

MODEL AR-1 KIT

MODERN PRINT LOGGER FOR MIDMARK M9/M1 1 AUTOCLAVE

- All print data normally sent to printer is sent wirelessly to Android device where it is clearly displayed and logged to internal memory.
- For autoclaves with or without a dot matrix printer. Replaces dot matrix printer.
- The user dedicates an Android device (tablet) for 24/7 logging of sterilization cycles.



Log and clearly view all cycle events with a common android tablet.

AR1-KIT:

1 Pc. Part# Bluetooth Sender:



1 Pc. Android software .apk application

Note: Android device is not supplied.

HIGH MEMORY CAPACITY:

- ▶ Android saves over 2 million sterilization cycles
- ▶ Cycle data is appended to a single log file as a text file in Android internal memory.
- ▶ Each sterilization cycle is also logged as a separate .jpg photo providing a more tamperproof record for auditing.

CLEAR DISPLAY OF CYCLE PROGRESS:

- ▶ View each step of the sterilization cycle as it occurs
- ▶ The display print lines are scrollable
- ▶ Choose larger size tablet for a display readable at a distance.
- ▶ Choose background and text colors to suit your need.

WIRELESS CONNECTION TO AUTOCLAVE:

- ▶ Bluetooth communication to 45 feet
- ▶ Strategically locate tablet in a hallway or another room for the best workflow advantage.

EACH CYCLE IS TIMESTAMPED:

- ▶ Both the beginning and end of the sterilization cycle is timestamped.
- ▶ Reliable Android time is used.

ANDROID COMPATIBILITY:

- ▶ General vast compatibility to old and new models. E.g. Year 2010 to present
- ▶ Typical manufacturers: Samsung, Amazon Fire
- ▶ WiFi or internet not required.

