

# Integrated Digital Audio Software R&S AllAudio

For digital recording, playback, mixing and distribution of audio signals

- ◆ Digital recording of audio signals and low IF signals
- ◆ Audio recording database
- ◆ Digitizing of analog audio signals with selectable quality
- ◆ Integration of digital audio signals from Rohde & Schwarz monitoring receivers/direction finders
- ◆ Distribution of audio signals via LAN or WAN
- ◆ Instant replay of audio signals
- ◆ Search and replay while recording
- ◆ Remote control of other R&S AllAudio software
- ◆ Integrated intercom system

## Introduction

Primarily designed to run on workstations of monitoring systems together with other application software, R&S AllAudio rounds out the range of monitoring system products from Rohde & Schwarz.

With the digitization and distribution of all audio signals within a monitoring system, audio cabling and integration of switches/multiplexers for audio distribution within a local system or to remote systems are a thing of the past.

On the workstation of a monitoring system, R&S AllAudio handles the acquisition of the analog and digital audio signals from connected receivers, direction finders, etc. and from the workstation's microphone.

These signals may be recorded to hard disk, switched to analog output channels (e.g. for analysis) and distributed to all workstations connected to the local area network (LAN) or to other workstations or LANs connected via wide area networks (WANs).

Distributed audio signals from connected workstations are selectable for live listening-in or offline playback.

To provide communication between workstations, an intercom subsystem is also integrated within R&S AllAudio, which makes use of the operator headset and/or speaker.

## Operation

R&S AllAudio is mainly controlled via the R&S AllAudio control panel. All available local or detached workstations with their audio sources are listed in a tree dialog at the left side, ordered by workstation names.

On the right side, individual source control panels are displayed for each selected audio source. The source control panels are used to control listening-in, recording, playback, mixing and switching of audio sources.

Volume and balance (left/right) of the output to either speakers or headset can be controlled as well. In replay mode, the time of day of the recording is displayed. Up to eight audio input channels can be selected simultaneously for direct access (e.g. listening-in, recording) by the user. In addition, up to four playback channels can be selected simultaneously.

The main toolbar contains the main volume control and the main mute function and allows direct access to the audio database and intercom control panel.

### Audio distribution and listening-in

Highly efficient distribution of digital audio signals within a LAN is achieved via UDP/IP multicast technology which

requires only a minimal amount of network bandwidth.

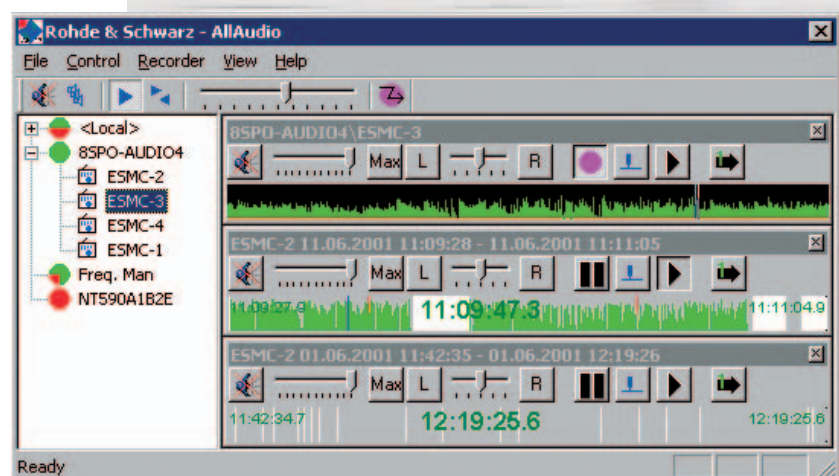
Connection of workstations via a WAN is implemented via R&S AllAudio gateways which convert the protocol UDP/IP to TCP/IP and, if necessary, compress the audio signals. Special bandwidth management is integrated in R&S AllAudio in order to use the available communication bandwidth of the WAN in an optimized way.

All connected sources feature an instant replay buffer of 60 s. An operator may replay parts of a signal of the last 60 s by simply clicking the desired play position in the replay buffer display within the source control panel even while recording is active.

Local audio sources or replayed audio sessions can be switched to analog output channels which may be connected to the input of an analysis device. This may be performed while the current radio signal content is recorded.

The basic module R&S AFBASIC includes two audio input channels. The R&S AF-D8 option adds eight digital audio input channels. The R&S AF-A8 option adds eight analog or digital audio input channels plus three output channels. Up to twenty six input channels and three output channels are supported by one basic module, i.e. operated from one workstation.

