React Native Expo App
APK Build Guide for macOS

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Abstract

This comprehensive guide provides step-by-step instructions for building Android APK files from React Native Expo projects on macOS. It covers complete installation of required tools, environment setup, APK signing configuration, and troubleshooting common issues. Compatible with Adobe Reader and all standard PDF viewers.

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1 Prerequisites Installation

1.1 Install Homebrew

Homebrew is macOS package manager.

```
/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"
```

1.2 Install Node.js via NVM

```
# Install NVM
curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.39.0/install.sh | bash

# Reload shell
source ~/.zshrc

# Install Node.js v22
nvm install 22
nvm use 22

# Verify installation
node --version  # Should show v22.x.x
```

1.3 Install Bun

Bun is a fast JavaScript runtime and package manager.

```
curl -fsSL https://bun.sh/install | bash

# Verify installation
bun --version
```

1.4 Install Android Studio

1. Download from: https://developer.android.com/studio
2. Install with **default settings**
3. Open Android Studio
4. Complete **Setup Wizard** (automatically installs Android SDK)

1.5 Install Java JDK 17+

```
brew install openjdk@17

# Link to system Java
sudo ln -sfn /opt/homebrew/opt/openjdk@17/libexec/openjdk.jvm /Library/Java/JavaVirtualMachines/openjdk-17.jdk

# Verify installation
java -version  # Should show openjdk 17.x.x
```

1.6 Install VS Code

Download from: https://code.visualstudio.com/

2 Environment Setup

2.1 Configure Environment Variables

Edit `~/.zshrc` file:

```
nano ~/.zshrc
```

Add the following lines:

```
# Android SDK
export ANDROID_HOME=$HOME/Library/Android/sdk
export PATH=$PATH:$ANDROID_HOME/platform-tools
export PATH=$PATH:$ANDROID_HOME/tools

# Java
export JAVA_HOME=/opt/homebrew/opt/openjdk@17
export PATH=$PATH:$JAVA_HOME/bin
```

Apply changes:

```
source ~/.zshrc
```

2.2 Verify Environment

```
echo $ANDROID_HOME
# Expected: /Users/yourusername/Library/Android/sdk

java -version
# Expected: openjdk version "17.x.x"
```

3 Project Setup

3.1 Install Project Dependencies

```
cd ~/YourProjectFolder

# Install dependencies
bun install

# Add Expo dev client
bun add expo-dev-client
```

3.2 Generate Android Native Files

```
npx expo prebuild --platform android --clean
```

This creates the `android/` folder with native Android code.

4 APK Signing Configuration

4.1 Step 1: Create Keystore

From project root directory:

```
keytool -genkeypair -v -storetype PKCS12 \
  -keystore ./android/app/my-upload-key.keystore \
  -alias my-key-alias \
  -keyalg RSA \
  -keysize 2048 \
  -validity 10000
```

Enter the following information:

- **Password:** `123456` (Remember this!)
- **First and last name:** `YourAppName`
- **Organizational unit:** `Dev`
- **Organization:** `YourCompany`
- **City:** `YourCity`
- **State:** `YourState`
- **Country code:** `IN` (or your country code)
- **Is correct?** `yes`

4.2 Step 2: Configure Gradle Properties

Edit file: `android/gradle.properties`

Add at the end of file:

```
MYAPP_UPLOAD_STORE_FILE=my-upload-key.keystore
MYAPP_UPLOAD_KEY_ALIAS=my-key-alias
MYAPP_UPLOAD_STORE_PASSWORD=123456
MYAPP_UPLOAD_KEY_PASSWORD=123456

org.gradle.jvmargs=-Xmx4096m
org.gradle.parallel=true
org.gradle.daemon=true
```

4.3 Step 3: Configure Build.gradle

Edit file: `android/app/build.gradle`

Find the `android {` block (around line 100) and add:

```
android {
    // ... existing code ...

    signingConfigs {
        debug {
            storeFile file('debug.keystore')
            storePassword 'android'
            keyAlias 'androiddebugkey'
            keyPassword 'android'
        }
        release {
            if (project.hasProperty('MYAPP_UPLOAD_STORE_FILE')) {
                storeFile file(MYAPP_UPLOAD_STORE_FILE)
                storePassword MYAPP_UPLOAD_STORE_PASSWORD
                keyAlias MYAPP_UPLOAD_KEY_ALIAS
                keyPassword MYAPP_UPLOAD_KEY_PASSWORD
            }
        }
    }

    buildTypes {
        debug {
            signingConfig signingConfigs.debug
        }
        release {
            signingConfig signingConfigs.release
            minifyEnabled false
            proguardFiles getDefaultProguardFile("proguard-android.txt"),
                          "proguard-rules.pro"
        }
    }
}
```

5 Build APK

5.1 Build Commands

```
# Navigate to android folder
cd android

# Make gradlew executable (one-time)
chmod +x gradlew

# Clean previous builds
./gradlew clean

# Build release APK
./gradlew assembleRelease
```

