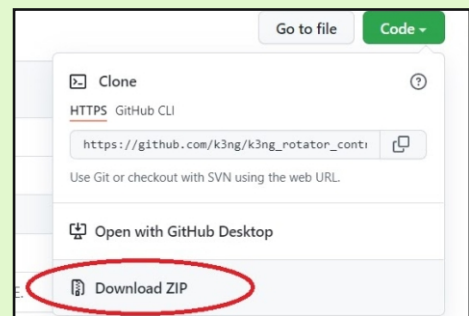
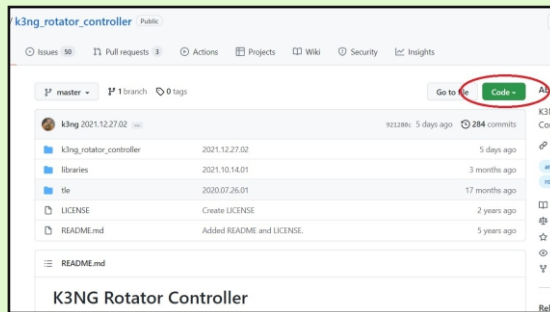
For the assembly of the few components, I used a plate of prototypes that connects directly on the Arduino.



Software

The code needed for our controller can be downloaded from the github repository, where we will always have the most up-to-date version:
github.com/k3ng/k3ng_rotator_controller

Download the compressed zip file by clicking on the button "Code" and choosing the "Download ZIP" option. Once downloaded, unzip it and save it on your PC to open it with the Arduino IDE that we should have previously installed.



Once the code is opened in the Arduino IDE we must adapt it to our needs by commenting out the lines with two slashes "//" to override them or removing the two bars to enable the line.

The files to modify are:

- rotator_features.h
- rotator_settings.h
- rotator_debug_log_activation.h

Rotator features.h

In this file you have to comment (with two slashes at the beginning of the line) all lines except the following:

- #define FEATURE_ELEVATION_CONTROL
- #define FEATURE_YAESU_EMULATION
- #define FEATURE_AZ_POSITION_POTENTIOMETER
- #define FEATURE_EL_POSITION_POTENTIOMETER
- #define OPTION_GS_232B_EMULATION
- #define OPTION_SAVE_MEMORY_EXCLUDE_EXTENDED_COMMANDS
- #define OPTION_SAVE_MEMORY_EXCLUDE_BACKSLASH_CMDS

That is, these lines will be the only ones that do not start with //

• Rotator settings.

The only lines to modify are :

- #define AZIMUTH_STARTING_POINT_EEPROM_INITIALIZE 0
- #define AZIMUTH_ROTATION_CAPABILITY_EEPROM_INITIALIZE 450
- #define ELEVATION_MAXIMUM_DEGREES 180

The rest of the file is left as is.

```
/* ----- rotation settings ----- */

#define AZIMUTH_STARTING_POINT_EEPROM_INITIALIZE 0 // the starting point in degrees of the azimuthal rotator - 0
#define AZIMUTH_ROTATION_CAPABILITY_EEPROM_INITIALIZE 450 // the default rotation capability of the rotator in degrees

/*

Use these commands to change the azimuth starting point and rotation capability if you have already ran the code or
initialized the EEPROM:

    \Ix[x][x] - set az starting point
    \I - display the current az starting point
    \Jx[x][x] - set az rotation capability
    \J - display the current az rotation capability
    \Q - Save settings in the EEPROM and restart

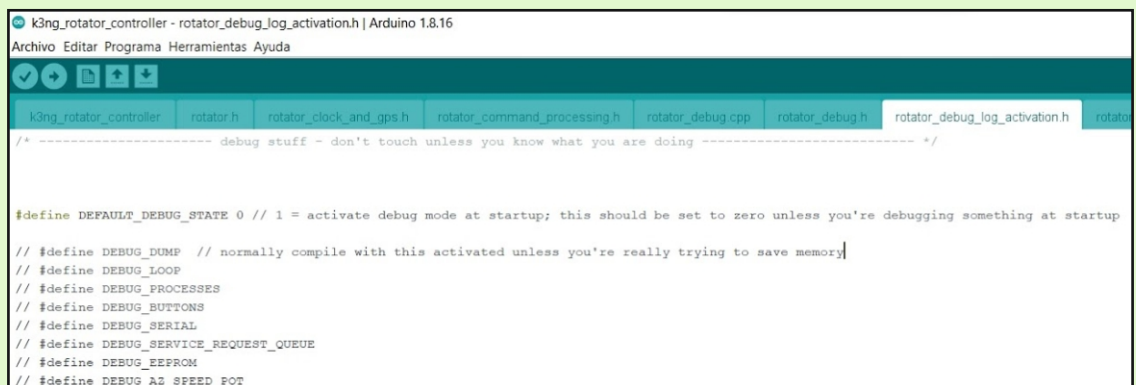
*/

#define ELEVATION_MAXIMUM_DEGREES 180 // change this to set the maximum elevation in degrees

/* ----- Settings ----- */
```

