

ECG modem transmission and troubleshooting No:005D

1. Introduction

This SOP offers guidance on transmitting ECG recordings for analysis via a modem, it also offers some troubleshooting advice. Following a successful ECG recording from a subject the information obtained needs to be stored in the ECG "memory" database. This is achieved by following the guidelines laid down by SOP 004. Prior to sending it via the modem for analysis, data can be retrieved at any time. ECG data will be sent via the modem on a weekly basis.

2. Responsibilities

Research nurses trained in the method are responsible for transmitting ECG readings for analysis via the modem. They are also responsible for ensuring that the ECG machine is functioning and programmed correctly.

3. Equipment

- ECG machine (Siemens -Sicard 440)
- Modem (SB 2422)
- Telephone outlet socket

4. Method

4.1 Preparation of equipment

All ECG data needs to be sent via the modem to Professor Macfarlane (Glasgow, Scotland) for analysis. Each machine has been programmed to allow a manual transmission of this ECG data to the appropriate destination.

- Connect the modem to the ECG machine using the correct cable. Then ensure the mains supply is available to both the ECG and modem. The modem does not have an ON/OFF switch, but ensure that the ECG machine is switched onto the mains and not working on the battery.
- Connect the appropriate modem cable to the telephone socket.
- The modem buttons DO NOT need to be altered. The buttons displayed on the machine should not be depressed. These buttons are not required for ECG transmission for this study.
- DO NOT ATTEMPT TO TRANSMIT ANY ECG RECORDINGS UNTIL YOU HAVE TWO HARD COPIES OF THE READINGS. NO RECORDINGS CAN BE PRINTED AFTER TRANSMISSION.

4.2 ECG transmission

- Switch on the ECG machine using button 1 (OO).
- The machine will perform a self test. When completed the viewfinder will display "Self

test OK" .

- Prior to transmitting the ECG's to Scotland a list of the ECG's currently stored in the memory should be obtained. This enables ECG's which may potentially be lost during transmission to have the original printed ECG hard copy photocopied and posted to Scotland for analysis.
- Stored ECG data lists can be obtained by selecting the Dir from the main menu (key top right hand side of machine), using the menu and arrow keys. After Dir has been selected the ECG machine will generate a printed list of the subject's ID details stored on the machine. File this list in a designated file to keep a record of all ECG's sent to Scotland.
- To modem the ECG's to Professor Macfarlane, press the menu button (top right hand side of keys). The viewfinder will display a list of variables. Select the "SEND" option and ensure it is flashing, by pressing keys LEFT or RIGHT arrow keys. After selection, SEND should be seen flashing in the viewfinder. If it is not selected it will not flash, proceed until it flashes.
- Press the RETURN or DOWN arrow key. Select the ALL variable, using the or LEFT or RIGHT arrow keys as before. This enables all the ECG's in the memory database to be sent. Press the RETURN key to transmit the recordings via the modem.
- A successful connection will display "TRANSMISSION IN PROGRESS" in the left hand side of the viewfinder.
- Watch the viewfinder to ensure the transmission of data has commenced. During transmission, f and w should flash (alternately) in the viewfinder right hand corner. The left hand side of the viewfinder will display how many ECG's have been transmitted or are left to transmit.
- Each ECG takes approximately 1 minute to be transmitted. If several ECG's are to be transmitted the machine can be left alone to transmit them. However, it is best to keep checking there has not been a break in transmitting. If there is a break, the programming steps may need to be repeated.
- After an ECG has been transmitted, it is erased from the memory. IT IS THEREFORE VITAL THAT A HARD COPY HAS ALREADY BEEN PRINTED.
- When transmission has been completed, switch off the machine by pressing the OO button. To check the transmission has been successful, switch on the machine. Look in the < > box, it should state 80 memory spaces available. If not, re-transmit the ECG readings.

4.3 Troubleshooting

Troubleshooting from messages displayed in the viewfinder.

- STOP - the ECG machine has run out of paper. Reload the paper and restart the recording again. Paper loading instructions can be read in the operating manual p23.
- BATTERY LOW - always recharge the machine overnight. Whenever possible always use the machine on the mains supply. This will prevent the battery becoming too low and

not able to perform an ECG when a mains supply is unavailable. A fully recharged battery is sufficient for about 3 hours of recordings.

5. Additional Information

- The transmission phone number should always remain the same. However, the steps to either check the telephone number or to enter a new number are as follows:-
 - Press the menu button and select CONNECTION using the LEFT or RIGHT arrow keys (as before).
- Using the DOWN key, select modem 1 to transmit recordings or manual to check the following settings. Using the DOWN or RIGHT key ensure the settings read :-
 - Terminal switch = **NO**
 - Connection type = **HAYES**
 - Hayes/Baudrate = **2400**
 - Hayes modem standard = (no setting)
 - Reset command = **atz**
 - Command sequence = **ats2 = 255**
 - Dial command = **atdt**
- Press RETURN to check or re-programme the telephone number.
 - Pre-programmed Telephone number = **Yes** or
 - Enter telephone number = **0141 552 8009** (for direct line) or enter your outside number code e.g. **9 then the telephone number 0141 552 8009** for a connection from the London centre.
- In the event of problems, please telephone Mr Shahid Latif who will try to assist. His direct line is 0141 211 4860. If he is not available, try to reach Professor Macfarlane on 0141 211 4724.

6. Reference Documents

Siemens, Sicard 440 operating and programming instructions. Sweden.