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ADIVIC
RF TECHNOLOGY ARCHITECT

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MP

RF STATION

9000

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>> Wireless Communication Test System

GPS

RF Player

FM / RDS / TMC

Digital TV

Audio Generator / Analyzer

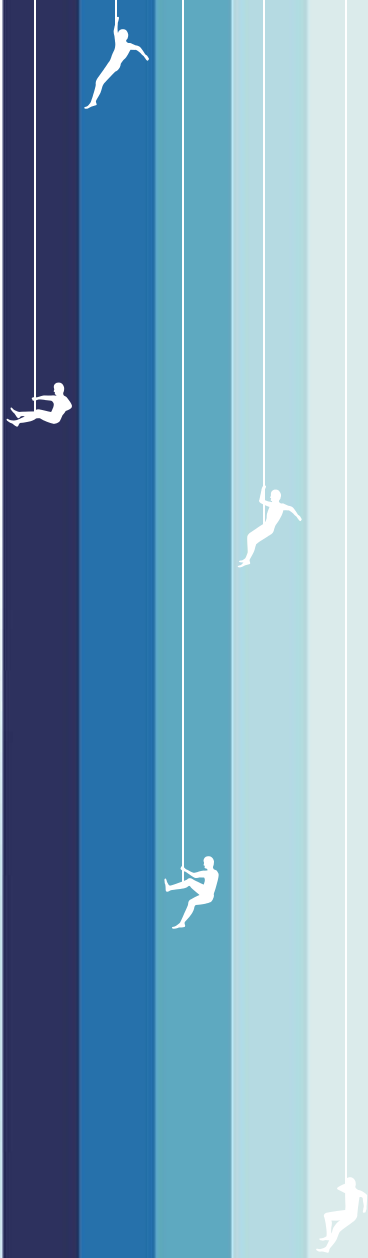
GPS

RF Player

FM / RDS / TMC

Digital TV

Audio Generator / Analyzer



ADIVIC

Product Features

Multi-Standards RF Communication Testing tool



GPS

- 6CH, 8CH GPS Model
 - RF Level -55dBm to -160 dBm
 - Global City Library
 - Location editor
 - Almanac upgradeable
-
- 1 Channel GPS Model
 - RF Level -55dBm to -160dBm
 - Almanac data
 - Doppler Control ± 30 KHz



RF Player

- Perfect solution for DTV, GPS, Radio and many RF communications
- Field testing signal source
- Performance testing signal source
- Supports Frequency ranged from 300K-2.7GHz
- Adjustable bandwidth 25MHz



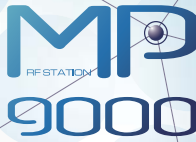
Audio Analyzer

RX

- AC Level
- Noise
- Distortion
- S/N
- Frequency response
- Total Harmonic Distortion
- THD+N
- SINAD

TX

- CW mode
- Multi Tone
- 20Hz-20KHz Sweepmode



DTV

- DVB-T/H
- ATSC
- DTMB
- ISDB-T
- RF level +10dBm to -110dBm
- Noise Generator



FM RDS

- FM 76 to 108MHz
- RF level -10 to -120dBm
- FM Mono
- FM Stereo
- RDS
- RBDS
- RDS TMC / RBDS TMC
- RDS Feature - Alternative Frequency / Enhance Other Network / Radio Text Plus

Overview

ADIVIC proudly introduces the new model - MP9000 RF Station. MP9000 provides a platform that adopts different wireless communication modules into variety of combinations for different purposes & standard requirements of tests including GPS, FM RDS/TMC, DTV, Audio Analyzer and all one way communication standard. The MP9000 allows the users to implement single or multiple standards testing, such as concurrent parallel testing and sequence-based testing. MP9000 is sophisticated for R&D applications, and the user friendly GUI also makes it ideal for production line applications. By bringing in the concept of one does all, MP9000 would greatly benefit the customers with dramatic time saving and high-level of cost-effectiveness.



