(Electronic BMS Project Engineer – Controlworks Pty Ltd)

1. Tell Me About Yourself

Thank you for the opportunity. I'm an **Electronic and Controls Engineer** with over **12 years of experience** across **embedded systems design, IoT-based smart controls, intelligent building automation, and control panel wiring**. My background combines **strong electronics fundamentals** with extensive **site, commissioning, and system-integration experience**, which I see as essential for a BMS Project Engineer.

Technically, I've built deep capability in **microcontroller-based control systems**, working across **STM32, ESP32, and PIC platforms**, with strong proficiency in **C/C++ firmware development**, including the use of AI-assisted tools to accelerate complex development and debugging. I'm highly experienced with **Altium Designer, AutoCAD, MATLAB, and Proteus**, and I'm very hands-on with engineering tools such as oscilloscopes, multimeters, signal generators, and power supplies for diagnostics, validation, and commissioning.

In my current role at **Wabtec (Relay Monitoring Systems)**, I design and develop **electronic hardware systems for intelligent monitoring products**, ensuring compliance with technical and industry standards. My work includes designing and optimising **complex PCBs in Altium** for relay calibration systems and automated test equipment, conducting comprehensive performance and safety testing, and developing **test and validation tools** used across development, production, and field environments.

I've also been heavily involved in **system testing, fault diagnostics, and field support** for deployed systems. This strengthened my ability to work on **live systems**, troubleshoot under pressure, and collaborate closely with technicians, engineers, and clients—skills that directly translate to **BMS project delivery and commissioning**. Working with cross-functional teams, I perform failure analysis, drive continuous improvement, and produce detailed technical documentation for manufacturing and testing.

Alongside my professional role, I continue advanced work in **embedded systems and building-automation-oriented controls**, where I design **ESP32-based controllers, I/O modules, energy-monitoring devices, and communication interfaces**. Through this, I've gained hands-on experience with **HVAC-relevant protocols such as Modbus RTU/TCP, BACnet/IP, and MQTT**, as well as **RS-485 and Ethernet-based system architectures**. I've also developed **PC-based engineering and commissioning tools**, closely mirroring modern BMS workflows.

What attracts me to **Controlworks Pty Ltd** is the company's strong reputation for delivering **high-quality BMS and HVAC automation projects**, and its emphasis on **engineering excellence, structured project execution, and long-term client relationships**. I'm particularly motivated by roles that span the **full project lifecycle**—from design review and control logic development through to integration, commissioning, optimisation, and handover.

I see myself as someone who **bridges electronics engineering, control systems, and on-site delivery**. I'm comfortable reading schematics, working with field devices, coordinating with mechanical contractors, and commissioning systems to specification. I'm now looking to bring that combined skill set into a **dedicated BMS Project Engineer role**, where I can contribute immediately and continue growing within a technically strong organisation like Controlworks.

2. Leaving your current employer, and why do you want to join Controlworks Pty Ltd?"

I've really valued my time at **Relay Monitoring Systems**. It's been a strong environment for developing my core electronics skills—particularly in hardware troubleshooting, monitoring systems, testing, and working with field-deployed equipment. I've gained solid experience in reliability-focused engineering and real-world fault diagnostics, which I believe is a strong foundation.

However, as my career has progressed, I've become increasingly focused on **control systems, building automation, and integrated BMS/OT solutions**. At Relay Monitoring Systems, the scope is more specialised around monitoring and diagnostics, and there are limited opportunities to work deeply across **PLC programming, HVAC/BMS integration, commissioning, and end-to-end project delivery**.

That's where **Controlworks Pty Ltd** really stands out to me. Controlworks has a strong reputation in **BMS, HVAC control, and large-scale automation projects**, and I'm particularly drawn to the way the company delivers complete solutions—from design and programming through to commissioning and long-term support.

I see Controlworks as an environment where my background in **electronics, embedded systems, field diagnostics, and protocols like Modbus and BACnet** can be combined with deeper exposure to **PLC-based control, BMS platforms, and project engineering**. It feels like a natural and well-aligned next step where I can both contribute immediately and continue growing as an engineer.

Ultimately, I'm not leaving my current role because of dissatisfaction—but because I'm looking for **broader technical responsibility, more complex systems, and long-term career growth**, and Controlworks aligns extremely well with those goals.

3. Troubleshoot a complex issue.

☆ **(STAR Method)**

Situation

While working at the Ceylon Electricity Board, I supported an automation and monitoring system at the Automation Control Centre that monitored zonal HT power meters. The meters communicated via IEC-101, with data bridged to the control system over Modbus TCP.

Task

The system became unstable under high data load, causing crashes, data loss, and incorrect timestamps, which led to misinterpreted trends and alarms. My task was to restore stable, accurate, real-time monitoring.

