

NMail



E-mail for the ZX Spectrum Next

USER MANUAL

NMail

File

Message

Get mail

New

Reply

Reply all

Forward

Delete

zx@example.com

Inbox

4

Drafts

Sent

Junk

1

Trash

Archive

Family

Friends

Holidays 2026

Invoices

Mailing lists

Mailing lists/Ne...

Mailing lists/ZX

Newsletters

Orders

Projects

Projects/Magaz...

From	Subject		Date
Kate Miller	Welcome to the ZX mail...		28.10.26 11:02
Dan Smith	BASIC listing for the m...		28.10.26 10:27
Lucy Grey	Lunch tomorrow?		28.10.26 08:15
*Peter Black	Demo party in November		27.10.26 16:02
Pixel Games	Your order has shipped		26.10.26 11:48
*Sarah Jones	Birthday present ideas		24.10.26 20:33
Mike Rowe	Re: Tape loading problems		22.10.26 14:12
Next Dev Weekly	Issue 42: Copper effects,...		20.10.26 08:00
Anna Novak	Photos from the party		17.10.26 21:41
Tom Baker	Spare joystick?		14.10.26 10:05
Retro Computer Club	Club meeting on Saturday		10.10.26 19:20

Ready.

11 messages, 4 unread

Contents

PART I – USING NMAIL	3
1 Introduction	4
1.1 What NMail is	4
1.2 How it works	4
1.3 What you need	4
2 Installation and first start	5
2.1 Installation	5
2.2 Setting up your mail account	5
2.3 Two-step verification and app passwords	6
3 The screen and controls	7
3.1 Main window	7
3.2 Keyboard	7
3.3 Mouse and menus	8
4 Folders and the message list	8
4.1 Folder panel	8
4.2 Message list	9
4.3 Working with folders	9
5 Reading messages	10
5.1 Opening a message	10
5.2 Saving an attachment	11
6 Writing messages	12
6.1 New message	12
6.2 Reply and forward	12
6.3 Editing text	13
6.4 Accented letters	13
6.5 Attaching a file	14
6.6 Signature	14
7 Organising and searching	14
7.1 Message actions	14
7.2 Several messages at once	15
7.3 Drag and drop	16
7.4 Search	16
8 Printing	17
9 Several accounts	18
10 Settings and saved mail	18
10.1 Settings	18
10.2 Saved mail and offline use	19
11 Help and About	20
12 Troubleshooting	20
13 Keyboard shortcuts	21
PART II – YOUR OWN GATEWAY	22
14 Why your own gateway	23
14.1 Requirements	23

14.2 Contents of gateway.zip	23
14.3 What the gateway stores	24
15 Option A: web hosting	24
16 Option B: your own Linux server	24
16.1 Apache	24
16.2 nginx and PHP-FPM	25
16.3 HTTPS for setup.php	26
16.4 Firewall and outgoing ports	26
17 Option C: home network	26
18 Testing the gateway	27
19 Connecting NMail to the gateway	27
19.1 Creating the account from the Next	27
19.2 Creating the account in a browser (setup.php)	27
20 Gateway settings	28
21 Operation and security	29
21.1 Updating the gateway	29
21.2 Log	29
21.3 Security	29
22 Gateway troubleshooting	30

PART I

Using NMail

Installation, first start, reading and writing mail, folders, attachments, printing and settings.

1 Introduction

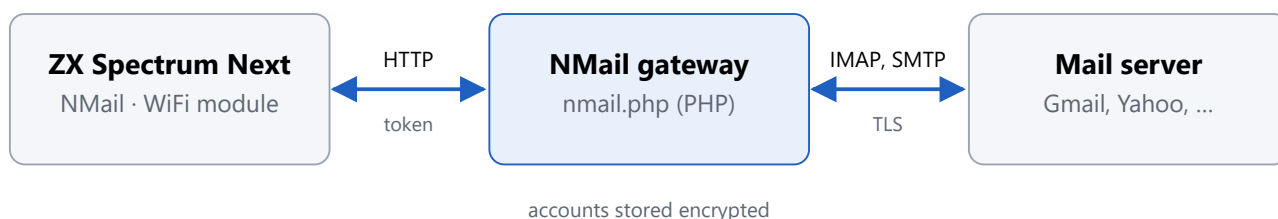
1.1 What NMail is

NMail is a real e-mail client for the ZX Spectrum Next. It reads, writes, sends and organises your mail right on the Next, over its built-in WiFi module. It runs in the 640×256 hi-res mode with a crisp pixel font, works with a mouse or entirely from the keyboard, and speaks English and Czech.

- account setup right on the Next, with the password encrypted before it is sent,
- up to 6 mail accounts, each with its own signature,
- folders, stars, search, drag and drop with the mouse, context menus,
- attachments to and from the SD card, reply, forward, drafts,
- printing a message on a network printer over WiFi,
- reading saved messages without a connection (offline),
- built-in help with search.

1.2 How it works

The Next cannot do TLS, the encrypted connection every mail server requires today. So NMail talks plain HTTP to a small **NMail gateway** (a PHP program on a web server). The gateway connects to your mail server over IMAP and SMTP with TLS and hands the mail back to the Next in a simple form it can process quickly.



You enter your mail password only once, when you set up the account. The Next encrypts it with the gateway's public key (RSA-2048), so it never travels over the network in readable form. The gateway checks the login, stores the account encrypted and gives NMail a **token** – a 12-character key NMail uses from then on to identify itself to the gateway. NMail does not keep the password.

Out of the box NMail uses the **public gateway** at `perrada.cz`, so there is nothing to install. If you want everything under your own control, you can run the gateway on your own server – see [Part II](#).

1.3 What you need

- a ZX Spectrum Next (a 1 MB machine is enough),
- the WiFi (ESP) module connected to your network in NextZXOS,
- an SD card and an internet connection,
- a mailbox with IMAP/SMTP access (Gmail, Yahoo, iCloud, ...),
- optionally a (Kempston) mouse and a network printer.

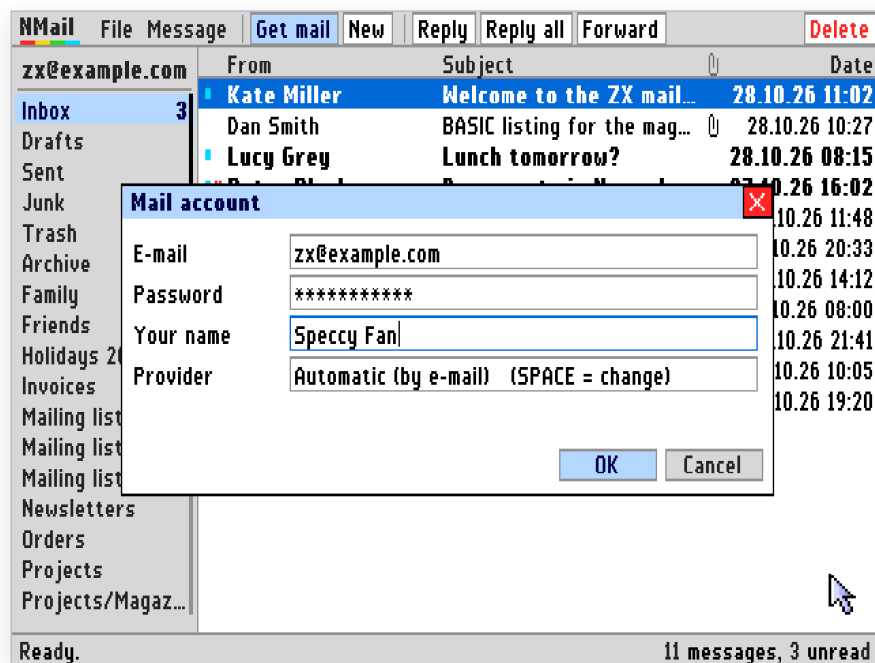
2 Installation and first start

2.1 Installation

- 1 Set up WiFi in NextZXOS (if you have not done so yet). NMail uses the connection stored in the module.
- 2 Copy `nmail.nex` to the SD card, ideally into its own folder such as `/apps/nmail/`. NMail keeps its settings `NMAIL.CFG` and the saved mail (folder `MAIL`) in the same folder.
- 3 Start `nmail.nex` from the NextZXOS file browser. A start screen with a progress bar appears while it loads.

2.2 Setting up your mail account

On the first start NMail opens the **File > Mail account** window by itself. You will find it in the same menu later (for example after you change your password).



Mail account. E-mail, password and name are enough; NMail picks the provider from the address.

Field	What to enter
E-mail	your e-mail address
Password	your mailbox password – or an app password if you use two-step verification (see below)
Your name	the name recipients see in the From field
Provider	<i>Automatic (by e-mail)</i> , or choose with SPACE : Gmail, Seznam.cz, Email.cz, Outlook.com, Centrum.cz, Atlas.cz, Yahoo Mail, iCloud Mail, AOL Mail, GMX, WEB.DE, Zoho Mail, Fastmail, Yandex Mail or <i>Other server</i>

With *Other server* more fields appear: IMAP and SMTP server, port, security, login name and an optional separate SMTP password. Your provider's help pages list these settings.

When you confirm with **OK**, NMail:

1. fetches the gateway's public key,
2. encrypts the password – the Next needs about **15 seconds** for that,
3. sends it to the gateway, which tries to log in to your mailbox.

When everything works, NMail reports *The account is ready*, saves the token in `NMAIL.CFG` and loads your folders and mail. If the login fails, NMail shows the mail server's message and tells you what your provider needs – most often an app password or IMAP access switched on.

2.3 Two-step verification and app passwords

If your mailbox uses **two-step verification** (SMS, app, key), a mail program cannot do the second step. Providers offer an **app password** instead: a separate, usually generated password just for mail programs. Enter it in NMail in place of your normal password. Your normal password and two-step verification for the web stay as they are, and you can revoke the app password at any time to disconnect NMail.

