

**COLLECT DATA REMOTELY BY EMAIL****SERIAL RS-232 RECORDER - EMAILER**

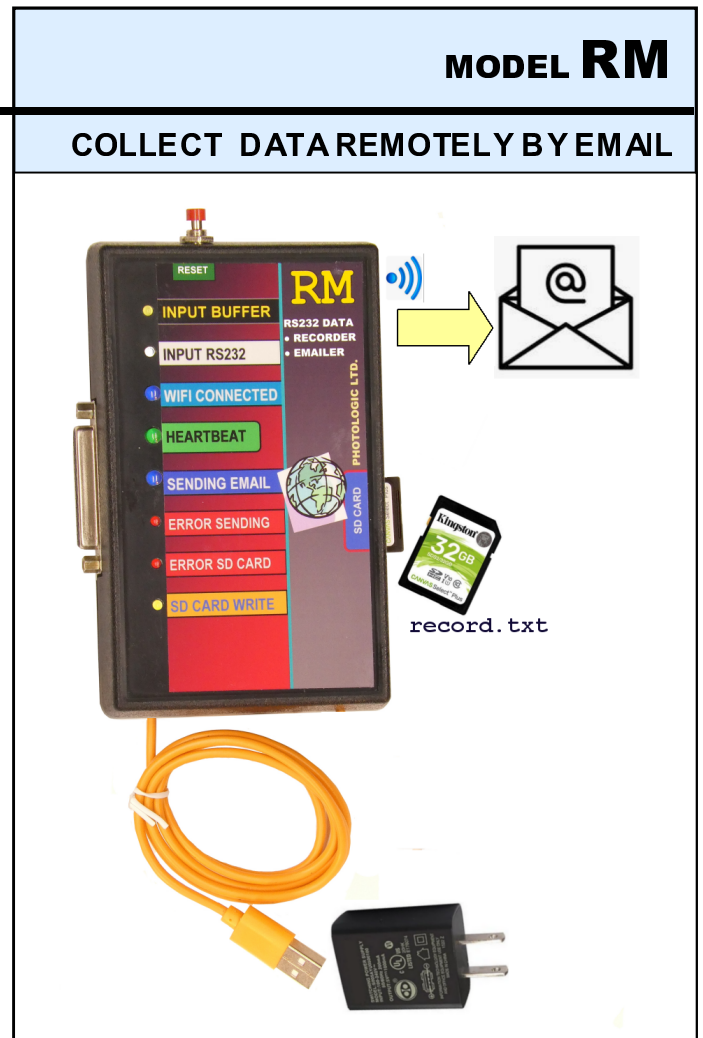
Model RM accepts RS232 serial text data from all sorts of measuring instruments, machines and print cables. All data is appended to a single SD Card file named record.txt

The user collects the record.txt file simply by sending an email request. Then the Model RM emails the record.txt to various recipients. The user can check measuring equipment or machines data reports remotely from another office, city, or country.

The RM requires no operator attention. Once configured, just power up with the USB cable.

After a power outage, WiFi or mail server interruption, the RM will automatically reboot and begin operating again without any user attention. It will always recover from a stall. This is an important feature for remote monitoring because the user may be miles away from the installation.

The RM unit can be simply tapped into existing cables to capture data in the background without interfering with an existing system. So no IT expertise is required to add remote monitoring/data capturing feature to your system.

**FEATURES:**

- RS-232 Serial Data Input "Text". Add Model CS-ZN-D25 for capturing Parallel LPT print cable data.
- Collect record.txt file by email. Set up a dedicated email account and use Model RM as a client.
- WiFi Connection For email. Wireless connectivity saves cabling. Longer range antenna option available.
- USB Cable Powered. Use a wallmount USB power adapter, or any convenient USB port.
- 8 LED Indicators. Helpful feedback at installation site to show operating status.
- SD Card holds an audit.txt file to record events for auditing such as power-ups, email transactions, errors.
- T-TAP25 optional cable can tap into existing systems for instant remote monitoring and data capture.
- Auto-Recovers After Power Outage, or Email Server Disconnections.

