ElectronIx DNC

User Guide

Distributed Numerical Control for the shop floor

Software version 0.3.7

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1. About this guide

This guide covers day-to-day use of ElectronIx DNC: sending programs to your CNC machines, receiving programs back from them, keeping the program library in order, and checking what happened when something does not go to plan.

It is written for two kinds of reader:

- Operators and setters, who send and receive programs. Sections 4 to 9 cover everything you need.
- Supervisors and programmers (the master role), who also register machines, manage logins and look after the licence. Sections 10 to 19 are for you.

Installation and commissioning are covered separately in the installation guide supplied with the software. This guide assumes the software is already installed and at least one machine has been registered.

Screenshots The screens in this guide were captured on a demonstration install, so the machine names, folders and logins you see here are examples. Your own floor will show your own machines.

2. What the system does

ElectronIx DNC runs on one PC on your shop network. Every CNC on the floor is registered in it, and each machine has its own folder of NC programs on that PC. Programs are sent from the PC to the machine, and programs punched out of a machine come back to the PC — so the PC, not the control, holds the copy that matters.

How a machine is connected

There are two ways a machine can be connected, and one install can use both at the same time.

Transport	Used for	How it works
Serial	Any control with a punch / read port	The PC dials a protocol converter on the machine panel over the LAN. The converter turns that into RS-232 for the control.
FTP	Fanuc controls with the Ethernet option	The PC hosts an FTP server. The control connects to it as a client and fetches or returns programs itself. No converter is needed.

What you can do with it

- Send a program from the PC to a machine.
- Drip-feed a program that is too large for the control's memory.
- Receive a program from a machine and save it into the library.
- Keep per-machine program folders, and preview or edit a program before it is sent.
- Compare two programs line by line before cutting metal.
- Look up a G or M code without leaving the application.
- See a record of every transfer — what, where, when, and whether it worked.

3. Before you start

Two pieces of software are installed on the PC:

- The ElectronIx DNC desktop application — the windows shown in this guide. You open it from the desktop shortcut.
- The ElectronIx DNC daemon — a background Windows service that does the actual talking to the machines. It starts with Windows and keeps running whether or not the application window is open.

You do not need to start or stop the service by hand. If the application reports that it cannot reach the daemon, contact whoever maintains the PC.

Roles

Every person signs in with their own login. There are two roles.

Role	Can see	Typically given to
User (operator)	Quick Transfer, Library, NC Assistant, Activity Logs, Compare Program, Account	Operators and setters
Master	Everything above, plus Machine Registry, FTP Server, FTP Logs, Flow Logs, Users, License and Updates	Supervisors, programmers, maintenance

Why it matters An operator cannot change a machine's settings, cannot add logins and cannot delete another person's programs from the registry. That is deliberate — the library stays under the control of the people who own it.

4. Signing in

4.1 Signing in

Step 1. Double-click the **ElectronIx DNC** icon on the desktop.

Step 2. Type your **Username** and **Password**. Use the eye icon at the right of the password box if you want to check what you typed.

Step 3. Click **Sign in**. The application opens on the Quick Transfer page.

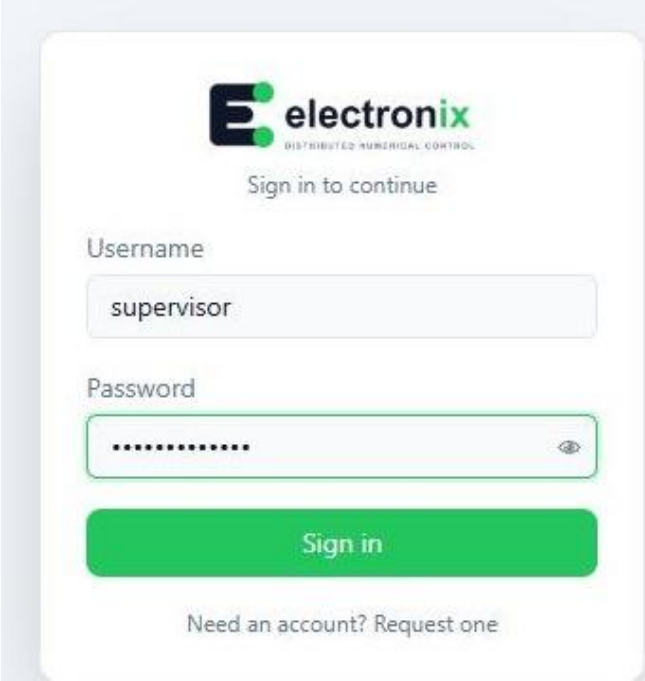

Figure 1 — The sign-in screen. Enter your own login — not a shared one.

4.2 The very first time (new install)

On a PC where nobody has ever signed in, the application does not ask for a password — there is no account yet. It offers to create the first master account instead. Choose a username and a password for the person who will own the system, and keep that password safe.

4.3 Asking for an account

If you do not have a login yet, you can ask for one from the sign-in screen.

Step 1. Click **Need an account? Request one** below the Sign in button.

Step 2. Enter the username you want and a password, twice.

Step 3. Click **Send request**.

Your request is now waiting. You **cannot** sign in until a master approves it — a pending request is not yet a login. Tell your supervisor you have requested an account so they can approve it on the Users page (section 16).

5. The screen at a glance

The bar down the left is the menu. Click a name to open that page. The arrow at the top of the bar collapses it to icons if you want more room for the page itself.

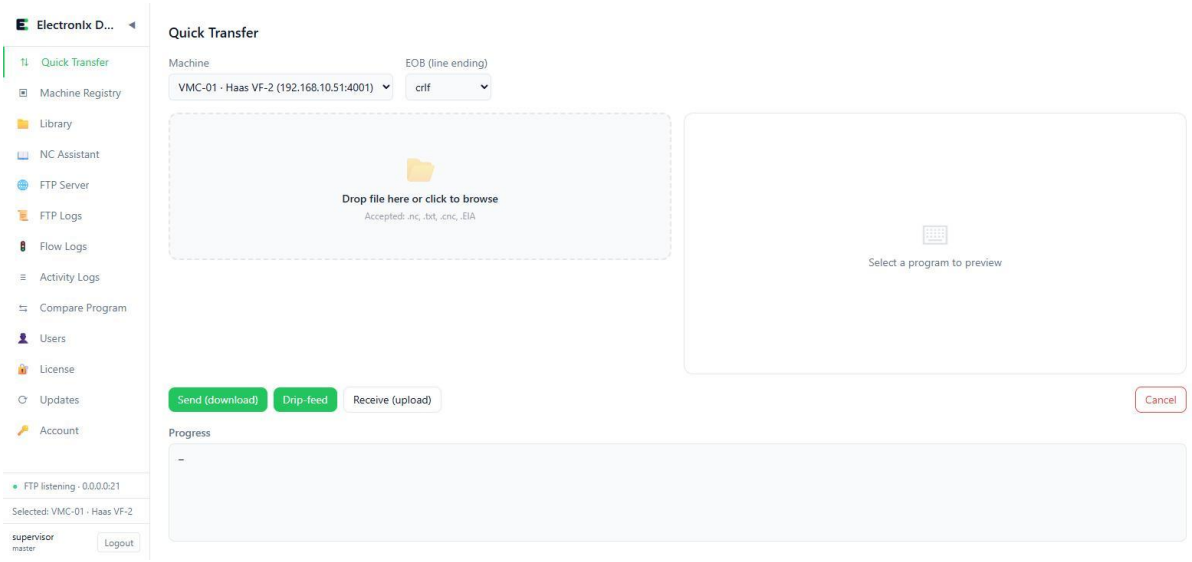

Figure 2 — The application window. Menu on the left, the open page on the right.

