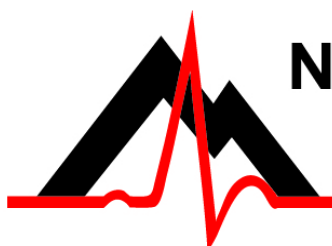


# LX Remote

*User's Manual*

*www.LXRemote.com*

*Version: 2.2.8*



*advancing Holter technology*

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# SCANNING SERVICE\*

## INSTRUCTIONS

Welcome to NorthEast Monitoring's LX Remote software. The LX Remote software allows your customers to save and send Holter and/or Event data to your Scanning Service location for analysis. Your Scanning Service must have either HE/LX Analysis or Holter LX Analysis V5.3 or greater - Pro or Enhanced Plus levels - for Holter analysis, or LX Event 2.11 or greater for Event analysis.

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\*Although this product was designed primarily for use by organizations that provide a centralized analysis capability, i.e., a scanning service, to a number of client cardiologists, physician offices, medical centers, etc., it applies equally well to large cardiology practices, medical centers, hospitals and other health care providers with a centralized analysis facility and distributed patient locations. In our software and documentation, the phrase "scanning service" could refer to any of these other centralized analysis facilities within other types of organizations or providers.

***Note:*** *This product, like all Holter and Event monitoring products, should be used only under the direct supervision of a licensed physician.*

### **System Requirements**

The computer where the NARP and LX Remote are running, should have the following minimal capabilities:

- Microsoft Windows 7 or 10 Operating System;
- 1 GB of RAM memory;
- 20 GB of available disk storage;
- Internet Explorer, Microsoft Edge or Mozilla Firefox browser application;
- Broadband Internet connection.

### **Operator knowledge**

All instructions assume a working knowledge of computers, specifically, the Windows operating systems. At least one copy of the HE/LX Analysis or Holter LX Analysis software version 5.3 or greater (Pro or Enhanced Plus) and/or LX Event 2.11 software.

### **About Passwords**

All LX Remote user passwords must be at least 9 characters in length and contain at least one number. The scanning service can choose whether they want to have user passwords expire after three months.

## ***Types of Users***

The LX Remote software allows remote users to send Holter and/or Event data to another site that utilizes the HE/LX Analysis or the LX Event software for analysis. There are three types of users:

1. **Scanning Service Administrator -**  
Responsible for customizing the Scanning Services's LX Remote web-site and setting up and maintaining all of the users.
2. **Base Technician** -The employee of the scanning service that retrieves the recording files and uses HE/LX Analysis (Pro or Enhanced Plus) or LX Event to analysis and report on the recording.
3. **Remote User** - A customer who sends Holter and/or Event recordings to the Scanning Service via the web-site and/or a browser.

## ***Getting started***

The following steps needs to take place in order to get started:

1. First, the Scanning Service contacts NorthEast Monitoring and signs an agreement to use LX Remote.
2. Once the Scanning Service is signed up, NorthEast Monitoring sets up and notifies the Scanning Service of the web-site location, the Username of the Administrator (admin), their initial password, and their Service (url key).
3. Next, the Scanning Service Administrator logs in, customizes the web-site and sets up the users - Remote Users (scanning service customers) and Base Technicians. The Scanning Service administrator then contacts the users providing them with:
  - The address of the Scanning Service web-site
  - Their Username
  - Initial password (should be changed by user once logged in)
  - The Service (url key). This is the same for all users - remote and base technicians.

## ***Step-by-step instructions***

The Scanning Service administrator should login to customize the web-site and reset their password. Go to [www.LXRemote.com](http://www.LXRemote.com) via Internet Explorer or Mozilla Firefox. The steps are generally as follows:

1. Login and edit your Scanning Service
2. Update the admin login information
3. Set up a single Base Technician who will login and install the NorthEast Automated Remote Program (NARP)
4. Download and install the NARP
5. Set up Remote Users

**LX Remote NorthEast Monitoring, Inc.**

Not logged in

**Login**  
You must login to access any part of this site.

**Username (\*)**  
Enter "admin" here. Your users will use the Username that you assign to them.

**Password (\*)**  
NorthEast Monitoring will assign you a password to get started. You will need to assign your users and initial password as well.

**Service (url key) (\*)**  
NorthEast Monitoring assigned you a unique Service key to use at logon. It identifies your site so that your users go directly to your location.




[Forgot your password?](#)

LX/Remote.com Login Screen

## Step 1: Edit Your Scanning Service

Once logged in, the administrator can get to their scanning service data by clicking on Edit Your Scanning Service from Add Content and Users.

### Add Content and Users

-  Edit Your Scanning Service
-  Add Remote User
-  Add Base Technician

On the edit screen, fields with the (\*) are required, and the administrator should review and/or update the following:

**Scanning Service** - The name that will appear when users log into your site. It should be your business name that you want your customers to see.

**Service (URL-Key)** - This cannot be changed. It is your unique identifier.

**Password Expiration plan for Service** - You can choose to have passwords for all users expire every three months. Emails will be sent

out the week prior to expiration, asking users to update their passwords.

**Allowed User Count** - You cannot edit. This is the maximum number of users that you are allowed to have as per your license agreement with NorthEast Monitoring.

**Contact Name and Contact Phone** - The administrator's name and contact for NorthEast Monitoring to use (The users will not see this information.)