Action

I investigated the full data path and identified two root causes:

- **Buffer overflows, where incoming IEC-101 data overwrote unprocessed frames**
- **Poor time synchronisation, which caused events to be logged out of sequence**

To fix this, I introduced circular buffers to control data flow, implemented timestamp normalisation at the gateway, and added buffer-health monitoring, exception handling and logging to detect issues early.

Result

The system became stable and reliable, crashes stopped completely, and data accuracy was restored even during peak traffic. Operators could trust trends and alarms again, and the solution was later reused as a standard design approach.

Learning

This taught me that in automation and BMS systems, data integrity and time synchronisation are just as critical as communication itself, and they must be designed in from the start.

4. Meet a tight deadline on a complex project.

In my current role at Wabtec, I had a situation where we needed to deliver a critical upgrade to an intelligent relay monitoring and calibration system under a very tight deadline, because it was tied to a scheduled test window and production release. The challenge was that it wasn't just one task — it involved **hardware validation, firmware control logic updates, test automation, and system-level verification**, all while ensuring compliance and reliability.

Chamil Resume Electrical Engine…

My responsibility was to lead the technical execution from testing through to final verification, and make sure the solution was stable enough to ship without delaying the program. I quickly broke the work into clear priorities — what must be fixed for functionality, what must be verified for safety, and what can be improved after release.

To meet the deadline, I took a structured approach:

- **Created a fast test-and-validation plan** to isolate the highest-risk failure points first
- **Ran parallel workstreams**: firmware/control changes while validating PCB and signal integrity
- Used engineering tools like **oscilloscope and instrumentation** to validate timing, noise margins, and communication reliability
- Built quick **automated test sequences** so we could repeat tests faster and eliminate human error
- Coordinated closely with the project team and technicians so that debugging, retesting, and documentation moved together—not in separate stages

Chamil Resume Electrical Engine…

The result was we delivered the upgraded system on time, passed the required testing, and avoided any production or deployment delays. More importantly, the system became more stable because I also documented the root cause and improvements so future builds could be verified faster and more consistently.

What I learned — and what I bring into BMS work — is how to stay calm under pressure, prioritise the risk, communicate clearly with stakeholders, and deliver a working, fully tested system within a deadline. That same mindset is exactly how I approach BMS projects: align control intent, verify performance, and commission confidently within the project schedule.

5. Mistake you made on a project and how you handled it.

Situation

In my current role at **Relay Monitoring Systems (Wabtec)**, I was involved in commissioning an **embedded monitoring and control system** that interfaced with multiple field devices and supervisory software. The system had passed functional testing, but during **late-stage site validation**, we noticed inconsistent data behaviour under certain operating conditions.

Task

My responsibility was to identify the cause quickly and ensure the system was **stable, reliable, and ready for deployment**, without delaying commissioning or impacting the client schedule.

Action

On investigation, I realised that I had **assumed a default configuration would hold under all load conditions**, rather than validating one specific edge case related to communication timing and polling frequency.

I immediately **owned the issue**, informed the project manager, and paused further deployment. I reviewed logs, reproduced the fault in a controlled test environment, and confirmed that the issue stemmed from a configuration oversight rather than hardware failure.

I corrected the configuration, implemented additional validation checks, and updated the **test and commissioning procedure** to explicitly cover this scenario. I also documented the lesson learned and shared it with the wider engineering team to prevent recurrence.

Result

The system was successfully commissioned **without further issues**, and there were **no field failures or warranty returns** related to that behaviour. The updated validation step was later adopted as part of the standard testing process, improving overall product reliability.

What I Learned

This experience reinforced for me that **assumptions—especially around integration and timing—can become risks if they're not explicitly validated**. Since then, I've been more disciplined about verifying edge cases during FAT and commissioning, particularly in systems involving **protocol integration, live data, and real-world operating loads**, which is directly relevant to BMS projects.

6. “Where Do You See Yourself in 5 Years?”

In five years, I see myself growing into a **senior or lead-level BMS Project Engineer at Controlworks**—someone who drives both technical outcomes and team success. My ambition is to become a **technical leader** the team relies on for complex HVAC control strategies, advanced BACnet/Modbus integrations, and high-stakes commissioning work.

I want to develop deep expertise in **Niagara, energy optimisation, and large-scale BMS architecture**, and use that capability to strengthen the wider team—whether that’s **mentoring junior engineers and technicians**, standardising engineering practices, or refining commissioning and QA processes.

I also see myself taking ownership of **larger, more complex BMS and EMS projects**, representing Controlworks confidently with clients and contractors, and contributing to the company’s reputation for engineering excellence and long-term partnerships.

7. "What steps would you take to troubleshoot a non-functioning electronic circuit or control device?"

