

PAVI Flight Computer

Easy User Manual

What You Have

- **TX Unit:** Goes on your rocket, records flight data
- **RX Unit:** Ground control with menu, controls everything

What It Does

- Records flight data (altitude, speed, weight)
- Controls pyro channels wirelessly
- Downloads data to your phone/computer
- Works up to 5km away

Quick Setup (First Time)

1. Power On Both Units

1. Plug in TX unit (USB cable or battery)
2. Plug in RX unit
3. Wait 30 seconds - both should show "ready" messages
4. RX unit will show the main menu

2. Test Connection

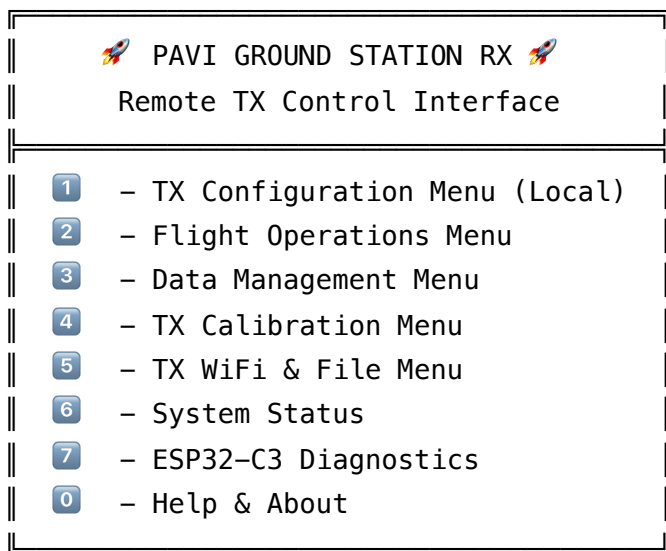
1. On RX menu, choose option 5 (System Status)
2. Should show "TX Connection: ACTIVE"
3. If shows "NO CONNECTION", see troubleshooting below

3. Calibrate Weight Sensor (If You Have One)

1. On RX menu, choose option 3 (Load Cell Calibration)
2. Follow the simple steps on screen
3. Done! System is ready to fly

Using the RX Unit Menu

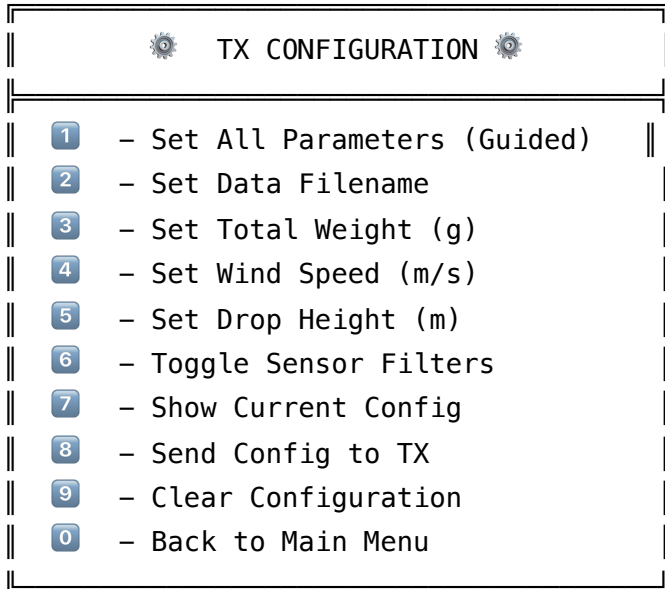
When you turn on the RX unit, you see this main menu:



Option 1: TX Configuration Menu ★ (Setup Your Flight)

This is where you set up all your flight parameters before sending them to TX:

Sub-menu options:



Option 1-1: Set All Parameters (Easiest)

