DYNACORD®

PRO ANNOUNCE™
SYSTEM

1. INTRODUCTION

Preamble
Thank you for choosing the DYNACORD PROANNOUNCE System. With the PROANNOUNCE System you purchased a high-quality product which is going to satisfy your highest demands. This extraordinarily flexible and versatile system allows the configuration of either small or complex installations as well. Most functions are realized through software modules, which - when compared to conventional PA-systems – not only reduces the amount of cabling but also the costs. Next to extensive audio signal generating and distribution functions, the PROANNOUNCE system provides ample control functions. On one hand, these functions offer the possibility to register and rate external events, as well as to control different external components, on the other hand. Boolean operations and relations to the internal state of the system can be programmed as well.
To be able to take advantage of all possibilities that are offered by the PROANNOUNCE system, we would like to ask you to read this handbook carefully. For getting a quick overview about the PROANNOUNCE system's components and functions, we recommend consulting the chapter S*ystem Description*.
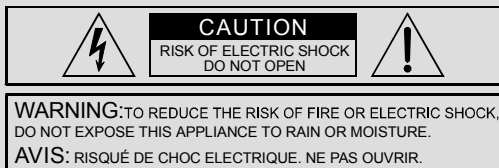
Owner's Manual
This handbook provides all the information that is necessary for planning and installing a PROANNOUNCE system. The handbook is structured in different chapters, each explaining a specific component or function. Thus, you can skip a section, if it is of no relevance for your particular application. The following table lists all chapters included in the handbook. It is meant as a guide for finding relevant information as quickly as possible.

1. Introduction	Notes on how to use the handbook
2. Operation Instructions	Precautions, operational conditions, environmental conditions, location, initial operation, maintenance and service
3. System Description	Overview of all components (appliances), audio and control functions of the PROANNOUNCE system
4. Installation	Notes on how to install the PROANNOUNCE DESIGNER configuration software
5. Single Device Descriptions	Detailed descriptions of all PROANNOUNCE components: central unit with modules, paging stations, power amplifiers, monitoring system
6. Appendix	Notes on how to configure the hardware, wiring, and initial operation

2. Operation Instructions

2.1 Safety Instructions

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IMPORTANT SAFETY INSTRUCTIONS

⚡ **CAUTION**
RISK OF ELECTRIC SHOCK
DO NOT OPEN ⚠

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.
AVIS: RISQUÉ DE CHOC ELECTRIQUE. NE PAS OUVRIR.

⚡ The symbol of a flash within an equilateral triangle is to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

⚠ The symbol of an exclamation mark within an equilateral triangle is to alert the user's attention to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance

1. Please carefully read all instructions.
2. Keep the instructions at a safe place, so that they are at hand for further reference.
3. Observe all warnings and precautions, whether attached to the appliance or within the owner's manual.
4. Do not expose or operate the appliance next to water or in environments with high humidity.
5. Do not cover any ventilation louvers. Mind manufacturer's instructions when installing the appliance.
6. For maintenance and servicing, please refer to qualified service personnel only.

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⚠ **CAUTION !**

1. To prevent the risk of fire and shock hazard, do not expose any appliance or module high humidity or water.

2. Make sure that no alien objects enter the appliances or get in contact with the modules – especially no metal parts – since this would very likely cause dangerous electric shock and/or malfunctioning. There are no user-serviceable parts located inside the appliances or on the modules. Opening appliance enclosures and/or rack shelf systems can lead to dangerous shock hazard. Do not open or try to reach inside the enclosures of appliances. Leave installation, servicing, maintenance, and any other works on the appliances or the rack shelf system to qualified service personnel only.

3. When exposing appliances/modules to extreme temperature changes, i. e. when moving them from the outside into a warm room, condensation may occur. If so, it is necessary to wait before use until the devices gained room temperature.

4. Under no circumstance place any liquid-containing cans, glasses, mugs, etc. on top of an enclosure. In case any liquids or foreign obstacles entered the enclosure of an appliance, immediately unplug the device from the mains supply and have it serviced.

5. Make sure that appliances/modules are always provided with sufficient ventilation. Do not expose devices to direct sunlight or any other heat-radiating source.

6. Do not expose appliances/modules to extreme dust or humidity. Operating the system under environmental conditions like these can lead to severe damage through fire or cause bodily harm to the operator.

7. Make sure that the stated mains voltage is in accordance to the specifications of your mains supplier. Mismatching will cause severe damage to all appliances/modules.

8. Make sure that mains cords and/or any other cabling are not damaged or being jammed by the turning frame or any other movable parts of the rack shelf. Damaged cables can lead to fire hazard and/or can be the cause for electric shock.

9. The mains cord of the rack shelf installation is supplied with a 3-pole plug to minimize the risk of electric shock. It should only be connected to a grounded wall outlet. Under no circumstances insulate the ground contact. When using an extension cord, always use a 3-pole grounded cable. When using multi-outlets for distributing, make sure that the wall outlet's capacity is not exceeded, since this could lead to fire hazard and/or can be the cause for electric shock.

10. The DPM 4000 contains a lithium-type battery to provide the internal clock with power. The lifetime of this battery-type spans approximately 10 years. When the battery's voltage drops below a certain minimum, an according message appears on the paging station display. In this case, the battery has to be exchanged by an EVI Audio GmbH authorized service technician. Under no circumstances try to exchange the battery yourself!

CAUTION!	There is a severe risk of explosion when incorrectly exchanging the battery. Only replace with the same type of battery or one especially recommended by the manufacturer. For environmental awareness: Take care of used batteries following the manufacturer's advice.

11. Obeying the VDE-regulation DIN VDE 0800 is necessary when installing and operating 100V-loudspeaker systems. Especially with 100V-loudspeaker systems that are part of an emergency alert installation, protection measures have to be in accordance with safety class 3 regulations.

CAUTION!	During operation, speaker group connectors (POWER OUTPUT) may carry shock hazard output voltages (>34V peak value). Thus, the installation of the connected loudspeaker groups has to in accordance to security standards and regulations as stated above.

12. Make sure to establish all connections before operating the system. Connecting/disconnecting cables during operation can cause malfunctioning or damage to the correspondent appliances.

2.2   Operation Instructions

2.2.1   Central Unit DPM 4000

According to its specified capabilities and specifications, the DPM 4000 central unit can be used to control and monitor PA- and paging systems in buildings, but also to operate professional audio systems.
The DPM 4000 central unit is not an independent device. For its operation, at least the following is necessary:

1. A power supply unit (24 V / 4 A) (24 V / 12 A), preferably of the DPP 4000 – Series, depending on the power consumption of the entire system.

2. When the installation includes paging stations:
    -   the desired amount of paging stations of the DPC 4000 – Series (max. 16)
    -   all required cables.

3. When the unit's audio section is utilized:
    -   power amplifiers, preferably of the DPA 4000 – Series, including cabling
    -   loudspeaker systems including cabling

4. When the integrated real-time clock is going to be synchronized to the DCF77–timesync-signal:
    -   an active DCF77–antenna for reception (NRS 90193) including cables
        This feature is only available in areas where DCF77-reception is strong enough.

5. When slave clocks need to be synchronized:
    -   the required amount of slave clocks (max. 40) including cabling

Additionally, a PC providing the following features is needed for configuration purposes and operation:

- PC computer system with Pentium processor (min. 90 MHz) and Windows 95/98/NT
- 16 MB of RAM
- 1 hard disk offering free space of at least 5 MB
- 1 x 3.5" floppy drive, 1.44 MB
- 1 mouse
- 1 monitor (with a resolution of at least 800 x 600 pixels) with VGA-graphics board, 256 colors
- 1 serial port RS-232 with serial cable
- PROANNOUNCE Designer configuration software
- 1 CD ROM drive

All necessary cables, plugs, connectors or adapters for establishing connections are available through EVI Audio GmbH. Our entire accessory assortment with order-numbers is included in the corresponding owner's manuals as well as in the PA-systems price lists.

2.2.2   DPA 4000 Power Amplifier

Especially designed for it, the DPA 4000 Series power amplifiers optimally match the PROANNOUNCE system. Thus guaranteeing trouble-free installation and operation.
The power amplifiers are "stand alone" devices, offering the opportunity for them to be operated together with several other pieces of equipment, as long as all valid specifications and applicable instructions for the installation are being observed.

2.2.3   DPC 4000 Paging Stations

Especially designed for it, the DPC 4000 Series paging stations optimally match the PROANNOUNCE system. Thus guaranteeing trouble-free installation and operation.
The paging stations cannot be used as "stand alone" devices. At least a DPM 4000, a 24 V power supply plus all necessary cabling is needed to build-up a minimal installation.
Configuration and operation is accomplished through the DPM 4000 central unit.

2.2.4   DCS 400 Control System

The DCS 400 control system – consisting of a DCS 401 control module, a DCS 408 relay module 100V, a DCS 409 control-relay module, DCS 412 logic input module and DCS 416 analog I/O module – cannot be used as a "stand alone" system. At least a DPM 4000, a 24 V power supply plus all necessary cabling is needed to build-up a minimal installation.
According to their technical specifications, it is possible to incorporate the modules of the DCS 400 system as follows:

- DCS 401:   control module for all other DCS 400 modules
                            query of 2 rotary encoders

- DCS 408:   5 floating switches for 100 V loudspeaker lines

- DCS 409:   5 floating switches for control signals (DC voltages, 24 V)
                            or for audio signals at line level

- DCS 412:   query and monitoring of 12 floating control voltages
                            (logic signals up to ±31 V)

- DCS 416:   8 analog inputs for the query of control voltages (0 – 10 V)
                            8 analog outputs to output control voltages (0 – 10 V)

- DCS 420:   Monitor Manager with loudspeaker, headphones socket,
                            7-segment display, and metering instrument

Configuration and operation is accomplished through the DPM 4000 central unit.

2.2.5   DPP 4000 Power Supply Units

Especially designed for it, the DPP 4000 Series power supply units optimally match the PROANNOUNCE system, guaranteeing trouble-free installation and operation.
The power supplies are "stand alone" units, which offers the possibility to utilize them to feed other equipment with 24 V supply voltage, as long as all valid specifications and applicable instructions for the installation are being observed.

2.3   Operation Location

The appliances are exclusively meant for the installation in 19" rack shelf systems while the modules can also be installed in an appropriate wall junction box. When installing the system, the safety regulations that are mentioned in chapter 2.1 have to be observed.
It is particularly important that the following environmental conditions are provided:
- ambient temperature at the installation site – which also includes inside the rack shelf system – is not to exceed 40° C. If necessary, the rack shelf system has to be supplied with forced ventilation or air conditioning.
  Heat sources like power amplifiers, etc. – especially when they are mounted underneath the appliance – can increase the ambient temperature to an exceeding degree, although the average temperature within the rack shelf system may stay below 40° C.
- The installation site should not suffer from increased dust and moisture.
- The radiation of direct sunlight or other heat sources should be avoided.
- During operation, rear connectors have to be covered, since they partly conduct voltages that could endanger your life.
- Ventilation louvres are not to be covered by any other installed gear. Therefore, it is reasonable to install a 1 HU ventilation blind above the correspondent appliance.
- The installation site should not be subject to vibration.

2.4   Excluded From Warranty

Damages, malfunction, or obstruction of certain performance features resulting from the following causes are excluded from the warranty.
- improper or erroneous maintenance by the customer
- changes or alterations without written consent
- operation outside of the environmental conditions specified for this product
- operation outside of electrical specifications
- improper installation
- damage during transportation because of improper packaging by the customer
Repair, replacing used batteries, altering, and retrofitting extensions is only admissible if EVI Audio GmbH or one of its authorized service centers or maintenance technicians carry out these tasks.

3. System Description

This chapter provides an overview of the general configuration of the PROANNOUNCE system and its most important functions. The following block diagram shows a typical PROANNOUNCE system installation including the DPM 4000 central unit, paging stations, audio equipment, amplifiers, power supply unit, relay board assemblies, loudspeaker lines, and control board assemblies for external signals.
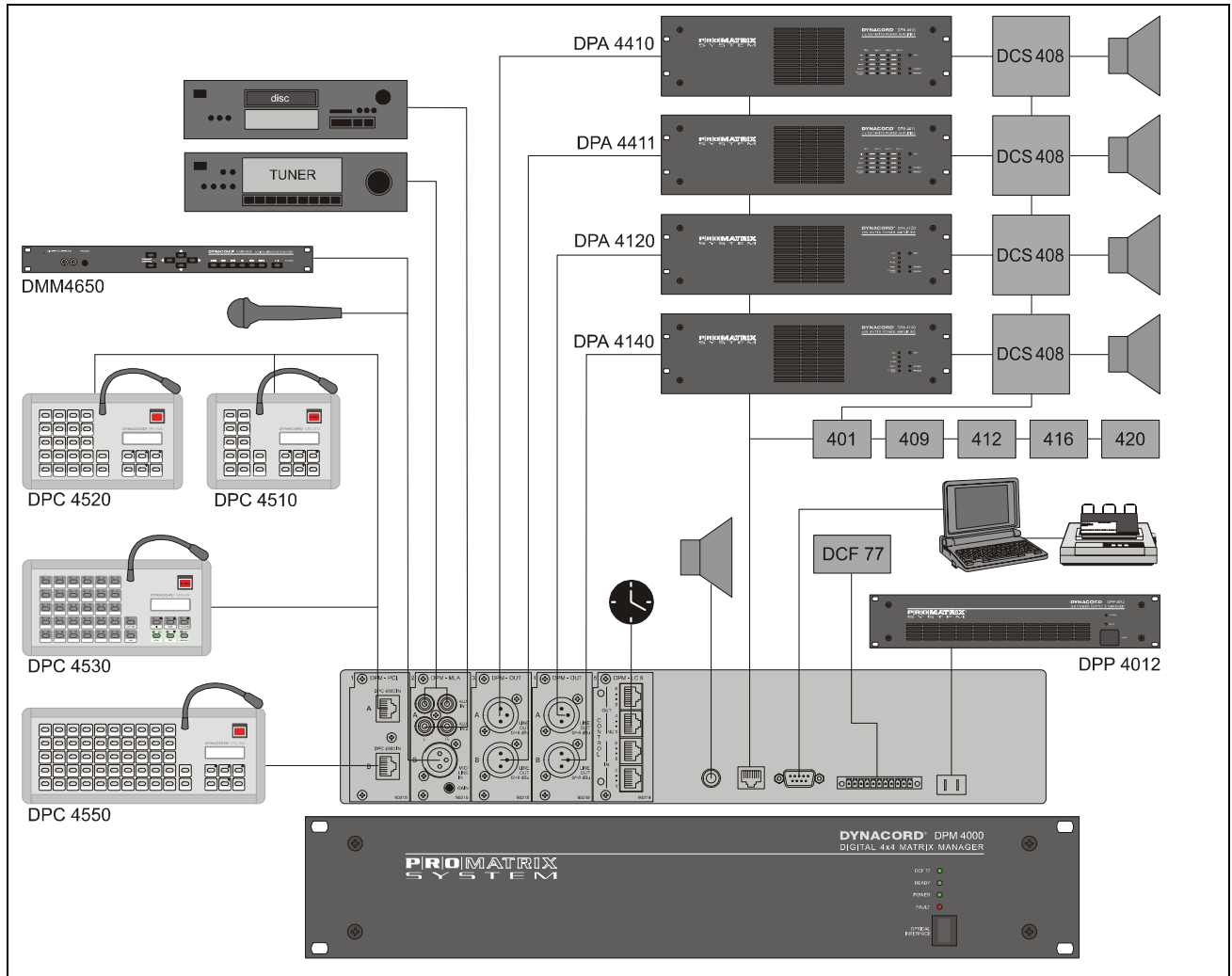

figure 3.1 PROANNOUNCE System

3.1 General Overview

The digital PROANNOUNCE manager DPM 4000 represents the central unit of the system. It is used to control and monitor all connected components via several serial interfaces. The chapter *Single Device Descriptions* contains all necessary information about the DPM 4000 and its available modules.

The kind and amount of connected audio sound sources, amplifiers, and relay board assemblies are extremely variable. This allows configuring the system to basically match any requirement. The system is capable of managing up to 16 paging stations and up to 100 output lines. More than 150 control inputs and outputs are available for controlling and monitoring purposes providing the possibility to generate and manage logic levels and analog levels as well. For detailed information, please refer to the chapter *DCS 400 Control System*.

Configuration and documentation of a PROANNOUNCE system installation is established through the use of the PROANNOUNCE Designer software – a comfortable graphical user interface that runs on a PC under Windows 95/98/NT. This allows changing the system's setup at any time to meet new requirements, without the need to alter the actual installation. The PC has to be connected to the system only when loading or changing its configuration. During

normal operation, PC-interaction is not necessary. Anyway, in most cases the permanent connection of a computer bears benefits, like displaying detailed status reports or the printing of protocols. It also offers the possibility for remote diagnosis and remote maintenance via modem.

