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Dove 6 display unit installed in a Red Arrow train

On track

Italy is modernising its railway network. **Steve Rogerson** looks at the opportunities for embedded electronics companies

The modernisation programme across Italy's high-speed train network is providing numerous opportunities for embedded companies both in the on-train communications and infotainment systems and in the signal control centres.

The new network is one of the most extensive projects to be implemented in Italy since the post-war period. The lines provide non-stop connections between Italy's largest cities. On the main national axis from Turin to Salerno, Italy's railways have already adopted the level two European Railway Traffic Management System/European Train Control System (ERTMS/ETCS). This system was entirely designed and developed in Italy and adopted by the EU as the common reference standard for new high-speed networks; elimi-

nating the possibility of human error and ensuring continuous control over the trains' movements.

This resulted in the highest degree of safety at the fastest

speeds, enabling a frequency of trains, which in turn, may run just a few minutes apart from one another. Italy has decided to install ERTMS level two as the railway's only signalling system



One of the existing Freccialossa (Red Arrow) trains that can travel at up to 300km/hr

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without any fallback system. This has allowed considerable cost savings because it does not need line-side light signals and

travel at up to 300km/hr.

Its dominance in the market though is about to change when the privately owned NTV enters

allows for a significant increase of traffic capacity.

At present, the main railway network in Italy is run by Treni-

the fray later this year or early next year. NTV is headed by Ferrari chairman Luca Cordero di Montezemolo.

talia, a public owned company that boasts among its stock more than 50 Freccialossa (Red Arrow) ETR500 trains that can

NTV will initially have about 24 AGV trains from Alstom. The trains will go under the name Italo. At the moment, the trains are in a certification phase, which is why the start date is still a little vague.

Added to this mix is a plan by Trenitalia to introduce another 50 trains in 2013. These

ETR1000 models are being made by Bombardier and AnsaldoBreda. They will be 200m long and capable of speeds up to 400km/hr, though service restrictions are limiting that to 360km/hr for the time being.

There are plans for these to be used for long-distance international journeys to France and

Germany and maybe Spain and the UK.

One company already with a toe in the water for the potentially lucrative contracts that these extensions offer is Italian company Sadel. It already has its PIS passenger information systems installed on all the Red Arrow trains.

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“Two passenger displays provide passenger information. This will be extended to six in each carriage later this year”

“We retrofitted these trains to make them look like new trains,” said Davide Amato, Sadel’s technical director.

The company has installed in each carriage two passenger displays that provide information on the journey, the next station, weather forecasts, a map of the train network showing current position, speed of the train, delays and so on. This will be extended later this year and early next year to six in each carriage.

Each module comprises a 43cm 24bit LVDS display with a 1280 x 768 resolution. The device has at its heart an Advantech PCM4386. This is an Epic form factor embedded CPU board for industrial computing.

With a 114.3 by 165.1mm footprint, it was the first Advantech Epic SBC to pass the stricter Phoebus Design ETT extended temperature testing process, which guarantees operation in temperatures from -40 to +85°C and can resist severe shock and vibration.

The installed units – known as Dove 6 or Ecotti – have a TFT LCB backlit using a lamp but Sadel is working on an LED backlit version to reduce power consumption.

The same PCM4386 board is also used in the Doc 3N communications device placed in each vehicle as part of the network between the main communications equipment in the driving trailer and the Dove 6 units.



Called Oboe, the main communications devices were initially installed in the Red Arrow trains in 2008 and allow communications with the ground system using GSM, GPRS and Wifi modules. They have a GPS receiver and store journey information.

Also included in the PIS is a Sax 3N568 30W audio amplifier

that complies with UIC568.

The PIS serves two main purposes. First, it acts as a public address system for sending video and audio information to passengers. Secondly, it is for entertainment and Trenitalia is looking at the possibility of back-of-seat displays so each passenger can have his or her

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own screen. There is also Wifi connectivity so passengers can connect using their laptops or PDAs.

Sadel is hoping that it can use this foundation as the base for winning the contracts for similar units on the new ETR1000 trains.

“We are involved in design activity on this,” said Amato. “We don’t know yet whether we have that contract. We are having meetings with the train companies and are still in the feasibility phase.”

The company is also trying to win a contract for the existing Red Arrow trains for a media server that will provide video

streaming to passengers via their Wifi connections.

“We are working with Aaeon on this,” said Amato. “We are in the design phase on this. We have shown them to the customer and they are checking and testing, and it will be a few more months before we know.”

He said that with this passengers would be able to connect to the internet via a router on the train and use the server for downloading video streams.

“These must comply with railway regulations for vibration, temperature and so on,” he said. “This will be set up with the server and hopefully start in summer this year.” ■