**Note:** Characters allowed in the phone number field are: dash "-", period ".", parentheses "()" and "x" for an extension. International numbers must start with "+".

**Description** - This is for your use only.

**Intro Web Page** - This text will be seen by all users who log in to your site.

**Company Logo** - For your web site. The files must be a jpg file. Your current image will be shown in the box. If you want to clear it click on the box below.

**Upload Local Path Override** - If you would like to "send" files between users using a local

## Edit Organization

**Scanning Service (\*)**

ABC Scanners

**Service (URL Key) (\*)**

abc

**Password Expiration plan for Service (\*)**

Password expires every three months ▼

**Allowed User Count**

10

**Contact Name**

Bob Jones

**Contact Phone**

999-555-1212

**Description**

**Intro Web Page**

**Company Logo**

 Browse...

**Upload Local Path Override**

Submit

Edit Your Scanning Service Screen

server instead of the LX Remote web-site, enter the path here. Files using a local file path will not be encrypted. NARP should not be run if this option is used. Sending of reports is not supported in this mode, and Remote Users will not see the Report option on the LX Remote screen.

Submit - Save your changes.

**Cancel** - In order to cancel, you can click on “LX Remote” at the top of the screen or “Go Back” using your browser.

## Step 2: Update Admin Info

Click on the “admin” at the top of the screen to update your email address and password.

Logged in as admin | Logout

**Edit User admin**

**Email**

ldischler@nemon.com

Leave the password fields blank if you do

**New Password**

**Confirm New Password**

Submit

*Note: It is important that you change your password once you first log in so that it is unique and personal to you.*

## User Naming Conventions

When adding users, please note that user names can only consist of the following combination:

- lowercase and uppercase letters
- numbers
- the only symbol is “\_” (underline)

Spaces are not allowed and at least one alphabet character is required.

### Step 3: Add Base Technicians

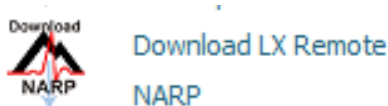
Base Technicians are the employees of the scanning service who analyze the recordings. Base Technicians require a Pro or Enhanced Plus level of either HE/LX Analysis or the Holter LX Analysis version 5.3 or greater; or LX Event 2.11 or greater, in order to retrieve and analyze recordings through LX Remote.

Because uploading and downloading files via the web-site is automated by the NARP, Base Technicians do not need to logon to the web-site to manage files as in previous versions, however, they may want to logon occasionally to delete any problematic files in the Filebox. A file may get stuck in the Filebox if it was sent prior to having the encryption keys set up correctly on both sides.

### Step 4: Download & install NARP

If you are using the LXRemote.com web-site to send files between customers and your Scanning Service, NorthEast's Automated Remote Process (NARP) **MUST** be run before any files can be sent. At this point, and before users are set up, is a good time to initiate the process.

The NARP program can be downloaded and installed by clicking on the icon on the LX Remote web-site.



More information on NARP can be found in the NARP chapter in this manual.

### Step 5: Add Remote Users

Remote Users are your customers who send Holter and/or event recordings to be analyzed. Remote Users will need to login and download the LX Remote desktop software to save the Patient Information, to transfer the Holter and

Event recordings, and to retrieve reports. Each Remote User must have a unique Username

The **Username** must contain no spaces and is case-sensitive.

#### Add Remote User

Username (*)	<input type="text"/>
Company Name (*)	<input type="text"/>
Location	<input type="text"/>
Contact Name	<input type="text"/>
Phone	<input type="text"/>
Email (*)	<input type="text"/>
FileBox Size (in Megabytes) 1000	
New Password (*)	<input type="text"/>
Confirm New Password (*)	<input type="text"/>
<input type="button" value="Submit"/>	

*Note: You should urge each of your users to reset their password the first time they log in to the system.*

### Notify Remote Sites

You will want to send an email to your remote customers with the web-site, their Username, their temporary password and your Service (Key url).

Remind your users to change the password the first time they log on and let them know that the manual is on the web-site. The manual has



step-by-step instructions for remote users starting on page 10.

Once they have installed the LX Remote software on their desktop, you may want to have your remote sites send a test file first thing, to ensure that everything is in place before going live.

## Linking to your Remote Site

All users affiliated with your web-site will have the same Service (url Key). This “key” tells the LX Remote web-site which scanning service they belong to.

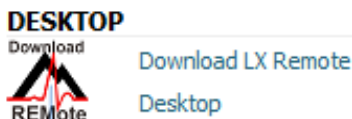
You can create a web address that will point to your site and not require you or your users to enter the Service (url key) every time. The modified web address is as follows: <http://www.lxremote.com/nexus/index.php?service=URLKEY>, with the URLKEY being replaced with the Service (url key) that was assigned to your organization by NorthEast Monitoring.

## LX Remote on the desktop

LX Remote desktop software allows your remote users to send Holter and/or event files and retrieve reports from you.

The LX Remote desktop software, must be installed by your customers, but can also be installed by any Base Technician to better support your remote users when they have questions.

The software can be downloaded from the Base technicians LXRemote.com web-site.



Once installed, LX Remote will create a shortcut on your desktop.

## LXRemote.com web-site

### Managing Users and Services

Under Other Actions you will see a button that allows you to Manage Users and Services. This will take you to a location where you can edit, view or delete any existing users.

In order to change a user password, you should choose to edit the user and then enter two passwords in order to reset. All other data, except for Username can be edited via the edit screen.