3.2 Audio Routing

The DPM 4000 employs a digital audio matrix providing 4 inputs and 4 outputs. Additional matrix junctions for the integrated gong and alarm signal generators, the vocal recording/playback unit, and the lock-on of the pilot tone and its evaluation are incorporated. All input signals and internally generated signals can be freely mixed inside the matrix and outputted through the 4 amplifier channels. Routing speaker lines to these amplifier channels is achieved via the relay-matrix, which offers up to four separate audio buses simultaneously, while the DPM 4000 takes over the management of all these signals according to their priority.

Next to connecting paging stations, the audio inputs also serve for the connection of other audio sound sources, like microphones, mixers, CD-players, cassette decks and DAT-recorders, tuners, etc. Several different input modules are available to optimally adjust and match signal levels and connections.

3.3 Volume And Tone Controls / Delays

The PROANNOUNCE system provides individual volume controls for each input, output, and paging station. Even the internal audio sources, like gong/alarm tone generators, voice message playback, and pilot tone generator employ individual level controls, each. Additionally, it is possible to set an attenuation that unanimously affects the inputs. This value determines the degree, by which the input signal is attenuated during the reproduction of messages or other signals with a higher priority setting. This allows to smoothly fade-out and fade-in background music during the transmission of important messages.

Besides, each of the four inputs embodies three fully parametric digital filters allowing for optimal tone control. The filters provide different filter types like Hi-/Lo pass filters, shelving filters, and peak-dip-filters providing the possibility for adjusting the sound within the entire audio transmission range. Factory-preset filter settings for the DPC 4000 Series paging stations are already provided.

Setting volume levels and filter parameters is accomplished via PC during the configuration procedure. Further, it is possible to alter any volume setting during the later operation of the system via special-function keys on the paging stations or through external controls that are connected to analog or digital control inputs.

All four outputs employ digital delays allowing signal delays of up to 330 ms per channel. Natural delays, resulting from loudspeaker positioning which causes time differences in the traveling of sonic events or environmental circumstances related to architectural characteristics of the location, can be equalized without additional effort.

3.4 Signal Generators / Voice Message Memory

The DPM 4000 provides a variety of tone generators for the generation of gong, alarm, and text signals. Signal generation is realized through DSP-algorithms, which are extremely flexible in use, so that they can be adjusted to match nearly any possible application. Factory presets include 6 different gong signals, 18 different alarm signals, plus sine cycle at any frequency. Other than in comparable equipment, the PROANNOUNCE signal generating DSP-algorithms do not take up any extra storage of the voice message memory.

In addition, a voice message recording/playback module providing CD-quality sound is optionally available. With a total recording time of approximately 6 minutes, 25 different messages are being managed. The DPM 4000 provides the possibility to install up to four optional FLASH-memory modules, depending on individual desires or requirements.

3.5   Paging Stations

The DPC 4000 Series paging consoles are mainly meant for transmitting voice messages and calls but also to manually control the PROANNOUNCE system. Available paging station functions are: line/group selection, voice messages, program assignment, launching gong and alarm signals, and reproduction of voice message memory announcements. Additionally, special commands include volume control, monitor selection, preset switching, lighting control, function status indication, etc. Thus, it is possible to configure the paging consoles to serve as operation panels for general control purposes.

If a voice call is being launched into a speaker line that is already busy with other audio transmissions, the caller gets a busy-sign, i. e. the BUSY-LED blinks. In case the calling terminal has a higher priority it will interrupt any messages from other paging stations or audio signals with lower priority levels. Interruption does not take place uncontrolled anymore. Before actually interrupting a transmission, the blinking LED indicates that a line or group is busy when selecting a destination, leaving the choice to the operator, whether he/she immediately wants to interrupt or wait upon the conclusion of the momentary reproduced program.

3.6   Control Inputs And Outputs

By using the control inputs, it is possible to link the PROANNOUNCE system to fire alert systems, burglary alert systems, or to a central operating desk. It is also possible to connect external switches, breakers, rotary controls or rotary encoders, respectively to query control outputs of external units (power supplies, power amplifiers, …).

The control outputs allow switching external devices ON or OFF, trigger signals and events, switch monitor sources, remote control doors, gates or shutters, generate analog signals for the control of multimedia systems, etc.

A total of 130 control inputs for logic levels, 128 control inputs for analog levels, 16 inputs for rotary encoders, 127 logic-control outputs, and 128 analog-control outputs are usable.

3.7   Clock / Calendar

The PROANNOUNCE manager DPM 4000 has an integrated quartz-controlled real-time clock which can be set for radio-controlled DCF 77 operation using the optional antenna (DCF 77 tuner NRS 90193). The system clock automatically recognizes leap years and, if in DCF 77 mode, automatically switches between daylight saving time and standard time.

The system clock provides the possibility to control up to 40 external slave clocks. For this purpose, the DPM 4000 employs a special, short-circuit-proof output for pole changing impulses. Slave clocks are automatically re-synchronized whenever a time difference to the system clock is detected; like for instance in cases of power outage or when time values were entered manually.

It is possible to activate pre-set functions like break-gong signals, background music, remotely controlled gates, switch lights ON/OFF, etc. when using system clock and calendar function together All the functions mentioned before can be programmed for specific days; but also hourly, daily, weekly, monthly, and yearly activation is possible. Up to 500 time-controlled events can be programmed.

3.8   Monitoring

The PROANNOUNCE manager DPM 4000 embodies a monitor amplifier with headphones/speaker output. The integrated logic-switching circuit provides the opportunity to listen to the signals of any internal input and output. Assigning external sound sources to the monitor bus is possible as well. This additionally allows monitoring amplifier outputs or pre-listen to the contents of external voice message memories and other audio devices.

The remote control's wiring already includes all the cabling necessary for the pre-/post-listen feature when using remote-controlled amplifiers.

When using the DCS 420 PROANNOUNCE MONITOR MANAGER, easy programming and operating is available. See also chapter 5.4.7

3.9   Macros

Macro is defined as the combination of several commands, functions, and their parameters in an internal consecutive sequence. For example a gong signal with specific volume and priority settings has to be transmitted in different calling zones, while simultaneously activating a control output. In that case the macro consists of the functions "gong" and "control" with the parameters gong-type, volume setting, priority number, calling zone numbers, and the type and id-number of the control output.

It is possible to initiate a macro via the special function keys on the paging consoles or to trigger it via control input. It is also possible to combine a macro with the internal clock or calendar.

The PROANNOUNCE system provides a number of pre-programmed macros, where only individual parameters still have to be entered. Additionally, it is possible to combine several macros in a sequence. Using pre-defined macros and sequences lets you create new, user-specified and application-related macros, which basically are capable of managing any control function imaginable. A total of up to 250 user-macros can be programmed.

3.10   Interfaces

Besides its control inputs and control outputs, the PROANNOUNCE system provides additional interface ports. The connection of paging consoles to the PROANNOUNCE manager DPM 4000 is performed via serial RS-485 ports. This allows connecting up to four terminals at a single port. Power amplifiers and the DCS 400 controller are connected to another independent RS-485 port, which allows direct management of up to 64 power amplifiers and 8 DCS 401.

Connecting a PC is established via serial RS-232 port on the rear panel of the DPM 4000. It is not necessary for the PC to be permanently connected to the DPM 4000.

An additional RS 485-interface offers the possibility to operate several DPM 4000 in a network.

3.11   Safety Standards

The PROANNOUNCE system complies with all applicable requirements of the IEC 849 standard – electro acoustics emergency alert PA-systems. The digital PROANNOUNCE manager DPM 4000 guards and monitors its entire internal functions. All connected paging stations and power amplifiers, including the wiring, are monitored via polling and pilot tone functions. Using the remote control units in the power amplifiers, it is also possible to monitor the loudspeaker lines. Of course, the PROANNOUNCE system is also prepared for operation with emergency power supply. In case of a power outage, the DPM 4000 takes over the entire power management; i. e. all internal and external power consuming components are switched to stand-by mode. Only when necessary, they are turned on again. This minimizes the total power consumption efficiently and guarantees maximum operational reliability when the system is operated from a battery power source.

Fault messages are being displayed in plain text on the paging console displays and a floating contact is provided for collective fault messages. An automatic protocol facility of the system's individual state of operation is optionally possible. This protocol is stored in the DPM 4000's internal memory. If necessary, it can be displayed on the screen of a connected computer or printed out via a printer.

4. Installation

The PROANNOUNCE Designer software has been designed for use on computers running Microsoft Windows95/98/NT and utilizes all typical features of these operating systems. Therefore it is important that the user is familiar with using application software running under Windows.

4.1   Installation And Program Start

4.1.1   System Specifications

The software can be used on a desktop or laptop PC running Windows95/98/NT as operating system. To guarantee satisfactory working with the PROANNOUNCE Designer software, the computer should provide the following features:

- PC computer system with pentium processor (at least 90 MHz) and Windows95/98/NT

- 16 MB of RAM

- 1 hard disk with at least 5 MB available disk space

- 1 x 3.5" floppy drive

- 1 mouse

- 1 monitor (800 x 600) incl. VGA graphics board, 256 colors

- 1 RS-232 serial port with interface cable

- 1 CD-ROM drive

4.1.2   Software Installation

To install the PROANNOUNCE Designer on your PC you have to:

insert the PROANNOUNCE Designer CD into CD-ROM or DVD drive on your PC.

-         in the Windows menu select the entry Execute

-         enter the correct names for the floppy drive, directory and the software:
          D:\PROANNOUNCE Designer\Disk1\SETUP.EXE

-         First, the setup-software prepares the Install Shield Wizard for the installation of the PROANNOUNCE software. During the following installation process, the program will ask you to acknowledge several specific notes and preferences.   To accept the standard preferences, you simply confirm the Next button. In general, the PROANNOUNCE software is installed in the directory C:\PROGRAMS\PROANNOUNCE. Additionally, the sub directories C:\PROGRAMS\PROANNOUNCE\ EXAMPLES and C:\PROGRAMS\PROANNOUNCE\PROJECTS are being installed. Anyway, it is possible to change the installation paths at your liking and you can also cancel the installation process at any time.

-         Now it comes to copying the files.

-         After successfully finishing the installation, you can "quit" the   installation software and "open" the PROANNOUNCE Designer application by "double clicking" the program icon.

4.1.3 Starting PROANNOUNCE Designer

Windows95/98/NT offers several choices to start the PROANNOUNCE Designer software:

- Select *EXECUTE* within the Windows95/98/NT start menu, enter the command line "**C:\programs\PROANNOUNCE\PROANNOUNCE.exe**" and confirm with **OK**.

- In the Windows95/98/NT start menu, select programs/PROANNOUNCE and click onto PROANNOUNCE Designer.

- Link the "PROANNOUNCE.exe" file onto your desktop and start the program by double clicking the PROANNOUNCE Designer icon.

- By dragging & dropping a configuration file (suffix .pmx) onto the PROANNOUNCE Designer icon on the desktop, the PROANNOUNCE Designer software starts using the corresponding project.

4.1.4 Uninstalling PROANNOUNCE Designer

For removing the PROANNOUNCE Designer software from your hard disk, using the Windows95/98/NT software uninstall-procedure is recommended.

To do so, you have to open the windows *my system* and *system controls* and select the entry *software*. Now, you are presented with a list of software that Windows95/98/NT is able to automatically uninstall. Click onto the entry "PROANNOUNCE" and confirm your selection with the button *install/uninstall*. After confirming the uninstalling procedure again, all components of the PROANNOUNCE Designer software including its .dll and registration files are automatically removed from your hard disk.

5. Description Of Individual Devices

5.1 Digital PROANNOUNCE Manager DPM 4000

5.1.1 Features

The Digital PROANNOUNCE Manager DPM 4000 represents the central unit of the PROANNOUNCE system incorporating all primary functions that are needed in advanced PA-system installations. The DPM 4000's most important characteristics are listed below:

- 4 audio inputs; universally configurable; connection of up to 16 paging consoles
- 4 audio outputs
- Digital 4 x 4 audio mixing matrix with volume controls in all inputs and outputs
- Parametric 3-band equalizer for all 4 inputs
- Delay processor for all 4 outputs
- Multi-chime gong signal
- Alarm generator
- Signal generator and evaluation used for pilot tone surveillance
- Voice message recording and playback (optional)
- Floating control inputs with freely definable functions
- Floating control outputs for general control purposes with freely definable functions
- Linking of internal and external control inputs and outputs
- System clock with DCF-77 receiver for radio-controlled operation (optional)
- Monitor output to control slave clocks via pole change impulse
- Monitoring facility for all inputs and outputs as well as DPA 4000 Series power amplifiers and other external audio sources
- Integrated monitoring amplifier with loudspeaker respectively headphones connector
- RS-485 remote interface for DPA 4000 Series power amplifiers and the DCS 400 control system
- RS-232 interface for PC-connection
- Optional RS-485 interface for network-based operation of several DPM 4000
- Electronically programmable fuses for all power supply outputs
- READY relay for remote indication of malfunctions
- Power management of the entire PROANNOUNCE system (optional)
- Surveillance and protocol of all internal and external functions (optional)

The following block diagram outlines the features once again. It shows a DPM 4000 equipped with a 2-channel paging station module (NRS 90215), a MIC/LINE + 2 AUX inputs module (NRS 90216), two 2-channel LINE output modules (NRS 90218) and an 8 I/O control module (NRS 90219). The ports of the interface block are standard. Their functioning is explained in detail on the following pages. The "Optional" port allows for retrofitting an additional serial port for the intercommunication between several DPM 4000s or connecting external devices / entire installations.
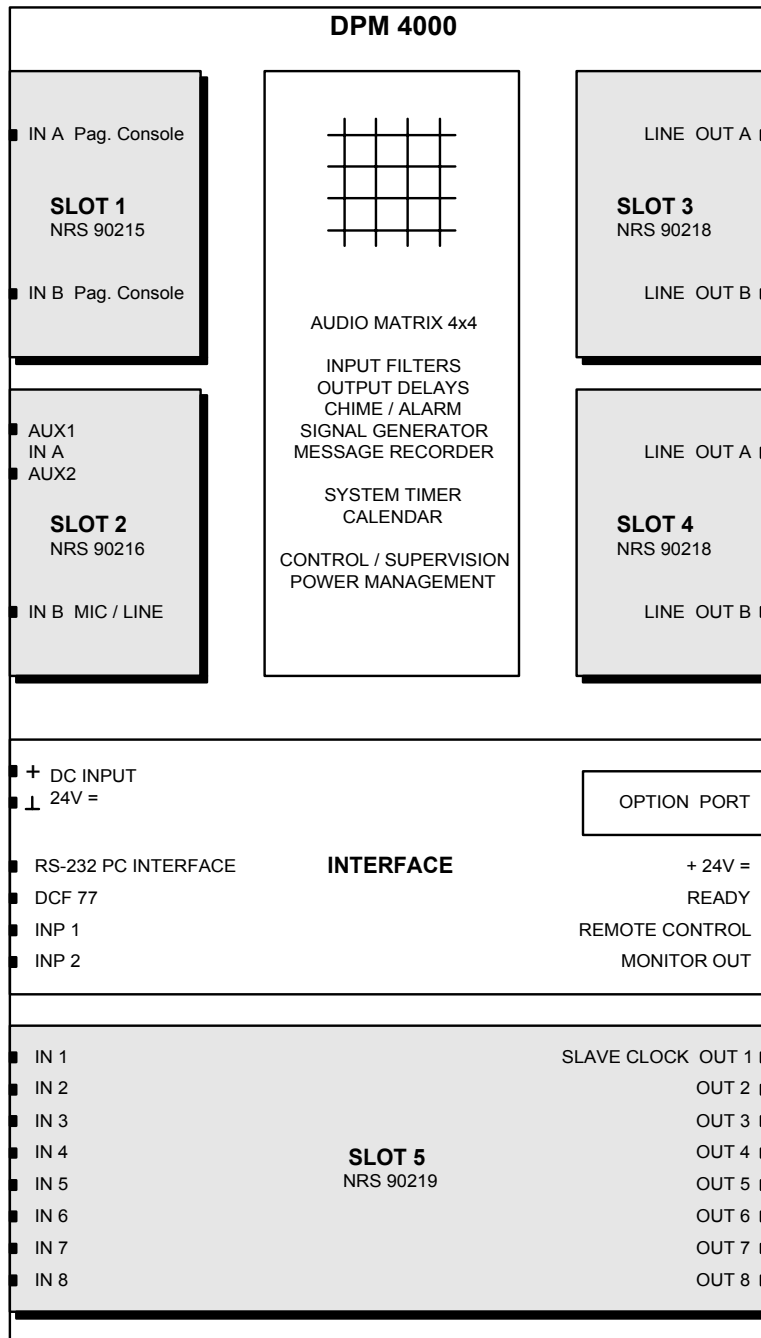
DPM 4000

IN A Pag. Console		LINE OUT A
SLOT 1 NRS 90215		**SLOT 3** NRS 90218
IN B Pag. Console		LINE OUT B

AUDIO MATRIX 4x4

INPUT FILTERS
OUTPUT DELAYS
CHIME / ALARM
SIGNAL GENERATOR
MESSAGE RECORDER

SYSTEM TIMER
CALENDAR

CONTROL / SUPERVISION
POWER MANAGEMENT

AUX1 IN A AUX2		LINE OUT A
SLOT 2 NRS 90216		**SLOT 4** NRS 90218
IN B MIC / LINE		LINE OUT B

+ DC INPUT
⊥ 24V =

OPTION PORT

RS-232 PC INTERFACE   **INTERFACE**   + 24V =
DCF 77   READY
INP 1   REMOTE CONTROL
INP 2   MONITOR OUT

IN 1		SLAVE CLOCK OUT 1
IN 2		OUT 2
IN 3		OUT 3
IN 4	**SLOT 5** NRS 90219	OUT 4
IN 5		OUT 5
IN 6		OUT 6
IN 7		OUT 7
IN 8		OUT 8

figure 5.1 DPM 4000 block diagram

5.1.2   Front View

figure 5.2 DPM 4000 front view

The following controls and indicators are located on the DPM 4000's front panel:

1. LED DCF 77

This LED indicates the operation mode of the DCF 77 radio-controlled-signal receiver. The following table shows the different indications and explains their corresponding status:

LED indication	status
OFF	No radio control signal detected or no DCF 77 antenna connected. The system clock is quartz-synchronized.
ON	The radio control signal is received. The system clock is synchronized to the DCF 77 signal.
Blinking, one cycle per second	The radio control signal is present and the system clock is being synchronized. This procedure can take up to 2 minutes. After synchronization is complete, the DCF 77 LED light continuously.
Blinking, fast	The radio control signal is detected but its reception is jammed. Re-adjusting the DCF 77 antenna or choosing a location with improved reception is recommended.