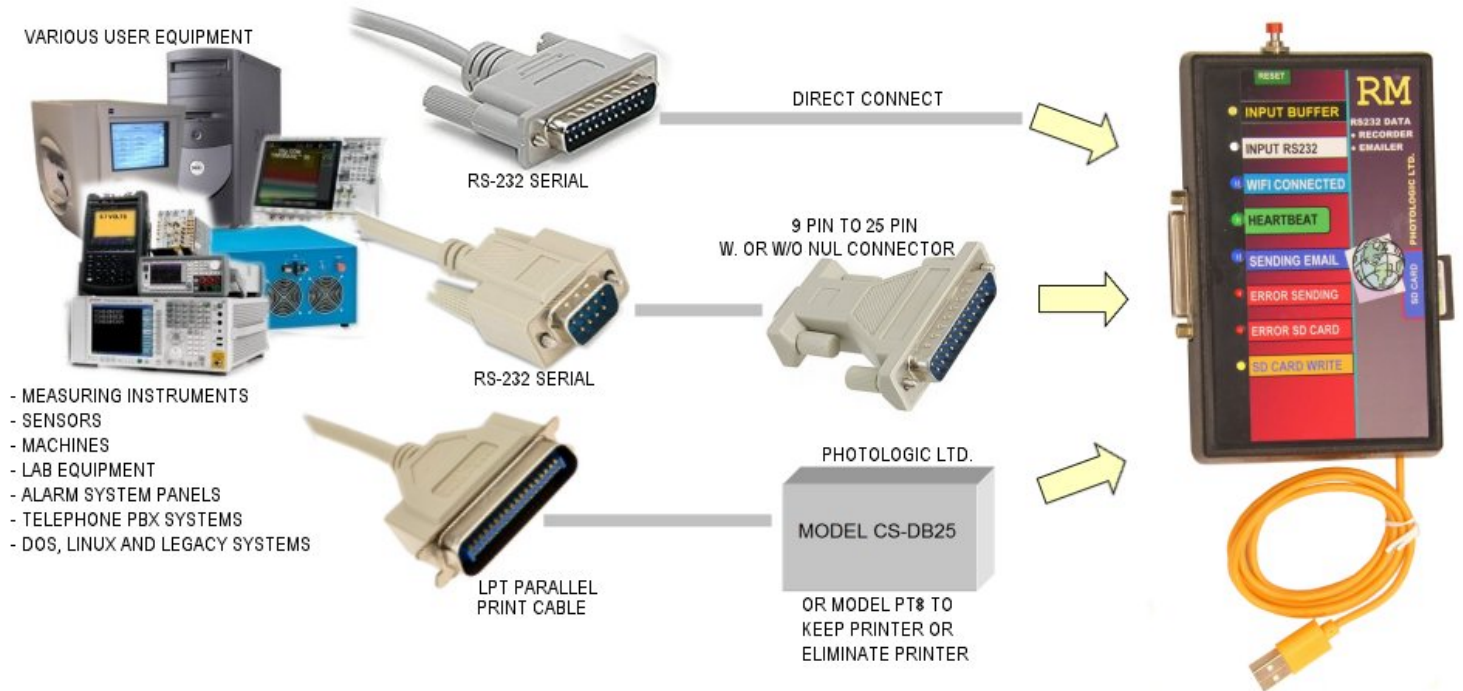
Example record.txt



record.txt

record.txt - Notepad						
File	Edit	Format	View	Help		
REST CYCLE		NEXT CYCLE		BATCH	LOT	
4-13-2024	11:42	4-13-2024	12:42	SAL3	11	
CYCLE DATA						
DATE	TIME	CHAMBER	STACK	PAL	SP	RESULT
4-13-2024	12:42	LR	80%	120.0	150.0	PASS
4-13-2024	12:52	LR	80%	121.0	150.0	PASS
4-13-2024	13:02	LR	80%	121.0	150.0	PASS
4-13-2024	13:12	LR	79%	121.2	150.0	PASS
4-13-2024	13:22	LR	79%	121.0	150.0	PASS
4-13-2024	13:32	LR	79%	120.8	150.0	PASS
4-13-2024	13:42	LR	80%	120.8	150.0	PASS
4-13-2024	13:52	LR	80%	120.7	150.0	PASS
4-13-2024	14:02	LR	80%	120.9	150.0	PASS
4-13-2024	14:12	LR	81%	120.0	150.0	PASS
4-13-2024	14:22	LR	81%	120.0	150.0	PASS
4-13-2024	14:32	LR	81%	120.0	150.0	PASS

## CONNECTING TO MODEL RM:



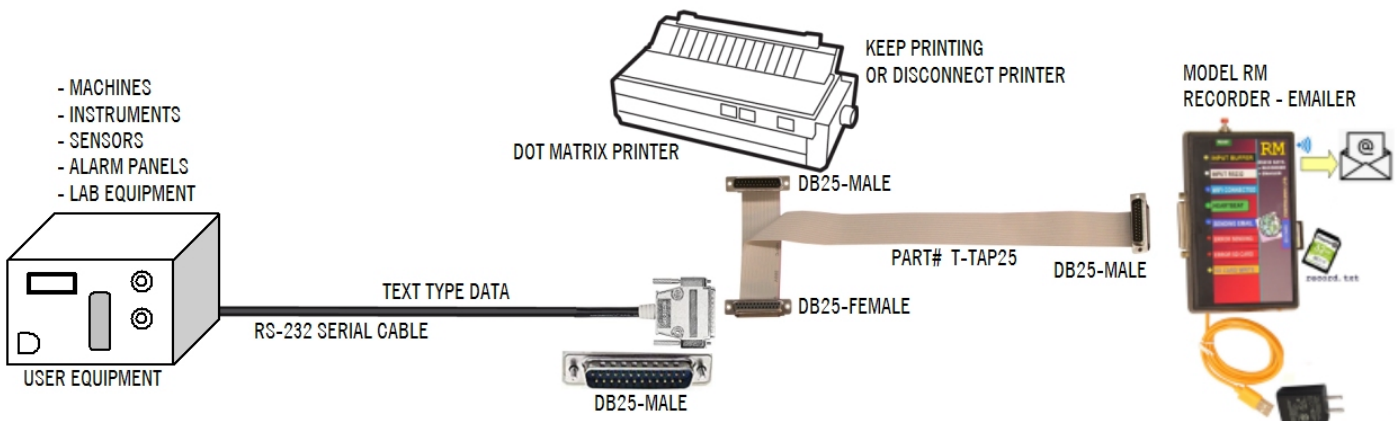
- Capture text data from all sorts of equipment that output text reports using a RS-232 serial interface. Match connectors of your serial port with a combination of gender changer, nul cable, or 9 to 25 pin adapter.

User equipment back panel may utilize these type of connectors for RS-232 Serial Interface:



