

Grizu-263A COMMUNICATION GUIDE (V1.0)



Introduction:

Grizu-263 is the first 'Pocketcube' project produced in Turkey. The production of the cube satellite, which is 5x5x5 cm in size, was completely carried out at Zonguldak Bülent Ecevit University. The Grizu-263A which will be launched by SpaceX, uses a single frequency to transmit telemetry data to the ground station. In this document, information is given about the reception, analysis, and conversion of signals sent from our satellite into meaningful data. The COMM information required to listen to our satellite is shown in Table 1.

Frequency	435.675 MHz
Band Width	12.5 kHz
Bit Rate	2.4 kbps
Modulation Type	FSK

Table 1 COMM Information

The telemetry data sent by our satellite is shown in Table 2.

Name	Content	Size(byte)
Call Sign	“YM2VRZ”	6
Year	UTC year	1
Month	UTC month	1
Date	UTC date	1
Hour	UTC Hour	1
Minute	UTC Minute	1
Second	UTC Second	1
Temperature	Temperature of satellite (10x°C)	2
Ina1 current	Current value from EPS to OBC(mA)	2
Ina1 voltage	Bus voltage of OBC(mV)	2
Ina2 current	Current of EPS(mA)	2
Ina2 voltage	Bus voltage of EPS(mV)	2
Ina3 current	Current supplied by the solar panel at the base(mA)	2
Ina3 voltage	Voltage supplied by the solar panel at the base(mV)	2
Ina4 current	Current supplied by the solar panel at the top(mA)	2
Ina4 voltage	Voltage supplied by the solar panel at the top(mV)	2
Ina5 current	Current supplied by the solar panel at the behind of antenna(mA)	2
Ina5 voltage	Voltage supplied by the solar panel at the behind of antenna(mV)	2
Ina6 current	Current supplied by the solar panel at the right side of satellite(mA)	2
Ina6 voltage	Voltage supplied by the solar panel at the right side of satellite(mV)	2
Ina7 current	Current supplied by the solar panel at the left side of satellite(mA)	2
Ina7 voltage	Voltage supplied by the solar panel at the left side of satellite(mV)	2
IMUmx	X axis value of magnetometer(uT)	2
IMUmy	Y axis value of magnetometer(uT)	2
IMUmz	Z axis value of magnetometer(uT)	2
IMUax	X axis value of accelerometer (g)	2
IMUay	Y axis value of accelerometer (g)	2
IMUaz	Z axis value of accelerometer (g)	2
IMUgx	X axis value of gyroscope (°/s)	2
IMUgy	Y axis value of gyroscope (°/s)	2
IMUgz	Z axis value of gyroscope (°/s)	2

Table 2 Telemetry Data Format



TELEMETRY DECODER

Software:

- SDR#(Optionally using a different program)
- Soundmodem Software (by UZ7HO) (Required)
- Telemetry decoder (DK3WN) (Required)
- Virtual Audio Cable (Required)

SDR#

Download Link: [SDR# and Airspy Downloads - airspy.com](https://airspy.com)

Look at the following image to see if your settings are similar to mine.(Figure 1)

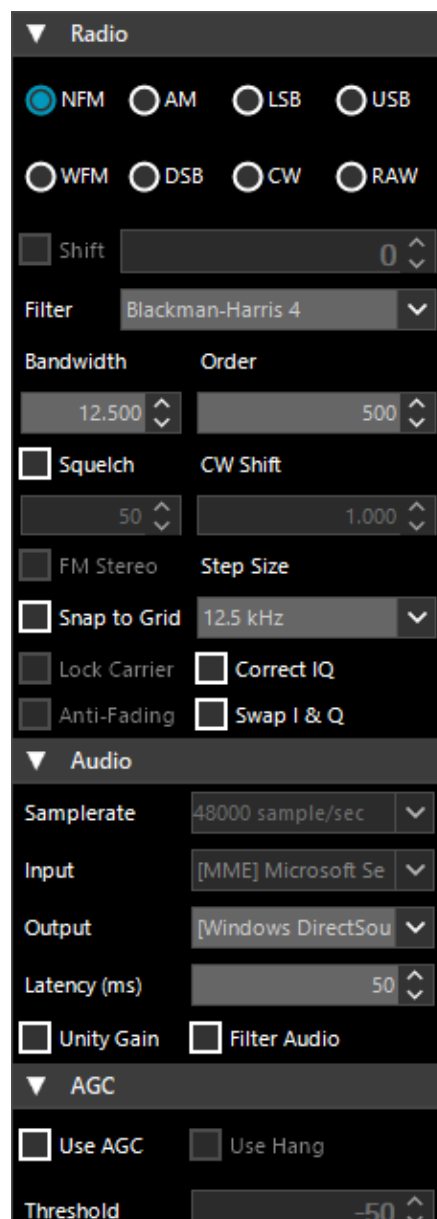


Figure 1-SDR#



Vitural Audio Cable

Dowland Link: [Virtual Audio Cable 4.62 için Windows - İndir \(uptodown.com\)](http://Virtual Audio Cable 4.62 için Windows - İndir (uptodown.com))

This option is to use VB-CABLE this software gives you a virtual audio in and a audio out. VB- CABLE allows routing signal from an application to another one. Typical application for the Virtual Audio Cable is to route your sound to an audio software in order to record and analyzeit.