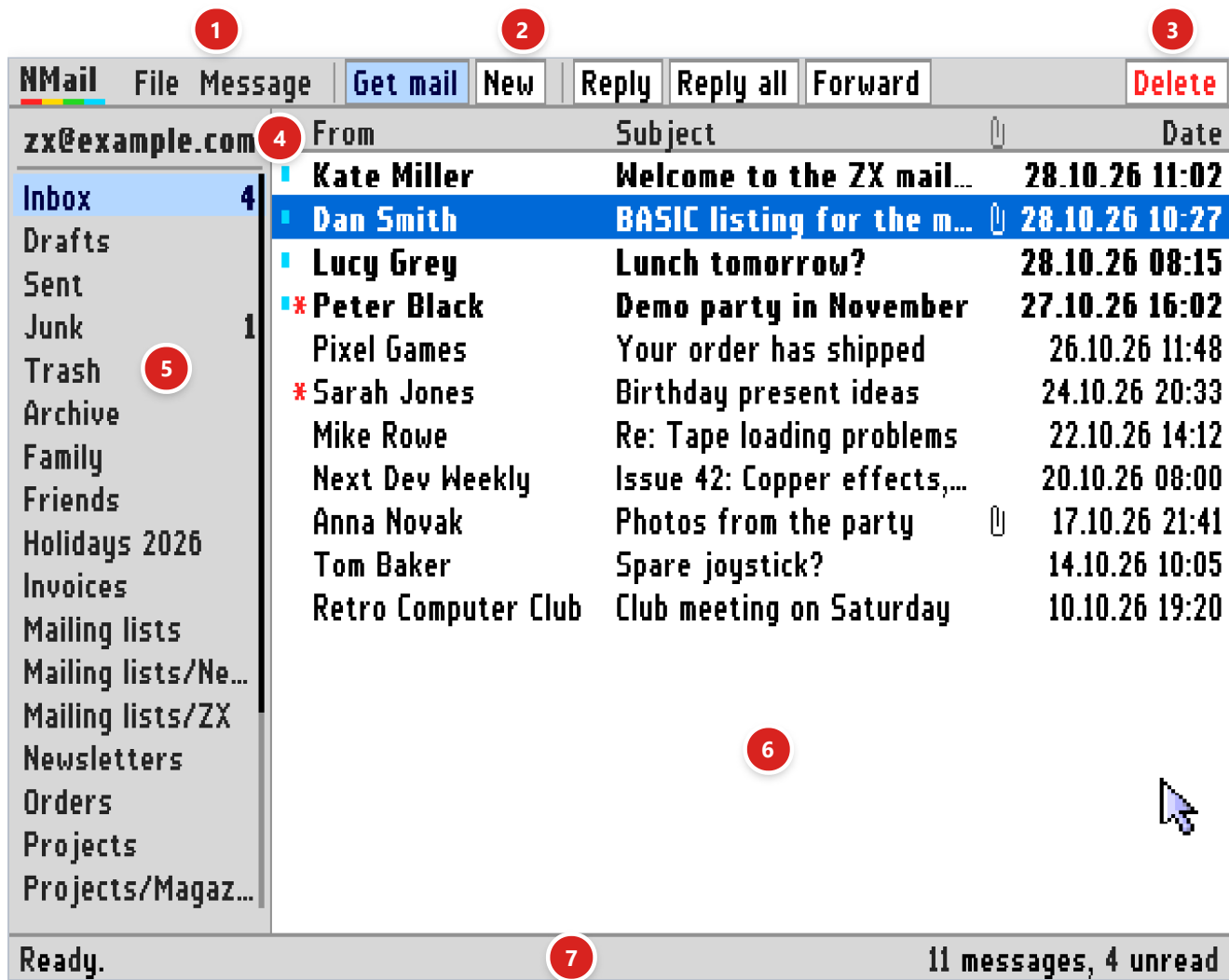
Provider	Where to create an app password	Note
Gmail	myaccount.google.com › Security › 2-Step Verification (turn on) › App passwords (directly at myaccount.google.com/apppasswords)	16 characters, type them without spaces; Google does not accept the normal password
Yahoo Mail, AOL	Account info › Account security › Generate app password	always required
iCloud Mail	account.apple.com › Sign-In and Security › App-Specific Passwords	always required
GMX, WEB.DE	Mail settings › POP3/IMAP: enable; with two-factor authentication Security › Application-specific passwords	GMX switches unused IMAP off after a while
Zoho Mail	Settings › IMAP: enable; with two-factor authentication accounts.zoho.com › Security › App passwords	
Fastmail	Settings › Privacy & Security › App passwords (IMAP, SMTP access)	always required
Yandex Mail	Mail clients: enable IMAP; id.yandex.com › Security › App passwords	
Seznam.cz, Email.cz	Account › Two-factor authentication › Application password	without two-step verification the normal password works
Centrum.cz, Atlas.cz	mailbox settings: enable IMAP; with two-step verification an app password in account security	

Not supported

Outlook.com, Hotmail, Live – since September 2024 Microsoft only allows OAuth sign-in for personal accounts; neither the password nor an app password works. **Proton Mail** works only through Proton Mail Bridge on your own computer (set up in NMail as *Other server*).

3 The screen and controls

3.1 Main window



Main window with the Inbox.

- 1 Menus File and Message (**EXT** + **M**).
- 2 Buttons for the most common actions; they change with what you are doing.
- 3 Delete – moves the message to Trash.
- 4 Active account; click it to switch accounts.
- 5 Folder panel with unread counts.
- 6 Message list: sender, subject, paperclip, date.
- 7 Status line: messages on the left, counts and transfer progress on the right.

3.2 Keyboard

Everything can be done from the keyboard. Most shortcuts use the **EXT** key (EXTEND MODE): press **CAPS SHIFT** and **SYMBOL SHIFT** together, then the key. In an emulator this is usually **Shift** + **Ctrl** + key. **BREAK** is **CAPS SHIFT** + **SPACE**.

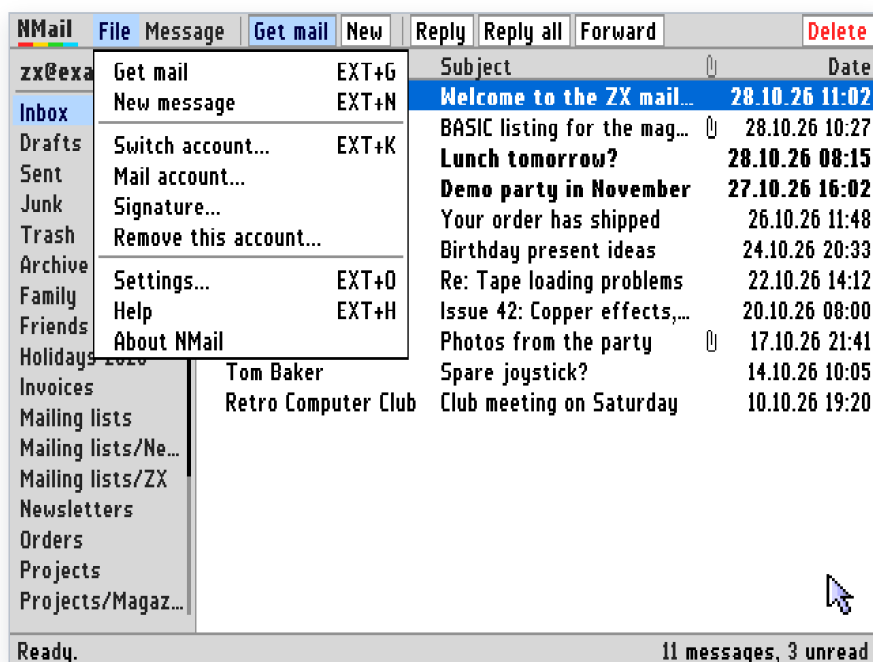
Action	Keys
Arrows	CAPS + 5 6 7 8

Open, confirm	ENTER
Back, cancel, close window	BREAK
Page up / down	CAPS + 3 / CAPS + 4
Delete character to the left	DELETE (CAPS + 0)
Switch folder panel / message list	EXT + SPACE
Menu	EXT + M , arrows, ENTER
Help	EXT + H

All shortcuts are listed in the chapter [Keyboard shortcuts](#).

3.3 Mouse and menus

The mouse works the way you expect: a click selects, a double click or **ENTER** opens, the wheel scrolls and the **right button** opens the context menu of a message or folder. Windows have a red × in the top right corner, which closes them just like **BREAK**.



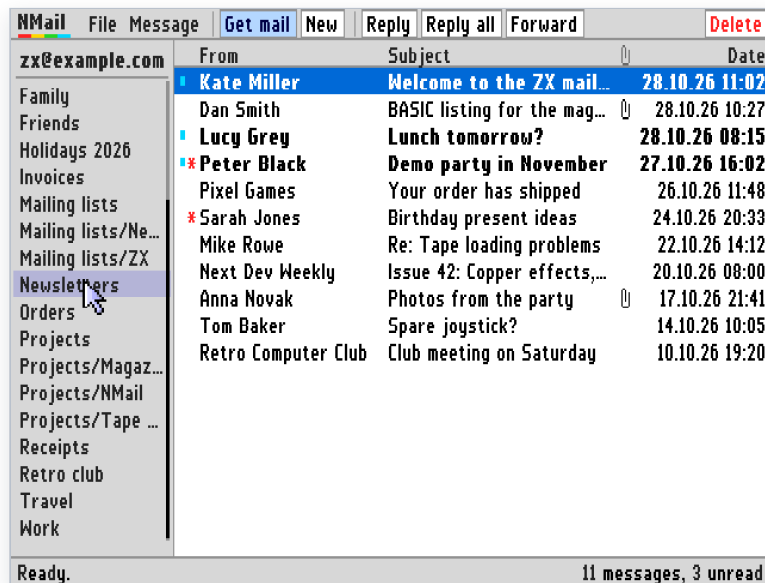
File menu with shortcuts. The arrow keys skip the separators.

4 Folders and the message list

4.1 Folder panel

On the left are the folders of the account: **Inbox**, **Drafts**, **Sent**, **Junk**, **Trash**, **Archive** (NMail recognises them by the role the mail server gives them) followed by your own folders in alphabetical order. The number after a name is the count of unread messages. Click a folder to open it, or switch to the panel with **EXT** + **SPACE** and choose it with the arrows.