ts_log.txt (file excerpt)

```
STERILIZING
mm:ss  Degrees  PSI
0:00  271.5  F  28.1
0:30  272.1  F  28.2
1:00  272.1  F  28.2
1:30  272.2  F  28.2
2:00  272.2  F  28.3
2:30  272.3  F  28.3
3:00  272.4  F  28.3
3:30  272.4  F  28.3
4:00  272.3  F  28.3
4:30  272.4  F  28.3
5:00  272.4  F  28.2
5:30  272.3  F  28.3
6:00  272.4  F  28.3
6:30  272.4  F  28.4
7:00  272.4  F  28.4
7:30  272.4  F  28.4
8:00  272.4  F  28.4

Min  271.5  F  28.1
Max  272.4  F  28.4

VENTING CHAMBER

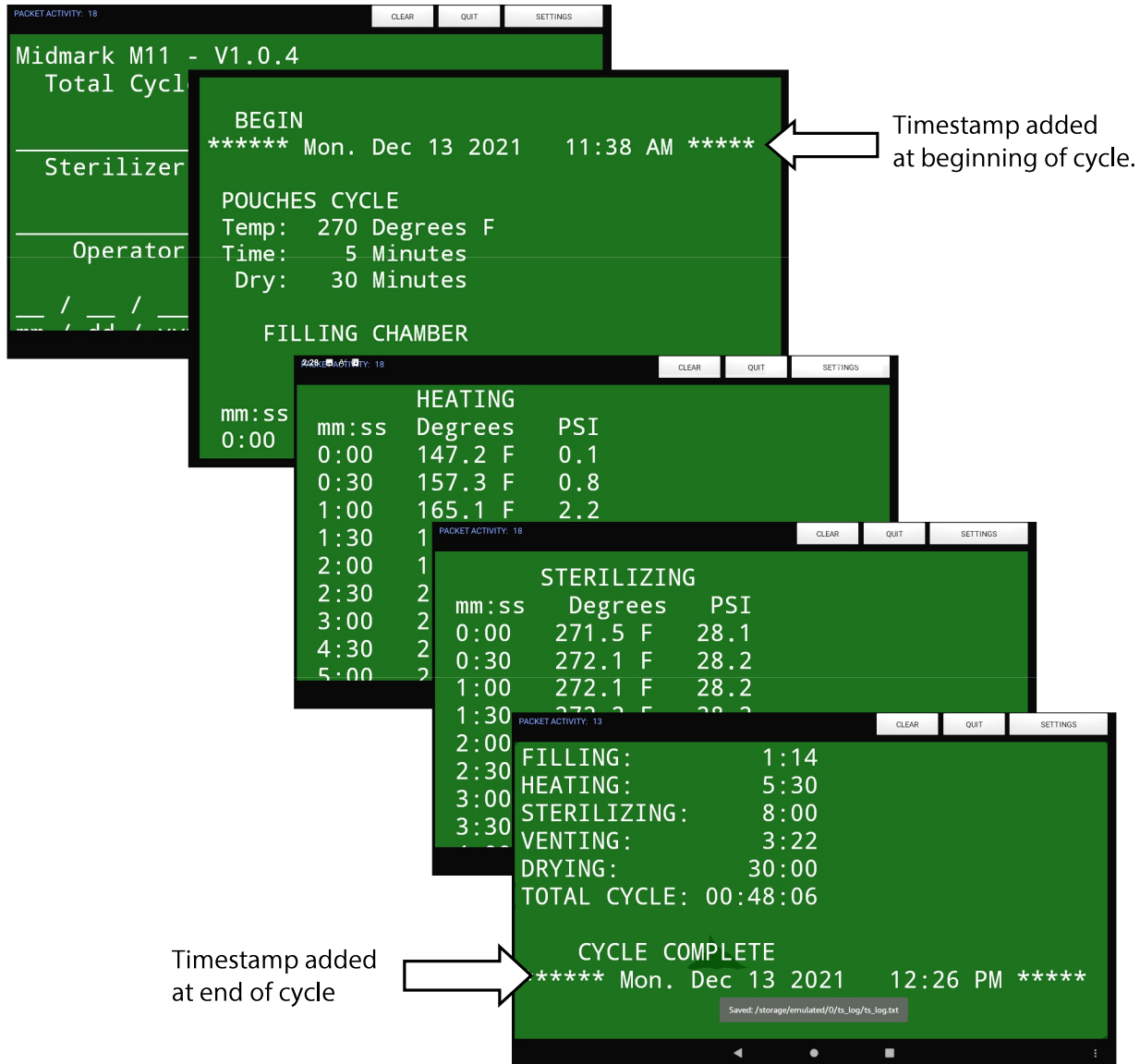
DRYING
mm:ss
0:00  Drying Start
5:00
10:00
15:00
20:00
25:00
30:00  Drying Complete

FILLING:      1:14
HEATING:      5:30
STERILIZING:  8:00
VENTING:      3:22
DRYING"      30:00
TOTAL CYCLE:  00:48:06

CYCLE COMPLETE
***** Mon, Dec 13 2021 12:26 PM *****
```

EXAMPLE SCREEN PRINTOUT:

- The normal printer data is printed to the Android screen line by line as the cycle progresses.
- The user may scroll back lines.
- The beginning of the cycle is timestamped.
- The end of cycle is timestamped.



Special Alert Screen For User:

When a sterilization cycle is finished, a special bright green screen can be displayed to alert the user at a distance of "CYCLE COMPLETE".

This feature is very handy as it can save visitation steps to the sterilizer to check status.

Setup the tablet at a strategic location where the screen is in plain view to users.

Choose this feature in the app Settings screen.

HARDWARE INSTALLATION:

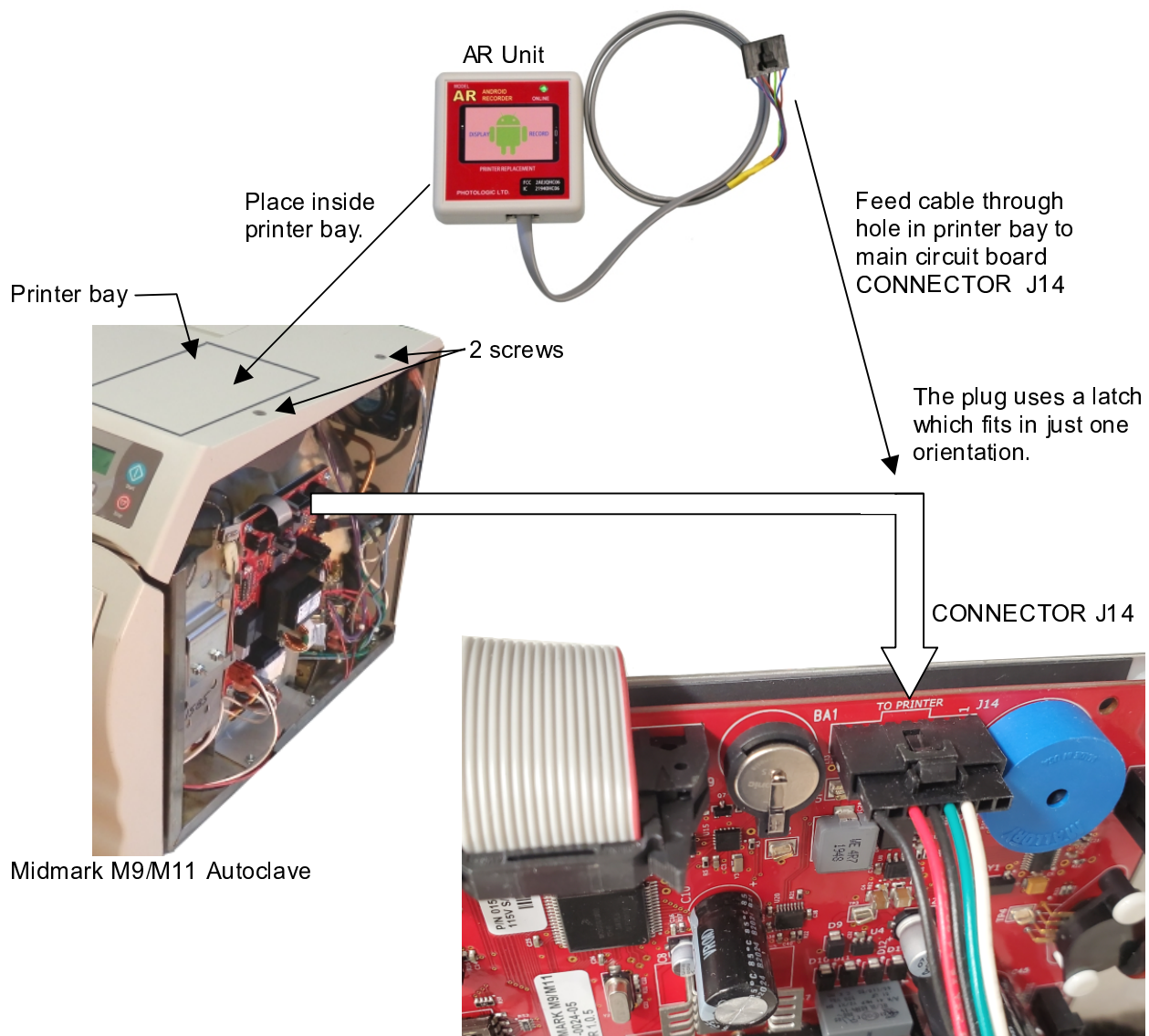
This procedure should be performed by a service technician.



CAUTION

Unplug power to autoclave before removing any covers or performing service work to prevent risk of shock.

- 1.) Unplug sterilizer power cord.
- 2.) Remove side panel: (2 top screws), See Midmark service manual if unsure.
- 3.) If dot matrix printer exists, then remove it from the printer bay, disconnect its cable using "press latch" from main circuit board CONNECTOR J14
- 4.) Replace the printer with AR Unit. Place AR Unit inside printer bay and add printer bay cover if available. Feed AR Unit cable through hole in printer bay to main board CONNECTOR J14
The cable plug uses a latch to orient the plug in the correct orientation.
- 5.) Replace metal side panel.
- 6.) The AR Unit installation is finished.



The user may proceed to install software .apk application on an Android tablet device.

SOFTWARE FOR ANDROID:

Typical software application name: starts with "ar" prefix e.g. **ar-2.apk**

The software is supplied with the AR-1 KIT e.g. web link, or USB drive

The software .apk file can be transferred to the Android by choice of several methods:

- Download from web link
- Email to Android
- USB cable from PC to Android
- Micro SD card connected to Android using OTG USB Adapter

To install the app:

- 1.) Click on the ar-1.apk file provided. The name may vary, but the prefix will be "ar".
- 2.) Android will ask for your permission to install.
- 3.) After the app is installed, the icon will be as shown: Android Icon:



- 4.) When the app is opened it will try to connect to the Midmark AR Unit by Bluetooth. Bluetooth Pairing setup is required just for the first time opening the app.