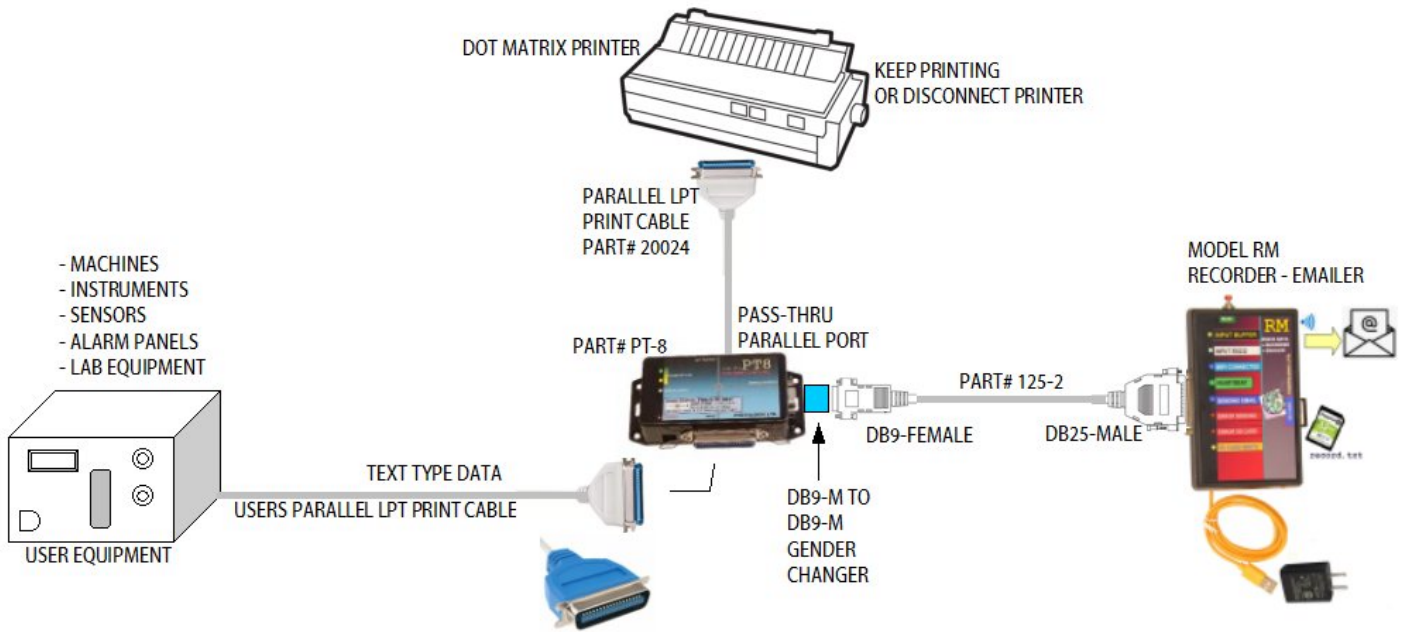
Check the machine user guide to confirm that a 25 pin interface connector is RS-232 serial, not LPT parallel.

### TAP INTO AN EXISTING SYSTEM USING T-TAP25 SPLITTER CABLE



- User continues to print normally, but also has both a record.txt file and a collectable email of the print data.

## TAP INTO AN LPT PARALLEL PRINTER INTERFACE



- User continues to print normally, but also has both a record.txt file and a collectable email of the print data.

### BASIC OPERATION:

- The RM unit acts as an email client.
- The RM user should acquire an email account with domain name to be dedicated solely for Model RM use:  
Example: Bluehost web hosting webmail or web site with one email address. \$39USD /year Yr 2024  
Example of a user's email address may be: **rm@sterilizer-mini5.com**  
The email account you choose should be plain and basic without two-step verification.
- Configure Model RM with the IMAP and SMTP server names. (SD Card > config.txt)
- Configure Model RM with the recipients to receive the record.txt print data. (SD Card > config.txt)  
The config.txt can be removed from SD Card to help keep credentials secure. Model RM will use internal memory.
- A user in any location sends an email to the example email address: **rm@sterilizer-mini5.com** with the Model RM command in Subject Line: "Model RM(send)". Body content in email is ignored.
- Model RM checks the webmail email Inbox every 30 sec.  
If it sees an email with Subject Line containing: "Model RM(send)" then Model RM will send SD Card **record.txt** as an attachment to recipients specified in SD Card > config.txt
- All emails in Inbox are then deleted. RM waits for next email command.
- Model RM continues to record user machine/instrument serial data while performing email transfers without data loss.  
This function is limited by any excessively long time periods to send an email to one or more recipients especially caused by the filesize of record.txt transfer being large.  
The 90,000 character serial input buffer eliminates most concerns.

## EMAIL COMMANDS:

*Include in Subject Line:*

- Model RM(send)**      Emails the full record.txt on SD card as attachment
- Model RM(audit)**      Emails audit.txt on SD card as attachment
- Model RM(erase)**      Erases record.txt on SD card.

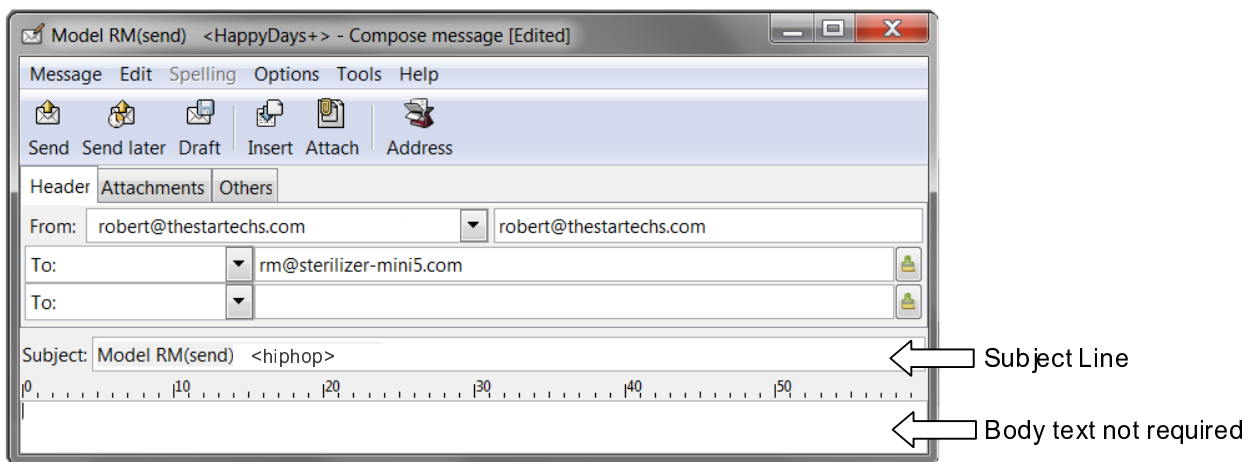
*FOR DATA SECURITY:*

*A configuration setting allows the user to include a password key in the Subject Line:*

- Model RM(send) <hiphop>**      Emails the full record.txt on SD card as attachment
- Model RM(audit) <hiphop>**      Emails audit.txt on SD card as attachment
- Model RM(erase) <hiphop>**      Erases record.txt on SD card.