Operation

An easy-to use GUI and an integrated 10.2" Touch panel fully conform with one of its designations to provide an user-friendly environment which allows the users to easily control the MP9000 functionalities. Speaking of compatibility, the USB and Ethernet ports are implemented to allow the users to easily integrate the MP9000 into the production-line ATE for production test purpose covering the semi-product (PCBA) and end product test.





SPECIFICATION

System Specifications

- Processor: Intel Series
- Memory: DDRII
- System storage: SATAII 320G HDD or above
- Power supply: AC 100 to 240V, 50/60Hz
- Operating temperature: 0 to 50°C
- Operating humidity: 0% to 95% RH (Non Condensation)
- Storage temperature: -20 to +80°C
- Dimensions: 360(L) x 340(W) x 200(H) mm
- Weight: Approx.17Kgw

OS system: Windows XP Professional User interface

- 10.2 inch TFT color LCD
- Touch Screen

External Interface

- USB 2.0 Port X 4
- eSATA X 1
- Ethernet LAN Port (10BASE-T / 100BASE-TX / 1000BASE-T) X 1

Option combination rule

| Option | Module Slot |
|--------------------------|-------------|
| GPS | 1 |
| RF Player | 2 |
| Audio Analyzer/Generator | 3 |
| FM RDS TMC | 1 |
| Digital TV | 2 |

System module slot is 4

All Option module slot combination must ≤ 4

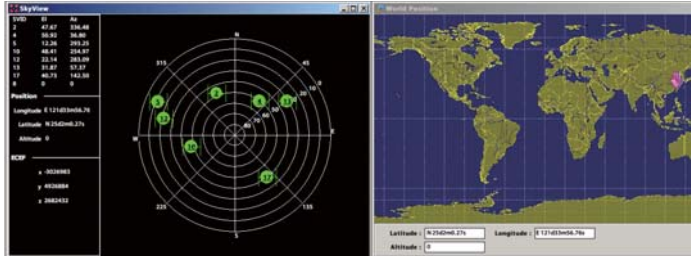
GPS + RF Player + FM RDS TMC = $4 \leq 4$

1 + 2 + 1 = 4 ≤ 4

GPS Option

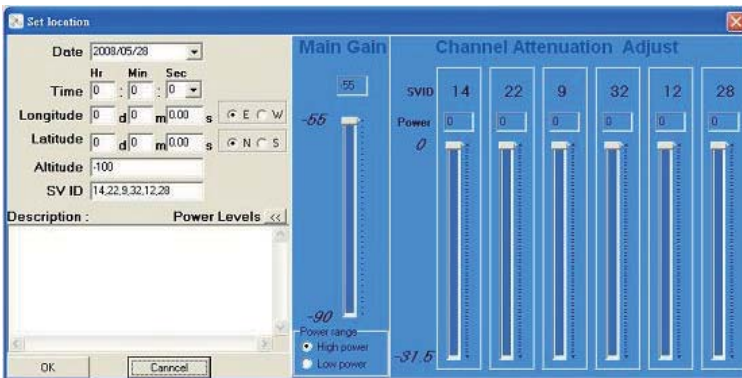
GPS Receiver testing

Modern GPS receivers are improving characteristics such as: lower power consumption, weak satellites tracking, acquisitions times, and accurate position



fixes. ADIVIC MP9000 GPS Option is design for various GPS receiver testing purpose. In multi-channel mode, user can test GPS receiver :position fix sensitivity, signal tracking sensitivity, TTFF(time to first fix) , position deviation, and position accuracy. In single channel mode, user can test sensitivity, S/N ratio, and production line ATE test. To provide the usage flexibility, the MP9000 GPS Option enables the users to switch between the single-channel and multi-channel modes.