*R&S AllAudio control panel*



## Recording and playback

R&S AllAudio allows recording of local audio to hard disk with the R&S AF-REC option. The following control functions for recording are available:

- ◆ Recording controlled by audio level
- ◆ Recording controlled by external system (e.g. R&S ARGUS, R&S RAMON)
- ◆ Timer-controlled recording
- ◆ Recording controlled manually
- ◆ Recording controlled by the monitoring receiver itself (with R&S AF-COR option)

Each recording creates one session which can consist of one or more wave files. Sessions are split into several wave files for example if recordings are longer than a defined period. They are stored in an audio database with the corresponding management information. The wave files are stored in the .wav format which is the standard Windows format. Therefore these files can also be replayed, processed and analyzed with a variety of third-party software.

Bookmarks (voice or text) can be entered during recording or playback in order to mark an important signal sequence. Bookmarks can later be used as search criteria during post-evaluation. A comment for a complete session may also be entered. If the Monitoring Receivers R&S EB200 or R&S ESMB are used, the RF frequency, bandwidth and modulation mode are automatically stored as bookmarks (see figure above).

The upper window of the audio database window contains an overview of recorded sessions. The center window shows the bookmarks entered; the lower window displays the recordings of the selected session. The user selects files for playback by querying the database by date, time or workstation/source to retrieve a list of available signals.

ID	Start	Stop	Time	#R	#B	Source	Net designator	Description	Comment	Locked by
121	08.05.2001 14:27:46	14:27:55	00:00:02	1	2	EB200	net05	05		
120	08.05.2001 14:27:46	14:44:00	00:16:14	1	0	Freq, Man	net06	06		
119	08.05.2001 14:27:55	14:28:02	00:00:07	1	1	EB200		04	comment04	
118	08.05.2001 17:01:06	00:26:03	2	1	ESMC			03	comment03	
117	09.05.2001 12:38:28	12:41:31	00:03:02	1	2	EB200		02	comment02	
116	17.07.2001 11:17:45	11:35:55	00:18:09	4	2	EB200			mu0a233d	

Time	Comment
17.07.2001 11:17:45	..F 92400000 150000 FM
17.07.2001 11:17:54	...602682E73BE911D6917B00105A274A2F

Start	Stop	File	Comment
17.07.2001 11:17:45	17.07.2001 11:22:45	EA256BA97A8611D590A300105A274A2F0000.wav	comment rec01
17.07.2001 11:22:45	17.07.2001 11:27:45	EA256BA97A8611D590A300105A274A2F0001.wav	comment rec02
17.07.2001 11:27:45	17.07.2001 11:32:46	EA256BA97A8611D590A300105A274A2F0002.wav	comment rec03

Audio database dialog window

R&S AllAudio is also designed to run on unattended stations where the recordings are made automatically and evaluated at a control station equipped with an audio server running R&S AllAudio software for playback only (with R&S AF-RREC option).

## Backup and export

R&S AllAudio offers two different strategies for backup of the recorded audio signals:

- ◆ DAT streamer: The wave files are backed up to the streamer along with the database information. Optionally, the wave files on the hard disk can be deleted after the successful backup process. However, the management information (recording time etc) is still kept in the database to allow easy access to audio information stored on external streamer tapes.
- ◆ Export of audio sessions: Selected audio sessions (wave files including management information) may be exported to disk. These files can be saved to CD-ROM etc.

## Intercom

R&S AllAudio allows voice communication (with R&S AF-ICM option) between two or more operators within a LAN or WAN. The main features are:

- ◆ Output of calls to operator headset and additional speaker (if available)
- ◆ Single button/function key for accessing participants (point to point) or groups (LAN: multipoint to multipoint; WAN: point to multipoint)
- ◆ Call tone at the called workstation
- ◆ Automatic attenuation of online and playback audio signals during intercom operation

## Operation in a system

In a monitoring system, the workflow concerning audio operation may be as follows: Each of the monitoring workstations records audio signals which are stored as audio sessions (recordings) on the local hard disk. After a working period, e.g. one day, selected sessions can be exported to a central server. From one R&S AllAudio workstation, an operator imports the audio sessions from each workstation into a central audio database for post-evaluation.

