Hello and welcome. If you don't know me, my name is Tim, and today I'm presenting a progress update on the Synputer project.

Our original goal at Synful was to create a powerful, low-cost computer for home and small office users. That goal remains unchanged, but we have had to adapt in response to new challenges.

In this presentation, I will cover the current status of the project, review the concerns raised by EDC, explain how we're addressing those issues, and outline our recommendations and next steps.

Every Home
Every Desk

Synputer

Project update and concerns.

Synful and EDC

Slide 2 – Synful Specification

EDC originally approached us because of Synful's reputation for affordability and long-term potential. Following initial discussions, we agreed to supply 2,000 units for a total of £500,000.

This arrangement generated strong interest during our presales phase. We built and shipped the first 350 units based on Synful's internal specification, which included:

- Motorola 68008 CPU
- A83 Board
- 32KB ROM
- 128KB RAM
- 2 Cartridge Drives
- Desktop case with internal keyboard
- Synful's Hyper Basic OS

This configuration allowed us to control production costs, resulting in a retail price of £399.99.

However, EDC rejected the delivered system, stating that it failed to meet their expectations regarding power, expandability, and modern interfaces. They demanded that at least 80% of their technical requirements be met, or the agreement would be terminated.

This prompted a complete review of our delivery strategy and technical design.

Synful Specification

HB / OS		
68008 CPU	A83 Board	32KB ROM
128KB RAM	2 Cartridge Drives	Serial Port
Joystick Port	Desktop Case	Integrated Keyboard
£399.99 RRP		

According to the SEPM case study (University of Essex Online, 2023)

EDC's formal requirements included:

- An industry standard operating system
- Support for an external keyboard
- At least 512KB RAM
- Industry standard removable storage
- Ability for SCSI expansion
- A 68000-series CPU or better
- Dual serial ports
- A graphical user interface with mouse support

The A83 system did not fully meet any of these criteria. It only partially satisfied three:

It offered removable storage but relied on proprietary cartridge drives instead of an industry standard format.

The CPU used was a Motorola 68008, a budget variant of the 68000, which technically qualified but fell short on performance.

Only one serial port was provided, limiting peripheral connectivity.

In all other respects, including operating system, RAM, keyboard support, GUI, and SCSI, the A83 did not meet EDC's specifications.

Outstanding Issues

EDC Requirement	Synful Delivered	Gap / Issue	
Industry standard OS	HB/OS only (proprietary)	Not industry standard	☒ Not Met
External keyboard	Integrated only	No support for external keyboard	☒ Not Met
512KB+ RAM	128KB	Insufficient memory	☒ Not Met
Removable storage	2 × cartridge drives	Non industry standard	☐ Partial
SCSI expansion	None	No expansion port	☒ Not Met
68000+ CPU	68008	Budget variant	☐ Partial
Dual serial ports	1 × serial port	Limited connectivity	☐ Partial
GUI + Mouse	CLI only, no GUI support	Lacks user interface	☒ Not Met

We decided to pursue a dual-path strategy to respond to EDC's concerns while preserving the value of the existing system.

Path 1: Upgrade existing A83 machines by adding a more powerful CPU and extending ROM and RAM.

Path 2: Design a new system from the ground up that will fully meet EDC's technical requirements.

This approach allows us to recover our initial hardware investment while progressing towards a modern, compliant solution.

The upgrade plan uses the Pro Expansion Board.

This board allows us to retrofit:

- A 68000 CPU
- 64KB ROM
- 512KB RAM
- Provides for SCSI Expansion

This allows the original A83 machines to run MCCOS with GUI, assuming an external SCSI drive is fitted.