Pairing Example:

- Go to Android Settings
- Turn Bluetooth Communication = ON
- "Scan for Bluetooth devices", or "Pair new device"
- Choose an available device with prefix name "Midmark", e.g. **Midmark-22**
- Use pairing password: **"1234"**

- 5.) After Midmark AR-Unit is paired, then that Bluetooth name can be set to automatically connect the Midmark AR Unit to the AR Android app.

Go to AR app: Settings > AUTO CONNECT SETUP > e.g. choose **Midmark-22** in the drop down list.
Press: SAVE SETTINGS

Settings screen:

Annotations:

- Helpful Green Screen alert informs user at a distance that sterilization cycle is complete.
- Link Midmark to Android
- Save
- Set user screen color and text color.

- 6.) Re-open the AR app, then the Android will automatically connect to the Midmark AR Unit within 10 seconds and be ready to log and display Midmark sterilizer cycle print lines. Top of screen says: **CONNECTED**

NORMAL OPERATION THEREAFTER:

Whenever the Android AR app is opened it will automatically connect the the Midmark AR Unit and be ready to log and display Midmark sterilizer cycle print lines. No other user intervention is required.

TRANSFERRING ANDROID LOG FILE TO PC:

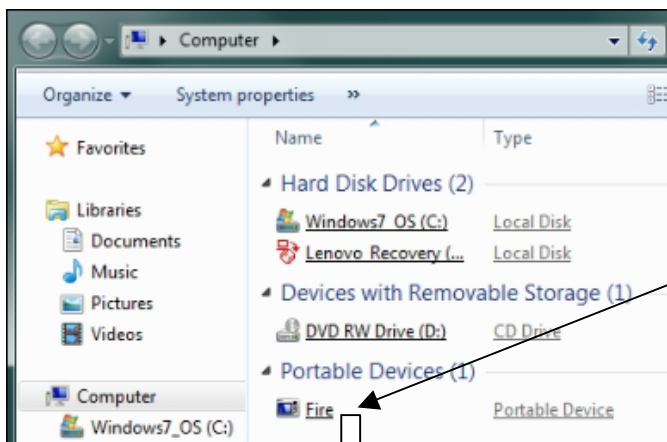
Your Android internal memory will save at least 2 million sterilization cycles in the **ts_log.txt** file. The user may wish to archive the log file to a PC occasionally, e.g. every 30-60 days or more.

There are several methods to transfer the log file to PC:

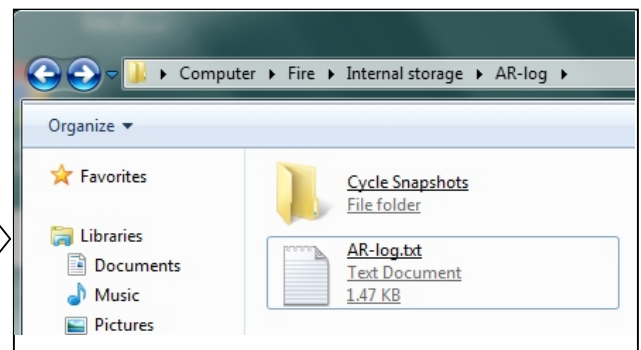
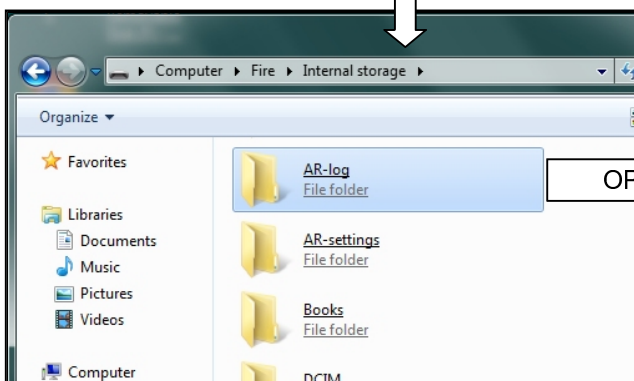
- 1.) Email the file if your Android has WiFi and internet setup.
- 2.) Use an Android "File Explorer" app to copy the log file to a MicroSd card using an Android OTG USB adapter.
- 3.) Use a USB Cable from Android to a PC. The PC can see the Android memory as a disk drive folder.
- 4.) Potential opportunities exist for users or developers to use WiFi sharing applications so that networked PC's can view and transfer the Android log file by WiFi.

