

TI 313 (1.0 EN)

d&b Remote network - Integration

1. Introduction

The d&b Remote network offers various options to configure, control and monitor a d&b sound reinforcement system. This can be done by either using a PC running the d&b R1 Remote control software or by connecting the system to the venue's media or control infrastructure. Typical applications of control integration of the d&b Remote network are:

- Simple control of an installed d&b sound reinforcement system.
- Multi-purpose venues equipped with a media control system.
- Large installations with a central control system for multiple rooms equipped with sound reinforcement systems.
- Sound Systems for Emergency Purposes (IEC 60849)

This Technical Information paper explains the principles of how to integrate a d&b sound reinforcement system. However, for configuration details of the relevant devices, please refer to the respective hardware and software manuals.

2. Simple control system using R1

The d&b R1 Remote control software requires a PC and a d&b R60 USB to CAN or an R70 Ethernet to CAN interface. R1 is used to configure and control all parameters of any d&b amplifier connected to the network. However, the actual R1 user interface can be designed individually depending on the level of access desired.

An R1 project file may contain several workspace pages providing different levels of control for the respective operator. Each page may be password-protected, if required. The project file can be configured to automatically start in full screen mode after booting up the PC.

Please also refer to TI 391 Effective use of R1 Remote control software.

The following example shows an easy-to-operate control interface using a PC with a touch screen. You can preconfigure and store R1 System settings for different events or scenes using R1 System or Control settings files (see also section 3.2.2). A single press on the touch screen recalls the respective settings.



Fig. 1: Example of a simple system control terminal running d&b R1 software

3. Media control system

A media control system integrates the operation of all system components that form a complete setup of electrical and media devices of a venue. Audio, video and lighting settings for the actual event can be controlled using a single control unit.

3.1. System components

A media control system typically consists of a control unit and at least one user interface like a touch panel. The devices to be controlled are connected to the control unit using different interface standards such as RS 232 or Ethernet. The media control unit must contain all software modules required to drive the connected devices.

The d&b Remote network is connected to media control systems via Ethernet using the d&b R70 Ethernet to CAN interface.

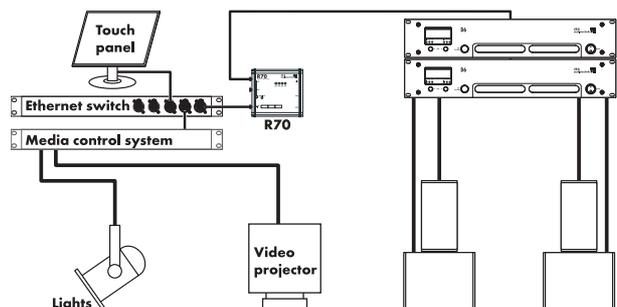


Fig. 2: d&b Remote network with media control system

The software required to support the d&b CAN-Bus protocol is available as a "Module" for Crestron and as a "Duet Module" for AMX. Media control modules are comparable to templates. They are designed to reduce the programming effort. Both are available on the respective manufacturer's website and at www.dbaudio.com. They come with a demo application to enable a quick start.

Note: It is not recommended to operate a Crestron or AMX control system and the d&b R1 Remote control software simultaneously. The CAN-Bus traffic created by R1 will affect the performance of the media control system.

3.2. Control functions

Both AMX and Crestron media control modules provide the following functions within the d&b Remote network:

- Power on/off
- Mute on/off
- Level control
- Recalling AmpPresets
- Indicating device errors

For more details on how to use the modules, refer to the help files included in the Crestron "Module" and the AMX "Duet Module".

3.2.1. AmpPresets

d&b amplifiers provide AmpPresets which contain all relevant user settings of the entire device such as input, output and channel configurations, EQ and delay settings. AmpPresets are particularly useful when a d&b system is remotely controlled by systems other than R1 as they allow to set detailed amplifier parameters using one single command.

There are three types of AmpPreset memories:

User: Nine AmpPresets which can be accessed locally or via the d&b Remote network. These AmpPresets are used to set the respective amplifier to a previously defined configuration for a particular application and can be named individually.

Alarm: Three AmpPresets which can only be accessed via the d&b Remote network. Intended for use in alarm systems to protect the system settings against local modifications.

Backup: Three AmpPresets which can only be accessed via the d&b Remote network. Intended for temporary use to back up the current system settings when another AmpPreset is loaded.

3.2.2. AmpPresets vs. R1 (System and Control settings)

An R1 System settings file contains all amplifier data objects which can be controlled by R1. It is therefore a complete snapshot of all amplifiers listed in the Device list and connected to the network.

An R1 Control settings file contains all controls of the selected Pages of the Workspace. R1 Control settings files are considerably smaller than a System settings file and therefore quicker to recall and upload to the system.

By using the AmpPresets, a sound reinforcement system can be operated in different configurations (e.g. "Conference", "Music" or "Emergency Call") without the need of transmitting all detailed settings to the related devices over the network because the settings are stored within the amplifier.