Upgrade for Synputer

HB / OS		HB / OS
A83 Board 68008 CPU 32KB ROM 128KB RAM Cartridge Drives	➕	**A83 Board** **Pro-Expansion Board** 68000 CPU 64KB ROM 512KB RAM
Joystick Port Integrated Keyboard		Joystick Port Integrated Keyboard
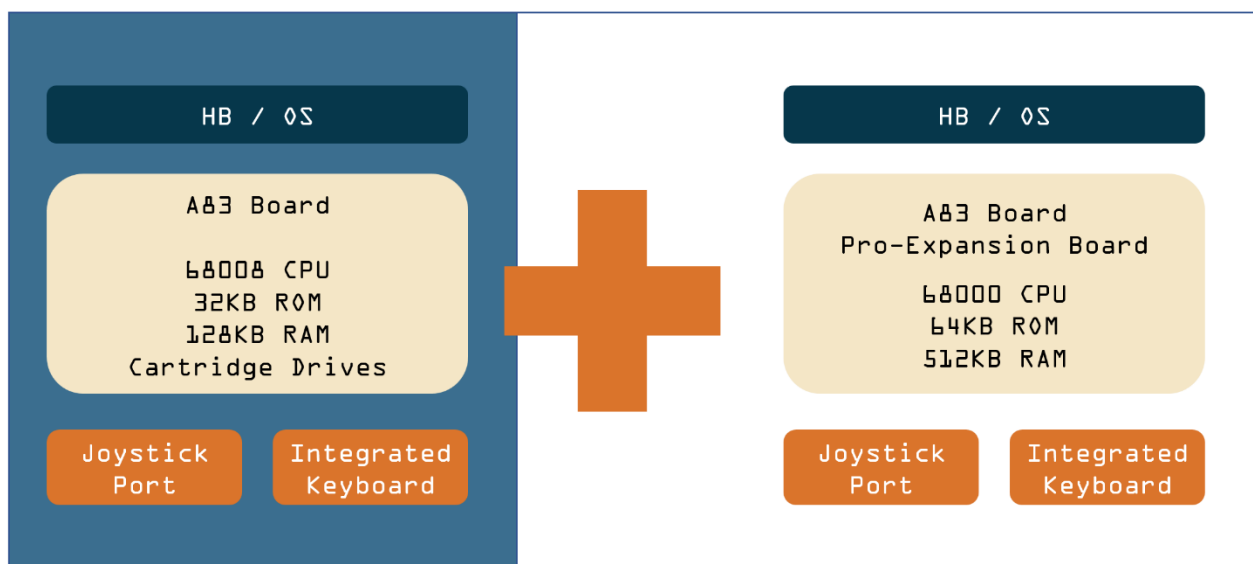
This upgrade strategy enables support for MCCOS and a graphical user interface, while keeping the original retail price of £399.99. The upgrade does not require any redesign of the A83 board, which keeps it efficient and cost effective.

By retrofitting the machines already built, we can meet our pre-sale commitments, avoid waste and deliver a more capable system to customers.

Our upgrade cost model estimates a total cost per unit of approximately £115.99, including all components, integration and testing. If all 350 units are upgraded, that brings the total project cost to around £40,300.

This approach protects our investment and our customers.

Component	Unit Cost (£)	Manufacturing Cost (£)	Units	Total (£)	Re-Design Time
68000	8		350	2800	2
ROM - 32KB	4		700	2800	4
RAM - 128KB	2.5		1400	3500	2
Pro-Expansion Board	15	12	350	9450	4
Role	Task		Days	Rate (£/day)	Total (£)
Hardware Architect	Hardware Re-design		60	250	15,000
Hardware Engineer	Construction		14	175	2,450
Hardware Engineer	Construction		14	175	2,450
Hardware Engineer	Testing		5	175	875
Software Engineer	Testing		5	195	975
				Total	40,300