R&S AllAudio may also synchronize the workstation time with a selected R&S AllAudio workstation via LAN. The time of the selected workstation is updated regularly by a GPS receiver via the R&S ARGUS or R&S RAMON software. Stations not connected to the LAN must be synchronized separately.

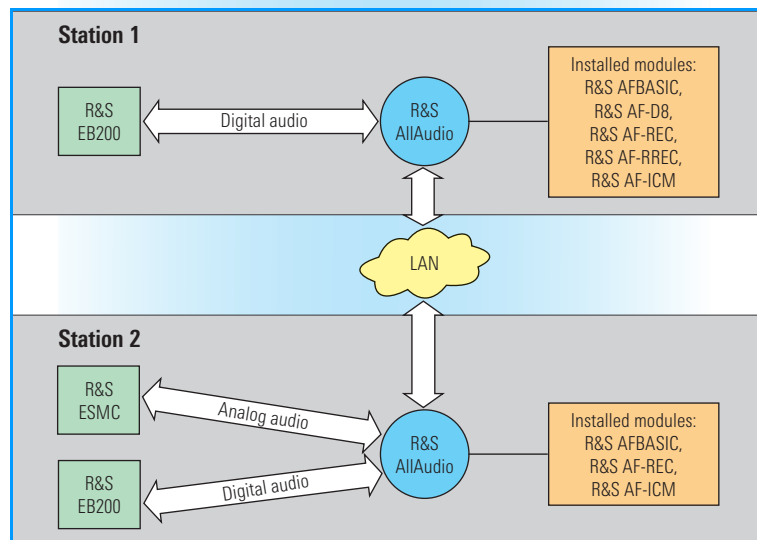
## Examples

The following three examples illustrate typical configurations of R&S AllAudio:

### Example 1: Audio distribution in network with local and remote recording and intercom

In station 1, R&S AllAudio is used for local and remote (station 2) audio recording and for voice communication with station 2 (intercom).

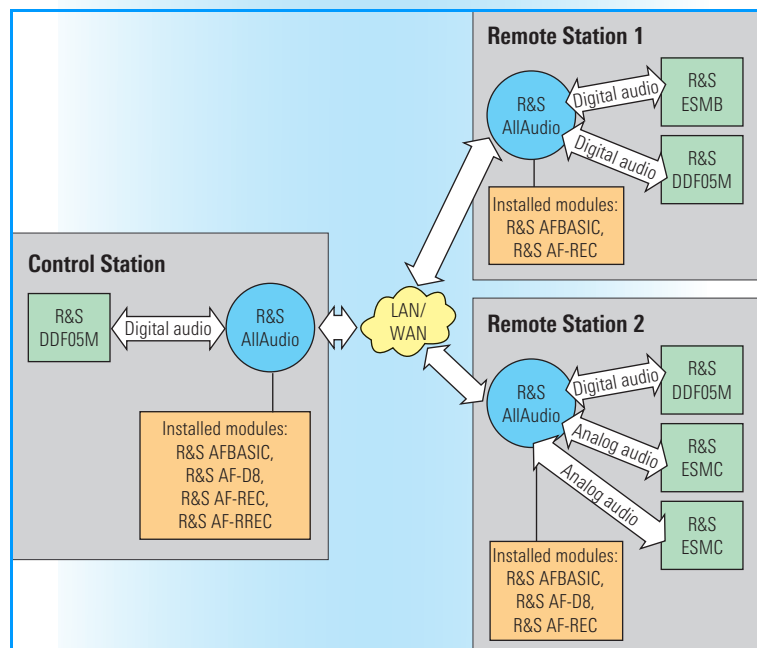
In station 2, R&S AllAudio is used for local audio recording and for voice communication with station 1 (intercom).



### Example 2: DF network with audio distribution plus local and remote recording

The control station listens in, records audio contents and manages the recording databases of the remote-controlled stations.

