

# Case Study

## The National Grid Company, UK

### The Challenge



The National Grid Company owns, operates and develops the high-voltage electricity transmission network in England and Wales and Great Britain's principal natural gas transportation system.

The company has an obligation under Electricity Supply Regulations to maintain the National Grid System Frequency within statutory limits. The existing equipment carrying out this fundamental task was originally supplied by Time & Frequency Solutions in 1985, and was approaching the end of its natural life cycle.

The real problem was that there had to be a smooth transition between the old and new systems, with no 'down-time'.

### The Solution

We developed the FATE2000 system, incorporating our commercial off-the-shelf (COTS) M211 Modular Time & Frequency System as the central measuring unit. In addition to a standard range of popular outputs, the M211 has 9 module slots so it is easy to include all desired outputs from the extensive range we have developed.

The resulting system was designed so that in the very unlikely event that a fault occurs in one M211 unit, backup M211 systems will still perform the required functions.

Universal Co-ordinated Time (UTC) was the selected time source, and is received into the system via the inclusion of a GPS receiver module.

The internal precision oscillator, which is disciplined

by GPS, allows the M211s to free run and continue to operate during any period of loss of synchronisation.

Plotter software allows a graphical interface from the M211 to the operator, showing vital information such as a plot of frequency and demand, history data log, configuration options, and so on.

Other outputs from the system were provided to enable messages to be displayed (e.g. time error, average frequency, etc), together with a range of measuring and monitoring control modules to flag discrepancies to a very high accuracy. In addition,

NTP output provided accurate time and date information to be disseminated throughout all computers on the Ethernet network.

### The Result

The National Grid Company was supplied with an accurate, modern and highly reliable method of frequency measurement.

As the new equipment utilises an algorithm updated from one previously used, this provided the client with the peace of mind that the equipment would operate in exactly the same way as the original equipment, thus ensuring confidence in the new design.

As the M211 has upgrade capability, future application requirements can be easily incorporated into the design.

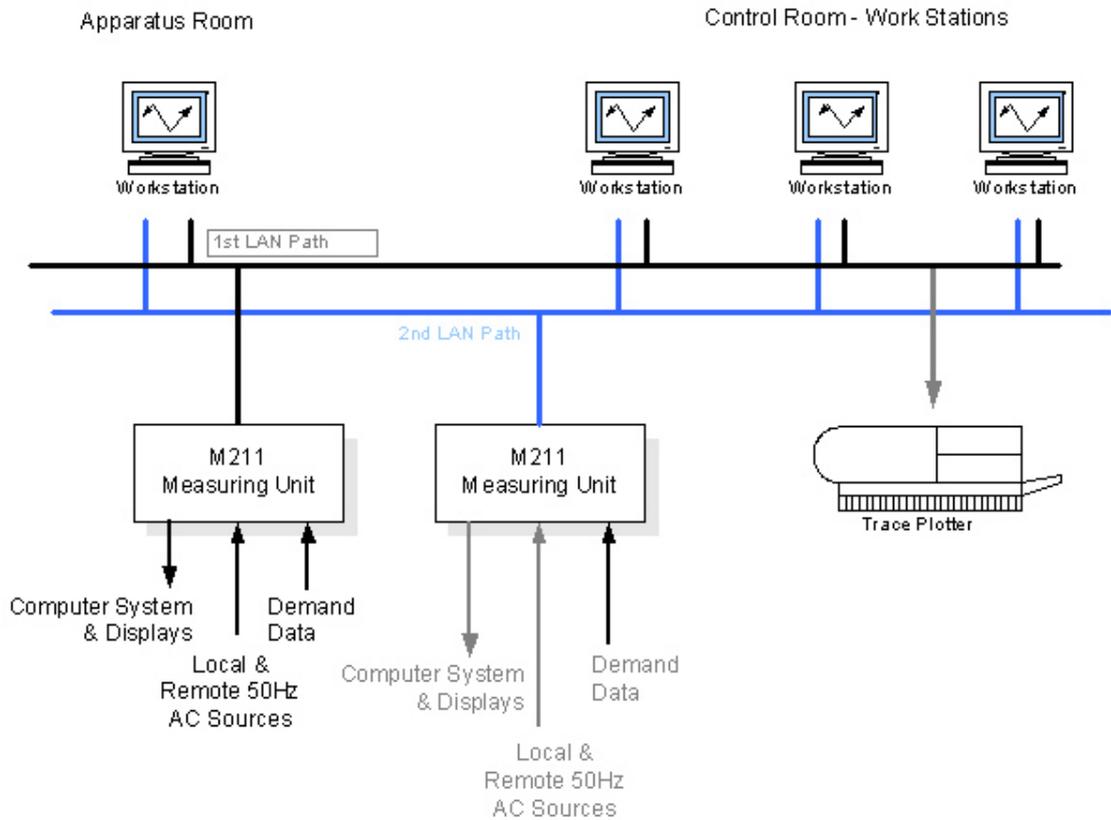
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# FATE2000

## Configuration for National Grid



### M211 Modular Time & Frequency System

- Ideal where synchronisation of many different output interfaces is required
- 9-slot module output capacity
- Choice of clock synchronisation options
- Choice of master clock accuracy
- Large range of output options
- 3 U high standard 19" rack mount
- 5 button front panel keyboard for equipment configuration and control
- Alphanumeric display of time, date and status
- Equipment configuration stored in non-volatile memory
- Synchronised to an external time and frequency source
- High accuracy internal oscillator options available
- Remotely controllable



M211 High Capacity Modular Time & Frequency System