Rotator debug log activation.h

In this file, all we have to do is disable the debug, in order to save memory in our Arduino. To do this, leave the file with only the first line enabled:



```
k3ng_rotator_controller - rotator_debug_log_activation.h | Arduino 1.8.16
Archivo Editor Programa Herramientas Ayuda

k3ng_rotator_controller rotator.h rotator_clock_and_gps.h rotator_command_processing.h rotator_debug.cpp rotator_debug.h rotator_debug_log_activation.h rotator...

/* ----- debug stuff - don't touch unless you know what you are doing ----- */

#define DEFAULT_DEBUG_STATE 0 // 1 = activate debug mode at startup; this should be set to zero unless you're debugging something at startup

// #define DEBUG_DUMP // normally compile with this activated unless you're really trying to save memory
// #define DEBUG_LOOP
// #define DEBUG_PROCESSES
// #define DEBUG_BUTTONS
// #define DEBUG_SERIAL
// #define DEBUG_SERVICE_REQUEST_QUEUE
// #define DEBUG_EEPROM
// #define DEBUG_AS_SPEED_FOT
```

Calibration

For calibration I recommend connecting to the COM port of the Arduino using the "putty" software that YOU can download from this link:

www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

To find out the port to which the Arduino is connected, the simplest way is to open the Windows "Device Manager" and look for it in the section "Ports (COM and LPT)" with the Arduino connected via USB, it must appear in the list.

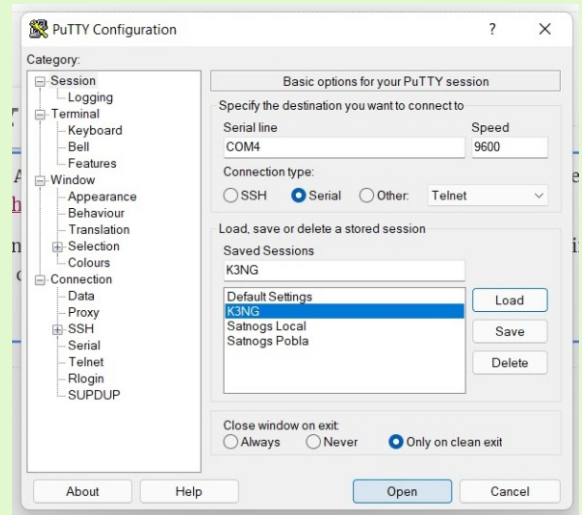
Once the port is found, we open the Putty software and select Serial connection at 9,600 baud for the COM port of the Arduino.

This will open a terminal window in which we can send commands to the Arduino.

According to the GS-232 protocol of Yaesu, the commands needed for the calibration are:

Azimut:

- O (Oscar) to calibrate zero, having the rotor at 0 degrees in Azimuth.
- F (Foxtrot) to calibrate the full scale, having the rotor at 450



Elevation:

- O2 (Oscar two) to calibrate the zero in Elevation, having the rotor at 0 degrees.
- F2 (Foxtrot two) to calibrate 180 degrees in Elevation.

In all four positions it is necessary to confirm with the "Enter" key when the rotor is in position.

The commands can be found on the K3NG wiki:

github.com/k3ng/k3ng_rotator_controller/wiki/820-Command-Reference

Juan Carlos
www.ea5wa.com

PORTABLE STATION OF THE MONTH (EA8TL - Jorge)



NEW RECORD ON AO-91

KE9AJ - Joe

Last February 10 at 13:16utc, KE9AJ (Joe) and G0ABI (Peter) have managed to break the record with a bilateral QSO with a distance of 6,215km and negative satellite elevation. The locators from which the contact was made were: EN53ba86 on a SOTA summit located in Winconsin (USA) and IO80bu56 in Eggesford (England).



Despite the state of health of the AO91 with continuous cuts you can continue to get these contacts at extreme distances from the satellite.

Congratulations !!!



73 on 73 Award

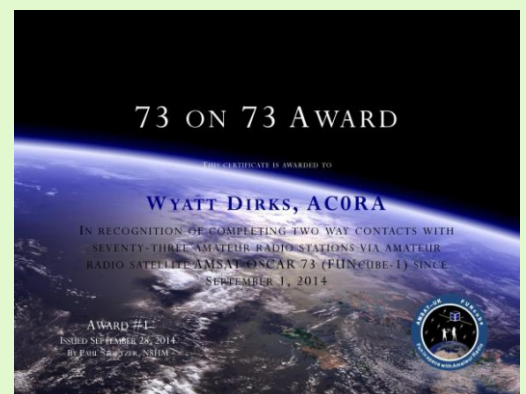
N8HM - Paul Soetzer

With the recent reactivation of the AO-73 transponder, arrives the diploma # 59 sponsored by Paul Stoetzer N8HM, the diploma has as objective to promote activity in AO-73. The requirements are simple:

- Work 73 unique stations on AO-73.
- Contacts must be made from September 1, 2014.
- There are no geographic restrictions on your operating location.

This diploma has no cost although donations to AMSAT-UK and to the AMSAT-NA Fox program are appreciated.

QSL cards are not required. When you complete the requirements, send an email with your registration log, including the call of each station worked, UTC time and the date to n8hm@arrl.net, as well as the address to which you want the certificate to be sent to.



AO-73 is a fantastic satellite, but it can be challenging due to the transponder frequency drift. With the recent technical problems, We don't know how long it will be available. Go ahead and make some QSOs so more operators can receive this award!

AMSAT-EA products in the URE store

For several weeks you have at your disposal several products of AMSAT-EA personalized with your callsign on the URE website.



*Don't hesitate
Support AMSAT-EA*