At the bottom of the menu bar you will find, in order:

- The FTP indicator — green when the FTP server is listening, grey when it is switched off, red if it could not start. Master only.
- The machine you currently have selected. The same selection is shared by Quick Transfer, Library and Flow Logs.
- Your username and role, and the Logout button.

Log out when you finish Anyone who walks up to an unlocked session can send programs as you. Click Logout at the end of your shift.

6. Quick Transfer — send, drip-feed and receive

Quick Transfer is for moving one program, now, using a file you already have on the PC. If you want to work from the machine's own program folder instead, use the Library page (section 7) — the buttons behave the same way.

6.1 Send a program to a machine

Step 1. Choose the machine from the **Machine** dropdown.

Step 2. Check the **EOB (line ending)** setting. This is the end-of-block character the control expects. Leave it as it is unless the machine needs otherwise.

Step 3. Drop the program file into the box on the left, or click the box to browse for it.

Step 4. The program appears in the preview pane on the right. Read it before you send it.

Step 5. Click **Send (download)**.

Step 6. Watch the **Progress** box at the bottom. It reports the connection, the bytes sent and the final result.

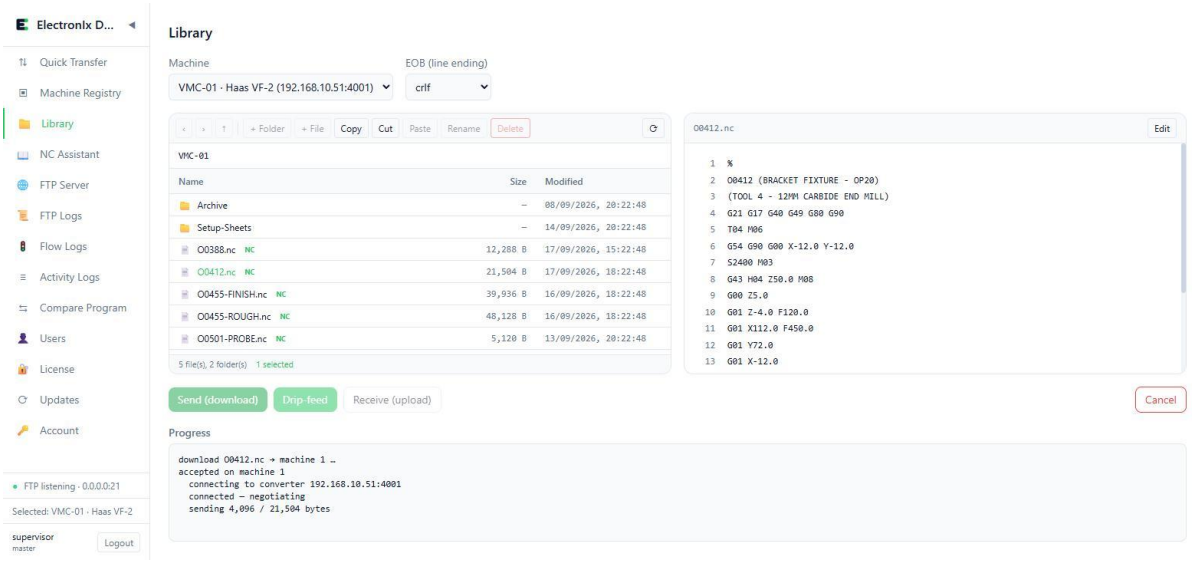

Figure 3 — A send in progress. Progress is reported line by line as it runs.

Direction words Send (download) means PC to machine. Receive (upload) means machine to PC. The words follow the control's point of view, which is the convention printed on most CNC panels.

6.2 Drip-feed a large program

If a program is larger than the control's memory, it cannot be sent in one piece. Drip-feed streams it line by line while the machine cuts, and the control's own XON/XOFF handshake sets the pace.

Step 1. Select the machine and pick the program exactly as for a normal send.

Step 2. Set the control to read from the port, as you would for any tape-mode job.

Step 3. Click **Drip-feed** instead of Send.

Step 4. Watch the Flow Logs page (section 14) if you want to see the handshake while it runs.

Do not walk away During a drip-feed the program is arriving as the machine cuts. If the PC is shut down, or the cable is disturbed, the job stops where it is.

6.3 Receive a program from a machine

Use this to bring a program back from a control — for example after a setter has edited it at the panel.

Step 1. Select the machine.

Step 2. Click **Receive (upload)**. A small dialog asks where to put what arrives.

Step 3. Choose the folder to save into and type the file name you want.

Step 4. Click **Start receive**. The application now waits for the machine.

Step 5. At the control, punch the program out as you normally would. The transfer starts when the machine begins sending.

If the received file is rejected A receive that arrives corrupted is refused rather than saved, and the Flow Logs page will say why — nearly always a baud rate, parity or data-bit mismatch between the converter and the control. See section 14.

6.4 Cancelling

The Cancel button stops whatever the selected machine is currently doing. A cancelled transfer is recorded as cancelled in the Activity Logs.

7. Library — the program folders

Each machine has its own folder on the PC, set when the machine is registered. The Library page is a file manager for those folders, with the transfer buttons built in. This is the page most shops use all day.

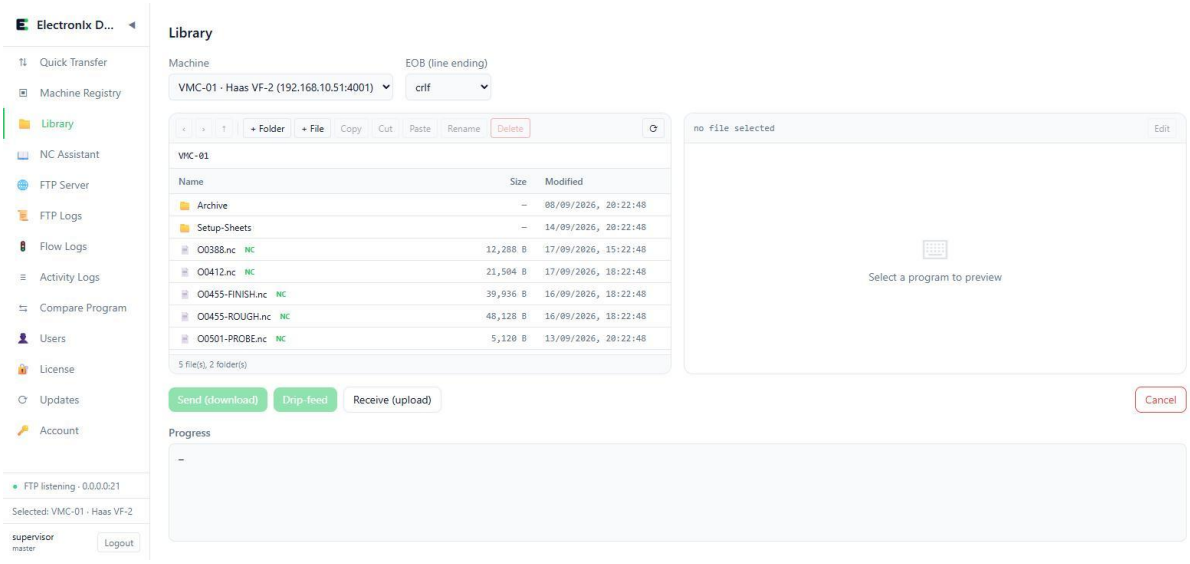

Figure 4 — The Library page. Folder contents on the left, preview on the right.