After the installation is complete you should see Line-1 on the audio devices.(Figure-2)



Figure 2-Líne 1

You should give the audio output of the radio you are using to the Line 1.(Figure 3)

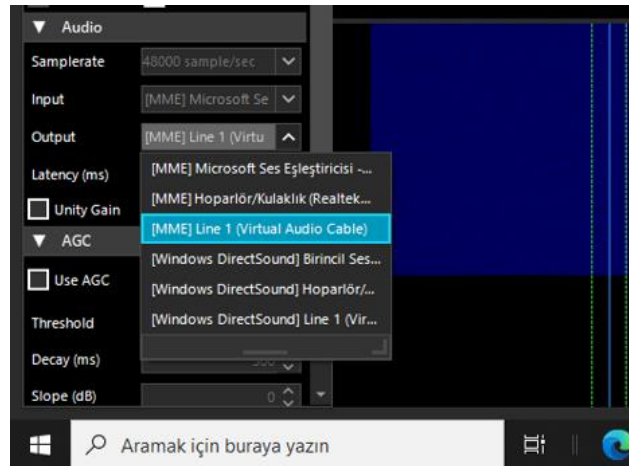


Figure 3-SDR# Connect Line1



Decoder Software

Link: [Decode Software - Grizu-263 Uzay Takımı \(beun.edu.tr\)](https://grizu263.beun.edu.tr)

You can download it on our website.(Figure-4)



Figure 4-How To Dowland

Soundmodem

Look at the following image to see if your settings are similar to mine.(Figure 5-6-7)

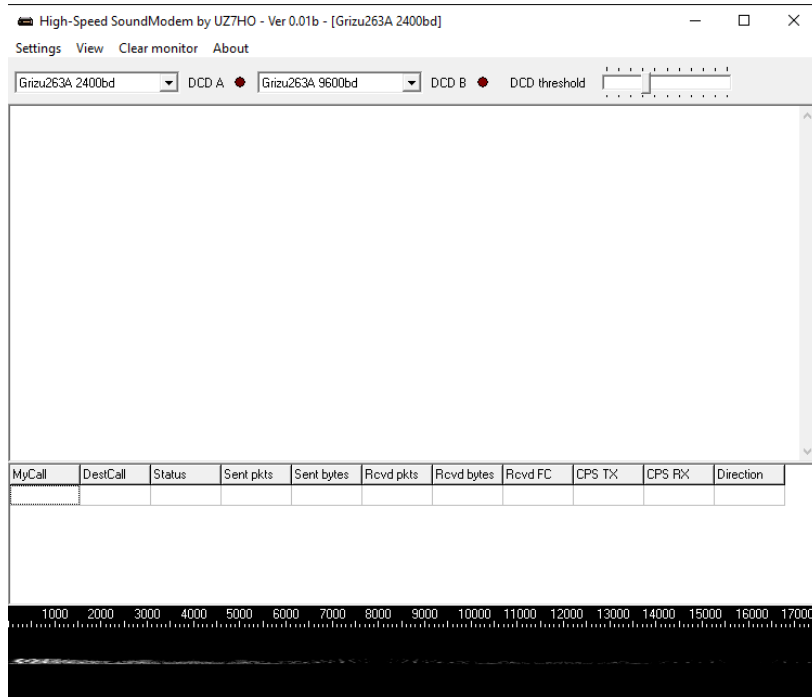


Figure 5-SoundModem

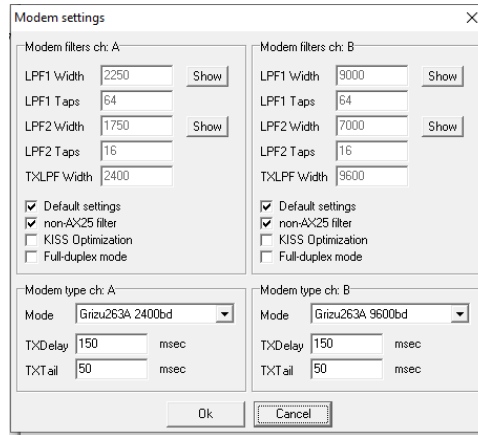


Figure 6-Modem Settings

When we enable KISS Server Port in devices settings, a connection is established with the decoder. You must change SoundModem's input audio device to Line 1. (Figure 7)