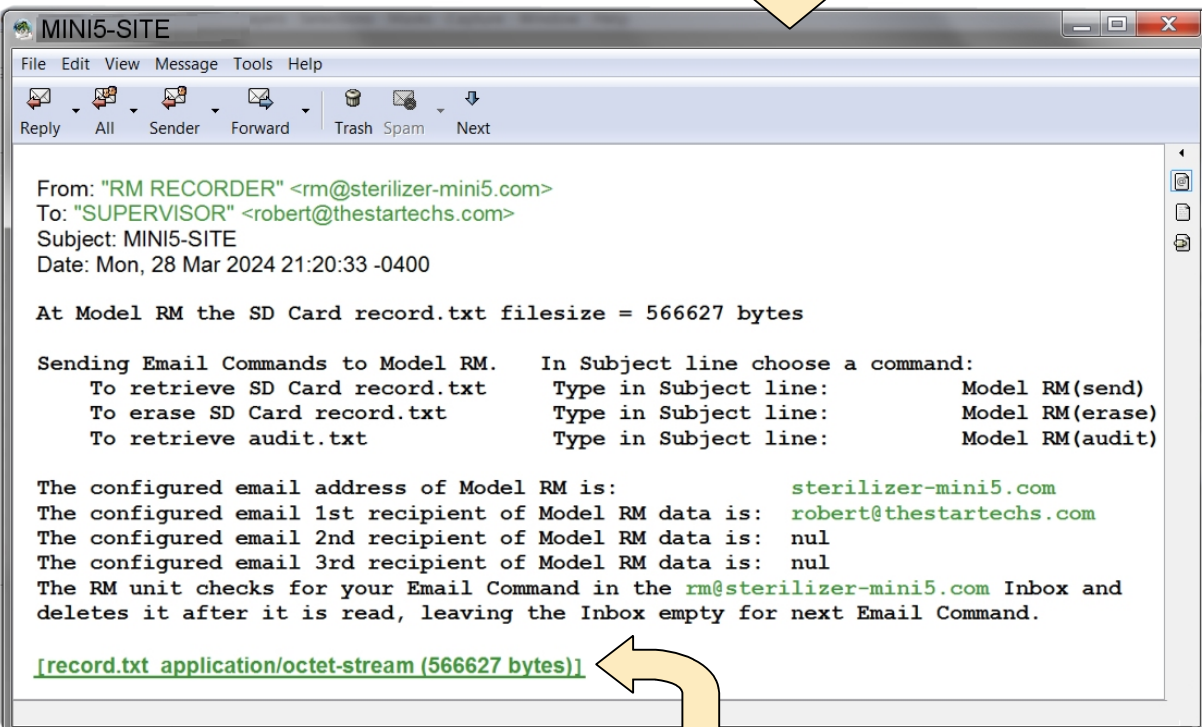
If the password key is not correct, then no data will be emailed.