7.1 Finding your way around

- Choose the machine at the top; the list below shows that machine's folder.
- Double-click a folder to go into it. Use the arrows and the up arrow to move back.
- Programs recognised as NC files are marked with a small NC tag.
- The bar under the list tells you how many files and folders you are looking at.

7.2 Looking at a program

Click a program once and it opens in the preview pane on the right, with line numbers. Nothing is sent and nothing is changed by previewing.

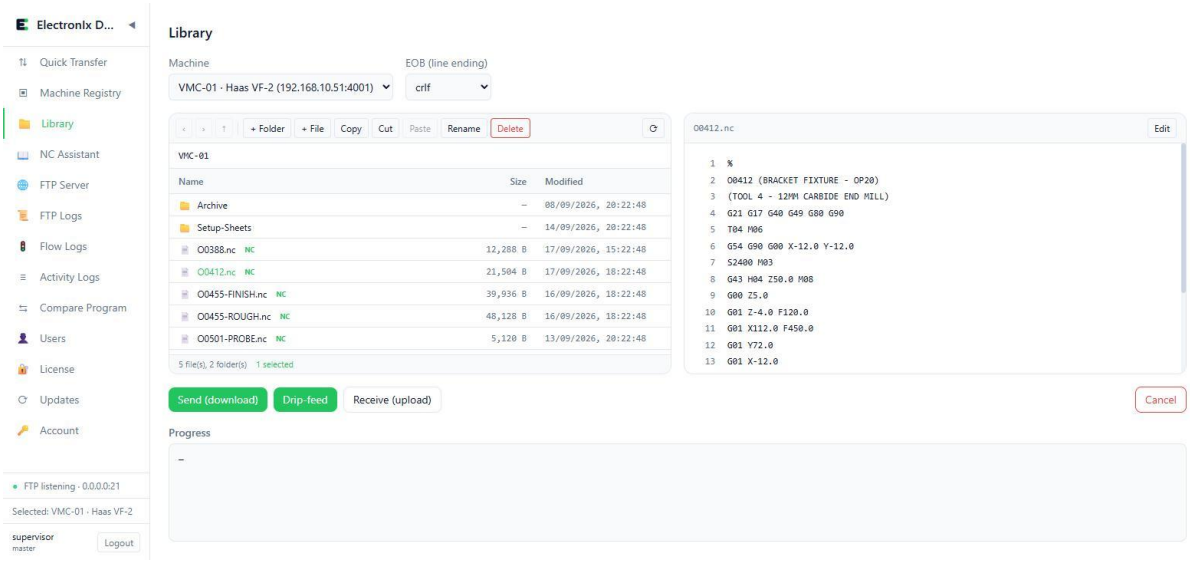

Figure 5 — A program selected and previewed, ready to send.

7.3 Editing a program

Step 1. Select the program, then click **Edit** at the top right of the preview pane.

Step 2. Make your changes in the editor.

Step 3. Click **Save (same file)** to overwrite it, or **Save as new file** to keep the original and write a new name.

Keep the original When in doubt, save as a new file and compare the two afterwards (section 8). A program you can still go back to has never cost anybody a part.

7.4 Housekeeping

The buttons above the list work on whatever you have selected:

Button	What it does
+ Folder	Creates a new folder inside the one you are in.
+ File	Creates a new, empty program and opens it for editing.
Copy / Cut / Paste	Copies or moves a file or folder to another folder. A name clash is given a suffix rather than overwriting.
Rename	Renames the selected file or folder in place.
Delete	Deletes the selection. A folder goes with everything inside it. This cannot be undone.

7.5 Sending from the library

Select a program in the list and use Send (download), Drip-feed or Receive (upload) at the bottom of the page. They behave exactly as described in section 6, except that a received program is saved straight back into the folder you are looking at.

8. Compare Program

Compare puts two programs side by side and marks the lines that differ. Use it before sending an edited program, and after receiving one back from a control.

Step 1. Open **Compare Program** from the menu.

Step 2. Drop the first program into the left box, or click to browse.

Step 3. Drop the second program into the right box.

Step 4. The comparison appears as soon as both files are loaded.

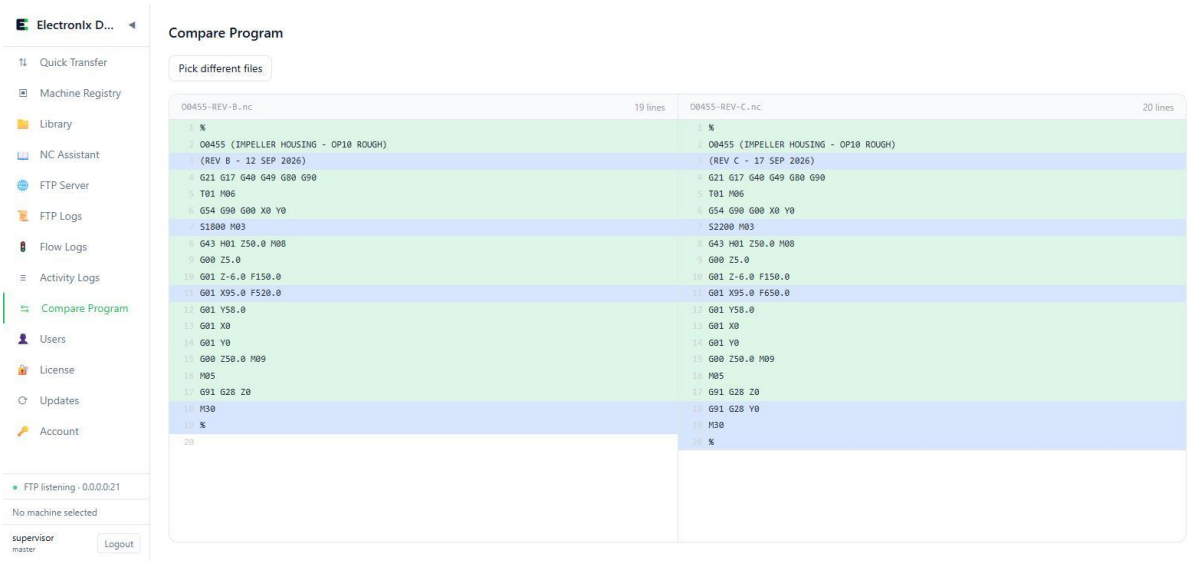

Figure 6 — Two revisions compared. Lines that match are green; lines that differ are highlighted.

Lines shown in green are identical in both files. Highlighted lines are the ones that differ — in the example above, a spindle speed, a feed rate and an extra homing block. Click Pick different files to start again with another pair.

What to compare The master copy against the copy a setter edited; the program you sent against the program the machine punched back; this month's revision against last month's.

9. NC Assistant

A built-in Fanuc G and M code reference, so nobody has to go looking for a printed sheet.