Using a USB Cable to Transfer Log File To PC:

- ▶ Plug the USB Charging cable that came with the Android device to a PC USB Port
- ▶ In Android Settings assign the USB cable for "file transfer", not charging use.
- ▶ Example for Amazon Fire Tablet: Settings > Connected Devices > USB > "Use USB for File Transfer"



Android device appears as disk drive, (e.g. Amazon Fire tablet), when the USB cable is plugged into PC.



Drag these files to a folder of your choice on the PC

The above is an example using Amazon Fire tablet. Other tablets (e.g. Samsung) use the same idea but the folders may be located in other areas of the tablet memory. Use an Android "File Explorer" to find the log folder (AR-log) if you wish to check the log file without a PC.

TWO PRODUCTS OF LOGGING

1.

File: AR-log > AR-log.txt

```

STERILIZING
mm:ss Degrees PSI
0:00 271.5 F 28.1
0:30 272.1 F 28.2
1:00 272.1 F 28.2
1:30 272.2 F 28.2
2:00 272.2 F 28.3
2:30 272.3 F 28.3
3:00 272.4 F 28.3
3:30 272.4 F 28.3
4:00 272.3 F 28.3
4:30 272.4 F 28.3
5:00 272.4 F 28.2
5:30 272.3 F 28.3
6:00 272.4 F 28.3
6:30 272.4 F 28.4
7:00 272.4 F 28.4
7:30 272.4 F 28.4
8:00 272.4 F 28.4

Min 271.5 F 28.1
Max 272.4 F 28.4

VENTING CHAMBER

DRYING
mm:ss
0:00 Drying Start
5:00
10:00
15:00
20:00
25:00
30:00 Drying Complete

FILLING: 1:14
HEATING: 5:30
STERILIZING: 8:00
VENTING: 3:22
DRYING: 30:00
TOTAL CYCLE: 00:48:06

CYCLE COMPLETE
***** Mon. Dec 13 2021 12:26 PM *****
    
```

This file contains all sterilization cycles appended into a single file.

- Enables quick searching through the whole history of sterilization cycles.

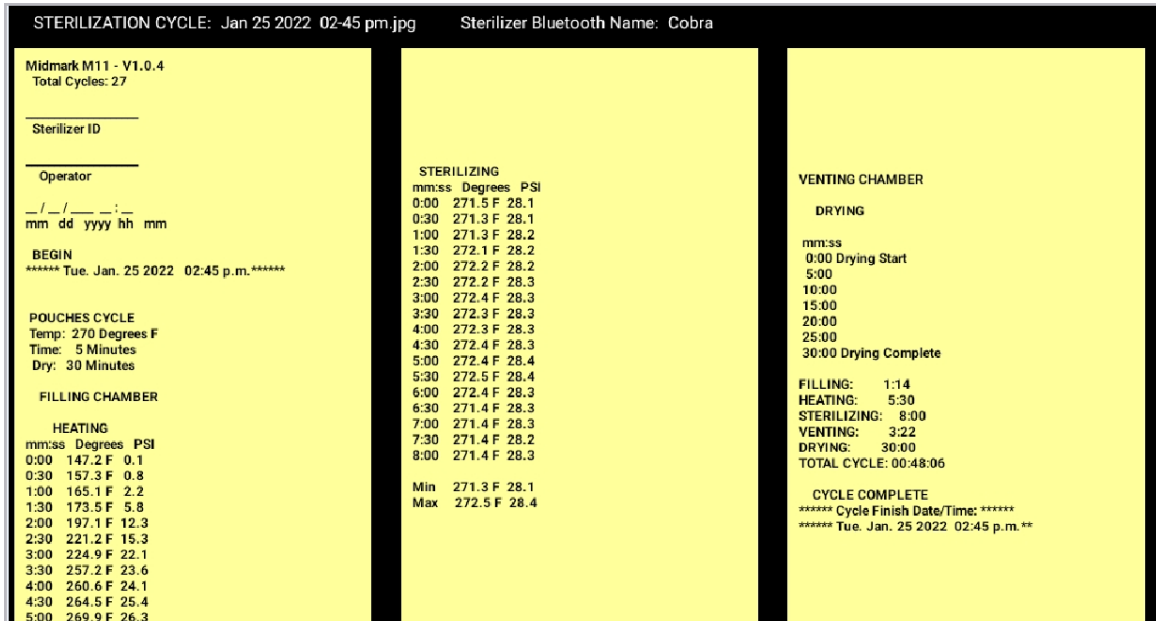
Example:

Search for a date with just one step (Notepad: "Find").

2.

File: AR-log > Cycle Snapshots > Jan 25 2022 02-45 pm.jpg

(Photo)



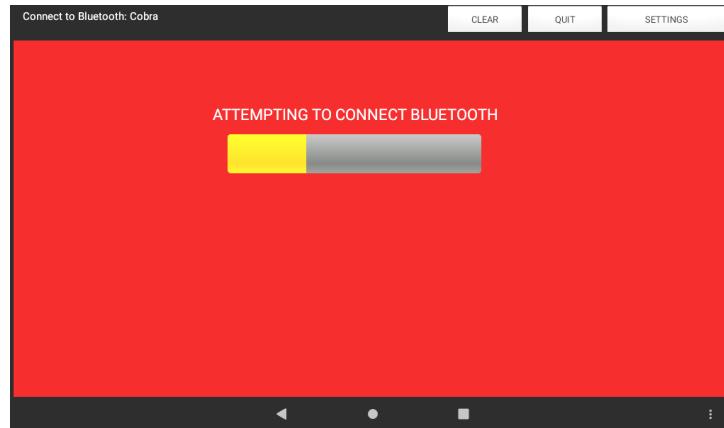
- Each sterilization cycle is saved as a .jpg photo and added to the AR-log > Cycle Snapshots folder.
- The photos have date filenames.
- The photo format provides tamper proof security for auditing compared to an editable text file.

OPERATION TIPS:

Red Screen:

The Android screen will turn red if Bluetooth connection is lost, e.g. if the Midmark sterilizer is powered off, or if tablet location is out of range (over 45 feet).

Red Screen: *shows that Bluetooth is disconnected:*



Starting Logger:

When app is opened: Automatic starting is attempted until Bluetooth connects. Then logging occurs.
When app is open, Bluetooth will attempt to connect until sterilizer is powered on. Then logging occurs.
As soon as Bluetooth is connected, the screen changes to user colors, and then logging occurs.

After Changing App Settings:

After settings are changed in SETTINGS screen, press SAVE, then close and reopen the app.
The Bluetooth connects within 10 seconds, and is ready to log/display sterilizer cycle data.

Continuous Operation:

The Android app operates 24 hours/day if the sterilizer is never powered down.

Turning Sterilizer Off Each Day:

The Android app may left on 24 hrs/day. When the sterilizer is powered down the Red screen attempts to reconnect Bluetooth. The next day when the sterilizer is powered on, the Bluetooth will automatically connect and the Android will be ready to record sterilizer cycle data without operator intervention.

Bluetooth Fails To Connect:

The sterilizer may be powered off. The Bluetooth may not be paired. Auto Connect Setup in app Settings Screen may be using a wrong Bluetooth name.

Popup: "Saved":

Everytime the app logs a data line to the Android memory, a small size message box will popup to verify that the data was saved. Ignore the "storage/emulated/0" path as a file explorer location will simply be internal memory: AR-og > AR-log.txt



3 second Pop-up:

Saved: /storage/emulated/0/AR-log/AR-log.txt

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Samsung, Amazon Fire

Model AR Unit Integrated radio: Emissions
FCC Part 15 Subpart C (Bluetooth) FCC ID: 2AEJQHC06
IC ID: (Bluetooth) 21940-HC06