User define GPS signal parameter



- Time
- Log / Lat
- Number of SV
- Each SV power level
- Main Power level

GPS Application Scenario



- RF Player
- 8 Channel GPS signal mode 24H profile
- 6 Channel GPS signal mode 1H profile
- 1 Channel GPS signal mode
- FM RDS TMC Generator

- GPS Signal L1 1575.42MHz
- FM RDS TMC 76MHz - 108MHz
- GPS Route

Antenna Transmission





GPS Product Test System performance specifications

Frequency Characteristics

- Frequency Range : 1575.42MHz
- Warm-up time (typical) : 30 minutes
- Frequency Accuracy : +/-100ppb maximum
- Temperature stability : +/-100ppb maximum
- Aging (Per year) : +/-100ppb maximum
(Per day) : +/-1 ppb maximum

Channels

- Number : 1CH, 6CH, 8CH
- Navigation data : GPS C/A @1.023MHz with 50bps
- Modulation : BPSK

Spectral purity

- Phase Noise@1KHz offset : <-80dBc/Hz
- Harmonic : <-70dBc

RF Output Characteristics

- High power normal output level : -55dBm ~ -90dBm
- Low power normal output level : -90dBm ~ -145dBm
- Channel Attenuation range (refer normal output level : -31.5dB ~ 0dB)
- Amplitude Resolution : 1dB step
- Amplitude Accuracy : <+/-1dB
- Output Impedance : 50 ohms
- Doppler Shift : ±30KHz (1CH option)

Voltage Standing Wave Ratio

- 1575.42MHz : <1.2

Overload protection on RF output

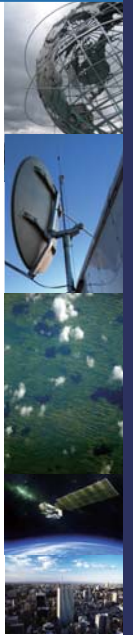
- Maximum reverse RF power : 1W maximum
- Maximum DC input : +/-50 VDC

Calibration

- Calibration : 1 year

Environmental

- Operating temperature 0 to 50 °C
- Relative Humidity : 10% to 90%
- Storage temperature : -20 to 70 °C
- Relative Humidity : 5% to 95%



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9000

RF Player Option



Overview

ADIVIC RF PLAYER is an exquisite RF- engineering tool for both field testing and performance testing. It has the capability of replacing many expensive instruments from one RF communication to another. It is by far the only instrument which crosses over RF communication standards from



the past, the present and the future. RF PLAYER is meant for all existing RF communications, for all modulation schemes, for analogue and digital. MP9000 plays the streams recorded from the ADIVIC's RF Recorders.



Supports Communication standards including

Worldwide radio communications

- FM/RDS/TMC
- IBOC - HD Radio
- Satellite Radio
- DAB
- AM
- DRM

Worldwide navigation systems

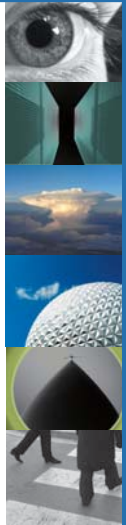
- CNSS
- GPS
- GLONASS
- GALILEO

Worldwide Mobile DigitalTV standards

- | | |
|------------------------|--------------|
| ● DVB-T/H | ● ISDB-T |
| ● DVB-NGH | ● MediaFLO |
| ● DVB-T2 | ● ATSC-MH |
| ● DVB-SH | ● OPEN CABLE |
| ● T-DMB | ● ATSC |
| ● DVB-C | ● DTMB |
| ● DVB-C2 | ● NTSC |
| ● CMMB | ● PAL |
| ● ISDB-T _{SB} | ● SECAM |
| ● ISDB-T _{mm} | |