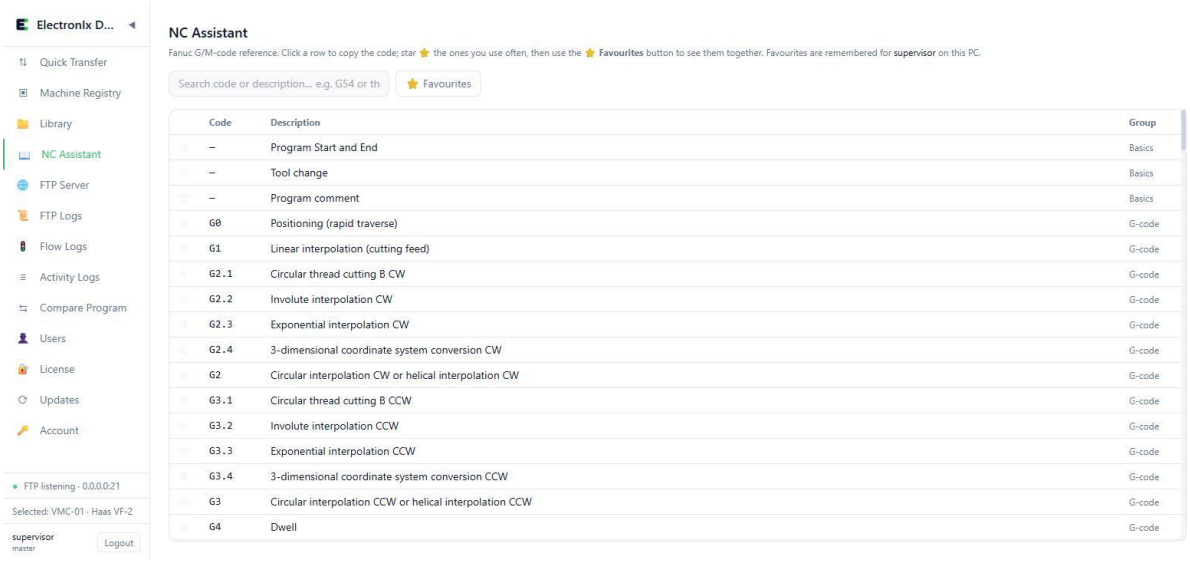

Figure 7 — The NC Assistant. Search by code or by what the code does.

- Type in the search box to filter — either a code such as G54, or a word such as thread.
- Click a row to copy that code.
- Click the star on a row to add it to your favourites.
- Click Favourites to show only the starred codes.

Favourites are remembered for your own login on that PC, so your list is not disturbed by anyone else's.

10. Machine Registry

Master only. The registry is the list of machines the system knows about. Everything else — the machine dropdowns, the library folders, the logs — follows from it.

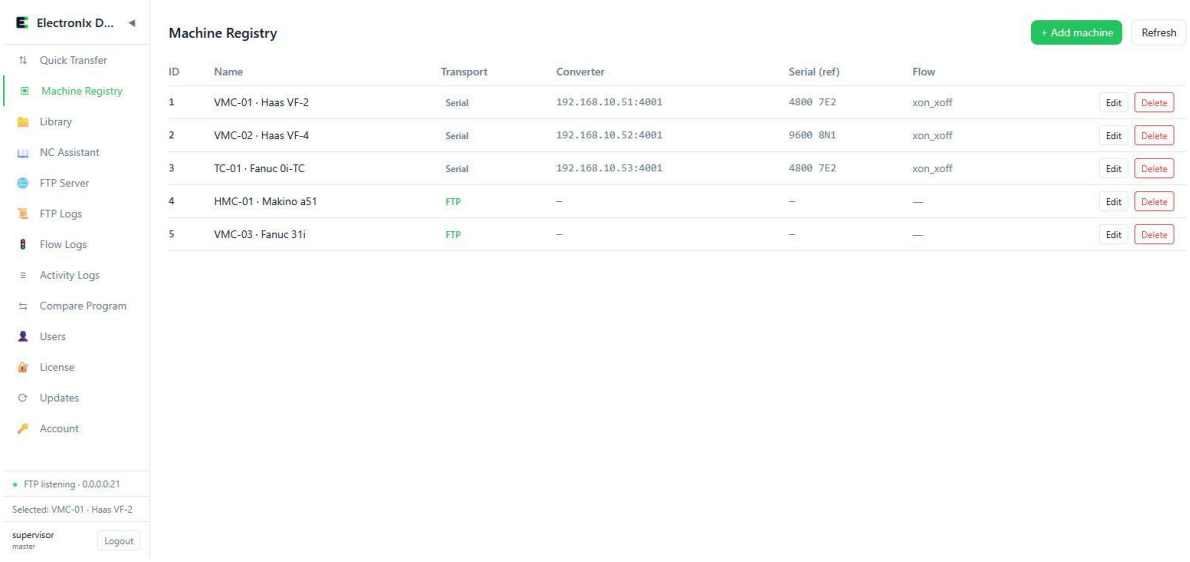

Figure 8 — The Machine Registry. One row per machine, with its transport and connection settings.

10.1 Adding a serial machine

Step 1. Click **+ Add machine**.

Step 2. Give the machine a **Name** people will recognise on the floor — the machine number and model, not a code only you know.

Step 3. Leave **Transport** set to `serial (RS-232 via converter)`.

Step 4. Enter the **Converter IP** and **TCP port** of the protocol converter fitted to that machine's panel.

Step 5. Set **Flow control**. XON/XOFF honours the control's DC1/DC3 pacing and is the right choice for most controls; None sends with no pacing at all.

Step 6. Open **Serial settings** and set the baud rate, data bits, stop bits and parity to match the control.

Step 7. Set the **Program library folder** — the folder on the PC that holds this machine's programs.

Step 8. Click **Add machine**.

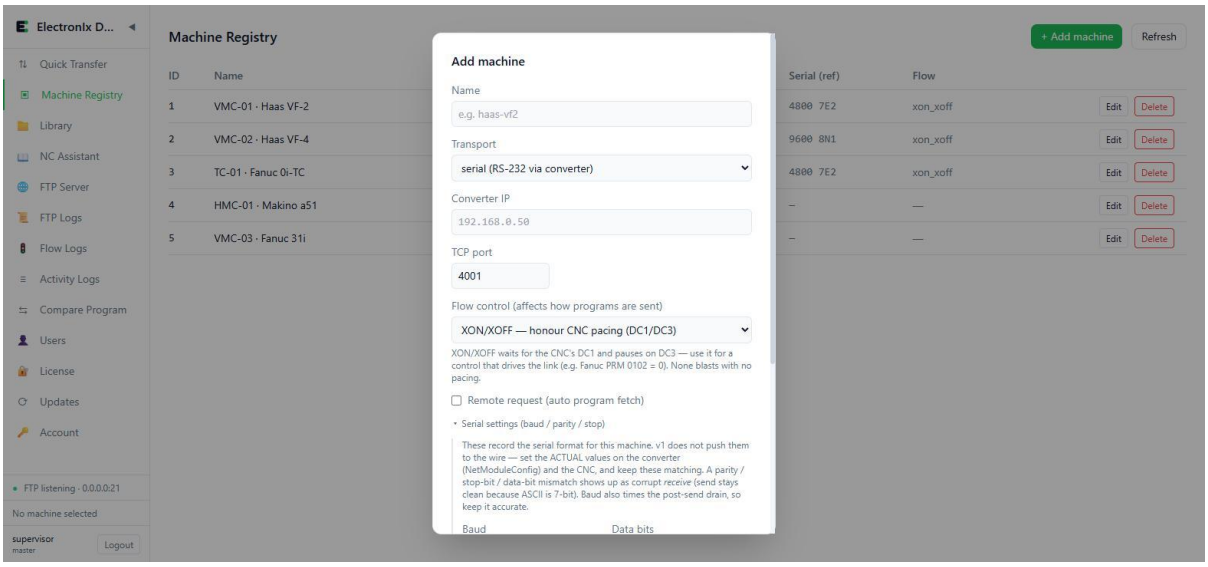

Figure 9 — Adding a machine. The serial settings must match what is set on the control.

