

## Clock time signal options

### 1. System controlled

A collection of Vultron Clocks may be controlled from an existing CIS by RS485/RS422 data cabling. The data should be transmitted to the Clocks regularly to an agreed data format and protocol.

### 2. Time Signal Sources

#### 2.1 RDS

The Vultron favoured method of independently acquiring a time signal is by the use of an RDS receiver. This uses an automatic time source device which synchronises its internal clock to FM radio stations which conform to the specification of the Radio Data Service (RDS) system. Further information on this service may be obtained from: [www.rds.org.uk](http://www.rds.org.uk)

Free-run clock accuracy - in the event of the RDS receiver losing its radio reception, the clock will free-run to an accuracy of  $10^{-4}$ , ie 1 second in 2.77 hours.

Reception of FM frequencies (87.5 to 107.9 Mhz) is superior to that of long wave signals (such as Rugby MSF) and does not require an antenna to see the sky (such as GPS antenna). These 2 factors are important for clock installations in Railway Stations.

The RDS receiver may be mounted internally to the clock housing, in the case of large clocks, with the antenna fixed to the body of the clock case. In this way the clock requires a mains supply only, simplifying the installation.

For small character clocks the RDS receiver may be mounted remotely in its own self-contained housing.

One or more clocks may be connected via a serial cable from a single RDS receiver.

#### 2.2 MSF

Rugby MSF receivers may also be supplied individually, one per clock, or one per series of clocks. A highly accurate master clock system using Rugby MSF is also available.

Individual MSF receivers need to be mounted outside of the clock case, in a plastic case, with the antenna lying horizontally and oriented generally towards Rugby. The MSF signal is long wave, 60kHz, and subject to interference from buildings and steel structures, and also local electrical interference, e.g. from fluorescent tubes and CRT monitors.

Individual MSF receivers would free-run to an accuracy of  $10^{-4}$ , the accurate master clock system would free-run to an accuracy of  $10^{-6}$ .

### 2.3 GPS

GPS receivers may be used in similar ways to RDS or MSF receivers. The principle disadvantages of GPS are that the receiver antenna needs to be positioned externally with a good view of the sky and that GPS has a built-in rule for changing from BST to GMT. In the event that the UK adopted a different rule from the current arrangements then every device would need to be reprogrammed to enforce the change. This is not the case for RDS and MSF.