When the folders do not fit, the panel gets a scroll bar; scroll it with the mouse wheel or the arrows.



Scrolled folder panel with its scroll bar.

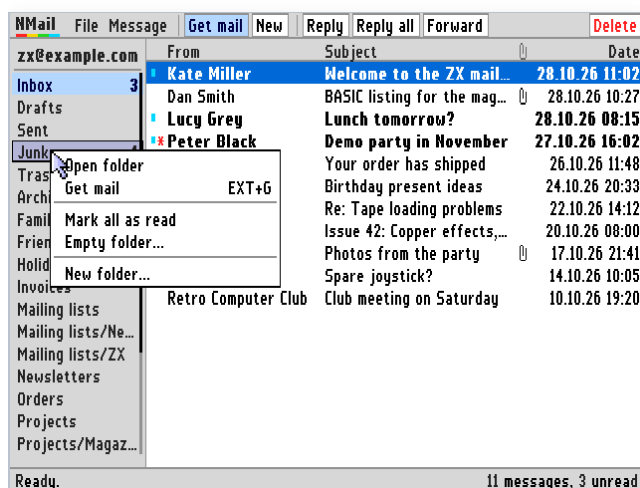
4.2 Message list

Messages are listed from the newest. **Unread** messages are bold with a blue dot, a **red star** marks starred messages and a paperclip messages with attachments. Fetch new mail with the **Get mail** button or **EXT + G**.

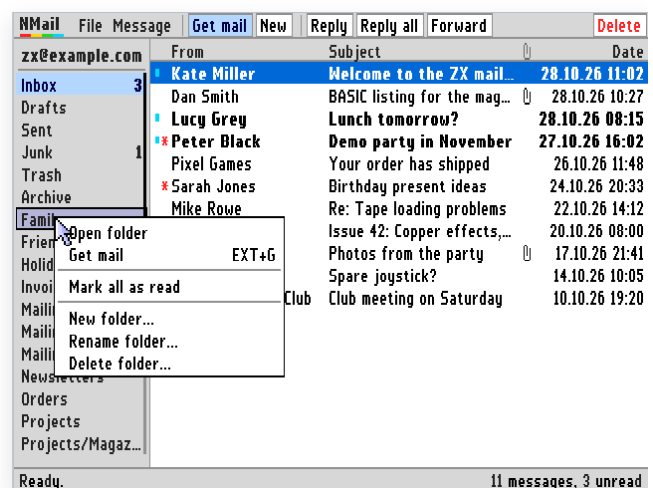
NMail loads messages page by page. The last row of the list reads » *Load more messages (n more on the server)* – click it or press **ENTER** to load more (up to 256 messages per folder).

4.3 Working with folders

The right mouse button on a folder opens its menu:



Junk folder menu – Trash and Junk can be emptied.



Menu of your own folder – rename and delete.

Item	What it does
Open folder	same as a click
Get mail	reloads the folder
Mark all as read	all messages in the folder

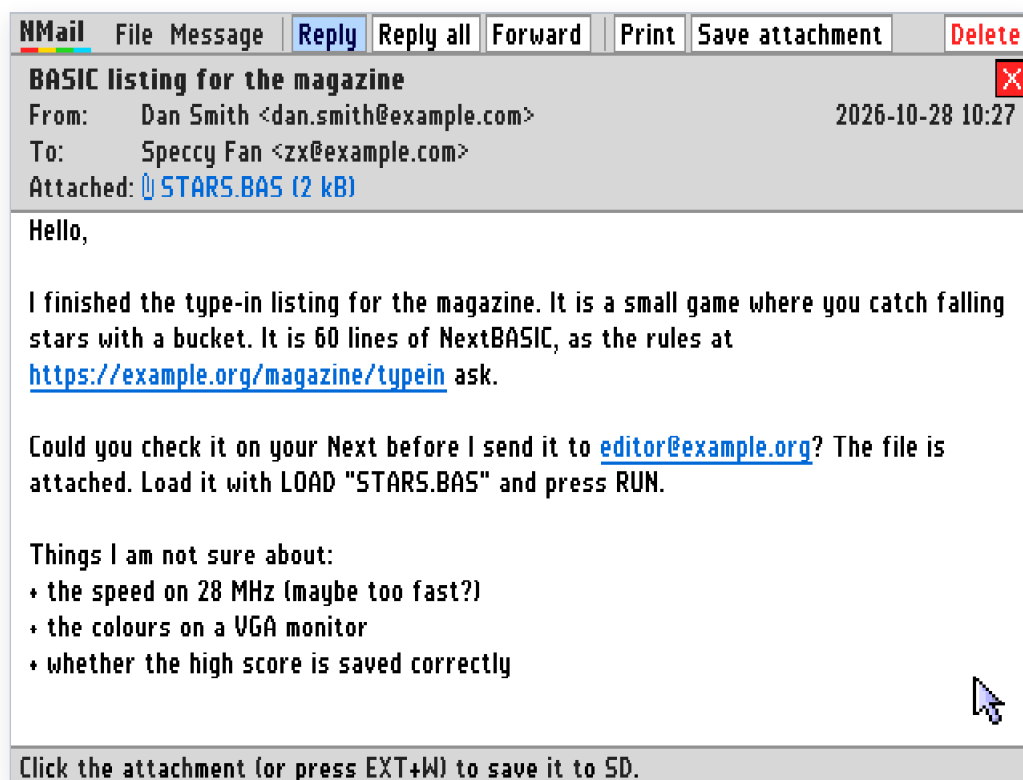
New folder...	a/b creates subfolder b in folder a
Rename folder...	your own folders only; a new name like Projects/2026 also moves the folder
Delete folder...	your own folders only; after confirmation it is deleted with its messages
Empty folder...	Trash and Junk only; after confirmation deletes all messages for good

The Inbox and folders with a role (Drafts, Sent, Trash ...) cannot be renamed or deleted.

5 Reading messages

5.1 Opening a message

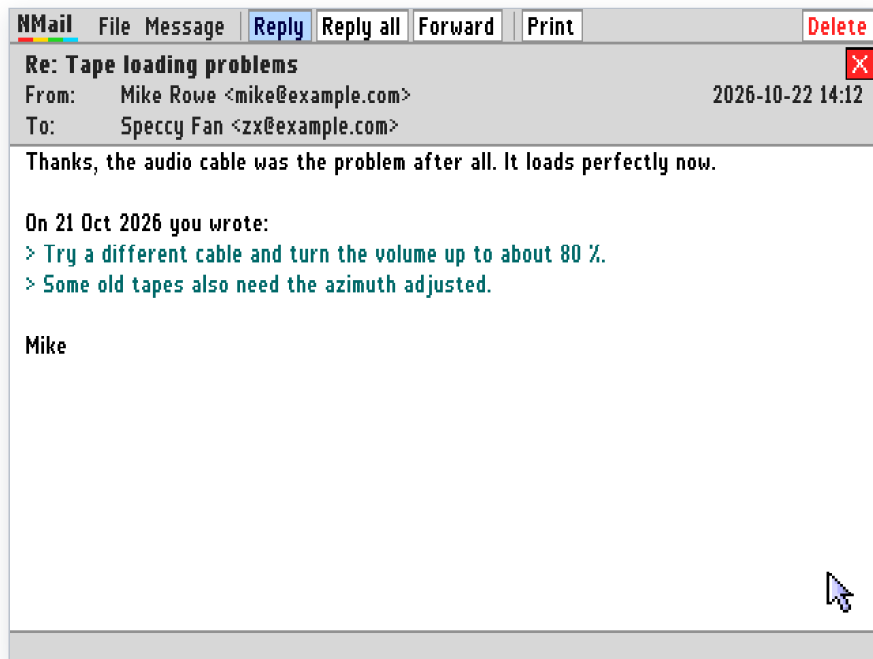
Open a message with a double click or **ENTER**. The headers are at the top (subject, From, To, Cc, date and attachments), the text below them is wrapped to the screen width. Links (<http://...>, www....) and e-mail addresses are blue and underlined.



Reading a message with an attachment. Buttons at the top: Reply, Reply all, Forward, Print, Save attachment, Delete.

Action	Keys
Scroll line by line	arrows, mouse wheel
Page by page	CAPS + 3 / CAPS + 4 , SPACE
Start / end of the message	EXT + 3 / EXT + 4
Back to the list	BREAK or x

Quotes (lines starting with >) are coloured, so you can see at once what is new and what is a reply to an older message.

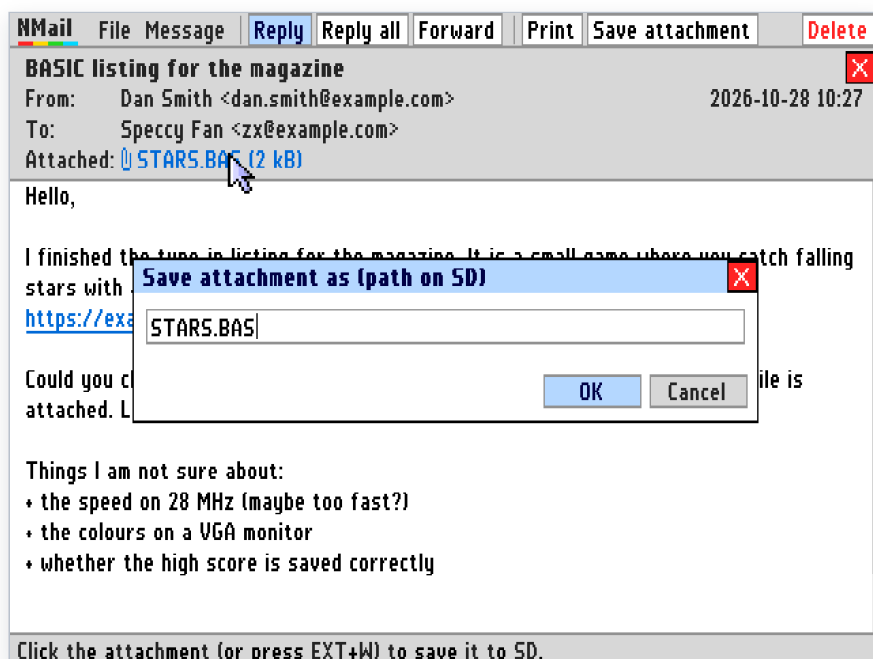


A message with a quote.