### Maximum Allowed Users

Your contract with NorthEast Monitoring has a maximum number of users attached to it. This includes all Base Technicians and Remote Sites combined.

You can view all users affiliated with your contract by going to Other Actions > Manage Users and Services and by pressing View User without selecting a User name. There you will see a count of your current users as well.

### The Filebox

The NorthEast Automated Remote Process (NARP) will automatically upload files and download reports for you, storing them in the Filebox temporarily. Once a file has been successfully received and deleted from the local receiving directory, the NARP will delete the corresponding files out of the Filebox on the web-site.

The Filebox can be used to delete files that cannot be deleted because they were sent using the wrong encryption key. Sometimes when problem files are deleted on the desktop, they may be downloaded again. If this keeps occurring with a file, you may need to delete it in the file-box to make it go away permanently.

***Note: Files left in the Filebox will be deleted automatically after 90 days.***

---

# REMOTE USER INSTRUCTIONS

Process overview: The remote user records Holter or Event data using a NorthEast Monitoring Holter or Event recorder. The remote user then sends the recording to a scanning service to be analyzed. The scanning service then analyzes the data and returns a report to the remote user.

LX Remote software will allow you to save Holter and/or Event files, set up Patient Information and send the information to your scanning service. Additionally, it will allow you to receive reports from your scanning service.

---

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***Note: This product, like all Holter and Event monitoring products, should be used only under the direct supervision of a licensed physician.***

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LX Remote consists of two distinct components:

1. The LXRemote.com webs-site is used for managing your password and enables secure transfer of recording and report files, and
2. LX Remote on the desktop which allows you to 1) enter patient information and send the recordings to the Scanning Service and 2) retrieve reports being returned from the Scanning Service.

## **System requirements**

To run the LX Remote on the desktop, the computer must have the following minimal capabilities:

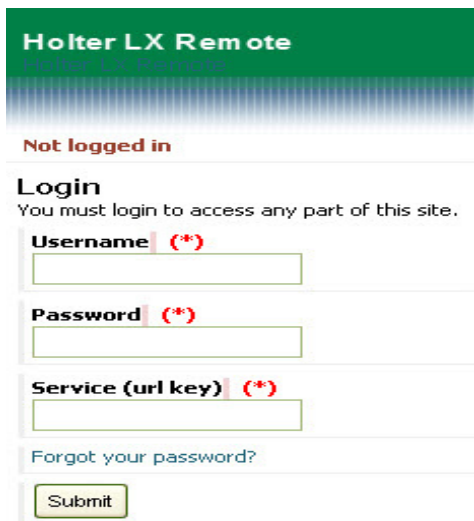
- Microsoft Windows 7 operating systems;
- 1 GB of RAM memory;
- 20 GB of available disk storage;
- Broadband Internet connection;
- Internet Explorer or Mozilla Firefox browser application;
- USB flashcard reader or a laptop PC card slot; and
- Read/write privileges to the c:\nm\ directory.

## **Getting started on web**

Your Scanning Service administrator will provide you with a remote Username, Password and Service (url key).

To begin, start up your Internet browser and go to the secure web-site:  
[www.LXRemote.com](http://www.LXRemote.com).

Enter your Username, Password and the Service (url key) provided by the scanning service.



**Note:** All login elements are case-sensitive.

Once logged in, you are taken to your scanning service's LX Remote web-site. The right-hand side of the screen will look something like this:

### First: Change your password and update personal information

When you login for the first time, you should change your password to something you will remember. Do this by clicking on Profile and entering your new choice in New Password and Confirm New Password.

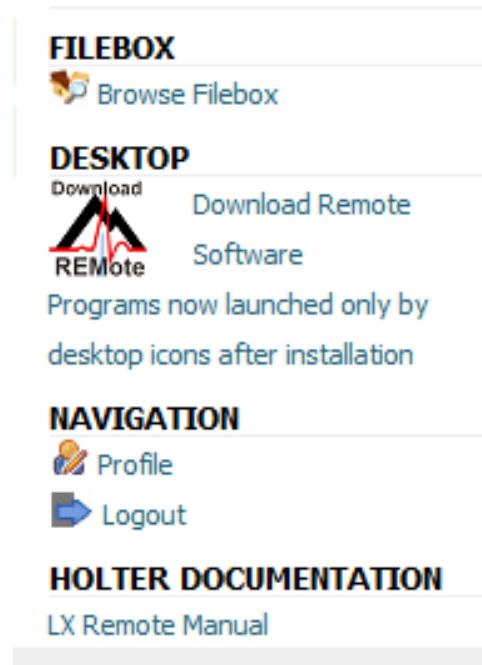
**Note:** Your new password must be at least 9 characters in length and contain at least one alpha-character and one digit.

At this point, you can also update your name, phone number and email address.

### Second: Install LX Remote on your desktop

You should now download and install the LX Remote desktop software by clicking on the

Download Remote icon on the right-hand side of the screen.

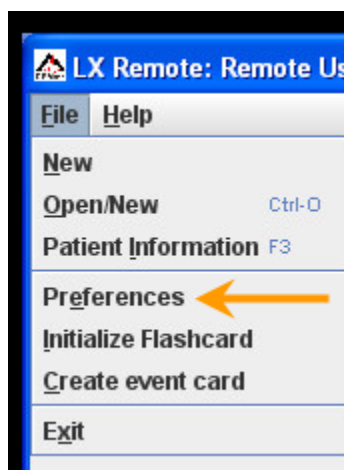


In order to use LX Remote on the desktop, you will need Adobe Reader. If it is not already installed, the installer will guide you through installation.

