# FM Multiplex Signal Generator

## MSG-2174

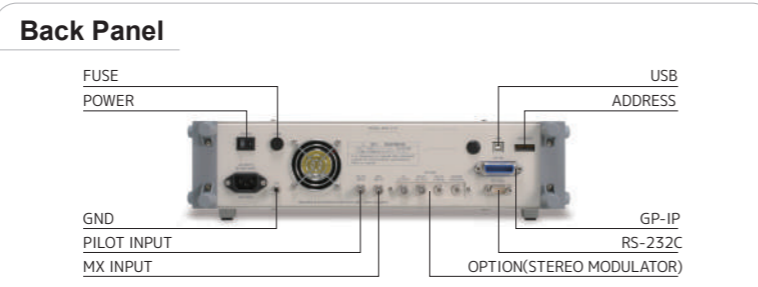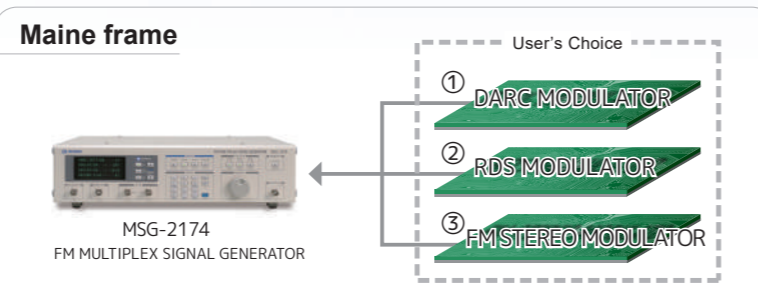# FM Multiplex Signal Generator

## MSG-2174

## DESCRIPTION

MSG-2174 is an FM multiplex signal generator adopted a multiple module method. Combination of DARC modulator, RDS modulator, and FM stereo modulator can be chosen depending on usage of user. DARC FM multiplex method and RDS (RBDS) FM multiplex method are available by this one unit, moreover a stereo modulator can be installed in same casing. By using application software attached to this unit, new data can be created and edited by a PC. This unit can output the data by being downloaded. Regarding DARC encoder function, we reduced its size by modifying specifications of MSG-2170/2173 and achieved cost reduction. As for RDS function, usability for production line was prioritized because it is an existing method. An FM-AM standard signal generator such as MEGURO MSG-2280 is required in order to generate signal from data which MSG-2174 encodes.

## FEATURES

MSG-2174 allows combination which matches user's needs. (DARC/RDS/Stereo modulator)

### 【Combination example】

- Main Flame + RDS only
- Main Flame + RDS + Stereo modulator
- Main Flame + DARC only
- Main Flame + RDS + DARC
- Main Flame + Stereo modulator only
- Main Flame + DARC + Stereo modulator
- Main Flame + RDS + DARC + Stereo modulator

### Maine frame

MSG-2174
FM MULTIPLEX SIGNAL GENERATOR

User's Choice
① DARC MODULATOR
② RDS MODULATOR
③ FM STEREO MODULATOR

### Back Panel

FUSE
POWER
GND
PILOT INPUT
MX INPUT

USB
ADDRESS
GP-IP
RS-232C
OPTION(STEREO MODULATOR)

## RDS/RBDS module

RDS (Radio Data System) is a broadcast service which is being adopted in Europe. It is based on the CENELEC standard EN50067:1998. RBDS (Radio Broadcast Data System) is a similar Service in North America.

○ Text information display

○ Voice information

○ Network

Text information displays title of music being played and traffic congestion information on a screen in an interrupted manner.

When audio source such as CD is being played, if information (such as traffic congestion informatio n and/or weather forecast) enters, it is replaced by a radio automatically and the announcement starts. The original audio source returns when the announcement finished.

Many local broadcast stations constitute a network under a key station to cover large area. However frequencies assigned for each local broadcast station are not same. By building a RDS network, even if a vehicle travels long distance, the radio automatical y tune radio frequency without listener's tuning, the radio can keep receiving a program.

| | |
|---|---|
| Signal level setting | 0.0% to 10.0% |
| Record setting | 00 to 10 (00 is a fixed pattern) |
| Modulation patterns | In addition to normal data, this module can output L-MSK modulation signal of ALL0 and ALL1. |

## DARC module

DARC (DAta Radio Channel) is a FM multiplex-broadcasting method which was developed by NHK (Japan Broadcasting Corporation)

○ There was a text information service of FM broadcasting before, but it is used for traffic congestion information (VICS= Vehicle Information and Communication System) now.

| | |
|---|---|
| Signal level setting | Auto/Manual (0.0% to 15.0%) |
| Record setting | 00 to 10 (00 is a fixed pattern) |
| Modulation patterns | In addition to normal data, this module can output L-MSK modulation signal of ALL0 and ALL1. |

## Stereo modulator

| | |
|---|---|
| Stereo signal modulation | ON, OFF, and variability of modulation (0.0 to 125%) |
| Internal modulation frequency | EXT, 400Hz, 1kHz, 6.3kHz, 10kHz, 15kHz |
| Pre-emphasis | OFF, 25µS, 50 S, 75 S |
| Modulation modes | OFF, MAIN, L & R, SUB, LEFT, RIGHT, MONO |

## Editor program

FM multiplex data for outputting by MSG-2174 can be created and edited by a PC.
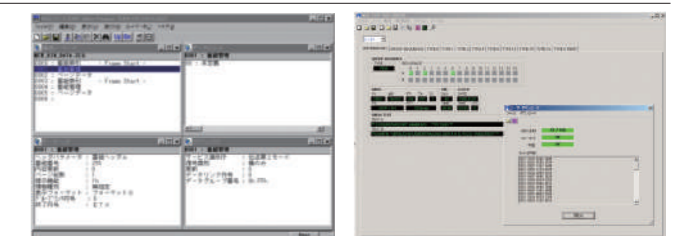
## Bit error rate measurement

This unit can measure and display bit error rate by comparison of demodulated signal from outside with PN9.