## EXAMPLE EMAIL SENT TO MODEL RM UNIT:



*Above causes:*

## EXAMPLE EMAIL RECEIVED FROM MODEL RM UNIT:

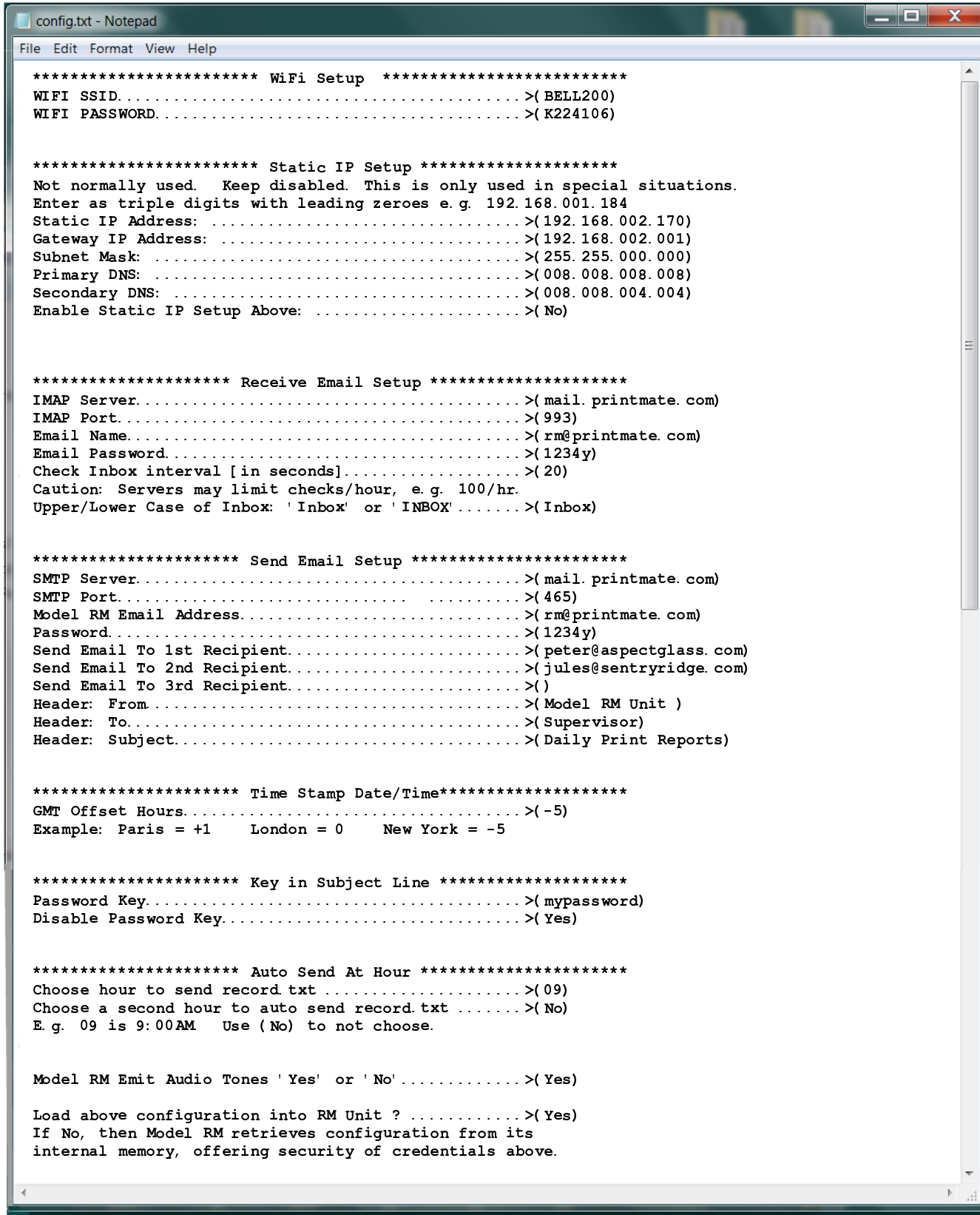


## CONFIGURATION:

SD Card > config.txt

Edit values in parentheses: ( )

EXAMPLE OF A USERS CONFIGURATION:



```
config.txt - Notepad
File Edit Format View Help

***** WiFi Setup *****
WIFI SSID.....>(BELL200)
WIFI PASSWORD.....>(K224106)

***** Static IP Setup *****
Not normally used. Keep disabled. This is only used in special situations.
Enter as triple digits with leading zeroes e.g. 192.168.001.184
Static IP Address:.....>(192.168.002.170)
Gateway IP Address:.....>(192.168.002.001)
Subnet Mask:.....>(255.255.000.000)
Primary DNS:.....>(008.008.008.008)
Secondary DNS:.....>(008.008.004.004)
Enable Static IP Setup Above:.....>(No)

***** Receive Email Setup *****
IMAP Server.....>(mail.printmate.com)
IMAP Port.....>(993)
Email Name.....>(rm@printmate.com)
Email Password.....>(1234y)
Check Inbox interval [in seconds].....>(20)
Caution: Servers may limit checks/hour, e.g. 100/hr.
Upper/Lower Case of Inbox: 'Inbox' or 'INBOX'.....>(Inbox)

***** Send Email Setup *****
SMTP Server.....>(mail.printmate.com)
SMTP Port.....>(465)
Model RM Email Address.....>(rm@printmate.com)
Password.....>(1234y)
Send Email To 1st Recipient.....>(peter@aspectglass.com)
Send Email To 2nd Recipient.....>(jules@sentryridge.com)
Send Email To 3rd Recipient.....>()
Header: From.....>(Model RM Unit )
Header: To.....>(Supervisor)
Header: Subject.....>(Daily Print Reports)

***** Time Stamp Date/Time*****
GMT Offset Hours.....>(-5)
Example: Paris = +1 London = 0 New York = -5

***** Key in Subject Line *****
Password Key.....>(mypassword)
Disable Password Key.....>(Yes)

***** Auto Send At Hour *****
Choose hour to send record.txt.....>(09)
Choose a second hour to auto send record.txt.....>(No)
E.g. 09 is 9:00AM Use (No) to not choose.

Model RM Emit Audio Tones 'Yes' or 'No'.....>(Yes)

Load above configuration into RM Unit ?.....>(Yes)
If No, then Model RM retrieves configuration from its
internal memory, offering security of credentials above.
```

## To Adopt config.txt Settings:

Press “RESET” pushbutton after SD Card is installed.

User should make a backup of config.txt and delete it from the SD Card to protect access to credentials.



**SWITCH SETTINGS:**

SWITCH BLOCK 1

SWITCH BLOCK 2

SWITCH	SERIAL INTERFACE INPUT								SWITCH		
	BAUD								1	ON = MAKE A DEFAULT TEMPLATE CONFIG.TXT ON SD CARD	
	600	1200	2400	4800	9600	19200	38400	57600	2		NOT USED
1	OFF	OFF	OFF	OFF	ON	ON	ON	ON	3		NOT USED
2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	4		NOT USED
3	OFF	ON	OFF	ON	OFF	ON	OFF	ON	5	NOT USED	
4	ON = USE PARITY BIT				OFF = NO PARITY BIT				6	NOT USED	
5	ON = ODD PARITY				OFF = EVEN PARITY				7	OFF = 3.5 MIN. TIMEOUTS ON = 7 MIN. TIMEOUTS	
6	ON = 7 DATA BITS				OFF = 8 DATA BITS				8	ON ALWAYS	
7	ON = AUTO LINEFEED				OFF = NO AUTO LINEFEED						
8	NOT USED										

THE SWITCH DIAGRAM ABOVE SHOWS SERIAL INTERFACE INPUT SETTING FOR:  
**9600 BAUD, 8 DATA BITS, NO PARITY BIT**

**SD CARD:**

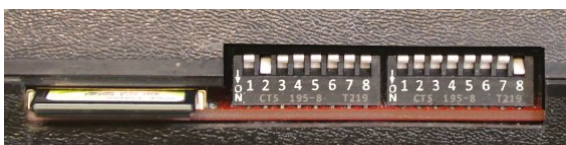
**Choose 2GB to 32 GB**  
 Popular Standard Original Type: "SD"  
 [ Not microSD  
 [ Not miniSD

**Scope of Capacity:**  
 2 GB size will store about 2,000,000,000 text characters.  
 This capacity far exceeds most users needs, as  
 2 million 1,000 character reports can be saved.