## LX Remote on the desktop

Once installed, you can start LX Remote at any time by clicking on the icon that was added to your desktop or by going to the Programs list. Every time you start the software you will need to login again. At this point the software connects to the internet in the background in order to send and retrieve files automatically.

## Toolbar

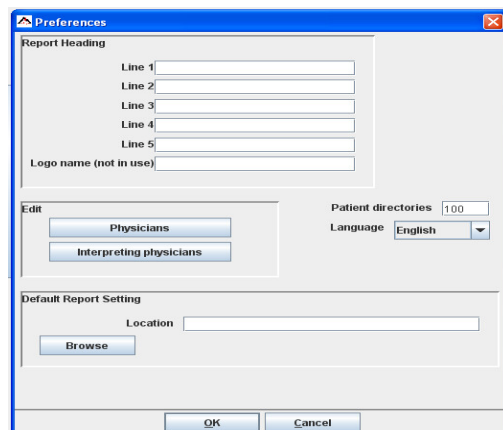


From File on the toolbar, you can create new patients, open the Patient List, view patient information of the current patient, set preferences and format cards for recording.

Before you start sending files, you will want to set up your preferences.

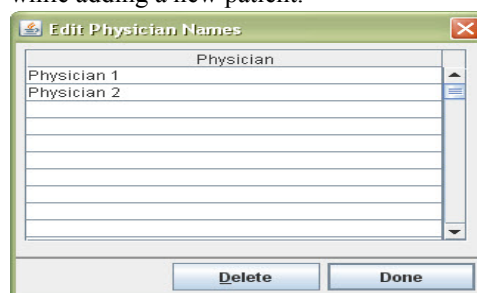
## Preferences

When you first start, you will want to set up your preferences. To get to the Preferences, click on File on the toolbar and select Preferences. You will see this screen:



**Report Heading** Lines 1 through 5 will be sent to the Scanning Service and will populate the report heading on your report. Enter this once and it will be sent with each patient. (The Logo option is not in use, but we plan to implement in the future.) After updating preferences, you may want to close and reopen the current patient before sending so that the new address is assigned to that patient.

**Physicians or Interpreting Physicians** allows you to add, edit or delete physician names. You can then select from this list while adding a new patient.



**Patient Directories.** You can increase or decrease the number of your patient directories here. If you decrease directories, you may lose patient data in the directories that you are getting rid of, so be sure that is what you want to do.

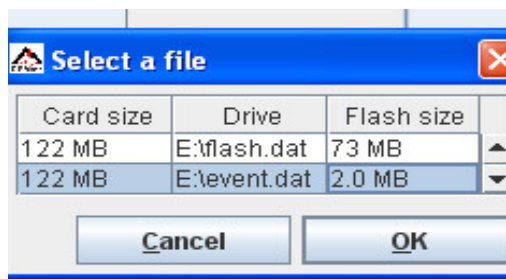
**Language.** Currently LX Remote is in English only.

**Default Report Setting.** Change the default location of where reports are saved from the Report Viewer screen.

## New Patient

You can create a new patient by inserting the patient's flashcard into the card reader and then pressing the "Send New File" button, by going to File > New or by choosing File > Open/New and opening the Patient List. From the Patient List, you will need to select a blank row to create a new patient.

When a new patient is initiated, LX Remote will look for any flash.dat (Holter) or event.dat (Event) files and open the correct Patient Information screen. If more than one file is found, you will be given a choice. The file selected will be highlighted blue.



When a file is selected, the data from the card will then be automatically copied into the patient record.

- If you select New before inserting the card, you will see a Confirm window that explains that there is no flashcard in the drive. If this happens, insert the flashcard into the drive and click Retry.
- If you see a message that says there are no patient directories instead of the New Patient window, see "Making room for new patients" at the end of this chapter.

Once the file has been copied, the "Copy flashcard" button in the Patient Information window changes to "Copy different flashcard." If the patient information from the card does not match the patient you intend to send, remove the card, insert the correct one and click "Copy different flashcard."

For Holter, the data saved by the recording includes the Patient I.D., the Recorder #, the Date recorded, the start time, and whenever the patient pressed the Event or Diary button. As the Holter data from the card loads onto your computer hard drive, you can enter the Patient Information. Once the card is completely read, you can enter Diary or 6MWA data, if you need to.

Once all of the information is complete, you can send the file to the remote site. You will not be able to edit Patient Information again, so be sure the data is correct prior to sending. Click OK to save the data at any time.

**Patient Information**

Last name, First, MI

Sex ☒ M ☐ F

D.O.B. MM/DD/YYYY   Years

I.D.  517228436

Scan #  2011-04-04 09:45

Hookup tech/analyst

Physician

Interpreting physician

Notes

Date recorded  01/20/2002  16:57

Recorder #  0000132829

Indication

Medication

Height  in.

Weight  lb.  BMI#

Patient copied (remove flashcard)

Patient Information: Holter

### Patient Information: Holter

First you will want to enter the patient's name. Starting with the last name, use your cursor or the Tab key to move to the next field. The name in the printed report appears as entered in this window. Use the cursor or Tab key to move around the screen and fill in the remaining information.