HTML mail is converted to plain text by the gateway. You choose the message font (pixel Next, Sans or Serif) in the [Settings](#).

5.2 Saving an attachment

The **Attached:** row in the message header shows the names and sizes of the attachments. Click it (or press **EXT** + **W**, or use the **Save attachment** button), pick the attachment if there are several, and enter the file name on the SD card. NMail downloads the attachment in chunks and shows the progress on the right of the status line.



Saving an attachment to the SD card.

The gateway handles attachments up to 8 MB, a sensible limit for the Next.

6 Writing messages

6.1 New message

The **New** button or `EXT + N` opens a new message. Fill in **To**, optionally **Cc**, and **Subject**; separate several addresses with commas. Move between the fields and the text with `EXT + SPACE` or the mouse. The text wraps by itself.



Writing a new message.

Action	Keys / button
Next field	<code>EXT + SPACE</code>
Send	<code>EXT + S</code> or <code>EXT + ENTER</code> , the Send button
Attach a file from SD	<code>EXT + P</code> , the Attach button
Save as draft	the Save draft button
Discard	the Discard button (NMail asks first)

A sent message is stored in the Sent folder (Gmail does this by itself). Drafts go to the Drafts folder.

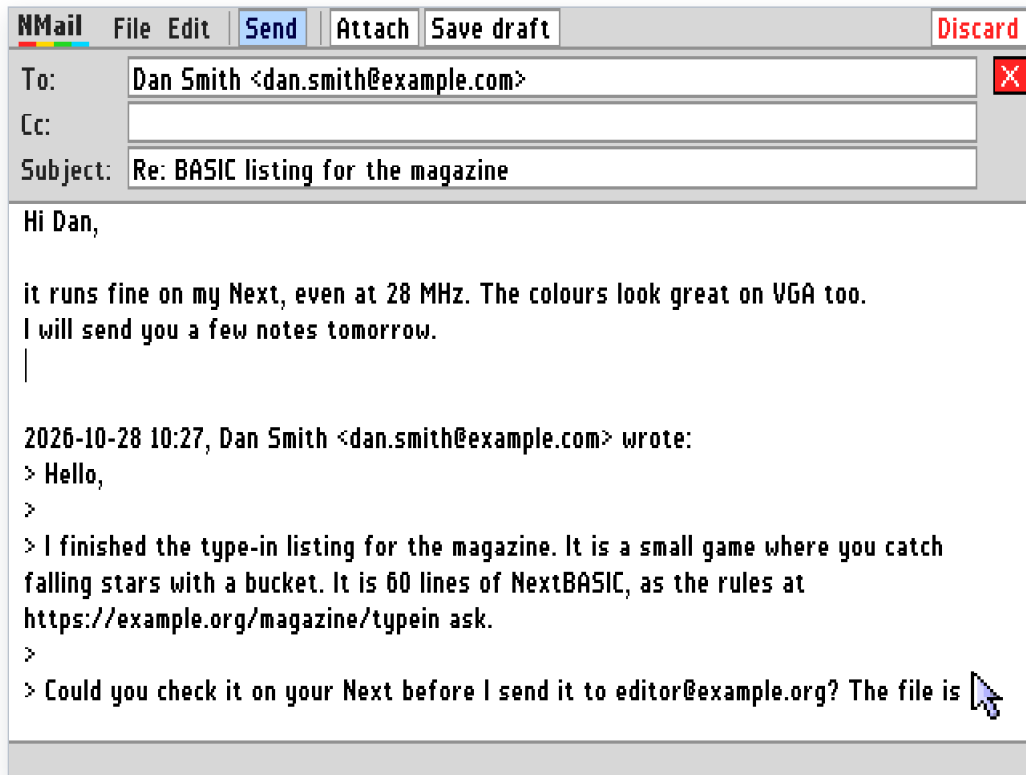
6.2 Reply and forward

Reply

`EXT + R`

Reply to all	EXT + A
Forward	EXT + F

A reply fills in the recipient and the subject with **Re:** and quotes the original message below the cursor. Forwarding adds the original attachments – they are not downloaded to the Next, the gateway attaches them.



A reply quoting the original message.

6.3 Editing text

Action	Keys
Select text	EXT + 5 6 7 8 , or drag with the mouse
Select all	EXT + A
Cut / copy / paste	EXT + X / EXT + C / EXT + V

The mouse wheel scrolls the text while the cursor stays on the screen.

6.4 Accented letters

Accents are typed with **dead keys**: first the accent, then the letter (just like in NWord).

Dead key	Accent
SYM + Q	´ (á é í ó ú ý), again: ¨
SYM + W	ˇ (č ď ě ň ř š ť ž), again: ˇ
SYM + E	° (û), then ¨ ^ ˇ , , ´

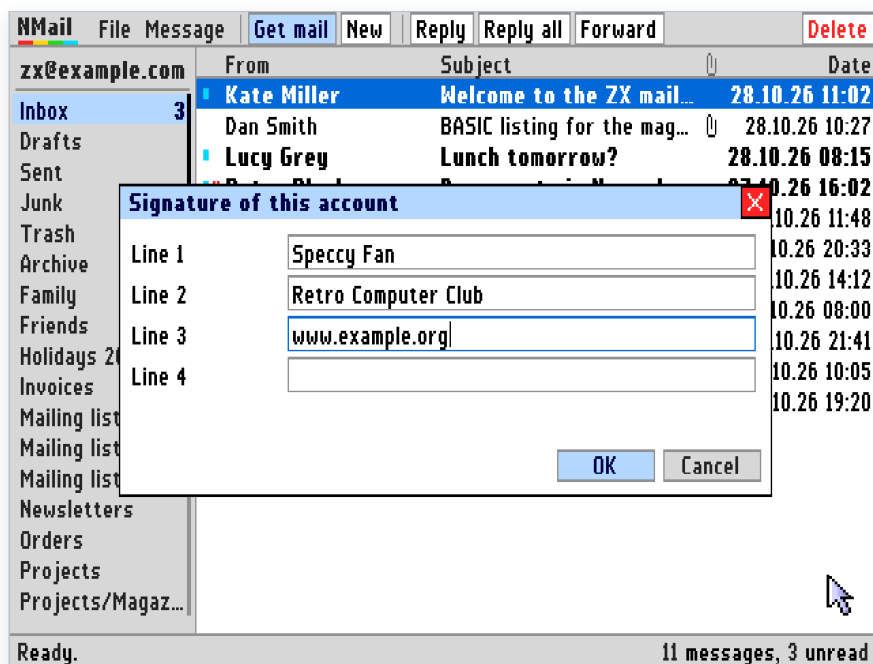
For example **SYM** + **E** twice and **U** types ü. A dead key followed by **SPACE** types the accent alone.

6.5 Attaching a file

EXT + **P** or the **Attach** button asks for the path of a file on the SD card (e.g. `/games/STARS.BAS`). The attachment appears in the **Attached:** row and is uploaded to the gateway when you send the message. One file can be up to 4 MB.

6.6 Signature

File > **Signature...** sets up to 4 signature lines (name, phone, web...) for the active account. NMail puts it below the `--` separator in new messages, replies (above the quote) and forwards.



Signature of the active account.

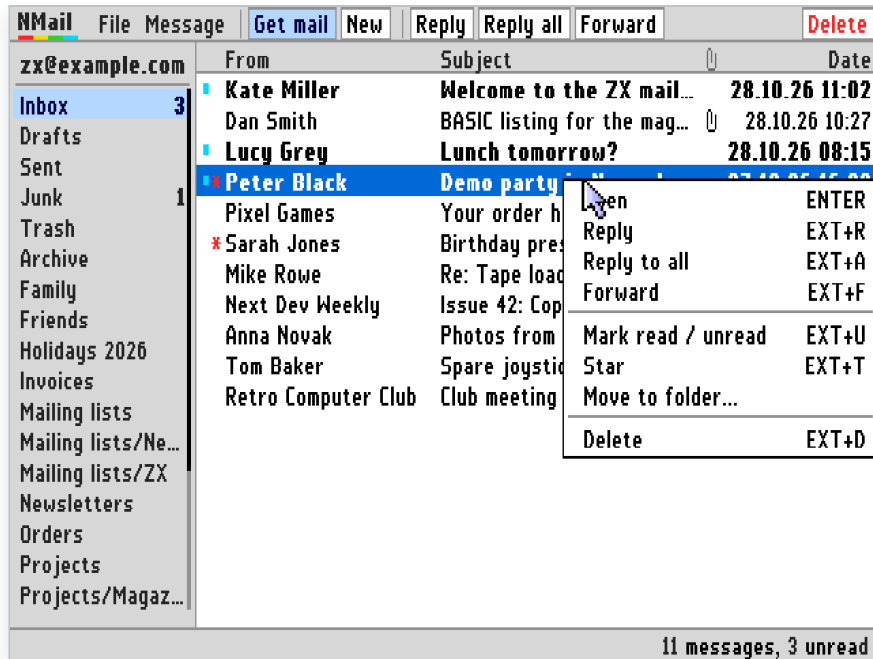
7 Organising and searching

7.1 Message actions

Action	Keys
Delete (to Trash)	EXT + D , the Delete button
Move to folder	Message > Move to folder...
Mark read / unread	EXT + U
Star	EXT + T

A deleted message goes to Trash; in Trash it is deleted for good. NMail always asks before deleting.