Upgrade Cost

350 machines sold
This offers an upgrade path

Sales can be passed into the EDC Design

Base Spec	Upgrade
32KB ROM	64KB ROM
128KB RAM	512KB RAM
68008 CPU	68000 CPU

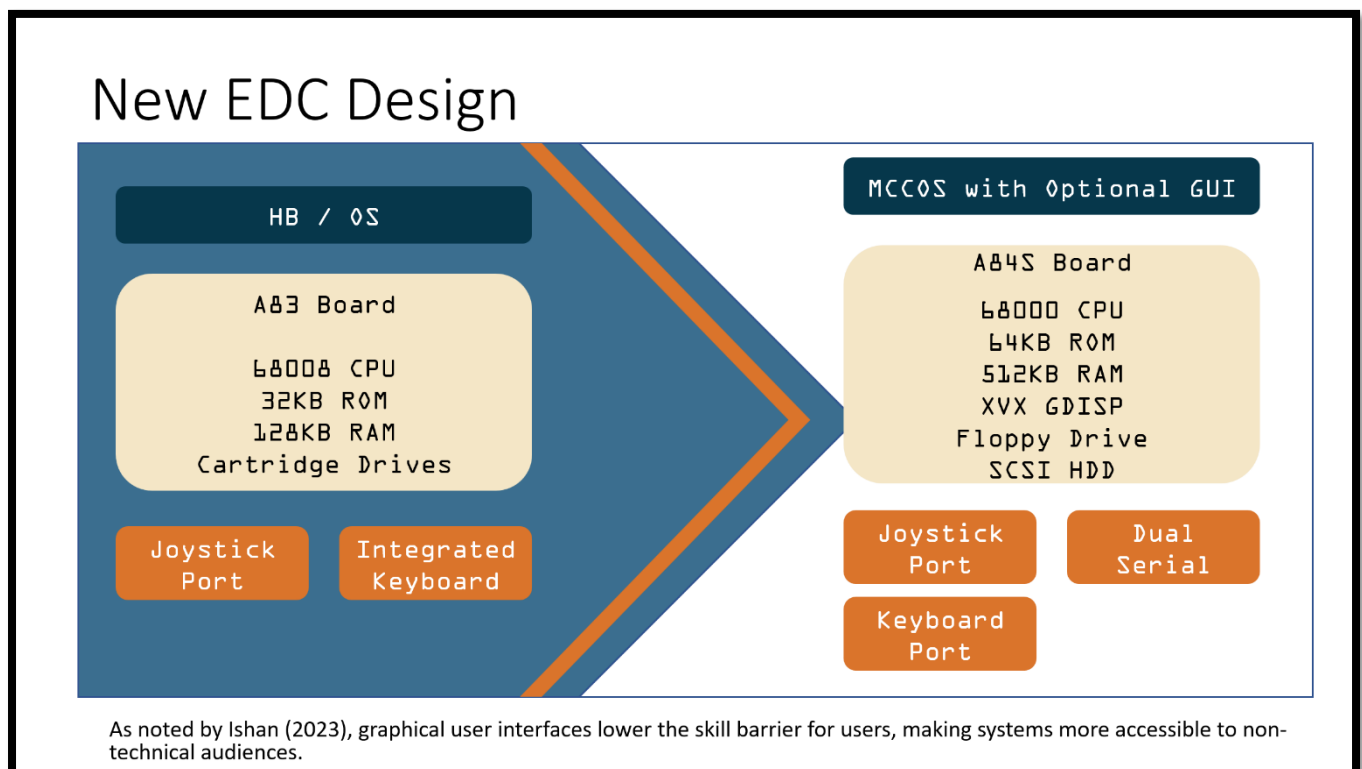Total cost of £40,300

Sale Price £115.99

In Path 2 we propose a new specification to meet all of EDC's technical requirements without the need for add-ons or external modules.

The new specification would include:

- Motorola 68000 CPU
- 64KB ROM
- 512KB RAM
- XVX graphics support
- Floppy Drive
- Onboard SCSI
- Dual serial ports
- External keyboard support

Including a modern graphical user interface is important because it lowers the entry barrier and broadens the potential user base. Ishan (2023) notes that GUIs make systems more accessible by reducing the skill level required for effective use.

This would be a fully socketed layout for easier upgrades and maintenance, fully meeting all of EDC formal requirements in a single, modern design. But how is this possible?

New EDC Design

HB / OS

A83 Board

68008 CPU
32KB ROM
128KB RAM
Cartridge Drives

Joystick Port

Integrated Keyboard

MCCOS with Optional GUI

A84S Board

68000 CPU
64KB ROM
512KB RAM
XVX GDISP
Floppy Drive
SCSI HDD

Joystick Port

Dual Serial

Keyboard Port

As noted by Ishan (2023), graphical user interfaces lower the skill barrier for users, making systems more accessible to non-technical audiences.

Continuing to rely on the A83 series and the Pro Expansion Board would introduce long term technical debt. Each add-on, SCSI, RAM expansion, external I/O, increases system complexity and complicates future support. As Li, Avgeriou and Liang (2015) note, unmanaged technical debt raises long term complexity and cost.

To meet the full EDC specification, we designed a new board, the A84-S. This board integrates all required features from the start, avoiding the need for bolt on expansions or workaround solutions.

Adding a SCSI drive to the specification gives access to fast, industry standard storage and is essential for the inclusion of the GUI.

New Technology, New Possibilities

A84-S Board. A newly designed mainboard that includes integrated SCSI support. Redesign was necessary because the original A83 board did not support SCSI and no existing variant could meet this requirement.

SCSI Drive. No SCSI Drive on BOM. Is required for the MCCOS and X-Windows. Floppy and Cartridge storage are insufficient for the required system files and GUI tools.

Unmanaged technical debt increases long-term complexity and slows future development (Li, Avgeriou and Liang, 2015).

SCSI supports reliable data transfer, making it necessary for GUI and OS operations (TechTarget, 2023).