2. LED READY

This LED indicates the operation mode of the PROANNOUNCE System. After switching the power on, the READY LED blinks while the system boots. Depending on the complexity of the installation blinking can take several seconds. After successful initialization, the LED lights, signaling that the system is ready for operation. Whenever erroneous operation – either in the DPM 4000 or in one of the connected components – is detected, the LED goes out indicating that a system error occurred. When the system power is OFF, the READY LED is OFF as well.

3. LED POWER

This LED lights as soon as a power source (24 V =, power supply or battery) is connected to the DPM 4000. The LED does not light when the DPM 4000's power supply is disconnected, switched off or fails.

4. LED FAULT

This LED lights during a reset or when an internal watchdog error is being detected within the DPM 4000. It also indicates erroneous operation of external system components (power amplifiers, paging stations, relay boards, ...). The LED is connected to the READY relay on the rear of the appliance, which allows remote indication of system errors.
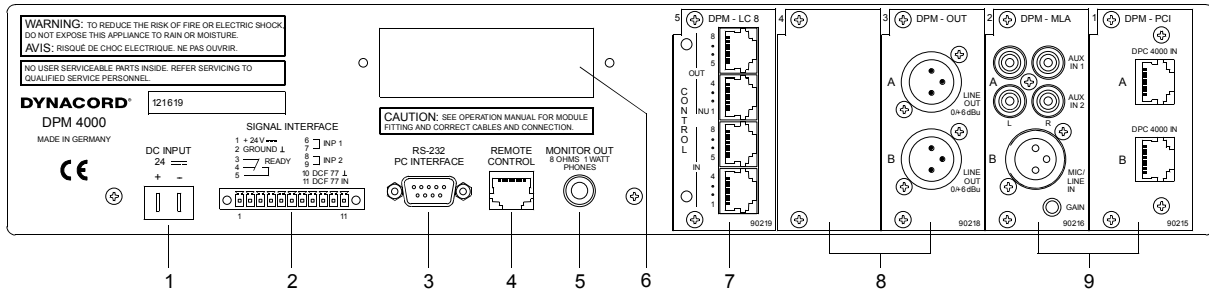
5.1.3   Rear View

figure 5.3 DPM 4000 rear view

The following module ports and connections are located on the rear panel of the DPM 4000:

1.   DC INPUT 24V ==

The DPM 4000's power supply source has to be connected here; a 24 VDC power supply or a PROANNOUNCE system battery module using insulated AMP flat-connector plugs 6.3 x 0.8 mm. The DPM 4000 is protected against polarization mismatch and all positive and negative conductors within the device are fuse-protected. The fuses are located inside the enclosure on the printed board assembly 80430. The connection cables have to be 1,5 mm^2 in diameter at least. With this diameter the cable length of a single path should not exceed 4.0 m (max. drop in voltage <1V).

CAUTION:	Using the DPM 4000 is only permissible with batteries that are not grounded or provide a grounded negative pole. Operation with grounded positive pole is not admissible.

2.   SIGNAL INTERFACE

Signal	Pins	Description
+24V ==	1	24 V== voltage output for the supply of external components. The maximum current handling capacity is 400 mA.
GROUND	2	Ground connector of the 24 V== voltage output.
READY	3, 4, 5	Floating output for the indication of the system's operation mode. In the normal ready mode the READY relay is activated. When internal errors occur or external devices show faulty behavior, the READY-relay drops. The relay is connected to the FAULT LED indicator on the front panel of the DPM 4000 providing indication of the operational status directly on the appliance.
INP1	6, 7	Floating input for monitoring / remote controlling the battery power supply, usually connected to a battery module or battery charging unit. Since this input can be freely programmed, using it for any other 24 V control signal is possible as well.
INP2	8, 9	Floating input for monitoring / remotely controlling the power supply, usually connected to the 24 V== system power supply. Since this input can be freely programmed, using it for any other 24 V control signal is possible as well.
DCF77	10, 11	Socket for connecting an external DCF 77 antenna. This input provides the supply voltage and simultaneously serves as input for the decoded DCF 77 signal. Only connecting the NRS 90193 DCF 77 receiver is admissible while polarity is not a critical factor. However, according to CE regulations, shielded cabling has to be used. Connect the shield to the connector's pin 10 and the signal line to pin 11.

3. RS-232 PC INTERFACE

This 9-pole PC-interface is meant for connecting a computer (female, pin 4 = TXD, pin 3 = RXD, pin 1 = ground). It is used to transfer data between the PC and the DPM 4000 during system configuration as well as for control, monitoring, and remote diagnosis purposes. The PC is connected to the DPM 4000 utilizing a standard 1:1 D-sub extension cord with male connectors on one end and female connectors on the other.

As an alternative to the RS-232 port, an optical IrDA interface is provided on the front panel of the appliance offering the possibility for wireless data transmission.
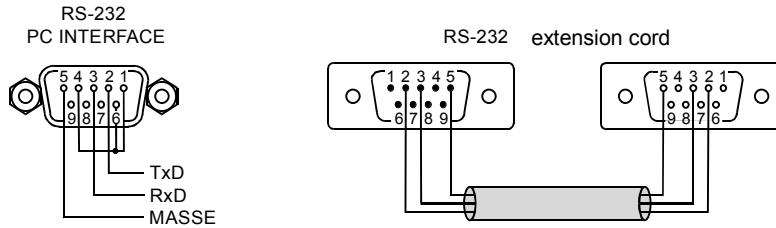
figure 5.4 pin-assignment of the RS-232 PC INTERFACE connector, D-Sub extension cord

4. REMOTE CONTROL socket

This 8-pole RJ-45-type socket is meant for connecting DCS 401 control modules or DPA 4000 power amplifiers with remote interface. The connector provides a RS-485 interface for communicating with control modules and power amplifiers (pins 4 / 5), a balanced audio input for the insertion of external monitor signals (pins 7 / 8), and a 24 V== supply voltage output for the supply of external modules (pin 1 = +24 V, 1 A max., pin 2 = GND). A programmable electronic fuse (adjustable to 330 mA, 660 mA, 990 mA) protects the voltage output against short-circuit and overload. External devices are connected through common RJ-45 extension cords. For additional information, please refer to the corresponding chapters of the individual device.
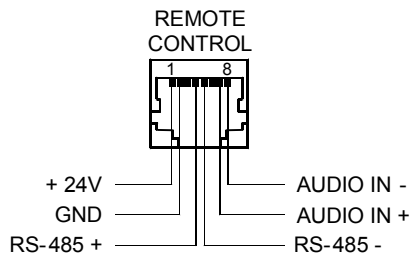
figure 5.5 pin-assignment of the REMOTE CONTROL socket

The RS-485 bus may not exceed a maximum length of 1,000m and must follow a line-structure (short stub cables are permissible). Cabling has to be carried out using twisted pair cables (38.400 Bd, 8N1)

5. MONITOR OUTPUT socket

The audio signal of the integrated monitor amplifier is outputted via this connector. In standard configuration, this output is set for the connection of headphones. It is also possible to directly connect a loudspeaker with minimum load impedance of 8 Ohms. To achieve higher output capacity it is possible to set the internal monitor amplifier to bridged operation. Thus some internal jumpers have to be re-set as shown in the figure below.
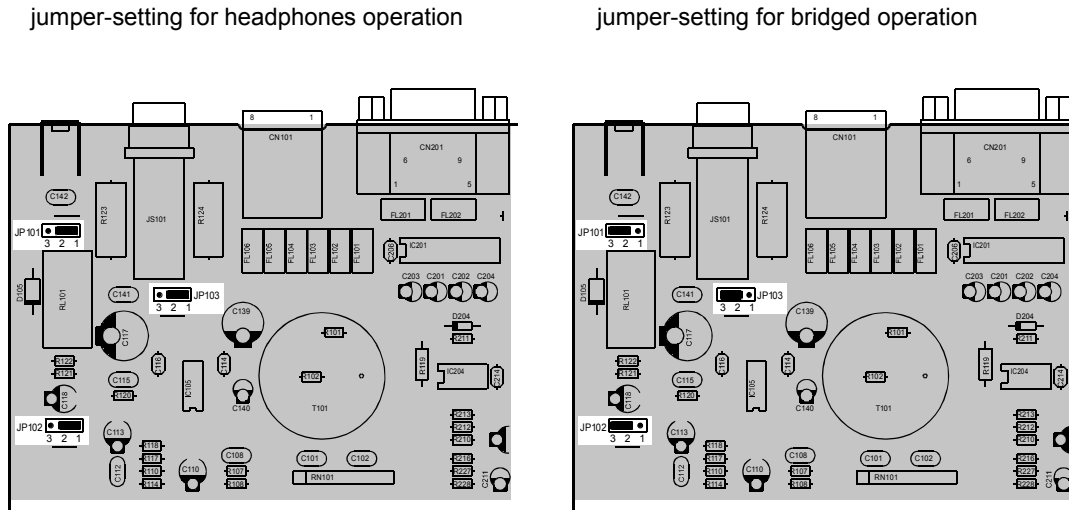
jumper-setting for headphones operation   jumper-setting for bridged operation

figure 5.6 adjusting the monitor amplifier's output power via jumpers on the printed board assembly 80430

6. Extension slot

The DPM 4000 extension slot allows retrofitting additional serial ports, which can be used for the inter-communication amongst DPM 4000 managers or to connect additional external devices. For detailed information, please refer to the owner's manuals of the individual extensions or modules.

7. Control Module Slot

Slot 5 is a control slot, which can be equipped with control modules for general control and query purposes. Control modules provide different kinds of control inputs and outputs. For detailed description, please refer to the following chapters. The DPM 4000 is shipped with one 8 I/O control module installed.

8. Slots for Audio Output Modules

The slots 3 and 4 are the DPM 4000's audio output slots providing two audio outputs per slot. Each slot can be equipped with a 2-channel audio output module. The DPM 4000 is shipped with a 2-channel audio output module installed in slot 3; described in detail at a later stage. Slot 4 is empty.

9. Audio Input Module Slots

The slots 1 and 2 are the DPM 4000's audio input module slots providing two audio inputs per slot. Each slot can be equipped with any suitable audio input module. A detailed description of available audio input modules can be found in the following chapters. The DPM 4000 is shipped with no audio input modules installed.

5.1.4   Specifications

Supply voltage	24 V DC (21.6 ... 31.2 V DC)
Nominal power consumption	500 mA
Maximum power consumption	6.7 A
Audio section	
Inputs	see specifications of the corresponding input module
Outputs	see specifications of the corresponding output module
Frequency Response	20 Hz ... 20 kHz, $\pm$ 0.5 dB
S/N ratio	> 100 dB (A-weighted)
Distortion	< 0.01 %
24 V output	24 V DC / 400 mA max. (21.6 ... 31.2 V DC)
Ready output	floating relay contacts, 1 A / 24 V DC
Logic inputs	2, floating via opto-coupler, bi-pole
Voltage with input OFF (LOW)	$U_{IN} < \pm 5$ V
Voltage with input ON (HIGH)	$U_{IN} > \pm 10$ V
Maximum input voltage	$U_{IN\ max} = \pm 31$ V
DCF77 input	2-pole, for the NRS 90193, DCF 77 receiver
RS-232 interface	19,200 Baud, 8 data bits, 1 stop bit, no parity, Xon/Xoff
Remote interface	
Serial port	RS-485 standard
Supply output	short-circuit-proof, electronically programmable fuse
Supply voltage	24 V DC (21.6 ... 31.2 V DC)
Nominal current	330 mA, 660 mA, 990 mA (selectable, electronic fuse)
Monitor input	electronically balanced, transformer optionally available
Nominal input level	+2.2 dBu / 1 V
Max. input level	+10 dBu / 2.5 V
Input balance	> -30 dB

Monitor output	6.3 mm phone jack, either for the connection of headphones or speakers	
Output level	with headphones:	650 mV / -1.5 dBu
	with loudspeakers:	1.8 V / 7.2 dBu
Output power handling	with headphones:	50 mW / 8 Ω
	with loudspeakers:	380 mW / 8 Ω

Operating temperature range	+5 °C ... +40 °C
Dimensions W x H x D	19", 2 HE 483 x 88 x 337 mm
Installation depth	340 mm (410 mm incl. connectors)
Weight	6.4 kg
Optionally available extensions	NRS 90208 input transformer for 1 monitor input, order no. 121 641

5.1.5   2-Channel Paging Station Module (NRS 90215)

This 2-channel audio input module is meant for the connection of DPC 4000 Series paging consoles. Each of the two input channels provide RJ-45 sockets allowing the connection of up to 4 paging stations plus paging station extensions per input. The microphone terminals are interconnected via 6-conductor parallel cables. The module can be installed in slot 1 and slot 2.

Next to the electronically balanced audio input, each input connector provides a serial RS-485 interface port and the power supply connection for the paging stations (see also: pin-assignment of the RJ-45 connector). The paging stations' power supply employs an electronic, programmable fuse, through which the maximum output current can be matched to meet actual system accommodations. This prevents the entire installation from malfunction, in case of short-circuit occurring in a single paging station only.

Input channels can be switched separately onto the monitor bus and you can monitor the audio signal via headphones or loudspeaker, either which is connected to the monitor output. Automatic pilot tone surveillance of the entire input stage is integrated as well. If necessary, retrofitting the audio inputs with transformers is possible.
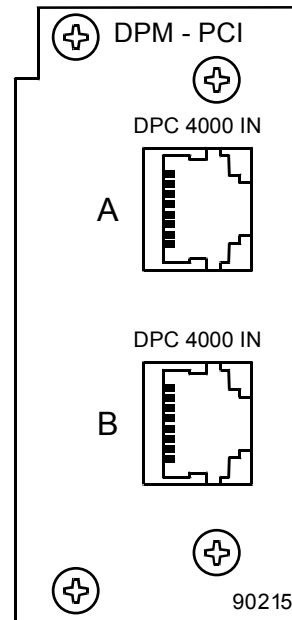
figure 5.7 2-channel paging station module

Note:	When connecting several paging consoles to a single input, please keep in mind that line interruption or short-circuit can cause malfunction of several or even all paging stations of that specific line. In emergency alert installation, connecting security-related consoles to individual inputs is therefore of major importance.

Specifications:

description	DPM-PCI 2-channel paging station module, NRS 90215
connections	2 x RJ-45 sockets
audio	
inputs	2, electronically balanced, transformers are optionally available
nominal input level	0 dBu / 775 mV
max. input level	+12 dBu / 3 V
input impedance	20 kΩ
input balancing	> -30 dB
frequency response	20 Hz ... 20 kHz, $\pm$ 0.5 dB
S/N ratio	> 100 dB (A-weighted)
distortion	< 0.01 %
A/D-conversion	18-bit linear, Sigma-Delta
control interfaces	2 x RS-485 standard
power supply outputs for the DPC 4000	2, short-circuit-proof, electronically programmable fuses
supply voltage	24 V DC (21.6 ... 31.2 V DC)
nominal current	330 mA, 660 mA, 990 mA (adjustable, electronic fuse)
power consumption	2 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 248 mm
weight	152 g (220 g including 2 x NRS 90208)
extensions	NRS 90208 input transformer for 1 paging station input, order-No. 121 641

Pin-Assignment Of DPC 4000 Connectors And The Extension Cord:

Connecting DPC 4000 paging stations to the DPC 4000 IN connector is established through the use of common RJ-45 extension cords, where the conductors are twisted in pairs as follows: pair 1 = 1/2 (24 V/GND), pair 2 = 3/6 (free), pair 3 = 4/5 (RS-485), pair 4 = 7/8 (AUDIO).
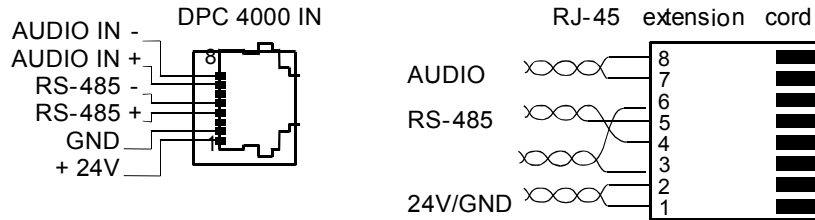
figure 5.8 pin-assignment of the DPC 4000 connectors, RJ-45 extension cords

The RS-485 bus may not exceed a maximum length of 1,000m (mind the voltage drop for operation voltage) and must follow a line-structure (short stub cables are permissible). Twisted-pair wiring is of special importance.