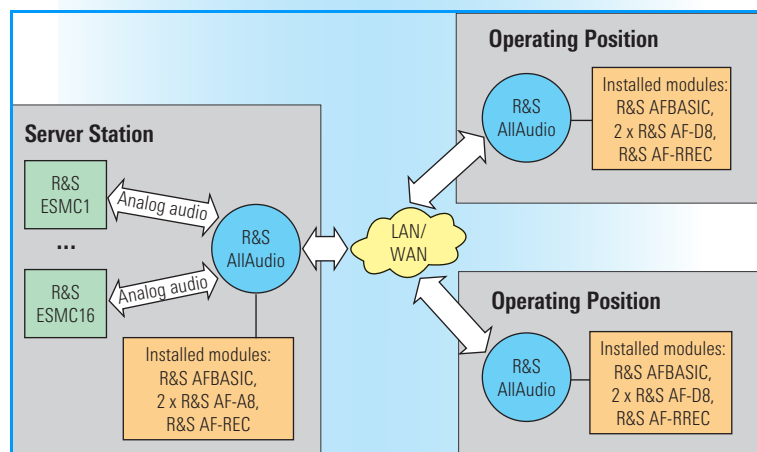
In the remote stations 1 and 2, R&S AllAudio is used for local audio recording.



### Example 3: Audio server (16 analog inputs) with 2 clients

The (unattended) R&S AllAudio server station is used to record and distribute the audio signals of 16 Monitoring Receivers R&S ESMC.

At both operating positions, R&S AllAudio is used to listen to any of the receivers of the server and to control recording and playback on the server.



## Specifications

### Basic Module of Integrated Digital Audio Software R&S AllAudio

Function	
R&S AFBASIC	basic module
General data	
Signal quality	telephone quality (8 kHz, 8 bit) or radio quality (22 kHz, 8 bit) or high audio quality or low IF quality (44 kHz, 16 bit)
Frequency range	20 Hz to 3.5 kHz (telephone quality) or 20 Hz to 10 kHz (radio quality) 20 Hz to 20 kHz (high audio quality)
Compression rates	2-fold (ADPCM), 4-fold (GSM), 8-fold (CELP)
Audio input channels	two audio input channels for: <ul style="list-style-type: none"> <li>– analog audio (via sound card)</li> <li>– digital audio from Rohde &amp; Schwarz devices (e.g. R&amp;S DDF0xM, R&amp;S DDF0xA, R&amp;S EB 200, R&amp;S ESMB)</li> <li>– digital audio from other R&amp;S AFBASIC modules (TCP/IP point-to-point connection via LAN/WAN) with selectable audio compression</li> <li>– digital audio from other R&amp;S AFBASIC (UDP/IP point-to-multipoint connection via LAN)</li> </ul>
Analog audio output channels	two analog output channels for listening-in to headset (left and/or right) or speakers (left and/or right); audio delay typ. 200 ms
Audio matrix and mixer	audio input channels can be mixed or switched to the two listening-in output channels or can be switched to other optional output channels
Audio distribution	output and distribution of configured audio channels to other R&S AFBASIC modules
Time for instant replay	60 s audio buffer
Interface	R&S ARGUS/RAMON system interface

#### Remarks

This module is needed for each R&S AllAudio workstation. Functionality can be extended by adding R&S AllAudio options. R&S AllAudio supports up to 32 users and 64 audio sources within one system.

For installation of R&S AllAudio, a multimedia PC with Windows NT 4.0, Windows 2000 or Windows XP, loudspeakers and a headset are required.

Only for Windows NT 4.0: R&S AllAudio occupies the sound card of the PC. Thus, due to sound card driver restrictions, no other applications may directly use the sound card.

### R&S AllAudio Digital Channel Extension

Function	
R&S AF-D8	eight additional digital audio input channels
General data	
Audio input channels	eight additional audio input channels for: <ul style="list-style-type: none"> <li>– digital audio from Rohde &amp; Schwarz devices (e.g. R&amp;S DDF0xM, R&amp;S EB 200, R&amp;S ESMB)</li> <li>– digital audio from other R&amp;S AFBASIC modules (TCP/IP point-to-point connection via LAN/WAN) with selectable audio compression</li> <li>– digital audio from other R&amp;S AFBASIC modules (UDP/IP point-to-multipoint connection via LAN)</li> </ul>

#### Remarks

Up to 26 input channels are supported by one R&S AFBASIC module.

Up to 8 input channels can be selected simultaneously for direct access by the user.

### R&S AllAudio Analog/Digital Channel Extension

Function	
R&S AF-A8	eight additional analog/digital audio input channels and three additional analog audio output channels
General data	
Audio input channels	eight additional audio input channels for: <ul style="list-style-type: none"> <li>– analog audio (on multichannel sound card)</li> <li>– digital audio from Rohde &amp; Schwarz devices (e.g. R&amp;S DDF0xM, R&amp;S EB 200, R&amp;S ESMB)</li> <li>– digital audio from other R&amp;S AFBASIC modules (TCP/IP point-to-point connection via LAN/WAN) with selectable audio compression</li> <li>– digital audio from other R&amp;S AFBASIC modules (UDP/IP point-to-multipoint connection via LAN)</li> </ul>
Audio output channels	three additional analog audio output channels (on multichannel sound card) for connection to decoders or analyzers etc
Sound card	multichannel sound card for PCI slot

#### Remarks

Up to 26 input channels and 5 output channels, including the analog output channels for listening-in, are supported by one R&S AFBASIC module.