Serial settings must match These values record the format for the machine — the application does not push them to the converter or the control. Set the same values in all three places. A parity, stop-bit or data-bit mismatch shows up as a corrupted receive, because a send of plain ASCII often survives a mismatch that a receive does not.

10.2 Adding an FTP machine

For a Fanuc control with the Ethernet option, no converter is involved — the control dials into the PC.

Step 1. Click **+ Add machine** and set **Transport** to `ftp`.

Step 2. Set the **Program library folder**. This is the default home folder for the machine's logins.

Step 3. Add a login — a username and password the control will use. You may add up to three, one for each Fanuc host.

Step 4. Give a login its own **Home folder** if that host should see a different folder; leave it blank to use the machine's library folder.

Step 5. Click **Add machine**, then set the same username, password and the PC's address on the control itself.

Isolated shop LAN only FTP logins are stored and sent in plain text, as the CNC controls require. Keep the shop network isolated from the office network and from the internet.

10.3 Editing and removing

Edit changes any of the settings above. Delete removes a machine, but it is refused while that machine has a transfer running or has transfer history against it — the audit record is not thrown away to tidy a list.

11. Remote request (auto program fetch)

Remote request lets the operator call a program up from the machine keypad, without walking to the PC and without being given access to the library. It is switched on per machine, and is available on serial machines.

11.1 How it works on the floor

Step 1. At the control, the operator punches the trigger program — O6666 unless you have changed it.

Step 2. The number of the wanted program goes in that program's first comment, for example `N100 (O0032)`.

Step 3. The system reads the request, finds the matching file in that machine's library folder, and sends it back automatically.

Step 4. The operator presses READ at the control to take it in.

11.2 Setting it up

Step 1. Open the machine in the Machine Registry and tick **Remote request (auto program fetch)**.

Step 2. Leave **Trigger program number** at 6666 unless that number is already in use on the machine.

Step 3. Choose the **Start mode**. **DC1** waits for the control to ask for the data when READ is pressed — use this where it works. **Delay** simply waits a fixed number of seconds and then sends.

Step 4. Set the wait limit or the delay in seconds to suit the machine.

Step 5. List the **Preferred extensions** in the order you want them tried when more than one file matches.

Step 6. Tick the content option if programs on this machine are not always named after their program number — the system will then look inside the files as well.

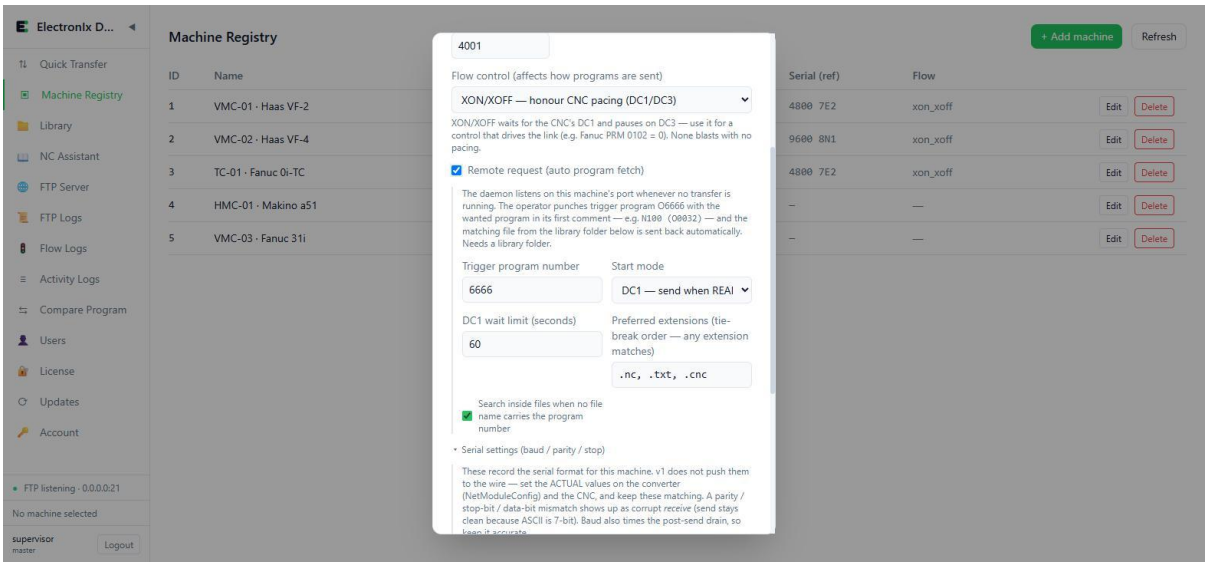

Figure 10 — Remote request settings, switched on for one machine.

The machine needs a library folder Remote request has nothing to search until the machine has a program library folder set. Set it in the same form.

12. FTP Server

Master only. This page controls the FTP server that the PC hosts for Fanuc Ethernet machines. The PC is the server; the controls are the clients that dial into it.

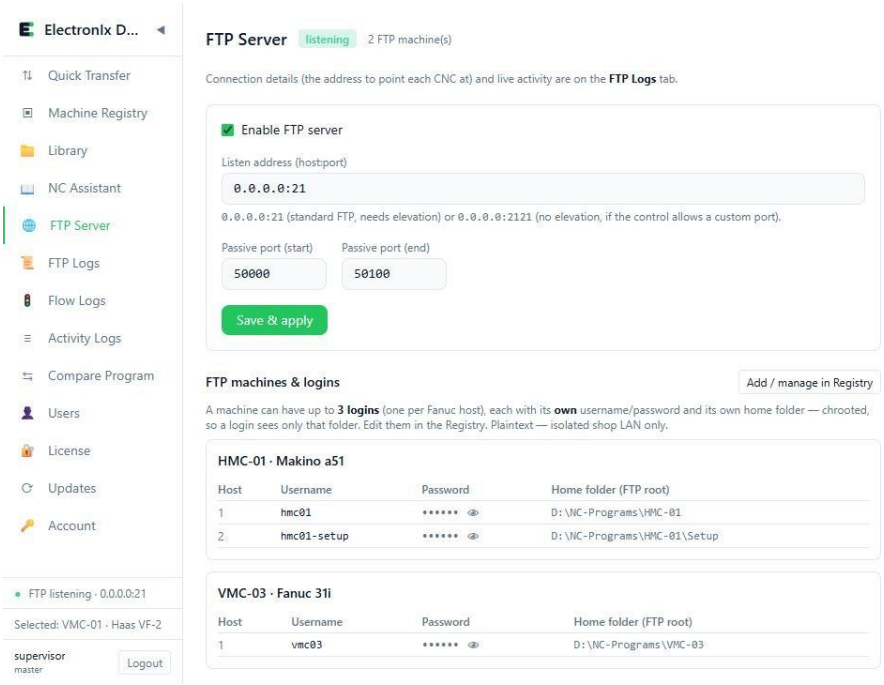

Figure 11 — The FTP Server page, listening, with the logins for each FTP machine.