Using IY(ST)Y wiring is allowable (38400 Bd, 9N1)

Block Diagram:
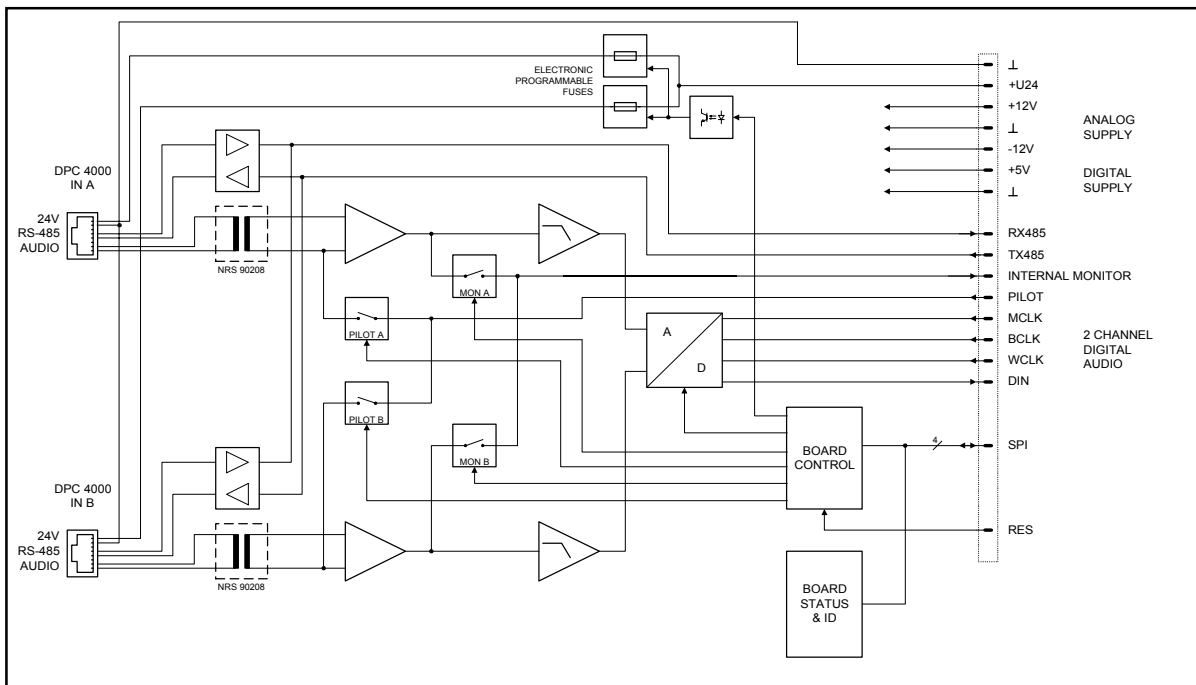
figure 5.9 block diagram 2-channel paging station module

Retrofitting Input Transformers:

In case galvanic separation of the audio signal is necessary, the module is prepared for retrofitting two input transformers. Separate NRS 90208 extensions consisting of audio transformer and insulation plate each are needed per input channel.

When retrofitting the transformers, please proceed as follows:

1. Disconnect the DPM 4000 from the mains power supply.
2. Loosen the two locking screws and carefully slide the module out of the slot.
3. Remove the two resistors of the corresponding input channel (IN A: R6 / R7, IN B: R3 / R8).
4. Place the insulation plate between the transformer and the printed board assembly and solder the transformer to position T1 for IN A or to position T2 for IN B.
5. Re-insert the module into the slot and carefully push it into the DPM 4000 until it firmly locks in place.
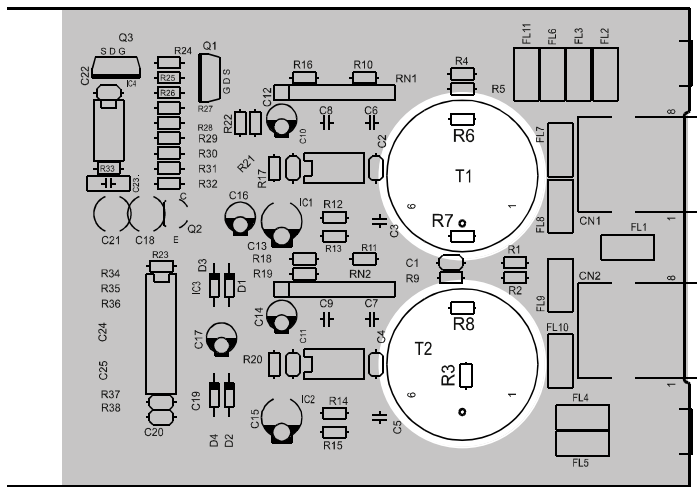6. Fix the module in place using the two locking screws and reconnect the power supply.

figure 5.10   retrofitting the input transformers, location of parts (NRS 90215)

5.1.6   MIC/LINE + 2 AUX Input Module (NRS 90216)

This 2-channel audio input module is meant for the connection of external audio sources of any kind. Channel A employs two switched AUX-inputs with 4 RCA-type connectors (2 x L / R) for CD players, tape decks, tuners, DAT decks, etc. The MIC / LINE-input of channel B is provided through an XLRF-type connector allowing the connection of microphones, mixers and other similar sources. The module can be inserted in slot 1 and slot 2.

Input levels of both AUX-inputs can be separately adjusted via internal potentiometers in a range between – 10 dBu to +12 dBu.

The MIC / LINE-input's sensitivity can also be adjusted through an internal MIC / LINE switch (PAD) providing 30 dB attenuation. The GAIN-control on the appliance's rear panel offers additional control within a range of 40 dB. The MIC / LINE input is electronically balanced and can be retrofitted with a transformer. Phantom power can be switched via a jumper. If necessary, it is also possible to incorporate a compressor / limiter into the audio path via jumper setting.

The input channels can be switched separately to the monitor bus and you can listen to the signal via headphones or loudspeaker, either which is being connected to the monitor output. Automatic pilot tone surveillance of the entire input stage is integrated as well.
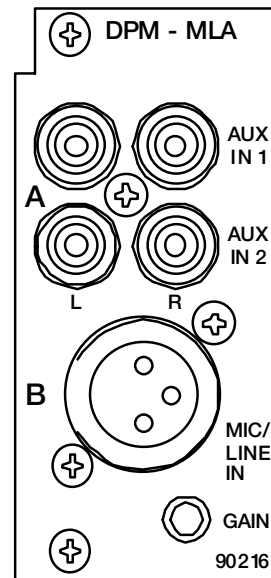

figure 5.11 MIC/LINE + 2 AUX input module

Specifications:

description	DPM-MLA MIC/LINE + 2 AUX input module, NRS 90216
connections	1 x XLRF-type / 4 x RCA-type connectors
input A	2 x AUX, unbalanced, internally summed
nominal input level	-10 dBu ... +12 dBu / 250 mV ... 3 V
max. input level	+12 dBu / 3 V
input impedance	10 kΩ
input B	MIC/LINE, electronically balanced, transformers are optionally available
nominal input level	MIC: -54 dBu ... -14 dBu / 1.5 mV ... 155 mV
	LINE: -24 dBu ... +16 dBu / 50 mV ... 5 V
max. input level	MIC: +5 dBu / 1.4 V
(im limiter operation)	LINE: +30 dBu / 25 V
input impedance	MIC: 3.6 kΩ
	LINE: 10 kΩ
input balancing	> -30 dB
phantom power	24V / 20 mA, switched via jumper
audio	
frequency response	20 Hz ... 20 kHz, ± 0.5 dB
S/N ratio	> 95 dB (A-weighted)
distortion	< 0.01 %
A/D-conversion	18-bit linear, Sigma-Delta
power consumption	2.3 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 252 mm
weight	160 g (173 g including NRS 90233)
extensions	NRS 90233 input transformer for 1 MIC/LINE input, order-No. 121 682

Pin-Assignment Of XLRF-Type Connectors:

The pin-assignment of the MIC/LINE input's XLRF-type connector is as follows: pin 1 = screen, pin 2 = positive conductor, pin 3 = negative conductor. In unbalanced configuration, the pins 3 (-) and 1 (screen) have to be bridged inside the connection plug.
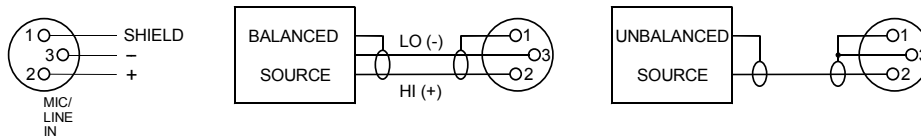
figure 5.12   pin-assignment of the MIC/LINE IN XLRF-type connector
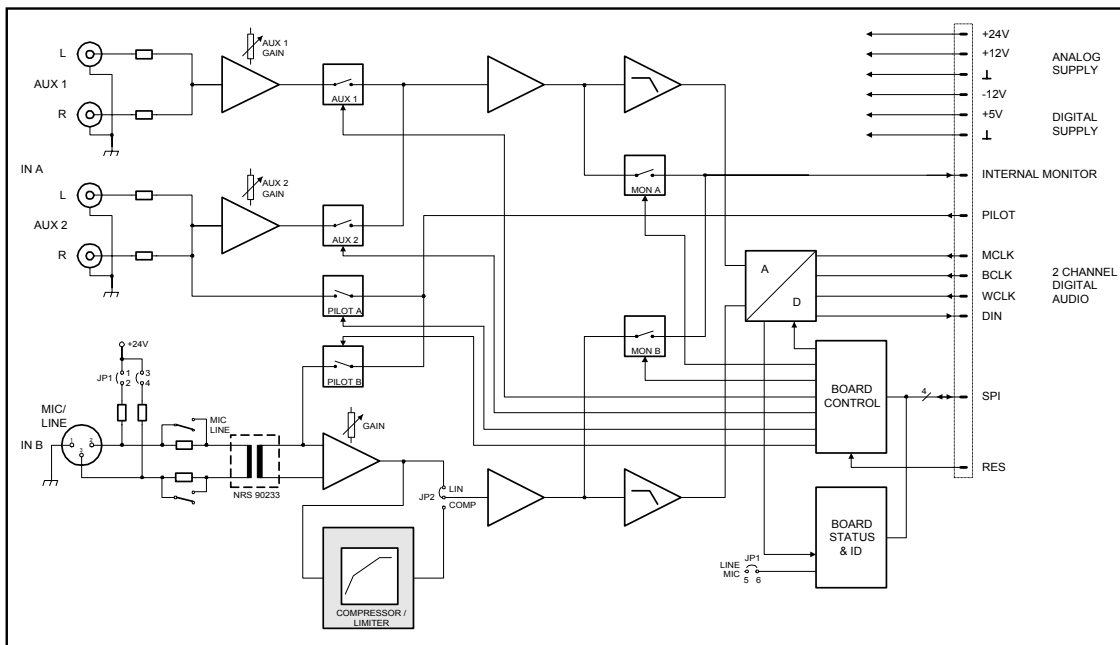
Block diagram:

figure 5.13   block diagram MIC/LINE + 2 AUX input module

Internal Settings:

1. AUX input sensitivity

   The input levels can be set in a range of -10 dBu to +12 dBu using trimmers VR2 (AUX 1) and VR3 (AUX 2). The trim-potentiometers' coarse scales are meant for your convenience, helping you in adjusting the levels.

Potentiometer setting	Input level
Left margin	+12 dBu
Center position	-3 dBu
Right margin	-10 dBu
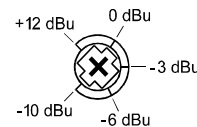
2. MIC / LINE switching and sensitivity setting for the MIC / LINE input

   The MIC / LINE input's internal PAD-switch (S1) allows switching the channels' sensitivity between microphone and line level (30 dB). The GAIN-control on the module's front panel is provided to precisely adjust the input sensitivity (range 40 dB).

In addition, a MIC/LINE jumper (JP1, pins 5-6) is located on the printed board assembly, which allows correctly configuring the input. When changing the MIC/LINE switch it is important to change the jumper correspondingly (open = LINE, closed = MIC).

When shipped, the factory preset is: switch S1 in the LINE position and jumper JP1 open.

GAIN setting	MIC / LINE setting	MIC / LINE jumper	Input level
Left margin	MIC	Closed	-14 dBu
	LINE	Open	+16 dBu
Center position	MIC	Closed	-28 dBu
	LINE	Open	+2 dBu
Right margin	MIC	Closed	-54 dBu
	LINE	Open	-24 dBu

3. Phantom Power

By closing the jumper JP1, pins 1-2 and pins 3-4, engage 24 V phantom power is possible for microphones that are directly connect. When shipped, the jumpers' factory preset position is "open" (no phantom power).

4. Compressor / Limiter

The MIC / LINE input channel embodies a compressor / limiter circuit which can be incorporated into the signal path via jumper JP2 (position 1-2, COMP). Normally, the compressor / limiter should be used to eliminate the risks of overdrive and clipping, when directly connecting a microphone. When shipped, the jumper is set to its "Linear" position (2-3, LIN).
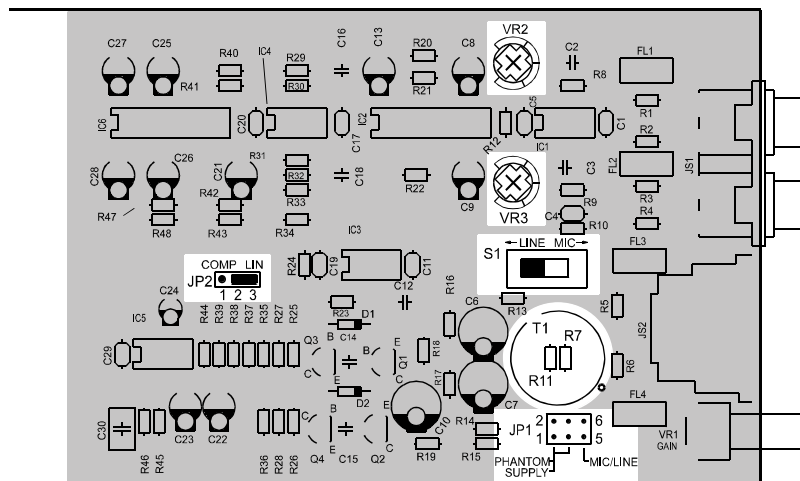

figure 5.14　　retrofitting the input transformer, internal settings, location of parts　(NRS 90216)

Retrofitting Input Transformers:

In case galvanic separation of the audio signal is necessary, an input transformer can be retrofitted to channel B of the MIC / LINE module. This is accomplished using the extension kit NRS 90233.

When retrofitting input transformers, please proceed as follows:
1. Disconnect the DPM 4000 from the mains power supply.
2. Loosen the two locking screws and carefully slide the module out of the slot.
3. Remove the two resistors of input channel B (R7 / R11).
4. Solder the transformer in position T1 onto the printed board assembly.
5. Re-insert the module into the slot and carefully push it into the DPM 4000 until it firmly locks in place.
6. Fix the module in place using the two locking screws and reconnect the power supply.

5.1.7 2-Channel MIC/LINE Input Module (NRS 90217)

This 2-channel audio input module is meant for the connection of external audio sources, like microphones, mixers, etc. Both channels are furnished with XLRF-type connectors. The module can be installed into slot 1 and slot 2.

The sensitivity of the MIC / LINE inputs can be adjusted in a wide range. The internal MIC / LINE switches (PADs) provide 30 dB attenuation. The separate GAIN-controls for each channel provide additional control in a range of 40 dB. The MIC / LINE inputs are electronically balanced and can be retrofitted with transformers. Phantom power can be switched via jumper setting. If necessary, compressors / limiters can also be incorporated in the audio paths via jumpers.

