Presentation Transcript

Slide 1

Good morning.

Today I will be presenting the current state of the Synputer project, the challenges we are facing as of November 1983, and the recovery plan for the project.

This briefing will provide you with a clear, realistic view of where the project stands, what risks we are managing, and how we plan to move from the current situation to a successful delivery for both consumers and EDC.

Slide 2

As of November 1983, the project is constrained by three immediate and conflicting pressures.

First, we received a formal complaint from EDC. We have previously provided them with a demo machine, and they are not satisfied with its specifications or behaviour. They now claim contractual non-compliance and threaten legal action of up to one million pounds if their requirements are not addressed.

The public launch is scheduled for the 1st of December, less than a month away, and we have no time to redesign the units before the launch.

In addition to that, we have a backlog of 3,000 pre-orders, but only 1,000 units are currently produced. Even without any redesign, with our production capacity of twenty cases per day and twenty-five boards per day, we need several months to clear this backlog.

Together, these constraints mean that we cannot delay the launch, cannot redesign the base units immediately, and cannot revise or cancel existing orders without damaging our reputation and business.

Slide 3

To understand why we are in this position, we need to look at how the project's requirements and expectations have evolved.

In this section, I will walk through the changing and sometimes conflicting requirements coming from three different directions: our enterprise customer, EDC; our consumer market; and our business itself.

Slide 4

These three groups are pulling the project's focus in different directions at the same time.

Consumers' expectations of our hardware have moved faster than the original hardware roadmap, and features that were previously optional, like graphics and sound, are now seen as baseline, especially in a competitive market.

At the same time, we have EDC as an enterprise customer. They have very specific and strict requirements that are contractual, non-negotiable, and stricter than the consumer baseline. Failing to meet them is a legal and financial risk.

Finally, from the business perspective, we have an upcoming, fixed launch date, and we are balancing delivery commitments, reputational impact, and profitability, and we do not have an option to pause the project and restart.

Slide 5

First, let us have a look at the recently communicated EDC requirements. These are contractual and therefore marked as high priority.

If we compare these expectations to the current situation, the gaps become clear. EDC is emphasising industry-standard components and connectivity. The machine is expected to support an industry-standard operating system, removable media, serial networking, and SCSI expansion, alongside improved performance, and long-term extensibility.

In addition, the importance of graphical user-interface support increases. EDC expects a system that is graphical-user-interface ready, even if a GUI is not deployed immediately.

Together, these requirements define the minimum compliance threshold we must meet to avoid contractual breach, which is why they directly drive the recovery plan presented in the next section.

Slide 6

In addition to the contractual requirements from EDC, our recent marketing research highlights a different kind of pressure: consumer expectations. These are not contractual obligations; however, they influence the long-term viability of the product.

Despite the strong pre-order numbers, users expect that our hardware will become more capable in the future and will feature better graphics, improved audio, broader peripheral support, and continued compatibility with existing software and games. There is also an expectation that the systems will move toward a graphical user interface.

At the same time, the consumer market is sensitive to pricing, and our research shows that while users are willing to accept upgrades and pay more for them, a price increase of more than 10% is not acceptable.

These expectations guide how we design the recovery plan to not only meet the contractual obligations but also provide our end users with a future-proof system.

Slide 7

Last but not least, in addition to the customer and contractual expectations, we have core business requirements that we cannot ignore.

We have publicly committed to the launch date of December 1, 1983, and we have a backlog of over 3,000 pre-orders at a fixed price point. These commitments directly affect both the financial viability of the project and the reputation of our business.

Importantly, these requirements do not replace the expectations from EDC or from customers and instead apply pressure in a different direction. While EDC's requirements imply significant redesign and rework, the business requirements demand continuity of production and on-time delivery.

This tension between redesign and delivery is a problem that is addressed in the recovery plan.

Slide 8

So far, we have seen the competing pressures acting on the Synputer project: contractual obligations, consumer expectations, and hard business constraints.

In this section, I will explain how we address these conflicts in practice, how the project is restructured, how development is phased, and how we balance delivery, redesign, and cost to remain viable in the long term.

Slide 9

Before diving deeper into the updated project plan and timelines, it is important to clarify the key assumptions the plan is based on.