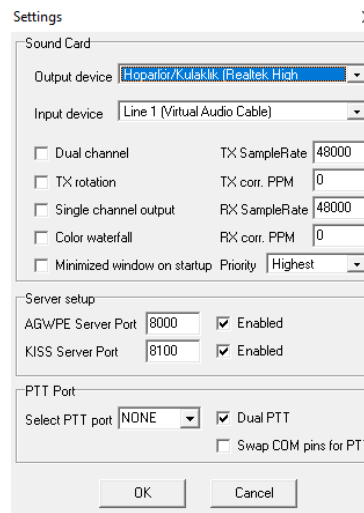


Figure 7-Devices Settings

Grizu-263A Telemetry Decoder

When we enable TCP client, a connection is established with the soundmodem.

Just click the button next to the data to plot the data you want.

You can change the chart type with this button.

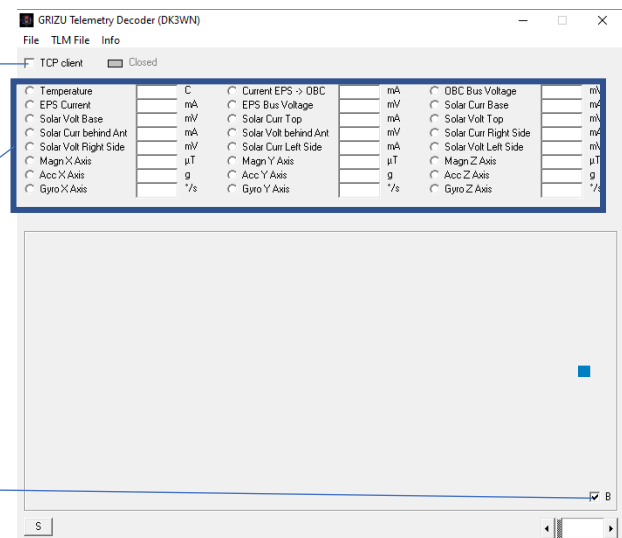


Figure 8-Telemetry Decoder



Finally you can access the data.(Figure 9)

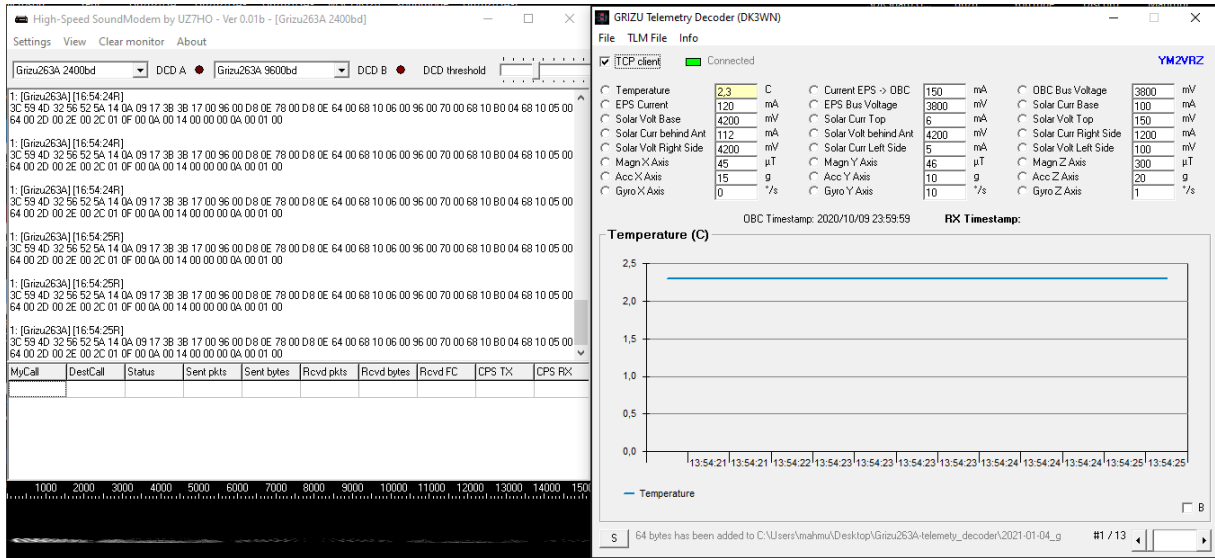


Figure 9-Final Data