Files On SD Card:

**record.txt**  
**config.txt**  
**audit.txt**

**SIDE VIEWS:**



Standard SD Card    Dip Switches Set Serial Baud Rate



Input: Serial RS-232 Sub-D25 25 Pin Female Connector

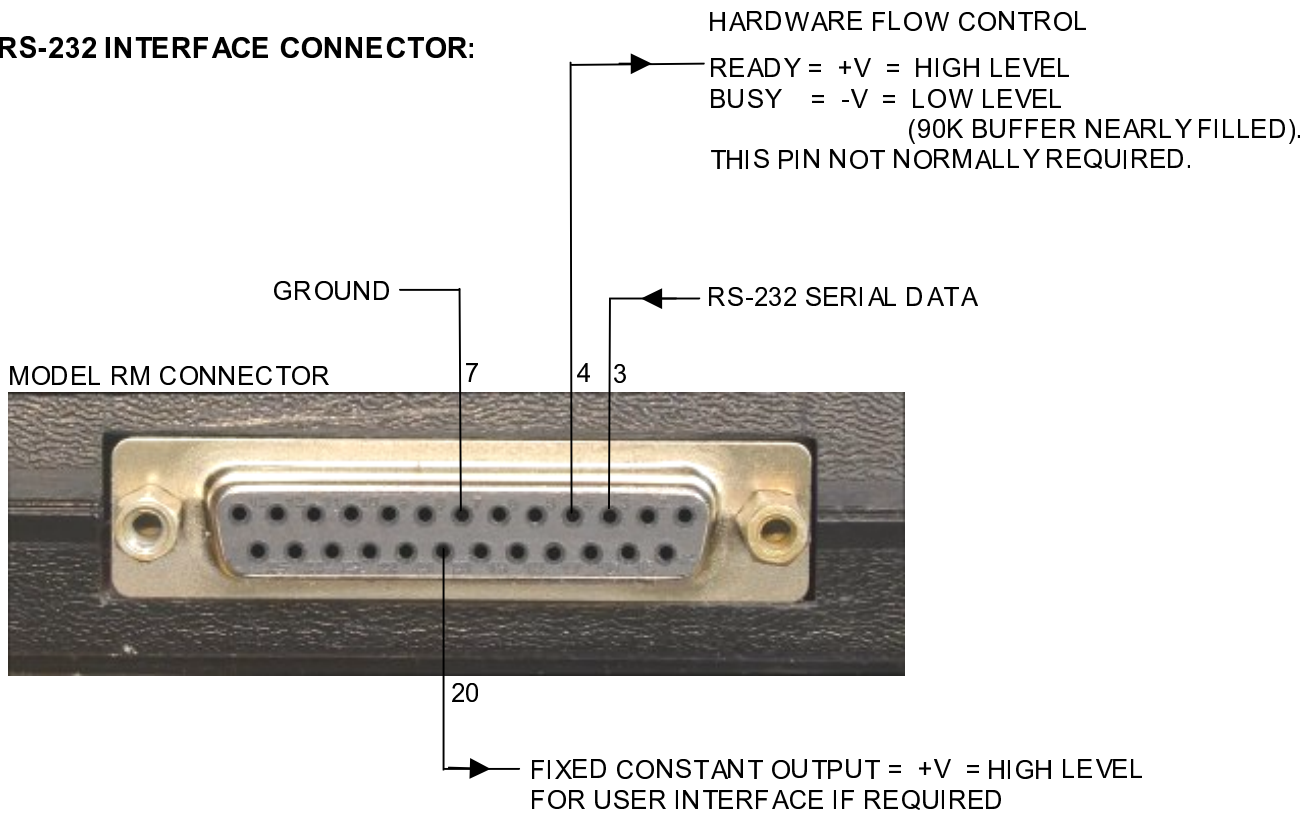
## EXAMPLE AUDIT.TXT ENTRIES:

- ▶ Model RM writes audit information into the SD Card `audit.txt` file.
- ▶ The user may collect this file remotely by email.
- ▶ This file can be very helpful to log events that may affect the performance or security of operation.
- ▶ This file can only be erased by deleting it from the SD Card mounted in a PC.

audit.txt

```
record.txt sent successfully to:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 02/19/2024 18:29:54 record.txt = 7400342 bytes
SN24MAR18
=====
audit.txt sent successfully to:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 03/11/2024 13:56:07 record.txt = 7400342 bytes
SN24MAR18
=====
The password key failed when an email command was sent.
The password key is text between < > brackets in Email Subject Line
The password key text did not match Password Key in SD Card config.txt
The incorrect key used in Subject Line was:      mypassword2
Mon, 11 Mar 2024 14:26:09 -0400 SD Card record.txt = 7400342 bytes
=====
Model RM could not connect to IMAP server to check for mail.
Configured email recipients are:
                                1st Recipient:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 03/18/2024 12:47:39 record.txt = 7400342 bytes
SN24MAR18
=====
'IMAP Error' email sent successfully:
                                1st Recipient:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 03/18/2024 12:47:46 record.txt = 7400342 bytes
SN24MAR18
=====
Failed to connect to SMTP server.
At Boot Up: Tried but failed to send 'Power Up Success' email to:
                                1st Recipient:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
SMTP Server: mail.sterilizer-mini5.com or Email Address may be incorrect.
mm/dd/yyyy 03/18/2024 13:21:05 record.txt = 7400342 bytes
SN24MAR18
=====
Model RM booted up successfully with SD Card tested and WiFi connected.
Configured email recipients are:
                                1st Recipient:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 04/26/2024 11:53:19 record.txt = 60000 bytes
SN24MAR18 IP: 192.168.2.184 MAC: 64:B7:08:D0:9F:A4
=====
'Reset Success' email sent successfully:
                                1st Recipient:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 03/20/2024 21:41:52 record.txt = 60023 bytes
SN24MAR18
=====
Auto Send hour 04 of record.txt was sent.
record.txt sent successfully to:      robert@thestartechs.com
                                2nd Recipient:      nul
                                3rd Recipient:      nul
mm/dd/yyyy 03/28/2024 04:00:36 record.txt = 60023 bytes
```

**RS-232 INTERFACE CONNECTOR:**



- ▶ The interface looks like a printer to the user machine/measuring equipment.
- ▶ Model RM only requires Pin 3 and Pin 7 to operate.
- ▶ Your data cable does not have to be a printer cable. It may be any serial text data from your equipment serial port.