Step 1. Tick **Enable FTP server**.

Step 2. Set the **Listen address**. `0.0.0.0:21` is standard FTP and needs the service to run with elevation; `0.0.0.0:2121` avoids that, if the control lets you set a custom port.

Step 3. Leave the **passive port range** as supplied unless your network team asks for a different one.

Step 4. Click **Save & apply**. The badge at the top of the page turns to listening when it is up.

The lower part of the page lists every machine that uses the FTP transport and the logins configured for it. The logins themselves are edited in the Machine Registry — click Add / manage in Registry to go there.

Open the firewall The control port and the whole passive range must be open on the PC's firewall, or the control will connect and then hang when it tries to transfer data.

13. FTP Logs

Master only. A live view of what the FTP server is doing: logins, file fetches and returns, and any errors. Use it while pointing a control at the PC for the first time.

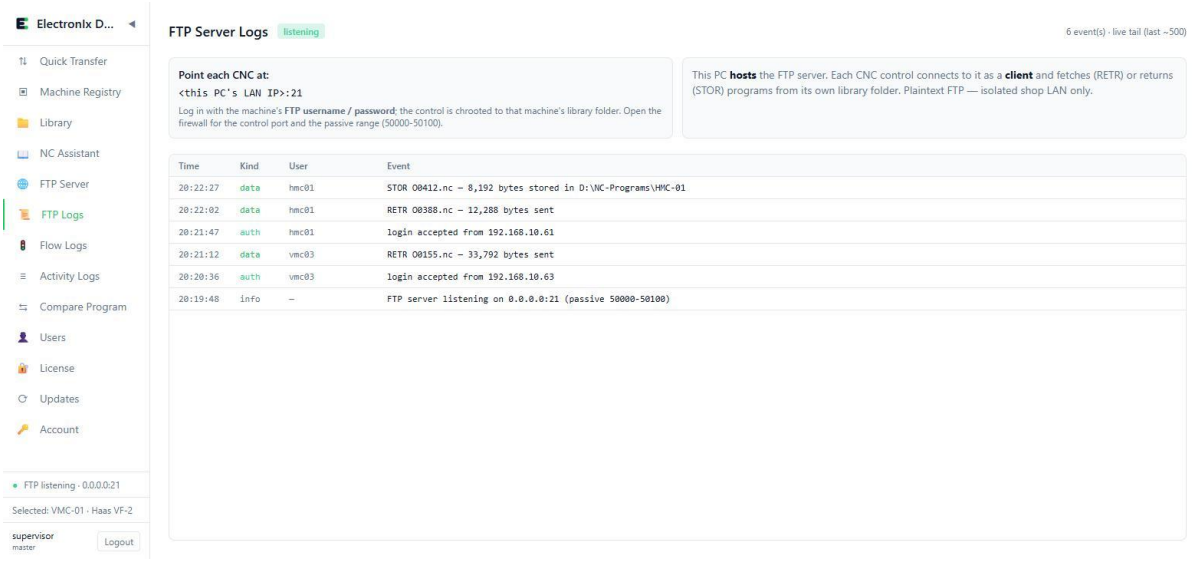

Figure 12 — FTP Logs. The panel at the top left is the address to set on the control.

Kind	Meaning
info	The server starting, stopping or changing configuration.
auth	A control logged in — or failed to.
data	A program fetched (RETR) or returned (STOR), with its size.
warn / error	Something went wrong; the message says what.

This log is not the audit record FTP Logs are a live tail and are lost when the service restarts. The permanent record of every transfer is on the Activity Logs page (section 15).

14. Flow Logs

Master only. Flow Logs show the handshake between the PC and a serial machine while a transfer runs. This is the page to open when a line is not behaving.

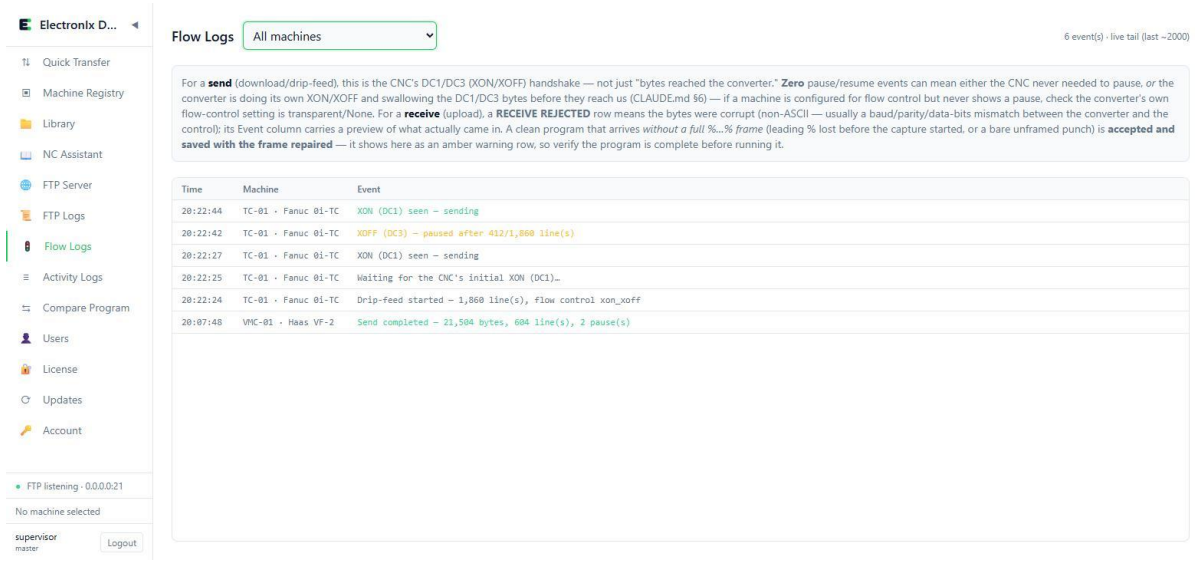

Figure 13 — Flow Logs for all machines, showing a drip-feed pausing and resuming on the control's own signal.

Choose one machine, or All machines, at the top. The newest event is at the top of the list.

What you see	What it means
Waiting for the CNC's initial XON	The PC is ready and is waiting for the control to ask for data. Press READ at the control.
XON (DC1) seen — sending	The control asked for data; the program is going across.
XOFF (DC3) — paused after n lines	The control has asked us to stop for a moment. This is normal during a drip-feed.
Send completed	The whole program went across. The byte and line counts are shown.
RECEIVE REJECTED	What arrived was not clean ASCII, so it was refused instead of being saved. Check the baud rate, parity and data bits on both the converter and the control.
No initial XON — sending anyway	The control never asked. The program was sent regardless; check the control was in read mode.

No pause events at all? That is not necessarily wrong. Either the control never needed to pause, or the converter is doing its own XON/XOFF handling and absorbing the signals before they reach us. If a machine is set to XON/XOFF but never shows a pause, check the converter's own flow-control setting.

15. Activity Logs

The permanent record of every transfer, serial and FTP alike. It is kept on the PC and survives restarts.