While the recovery plan addresses the internal challenges, several external factors outside of the project team's control also influence the success of the plan. These include a stable production rate, the successful completion of existing pre-orders, and the ability of the subcontractor to supply sufficient expansion boards on schedule.

In addition, the plan also assumes that the third-party software dependencies, such as the GEM graphical environment will release in line with the announced timelines, and that EDC remains engaged in completing the contract rather than pursuing the contract termination.

If any of these factors change significantly, timelines, costs, or delivery scope will have to be revisited. These assumptions represent key project risks that must be monitored throughout the project completion.

Slide 10

To address these conflicting pressures without blocking delivery, the project is restructured into parallel tracks.

Track A is focused exclusively on fulfilling the existing pre-orders and continuing production of the current system. This protects the launch date, revenue, and business commitments.

Track B focuses on implementing the updated requirements, redesigning the system to meet EDC and future consumer expectations without disrupting ongoing deliveries.

From this point onward, the shipping system is referred to as Revision 1, and the redesigned system becomes Revision 2. Revision 2 is positioned not as a correction, but as an evolution of the product, reflecting both enterprise requirements and the results of our marketing research.

This approach reduces delivery risk, preserves the credibility of the December launch, and allows Revision 2 to be introduced as a clear, forward-looking upgrade rather than a response to failure.

Slide 11

The project continues to use the spiral methodology that was applied during the original system design. This decision is deliberate.

First, the project team is already familiar with this approach, which avoids additional onboarding or process risk during a critical recovery phase.

Second, the project environment is dynamic, requirements are evolving, and risks are emerging. Design decisions need to be revisited frequently, and at the same time the project has clearly defined milestones such as the EDC delivery.

Finally, the spiral model explicitly incorporates regular review and risk assessment at each iteration, which is essential given the contractual, technical, and commercial risks that the project currently faces.

For these reasons, the spiral methodology as described by Boehm (1988) remains the most appropriate framework for managing this recovery.

Slide 12

The chart summarises how the project progresses over time across two parallel tracks.

Track A represents the December launch and continued production of the Revision 1 machines to fulfil the pre-orders. This track runs uninterrupted to protect our public commitments and the revenue stream.

In parallel, Track B represents the recovery and upgrade effort for Revision 2. It is structured into three spiral iterations.

Spiral 1 focuses on project review, risk assessment, and hardware redesign. Spiral 2 concentrates on software updates and system integration, at which point the Revision 2 hardware is production ready. Production of Revision 2 is planned to begin in the final week of February 1984, with Spiral 3 covering the final validation, production preparation, and pre-launch activities. An overview of each spiral's activities is listed in the handout materials (Appendix 2 — Spirals overview).

Delivery of the EDC system is scheduled for the end of March 1984, after which Revision 2 becomes the standard offering and Revision 1 is phased out.

Slide 13

Here is a summary of the actual changes in Revision 2.

On the hardware side, we introduce a single upgraded baseline that satisfies both the EDC requirements and consumer expectations: improved graphics and audio, a default 512-kilobyte memory configuration, external keyboard support, serial connectivity, and hybrid storage using both floppy and cartridge media.

For EDC, we also deliver machines with an expansion board for SCSI compatibility without impacting consumer configurations.

On the software side, HB/OS remains the default option for consumer systems and provides compatibility with older games and software, while CP/M is provided as an industry-standard solution for business users such as EDC.

Finally, although a graphical user interface is not shipped at launch, the hardware and operating system configuration fully supports GEM for CP/M when it becomes available in November 1984.

Private users will also be presented with an option to purchase the expansion board as an add-on to their machines, as well as ROMs for the future upgrade to the graphical user interface.

This approach allows Revision 2 to be both graphical UI-ready and future-proof without delaying delivery or fragmenting the product line.

The upgraded system both fulfils all requirements stated by EDC and meets the consumers' expectations.

Slide 14

This slide summarises the cost impact of moving from Revision 1 to Revision 2.

