

# MIP monitoring in single-frequency networks

Following its successful implementation in satellite and cable systems, digital transmission of TV signals is now also making its entry into terrestrial networks. Besides efficient data compression and flexible multiplexing in line with MPEG2 standards, single-frequency networks (SFNs) allow the best possible utilization of scarce terrestrial frequencies. Such networks are controlled by MIPs (megaframe initialization packets, see box). Prerequisites for the working of an SFN are correct MIP generation and transmission plus continuous monitoring to avoid malfunctions or network failures.

## MIP monitoring: an innovative add-on

Both Rohde&Schwarz instruments MPEG2 Realtime Monitor DVRM [1] and MPEG2 Measurement Decoder DVMD [2] can monitor MIPs in real-time – an innovative extra to the many measurement parameters already supported. Each incoming MIP is subjected to twelve individual tests for transmission time, structure and content as recommended by the DVB Measurement Group.

Every error detected immediately produces an alarm signal that is displayed by LEDs on the front panel of the instruments and signalled on one of twelve selectable alarm lines. Plus, the error is registered in error statistics and included in a measurement report with details of its cause.

## Here comes Stream Explorer™ with new functions

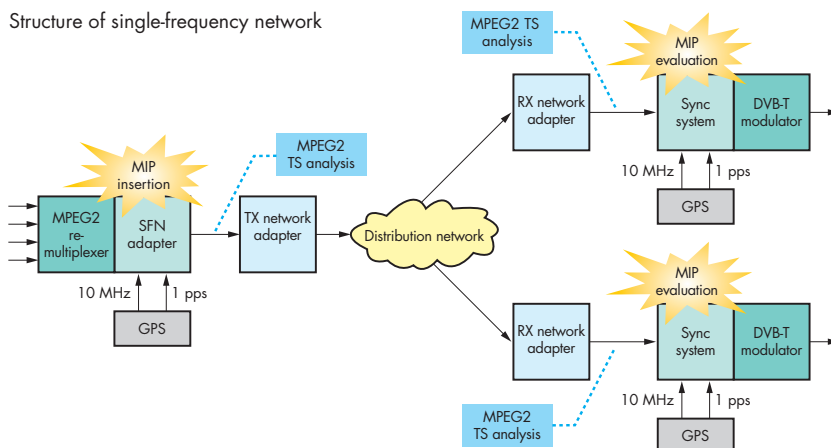
Stream Explorer™ [3, 4] for DVMD/DVRM is an innovative computer software option. The extended control and display functions including a table interpreter are supplemented by a new operating mode specially for MIP monitoring. Stream Explorer™ reproduces the complete and interpreted content of the incoming MIP in real-time and thus allows in-depth insight into the operation routines irrespective of compliance with error criteria.

This means that DVRM, DVMD and Stream Explorer™ guarantee operational reliability also in new terrestrial SFNs. The first nationwide SFN in Spain is proof of this reliability, where all high-power transmitters are monitored by a DVMD (see Newsgrams p 44).

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Reader service card 168/10

Structure of single-frequency network



## SFN and MIP

In single-frequency networks (SFN), neighbouring transmitters with identical program content use exactly the same channel. This is only feasible if all transmitters operate synchronized and simultaneously. Here the global positioning system (GPS) serves as a time reference. The transport stream to be transmitted is provided with additional information allowing exact assignment of the transmit signal to this time reference in the TV transmitters and thus an appropriate time shift. The extra information is transmitted in megaframe initialization packets (MIPs). Any error in the structure or content of a MIP could cause failure of the complete transmitter network, making overall MIP monitoring indispensable.

## REFERENCES

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- [3] Fischbacher, Michael; Rohde, Werner: PC software for MPEG2 dream team DVG/DVMD. News from Rohde & Schwarz (1997) No. 154, p 29
- [4] Finkenzeller, Richard; Fischbacher, Michael: MPEG2 transport stream analysis in networked DVB monitoring system using Stream Explorer software. News from Rohde&Schwarz (1998) No. 159, pp 24–25