RF Player Performance Specifications



- ▶ **Frequency Characteristics**
 - ▶ Frequency range300 K ~ 30 MHz (option)
 - 25 MHz ~ 1 GHz
 - 25 MHz ~ 1.8 GHz
 - 25 MHz ~ 2.7 GHz
 - ▶ Real-time bandwidth (Digital vector modulation bandwidth)25 MHz maximum
 - ▶ Frequency resolution.....1KHz step minimum
 - ▶ Warm-up time (typical)30 minutes
 - ▶ Temperature stability.....+/-20 ppb maximum
 - ▶ Aging
 - ▶ Per year.....+/-100 ppb maximum
 - ▶ Per day+/-1 ppb maximum
 - ▶ Initial achievable accuracy.....+/-50 ppb maximum
- ▶ **Spectral purity**
 - ▶ Phase Noise@1KHz, 1Ghz.....<-80 dBc/Hz
- ▶ **Spurious Responses**
 - ▶ Second harmonic.....< -40 dBc
 - ▶ Output third-order distortion (IMD)
 - ▶ (two -13 dBm tones, >200 kHz apart).....-70 dBc typical
 - ▶ LO leakage.....<-80dBm
- ▶ **RF Output Characteristics**
 - ▶ Output power range @ CW mode-10 dBm to -145 dBm minimum
 - option +5 ~ -145 dBm
 - ▶ Amplitude resolution.....0.1dB step minimum
 - ▶ Amplitude accuracy.....<+/-1dB -100dBm ~ -5dBm
 - <+/-2dB < -100dBm
 - ▶ Output Impedance.....50 ohms
- ▶ **Voltage Standing Wave Ratio (VSWR)**
 - ▶ 25 MHz to 2.7 GHz<1.7:1
- ▶ **Overload protection on RF output**
 - ▶ Maximum reverse RF power1 W maximum
 - ▶ Maximum DC input.....±50 VDC
- ▶ **Noise Floor@1GHz**
 - ▶ -10dBm output power.....<-120dBm/Hz
 - ▶ -20dBm output power.....<-130dBm/Hz
 - ▶ -30dBm output power.....<-140dBm/Hz
 - ▶ -40dBm output power.....<-150dBm/Hz
 - ▶ -50dBm output power.....<-160dBm/Hz
- ▶ **Flatness**
 - ▶ IF Band(20MHz) flatness.....1 dB Typical
 - ▶ Group delay.....30 ns Typical
- ▶ **IF Band**
 - ▶ Resolution.....14 bits
 - ▶ Sample.....100MS/s
- ▶ **Storage**
 - ▶ Storage.....SSD:600 GByte (recommend option)
 - HDD: 1 Tera Standard
- ▶ **Calibration**
 - ▶ Calibration1 year
- ▶ **Environmental**
 - ▶ Operating Environment
 - ▶ Operating temperature0 to +50°C
 - ▶ Relative humidity.....10 to 90%
 - ▶ Storage temperature-20 to 70 °C
 - ▶ Relative humidity.....5 to 95%
- ▶ **Power**
 - ▶ AC.....100V to 240V

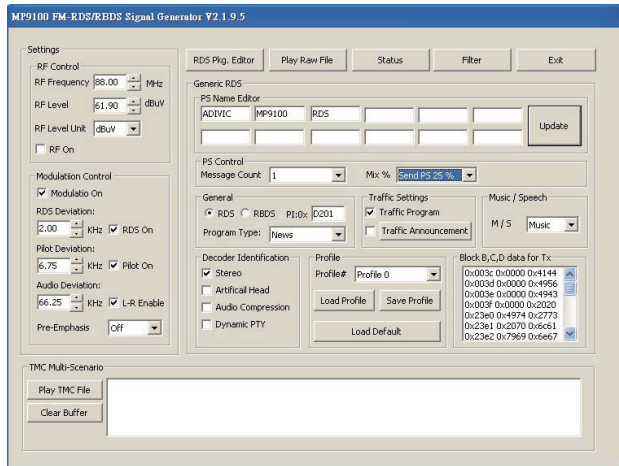
FM / RDS / TMC Option

Overview

FM RDS TMC is a standard RDS signal generator. It allows user define multi TMC events in profiles which can simulate the real broadcaster RDS TMC broadcasting. User can combine with Audio option to test FM receiver for Audio/RDS/TMC function in one single MP9000 box.

Feature

- (FM+Audio+RDS+TMC) x Test = In One Box
- Easy TMC setting GUI
- Multi TMC Event Profile Editor
- Internal TMC event table ready
- Allow user define table
- All Setting factor can be stored as presets
- Combine with RF player can simulate like real TMC event and GPS route test scenario



Specification

RF Frequency Characteristics

- Frequency Range : 76 ~ 108 MHz
- Frequency Resolution : 50 KHz step
- Warm-up time (typical) : 30 minutes
- Frequency Accuracy : +/-3.5 KHz maximum
- Temperature stability : +/-3.5 KHz maximum

