SynFinder User Manual

1 Product Overview

1.1 Introduction

SynFinder is an intelligent star-finding assistant app designed for visual astronomical observation. Using your phone's camera to plate-solve the telescope's current pointing, combined with NFC-based automatic telescope identification and GPS positioning, SynFinder calculates the target's position in real time, guides you to it quickly, and recommends objects worth observing — dramatically reducing the time spent star-hopping and enhancing your overall stargazing experience.

1.2 Features

- One-tap NFC telescope binding — automatically retrieves telescope information
- Plate solving — accurately determines the telescope's current pointing coordinates
- Real-time display of target altitude, azimuth, and tonight's observable window
- Object database covering recommended targets, Solar System objects, double stars, named stars, Messier, IC, and NGC catalogs
- Direction filtering — quickly narrow down observable targets in your current sky area
- Observation list — pre-plan your session and navigate targets in sequence
- Voice announcements and voice control — go hands-free throughout your session
- Night mode — low-glare amber theme to protect your dark adaptation

1.3 System Requirements

Item	Requirement
Operating System	Android 8.0+ / iOS 14.0+
Required Permissions	Camera, Location (GPS), NFC
Hardware	Sky-Watcher telescope with built-in NFC sensor
Phone Mounting	

	A compatible mount adapter is required to secure your phone to the telescope's eyepiece holder

2 Setup

Complete the following steps the first time you use SynFinder.

2.1 Installing the App

SynFinder is available on both iOS and Android. Download and install it from an official app store to ensure you receive a complete and authentic version.

- **iOS users:** Search for SynFinder in the App Store.
- **Android users:** Search for SynFinder on Google Play or your device manufacturer's app store (Xiaomi, Huawei, OPPO, vivo, etc.).

> **Note:** After installation, go to your phone's system settings and confirm that SynFinder has been granted Camera, Location, and NFC permissions. Missing any one of these permissions will prevent key features from working.

2.2 Telescope Identification (NFC Pairing)

Before using SynFinder, you must identify and pair your telescope via NFC. Each time you launch the app, if no telescope is paired or the previous pairing has expired, the identification panel will open automatically.

1. Enable NFC on your phone (Settings > Connections > NFC).
2. Launch SynFinder. The telescope identification panel opens automatically, or tap the [Scan Telescopes] button
3. Hold your phone's NFC antenna against the NFC sensor on the telescope body and keep it still until identification completes.
4. Once identified, the telescope model and its parameters are displayed at the top of the main screen.

> **Note:** The NFC antenna location varies by phone model — it is typically found in the center or upper portion of the back panel. If identification fails, slowly reposition your phone and try again.
>
> **Tip:** You can adjust the **Scan Grace Period** in App Settings to reduce how often you need to re-pair.

2.3 Mounting Your Phone

Mount your phone to the telescope before starting the setup procedure.

1. Attach the mount adapter to the telescope and tighten it securely.
2. Insert your phone into the mount adapter and adjust its position so the camera lens is as closely aligned with the telescope's optical axis as possible.
3. Confirm the phone is firmly secured with no play or movement.

3 Setup Procedure

Before each session, complete the following two steps in order: Alignment Offset Calibration and Plate Solving. Both are accessed by tapping **[Preparation]** on the main screen.

3.1 Alignment Offset Calibration

Offset Calibration aligns the phone camera's center with the telescope's actual field center, ensuring that plate solve results accurately reflect where the telescope is pointing.

1. Tap **[Preparation]** on the main screen. The offset adjustment view opens, showing an orange crosshair that marks the current telescope center point.
2. Check the exposure. The image should show clear detail with no overexposure (washed-out white) or underexposure (pure black with no visible detail). If adjustment is needed, tap **[Camera Settings]** in the lower-right corner:
    a. **Auto Setting:** When enabled, the camera automatically adjusts focus, exposure, and ISO.
    b. **Focus:** Drag the slider to adjust focus manually.
    c. **Exposure:** Drag the slider to adjust shutter speed manually.
    d. **ISO:** Drag the slider to adjust sensitivity manually.
3. Look through the eyepiece and identify a reference object — such as a bright star — that is roughly centered in the telescope's field of view.
4. Locate that same reference object in the phone's camera view.
5. Drag the image until the orange crosshair is centered on the reference object. Pinch to zoom in for a more precise adjustment.
6. Once the crosshair is correctly positioned, tap the lock icon in the upper-right corner to complete Offset Calibration.

> **Note:** Do not reposition the phone in the mount adapter after completing Offset Calibration. Any movement will invalidate the calibration and require you to repeat this step.

3.2 Plate Solving

It photographs the current sky and plate-solves the image to determine the telescope's precise pointing coordinates.

1. Point the telescope and phone toward a clear, dark area of sky — avoid city light domes and the horizon.
2. Tap the shutter button at the bottom center of the screen. The app captures an image and begins solving automatically.
3. When solving completes, the screen displays the current pointing coordinates.