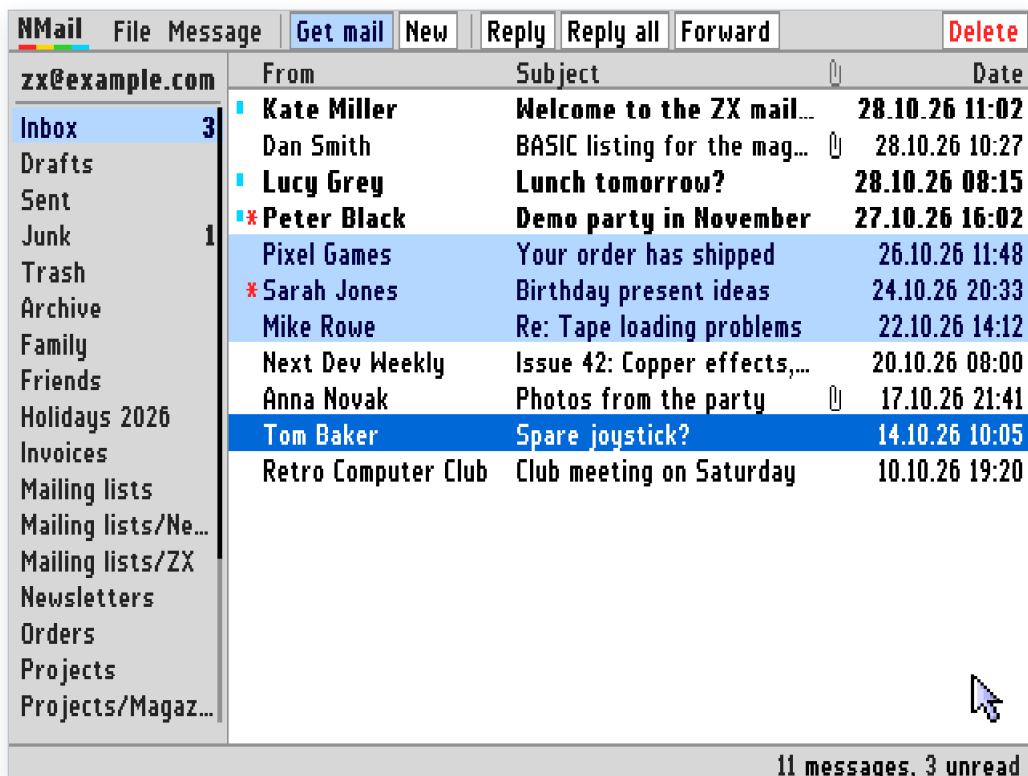
The **right button** on a message opens a context menu with all actions:



Message context menu.

7.2 Several messages at once

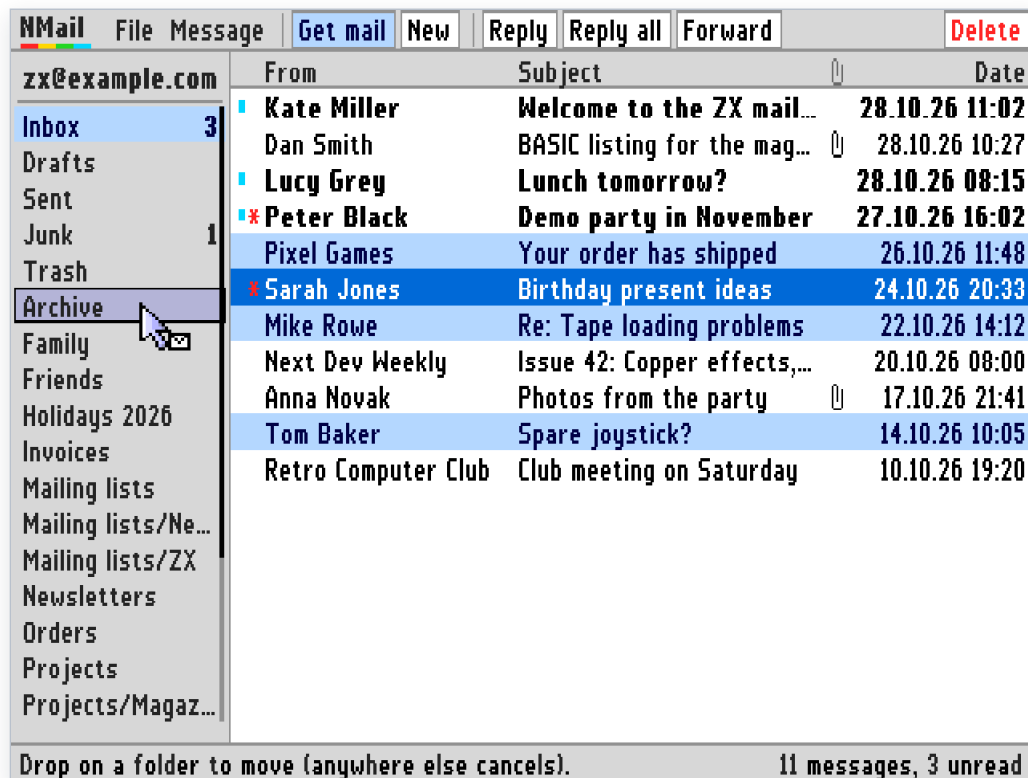
SHIFT+click selects a range from the last clicked message, **EXT**+click adds or removes a single message. Delete, move, read and star then apply to all selected messages.



Selected messages: a range with SHIFT+click and one more with EXT+click.

7.3 Drag and drop

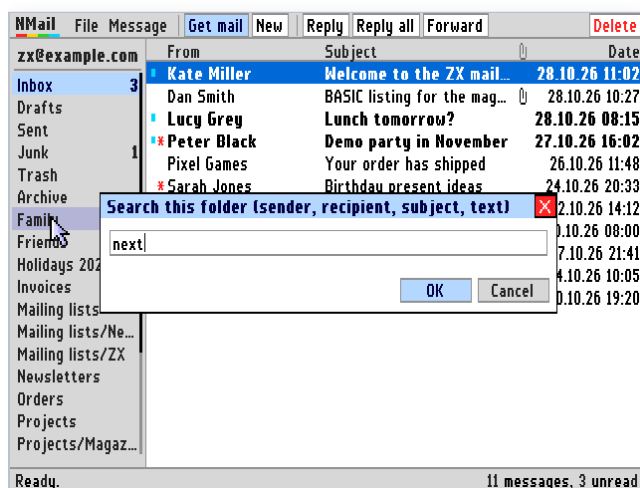
Grab a message (or all selected ones) with the left button and drop it on a folder in the panel on the left. While dragging, the pointer shows an envelope and the target folder is highlighted. NMail asks whether to really move the messages; dropping anywhere else does nothing.



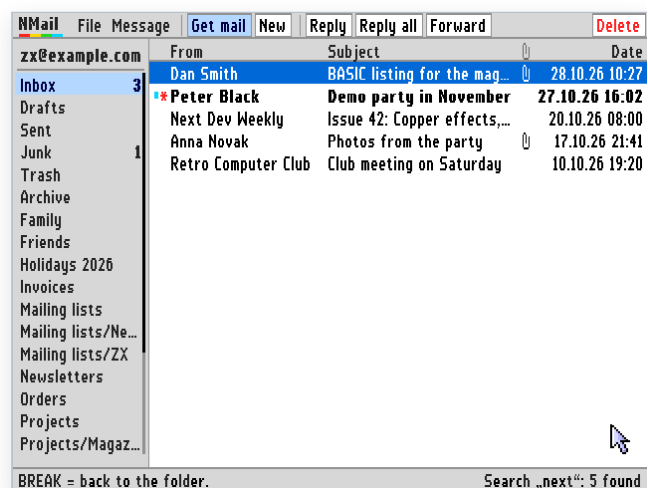
Dragging the selected messages to Archive.

7.4 Search

EXT + **S** (when not writing) or **Message > Search...** searches the open folder by sender, recipient, subject and text. The mail server does the search, so it also finds messages NMail has not loaded yet.



Entering a search.

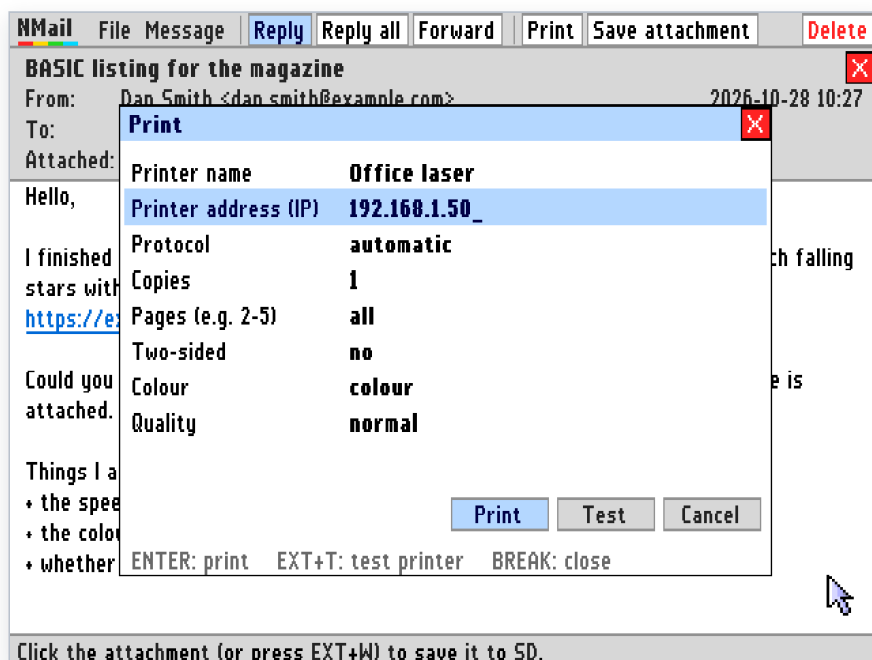


Results – the query and the count are in the status line.

The results replace the message list and work like a normal list. **BREAK** or a click on a folder takes you back to the folder.

8 Printing

You can print the open message on a network printer over WiFi: **EXT** + **P** while reading, **Message** > **Print...** or the **Print** button. The A4 page has the headers (subject in bold, From, To, Cc, Date, Attachments), a line and the text in the same font as on the screen.



The Print dialog. ENTER prints, EXT+T tests the printer.