3.2.3. System setup using R1/R10

The configuration of the d&b amplifiers and the tuning of the sound system is preferably done in an R1 project. The defined settings are then stored in the amplifier as AmpPresets using the d&b R10 service software. Should the system tuning need to be changed later, use R1 again and modify the AmpPresets correspondingly using R10.

If you proceed in this way, the acoustical adjustments made to the system will not affect the programming of the control system (media control system or PLC).

4. Sound Systems for Emergency Purposes

Using the d&b Remote network allows you to integrate a d&b sound system into an installation as a voice alarm system according to IEC 60849 "Sound Systems for Emergency Purposes". This international standard ensures the availability of the sound system in case of an emergency. Its main criteria are:

- Speech intelligibility, also at high ambient noise levels.
- Permanent availability of the system including an uninterrupted power supply (UPS).
- Error monitoring and display for the entire signal chain.
- Interruption of any non-alarm program.

d&b systems provide the following functions specifically designed to fulfill the requirements of IEC 60849.

4.1. Load Monitoring

d&b Load Monitoring serves to identify a possible loudspeaker malfunction by monitoring the impedance of the loudspeaker components.

In a calibration process carried out with the completely set up system, each amplifier measures the impedance of both the LF and HF sections of each channel and calculates the related upper and lower impedance limits.

While the system is operating, d&b Load Monitoring continuously checks the loudspeaker impedances detecting any changes and reporting an error if the limits are exceeded. To do so, Load Monitoring uses inaudible Pilot Signals, which are faded in for approximately 2 seconds in user defined intervals.

4.2. Input Monitoring

The d&b Input Monitoring function allows the detection of an externally generated pilot signal to be inserted into the signal chain in front. The following modes are available.

Analog pilot

The respective analog input is monitored for an inaudible pilot signal which is externally generated and fed into the signal chain, for example into an input of the mixing console. On the amplifier, the signal frequency can be selected (e.g. 19 kHz) and cut by a notch filter, if required.

Digital pilot

The same functionality as above only for the digital AES/EBU signal inputs.

Digital lock

This mode checks whether the clock of the digital signal source is available and the digital AES/EBU input has locked onto it.

You can activate the Input Monitoring function for input A and/or B independent of the input routing of the amplifier channels. For instance, while both amplifier channels are fed from INPUT A, Input Monitoring can monitor INPUT B.

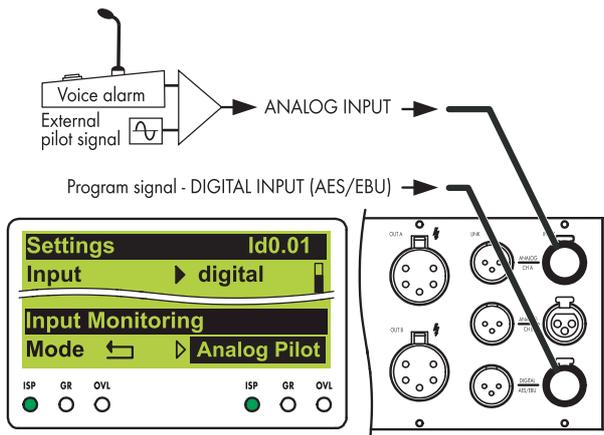
Please note that the Input Monitoring mode is not directly linked to the Input mode (analog or digital).

Depending on the selected input mode the following Input Monitoring modes are functional:

Input mode	Analog Pilot	Digital Pilot	Digital Lock
analog	Yes	No	No
digital	Yes	Yes	Yes

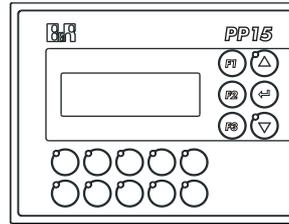
Example:

The amplifier's input mode is set to digital while the analog input connectors are monitored for incoming pilot signals (Analog Pilot). The program signal is fed to the digital input. In case of emergency calls, the amplifier is switched to its analog inputs thus interrupting the audio program.



4.3. PLC control and error display

In installations according to IEC 60849 a Programmable Logic Controller (PLC) is used to control the d&b Remote network.



d&b recommends and supports the PP15 model by B&R. It provides the following functions:

- Control of up to 255 d&b amplifiers via the d&b remote network.
- Error monitoring of connected amplifiers.
- Switching AmpPresets.
- I/Os to connect to a voice alarm control center.
- Monitoring of an external UPS for the amplifiers.

When the d&b Remote network is controlled by a PLC, the detailed system settings should be defined using the amplifier's AmpPresets. This reduces the PLC programming effort to a minimum while ensuring a consistent system status for voice alarm situations.

The d&b R1 Remote software and the PLC may be operated in parallel. In case of emergencies, the PLC takes precedence over the R1 software and is therefore configured as primary master while R1 is configured as secondary master.