### DOB and Age

The D.O.B. and Age fields work together. If you know the patient's date of birth, enter it, and the software automatically calculates the patient's age based on the D.O.B. and the recording date. If you do not know the date of birth, but know the age, type a numeric entry in the Age field, and select the appropriate unit (e.g., years) in the Age Unit field. If you know neither, leave the fields blank. The software does not allow an inconsistent D.O.B. and age; if you enter inconsistent data, it will leave the age and remove the D.O.B.

### Notes

The Notes field can be used to record information that might be helpful about the Holter test or the patient. It is not printed on the final report. To enter notes to be printed in the final report, use the Comments section of the Report summary.

### BMI

The screen will calculate your patient's Body Mass Index (BMI) if you enter the patient's height and weight and the appropriate units. A patient's weight status can be determined from the BMI as follows:

- Below 18.5 - Underweight
- 18.5 -24.9 - Normal
- 25 - 29.9 - Overweight
- 30 & Above - Obese

### 6-Minute Walk Assessment

If you have a 6-Minute Walk Assessment patient, you are able to enter 6MWA data using

the window that is accessible at the bottom of the screen.

### Diary information

While wearing the Holter recorder, the patient can identify symptoms and activities in two ways:

- (1) by pressing the Event button on the recorder and, possibly, entering a pre-coded symptom or activity, or
- (2) by keeping a written record of times and symptoms or activities. These entries should be entered into the diary screen at this point. Click on each field to enter and/or edit the data. Date and time will default to the last entry to assist you in entering the required data.

Diaries saved on the recorder will be seen when the scanning service analyzes the Holter recording.

### Patient Information: Event

The Patient Information for event has fewer items than Holter. For Event the Patient Name must be entered. Date recorded and Recorder # will be copied automatically from the card.

The screenshot shows a software window titled "Patient Information" with a blue header bar and a red close button in the top right corner. The window contains several input fields and buttons. On the right side, there is a button labeled "Copy different flashcard". The input fields are arranged vertically on the left: "Last name, First, MI" (three separate text boxes), "Sex" (radio buttons for M and F, with M selected), "D.O.B." (a date field showing MM/DD/YYYY, a numeric field showing 0, and a dropdown menu for Years), "I.D." (a single text box), "Scan #" (a text box containing "2014-10-09 11:15"), "Hookup tech/analyst" (a text box), "Physician" (a text box with a dropdown arrow), "Interpreting physician" (a text box with a dropdown arrow), "Date recorded" (a text box containing "01/02/2011"), "Notes" (a text box), and "Recorder #" (a text box containing "6956"). At the bottom of the window, there are three buttons: "OK/Send", "OK", and "Cancel".

Patient Information: Event



## Send a Patient file

Once you are finished entering all patient information and have copied the flashcard, you should send your information to your scanning service.

This can be done by clicking OK/Send on the Patient Information screen or Send from the Patient List. It is important to make sure that the patient data is entered correctly before sending the file to the Scanning Service as you will not be able to change it after the fact.

If you are not sure, you can always save the patient without sending by clicking OK. If the patient information needs to be changed after sending, you will need to contact your Scanning Service and they will be able to update the information on their end.

When you close the software, files will stop being sent, so be sure that you want to do this. If this does occur, files will be saved in the queue folder and will resume sending automatically when the software is restarted.

## Patient List

You can keep multiple patient Holter records on your computer system. All of the patients currently saved on your desktop appear when you select File > Open/New from the toolbar.

To change the current patient to a another, either click on the appropriate name on the list and click Open, or double-click on the appropriate line. The Patient Information window for the selected patient will appear on the screen. A column labeled "Sent" shows you when and if the file has already been sent to the Scanning Service.

Sent	Mon Mar 28 15:12:14 EDT 2011
In Process	Tue Mar 29 10:01:46 EDT 2011

In Process means that the file is currently being sent or is in the queue to be sent. If a patient has not yet been sent, you can either edit that

patient information or press the Send button on the Patient Information or Patient Open screen to send.

---

**Note:** *If a patient record shows that it is "In Process", but no files are being sent, this means that the upload to the web did not finish successfully and you will need to Send it again.*

---

## Delete Patients

We highly recommend that you do not delete any patient data until you have received a satisfactory report back from your Scanning Service. This will ensure that you have a back-up of the Holter recording, just in case you need to resend for any reason.

## Making room for new patients

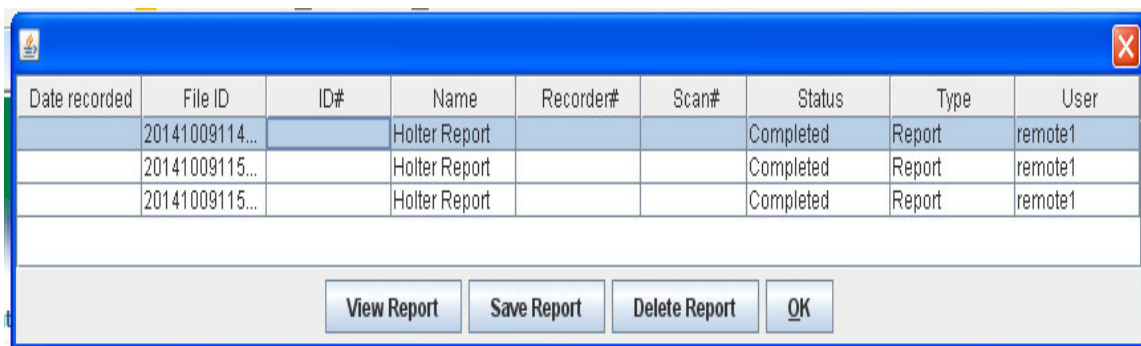
When the software has saved the maximum number of patients allowed by your system, and you choose to not increase the number of directories (see Preferences) you must delete old patients to make room for new ones. If you want to archive an electronic version of each patient record, make sure you back up a patient before you delete it.