Slide 9: Update Specification for EDC

As you can see, in the new specification we have:

- Replaced the original proprietary OS with MCCOS, a Unix-like system with full GUI support using X-Windows
- Enabled external keyboard support via the SC150 chip
- Provided 512KB of socketed RAM, upgradeable for future needs
- Added an industry-standard 3.5-inch floppy drive for removable storage
- Integrated full SCSI expansion and SCSI hard disk support
- Installed a 68000-series CPU, with scope for future upgrades
- Enabled dual serial ports
- Delivered a complete graphical user interface and mouse support

The result is a fully integrated, technically modern system that aligns precisely with EDC's stated expectations.

This confirms that the A84-S delivers 100% compliance, with no outstanding issues.

Updated Specification for EDC
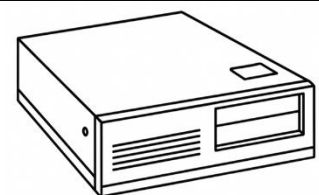
Requirement	Solution	
Industry standard OS	MCCOS (Unix-like) with GUI (X-Windows)	☑ Met
External keyboard	SC150 chip enables external keyboard via adapter	☑ Met
512KB+ RAM	A84-S supports socketed RAM chips, upgradeable	☑ Met
Removable storage	Add 1 × 3.5" floppy drive	☑ Met
SCSI expansion	A84-S supports SCSI + SCSI HDD	☑ Met
68000+ CPU	68000 installed, upgradeable	☑ Met
Dual serial ports	IOP-S 16550 UART enables dual port support	☑ Met
GUI + Mouse	GUI layer (X-Windows)	☑ Met

Meets all EDC requirements (100%)

With new A84-S Board with SCSI Support

The total project cost, including hardware, software, labour and development, is £626,975. This covers component manufacturing, board design, assembly, testing and project management.

Our confirmed income sources are:

- £500,000 from the EDC contract
- £139,997 from 350 confirmed Synful pre-sales at £399.99 each
- This gives a total income of £639,997.

This means the full solution is fully funded, with no need for additional investment. The pre-sale revenue covers all additional costs tied to redesign, expansion and integration, making this a financially sound and strategically secure response to EDC's concerns.

These figures are taken directly from Appendix 1 and 2 of the SEPM Case Study (University of Essex Online, 2023).

EDC Design Costs

Component	Unit Cost (£)	Manufacturing Cost (£)	Units	Total (£)	Design Time
68000	8		2000	16000	
G1	5		2000	10000	4
G2	5		2000	10000	4
Gdisp - XVX	25		2000	50000	
G4	5		2000	10000	4
i8042	1.5		2000	3000	
ROM - 32KB	4		4000	16000	4
RAM - 128KB	2.5		8000	20000	
Board - A84-S	25	15	2000	80000	10
IOP-S 16550 UART	5		4000	20000	
IOP-J SC150	15		2000	30000	
Floopy Drive	7.5		2000	15000	
SCSI Drive	25		2000	50000	
Case Custom	20	20	2000	80000	20
Keyboard External	7.5		2000	15000	
Software					
MccOS Distro	99		1		17
MccOS Licence	25		2000		
X-Windows					8
Floopy Disk	5		4000	20000	

Role	Task	Days	Rate (£/day)	Total (£)
Hardware Architect	Hardware Design	230	250	57,500
Software Architect	Software Design	125	300	37,500
Hardware Engineer #1	Construction	90	175	15,750
Hardware Engineer #2	Construction	90	175	15,750
Hardware Engineer	Testing	5	175	875
Software Engineer	Testing	5	195	975
Project Manager	Oversight and delivery	195	275	53,625
			Total	626,975

EDC contract Price - £500,000

Presales of 350 units @ £399.99 - £139,997

Total Cost £626,975

Total income £639,997

Figures taken from the hardware BOM (Appendix 1, University of Essex Online, 2023) and the software BOM (Appendix 2, University of Essex Online, 2023).

This project has a very strict timetable, with a total duration is 39 weeks.

We have managed to keep the schedule short by running the case design and software development in parallel.

We have a mid-design review in week 10 to check progress and manage risks early.

In week 20, the case design should be completed, which will allow us to start construction of the case while the board design is starts.

In week 25, the software design and development will be completed. The board construction will begin in week 30 after the design is completed. As the boards are completed this will allow the integration of components to start and the software to be tested.

Final testing takes place in week 39.