The table on the left shows how labour cost effort is distributed across these three spiral iterations. The allocation of days across roles follows an engineering project pattern in which roughly one-third of the total effort is dedicated to design and architectural work, and the remaining effort is spent on implementation, testing, integration, and other actions (Koopman, 2015). The project avoids employing subcontractors for architectural and engineering work on vital stages to minimise onboarding time, optimise project work, and simplify project decisions (Brooks, 1995, p. 46).

Spiral 1 is focused on project management and hardware redesign. Spiral 2 shifts the focus toward software integration and remaining hardware labour, whereas Spiral 3 concentrates on project finalisation and review, and product support.

The total labour cost for the Revision 2 is £60,515. To translate this into a labour cost per unit, we assume delivery of 2,000 EDC machines and a conservative estimate of 1,000 customer purchases of Revision 2 units. Under this assumption, labour cost per unit is approximately £20.

The hardware upgrade cost for the Revision 2 is £76, with full breakdown in handout materials (Appendix 3 — Project Costs). When we combine the labour cost, hardware upgrade cost, and the original cost price of £250, the resulting cost price for a Revision 2 machine is £346.17. This figure forms the basis for the pricing and commercial decisions discussed next.

Slide 15

With the Revision 2 cost price established, we can now decide on the pricing model. Revision 2 is more expensive to build than Revision 1, so maintaining the original £399 price would significantly reduce margins. At the same time, our marketing research shows that consumers are willing to accept a price increase of up to 10% in exchange for a more capable, future-proof system.

Based on this, a selling price of £435 is reasonable, which represents a 9% increase over Revision 1 and remains within consumer expectations. At this price point, Revision 2 maintains a healthy margin of approximately £88, and as production volume increases, the per-unit share of development costs decreases, further improving profitability.

This pricing strategy balances customer acceptance, cost recovery, and long-term commercial viability.

Slide 16

Having defined the consumer pricing strategy, we now turn to the EDC contract.

Delivering 2,000 Revision 2 units to EDC requires an additional investment of approximately £232,000 compared to the original Revision 1 plan.

This raises an obvious question: whether to seek a contract renegotiation or absorb the costs internally. Given our delayed compliance and the resulting weakened negotiating position, pursuing additional payment from EDC would significantly increase legal and reputational risk. The potential cost of litigation is estimated at £1 million, which far exceeds the additional delivery cost.

Therefore, Syn will absorb the EDC upgrade cost within the overall project margin, generated by consumer sales of Revision 1 and Revision 2. Even after doing so, the project remains profitable, with an estimated gross revenue of approximately £306,000.

This approach fulfils our contractual obligations, avoids legal escalation, and preserves the business relationship with EDC, prioritising long-term partnership and reputation over short-term gains (Valentinov and Roth, 2024; Silva and Resende, 2025).

References

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Appendix 1 — Project Timeline