Input channels can be switched separately onto the monitor bus and you can listen to the signal via headphones or loudspeaker, either which is being connected to the monitor output. Automatic pilot tone surveillance of the entire input stage is integrated as well.
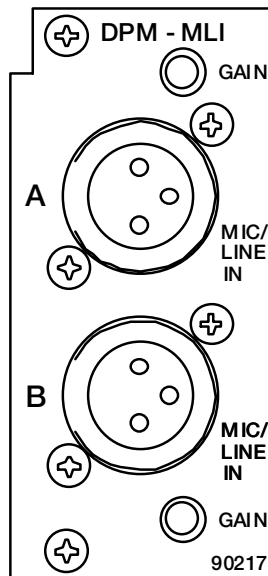

figure 5.15 2-channel MIC/LINE input module

Specifications:

description	DPM-MLI 2-channel MIC/LINE input module, NRS 90217
connections	2 x XLRF-type connectors
audio	
inputs	2 x electronically balanced, transformers are optionally available
nominal input level	MIC: -54 dBu ... -14 dBu / 1.5 mV ... 155 mV
	LINE: -24 dBu ... +16 dBu / 50 mV ... 5 V
max. input level	MIC: +5 dBu / 1.4 V
(in limiter operation)	LINE: +30 dBu / 25 V
input impedance	MIC: 3.6 kΩ
	LINE: 10 kΩ
Input balancing	> -30 dB
phantom power	24V / 20 mA, switched via jumper
frequency response	20 Hz ... 20 kHz, ± 0.5 dB
S/N ratio	> 95 dB (A-weighted)
distortion	< 0.01 %
A/D-conversion	18-bit linear, Sigma-Delta
phantom power	24V / 20 mA, switched via jumper
power consumption	3 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 252 mm
weight	160 g (186 g including 2 x NRS 90233)
extensions	NRS 90233 input transformer for 1 MIC/LINE input, order-No. 121 682

Pin-Assignment Of XLRF-Type Connectors:

The pin-assignment of the MIC/LINE input's XLRF-type connector is as follows: pin 1 = screen, pin 2 = positive conductor, pin 3 = negative conductor. In unbalanced configuration, the pins 3 (-) and 1 (screen) have to be bridged inside the connection plug.
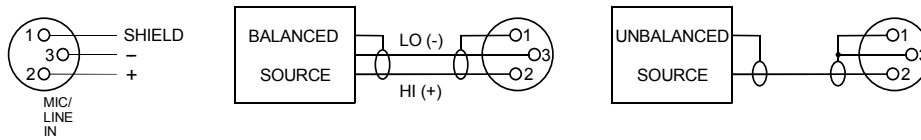

figure 5.16   pin-assignment of the MIC/LINE IN XLRF-type connectors
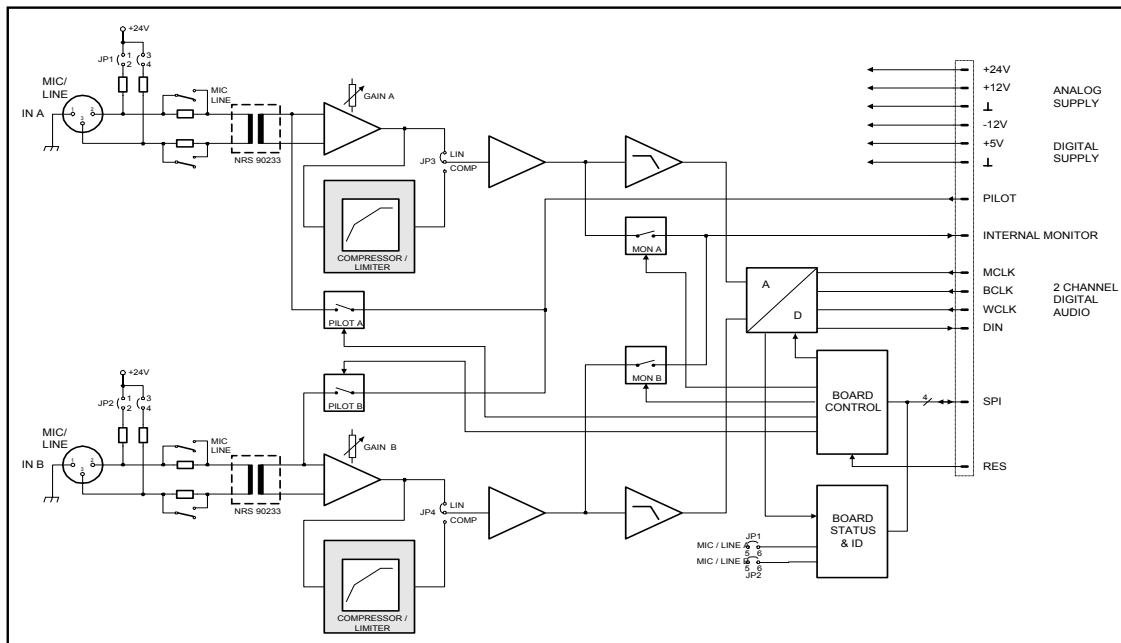
Block diagram:

figure 5.17   block diagram of the 2-channel MIC/LINE input module

Internal Settings:

1. MIC / LINE switching and sensitivity setting for the MIC / LINE inputs

   The MIC / LINE input's internal PAD-switches (IN A: S1, IN B: S2) allow switching the channels' sensitivity between microphone and line level (30 dB). The two GAIN-controls on the module's front panel are provided to precisely adjust the input sensitivity (range 40 dB).

   In addition, two MIC/LINE jumpers (IN A: JP1, pins 5-6, IN B: JP2, pins 5-6) are located on the printed board assembly allowing the correct configuration of the inputs. When changing a MIC/LINE switch it is important to change the related jumper correspondingly (open = LINE, closed = MIC).

   When shipped, the factory presets are: switches S1 and S2 set to LINE and jumpers JP1 and JP2 are open.

GAIN setting	MIC / LINE setting	MIC / LINE jumper	Input level
Left margin	MIC	Closed	-14 dBu
	LINE	Open	+16 dBu
Center position	MIC	Closed	-28 dBu
	LINE	Open	+2 dBu
Right margin	MIC	Closed	-54 dBu
	LINE	Open	-24 dBu

2. Phantom Power

By closing the jumpers JP1, pins 1-2 and pins 3-4 (IN A) respectively JP2, pins 1-2 and pins 3-4 (IN B), it is possible to (separately) engage 24 V phantom power when a microphone is connected to the corresponding input. When shipped, jumpers are set to "open" (no phantom power).

3. Compressor / Limiter

The MIC / LINE input channels embody compressor / limiter circuits, which can be incorporated in the signal paths via the jumpers JP3 for IN A and JP4 for IN B (position "COMP"), if needed. Normally, the compressors / limiters should be used to eliminate the risks of overdrive and clipping, when directly connecting microphones. When shipped, the jumpers are set to "LIN".
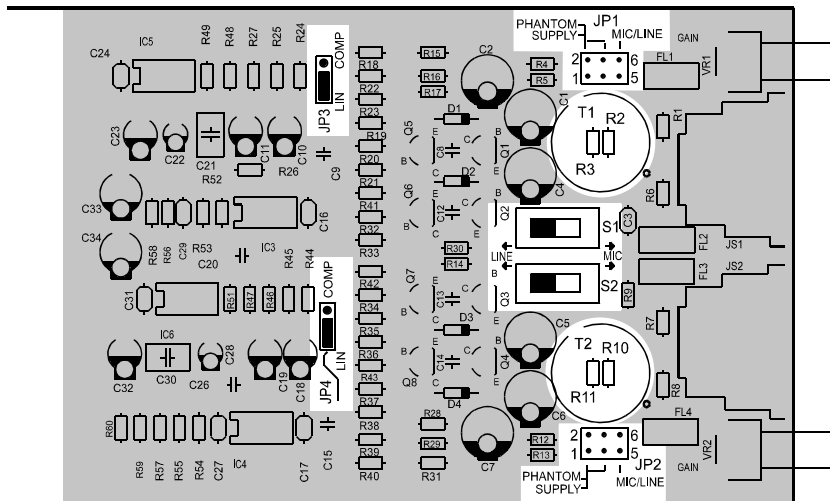

figure 5.18   retrofitting the input transformers, internal settings, location of parts (NRS 90217)

Retrofitting Input Transformers:

In case galvanic separation of the audio signals is necessary, the module can be retrofitted with two input transformers. This is accomplished by using an extension kit NRS 90233 per input channel.

When retrofitting input transformers, please proceed as follows:

1. Disconnect the DPM 4000 from the mains power supply.
2. Loosen the two locking screws and carefully slide the module out of the slot..
3. Remove the two resistors of the correspondent input channel (IN A: R2 / R3, IN B: R10 / R11).
4. Solder the transformer for IN A in position T1 and for IN B in position T2 onto the printed board assembly.
5. Re-insert the module into the slot and carefully push it into the DPM 4000 until it firmly locks in place.
6. Fix the module in place using the two locking screws and reconnect the power supply.

5.1.8 2-Channel AUX Input Module (NRS 90228)

This 2-channel audio input module provides 8 RCA-type connectors (4 x L / R) for connecting external audio sources such as CD-players, tape decks, tuners, DAT decks, etc. The module can be installed into slot 1 and slot 2.

The input levels of the four AUX inputs can be independently adjusted in a range between -10 dBu and +12 dBu via internal trim-potentiometers.

Input channels can be switched separately to the monitor bus and you can listen to the signal via headphones or loudspeaker, either which being connected to the monitor output. Automatic pilot tone surveillance of the entire input stage is integrated as well.
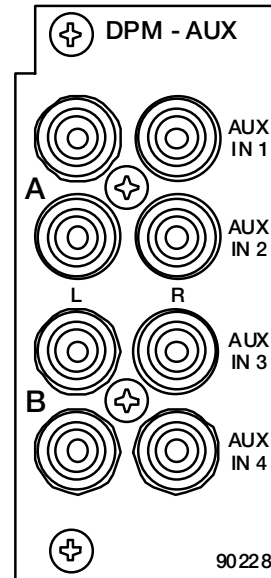

figure 5.19 2-channel AUX input module

Specifications:

|	
description	DPM-AUX 2-channel AUX input module, NRS 90228
connections	8 x RCA-type connectors
audio	
inputs	4 x AUX, unbalanced, internally summed
nominal input level	-10 dBu ... +12 dBu / 250 mV ... 3 V
m**ax. input level**	+12 dBu / 3 V
input impedance	10 kΩ
frequency response	20 Hz ... 20 kHz, $\pm$ 0.5 dB
S/N ratio	> 100 dB (A-weighted)
distortion	< 0.01 %
A/D-conversion	18-bit linear, Sigma-Delta
power consumption	1.4 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 252 mm
weight	150 g

Block Diagram:
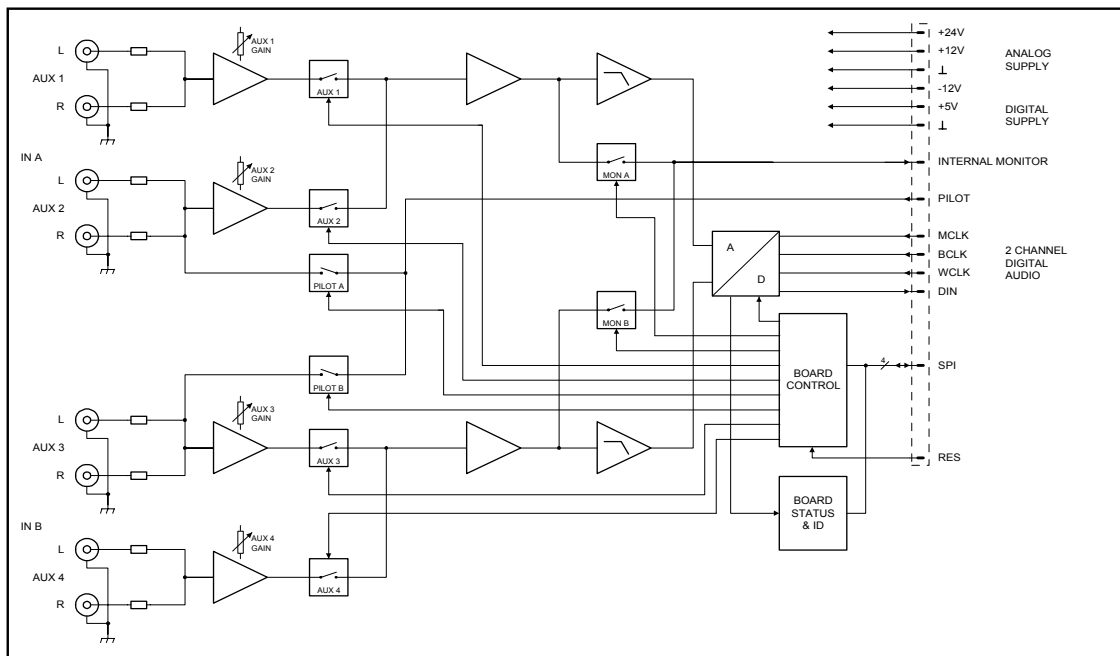
figure 5.20   block diagram 2-channel AUX input module

Internal Settings:

AUX input sensitivity setting

Using trimmers VR1 (AUX 1), VR2 (AUX 2), VR3 (AUX 3) and VR4 (AUX 4), adjusting input levels is possible in a range between -10 dBu and +12 dBu. The trim-potentiometers' coarse scales are meant for your convenience, helping you in adjusting the levels.

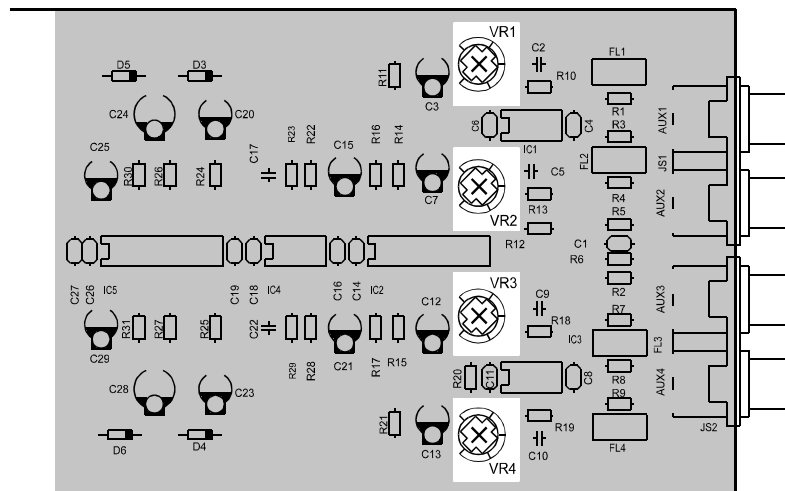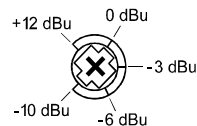| Potentiometer setting	Input level
Left margin	+12 dBu
Center position	-3 dBu
right margin	-10 dBu

figure 5.21   internal settings, location of parts (NRS 90228)

5.1.9 MIC/LINE + Paging Station Module (NRS 90234)

This 2-channel audio input module is meant for the connection of DPC 4000 Series paging stations and other external audio sources. The RJ-45 socket of channel A allows the connection of up to 4 microphone terminals plus paging station extensions. The MIC / LINE input of channel B is furnished through an XLRF-type connector allowing the connection of microphones, mixers and other audio signal sources. The module can be installed into slot 1 and slot 2.

Next to the electronically balanced audio input, the DPC 4000 input connector provides a serial RS-485 interface and the power supply for the connected paging consoles (see also pin-assignment of the RJ-45 connector). The paging stations' power supply employs an electronic, programmable fuse, through which the maximum output current can be matched to meet actual system accommodations.

The MIC / LINE input employs an internal switch (PAD) providing 30 dB of attenuation. The GAIN-control located on the appliance's rear panel offers additional control in a range of 40 dB. The input is electronically balanced and prepared for retrofitting a transformer. Phantom power can be switched via jumper. If necessary, a compressor / limiter circuit can be incorporated in the audio path.
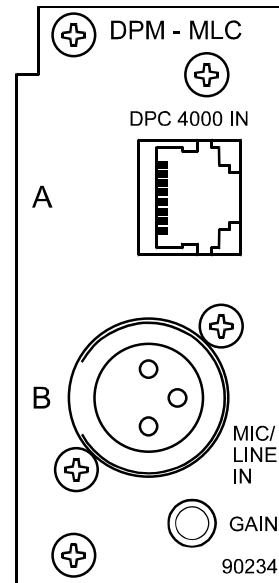
Input channels can be switched separately to the monitor bus and you can listen to the signal via headphones or loudspeaker, either which being connected to the monitor output. Automatic pilot tone surveillance of the entire input stage is integrated as well.

figure 5.22 MIC/LINE + paging station module (NRS 90234)

Note:	When connecting several paging consoles to a single input, please keep in mind that line interruption or short-circuit can cause malfunction of several or even all paging stations of that specific line. In emergency alert installation, connecting security-related consoles to individual inputs is therefore of major importance.