FM Channel

- Bandwidth : +/- 100KHz

Spectral purity

- Phase Noise@10KHz offset : < -90dBc / Hz

RF Output Characteristics

- Output power range : -120dBm ~ -10dBm
- Amplitude Resolution : 0.1dB step
- Amplitude Accuracy : < +/-1 dB
- Output Impedance : 50 ohms
- Maximum reverse RF power : 1W maximum
- Maximum DC input : +/- 50 VDC

Voltage Standing Wave Ratio

- 47 ~ 862 MHz : < 1.2

FM

- Frequency Deviation:0~90KHz
- Resolution:10Hz
- Modulation Accuracy:+/-10%
- Pre-emphasis:50us, 75us or off
- Pilot Signal Frequency:19KHz
- Pilot Frequency Deviation:0~10KHz
- Pilot Signal Resolution:10Hz
- Pilot Modulation Accuracy: +/-10%

Specification

RDS (Radio Data System)

- Sub carrier Frequency : 57 KHz
- Frequency Deviation : 0 ~ 7.5 KHz
- Frequency Resolution : 10 Hz

Audio

- SNR@1KHz, 22.5KHz deviation : 46dB Typical
- Distortion@1KHz, 22.5KHz deviation : <1%

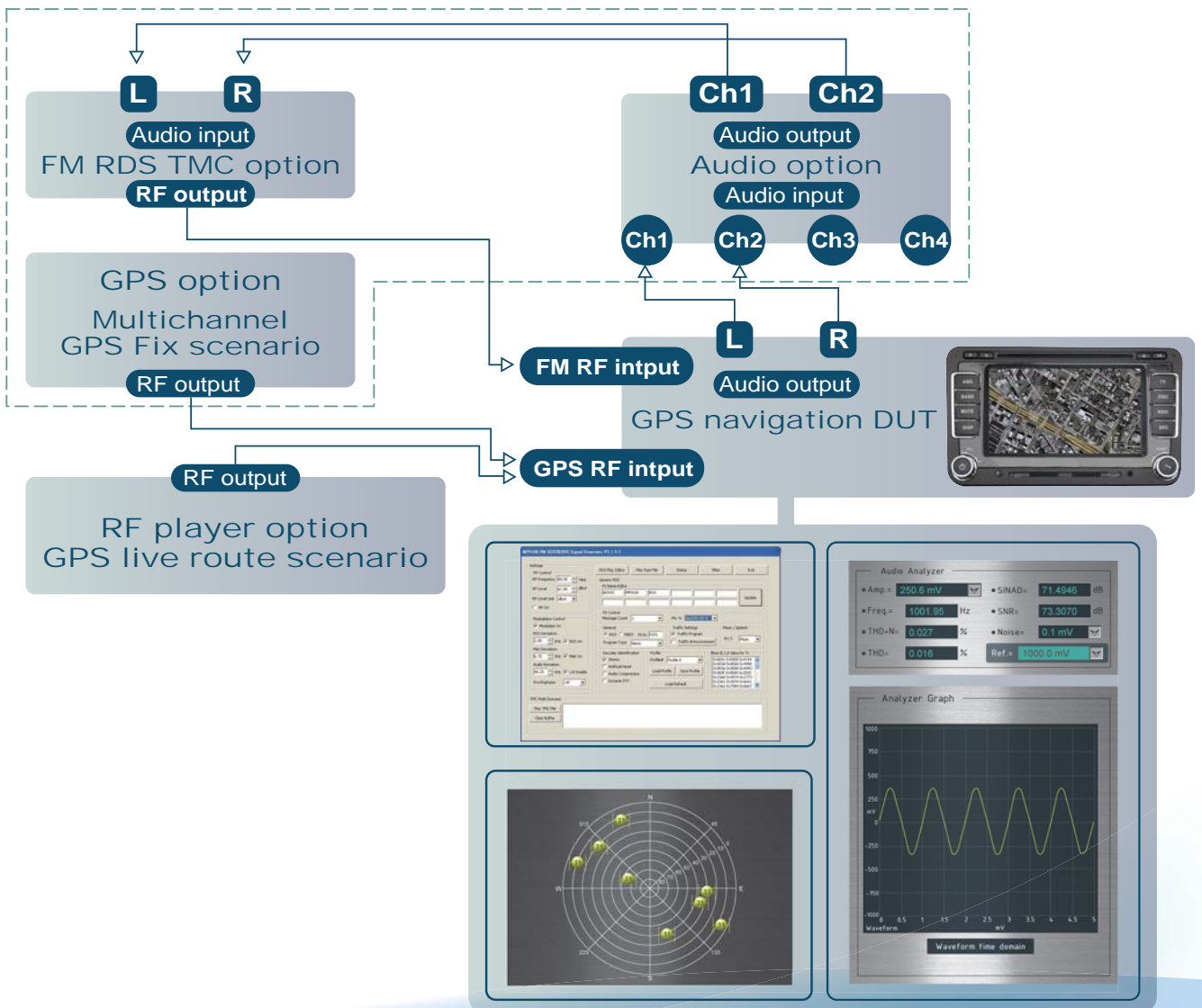
System

Calibration

- Calibration : 1 year

Environmental

- Operating temperature 0 to 50 °C
- Relative Humidity : 10% to 90%
- Storage temperature : -20 to 70°C
- Relative Humidity : 5% to 95%



DTV Option

Overview

The ADIVIC MP9000 DTV options are digital terrestrial and mobile multi-standard broadcast signal generators that support all common TV standards. ADIVIC MP9000 DTV options combine a high-quality RF modulator, an accurate attenuator, and baseband signal sources in one box. It covers all common Digital TV Broadcasting standards including DVB-T, DVB-H, ATSC, DTMB (DMB-TH, ADTB-T) and ISDB-T. Due to the modular design, MP9000 can be optimally adapted to the requirements of different applications. It is an ideal research and developing tool. The design is also a production line cost-effective solution.