**TO SUPPORT OTHER SERIAL DATA CABLES:**

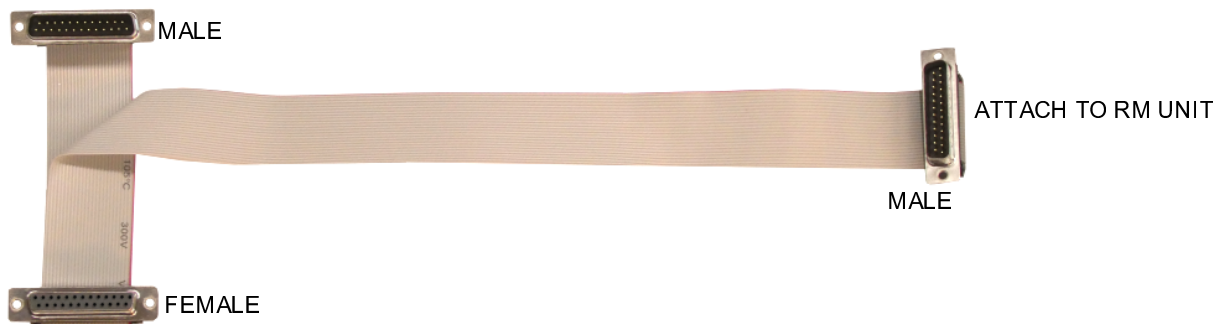
Use combinations of:

- NUL Model Cable/Adapter
- DB9 to DB25 Adapter
- Gender Changer



**OPTIONAL SPLITTER CABLE PART# T-TAP25**

- For capturing data in the background from existing setups.
- Capture machine/instrument reports remotely without IT skills or resources.
- Does not interfere with existing equipment setups as pass-thru is straight “copper” connection.
- Just plug into a D-Sub 25 Pin RS-232 serial port. Add Extension Cable or NUL Cable if required.





## FRONT PANEL:

### LED INDICATORS

Turns on whenever there is greater than 1 character in 90K character buffer.

Indicates presence of any serial data on D-SUB25 in terface connector Pin 3 whether Baud Rate is correct or not.

Turns on about 5 seconds after a reset.

Heartbeat blinks every couple of seconds to indicate to the user that the unit is functioning.

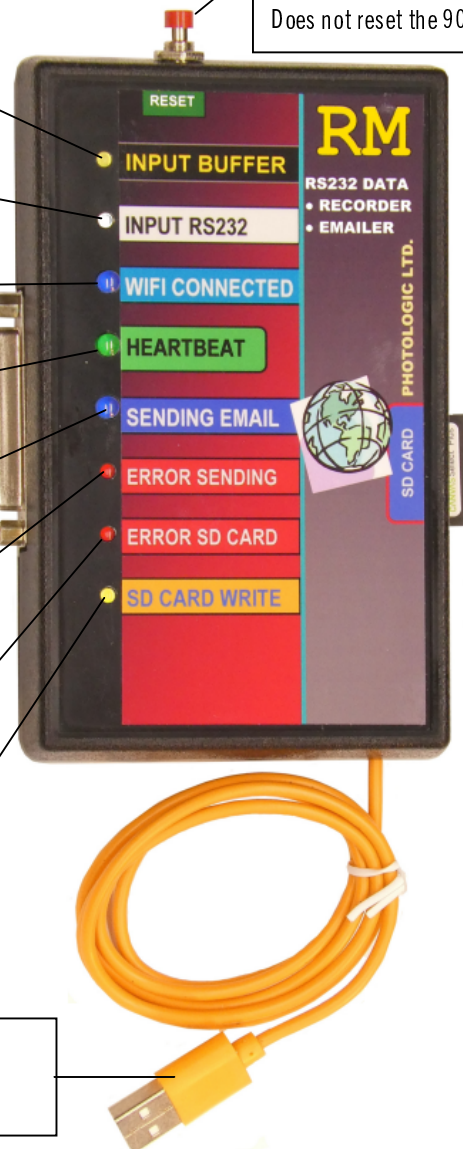
Turns on for the duration of sending one or more emails.

An email was attempted to be sent, but some failure existed. Possible reason is that the SMTP server refused connection or was unavailable.

The SD Card is Write/Read tested about every 30 sec. The error is displayed if card is defective or is removed.

Indicates that the serial data is being written to the SD Card. Provides user assurance of recording function.

Pushbutton resets the RM unit like a power reset. After pressing, the RM will attempt to connect WiFi and send an email with message: "RM Restarted" Does not reset the 90,000 character serial input buffer.



USB Cable for Power:  
Plug in to any convenient USB socket or  
Wallmount charger.

## WHEN INSTALLING RM UNIT:

### TO QUICKLY TEST SENDING EMAIL FUNCTION:

- Press Pushbutton to send a "RM RESTARTED" email. The Blue SEND LED will go on while email is being sent.

### TO VERIFY THAT THE CABLE WIRING TO RM UNIT SERIAL INPUT IS CORRECT:

- The White "INPUT RS232" LED will turn on when serial data from the machine/instrument is received. This works whether Baud Rate settings are correct or incorrect.

### WHEN USING A BRAND NEW SD CARD:

- Create an empty record.txt file on it before using.
- The RM unit will automatically create an empty audit.txt file.
- The RM unit will use its internal memory configuration settings, unless config.txt exists on the SD Card. Or else set SWITCH PACK2 #1 = ON to write a config.txt template that you can edit for your site.

## ABOUT EMAIL SERVERS:

It is recommended that the RM unit is configured to an independent dedicated email server.

### Reason:

The RM unit erases all emails in the server Inbox after the RM unit has received an RM email command from a remote user.

An independent dedicated email server for RM unit protects other business/personal email accounts from potential damages from any misbehaviour of the RM unit, such as excessive email transfers.

### Typical Setup:

The RM user should acquire an email account with domain name to be dedicated solely for Model RM use:

Example: "Bluehost" web hosting webmail or web site with one email address. \$39USD /year Yr 2024  
Upcharges like Domain Privacy + Protection is not mandatory and user can economize by not accepting such extra features.