Specifications:

description	DPM-MLC MIC/LINE + paging station module, NRS 90234
connections	1 x RJ-45 socket; 1 x XLRF-type connector
input A	DPC 4000, electronically balanced, transformers are optionally available
nominal input level	0 dBu / 775 mV
max. input level	+12 dBu / 3 V
input impedance	20 kΩ
input B	MIC/LINE, electronically balanced, transformers are optionally available
nominal input level	MIC: -54 dBu ... -14 dBu / 1.5 mV ... 155 mV
	LINE: -24 dBu ... +16 dBu / 50 mV ... 5 V
m**ax. input level**	MIC: +5 dBu / 1.4 V
(in limiter operation)	LINE: +30 dBu / 25 V
input impedance	MIC: 3.6 kΩ
	LINE: 10 kΩ
Phantom power	24V / 20 mA, switched via jumper
audio	
input balancing	> -30 dB
frequency response	20 Hz ... 20 kHz, $\pm$ 0.5 dB
S/N ratio	> 95 dB (A-weighted)
distortion	< 0.01 %
A/D-conversion	18-bit linear, Sigma-Delta
control interface	1 x RS-485 standard

supply output for the DPC 4000	1, short-circuit-proof, electronic, programmable fuse
supply voltage	24 V DC (21.6 ... 31.2 V DC)
nominal current	330 mA, 660 mA, 990 mA (set via electronic fuse)
power consumption	2.5 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 252 mm
weight	165 g (215 g including NRS 90208 + NRS 90233)
extensions	NRS 90208 input transformer for 1 paging station input, order No. 121 641
	NRS 90233 input transformer for 1 MIC/LINE input, order No. 121 682

Pin-Assignment Of RJ-45 Socket And Extension Cord:

Connecting DPC 4000 paging stations to the DPC 4000 IN connector is performed using common RJ-45 extension cords, where the conductors are twisted in pairs as follows: pair 1 = 1/2 (24 V/GND), pair 2 = 3/6 (free), pair 3 = 4/5 (RS-485), pair 4 = 7/8 (AUDIO).
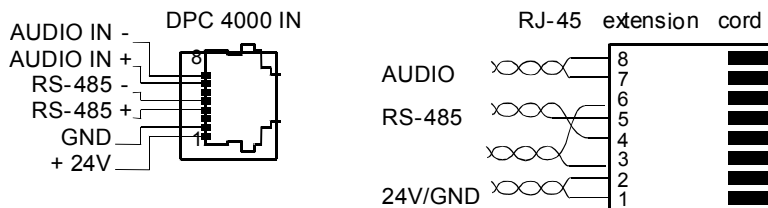
figure 5.23   pin-assignment of the DPC 4000 socket, RJ-45 extension cord

The RS-485 bus may not exceed a maximum length of 1,000m (mind the voltage drop for operation voltage) and must follow a line-structure (short stub cables are permissible). Twisted-pair wiring is of special importance.

Using IY(ST)Y wiring is allowable (38400 Bd, 9N1)

Pin-Assignment Of XLRF-Type Connectors:

The pin-assignment of the MIC/LINE input's XLRF-type connector is as follows: pin 1 = screen, pin 2 = positive conductor, pin 3 = negative conductor. In unbalanced configuration, the pins 3 (-) and 1 (screen) have to be bridged inside the connection plug.

figure 5.24   pin-assignment of the MIC/LINE IN XLRF-type connector

Block Diagram:
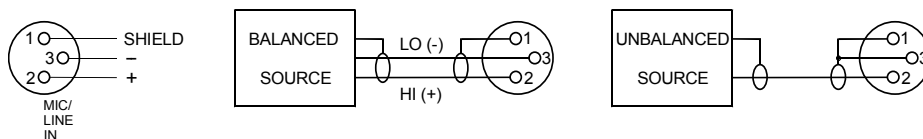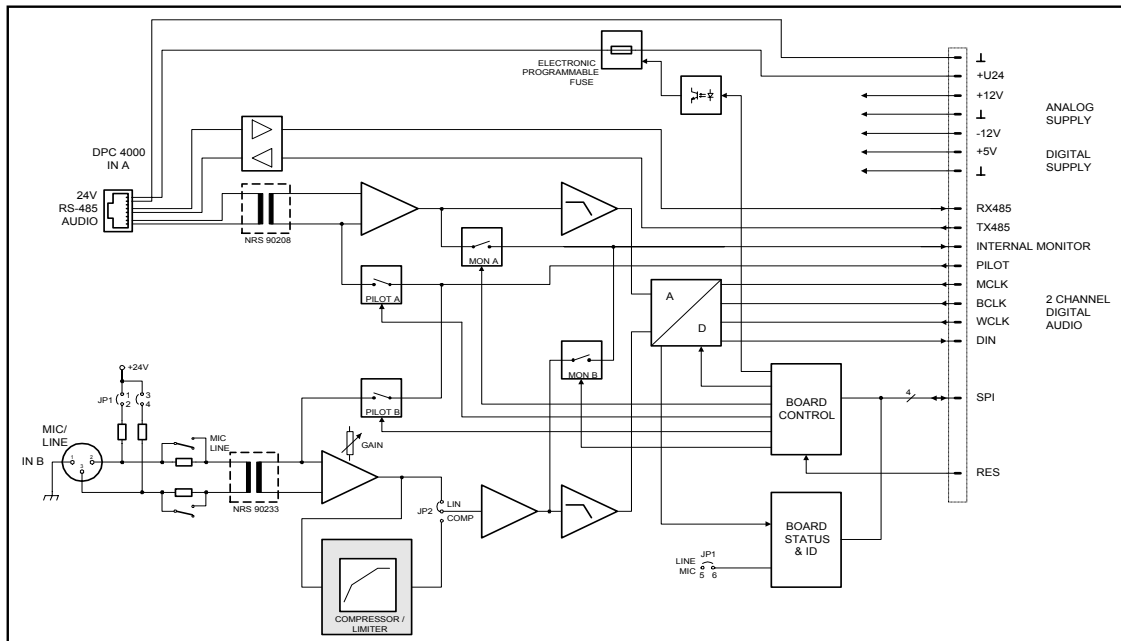

figure 5.25   block diagram MIC/LINE + paging station module

Internal Settings:

1. MIC / LINE switching and sensitivity of the MIC / LINE input

    The MIC / LINE input's internal PAD-switch (S1) allows switching the channels' sensitivity between microphone and line levels (30 dB). The GAIN-control on the module's front panel is provided to precisely adjust the input sensitivity (range 40 dB).

    In addition, a MIC/LINE jumper (JP1, pins 5-6) is located on the printed board assembly, which allows correctly configuring the input. It is important to change the jumper accordingly (open = LINE, closed = MIC) when changing the MIC/LINE switch.

    When shipped the switch S1 is pre-set to LINE and the jumper JP1 to its open position.

GAIN setting	MIC / LINE setting	MIC / LINE jumper	Input level
Left margin	MIC	Closed	-14 dBu
	LINE	Open	+16 dBu
Center position	MIC	Closed	-28 dBu
	LINE	Open	+2 dBu
Right margin	MIC	Closed	-54 dBu
	LINE	Open	-24 dBu

2. Phantom power

    Closing the pins 1-2 and 3-4 of the jumper JP1 offers the possibility to engage 24 V phantom power for microphones that are connected directly. When shipped, the jumper is factory pre-set to its "open" position (no phantom power).

3. Compressor / Limiter

    The MIC / LINE input channel embodies a compressor / limiter circuit which can be incorporated into the signal path via jumper JP2 (position COMP). Normally, the compressor / limiter should be used to eliminate the risks of overdrive and clipping, when directly connecting a microphone. When shipped, the jumper is pre-set to its "Linear" position (LIN).

Retrofitting Input Transformers:

Retrofitting two input transformers onto the module is possible for the case that galvanic separation of the audio signals is needed. For the DPC 4000 input a NRS 90208 extension is needed, which consists of an audio transformer and an insulation plate. For the MIC/LINE input a NRS 90233 extension is needed.

When retrofitting input transformers, please proceed as follows:

1. Disconnect the DPM 4000 from the mains power supply.
2. Loosen the two locking screws and carefully slide the module out of its slot.
3. Remove the two resistors of the corresponding input channel (IN A: R8 / R9, IN B: R3 / R4).
4. With the DPC 4000 input (IN A), you have to place the insulation plate between the transformer and the printed board assembly. Then solder the transformer in position T2; with the MIC/LINE input (IN B), you have to solder the transformer in position T1.
5. Re-insert the module into the slot and carefully push it into the DPM 4000 until it firmly locks in place.
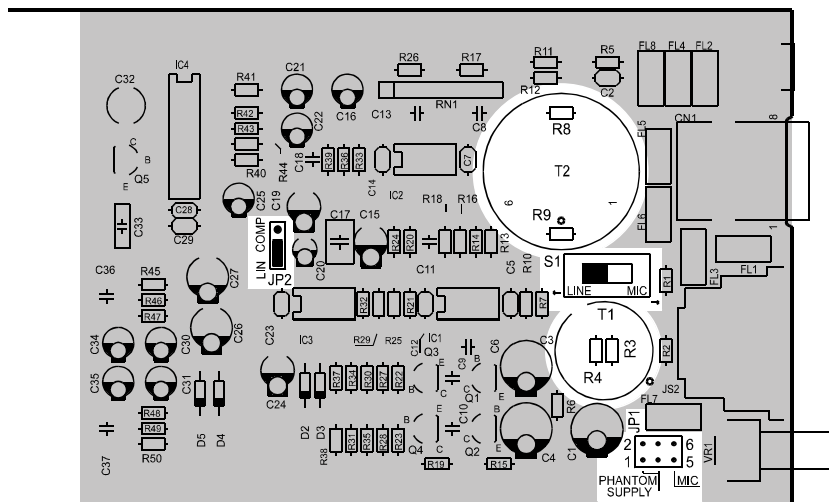6. Fix the module in place using the two locking screws and reconnect the power supply.

figure 5.26 retrofitting the input transformers, internal settings, location of parts (NRS 90234)

5.1.10 2-Channel LINE Output Module (NRS 90218)

The output module is meant for the connection of power amplifiers with an input sensitivity of 0 dB or +6 dB. Two XLRM-type connectors allow the connection of up to 20 power amplifiers each. The audio signal is electronically balanced; if necessary, transformers can be retrofitted. The module can be installed in slot 3 or slot 4.

The output channels can be switched separately to the monitor bus and you can listen to the signal via headphones or loudspeaker, either which is connected to the monitor output. Automatic pilot tone surveillance of the two output channels is also integrated. The jumpers for adjusting the output voltage to 0 dB or +6 dB are located on the printed board assembly. At the same time you have to alter the jumper setting of the monitor signal correspondingly.

The output module employs integrated output relays that prevent switching noise from being heard. When switching the system on, the output signal is put through after the system is been initialized (power-on delay); the contacts are immediately interrupted when switching the power off.
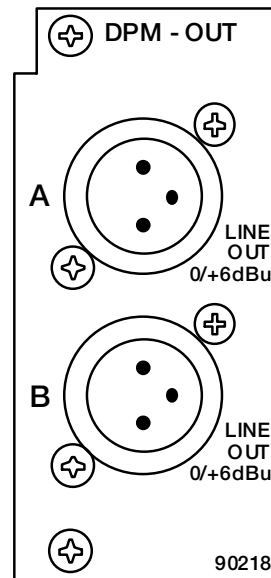
figure 5.27 2-channel LINE output module

Specifications:

description	DPM-OUT 2-channel LINE output module, NRS 90218
connections	2 x XLRM-type connectors
audio	
outputs	2, electronically balanced, transformers are optionally available
nominal output level	0 dBu / 775 mV or +6 dBu / 1.55 V, switched via jumper
output impedance	115 Ω
frequency response	20 Hz ... 20 kHz, $\pm$ 0.5 dB
dynamic range	> 97 dB (A-weighted)
S/N ratio	> 109 dB (A-weighted)
distortion	$\leq$ 0.005 %
D/A-conversion	20-bit linear, Sigma-Delta
power consumption	1.5 W
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 247 mm
weight	160 g (255 g including 2 x NRS 90227)
extensions	NRS 90227 output transformer for 1 output order-No. 121 679

Pin-Assignment Of XLRM-Type Connectors:

The LINE output XLR-connectors' pin-assignment is as follows: pin 1 = screen, Pin 2 = positive conductor, pin 3 = negative conductor. In unbalanced configuration the pins 3 (-) and 1 (screen) have to be bridged inside the connected plug.
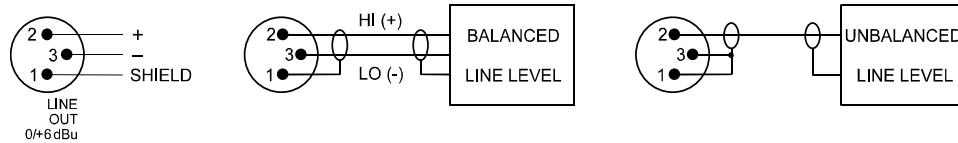
figure 5.28   pin-assignment of the OUT XLR-connectors

Block diagram:
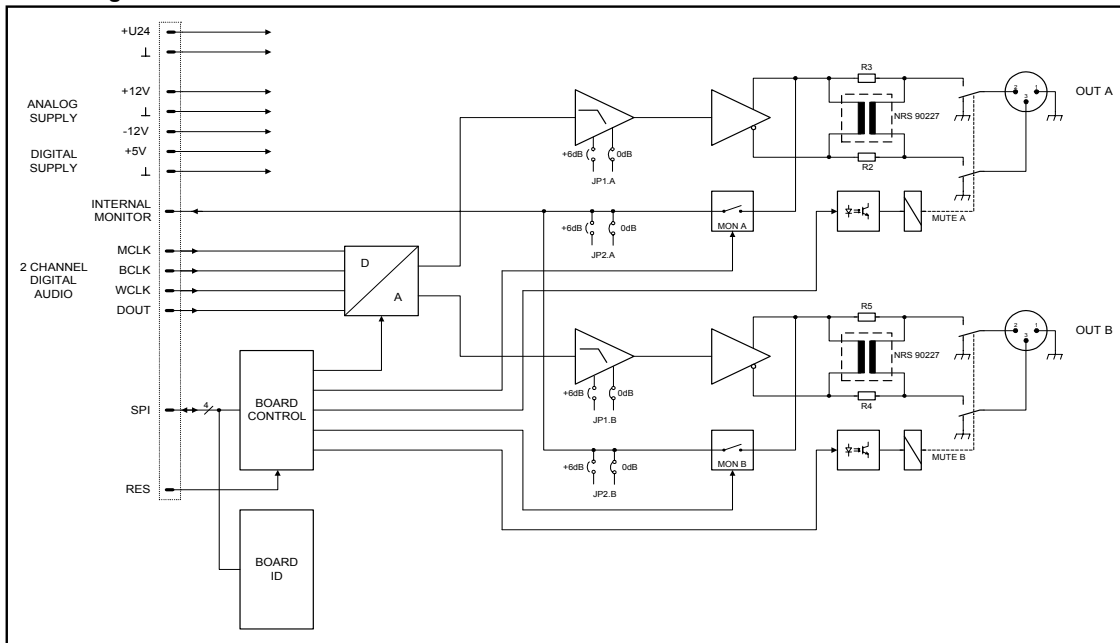
figure 5.29   block diagram of the 2-channel LINE output module

Setting Output Levels Via Jumpers:

Each of the two outputs' output level can be set to 0 dB or +6 dB using the jumpers JP1 and JP2. Please make sure to set both jumpers of an output channel (A / B) to the desired position.

When shipped, the output levels for both output channels are factory pre-set to 0 dB (all jumpers are closed).

Jumper setting JP1, 2-4 / JP2, 2-4	Output level channel A
Open	+6 dB
Closed	0 dB

Jumper setting JP1, 1-3 / JP2, 1-3	Output level channel B
Open	+6 dB
Closed	0 dB

Jumper setting for the output assignment: To be used in network installations.
When used in a network environment, the following jumpers have to be <u>open</u>:

OUT A   **LK10, LK11**   (applies to printed board assemblies starting with index C!)
OUT B   **LK 8,   LK 9**

Retrofitting Output Transformers:

Retrofitting two output transformers onto the module is possible for the case that galvanic separation of the audio signals is needed. Therefore, separate NRS 90227 extensions are needed per output channel.

When retrofitting output transformers, please proceed as follows:

1. Disconnect the DPM 4000 from the mains power supply.
2. Loosen the two locking screws and carefully slide the module out of its slot.
3. Remove the two resistors of the correspondent output channel (OUT A: R2 / R3, OUT B: R4 / R5).
4. Close the two bridges of the correspondent output channel (OUT A: LK1 / LK2, OUT B: LK3 / LK4). The soldering pads on the printed board assembly have to be short-circuited (closed).
5. Solder the transformer onto the printed board assembly: for OUT A in position T1 and for OUT B in T2.
6. Re-insert the module into the slot and carefully push it into the DPM 4000 until it firmly locks in place.
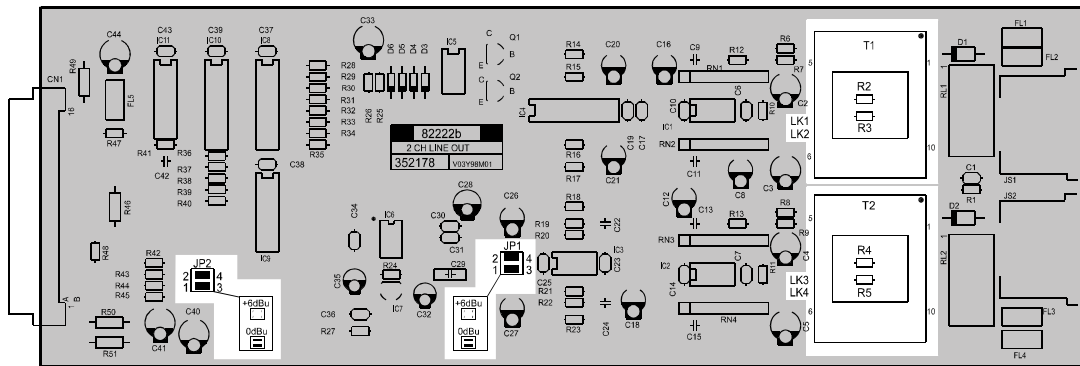7. Fix the module in place using the two locking screws and reconnect the mains power supply.

figure 5.30   output level jumpers, retrofitting transformers, location of parts (NRS 90218)

5.1.11 8 I/O Control Module (NRS 90219)

This control module provides 8 floating control inputs and 7 floating logic level outputs (0 V, 24 V). An additional output provides pole change impulses for controlling slave system clocks. Contact is established via 4 x RJ-45 sockets providing 8 contacts each. The module can be installed in slot 5.