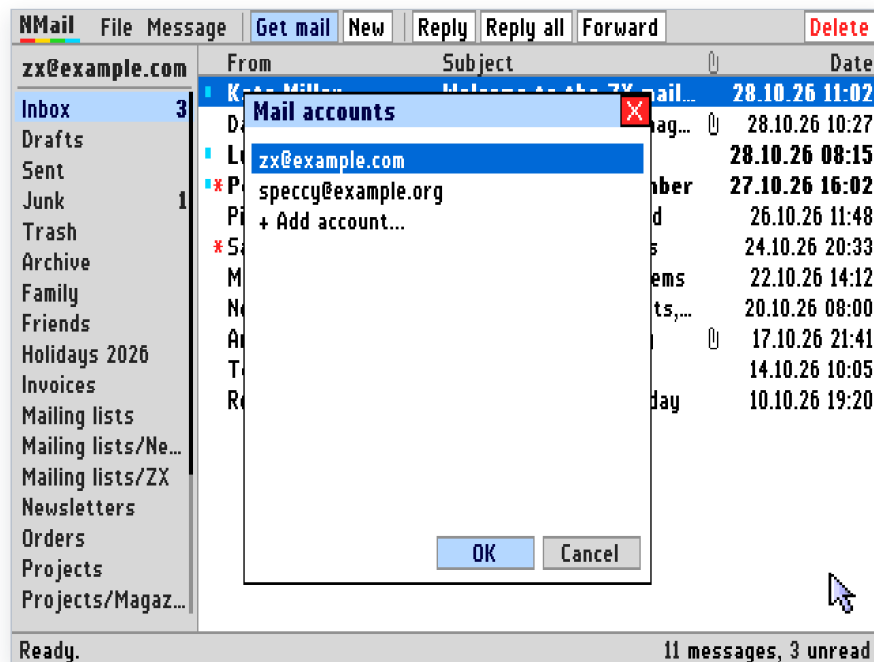
Field	Meaning
Printer name	any description for yourself
Printer address (IP)	e.g. 192.168.1.50, optionally with a port and a path: 192.168.1.50:631/ipp/print
Protocol	see the table below; <i>automatic</i> finds out what the printer can do
Copies	1 or more
Pages	a range, e.g. 2-5; empty = all
Two-sided, Colour, Quality	if the printer supports them

Protocol	For printers
automatic	asks over IPP; sends PDF or PWG raster
IPP – PDF	AirPrint, Mopria (most newer network printers)
IPP – raster (PWG)	IPP Everywhere without PDF
RAW port 9100 – PDF	printers that take PDF on port 9100
PCL laser (raster)	laser printers with PCL 5, port 9100
Brother laser (raster)	low-cost Brother GDI laser printers (e.g. DCP-1610W), port 9100

The **Test** button (**EXT** + **T**) asks the printer and shows its model and whether it can print PDF. Progress is shown on the right of the status line, **BREAK** stops printing. The printer settings are saved in `NMAIL.CFG`. While printing, NMail writes a temporary file `NMAILPRN.PDF` to the SD card and deletes it afterwards.

9 Several accounts

NMail keeps up to 6 accounts. The e-mail of the active account is at the top of the folder panel. Clicking it, **EXT** + **K** or **File > Switch account...** opens the account list.



Mail accounts. The last row adds a new account.

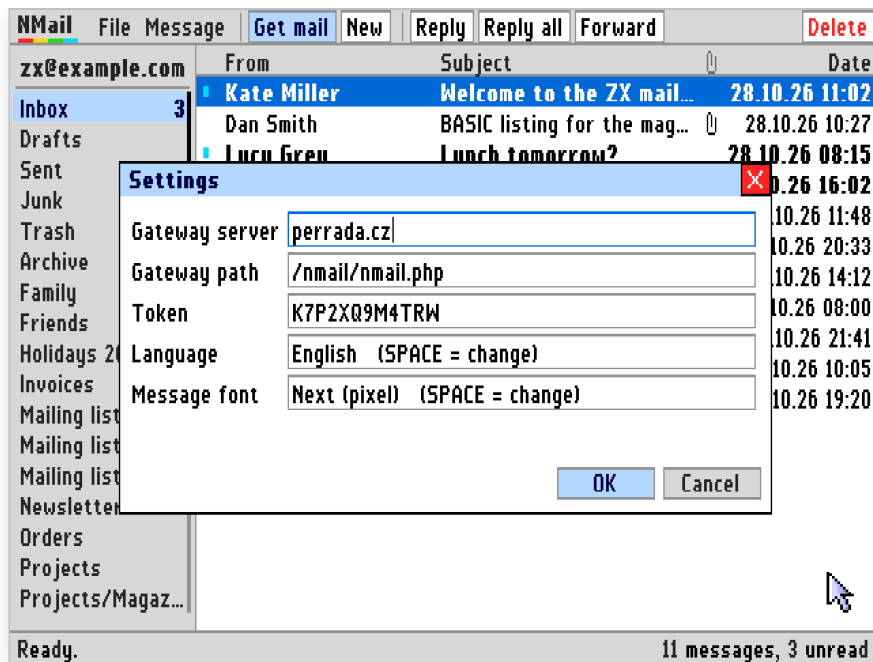
- **Add an account:** **+ Add account...** opens the same window as on the first start.
- **Remove an account:** **File > Remove this account...** removes the active account from NMail and from the gateway (the token stops working and the gateway deletes the stored account).
- **Changed password:** after changing your mail password, enter the same e-mail with the new password in **File > Mail account...**; the account gets a new token.

Each account has its own signature and its own folder on the SD card. All accounts use the same gateway, set in the Settings.

10 Settings and saved mail

10.1 Settings

EXT + **O** or **File > Settings...**



Settings with the default public gateway.

Field	Meaning
Gateway server	name or IP address of the gateway server; default perrada.cz
Gateway path	path of nmail.php; default /nmail/nmail.php
Token	token of the active account (filled in automatically; by hand only with a token from setup.php)
Language	English or Czech (SPACE switches)
Message font	Next (pixel), Sans or Serif

The settings are kept in NMAIL.CFG in the folder NMail was started from. The gateway port (default 80) can only be set there, with a port= line. WiFi is set up in NextZXOS.

10.2 Saved mail and offline use

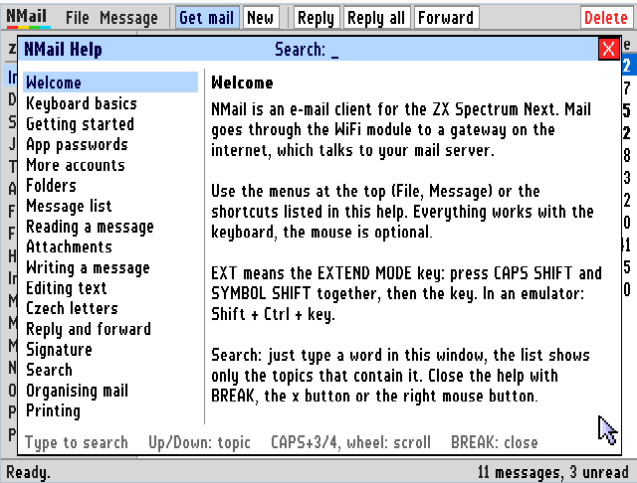
A message you have read is saved on the SD card and opens from the card next time, without a transfer. The folder and message lists are saved after each load. When the gateway cannot be reached, NMail shows the saved state (*Offline (saved messages): ...*) and you can still read the saved messages. Deleting or moving a message also deletes its copy on the card.

File on SD	Contents
NMAIL.CFG	settings, tokens and e-mails of the accounts, signatures, printer
NMAIL.LOG	log of the WiFi module communication when a transfer fails (without message data)
MAIL/Txxxx/	saved mail of one account: folder list, message lists and messages

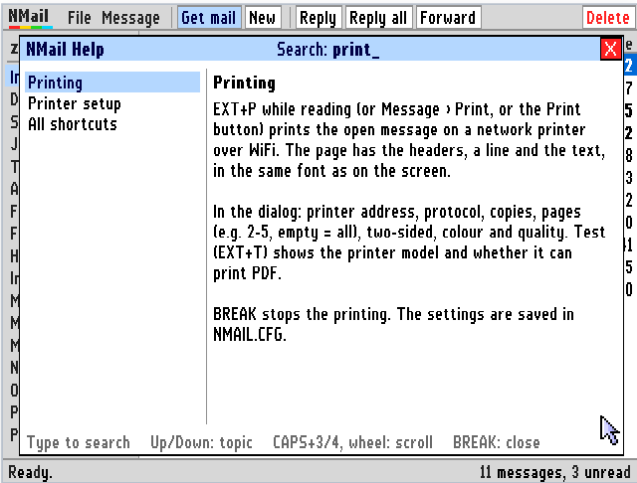
NMAIL.CFG contains the tokens of your accounts. Anyone who has it can read your mail through the gateway until you remove the account. Treat the card like your keys.

11 Help and About

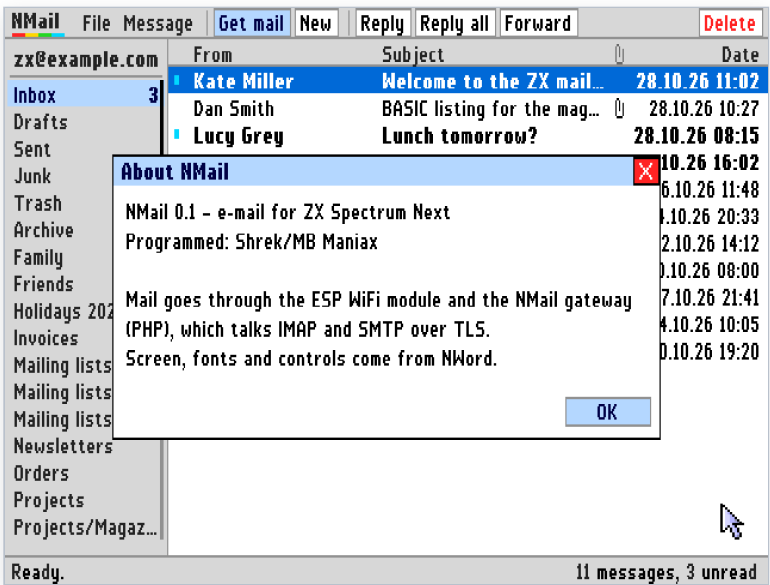
The built-in help (**EXT** + **H**, **File > Help**) has the topics on the left and the text on the right. Just start typing and the list shows only the topics that contain the text. Close the help with **BREAK**, the **x** button or the right mouse button.