Feature

- DTV generator with all important digital terrestrial standards in one option module
- +10 to -110dBm wide output level range for receiver, chip test and production line applications
- Frequency steps of 100 KHz
- Digital noise source with highly precise carrier/noise ratio for channel simulation
- Dynamic fading (channel) simulation for testing mobile and multipath reception
- User define TS play list function
- Real time live TS program and Table information
- Wear-free electronic attenuator
- User friendly GUI with touch screen



DTV Product Test System performance specifications



Frequency Characteristics

- Frequency Range: 47~862MHz
- Warm-up time (typical):30 minutes
- Frequency Accuracy: +/-1ppm maximum
- Temperature stability:+/-1ppm maximum

Channel

- Bandwidth:5~8MHz
- MER(OFDM):40dB Typical
- Modulation Standard: ATSC, DTMB, DVB-T/H/C, ISDB-T

Spectral purity

- Phase Noise@10KHz offset:<-90dBc/Hz
- Harmonic@0dBm:<-70dBc
- Nonharmonic@0dBm:<-50dBc

RF Output Characteristics

- Output power range:-110dBm~+10dBm
- Amplitude Resolution:0.1dB step
- Amplitude Accuracy:<+/-1dB
- Output Impedance:50 ohms

Voltage Standing Wave Ratio

- 47~862MHz:<1.5

Overload protection on RF output

- Maximum reverse RF power:1W maximum
- Maximum DC input:+/-50 VDC

Calibration

- Calibration:1 year

Environmental

- Operating temperature 0 to 50 °C
- Relative Humidity:10% to 90%
- Storage temperature:-20 to 70 °C
- Relative Humidity:5% to 95%