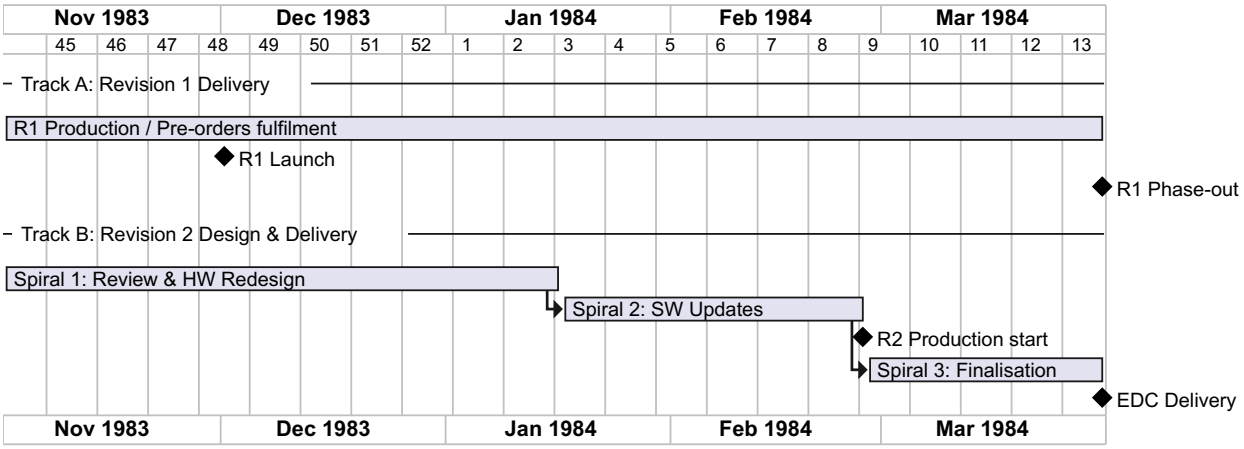

Figure 1. Project timeline Gantt chart

Appendix 2 — Spirals overview

Spiral Iteration 1

Objectives & Planning	**Risk Analysis & Mitigation**	**Engineering & Implementation**	**Evaluation & Review**
Analyse the project in the November 1983 time context, taking into account the fixed December 1 launch date.	Identify clashes between consumer requirements, EDC contractual requirements, and technical constraints.	Analyse how the newly identified requirements affect the existing system design.	Review the outcomes of feasibility analyses and engineering investigations.
Analyse EDC complaints and contractual obligations.	Assess business risks related to pre-orders, production backlog, and inability to meet demand quickly.	Revise the motherboard design for Revision 2, including addressing identified EMI issues.	Review compatibility of proposed design changes with existing production and supply chains.

Analyse newly identified system requirements and constraints.	Assess legal risk related to the £1m lawsuit threat from EDC.	Implement design changes required for Revision 2 and EDC configuration.	Perform initial functional and integration testing on revised system designs.
Define a high-level mitigation strategy based on multiple parallel tracks (Revision 1, expansion board, Revision 2).	Evaluate feasibility of continuing production of the current revision without redesign.	Procure expansion cards from the external contractor for EDC delivery and future consumer upgrades.	Evaluate integration of procured expansion cards with existing and revised system designs.
Establish preliminary timeline assumptions for fulfilling pre-orders, expansion card availability, and Revision 2 design.	Evaluate supplier risk, lead times, and dependency on external contractors for expansion cards.	Integrate procured expansion cards into system configurations where required (EDC and upgrade path).	Decide on readiness to proceed to the next spiral iteration.

Spiral Iteration 2

Objectives & Planning	**Risk Analysis & Mitigation**	**Engineering & Implementation**	**Evaluation & Review**
Define objectives for producing a working Revision 2 prototype based on outcomes of Iteration 1.	Verify technical viability of the Revision 2 hardware design under realistic conditions.	Produce Revision 2 prototype units based on the updated motherboard design.	Review prototype functionality against consumer and EDC requirements.
Plan delivery of a Revision 2 evaluation unit to EDC, including pre-installed expansion board.	Assess availability and lead times of key components required for Revision 2 production.	Integrate procured expansion boards into Revision 2 prototype configurations.	Evaluate integration of expansion boards with the Revision 2 hardware.
Incorporate issues and risks identified during Iteration 1 into the Revision 2 scope.	Assess supplier risk and availability of expansion boards for EDC and future upgrades.	Integrate operating system support and required software for Revision 2 and EDC configurations.	Perform system-level testing of hardware and software integration.

Define scope of software to be delivered with Revision 2 (OS options, compatibility, configuration).	Verify that software integration does not introduce new performance or stability risks.	Configure software environments for consumer and EDC evaluation units.	Review software stability and compatibility on Revision 2 prototypes.
Establish preliminary plan for transitioning Revision 2 from prototype to limited production.	Evaluate risk of delaying EDC delivery due to unresolved integration or supply issues.	Prepare evaluation units for EDC delivery and internal validation.	Review readiness for market introduction of Revision 2 and EDC delivery timeline.
Identify communication and positioning strategy for Revision 2 and upgrade path.	Evaluate reputational and commercial risks related to Revision 2 announcement timing.	Prepare documentation and configuration needed to support evaluation and feedback.	Decide whether Revision 2 is ready to proceed to production planning and wider rollout.