To delete a patient from the patient list, go to File > Open to display the list of patient records currently in LX Remote. In the Open Patient window, click on a patient name to highlight it and click the Delete button. When the Confirmation window appears, click Yes. That slot in the list will now be available the next time you select File > New.

To delete multiple sequential patients in the Open Patient window, click on the first patient to be deleted, then drag down to the last one you want deleted. With multiple patient names highlighted, click the Delete button. When the Confirmation window appears, click Yes.

To close the Confirmation window without deleting any patients, click No.





Date recorded	File ID	ID#	Name	Recorder#	Scan#	Status	Type	User
	20141009114...		Holter Report			Completed	Report	remote1
	20141009115...		Holter Report			Completed	Report	remote1
	20141009115...		Holter Report			Completed	Report	remote1

View Report Save Report Delete Report OK

Report Viewer Screen

## Report Viewer

Your scanning service may choose to send your reports back to you using LX Remote. You can click on the “Go To Report Viewer” button on the center of the screen to view the report window. Here you can view, Save and Delete reports.

You should receive an email when a report is initially sent to you. If LX Remote on the desktop is not open when you receive the email, it make take a minute or two for it to find a download the new report once you start up the desktop applicaiton.

## Viewing and Saving Reports

We recommend that you open, review and save reports using Adobe Reader and the “View Report” button on the Report Viewer screen.

You will want to install Adobe Reader on your desktop if it is not already installed. The install file can be found on the LXRemote.com web-site.

The Save Report button will copy reports directly to the location that you have defined in Preferences. If this button is not working properly, you may want to check to ensure that the location in Preferences is set up correctly.

## Deleting Reports

You should only delete a report from the Report Viewer once it has been saved locally. Once the report is deleted from the Report

Viewer screen, it will shortly thereafter be deleted from the Filebox on your web-site. Your scanning service should still have a copy of the report on their local computer if questions or issues arise.

## Transfer error: Encryption Key...

If a report transfers with the Status of “Transfer Error: Encryption key does not match sent file”, you will need to delete this report from the Filebox on the web-site to remove it permanently from the Report Viewer. Before doing this, you may want to contact your scanning service so that they resend any report that you did not receive.

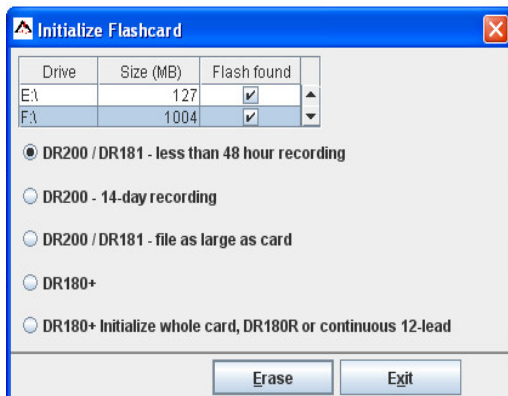
## Formatting flashcards

To use a flashcard with a NorthEast Monitoring recorder, it must first be initialized with either a flash.dat file for Holter or an Event.dat file for event. To do so, insert the card into the card reader, close the Explorer window if it opens, and select File > Initialize Flashcard for Holter and File > Create event card for event.

For Holter recording, the card is put into the recorder before recording starts. For Event recordings, the card is placed into the recorder after events are saved, and the events are copied to the card at the end of the recording.

## For Holter

The Initialize Flashcard window will open if at least one flashcard is found. First determine



that the correct drive has been selected for your card. The drive that will be updated should be highlighted in blue, and if there is already a flash.dat file on it, the check box will be populated. If a drive has not been found, check to be sure that a card is in the slot and the reader is attached to the computer. You will need to Exit and return to this screen to refresh the Drive list.

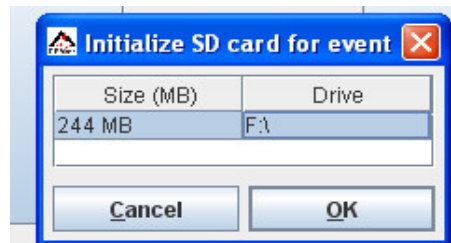
Lastly, check to make sure that the correct card format option is selected - the correct recorder should be selected and the appropriate format should be chosen. If you are sure that your 3-channel recording will be less than 48 hours, you can select that option.

Now press Erase and your card will be initialized for its next use.

**Note:** *If you insert a card into the recorder and get a message that the "Flashcard is missing," the card is not formatted or erased properly.*

## For event

The create event card window lets you select the card to format. The card is put into the



recorder after events are recorded. The recorder screen will show when events are being copied and when it is finished. If this does not occur, the card may be missing an event.dat file.

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# NARP - NORTHEAST'S AUTOMATED REMOTE PROCESS

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NorthEast's Automated Remote Process (NARP), allows you to automatically receive Holter and/or Event patient recordings and send patient reports between your facility and your remote users via the LXRemote.com web-site. When NARP is running the entire encryption, transfer and decryption process is automated so that users do not need to logon to the web-site to upload, download or delete the files.