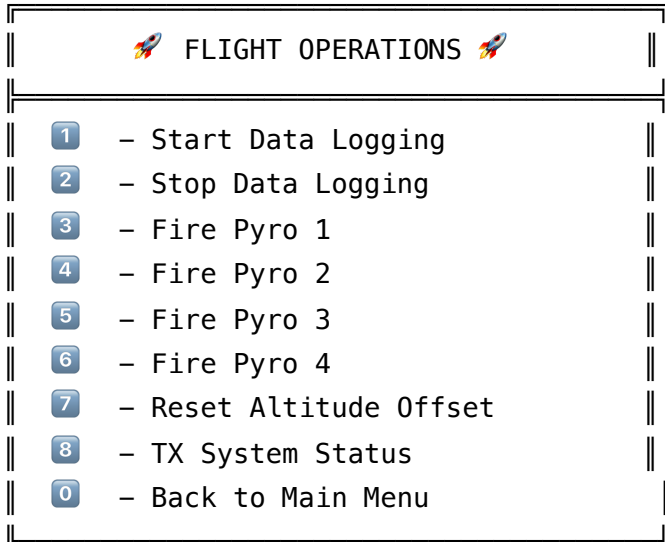
- Guided setup walks you through all settings
- Type values or "skip" to keep current
- Sets filename, weight, wind speed, height all at once

Option 1-8: Send Config to TX

- Sends all your settings to TX unit at once
- TX confirms it received the configuration
- Must do this before starting flight

Option 2: Flight Operations Menu

Controls the actual flight recording and pyro channels:

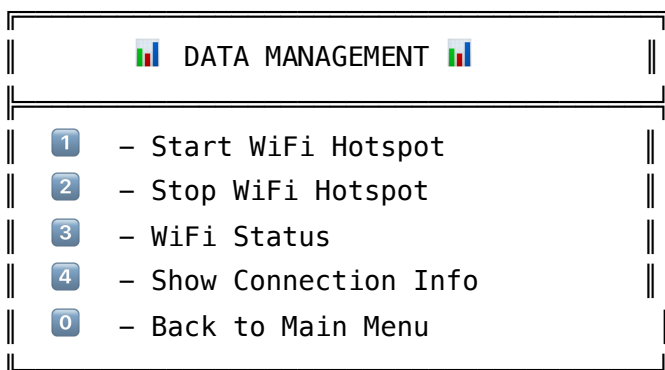


Most Used:

- **Option 2-1:** Start recording flight data
- **Option 2-2:** Stop recording
- **Option 2-7:** Reset altitude to zero (before launch)
- **Option 2-8:** Check TX status

Option 3: Data Management Menu 📊

Download your flight data via WiFi:



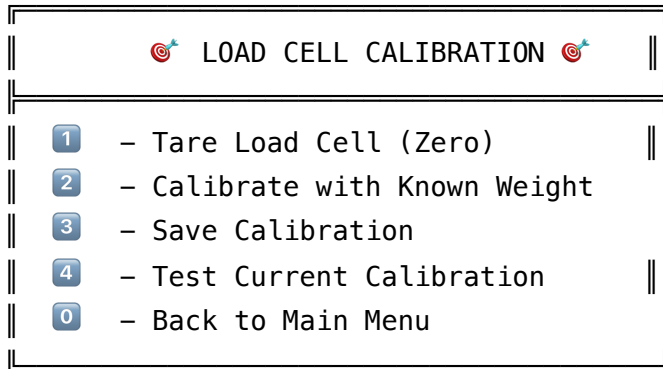
Download Process:

1. Choose option 3-1 (Start WiFi Hotspot)
2. Connect phone/computer to "PaviFlightData" network
3. Password: pavi2024
4. Go to 192.168.4.1 in browser

5. Download your files
6. Choose option 3-2 (Stop WiFi) when done

Option 4: TX Calibration Menu

Calibrate the load cell (weight sensor):

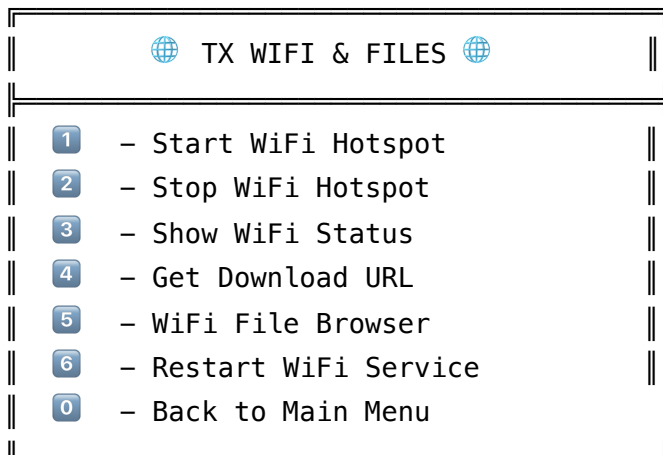


Calibration Steps:

1. Option 4-1: Remove all weight, set zero point
2. Option 4-2: Place known weight (like 1kg), calibrate
3. Option 4-3: Save calibration permanently
4. Option 4-4: Test accuracy

Option 5: TX WiFi & File Menu

Same as Option 3 but with more WiFi controls:



Option 6: System Status

Shows complete system information:

- TX connection status
- Signal strength (RSSI)
- Free memory
- SD card status
- Requests full status from TX unit

Option 7: ESP32-C3 Diagnostics

Technical information for troubleshooting:

- Memory usage
- CPU frequency
- Reset information
- LoRa status

Complete Flight Procedure (Step by Step)

Step 1: Configure Your Flight (Main Menu → Option 1)

1. Choose **Option 1** from main menu (TX Configuration)
2. Choose **Option 1-1** (Set All Parameters - Guided)
3. Enter when prompted:
 - **Filename:** MyFlight (or whatever you want)
 - **Weight:** 2500 (weight in grams)
 - **Wind Speed:** 5 (meters per second)
 - **Height:** 100 (launch height in meters)
4. Choose **Option 1-8** (Send Config to TX)
5. Wait for "✅ Configuration sent!" message

Step 2: Start Recording (Main Menu → Option 2)

1. Go back to main menu (type 0)
2. Choose **Option 2** (Flight Operations)

3. Choose **Option 2-7** (Reset Altitude Offset) - do this at launch site
4. Choose **Option 2-1** (Start Data Logging)
5. Wait for "✅ TX ACK: Flight logging started"

Step 3: Launch Your Rocket

- RX unit stays with you
- TX unit records flight data automatically
- You can fire pyro channels if needed (Options 2-3 through 2-6)

Step 4: Stop Recording (After Flight)

1. Choose **Option 2-2** (Stop Data Logging)
2. Wait for "✅ TX ACK: Flight logging stopped"

Step 5: Download Data (Main Menu → Option 3)

1. Go to main menu, choose **Option 3** (Data Management)
2. Choose **Option 3-1** (Start WiFi Hotspot)
3. On your phone/computer:
 - Connect to WiFi "PaviFlightData"
 - Password: pavi2024
 - Open browser: 192.168.4.1
 - Download your flight file
4. Choose **Option 3-2** (Stop WiFi Hotspot)

Downloading Your Flight Data

Method 1: From RX Menu (Easiest)

1. Choose option 4 (File Management)
2. Select "Start WiFi"
3. On your phone/computer:
 - Connect to WiFi "PaviFlightData"
 - Password: pavi2024
 - Open browser, go to 192.168.4.1
 - Download your flight files

4. Choose "Stop WiFi" to save battery

Method 2: Direct Commands

1. In Manual Commands (option 2), send: `WIFI_START`
2. Follow same WiFi steps above
3. Send: `WIFI_STOP` when done

Opening Your Data

- Files are CSV format
- Open in Excel, Google Sheets, or similar
- Contains: time, altitude, acceleration, weight data

Load Cell Calibration (Weight Sensor)

When to Calibrate

- First time using system
- Weight readings seem wrong
- After rough handling

Simple Calibration (From RX Menu)

1. **Main Menu:** Choose **Option 4** (TX Calibration Menu)
2. **Step 1:** Choose **Option 4-1** (Tare Load Cell) - removes all weight
3. **Step 2:** Choose **Option 4-2** (Calibrate with Known Weight)
 - Enter weight in grams (like `1000` for 1kg)
 - Place that exact weight on TX load cell
4. **Step 3:** Choose **Option 4-3** (Save Calibration) - saves permanently
5. **Step 4:** Choose **Option 4-4** (Test) - verify accuracy

Testing Your Calibration

- Remove all weight: should read close to 0.00kg
- Place known weight: should read correct value
- If error more than 5%, repeat calibration