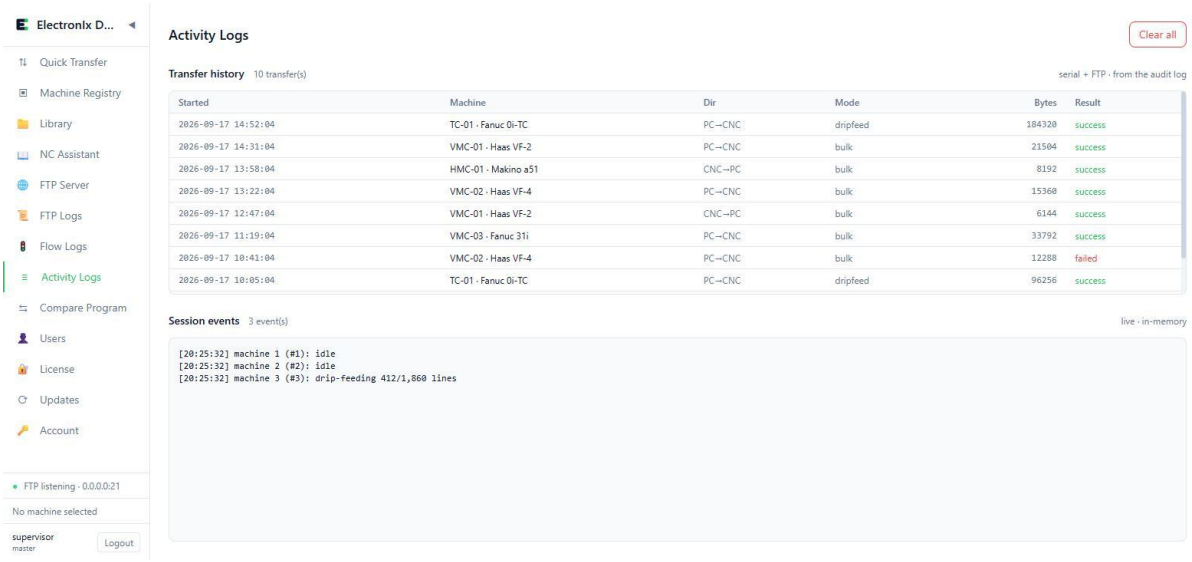

Figure 14 — Activity Logs. Transfer history above, live session events below.

Column	Meaning
Started	When the transfer began.
Machine	Which machine it went to or came from.
Dir	PC→CNC for a send, CNC→PC for a receive.
Mode	bulk for a normal send, dripfeed for a drip-feed.
Bytes	How much was transferred.
Result	success, failed or cancelled. A failure shows the reason.

Below the history, Session events is a live list of state changes for the current run of the application.

Clear all Clear all archives the transfer history so it no longer appears on this page, and clears the session events. Use it sparingly — this is the record you will want if a part is ever questioned.

16. Users

Master only. Logins are managed here.

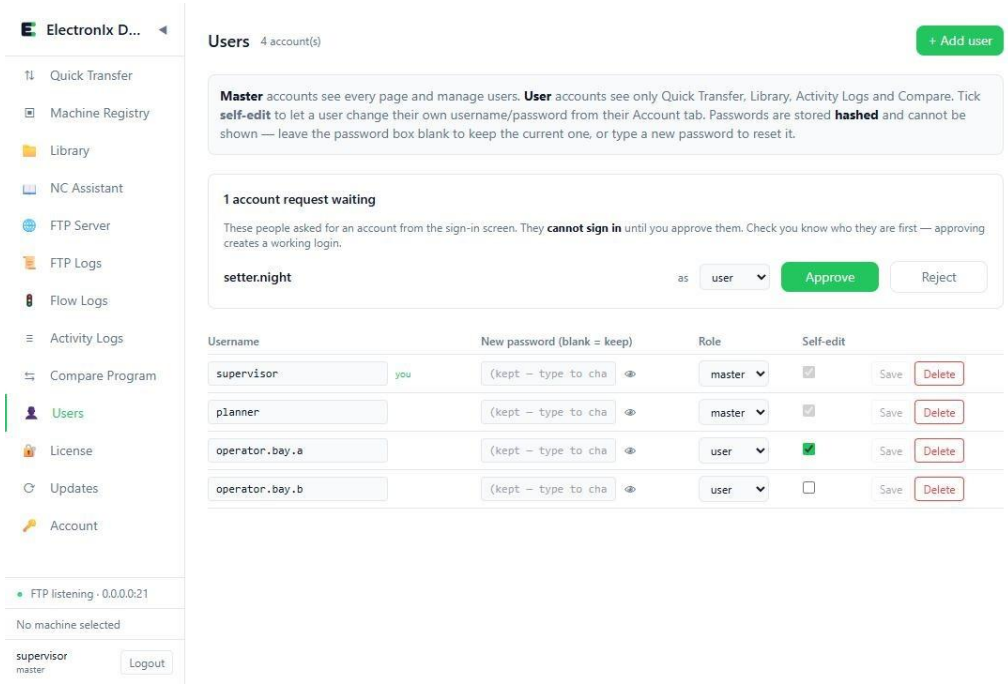

Figure 15 — The Users page, with one account request waiting for approval.

16.1 Approving a request

When somebody asks for an account from the sign-in screen, their request appears at the top of this page. They cannot sign in until you approve it.

Step 1. Check that you know who the person is. Approving creates a working login.

Step 2. Choose the role — `user` for an operator, `master` for a supervisor.

Step 3. Click **Approve**, or **Reject** if you did not expect the request.

16.2 Adding and changing accounts

- + Add user creates a login directly, without a request.
- Change the role in the Role column, then click Save on that row.
- Tick Self-edit to let that person change their own username and password from their Account page.
- To reset a password, type the new one in the password box for that row and click Save. Leave it blank to keep the current password.
- Delete removes a login. The last remaining master account cannot be deleted.

Passwords are hashed Stored passwords cannot be read back or shown — not by you, and not by us. If somebody forgets theirs, set a new one here.

17. Account

Your own login, and the way to send us diagnostics when you need help.

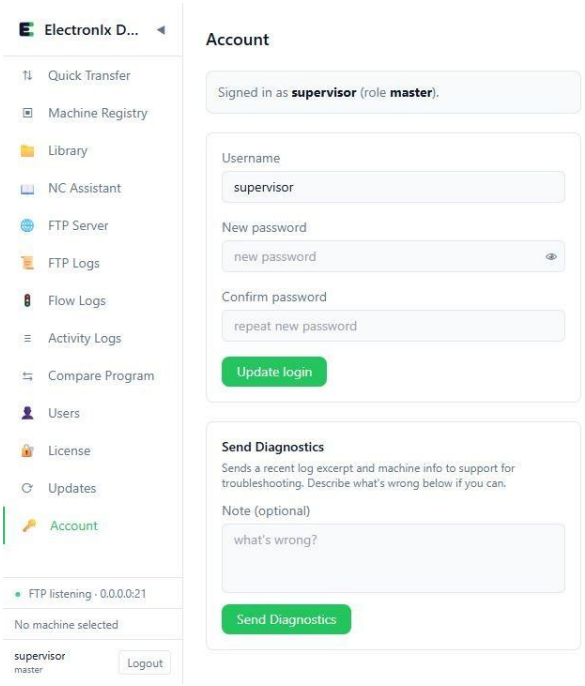

Figure 16 — The Account page.

17.1 Changing your own login

If your account has been given the self-edit permission, you can change your own username and password here. Type the new password twice and click Update login. If the fields are not available to you, ask a master to make the change on the Users page.