Example of a user's email address may be: `rm@sterilizer-mini5.com`

- ▶ Choose an hosting account with IMAP and SMTP servers.
- ▶ IMAP Port 993 SMTP Port 465
- ▶ The email account you choose should be plain and basic without two-step verification.
- ▶ There are many inexpensive webmail hosting companies, so this should be a simple step.
- ▶ Perhaps name your domain to relate to the equipment/machine you are accessing remotely,  
e.g. `rm@sterilizer-mini5.com` for a sterilizer site.  
e.g. `rm@west-side-plaza3.com` for an alarm panel site.
  
- ▶ It may be possible to install several RM units with one web hosting account that supports multiple email addresses.

### About Google Email:

Two-Step Verification is mainly required, so such would not be compatible to Model RM use. It may be difficult to reopen a Gmail account in a timely manner if it was closed by Google due to unusual activity or too many password retries.

It is perhaps stricter than many other simple web mail accounts. Gmail may change user properties, operating procedures more frequently, so it could be harder to manage.

## ABOUT PROTECTING SERVER CREDENTIALS:

The server name and password is stated in the SD Card config.txt file.

To prevent exposure of this information to other users:

- Choose in config.txt:
- Make a backup of config.txt to a PC
- Reset Model RM *Loads config.txt into RM internal memory.*
- Remove config.txt from the SD Card.

The Model RM will then use the configuration information from its internal memory, not SD Card.

## STRATEGY OF COLLECTING DATA REMOTELY:

Elements that affect success are:

- **TIME TO SEND EMAIL:**

If the time sending the email is excessively long, then data from the user machine will build up in the 90,000 character buffer and possibly overflow. Try to keep record.txt filesize under 10MB. Consider reducing the number of email recipients if shorter email time is required.

- **BUFFER SIZE:**

RM buffer size is 90,000 characters. This equates to buffering 90 seconds of serial data at 9600 Baud (180 seconds at 4800 baud). Thus, in those cases where non stop constant data is being received with no gaps by the RM unit, the user should make sure that the email sending time is less than 90 seconds.

- **FILESIZE OF record.txt:**

Filesize affects the time required to send an email. The smaller the filesize, the quicker an email transfer will occur. Typical send time for a 2MB file is 60 seconds. 7MB file is 3.5 minutes

Scope of 2MB record.txt filesize:

If 1 data report from the user machine serial interface is 1,000 characters then 2MB filesize will store about  $2\text{ million}/1,000 = 2,000$  reports

<u>Data Report Size</u>	<u>record.txt size</u>	<u>Number of Reports Saved</u>
10,000 characters	2MB	200
1,000 characters	2MB	2,000
100 characters	2MB	20,000

It is expected from the above that the user will be able to store more reports than required in a reasonable file size of just 2MB.

### **Larger filesizes:**

7MB filesize may require 3.5 minutes to send an email to one recipient.

This is not a problem if the user machine serial data cannot fill the 90,000 character buffer in 3.5 minutes, as some machines/measuring equipment only send periodic reports.

The user may command the RM unit to send 7MB record.txt files only when the user machine is known to be idle.

### **Summary:**

Collect and erase record.txt frequently enough so that emailing large record.txt filesizes (e.g. 7MB) does not cause buffer overflow of any user machine data report being received concurrently.

## **COMMON ERROR SITUATIONS:**

### **SD CARD IS OUT:**

If SD Card is removed or becomes defective, during RM operation, there will not be an audit.txt entry indicating this as the card is unavailable to write to.

However an email is sent to recipients: "SD CARD MAY BE OUT"

When the SD Card is returned, the RM unit resets itself and sends a second email "RESTARTED".

Data logging will stop while the card is out, but the RM unit will continue to store the users serial data from the machine into the 90,000 character buffer. No data will be lost if the buffer does not overflow.

### **TIMEOUTS:**

If there is any condition that causes a timeout such as an inability to connect to the IMAP or SMTP server then Model RM will reset itself and begin again. The timeout value is settable to 3.5 min. or 7 min. using Switch Block2 Switch#1. This feature assures the user in a remote location that the RM unit will not permanently stall in a hangup situation, as it will always escape by itself with an RM reset.

A continual condition that causes a hangup may lead to numerous "RM RESTARTED" emails being sent. In that case choose timeout value of 7 min. to lessen the frequency.

If a large record.txt file size (e.g. 10 MB, 10 million characters) is being sent to one or more recipients, then the emails may require more than 3.5 minutes send time and cause a timeout.

In that case choose timeout value of 7 min.

### **IMAP SERVER CONNECTION FAILS:**

The Heartbeat LED stops beating and only the WiFi LED is on. Recording will not occur.

After a timeout is reached, the RM unit will reboot and a "RM RESTARTED" email will be sent. audit.txt file will show: "Reset Success" email was sent.

If IMAP server times out on it's own then RM unit emails: "IMAP Message" to alert the user, then resets and sends a "RM RESTARTED" email.

This error may exist at installation time when the IMAP server name or credentials are incorrect.

### **SMTP SERVER DOES NOT ACCEPT CREDENTIALS:**

Causes:

The server name or email name, domain, or password may be incorrect.

Symptom: The Blue SENDING EMAIL LED turns on.

The Red ERROR SENDING LED may turn on.

If SMTP server does not timeout, the RM unit will timeout (e.g. 3.5 minutes) and the RM unit is automatically rebooted to try again.

Two audit.txt file logs are created:

- 1.) "Failed to connect to SMTP server"
- 2.) "Model RM booted up successfully"

### **SMTP SERVER DOES NOT CONNECT:**

The SMTP port number may be incorrect, e.g. 466 rather than 465

Symptom: On power up the Blue SENDING EMAIL LED flashes on for 1 sec. followed by the Red ERROR SENDING LED turning on for up to 30 sec.

Green HEARTBEAT LED will beat

RM unit will log data but any request to send an email will fail and the above will be repeated.

***ABOUT SUITABILITY OF THIS EQUIPMENT AND DISCLAIMER:***

Information in this document and any subsequent hardware unit apparatus labeled as “Model RM” should not be interpreted as suitable for any particular use, application or performance.

No certifications are provided.

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