Spiral Iteration 3

Objectives & Planning	**Risk Analysis & Mitigation**	**Engineering & Implementation**	**Evaluation & Review**
Define objectives for starting standard production of Revision 2.	Assess risk of late-breaking requirement changes emerging during production ramp-up.	Finalise software configuration to be shipped with Revision 2 systems.	Perform final system-level testing on production-ready Revision 2 units.
Plan transition from Revision 1 production to Revision 2 production, including winding down Revision 1.	Assess risk that initial production capacity may not meet planned output volumes.	Finalise hardware configuration for Revision 2 production units.	Review production quality and consistency during early manufacturing runs.
Define production volumes and sequencing for Revision 2 units, including EDC deliveries.	Assess risk of supply-chain or component availability issues during scale-up.	Integrate expansion boards into EDC production configurations.	Validate integration of expansion boards in production units.

Finalise market positioning and messaging for Revision 2 as an enhanced platform.	Assess commercial risk related to pricing, margins, and market acceptance.	Finalise pricing, packaging, and product variants for consumer and EDC markets.	Review market readiness and alignment between engineering, production, and marketing.
Plan launch activities and communication strategy for Revision 2.	Assess reputational risk related to customer perception of Revision 1 vs Revision 2.	Prepare production documentation, support materials, and release configuration.	Decide on readiness for full-scale rollout and post-launch monitoring.

Appendix 3 — Project Costs

Hardware Cost & Changes

Base System

Component	Action	Cost	Production	Count	Total	Effort
GDISP	add	£25.00		1	£25.00	
INTSND i8042	remove	£1.50		1	-£1.50	
INTSND YM2149	add	£2.50		1	£2.50	
RAM 32KB	remove	£1.50		4	-£6.00	
RAM 128KB	add	£2.50		4	£10.00	
Keyboard (internal)	remove	£5.00		1	-£5.00	
Keyboard (external)	add	£7.50		1	£7.50	
					-	
Case (desktop)	remove	£25.00	£20.00	1	£45.00	
Case (luggable)	add	£35.00	£20.00	1	£55.00	10
Serial pts IOP-J Model SC100	add	£12.00		1	£12.00	
					-	
Storage (cartridge)	remove	£5.00		2	£10.00	
Storage (floppy + cartridge)	add	£12.50		1	£12.50	
					-	
Board (solder)	remove	£15.00	£10.00	1	£25.00	
Board (socket)	add	£25.00	£14.00	1	£39.00	8
G1	add					4
G2	add					4
G3	add					4
GX	add	£5.00		1	£5.00	5
Total cost, £	£76.00					
Total effort, weeks	35					

Expansion Board

Component	Action	Cost	Production	Count	Total	Effort
Pro Expansion Board	add	£15.00		1	£15.00	
IOP-X	add	£5.00		1	£5.00	
Total cost, £	£20					
Effort, weeks	0					

Software Cost & Changes

Component	Cost	Count	Total	Effort	ROM	Comment
CP/M + BIOS		1	£0.00	4	16 KB	
Libs + CLI		1	£0.00		472 KB	Disk only
68K Basic		1	£0.00	4	16 KB	
Drivers	£45.00	1	£45.00		628 KB	OPTIONAL
Core utils		1	£0.00		512 KB	OPTIONAL
CP/M 80 emulator	£45.00	1	£45.00	2	600 KB	OPTIONAL
GEM GFX & Libs		1	£0.00	12	32 KB	GEM — OPTIONAL
GEM Env & Apps	£99.00	1	£99.00		1512 KB	GEM — OPTIONAL
Syn Drivers		1	£0.00	2		
Syn Graphics		1	£0.00	2		
Syn Sound		1	£0.00	2		

HB/OS update cost, £	£0.00
HB/OS update effort, weeks	6
CP/M base system cost, £	£0.00
CP/M base system effort, weeks	8

Labour cost

Role	Days	Internal	Agency	Cost	Notes
Spiral Iteration 1: Requirements & Initial Design					
Project manager	7	1		£1,925	One week for requirements elicitation and compiling the new project plan
Hardware architect	35	1		£8,750	7 weeks; Initial design for the updated hardware
Hardware engineer	45	2		£15,750	9 weeks (11-2); Hardware implementation pt. 1
					£26,425
Spiral Iteration 2: Hardware & Software implementation					
Project analyst	7		1	£1,750	Spiral review
Hardware engineer	25	2		£8,750	5 weeks; Complete HW implementation
Software architect	20	1		£6,000	4 weeks; HB/OS updates & CP/M planning
Software engineer	25	2		£9,750	5 weeks; HB/OS updates & CP/M porting
					£26,250
Spiral Iteration 3: Finalisation					
Project manager	14	1		£3,850	Project review
Hardware engineer	7		1	£1,925	Finalisation & Support
Software engineer	7		1	£2,065	Finalisation & Support
					£7,840
Total		**£60,515**			

Appendix 4 — Cost Price Evolution

The graph on the Figure 2 visualizes dependency of the cost price (orange, upper line) and the gross profit from a unit (blue, bottom line) from the sales numbers. Increase in sales distributes the research-and-development costs across a larger number of units, thus increasing the profitability.