## External data save function（DARC only）

Internal recorder can save data which is input by external connector. (Max. 60 frames)

## Friendly interface

This unit equips GP-IB, RS-232C, and USB.

## SYSTEM EXAMPLE



D.U.T / TUNER

PC

RF

GP-IB
RS-232C
USB

DARC
RDS

**MAS-8420**
AM/FM STEREO SIGNAL GENERATOR

**MSG-2174**
FM MULTIPLEX SIGNAL GENERATOR

## BIT ERROR RATE MEASUREMENT



D.U.T / TUNER

Bit Error Rate test

DATA
CLOCK

DARC
RDS

**MAS-8420**
AM/FM STEREO SIGNAL GENERATOR

**MSG-2174**
FM MULTIPLEX SIGNAL GENERATOR

PC

GP-IB
RS-232C
USB

## SPECIFICATIONS

### 1. Main frame

| | |
|---|---|
| Composite output signal | |
| Output level | Max. 3.00 Vp-p (0.00 to 3.00 0.01V step ) |
| S/N ratio | 80dB < |
| Output impedance | 75Ω |
| External signal mixing input | |
| Input frequency range | 30Hz to 100kHz |
| Input/Output gain | 1.0 (+0, -0.5dB ) |
| Input impedance | 10kΩ |
| Pilot input | |
| Input level range | 1.0 Vpp to 3.0 Vpp |
| Input impedance | 10kΩ |
| Input data/clock | |
| Input level range | TTL |
| Input impedance | 10kΩ |

### 2. RDS

| | |
|---|---|
| Output level | Max. 300mVpp:3.0Vpp=75kHz(100%) |
| Output level setting | 0.0 to 10.0%(0.1%step) |
| Subcarrier frequency | 57kHz ± 2Hz |
| Subcarrier distortion | 0.1% < (OUTPUT3Vp-p,DEV10%) |
| Data modulation mode | DPSK 1.1875kbps |
| External data/clock input | TTL |
| Bit error rate | PN9 |
| Records | 00 to 10 (00 fixed pattern) |

### 3. DARC

| | |
|---|---|
| Output level | Max. 450mVpp:3.0Vpp=75kHz(100%) |
| L-MSK level control | Auto/Manual switching |
| Auto | Upper limit:: 10.0%, Lower limit::4.0% |
| Manual | 0.0 to 15.0%(0.1% step) |
| Subcarrier frequency | 76kHz ± 2Hz |
| Subcarrier distortion | 0.1%<(OUTPUT3Vp-p,DEV at 10%) |
| Data modulation mode | LMSK16kbps Frequency shift:±4kHz |
| External input data/clock | TTL |
| Bit error rate | PN9 |
| Records | 00 to 10 (00 fixed pattern) |

### 4. Stereo Modulator

| | |
|---|---|
| Output | |
| Output level | Max. 3.75 Vpp :3.0 Vpp = 75kHz(100%) Pre-emphasis : OFF |
| Output level setting | 0 to 125% ( 0.5% step ) |
| Internal modulation frequency | 400Hz,1kHz,6.3kHz,10kHz,15kHz,EXT. |
| Modulation mode | L&R,MONO,MAIN,LEFT,RIGHT,SUB,OFF |
| Pre-emphasis | OFF,25µs,50µs,75µs |
| Frequency characteristics | 30Hz to 15kHz ±0.2dB |
| Separation | 55dB> |
| Distortion | 0.02%<(OUTPUT3 Vp-p,DEV100%,at MONO) |
| S/N ratio | 74dB> |
| Pilot | |
| Pilot signal | 19kHz±1Hz |
| Output level setting | 0 to 15% (1% step) |
| Pilot output | 1.0Vp-p |
| External AF input frequency lenge | 30Hz～15KHz |
| Input level judgment accuracy | 2Vpp±2% |
| Input impedance | 10kΩ |

### 5. Interface

| | |
|---|---|
| Serial interface | RS-232C:D-sub 9pin(male), USB:Type B(female ) |
| Parallel interface | GP-I B(Compliant with IEEE Std. 488-1975 ) |

### 6. General Data

| | |
|---|---|
| Power requirements | AC90V to 240V 50/60Hz |
| Power consumption | Max. 20 VA (Full-featured product ) |
| Dimensions | Approx. 240(W)x100(H)x350(D) mm |
| Weight | Approx. 5kg |
| Operating temp range | 0 to +40℃ |
| Guarantee temperature range | +10 to +35℃ |

## ORDER INFORMATION

① DARC Function only
② RDS Function only
③ Stereo modulator only
④ DARC + Stereo modulator
⑤ RDC + Stereo modulator
⑥ DARC + RDS
⑦ DARC + RDS + Stereo modulator

● Specifications are subject to change without notice for product improvement.