The staggered timing allows us to run key activities in parallel without overloading the team or creating bottlenecks. Major milestones are clearly marked so we can track progress and manage dependencies throughout.
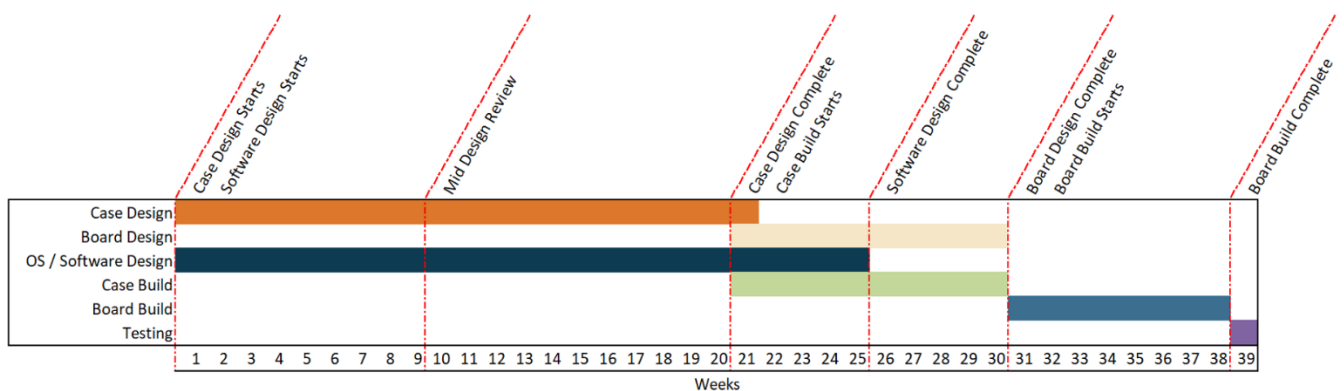
Here you can see a breakdown of each task in the project plan, stating the start and end time along with the duration.

Case design runs from week 1 to 20 and has a duration of 20 weeks. This is important so that the case construction can start.

Board design starts once the case design is complete, running from week 21 to 30.

While the hardware team are working on the case the software team will be working on the OS and software development, spanning weeks 1 to 25.

Case build overlaps with board design, running from week 21 to 30.

Once the board design is competed the board construction will be completed in weeks 31 to 38.

Final system testing is scheduled for week 39.

These durations reflect realistic delivery windows based on known lead times and available resources. This breakdown supports resource planning and ensures that hardware and software teams remain aligned.

EDC Timings
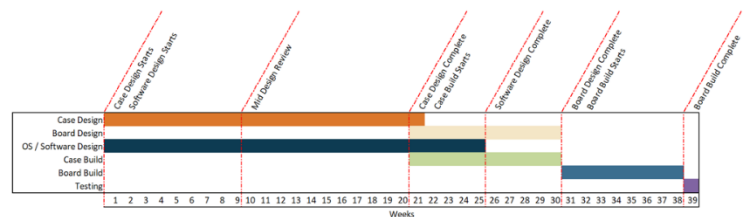
	Start	End	Total
Case Design	1	20	20
Board Design	21	30	10
OS / Software Design	1	25	25
Case Build	21	30	10
Board Build	31	38	8
Testing	39	39	1

Total time of 39 weeks.

To summarise, we are proposing a two-path strategy:

1. Upgrade the 350 A83 units using the Pro Expansion Board
2. Build the new A84-S systems to meet EDC's full technical specification

This approach allows us to recover existing investment while delivering a modern, compliant solution.

Funding is fully secured:

- £500,000 from the EDC contract
- £139,997 from confirmed pre-sales
- Total income: £639,997
- Total project cost: £626,975

All EDC requirements are now met.

The A84-S board offers a clean and scalable platform suitable for business use. At the same time, upgrading the A83 systems allows us to fulfil our pre-sale commitments without delay or waste.

We recommend proceeding with both tracks in parallel, delivering the upgraded systems to existing customers while completing and deploying the A84-S systems for EDC and future clients.

This approach is technically robust and financially sound.

Thank you for listening.

Summary

Two-Path Strategy

- 350 existing Synful units upgraded using Pro Expansion Board
- New A84-S system built to fulfil EDC contract cleanly and efficiently

Funding Secured

- £500,000 from EDC
- £139,997 from pre-sales
- Total income: £639,997
- Project cost: £632,975

Final Recommendation

- Proceed with dual-path execution.
- Upgrade A83 units to recover costs
- Manufacture A84-S to meet EDC requirements