4 Observing

4.1 Single-Target Session

Once you have selected a target in the object database, follow these steps to star-hop to it:

1. Tap **[Go Observe]** on the target's entry.
2. The app returns to the main screen and displays the target's coordinates, current altitude and azimuth, and the angular offset you need to move.
3. Move the telescope to reduce the offset: sweep horizontally to correct azimuth, tilt up or down to correct altitude.
4. As you approach the target, the app automatically triggers a new plate solve to confirm the remaining offset precisely.
5. Fine-tune based on the updated solve result until the offset reaches near zero. You can also tap **[Refresh Current Pointing]** at any time to trigger a solve manually.
6. Once on target, look through the eyepiece.

4.2 Multi-Target Session

The Observation List Mode lets you pre-plan a sequence of targets. The app guides you through them one by one in order.

1. **Create a list**
    a. In the object database, tap the list icon (📄) in the upper-right corner to switch to the Observation List view.
    b. Tap **[Add]** to open the object database, check the targets you plan to observe, then tap **[✓]**.
2. **Manage the list**
    a. **Reorder:** Hold the drag handle (≡) to the right of a target and drag it up or down.
    b. **Delete:** Tap **[Edit]** in the upper-right corner, check the targets to remove, then tap Delete.
3. **Run the sequence**
    a. Tap **[Start]** to begin the session.

b. The app guides you to the first target in the list. When you are done, tap **[Next]** to move to the following target.

c. With Voice enabled, say the wake command to move to the previous or next target without touching the screen.

5 Additional Features

5.1 Object Database

The object database provides multiple catalog categories for searching, filtering, and selecting observation targets. Tap **[Select Target]** on the main screen to open it.

1. **Catalog Categories**

Catalog	Contents
Best	Intelligently recommended targets based on your current time, location, and telescope field of view — optimized for tonight's conditions
Solar System	Planets, the Moon, comets, and other Solar System objects
Double Stars	Double star systems suited for visual splitting
Named Stars	Bright, easily recognized stars with proper names
Messier	The Messier catalog (M1–M110)
IC	Index Catalog objects
NGC	New General Catalog objects

2. **Object Information**
   - **Left side:** Object designation, visual magnitude, and tonight's observable window (local time).
   - **Right side:** Current altitude and azimuth, and the **[Go Observe]** button.
   - **Altitude graph:** Shows the object's altitude trend over the next 24 hours, with a blue dot marking the current time. Light gray indicates daytime, dark gray indicates twilight, and black indicates full night.
3. **Search and Filter**
   - **Search:** Tap the search icon in the upper-right corner and enter an object name or designation.

- **Filter:** Tap the filter icon in the upper-right corner to open the direction filter panel. Tap one or more compass direction buttons to show only targets in that part of the sky. Tap **[Reset]** to clear all filters.

5.2 Voice Announcements and Voice Control

The main screen provides two independent toggles: **Announce** and **Voice**.

Announce: When enabled, the app reads out azimuth and altitude offset values and adjustment cues aloud during star-hopping and observing — no need to keep looking at the screen.

Voice: When enabled, say **"Hi Finder"** (works in all languages) to activate voice control and navigate your observation list. The following commands are currently supported:

Command (English)	Command (Chinese)	Action
Next	下一个	Moves to the next target in the list and announces the required adjustment
Last	上一个	Moves to the previous target in the list and announces the required adjustment
Refresh	刷新	Triggers a new plate solve to confirm the current offset between your pointing and the target
Night Mode	夜间模式	Toggles Night Mode on or off

6 App Settings

Tap the gear icon in the upper-right corner of the main screen to open App Settings.

6.1 Scan Grace Period

Sets how long an NFC pairing remains valid. The default is 4 hours. Once the duration expires, you will need to re-identify the telescope via NFC. Adjust this value to match the length of your typical observing session.

6.2 FOV Parameters

Enter your eyepiece details, and the app automatically calculates your true field of view for use in object database recommendations.

Parameter	Description

Eyepiece Focal Length (mm)	The focal length of your eyepiece, used to calculate magnification and true field of view
Apparent Field of View (°)	The eyepiece's apparent field of view (AFOV) — refer to your eyepiece documentation
Barlow / Reducer	Select any attached accessory (None / 2× Barlow / 0.5× Reducer, etc.). The app recalculates the effective focal length automatically

Once configured, the app displays the following computed values: true field of view, magnification, exit pupil diameter, and Dawes' limit / Rayleigh limit.

6.3 Observing Location

Option	Description
Current	Use the phone's GPS to retrieve your current coordinates (latitude, longitude, and elevation)
Custom	Manually enter the coordinates of a fixed observing site

> **Note:** Location data directly affects altitude and azimuth calculations, object database recommendations, and observable window times. An incorrect location will cause all position-dependent data to be wrong. Double-check this setting before each session.

6.4 Language

Select your preferred display language. Simplified Chinese, Traditional Chinese, English, French, German, Hungarian, Italian, Japanese, Romanian, Russian, and Spanish are currently supported.

6.5 Night Mode

Switches the interface to a low-contrast amber theme to reduce screen glare and protect your dark adaptation during nighttime observing.

7 Appendix

7.1 Technical Support

For technical assistance, contact us through any of the following channels:

- **Website:**
- **Email:**