Quick Troubleshooting

Problem: "No TX Connection" or "Connection Lost"

Quick Fixes:

1. **Check Power:** Make sure TX unit is plugged in
2. **Move Closer:** Get within 50 meters for testing
3. **Check Antennas:** Make sure both antennas connected
4. **Restart Both:** Unplug and plug back in both units
5. **Test Command:** Try option 2, send PING command

Problem: "Load Cell Not Working" or Wrong Weight

Quick Fixes:

1. **Recalibrate:** Use option 3 from menu
2. **Check Connections:** Make sure weight sensor plugged in
3. **Remove Everything:** Nothing should touch the sensor
4. **Stable Surface:** Put sensor on solid, level surface
5. **Wait:** Let sensor settle for 30 seconds

Problem: "Can't Connect to WiFi" for Data Download

Quick Fixes:

1. **Start WiFi:** Make sure you chose "Start WiFi" first
2. **Forget Network:** Delete old "PaviFlightData" from phone
3. **Correct Password:** Use pavi2024 (all lowercase)
4. **Turn Off Data:** Disable cellular data on phone
5. **Right Address:** Go to 192.168.4.1 (not .com)

Problem: "Storage Full" or "Can't Save Data"

Quick Fixes:

1. **Download Files:** Use option 4 to get your data
2. **Delete Old:** Remove old flight files

3. **Check Space:** Status shows storage percentage
4. **Shorter Names:** Use shorter filenames

Problem: "Sensors Not Ready" or Startup Errors

Quick Fixes:

1. **Wait Longer:** Give 60 seconds for full startup
2. **Power Cycle:** Unplug for 10 seconds, plug back in
3. **Check Connections:** Make sure all sensors connected
4. **USB Power:** Try different USB cable/power source

Problem: Poor Signal or "Weak Signal"

Quick Fixes:

1. **Line of Sight:** Remove obstacles between units
2. **Higher Position:** Put RX unit higher up
3. **Check Antennas:** Make sure antennas vertical
4. **Move Closer:** Reduce distance for testing
5. **Avoid Interference:** Away from WiFi routers, phones

Safety - READ THIS!

Pyro Channels (Rocket Ignition)

- **ALWAYS double-check** before using PYRO commands
- Pyro channels automatically turn off after 1.5 seconds
- Keep safe distance when testing
- Only use proper pyrotechnic devices

General Safety

- Test system completely before important flights
- Keep spare batteries
- Download data immediately after flights
- Check local laws for 433MHz radio use

Data Analysis Made Simple

Your Data File Contains:

- **Time:** Seconds since launch
- **Altitude:** Height above launch point (meters)
- **Acceleration:** G-forces in 3 directions
- **Weight:** Load cell reading (kg)

Quick Analysis in Excel:

1. **Altitude Graph:** Plot Altitude vs Time
2. **Max Altitude:** Find highest altitude value
3. **Flight Time:** Time when altitude returns to zero
4. **Max Acceleration:** Find highest G-force

Quick Reference Card

Essential Menu Navigation:

- **Main Menu Options 1-7, 0:** Always available by typing number
- **Type 0 :** Go back to previous menu
- **Type 99 :** Jump to main menu from anywhere

Most Common Flight Sequence:

1. **Main Menu → 1 → 1-1:** Set all flight parameters
2. **→ 1-8:** Send config to TX
3. **Main Menu → 2 → 2-7:** Reset altitude at launch site
4. **→ 2-1:** Start recording
5. **→ 2-2:** Stop recording after flight
6. **Main Menu → 3 → 3-1:** Start WiFi for download

Emergency Commands:

- **Main Menu → 2 → 2-2:** Emergency stop recording
- **Main Menu → 2 → 2-8:** Check TX status
- **Main Menu → 6:** Full system status

WiFi Download Quick Steps:

1. **Menu 3 → 3-1:** Start WiFi
2. **Connect to:** PaviFlightData
3. **Password:** pavi2024
4. **Browser:** 192.168.4.1
5. **Menu 3 → 3-2:** Stop WiFi

Questions? Problems?

1. Try the troubleshooting section above
2. Check system status (option 5)
3. Power cycle both units
4. Keep this manual handy!