The slave clock output (NU, OUT 1) is short-circuit proof; up to approximately 40 slave clocks can be connected. Please make sure to connect all slave clocks according to their correct polarity.

The control outputs (OUT 2 - 8) are capable of switching voltages of either polarity and up to a maximum current of 1 A.

The control inputs (IN 1 - 8) are capable of handling voltages of either polarity between -31 V and +31 V; for voltages between 0 and 5 V the inputs are not active (low), for voltages between 10 V and 31 V the inputs are active (high). The control inputs can ignite switching functions or macros either during a change of state or in any stationary state. This offers the possibility to monitor line idling currents (e. g. in fire alert system installations).
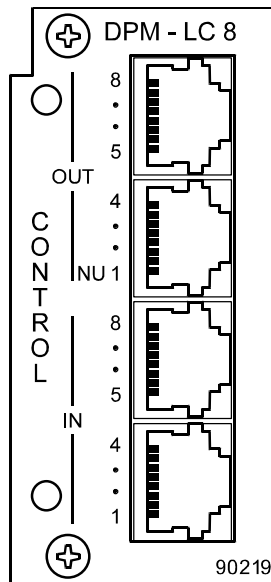
figure 5.31 8 I/O control module

Note:	The opto-coupler inputs are primarily meant to prevent noise loops that can result from dropping voltages in long distance cabling. They are not suitable for separating networks from each other. Therefore, only floating sources should be connected.

Specifications:

description	DPM-LC8 8 I/O control module, NRS 90219
connections	4 x RJ-45 sockets
logic inputs	8, floating via opto-coupler, bi-polar
voltage when the input is LOW	$U_{IN} < \pm 5$ V
voltage when the input is HIGH	$U_{IN} > \pm 10$ V
maximum input voltage	$U_{IN\ max} = \pm 31$ V
logic outputs	7, floating via relay contacts
contact capacity	1 A / 24 V DC
slave clock output	pole change impulse / turning impulse
output voltage	24 V DC
maximum output current	500 mA, electronically protected against overload
power consumption	3.2 W (12 W with the maximum amount of slave clocks connected)
operational temperature range	+5 °C ... +40 °C
dimensions W x H x D	37.5 x 81 x 247 mm
weight	195 g

Pin-Assignment Of RJ-45 Connectors:

The floating control inputs and outputs provide 2 adjacent contacts, each. The following diagram shows the assignment of RJ-45 contacts to inputs / outputs.

	OUT 1 - 4	OUT 5 - 8	IN 1 - 4	IN 5 - 8
8 7 }	OUT 4	OUT 8	IN 4	IN 8
6 5 }	OUT 3	OUT 7	IN 3	IN 7
4 3 }	OUT 2	OUT 6	IN 2	IN 6
2 1 }	slave clocks	OUT 5	IN 1	IN 5

figure 5.32   pin-assignment of the IN / OUT connectors
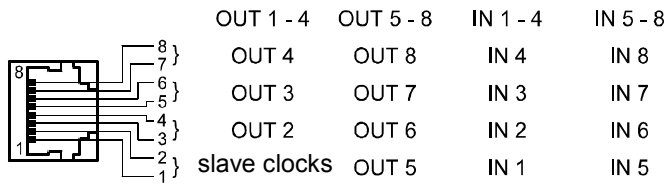
Block diagram:
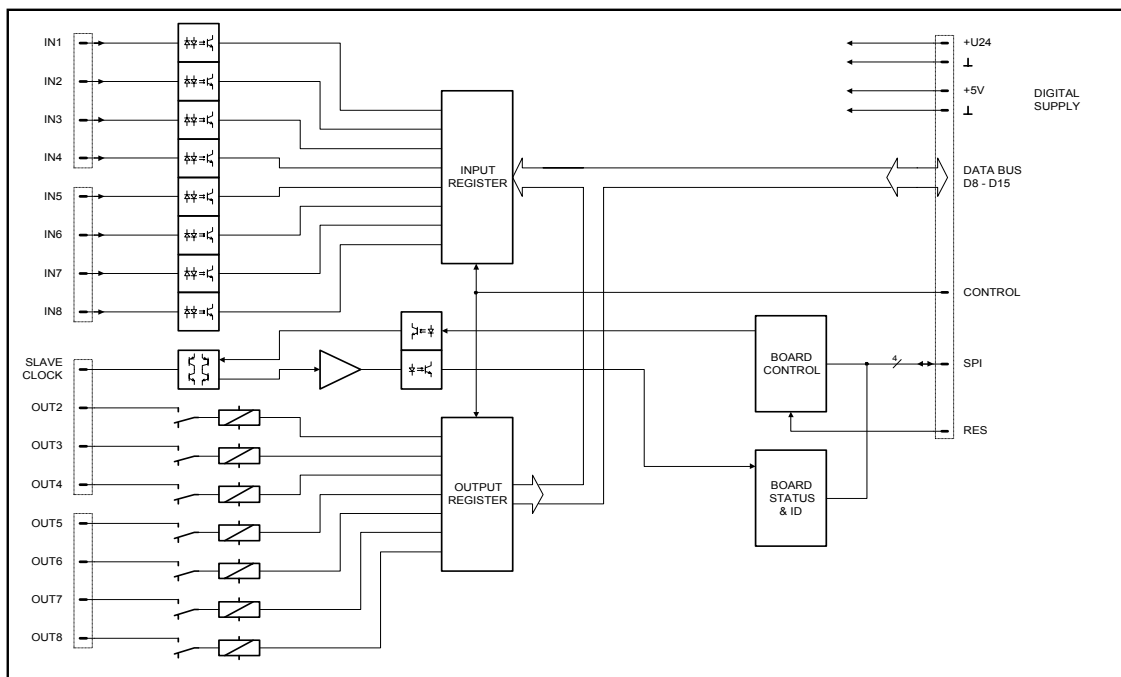
figure 5.33   block diagram of the 8 I/O control module

5.1.12 Flash Memory for Voice Recording/Playback (NRS 90205)

Internal Message Recorder

For using the internal message memory at least one voice message module NRS 90205 (121648) needs to be installed in the DPM 4000 and the SW-Message (121709) needs to be enabled. Up to maximally 4 memory modules can be retrofitted. The memory modules need to be formatted before the first use.

The Message Stacking Function is available together with the recorder.

Data:

- number of internal texts (messages)	25
- sampling frequency	48kHz
- sampling format	16-bit linear at a bandwidth of 20kHz
	8-bit compressed at a bandwidth of 10kHz
- maximum recording time	16-bit, 20kHz, 1 message memory: 22,5 sec.
	16-bit, 20kHz, 4 message memory: 90 sec.
	8-bit, 10kHz, 1 message memory: 90 sec. (1,5 min.)
	8Bit, 10kHz, 4 message memory: 360 sec. (6 min.)
- signal sources	DPM 4000 inputs IN1 – IN4

Instructions for retrofitting the Message Memory Extension (NRS 90205) into the DPM 4000

contents: 1 printed board assembly 86237
             1 manual

1.   Disconnect the appliance from any power supply.

2.   Remove the cover (7 screws).

3.   Insert the printed board 86237 on the main pcb 80249C
      - Insert the printed board 86237 into an empty slot, starting with CN301, CN302, CN303 or CN 304.

4.   Format the inserted memory boards (only possible using the PROANNOUNCE Designer software).
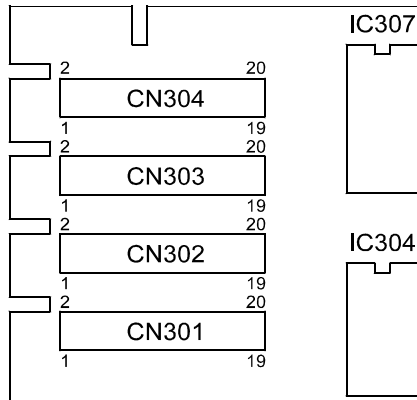
5.2   PROANNOUNCE – DPC 4000 Paging Consoles

5.2.1   System Overview

The PROANNOUNCE system includes 5 different models of DPC 4000 Series paging stations and one paging station extension. All microphone terminals employ gooseneck microphones, 6 or 8 function keys and a covered alarm key. An additional alarm key and a key-locked switch can be retrofitted. The paging stations are available with 10, 20, 30, or 50 selection keys. All models also employ LC-displays (2 lines with 16 characters each).

The following list provides you with an overview of available paging station models:

DPC 4106	6 function keys
DPC 4510	8 function keys + 10 selection keys + alarm key
DPC 4520	8 function keys + 20 selection keys + alarm key
DPC 4530	8 function keys + 30 selection keys + alarm key
DPC 4550	8 function keys + 50 selection keys + alarm key
DPC 4350	paging console extension with 50 selection keys

All paging consoles include the following common features:

- all functions are processor-controlled
- configuration data is stored in non-volatile FLASH RAM
- condenser microphone with pre-amplifier and compressor / limiter circuitry
- freely programmable key-assignment
- easy key-labeling through label-strips and MS WORD™ templates
- analog circuitry surveillance via integrated pilot tone generator
- processor surveillance via watchdog function
- line surveillance via pilot tone and polling functions
- covered alarm key (not with DPC 4106)
- additional alarm keys or key-locked switches can be optionally retrofitted
- connection of an external PTT-microphone or audio source
- piezo buzzer for acoustical alerts
- an optional loudspeaker can be retrofitted
- setup-mode allows direct parameter setting at the paging station
- two-line LC-display

All paging consoles are processor-controlled and extensive monitoring functions are provided. The watchdog function monitors the processor system while a switchable pilot tone generator monitors the audio section. Additionally, the internal supply voltage is constantly measured. When it falls below a critical threshold an alert message is being displayed. The line surveillance function recognizes any line-interruption and/or short-circuits in the audio and RS-485 control cabling. Upon the detection of failure a corresponding message is displayed.

The PROANNOUNCE Designer software allows comfortably configuring the paging stations. Its graphic, dialogue-oriented user interface offers effortless assign of key functions, priorities, options, and many other paging station functions.

Note:	Up to four paging consoles can be connected to a single input of the central unit. However, it is important to keep the fact in mind that in case of line interruption and short-circuit several microphone terminals may fail. Despite, one input allows only launching one message at a time. All other connected paging stations are presented with a busy-message. If these restrictions are not acceptable, every microphone terminal – or at least all directing stations and other important paging stations – should have its own input at the central unit.

5.2.2   Paging Console Functions

Next to elementary messaging, the paging stations offer several additional functions, which in summation are shown in the following diagram. Which functions a microphone terminal can initiate depends on its configuration and priority setting.

Table of all functions

```
announcement ─┬─ selective    ─── lines    ─┐
              │   call            groups     │
              │                              ├─ clear
              ├─ collective   ─── all       ─┘   selection
              │   call
              │
              └─ direkt
                  call


start signal ─┬─ gong        ─┐
             │                │
             ├─ text          ├─ stop
             │                │   signal
             ├─ general      ─┘
             │   alarm
             └─ selective
                 alarm


power
on / off

program      ─── lines         ─── clear
assignment       groups, all       assignment

special      ─── start
functions        macro
                 instruction

paging station ─┬─ address
setup          │   password
               │
               └─ Pre-gong
                   buzzer
                   compressor
                   date / time
                   LCD-contrast

service
functions
```
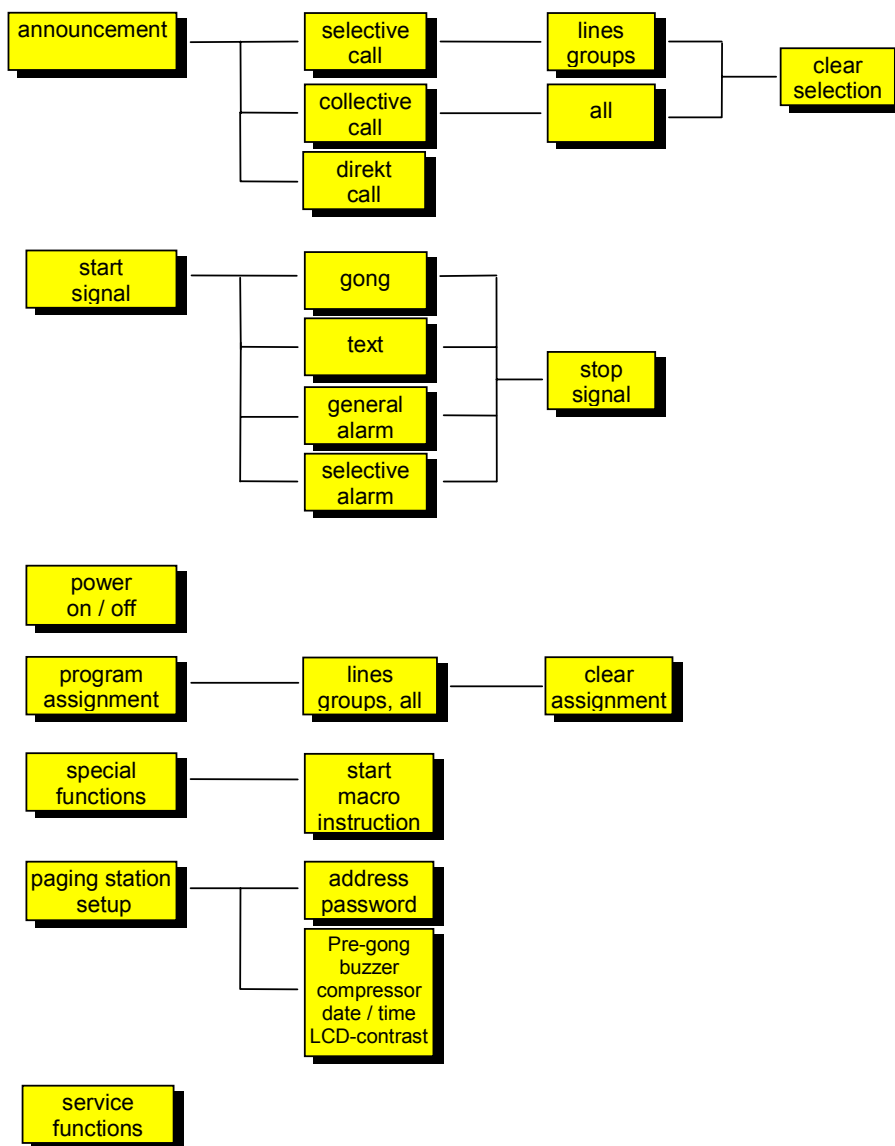
figure 5.34   overview of possible paging console functions

Detailed information on the different functions is provided within the following chapters of this handbook.
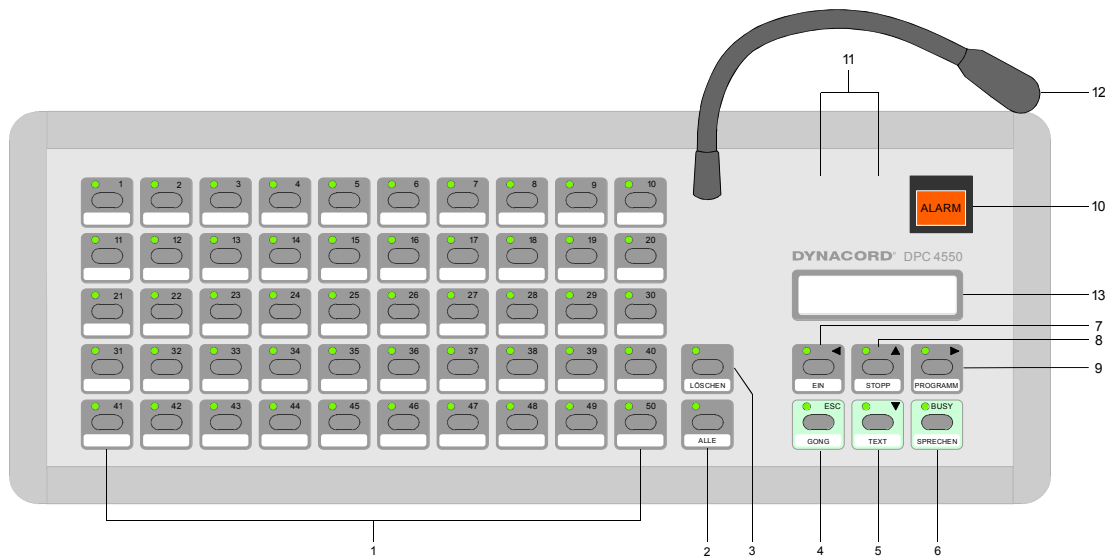
5.2.3   Control Panel Of The DPC 4550

figure 5.35   control panel of the DPC 4550

1   Selection Keys and LED's

Depending on the individual paging station model, 10, 20, 30, or 50 selection keys with corresponding LED's are provided. The selection keys are used to pre-select areas or groups for the reproduction of messages, gong or alarm signals, vocal messages, or to assign programs (pressed once = ON, subsequently pressed = OFF). The LED's indicate the momentary selection status (also refer to the paragraph "indications"). It is also possible to assign special functions or no function at all (no function assigned) to the selection keys. Assigning functions is performed during the configuration procedure via PC.