***Note: If the local option is used, NARP is not used. All files are placed in the specified location for the Scanning Service.***

## **System Requirements**

The computer where the NARP is running should have the following minimal capabilities:

- Microsoft Windows 7 Operating System;
- 1 GB of RAM memory;
- 20 GB of available disk storage;
- Internet Explorer or Mozilla Firefox browser application;
- Broadband Internet connection; and
- Any firewall on the computer or at a network level must enable www.lxremote.com access for port 80 (HTTP) and port 443 (HTTPS).

HE/LX Analysis or the Holter LX Analysis version 5.3 or greater, levels PRO or Enhanced Plus; and/or LX Event 2.11 or later, are required to fully automate the remote download and upload process. If the technicians are not using a current version of the software, they can still use the NARP to automatically download flash and/or event files and send reports via the Remote web-site.

## **NARP Installation**

In order to run this process, you need to install the NARP application which can be downloaded from the base technician's LXRemote.com web-site. Once installed, you can find the program listed under the "NorthEast Monitoring" folder on the programs list on your computer.

The NARP need only be run on a single computer/server. All technicians in your organization will need to access files either directly on that computer or via a Windows Network Share. All other computers in your organization (technician computers) that need access to the files, will need to be able to see and write to and from the directories that NARP creates.

If NARP needs to run on more than one computer, see "Installation for Multiple Locations at the end of this chapter.

## Incoming Files

"Incoming Files" at the bottom of the NARP screen displays the downloaded Event and/or Holter recordings. Your base technicians will use NorthEast Monitoring's HE/LX Analysis or LX Event software Remote screen to copy the files into the software for analysis.

When the files are deleted from the narp directory, the NARP will automatically delete them on the web-site.

## Outgoing Reports

"Outgoing Reports" at the top of the NARP screen is a dynamic list of reports that were recently sent by your Base Technicians. The reports are automatically uploaded to the Filebox on the web-site and downloaded by the user using the LX Remote software's Report Viewer. Once the user copies the report onto their computer and deletes it from Report Viewer, the reports will be deleted from the Filebox on the web-site.

If a report fails to upload, you will see an error message. The NARP will retry to send a report every hour until it succeeds.

## narp.ini

The NARP installation creates a directory in c:\nm\NARP\, where the software is installed. In this directory is a narp.ini file which can be modified to meet your needs.

If you would like to keep the NARP process running indefinitely, enter the Password, UrlKey, and Username into the narp.ini file so that it can routinely log back in to automatically retrieve and send files.

Once the NARP is installed and running, patient files uploaded by remote users will automatically be downloaded to the DownloadDirectory and PDF (report) files that are placed in the UploadDirectory will be placed on Remote User's Remote web-site.

The pointers will initially appear in the narp.ini file as follows. You can modify the pointers to meet your needs.

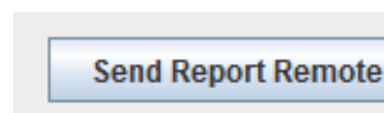
- UploadDirectory = c:\nm\reports Once the program runs, folders will be created for each user. Reports going out should be placed in the receiver's folder.
- DownloadDirectory = c:\nm\ftp Holter and Event files will be put in two different folders under this directory.

## Using the Incoming files:

**Holter files** can be retrieved by clicking on the "Remote Receive" button at the bottom of the Patient List in the Holter software. The FTP Directory at the top of the screen should be changed to the location where the Download Directory specifies.

**Event files** can be retrieved by clicking on the Remote Files button at the top of the screen. The LX Event.ini file RemoteEventDataDirectory variable should be the same location specified in DownloadDirectory in narp.ini.

## Sending Reports to the Users



HE/LX Analysis enables you to easily send

reports back to remote users using NARP and the button found on the bottom of the Patient List.

For **HE/LX Analysis** to work, its h4w.ini file must include a pointer to the directory where NARP expects to find the reports. This location would be the same location identified in UploadDirectory in the narp.ini file. Examples of how the variable would look in h4w.ini are:

;single user; local directory example:

```
[NARP]
uploadDir= C:\nm\reports
```

;shared server example:

```
[NARP]
uploadDir=\\Servername\
sharename\nm\reports
```

5.4f4, so that they can use all of the Remote features.

The **LX Event** program allows to send previously created reports by clicking on the Report Send button on the Print Report screen. For LX Event to work, the RemoteEventReportDirectory in the LX Event.ini file must match the location specified in the narp.ini file.

### Status Login Failed

If you see the “Status Login Failed” at the bottom



of the NARP screen, this means that you need to restart the NARP application in order to login and reconnect to the internet.

### ***Installation for multiple locations***

The instructions below are for the LX Remote system set up when a scanning service has technicians that do not share data directories, specifically, c:\nm\ftp.

For this set up, no two copies of the NARP should have the same network path. If that were the case, then only one version of NARP is allowed to run.

Set up as follows:

1. Each location will have a different base technician set up in [www.LXRemote.com](http://www.LXRemote.com)
2. Each technician will download and initiate the NARP on their local computer.
3. Each technician should sign into the NARP and the NARP should be kept running at all times.
4. If the technician is using LX Analysis 5.4f, be sure that they update their system to

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# Encryption & Security

This chapter applies to LXRemote.com web-based data transfer only. Files sent using the local transfer mode of LX Remote desktop are not encrypted.

