



## Thales System Up and Running on London Underground

### The Challenge

**Over the last few years, Unipart Dorman have been working closely with Thales to develop a range of new signals for the modernisation of four London Underground lines (Hammersmith and City, Metropolitan, District and Circle).**

**Unipart Dorman had the role of developing a new suite of signals that would offer unrivalled levels of signal reliability, as per UK Mainline network. This included a number of more onerous technical challenges than those we have faced in the past, due to the unique environment of London Underground.**

This included:

- EMC compliance being three times more extensive than that of Network Rail specifications.
- The necessity for quick swap out times.
- Harsh operating environments due to the majority of lines being located underground.
- Carrying out numerous driver readability assessments both on and off-site to ensure drivers were able to access each new LED display, in various operational circumstances.
- IP compliance – During Water and Dust Ingression Testing, it was vital that all Enclosures were protected from dirt, dust, oil, and other non-corrosive material in order to adhere to IP55. They were also required to have complete protection from water, including water spray from any direction.

## The Solution

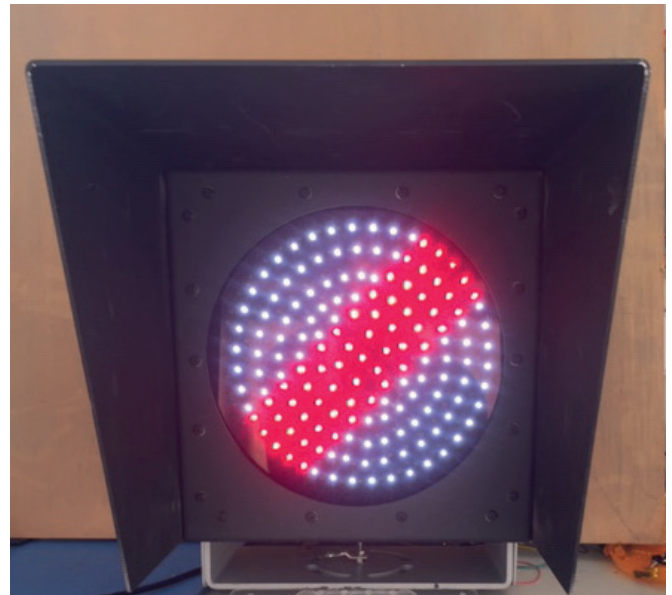
Unipart Dorman established a dedicated design team for 4LM, enabling rapid evolution of the new signals from basic concept to working prototypes. We based the technology on our current range of mainline signalling, while also ensuring the specific challenges and needs of the operating environment were taken into account.

One of the more frequent causes of delays on the lines is due to signal failure. By utilising the experience and reliability data Unipart Dorman has amassed, as well as following Third Party Compliance steps through collaboration with EMC experts from Thales Canada, we have aimed to eliminate this issue.

To meet the complex needs of the project, Surface Mount Technology was used, along with specially formulated paint finishes and bespoke enclosures, all of which adhered to strict regulations. We developed a new supply chain approach with a flexible, small batch Production line, utilising Robotas technology trials and Automated Test Equipment, to ensure each signal was manufactured and tested to the exacting standards with members of the team also attending numerous day and night-time trials throughout. Unipart Dorman also had to consider the issues presented by the harsh environment of London Underground, making sure LU specific requirements including Fire Safety Performance of Materials and Environmental Requirements for Signalling Equipment were met.

The signals all now comply with Thales interlocking system; achieving these standards is extremely complex and has not been achieved by any of our competitors. The signals also offer

a Degraded mode. This means that if a situation were to arise whereby there a fault was detected, a notification would be sent to signalling, during which time the signal could remain lit. This allows drivers to still utilise the signal itself, keeping effected train lines functioning, until someone could be made available to investigate any possible issues. If at any point an error did occur, it was vital that the lines had little opportunity for disruption. To address this, we devised a means of quickly and reliably swapping out units in a methodical way, using the Unipart way tools to help us to do so. The signals were designed as line replaceable, allowing the units to be swapped out and back to full operation within 21 minutes.



## The Result

The new Thales signalling system is now operating between Hammersmith and Latimer Road and is the first part of the network to benefit from the improvements with completion targeted for 2023. The upgrades will increase reliability, improve capacity by an average of a third on the four lines and aim to deliver a train every two minutes at peak times. This in turn will increase train frequency in central London from 28 to 32 per hour, providing space for an extra 36,500 passengers and contributing to the Mayor's target of 80 per cent of journeys made by public transport, cycling or walking by 2041.

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