Up to 8 input channels can be selected simultaneously for direct access by the user.

## R&S AllAudio Recording and Database

Function	
R&S AF-REC	recording and local audio database
General data	
Recording	functions: – digital recording of local audio on hard disk starting from the insert mark or from the play mark of the instant replay buffer – search and playback while recording – bookmarks and/or comment via microphone can be entered during recording or playback control: – recording controlled by audio level – recording controlled by external system (e.g. R&S ARGUS, R&S RAMON) – timer-controlled recording – recording controlled manually
Database	– integrated local audio database with backup and export functions – management of audio sessions which contain one or more recorded wave files; storage of time stamps, comments, time-related bookmarks, receiver and workstation name
Audio server	server for remote access by other R&S AllAudio workstations (see also option R&S AF-RREC)

### Remarks

For backup and restore functions a DAT streamer (e.g. Sony SDT 9000, capacity 12 Gbyte) is recommended. Alternatively, audio sessions may be exported to another hard disk (e.g. on a system server). The exported files may then be saved to other storage media, e.g. a CD-ROM. For recording 240 channel-hours, a 8 Gbyte hard disk is needed (8 kHz/8 bit).

A microphone or a headset is not included. The microphone occupies one audio input channel in R&S AllAudio. Both analog input channels on the sound card are occupied.

Up to 4 playback channels can be selected simultaneously for direct access by the user.

## R&S AllAudio COR Control

Function	
R&S AF-COR	COR-controlled recording via the COR output of a receiver (TTL level or 24 V optocoupler); an I/O board (for PCI slot) for up to 16 COR inputs is included

## R&S AllAudio Remote Recording and Database

Function	
R&S AF-RREC	– access to remote audio database – remote-controlled recording – local audio database

## R&S AllAudio Intercom

Function	
R&S AF-ICM	– voice communication between operators within a LAN or WAN: between two users (point to point) or within groups (LAN: multipoint to multipoint; WAN: point to multipoint) – automatic attenuation of other audio signals during voice communication

### Remarks

A microphone or headset is not included.

## Ordering information

Designation	Type	Order No.
<b>Basic versions</b>		
Basic Module of Integrated Digital Audio Software R&S AllAudio <i>Two audio input and two output channels (analog or digital), audio matrix and mixer, audio distribution, integration of digital audio from Rohde &amp; Schwarz devices</i>	R&S AFBASIC	R&S ARGUS Systems: 3022.7013.02 R&S RAMON Systems: 3022.6023.02
<b>Options</b>		
R&S AllAudio Digital Channel Extension <i>Eight additional digital input channels</i>	R&S AF-D8	R&S ARGUS Systems: 3022.7113.02 R&S RAMON Systems: 3022.6469.02
R&S AllAudio Analog/Digital Channel Extension <i>Eight additional analog or digital input channels and three additional analog output channels</i>	R&S AF-A8	R&S ARGUS Systems: 3022.7065.02 R&S RAMON Systems: 3022.6075.02
R&S AllAudio Recording and Database <i>Digital audio recording of local audio sources on hard disk, search and playback of recordings, integrated local audio database with backup and export functions</i>	R&S AF-REC	R&S ARGUS Systems: 3022.7165.02 R&S RAMON Systems: 3022.6117.02
R&S AllAudio COR Control <i>COR-controlled recording via the COR output of a receiver</i>	R&S AF-COR	R&S ARGUS Systems: 3022.7213.02 R&S RAMON Systems: 3022.6169.02
R&S AllAudio Remote Recording and Database <i>Remote control of the audio recording and the audio database and integrated local audio database</i>	R&S AF-RREC	R&S ARGUS Systems: 3022.7265.02 R&S RAMON Systems: 3022.6223.02
R&S AllAudio Intercom <i>Voice communication between operators within a LAN or WAN</i>	R&S AF-ICM	R&S ARGUS Systems: 3022.7313.02 R&S RAMON Systems: 3022.6317.02





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