When troubleshooting a non-functioning electronic circuit or control device, I follow a **structured, risk-aware approach** to identify the root cause quickly while protecting the system and surrounding equipment.

First, I clarify the **symptom and operating context**—what is not working, when it fails, and whether the issue is permanent or intermittent. I review schematics, wiring diagrams, I/O lists, and any recent changes, because understanding the intended behaviour is critical before touching the hardware.

Second, I start at the **fundamentals: power and safety**. I verify supply voltage, polarity, current capability, grounding, and fusing using a Multimeter or power analyser. Many faults are power-related, so I always eliminate this early.

Third, I perform a **visual and physical inspection**—checking for loose terminals, damaged components, dry joints, overheating marks, or incorrect wiring. This often reveals issues that instruments alone won't catch.

Fourth, I isolate the problem by breaking the system into **functional blocks**—power stage, input conditioning, processing/control, and outputs. I test each stage independently using known-good signals or substitution, which helps narrow the fault efficiently.

Fifth, I use the appropriate **diagnostic tools**—Multimeter, oscilloscope, logic analyser, or protocol monitor—to confirm signal integrity, timing, and communication behaviour. For control devices, I also verify firmware status, configuration parameters, and communication health such as Modbus or BACnet traffic.

Sixth, once the fault is identified, I apply a **controlled fix**, whether it's component replacement, wiring correction, configuration change, or firmware update. I then re-test under normal operating conditions to ensure the issue is fully resolved and not just masked.

Finally, I document the fault, root cause, and corrective action, and where possible, implement **preventive improvements**—such as design changes, better protection, or updated commissioning checks—so the same issue doesn't recur.

This approach allows me to troubleshoot efficiently, safely, and repeatably, which is essential in live building automation and control environments like those managed by Controlworks.

8. Manage multiple projects at the same time, and how have you adapted?”

In my current role at **Wabtec**, I often handle multiple projects at the same time—new development, production support, and field troubleshooting. I manage it by staying **structured, priority-driven, and clear with communication**.

I break each job into tasks with deadlines and dependencies, and track progress using tools like **MS Project, Planner, JIRA, and Excel task trackers**. I prioritise by **risk and impact**—safety and compliance first, then customer or production-critical issues, then improvements.

To stay efficient, I use **time-blocking** for deep engineering work and set daily check-ins to keep progress moving. As workloads increased, I adapted by using **repeatable checklists, strong documentation, and early escalation of risks**, so projects stay on track without compromising quality.

That same approach fits BMS work at **Controlworks**, where you need to balance multiple jobs while delivering clean commissioning and on-time handover.

9. Disagreed with a colleague on a technical design. How did you resolve it?”

In my current role at **Wabtec**, I once disagreed with a colleague on a **PCB layout and test architecture** for a relay calibration system. Their focus was keeping the board compact and low cost, but I felt it lacked proper **DFM/DFT**, meaning production testing and future servicing would be difficult.

Instead of arguing, I took a **data-based approach**. I identified the **critical signals that needed test access**, highlighted the assembly and rework risks, and proposed a **minimal compromise**—only adding test points on high-risk nodes and making them production-friendly.

We validated it with a quick pilot test, and the result was **faster debugging, more repeatable testing, and easier servicing**, without increasing cost significantly.

That experience reflects how I handle disagreement: **stay professional, align on the goal, use evidence, and choose the most reliable long-term solution.**

10. Strengths and Weaknesses

✅ Strengths

One of my key strengths is a **structured, methodical approach to problem-solving**. When I'm faced with an issue—whether it's a control logic fault, a communication problem, or a commissioning challenge—I break it down systematically, validate assumptions, and work through it step by step. This helps me identify root causes efficiently and avoid quick fixes that don't last.

I'm also highly **analytical**. I'm comfortable interpreting schematics, I/O lists, trends, logs, and live system data, which is especially important in BMS environments where multiple systems—HVAC, networking, and controls—interact. This analytical mindset helps me troubleshoot effectively on live sites and deliver reliable, well-commissioned systems.

These strengths allow me to deliver **consistent, high-quality outcomes**, particularly during commissioning and handover, which I know is critical to Controlworks' reputation.

⚠ Weakness

One area I actively manage is that I can sometimes **spend too much time perfecting technical details** because I value accuracy and long-term reliability. While that attention to detail is beneficial in engineering, I'm conscious that projects also have **time and commercial constraints**.

To address this, I've learned to **prioritise based on impact**—focusing on what genuinely affects system performance, safety, and client outcomes, and aligning my level of detail with project stage and deadlines. I also use checklists, peer reviews, and defined acceptance criteria so work is delivered **accurately, on time, and to scope**, rather than over-engineered.

This balance has helped me maintain high technical standards while supporting efficient project delivery.