Note

Build time: 5-10 minutes (first time)

5.2 Locate Built APK

APK file location:

`android/app/build/outputs/apk/release/app-release.apk`

Copy to Desktop:

```
cd ..
cp android/app/build/outputs/apk/release/app-release.apk \
   ~/Desktop/MyApp.apk
```

6 Rebuild After Changes

6.1 For Code-Only Changes

When you only change JavaScript/TypeScript code:

```
cd android
./gradlew clean
./gradlew assembleRelease
```

6.2 For Dependency or Config Changes

When you install new packages or change native configuration:

```
# From project root
rm -rf android
npx expo prebuild --platform android --clean

# Reconfigure signing (Steps 2 & 3 from Section 4)

# Then build
cd android
./gradlew assembleRelease
```

7 Common Errors & Solutions

7.1 Error: ANDROID_HOME not set

Solution:

```
export ANDROID_HOME=$HOME/Library/Android/sdk
source ~/.zshrc
echo $ANDROID_HOME  # Verify
```

7.2 Error: SDK location not found

Solution: Create `android/local.properties`

```
sdk.dir=/Users/yourusername/Library/Android/sdk
```

7.3 Error: Permission denied: gradlew

Solution:

```
cd android
chmod +x gradlew
```

7.4 Error: Keystore not found

Solution: Verify keystore location

```
ls android/app/my-upload-key.keystore
# If missing, recreate from Section 4.1
```

7.5 Error: Out of Memory

Solution: Increase Gradle memory in `gradle.properties`

```
org.gradle.jvmargs=-Xmx6144m
```

8 Testing APK

8.1 Install via ADB

1. Enable **USB Debugging** on Android phone
2. Connect phone via USB
3. Run commands:

```
# Check device connection
adb devices

# Install APK
adb install ~/Desktop/MyApp.apk
```

8.2 Install via File Transfer

1. Copy APK file to phone
2. Open APK with File Manager
3. Enable **"Install from Unknown Sources"** in settings
4. Install the app

9 App Configuration

9.1 Update App Name

Edit `app.json`:

```
{
  "expo": {
    "name": "Your App Name",
    "slug": "your-app-slug",
    "android": {
      "package": "com.yourcompany.yourapp",
      "versionCode": 1,
      "versionName": "1.0.0"
    }
  }
}
```

9.2 Update Android App Name

Edit `android/app/src/main/res/values/strings.xml`:

```
<resources>
    <string name="app_name">Your App Name</string>
</resources>
```

10 Useful NPM Scripts

Add to `package.json`:

```
{
  "scripts": {
    "android:clean": "cd android && ./gradlew clean && cd ..",
    "android:build": "cd android && ./gradlew assembleRelease && cd ..",
    "android:install": "adb install android/app/build/outputs/apk/release/app-release.apk",
    "android:full": "npm run android:clean && npm run android:build",
    "android:copy": "cp android/app/build/outputs/apk/release/app-release.apk ~/Desktop/MyApp-$(date +%Y%m%d).apk"
  }
}
```

Usage:

```
bun run android:full      # Clean + Build
bun run android:install   # Install on device
bun run android:copy      # Copy to Desktop
```

11 Pre-Build Checklist

Node.js 22+ installed

Bun installed

Android Studio installed with SDK

Java JDK 17+ installed

Environment variables configured

`ANDROID_HOME` verified

Keystore created

`gradle.properties` configured

`build.gradle` signing configured

App name updated in `app.json`

App icons added to `assets/images/`

12 Additional Tips

12.1 Clear Cache Issues

```
# Clear all caches
rm -rf node_modules .expo
bun install

# Clear Metro bundler cache
npx expo start --clear

# Clear Gradle cache
cd android
./gradlew clean
./gradlew --stop
```

12.2 Reduce APK Size

Edit `android/app/build.gradle`:

```
buildTypes {
    release {
        minifyEnabled true
        shrinkResources true
        proguardFiles getDefaultProguardFile("proguard-android-optimize.txt"),
                      "proguard-rules.pro"
    }
}
```

12.3 Generate Multiple APKs (per Architecture)

```
splits {
    abi {
        enable true
        reset()
        include 'armeabi-v7a', 'arm64-v8a'
        universalApk true
    }
}
```

13 Troubleshooting Guide

Issue	Solution
Build fails with Java error	Verify Java 17+ installed, check JAVA_HOME
Gradle daemon issues	Run `./gradlew --stop` and rebuild
Metro bundler not starting	Run `npx expo start --clear`
404 errors in production	Check routing, rebuild fresh APK
Keystore password forgotten	Create new keystore (development only)
APK not installing	Enable "Unknown Sources" on phone
Bottom tabs overlap	Adjust tabBarStyle height/padding

14 Resources

- Expo Documentation: https://docs.expo.dev/
- React Native Docs: https://reactnative.dev/
- Android Studio: https://developer.android.com/studio
- Gradle Guides: https://docs.gradle.org/

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