Holter Remote is a system used to transfer ECG data and reports between a remote doctor's office and a centralized location or Scanning Service. Each remote user has a dedicated log-in and is associated with exactly one scanning service. Data is encrypted on the sending computer and is decrypted on the receiving computer. The web application used to transfer the data between the computers has no ability to decrypt the data.

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## Transport Layer Security

All interaction with the web server are encrypted with standard SSL. Thus, all page views, logins, uploads, downloads are secured against eavesdroppers and man-in-the-middle attacks.

## Transmitted Data encryption format

Regardless of the SSL transport security, medical data is transmitted in a ZIP format file with each data file encrypted via the Blowfish symmetric encryption algorithm using a 128 bit randomly generated session key.

The session key is then encrypted in a folder in the same zip file using the RSA asymmetric encryption algorithm with a 1024 bit key. The session key is encrypted to both the sender's RSA public key and the receiver's RSA public key. The data may be encrypted to multiple receiver keys as required. Decryption of the session key can only be done by a party holding the RSA private key corresponding to the sender or recipient public key.

**TABLE 1. Data Security Algorithms Used**

Algorithm	Key Length
Blowfish	128 bit
RSA	1024 bit

RSA decryption keys are not available on the web server and thus the medical data abides by “encryption at rest” and any possible web server compromise will not compromise any medical data. At no time is unencrypted PHI transmitted to or stored on the web site.

## Key Management

End user RSA key pairs are generated automatically by the NARP (NorthEast Automated Remote Process) and LX Remote desktop software. End user RSA key pairs are generated randomly on end user computers and are unique to the actual computer used to upload data.

When the scanning service first launches NARP, a private RSA key is generated and stored locally. At that same time, a public RSA key is created and stored on the Scanning Service web server. Then, when the user launches LX Remote on the desktop, the program downloads a copy of the Scanning Service

public RSA key. The Scanning Service private key is never stored on the server.

The LX Remote desktop software follows the same process on the remote user desktop. This allows for encryption and decryption of the reports that are being returned to the remote user.

In both cases, the private key remains on the local desktop, while the public key is installed on in the web application by software when first initiated.

## **Separation of Data**

The web application implements separation of user data at the application data. Files are stored on disk such that they are not associated with any specific user. The application maintains a database containing the association between user and specific file. Remote users are only presented with their own files. Scanning Service users are presenting with a view of the files of those remote users associated with the Service.

Passwords are required to be a minimum of 9 characters in length, and must contain at least one character and one digit.

The Scanning Service can choose to have password expire every 3 months.

## **Account Password Security**

Passwords are required to be a minimum of 9 characters in length, and must contain at least one character and one digit. Passwords are validated by the web server, for both LX Remote desktop application and web-site. Account passwords are presented to the server through a standard web submission form. Passwords are hashed using the MD5 one-way hashing algorithm in memory on the server and only the hash values are stored.

The scanning service can choose to have password expire every 3 months. In this case a user's password will expire exactly three calendar months since the last password change. LXRemote.com web-site will display password expiration dates at login, and on View/Edit User screens. If a password expires, in order to use the

system a user must reset their password via LXRemote.com web-site; same password cannot be reused.

When a scanning service enables 3-month password expiry, all its existing users' password are set to expire 3 calendar months from that date. When a scanning service disables password expiry, all its existing users' passwords are changed to not expire.

Users will be notified via daily email when their password expiration date approaches, starting one week in advance.

## **Compromise Vulnerability**

This section describes the vulnerabilities in the event of attacks or compromises of various natures.

### **Server database compromise**

An attack which allows malicious users to read the web application database will recover the Doctor's office names and file sent times of all files which have been transmitted but not yet removed from the system. Neither user passwords nor password equivalents are recoverable from the database without substantial computational effort.

### **Server file system compromise**

An attack which allows malicious users to read files on the server file system will allow access to the encrypted content of the files being transferred. Additional work will be required to correlate those files to specific remote users. However, the data files and all other PHI are fully encrypted and the decryption key is not available on the server. Lists of Scanning Services and remote users of those scanning services will be recoverable, possibly including contact information.

### **Eavesdropping**

At attack which allows a malicious user to observe the data of a specific connection will not allow them to intercept any usable data. Any observer sees only an SSL encrypted stream.

## **Key Troubleshooting**

Each program, whether NARP or Remote, has a public/private key pair stored locally on the machine in `keyring.properties`.

When the user logs in to the server, the public key part is uploaded to the server for that user.

When the a user logs in to the remote desktop, all of the public keys for all scanning technicians are retrieved and any files sent from that point are encrypted to all scanning tech keys.

**Encryption** When the NARP encrypts a report to a user, *\*all\** of that user's keys are retrieved from the server and the file is encrypted to all of those keys.

NOTE: The server does *\*NOT\** store the private key part -- the private key never leaves the local system which generated it. Thus, the server has no ability to decrypt any files.

**Dealing with files that cannot be decrypted** If, however, a individual remote or NARP system is first used *\*after\** a file is uploaded, the file will *\*NOT\** have been encrypted to that key and thus the remote or NARP will not be able to decrypt it. At that point, the file will be downloaded but you will see an error message that the file cannot be decrypted.

The only way to "cure" this failure to decrypt is to find the `keyring.properties` file from the older system and copy it to the new system.

Alternatively, you can simply delete the file and re-send a new file (which will then be encrypted to all the keys, including the new keys.)