17.2 Send Diagnostics

If you are on a support call with us, this button packages a recent extract of the system's own log, with a note you can type, and sends it to us. It is the fastest way to get a problem looked at properly.

Step 1. Describe what went wrong in the Note box — which machine, what you were doing, what you saw.

Step 2. Click **Send Diagnostics**.

Step 3. Quote the reference that comes back when you speak to us.

18. License

Master only. Shows the state of this PC's licence and is where a new one is installed.

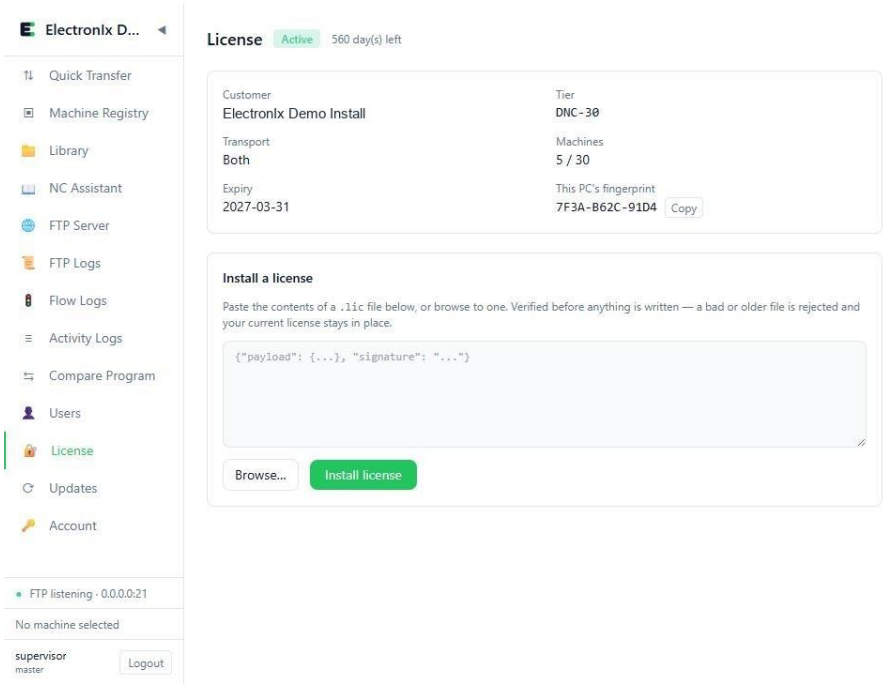

Figure 17 — The License page, showing an active licence and this PC's fingerprint.

The card at the top shows the customer the licence was issued to, the tier, which transports it covers, how many machines are registered against the limit, the expiry date, and this PC's fingerprint.

18.1 Getting a licence issued or renewed

Step 1. Click **Copy** beside the fingerprint.

Step 2. Send the fingerprint to ElectronIx with your machine count.

Step 3. We return a `.lic` file.

Step 4. Paste its contents into the box, or click **Browse…** to load the file, then click **Install license**.

The file is checked before anything is written. If it is not valid, or is older than the licence you already have, it is rejected and your current licence stays in place.

18.2 What the states mean

State	What it means
Trial	Running without an installed licence. A banner shows the days remaining.
Active	A valid licence is installed.
Grace	The licence has expired but the system is still working, for a limited number of days. Renew now.
Blocked	New sends are refused. Receives still work, so a program already on a machine can still be brought back.

19. Updates

Master only. Both parts of the software — the desktop application and the background service — are updated from here.

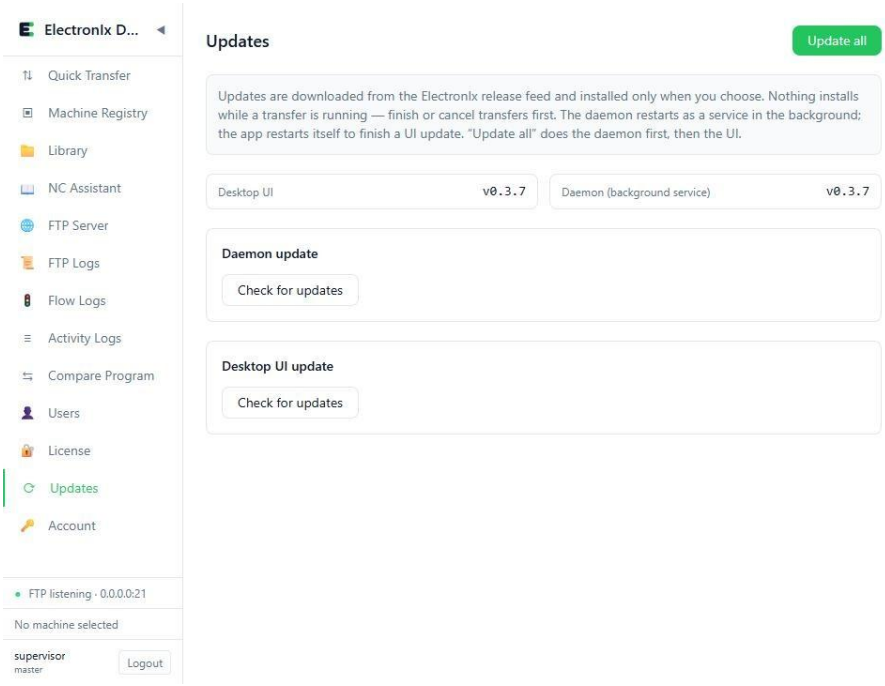

Figure 18 — The Updates page, showing both versions.

- Check for updates asks whether a newer build is published.
- Update all applies the service update first, then the application.
- The application restarts itself to finish an update. The service restarts in the background.

Nothing installs by itself An update is never applied behind you, and it will not start while a transfer is running — finish or cancel transfers first. Apply updates when the floor is quiet, not in the middle of a shift.

20. Troubleshooting

Work down this table before calling. Most problems are in the first three rows.

Symptom	What to check
The machine dropdown is empty	No machines are registered yet. A master must add them in the Machine Registry (section 10).
Send fails — the converter did not answer	The converter is powered and on the network, its IP and port match the registry, and the PC can reach it. Check the cable at the panel.
A received program is rejected	Baud rate, parity, data bits and stop bits must match on the converter and the control. See section 14.
A drip-feed stops part way	The control stopped asking for data. Check the Flow Logs for a long pause, and check the cable and the control's read mode.
The program was sent but the control shows nothing	The control was not in read mode, or it is expecting a different end-of-block character. Check the EOB setting.
An FTP machine cannot log in	The username and password on the control must match the login in the registry. Check the FTP Logs page while you try.

Symptom	What to check
An FTP machine logs in but transfers hang	The passive port range is not open on the PC's firewall.
A licence banner appeared	The licence is near expiry, expired or blocked. See section 18 and contact ElectronIx.
Someone cannot sign in	Their request may still be waiting for approval on the Users page. A pending request is not a login.

If none of this helps, use Send Diagnostics on the Account page (section 17.2) and then call us.

21. Good practice on the floor

- One person owns the library. Everyone else works from it.
- Give each person their own login. Shared logins destroy the value of the activity record.
- Read the preview before you send. It takes two seconds.
- Compare before you send an edited program, and after you receive one back.
- Bring edited programs back from the control the same day, so the library stays the master copy.
- Keep superseded revisions in an Archive folder rather than deleting them.
- Apply updates when the floor is quiet.
- Log out at the end of your shift.

Support
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