DTV Option



DTV Product Test System performance specifications

| | |
|-------------------|--|
| DVB-T/H | EN300744/EN302304 |
| Modulation | COFDM |
| Bandwidth | 5MHz,6MHz,7MHz,8MHz |
| Constellation | QPSK,16QAM,64QAM |
| FFT Mode | 2K,4K,8K |
| Code Rate | 1/2, 2/3, 3/4, 5/6, 7/8 |
| Guard Interval | 1/4, 1/8, 1/16, 1/32 |
| Interleaver | Native / in-depth |
| DTMB | GB20600-2006 |
| Modulation | TDS-OFDM |
| Constellation | 4-QAM-NR, 4-QAM, 16-QAM,32-QAM, 64-QAM |
| Bandwidth | 5MHz,6MHz,7MHz,8MHz |
| Frame Structure | PN420,PN595,PN945 |
| Carrie Mode | Single Carrier , Multi Carrier |
| Code Rate | 0.4, 0.6, 0.8 |
| Interleaver Mode | 240 ,720 |
| Pilots | On , Off |
| ATSC | ATSC Doc A/53 |
| Modulation | 8VSB,16VSB |
| Bandwidth | 6MHz |
| Symbol rate | 10.762Msps |
| Data rate | 19.392658Mbit/s |
| ISDB-T | ARIB STD-B31/B29/Brazilian Standard |
| Modulation | OFDM |
| Bandwidth | 5MHz,6MHz,7MHz,8MHz |
| Constellation | QPSK,DQPSK,16QAM,64QAM |
| FFT Mode | 2K,4K,8K |
| Number of Layers | 1 to 3 |
| Number of Segment | 1,3,13 |
| Code Rate | 1/2,2/3,3/4,5/6,7/8 |
| Guard interval | 1/4,1/8,1/16,1/32 |
| Time Interleaver | 0,1,2,4,8,16 |
| TMCC setting | On,Off, |

Audio Generator/Analyzer Option

ADIVIC

Overview

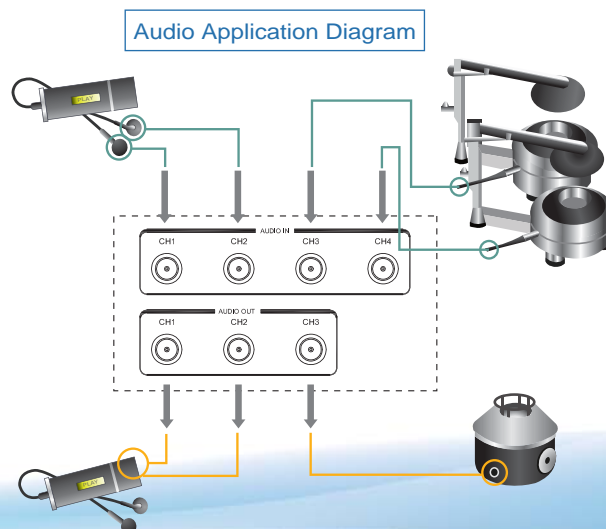
MP9000 Audio option is an Audio Analyzer which incorporates the measurement functions of distortion, relative Value, AC/DC level and frequency characteristics in a single instrument, and is also equipped with an audio signal source. This unit is designed for multifunction, high-performance and high speed measurements of various characteristics of stereo amplifiers, AM-FM receivers and other electronics appliances Audio analyzer option comprises a three channel generator and four channels Audio Frequency Analyzer offering multi-tone, stepped sweep and continuous sweep analysis. It ensures proper and reliable function in every industrial environment, including easy operating self-calibration.

Audio Generator function

| | |
|----------------------|--|
| CW tone mode | Single carrier wave to generate single tone |
| Sweep mode | 20Hz ~ 20 KHz to measure frequency response |
| High Resolution mode | Extend normal frequency start from 20Hz to 200Hz |
| Polarity | Support Speaker Polarity test |

Audio analyzer function

| | |
|------------|--|
| Amp(mVrms) | The level of the highest peak audio level |
| Freq(Hz). | The frequency of the highest audio tone |
| THD+N(%) | The level of all harmonic in audio range plus noise vs. the fundamental level |
| THD(%) | The level of all harmonic in audio range vs. the fundamental level |
| SINAD | Ratio in dB of the power between signal-plus-noise-plus-distortion to the received noise-plus-distortion |
| SNR(%) | Ratio in dB of the power between signal and the background noise |
| Ref(mVrms) | Amp & Noise display level(dBr) refer to the Ref level |



>> Wireless Communication Test System

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Audio Generator/Analyzer Option



Output (Audio Generator)