Help.



Searching the help ("print").



File > About NMail.

12 Troubleshooting

Message	What to do
WiFi module (ESP) is not responding.	Check the WiFi module and its setup in NextZXOS. Switching the Next off and on can help.

<i>WiFi is not connected</i>	Connect WiFi in NextZXOS.
<i>Cannot connect to the gateway.</i>	The gateway or the internet is not reachable, or the gateway server in the Settings is wrong. Meanwhile NMail shows the saved mail.
<i>The gateway is not answering (timeout).</i>	The mail server is slow; try again. With very large folders, archiving old messages helps.
<i>The gateway returned an HTTP error.</i>	Wrong gateway path in the Settings, or the server redirects to HTTPS (for your own gateway see Gateway troubleshooting).
<i>Incomplete answer from the gateway.</i>	The transfer was interrupted; try again. NMail writes details to <code>NMAIL.LOG</code> .
<i>Gateway: ...</i>	A message from the gateway or the mail server, e.g. a rejected login. An app password often helps (see above).
<i>Set up your mail account</i>	NMail has no account yet: File > Mail account...
<i>Account not created</i>	The mail server rejected the login; the window shows the reason and what the provider needs.

13 Keyboard shortcuts

EXT = **[CAPS SHIFT]** + **[SYMBOL SHIFT]**, BREAK = **[CAPS SHIFT]** + **[SPACE]**.

Mail	
Get mail	EXT + G
New message	EXT + N
Reply	EXT + R
Reply to all	EXT + A
Forward	EXT + F
Delete	EXT + D
Mark read / unread	EXT + U
Star	EXT + T
Search	EXT + S
Save attachment	EXT + W
Print (reading)	EXT + P
Switch account	EXT + K
Settings	EXT + O
Help	EXT + H
Menu	EXT + M

Writing	
Send	EXT + S, EXT + ENTER
Next field	EXT + SPACE
Attach file	EXT + P
Select	EXT + 5 - 8
Select all	EXT + A
Cut / copy / paste	EXT + X C V
Accents ´ °	SYM + Q W E

Moving around	
Arrows	CAPS + 5 - 8
Page	CAPS + 3 / 4
Start / end	EXT + 3 / 4
Folders ↔ messages	EXT + SPACE
Open / back	ENTER / BREAK

PART II

Your own gateway

How to run the NMail gateway on web hosting, on your own Linux server or in your home network, and connect NMail to it. The gateway is in the `gateway.zip` archive.

14 Why your own gateway

The public gateway `perrada.cz` is enough for most users. Running your own gateway makes sense when:

- you do not want your mail to pass through someone else's server (the gateway sees the content of the messages it hands to the Next),
- you have your own mail server, perhaps only in a company or home network,
- you want to create accounts from a PC browser too (the `setup.php` page, HTTPS only),
- you want a gateway for a club or a group of friends,
- the public gateway happens to be down.

14.1 Requirements

What	Requirement
PHP	5.6 to 8.x with the <code>iconv</code> , <code>openssl</code> , <code>json</code> and <code>pcre</code> extensions (present in almost every installation). The <code>imap</code> and <code>mbstring</code> extensions are not needed.
Web server	Apache (with <code>.htaccess</code>), nginx with PHP-FPM, or anything that runs PHP
HTTP	<code>nmail.php</code> must be reachable over plain HTTP (no redirect to HTTPS) and without gzip compression – the Next cannot do TLS and does not follow redirects.
Outgoing connections	the server must reach the mail servers' ports: 993 (IMAP), 465 and 587 (SMTP)
Disk	a data directory writable by PHP – ideally outside the web root
HTTPS	optional; only for <code>setup.php</code> (creating accounts in a browser)

14.2 Contents of gateway.zip

File	Purpose	Upload
<code>nmail.php</code>	the gateway – the only address the Next calls	yes
<code>setup.php</code>	creating and revoking accounts in a browser (HTTPS only)	yes
<code>config.php</code>	gateway settings	yes
<code>lib/</code>	library: IMAP, SMTP, MIME, character sets, accounts	yes
<code>.htaccess</code>	for Apache: disables gzip, blocks access to the configuration	yes
<code>cacert.pem</code>	certificate authorities (Mozilla) for verifying mail servers	yes
<code>data/</code>	default data directory (only an access-denying <code>.htaccess</code>)	if needed
<code>README.md</code> , <code>README_en.md</code>	technical documentation of the gateway	no
<code>test/</code> , <code>accounts.dev.example.php</code>	tests and development	no

14.3 What the gateway stores

The gateway keeps in its data directory: a random secret (`secret.php`), the private RSA key (`rsa_key.php`), the encrypted accounts, temporarily uploaded attachments (24 h), a short-lived cache of downloaded attachments (10 min) and a log. Accounts are encrypted with AES-256 using a key derived from the token and the gateway secret – without the token the password cannot be recovered. The gateway creates the secret and the key by itself on first use.

15 Option A: web hosting

The simplest way: ordinary web hosting with PHP, where you upload files by FTP or a file manager.

- 1 **Create a directory**, e.g. `/nmail/`, and upload `nmail.php`, `setup.php`, `config.php`, `.htaccess`, `cacert.pem` and the whole `lib/` directory into it. Do not upload the `test/` directory or `accounts.dev*.php`.
- 2 **Data directory**. If your hosting allows a directory outside the web root (e.g. next to `www/`), create it and set it in `config.php`:

```
nm_def('NMAIL_DATA_DIR', dirname(__DIR__) . '/nmail_data');
```

Otherwise upload `data/` with its `.htaccess`, which denies web access (works on Apache; if it is missing, the gateway writes it there by itself). The directory must be writable by PHP (permissions 755 or 775, depending on the hosting).

- 3 **Time zone** of the dates in the message list: `NMAIL_TIMEZONE` in `config.php` (default `Europe/Prague`, e.g. `Europe/London`).
- 4 **Turn off forced HTTPS** for the `/nmail/` directory if your hosting enables it (often a “Redirect to HTTPS” switch in the control panel). The Next must call `nmail.php` over plain HTTP.
- 5 **Test the gateway** in a browser – see [Testing the gateway](#).
- 6 **Connect NMail** – see [Connecting NMail to the gateway](#).

Some cheap hosting plans block outgoing connections to ports 993, 465 and 587. The gateway then reports `ERR_CONN`. Ask the hosting support, or choose another option.

16 Option B: your own Linux server

Steps for Debian 12 or Ubuntu 22.04/24.04 (VPS, home server, Raspberry Pi). The examples use the domain `mail.example.com`; replace it with yours (or an IP address).

16.1 Apache

- 1 **Install Apache** with PHP:

```
sudo apt update
sudo apt install apache2 libapache2-mod-php unzip
```

- 2 Unpack the gateway into the web root and create the data directory outside it:

```
unzip gateway.zip -d /tmp/nmail-gw
sudo mkdir -p /var/www/html/nmail /var/lib/nmail
cd /tmp/nmail-gw
sudo cp -r nmail.php setup.php config.php .htaccess cacert.pem lib /var/www/html/nmail/
sudo chown www-data:www-data /var/lib/nmail
sudo chmod 700 /var/lib/nmail
```

- 3 In `/var/www/html/nmail/config.php` set the data directory (and the time zone if needed):

```
nm_def('NMAIL_DATA_DIR', '/var/lib/nmail');
nm_def('NMAIL_TIMEZONE', 'Europe/London');
```

- 4 Allow `.htaccess` in the gateway directory (Debian ignores it by default). Create `/etc/apache2/conf-available/nmail.conf`:

```
<Directory /var/www/html/nmail>
    AllowOverride All
</Directory>
<Directory /var/www/html/nmail/lib>
    Require all denied
</Directory>
```

and enable it:

```
sudo a2enconf nmail
sudo systemctl reload apache2
```

- 5 Test the gateway: `http://mail.example.com/nmail/nmail.php?a=ping` (see [Testing the gateway](#)).

16.2 nginx and PHP-FPM

Steps 2 and 3 are the same as for Apache. Install `nginx php-fpm unzip` and add this to the `server` block for port 80:

```
location ^~ /nmail/ {
    gzip off;
    location ~ ^/nmail/(nmail|setup)\.php$ {
        include snippets/fastcgi-php.conf;
        fastcgi_pass unix:/run/php/php8.2-fpm.sock; # by version: ls /run/php/
    }
    return 404; # show nothing else from the directory
}
```

Then `sudo nginx -t && sudo systemctl reload nginx`. `nginx` does not use `.htaccess`; the configuration above only lets `nmail.php` and `setup.php` be reached from the web.

16.3 HTTPS for setup.php

Only `setup.php` needs HTTPS; the Next keeps using HTTP. Get a Let's Encrypt certificate with `certbot` – **without** redirecting HTTP to HTTPS:

```
sudo apt install certbot python3-certbot-apache      # or python3-certbot-nginx
sudo certbot --apache --no-redirect -d mail.example.com  # or --nginx
```

If your site already redirects to HTTPS, make an exception for the gateway. In Apache, add this in the port 80 virtual host before the redirect rule:

```
RewriteCond %{REQUEST_URI} !^/nmail/nmail\.php
```

In nginx, keep the `location ^~ /nmail/` block in the port 80 server and put the redirect (`return 301 https://...`) into `location /`.

16.4 Firewall and outgoing ports

Incoming: port 80 (and 443 for HTTPS). Outgoing: 993, 465 and 587 to the mail servers. Some VPS providers block outgoing SMTP ports on new servers – the gateway can then read mail but not send it (`ERR_CONN` when sending).

17 Option C: home network

You can also run the gateway at home, for example on a Raspberry Pi or an always-on PC, in the same network as the Next. Your mail then only leaves your network encrypted, on its way to the mail server.