The PP15 must be backed up by a UPS (uninterruptible power supply) to ensure the PP15 is ready for operation at all times.

With a further I/O of the PLC it is possible to monitor the UPS of the sound reinforcement system.

4.4. Example setup

The following graphic shows a typical setup of an installed IEC 60849 compliant sound reinforcement system. Its main features are:

- Optical Ethernet backbone.
- Audio over Ethernet signal distribution.
- d&b Remote network via R70 Ethernet to CAN Interface.
- Digital I/O of the PLC to interface to a voice alarm system.

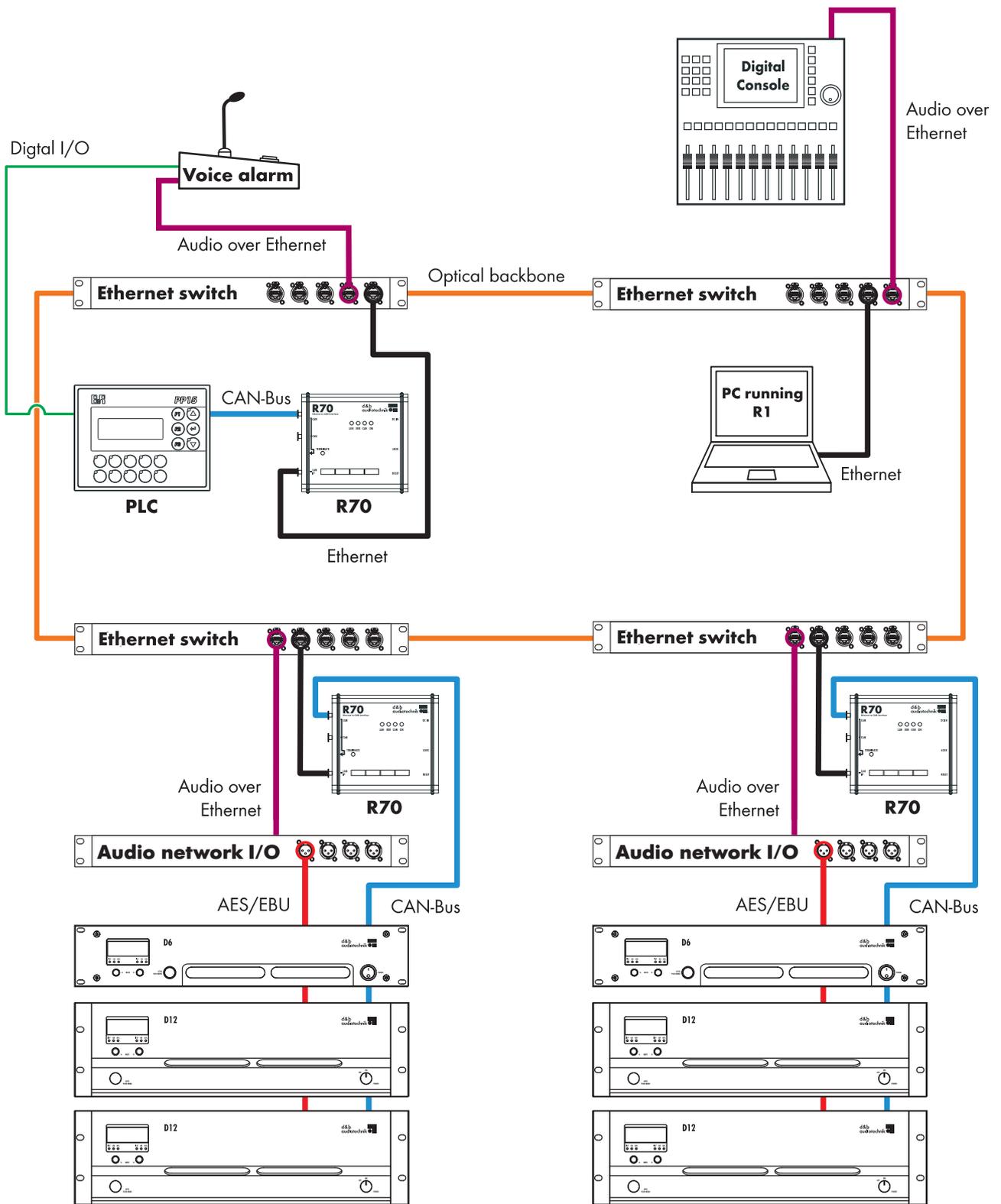


Fig. 3: Example of a networked system according to IEC 60849

5. References

- D6/D12 Hard- and Software manuals
- R60/R70 Manuals
- R1 Remote control software manual
- R10 Service software manual
- B&R PP15 d&b Firmware, Reference manual
- TI 312 d&b Remote network
- TI 391 Effective use of R1
- Crestron Help, AMX Help