- Type: Single-ended
- Frequency range: 20 Hz ~ 20 kHz
- Frequency Accuracy: ± 1 Hz
- Frequency Resolution: 1 Hz
- Output level: 0 ~ +1 Vrms
- Output level Accuracy@1KHz/1Vrms: ± 1 mVrms
- Output level Resolution: 1 mVrms
- Impedance: 0.01 Ω @ 10 kHz
- THD+N: 0.01% Typical
- Channel Crosstalk@1KHz/1Vrms: -80dB Typical
- Channels: 3

Input (Audio Analyzer)

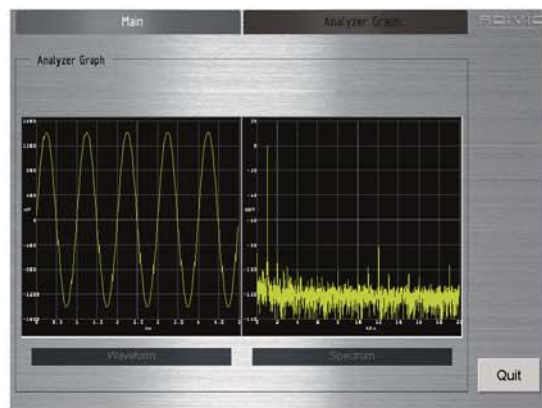
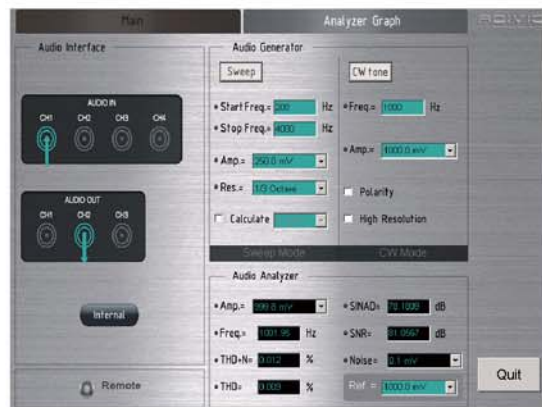
- Type: Differential
- Frequency range: 20 Hz ~ 20 kHz
- Frequency Accuracy: ± 1 Hz
- Frequency Resolution: 1 Hz
- Input level: 0 ~ +1 Vrms
- Input level Accuracy@1KHz /1Vrms: ± 1 mVrms
- Input level Resolution: 1mVrms
- Impedance: 100k Ω
- THD+N: $< 0.01\%$ Typical
- Channel Crosstalk@1KHz/1Vrms: -80dB Typical
- Channels: 4

Audio Generator function & unit

- CW mode
 Freq : Output Frequency(Hz)
 Amp : Output Audio Level(mV/dBV/dBu)
- Sweep mode
 Start Freq : Sweep Output Start Frequency(Hz)
 Stop Freq : Sweep Output Stop Frequency(Hz)
 Amp : Output Audio Level (mV/dBV/dBu)
 Res : Sweep resolution(1/3Octave/ 1/6Octave / 1/12Octave)
 Calculate: Display Audio THD+N Quality Analyzer
- High Resolution : Extend normal frequency start from 20Hz to 200Hz

Audio analyzer function & unit

- Amp: Input Audio Level(mV/dBV/dBu/dBr)
- Frequency: Input Audio Frequency(Hz)
- THD+N : Input Audio THD+N Analyzer (%)
- THD: Input Audio THD Analyzer (%)
- SINAD : Input Audio SINAD Analyzer (dB)
- SNR (dB): Input Audio SNR Analyzer(dB)
- Noise : Background noise level(mV/dBV/dBu/dBr)
- Ref : Set Reference level (mV/dBV/dBu)





RF Player Option List

· Frequency 25M to 1GHz

· RF Player

· Bandwidth 25MHz

90P-01

RF Player



· Frequency 25M to 1.8GHz

· RF Player

· Bandwidth 25MHz

90P-02

RF Player



· Frequency 25M to 2.7GHz

· RF Player

· Bandwidth 25MHz

90P-03

RF Player



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— RF TECHNOLOGY ARCHITECT —

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