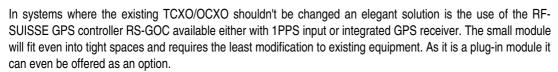# Frequency Calibration Made Easy

Equipment with high requirements on frequency stability (RF test equipment, transmitters, receivers, transceivers, RADAR, professional audio/video equipment to name some) are usually supplied with oven controlled crystal oscillators (OCXO) to achieve the required stability. Unfortunately these oscillators drift over time due to ageing. Manufacturers usually offer two ways to compensate for this problem. The equipment has some frequency calibration means (like a trimmer) or an external reference can be used but the correction is usually not saved in the later case. This however requires the existence of a calibrated reference standard and the calibration has to be done manually.

For the external reference RF-SUISSE offers several GPS Guided Frequency References like the RS-CGGO10 and RS-MRGGT which are easy to set up but it doesn't solve the inherent calibration problem of the equipment being uncalibrated when the reference is removed.

An easy system solution is to simply replace the internal OCXO with a frequency reference module from RF-SUISSE. Depending on the requirements this can be any versions of the RS-GGO10 series ranging from TCXO's to OCXO's. Their advantage is that they store the actual correction factor once they ran for a day with a stable GPS signal. In normal mode the GPS can be connected all the time which guarantees perfect stability all the time. If the GPS (or 1PPS) is disconnected they continue to operate with the accuracy of their crystal reference but calibrated to the last value under GPS guidance. In a lot of cases the internal reference stability is sufficient for the equipment and it only has to be connected to a GPS/1PPS signal for a few hours to refresh the calibration. All these modules are available with either a 1PPS input or integrated GPS receiver.

The advantage of the TCXO based models is that they only need less than 15mins to reach GPS lock and that they do not mind to be turned on and off on a frequent basis. This together with the low current consumption (<15mA for the 1PPS models0 makes them ideal for mobile and portable equipment too.

In systems where the existing TCXO/OCXO shouldn't be changed an elegant solution is the use of the RF-SUISSE GPS controller RS-GOC available either with 1PPS input or integrated GPS receiver. The small module will fit even into tight spaces and requires the least modification to existing equipment. As it is a plug-in module it can even be offered as an option.

The recommended solution is an outdoor mounted GPS antenna (i.e. RS-GPSANT70) and a GPS receiver mounted under the roof. We highly recommend the use of our fibre-optic 1PPS transmission to avoid any problems with lightning and static charges! The RS-GPSPPS4 is a high end timing receiver with optical 1PPS output. Indoors the solution depends on whether the GPS reference is integrated into the equipment or an external reference source is used. The datasheets of the relevant modules show the required circuitry for an optical 1PPS input.

For the latest product information, datasheets and application information please visit our website at http://www.rf-suisse.ch

As we continuously improve our product we reserve the right to change published specifications without further notice.

All product manufactured and sold by INWAVE AG under the RF-SUISSE brand is intended for laboratory use or are components (modules) not suitable for consumer use. Thus they are not required to and do not carry CE certification.
Except as noted otherwise all RF-SUISSE product is RoHS 5 compliant meeting the requirements as per the date of shipping.

Inquiries, quote requests and questions: please email to info@rf-suisse.ch (na@rf-suisse.ch for North America) or your RF-SUISSE representative. Technical questions please email to tech@rf-suisse.ch . Please use English or German if you email us.

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