- **Raspberry Pi / Linux:** the steps are the same as in [Option B](#). In NMail, enter the local IP address as the gateway server, e.g. `192.168.1.10`. Give the Raspberry Pi a fixed IP address (a DHCP reservation in your router).
- **Quick try on a PC with PHP installed** – the PHP built-in server is enough for one Next:

```
cd nmail-gw
php -S 0.0.0.0:8080
```

In NMail set the gateway server to `192.168.1.10`, the path to `/nmail.php` and add `port=8080` to `NMAIL.CFG`. The built-in server ignores `.htaccess` and serves every file in the directory – so put the data directory outside it (`NMAIL_DATA_DIR`) and do not expose a gateway run this way to the internet.

PHP on Windows

Enable `extension=openssl` in `php.ini`. To create the RSA key, PHP needs an `openssl.cnf` file: the gateway looks for it in the `OPENSSL_CONF` variable, in `extras/ssl/` next to `php.exe` and next to `nmail.php`; otherwise set the path in `NMAIL_OPENSSL_CONF`. The Windows firewall must allow incoming connections on the chosen port.

If you want to use your home gateway from elsewhere too, set up port forwarding in your router to the computer running the gateway. Think it over: the gateway will then be reachable from the whole internet.

18 Testing the gateway

Open the gateway address with the `a=ping` parameter in a browser:

```
http://mail.example.com/nmail/nmail.php?a=ping
```

```
OK      NMAILGW 1      1.0
```

Then check that the gateway can create the RSA key for creating accounts from the Next:

```
http://mail.example.com/nmail/nmail.php?a=key
```

```
OK      k3f9... (512 hexadecimal characters)
```

The first `a=key` call creates the key (this may take a few seconds) and stores it in the data directory. Also check that the data directory and the configuration cannot be reached from the web: `.../nmail/config.php`, `.../nmail/lib/core.php` and (if it is inside the web root) `.../nmail/data/` must return error 403 or 404.

If an `http://` address ends up as `https://` in the browser, the server redirects. The Next does not follow redirects – turn them off for `/nmail/` (see [HTTPS for setup.php](#)).

19 Connecting NMail to the gateway

19.1 Creating the account from the Next

- 1 On the Next, open **File > Settings...** (`EXT` + `O`).
- 2 **Gateway server:** the server name or IP address, e.g. `mail.example.com` – without `http://`.
- 3 **Gateway path:** the path of `nmail.php`, e.g. `/nmail/nmail.php`.
- 4 For a port other than 80, add a `port=8080` line to `NMAIL.CFG` (edit the file on a PC or in NextZXOS).
- 5 Confirm with **OK** and create the account: **File > Mail account...** – e-mail, password, name. The gateway returns the token by itself.

A token is only valid on the gateway that issued it. When you move to another gateway, you have to create your accounts again. All accounts in NMail use the same gateway.

19.2 Creating the account in a browser (setup.php)

If the gateway has HTTPS, you can create the account on a PC as well: open

`https://mail.example.com/nmail/setup.php?l=en`, choose the provider, enter the e-mail and password and confirm with *Test and create token*. The gateway tests the IMAP and SMTP login, stores the account and shows the token.

NMail – account setup [Česky](#) | [English](#)

Enter your mailbox details. The gateway tests the IMAP and SMTP login, stores the account encrypted and shows a token to type into NMail on the ZX Spectrum Next. Your mail password never travels from the Next.

Provider
Seznam.cz

Seznam / Email.cz: IMAP is always on; with two-factor authentication log in with an application password (Account > Two-factor authentication > Application password).

E-mail address
novak@seznam.cz

Sender name
Jan Novak

Signature (1 line, optional)

IMAP server (incoming mail)

Server imap.seznam.cz Port 993 Security SSL/TLS

User name (empty = e-mail) Password

SMTP server (outgoing mail)

Server smtp.seznam.cz Port 465 Security SSL/TLS

User name (empty = same as IMAP) Password (empty = same as IMAP)

Copy to Sent folder
automatic (not for Gmail)

Test and create token

setup.php – the account form.

NMail – account setup [Česky](#) | [English](#)

IMAP: OK

SMTP: OK

Done! Your token:

C7PM-RP48-SWQ8

Type it into NMail (Settings → Token), dashes are optional. Write it down – it cannot be shown again.
Gateway address: mail.example.com /nmail/nmail.php

Done – the token for NMail.

Enter the token in NMail in **Settings > Token** (the dashes are optional) together with the gateway server and path. Write the token down – it cannot be shown again. Over plain HTTP `setup.php` refuses to work, because the password would travel unencrypted. A token can also be revoked at the bottom of the page.

20 Gateway settings

Everything is set in `config.php` with lines like `nm_def('NAME', value);`. The defaults are fine in most cases; the data directory and the time zone are the usual changes.

Constant	Default	Meaning
<code>NMAIL_DATA_DIR</code>	<code>__DIR__/data</code>	accounts, key, uploads, cache, log
<code>NMAIL_SECRET</code>	CHANGE-ME...	gateway secret; default = created automatically in <code>secret.php</code> . Set your own (32+ characters) only before the first account – changing it invalidates all tokens.
<code>NMAIL_TIMEZONE</code>	Europe/Prague	time zone of the dates in the message list
<code>NMAIL_TIMEOUT</code>	20	IMAP/SMTP connection timeout (s)
<code>NMAIL_LOG_ENABLED</code>	true	log requests to <code>nmail.log</code>
<code>NMAIL_UPLOAD_MAX</code>	4 MB	largest attachment uploaded from the Next
<code>NMAIL_ATT_MAX</code>	8 MB	largest attachment for download and forwarding
<code>NMAIL_SSL_VERIFY</code>	true	verify mail server certificates

<code>NMAIL_NEXT_URL</code>	<code>"</code>	gateway address for the Next shown by <code>setup.php</code> (when it runs elsewhere)
<code>NMAIL_OPENSSL_CNF</code>	<code>"</code>	path to <code>openssl.cnf</code> for creating the RSA key
<code>NMAIL_SETUP_RATE</code>	<code>30</code>	account creation attempts per IP per hour
<code>NMAIL_SETUP_PORTS</code>	<code>993,143,465,587,25,2525</code>	allowed mail server ports
<code>NMAIL_PAD_BYTES</code>	<code>4400</code>	padding after each response for the ESP firmware; do not change

The gateway does not connect to servers in private networks (127.x, 10.x, 192.168.x...). To allow a mail server in your own network, set `NMAIL_ALLOW_PRIVATE_HOSTS` – but it also allows unencrypted connections, so only enable it on a gateway you use yourself. The full list of constants is in `README_en.md` in the archive.

21 Operation and security

21.1 Updating the gateway

Upload the new `nmail.php`, `setup.php`, `.htaccess`, `cacert.pem` and `lib/`. Upload `config.php` only if it has changed and you have no changes of your own in it (otherwise carry them over by hand).

Never overwrite or delete the data directory

It holds the gateway secret, the RSA key and all accounts. Without them all tokens stop working and users have to create their accounts again. Beware of FTP synchronisation in "mirror with deletion" mode. Back up the data directory regularly.

Refresh `cacert.pem` now and then from `https://curl.se/ca/cacert.pem`; the gateway prefers it over the system certificates, which tend to be outdated on older servers.

21.2 Log

`nmail.log` in the data directory has one line per request: time, IP, action, result, size and duration. The token is shortened to 3 characters and passwords are never logged.

```
2026-10-27 14:45:40      req      1.2.3.4 a=list  t=TES*  f=INBOX u=      res=OK detail=
bytes=1830      ms=412
```

21.3 Security

- The Next ↔ gateway connection is plain HTTP: anyone sniffing the network sees the token and the mail content, not the password.
- The password travels from the Next encrypted with RSA-2048 using the gateway's public key; on the gateway the account is encrypted with AES-256 (+ HMAC) using a key derived from the token and the gateway secret.
- Uploaded attachments (24 h) and the attachment cache (10 min) are stored unencrypted in the data directory – keep it outside the web root.

- The gateway only connects to the servers stored in an account; account creation restricts ports, private addresses and the number of attempts per IP.
- New RSA key: delete `rsa_key.php` – accounts stay, the Next fetches the new key by itself.
- Removing an account: **File > Remove this account...** in NMail, or at the bottom of `setup.php` on an HTTPS gateway.

22 Gateway troubleshooting

Symptom	Cause and fix
<code>ERR LOGIN</code>	The mail server rejected the password. With two-step verification an app password is required; for GMX, WEB.DE, Zoho, Yandex and Centrum enable IMAP.
<code>ERR CONN</code>	The mail server is unreachable, the hosting blocks outgoing ports 993/465/587, or certificate verification failed (upload a current <code>cacert.pem</code>).
<code>ERR AUTH</code>	Unknown or revoked token, or the gateway secret has changed (<code>secret.php</code> deleted). Create the account again.
<code>ERR KEY</code>	The gateway's RSA key has changed; NMail fetches the new one by itself.
<code>ERR RATE</code>	Too many account creation attempts from one IP within an hour (<code>NMAIL_SETUP_RATE</code>).
<code>ERR INTERNAL</code>	Details are in <code>nmail.log</code> , PHP errors in the server's error log.
NMail: <i>The gateway returned an HTTP error</i>	Wrong gateway path, a redirect to HTTPS, or access denied (403). Try <code>a=ping</code> in a browser with <code>http://</code> .
NMail: <i>Incomplete answer from the gateway</i>	The server compresses the response or does not send its length. Make sure gzip is off for <code>/nmail/</code> (<code>.htaccess</code> on Apache, <code>gzip off</code> on nginx) and so is PHP's <code>zlib.output_compression</code> .
<code>a=key</code> returns an error	PHP lacks <code>openssl</code> , or cannot find <code>openssl.cnf</code> (set <code>NMAIL_OPENSSL_CNF</code>). The data directory must be writable.
<code>setup.php</code> refuses to work	The page runs over HTTP; open it with <code>https://</code> . Behind a proxy, the proxy must send <code>X-Forwarded-Proto: https</code> .