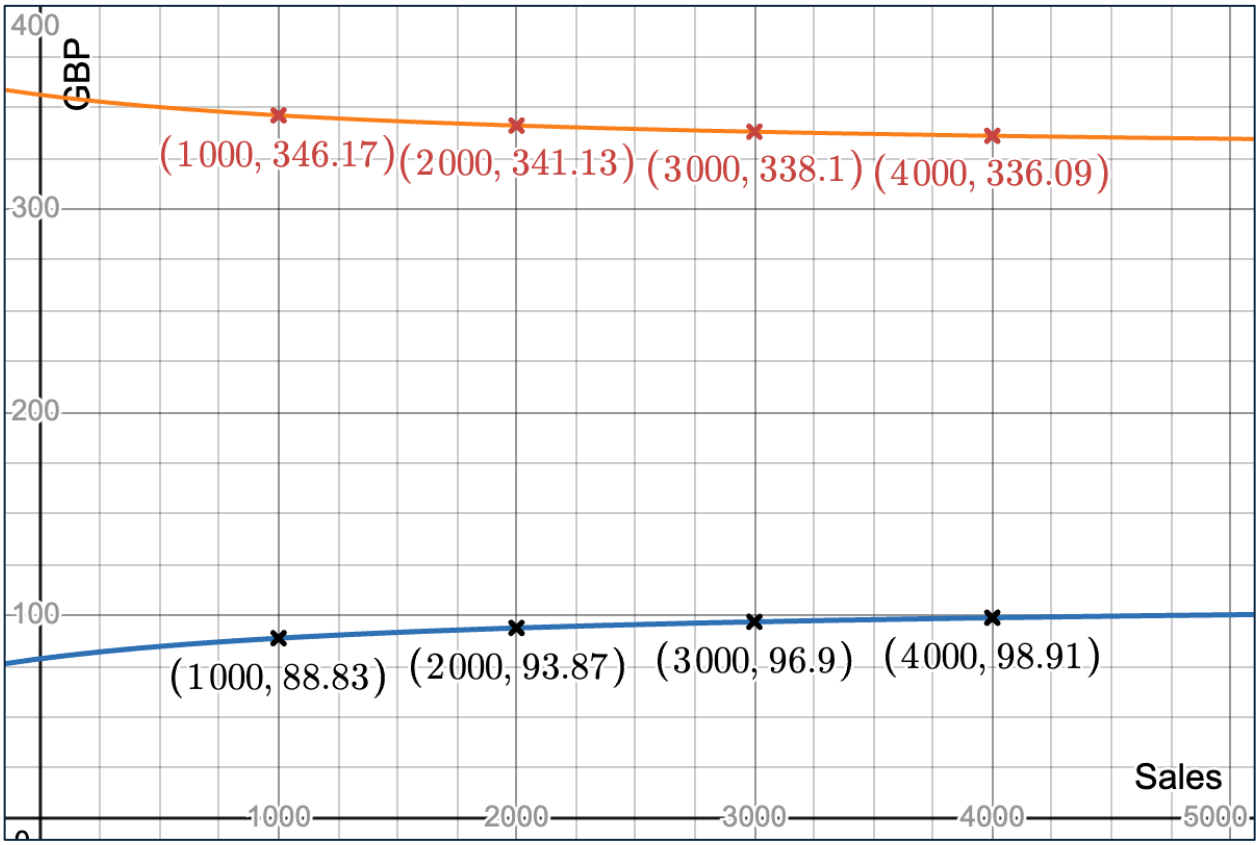

Figure 2. Cost price evolution