> **Note:**   When shipped, these keys are factory pre-set as area selection keys, where key 1 – area 1, key 2 – area 2, ..., key n – area n.

2   ALL key and LED

The ALL key allows the selection of all programmed areas at once for transmitting messages, gong or alarm signals, vocal messages, or to assign programs. One time pressing selects all areas. The corresponding LED's and the ALL LED are lit. Subsequent pressing cancels the selection.

3   CANCEL key

This key offers different functions, depending on the actually selected operation mode, e.g. cancel calling pattern or cancel program-assignment. Which function is carried out at times is explained in detail in the paragraph OPERATION.

4   GONG key (ESC) and LED

Pressing this key starts the transmission of a gong signal in the pre-selected areas or groups. The GONG LED lights or blinks during the transmission of a gong signal. What kind of gong signal is being transmitted is defined during the configuration procedure. Pressing the STOP key cancels the reproduction of the gong signal.

While in setup-mode, this key is used to return to 'normal' user mode (ESCAPE = leaving setup-mode).

5   TEXT key (∨) and LED

Pressing the TEXT key starts a prerecorded message (optional voice reproduction), which is transmitted into pre-selected areas or groups. The TEXT LED lights or blinks during the transmission of a prerecorded message. The desired text message is selected during the configuration procedure. Pressing the STOP key cancels the reproduction of a text message.

While in setup-mode, pressing the TEXT key decreases the selected parameter value (parameter entry).

6   TALK key and BUSY-LED

This key activates a message for pre-selected areas or groups. The BUSY LED lights during transmission. The TALK key has to be pressed until the end of a message. The BUSY LED blinks when one or several areas are busy or when an event with higher priority setting interrupts the output message (see paragraph indications). In the latter, it is necessary to repeat the message.

7   ON key (<) and LED

This key turns the system's power on or off. Turning the power on can take several seconds. The ON LED blinks while the system boots. The ON LED lights steadily when the system is operational. To prevent inadvertent erroneous operation pressing the key for at least 1 second is necessary when turning the power off. It is also possible to prohibit the operation of the ON key during the configuration procedure.

In setup-mode this key is used to select the previous parameter (parameter selection).

8   STOP key (∧)

Pressing the STOP key cancels an output alarm signal or text message. Terminating an alarm signal is also possible by subsequently pressing the ALARM key. Only events that were triggered from a specific paging console can be stopped from the exact terminal with the exception of the directing station. This terminal allows canceling all signals.

While in setup-mode, this key increases the selected parameter value (parameter entry).

9   PROGRAM key (>) and LED

Pressing the PROGRAM key selects the program assign mode. The selection keys are used in this mode to assign a program (background music) to the desired areas or groups. The PROGRAM LED lights while being in the program assign mode. In this case the selection LED's indicate the areas / groups the program is being transmitted into.

Keeping this key pressed and simultaneously pressing the STOP key selects the setup-mode and the PROGRAM LED starts blinking. Now you can alter preferences or make other changes as described in the chapter 5.2.7 *Paging Station Configuration In Setup Mode*.

When in setup-mode, this key is used to select the following parameter (parameter selection).

10 ALARM key and Indicator

Pressing the ALARM key starts an alarm signal that is transmitted into all areas. The alarm indicator lights when launching an alarm. Pressing the STOP key or subsequently pressing the ALARM key terminates the alarm signal. What kind of alarm signal is being transmitted is defined during the configuration procedure of the PROANNOUNCE system.

11 Optional Key-Slots

These slots allow retrofitting an additional covered key and a key-locked switch. The front panel is already prepared for the installation of two 18 mm pushbuttons / switches. You only have to cut suitable holes into the front panel foil. Internal fittings and cables are also already prepared. The newly installed switches' functions are assigned during the configuration procedure via PC; e.g.: second alarm-pushbutton for transmitting an alarm signal into specific areas (selective alarm), or assigning the system ON / OFF function to the key-locked switch.

Detailed information and installation instructions are provided in the chapter 5.2.13 *Optionally Available Accessories*.

12 Microphone

After pressing the TALK button and after the BUSY LED lights making announcements in pre-selected areas or groups is possible using the integrated gooseneck microphone. The optimum distance from the microphone is approximately 20 to 35 cm. The microphone pre-amplifier embodies a limiter to control signal peaks and protect the system against overdrive.

The extension socket (EXT) allows connecting a second microphone with TALK button. Assigning the function (area, group) of the external microphone is performed during the configuration via PC.

13 Display

Depending on the actual operational status of the system, the LC-display with 2 lines of 16 characters each, shows information on time, operation mode, user notes, setting up, fault messages including precise device / module specification, etc.

5.2.4   Connections

1   LAN socket

This is the interface for connecting DPC 4000 Series paging stations to the PROANNOUNCE system. The 8-pole RJ-45 connector provides power supply, control interface RS-485, and audio connections. The microphone terminal has to be connected to a corresponding RJ-45 wall outlet using the supplied connection cord (3 m). The following figure shows the pin-assignment of LAN socket and RJ-45 network cable. Please also pay attention to chapter *5.2.14 Cable Lengths*.
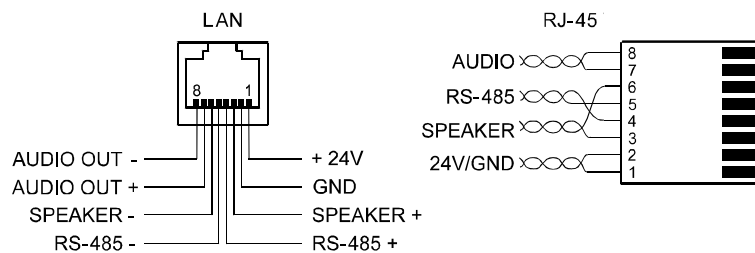
figure 5.36   LAN socket and RJ-45 network cable pin-assignment

2   EXT socket

Mostly, this socket is used for connecting a DPC4350 paging station extension. Use the supplied network cable (0.5 m) to connect the DPC4350 to the paging console's EXT socket.

In case no paging station extension is being connected, utilizing the EXT socket for connecting a second microphone with TALK button or other external audio signal sources to the paging console is possible as well. Detailed information is provided in chapter 5.2.13 *Optionally Available Accessories*.
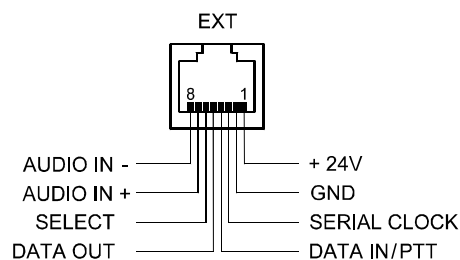
figure 5.37   EXT socket pin-assignment

5.2.5 Key-Labeling

Labeling the keys of paging consoles is done using label-strips, which can be slid in from the side. The label-strips for the 6 or 8 function keys are slid in from the right while the selection key strips – for 10, 20, 30, or 50 selection keys – are inserted from left. Therefore, you have to detach the correspondent side panel (2 screws) and insert the labeled strip into the gap between the front panel and the front panel foil.

The most convenient way of printing the labels is to utilize the word processing software MS-WORD. A suitable MS-WORD template file is supplied. Please note that with different printer models margin-settings may vary. Please adjust the layout form according to the individual specifications of your printer model.

Tested printer models are: **HP LaserJet 6P**
HP LaserJet 5
HP LaserJet II

The recommended paper thickness is between 120 g/m^2 and 200 g/m^2.

Also supplied with this handbook are prepared label-strips in German, English and French as well as empty strips which only have to be cut out. You can label the empty strips in handwriting or by using Letraset$^®$ letters.

5.2.6   Operation

This chapter explains all functions that are used during general operation.

Selective Call

The user can launch calls or announcements into freely selectable areas or groups.

Pressing a single or several selection keys defines areas or groups where a call is launched into – corresponding LED's will light. By pressing the key of an already pre-selected line once again deactivates that line and the corresponding LED goes out.

After making a selection, pressing the TALK-button ignites the call. Prior hereto, the BUSY LED allows checking whether all lines and the paging station input are actually free. If single lines or the terminal input are busy with lower priority transmissions, the BUSY LED will blink slowly. Whilst making an announcement is possible, this will interrupt any other transmitted event. If single lines or the terminal input are busy with higher priority signals, the BUSY LED will vastly blink and the calling attempt is ignored (also refer to the description of indications).

The BUSY LED lights during the transmission of an announcement. The TALK button has to be pressed during the whole message. Until the user makes any changes, the defined selection stays memorized, even after releasing the TALK button. Pressing the CANCEL key de-selects the entire selection.

Additionally and in case of a pre-gong signal has previously been programmed, the GONG LED will light during the transmission of the pre-gong signal.

Collective Call

The announcement is launched into all areas of the entire installation.

The procedure is similar to making a selective call. First, all areas of the installation are selected by pressing the ALL key. Pressing the TALK button activates the collective call. During the transmission of a call, all area and/or group LED's as well as the ALL LED will light (also refer to the paragraph "indications"). The TALK button has to be pressed down until the end of the announcement. BUSY LED indication and the behavior of the pre-gong signal are equivalent to the selective call.

Direct Call

Principally, assigning a direct call to any selection key (area key, group key, ALL key) is possible via PC during the configuration procedure. This allows making an announcement directly by pressing the desired selection key – without need to press the TALK key. For direct calls the BUSY LED also signals the status of correspondent areas (free, busy with lower priority signal, busy with higher priority signal; see "indications"). When shipped, there is no factory pre-set direct call programmed.

Gong (Chime) Signal

By factory the Gong key is programmed as a general call

A gong signal can also be transmitted into any selectable area or group of the entire installation (if programmed).

First, the desired areas / groups have to be selected; either by use of the selection keys (selective gong) or with the ALL key (general gong). Pressing the GONG key releases the gong signal. While the gong signal is being transmitted, the GONG LED lights continuously or blinks (also refer to indications). The gong's priority can be set to 6 or 7. Therefore it has priority over announcements from any paging station, except for the directing terminal (priority 10).

Pressing the STOP key cancels the transmission of a gong signal.

During setup mode this key is used to go back to the normal operating mode (escape).

Text Message

A text message recorded via the optional message module or using an external recording/playback device can be transmitted into any selectable area or group of the entire installation.

First, the desired areas / groups have to be selected; either by use of the selection keys or via the ALL key. Pressing the TEXT key starts the reproduction of a prerecorded message that had been assigned during configuration. While the text message is being transmitted, the TEXT LED lights steadily or blinks (also refer to indications). The text message priority can be set to values between 2 and 8.

Pressing the STOP key cancels the transmission of a text message.

General Alarm

A general alarm signal is always transmitted to all lines of the entire installation.

Pressing the covered ALARM key launches the integrated alarm. The key lights during the transmission of the alarm signal. The priority of the alarm can be set between 7 and 9. Therefore it has priority over any announcement or other event, except for those that were ignited from the directing paging station (priority 10).

Pressing the STOP key or subsequently pressing the ALARM key cancels the alarm.

Selective Alarm

When a paging station is equipped with a second ALARM key providing the option for selective alarms, it is possible to transmit alarm signals into selected lines.

Similar to the procedure for making a selective call you first have to select areas or groups to which the alarm signal shall be transmitted. Afterwards, pressing the covered ALARM key starts the selective alarm. The key lights during the transmission of an alarm. Already now, you are able to enter the lines for the following alarm.

Pressing the STOP key or subsequently pressing the ALARM key cancels the alarm.

When shipped, there is no factory pre-set selective alarm pre-programmed.

Note:	The launch of an alarm does not depend on a paging console's priority setting it had been activated from. Launching an alarm is possible from any microphone terminal at any time, even when the system is in stand-by mode. A running alarm is optically and occasionally also acoustically indicated at every paging station.

Canceling Signals

Pressing the STOP key cancels alarms, gong signals and text message transmissions. Events can only be terminated at the paging station they were launched from with the exception of the directing terminal (paging console with the highest priority possible 10). Through the directing station it is possible to cancel any signal in progress.

System ON / OFF

The ON key switches a PROANNOUNCE system ON or OFF. Mostly, it is not intended that any paging station be provided with the possibility to do so. Thus, this function can be programmed via PC-configuration.

When the system is in stand-by mode, the ON LED is off. Pressing the ON key turns the PROANNOUNCE system's power on which can take up to 10 seconds, while the ON LED is blinking. Once the system is ready for operation, the ON LED lights continuously (which also applies for all paging stations of the entire installation).

To switch the system OFF, you have to press the ON key for approximately 1 second. This is to prevent inadvertently turning off the system.

Pressing an ALARM key or igniting an alarm sequence at external terminals automatically switches the PROANNOUNCE system's power on and boots the system.

Program Assignment

Activating this feature allows the assignment of programs to individual areas and groups of the entire installation during the PC-configuration procedure.

First, by pressing the PROGRAM key, the paging station has to be set to program-assign mode. Pressing a single or several selection keys assigns the outputted program (background music) to the selected areas and groups. The corresponding LED's are lit. Program transmission has always the lowest priority (1). The signal level is determined during system configuration. The assignment stays memorized until the selection keys are pressed again. Pressing the CANCEL key erases the entire assignment-pattern.

Subsequently pressing the PROGRAM key or any other function key cancels program-assign mode. It is also automatically canceled after approximately 15 seconds.

In single-program configuration the music reproduction into all areas of the installation is attenuated for the time of an announcement. In double-program configuration parallel transmission of a background music program into rooms that are not part of an actual announcement selection is possible as well. If every line incorporates its own LF-output and separate power amplifiers, mixing announcements and background programs is possible in any way.

Special Functions

Generally, assigning a function to each selection key is possible. This allows utilizing a paging station to control the lighting, door openers, blinds, etc.; even controlling volume settings is possible through the use of the UP / DOWN keys.

When shipped, there are no special functions assigned.

5.2.7   Paging Console Configuration In Setup Mode

Configuring paging consoles is preferably performed on the central unit via computer and using the PROANNOUNCE Designer software. This represents the most convenient way without any limitation, while a paging terminal itself offers only limited programming ability.

Several key functions differ between setup-mode and operation mode. Alternate functions are marked on the right top corner of the individual key area.

Pressing PROGRAM key and STOP key simultaneously for at least 1 second – the PROGRAM LED starts blinking – engages a paging station's setup-mode.

Note:	Paging stations where program-assignment has been activated indicate the program assignment-pattern for a short period of time.

Using the '<' and '>' keys lets you step through the setup menu items in forward and backward direction (parameter selection). Parameter number and name are shown on the display.

The following table shows an overview of parameters and their meaning:

Parameter number	Parameter name	Description
1	Address	Paging station address-assignment (addresses 1 - 16)
2	Password	Unwanted access protection in two levels via code numbers: - 3-digit = normal operation - 4-digit = setup-mode
3	Pre-gong signal	Message pre-gong ON / OFF
4	Buzzer	Acoustic signal (buzzer) on failure or as alert and during an outgoing alarm signal
5	Compressor	Microphone pre-amplifier compressor ON / OFF
6	Date / Time	Entry of date and time in the formats: tt.mm.yy hh:mm
7	LCD contrast	Setting the LCD-contrast and/or view angle

The '∧' and '∨' keys activate / deactivate corresponding parameters or increment / decrement according parameter values. For directly entering numerical parameters, use selection keys 1 to 10, where the 10-key represents the "0".

Pressing the ESC key returns to 'normal' operation. The setup-mode is also automatically canceled when for approximately 15 seconds no entry or change has been made. All parameters are automatically stored.

1   Address

Paging consoles accept the assignment of addresses between 1 and 16. The setting is generally performed using the numerical keys 1 to 10, where the 10-key represents the "0". For paging stations without selection keys, the address has to be set using the '∧' und '∨' keys.

CAUTION:	**When shipped all paging station addresses are set to OFF (no address). Therefore it is important to assign a correct address to a microphone terminal, before the first operation. Within an installation terminal addresses have to be assigned exclusively; a specific address can exist only once!**
	When applying operation voltage for the first time, paging consoles start up in entry mode right away.

2 Password (does not apply to paging consoles without selection keys)

3 or 4-digit passwords provide protection for paging consoles against unauthorized operation. Password protection can be established in two levels. The first level is the 'normal' user-level. In case this level is password-protected, the paging station cannot be operated except for launching an alarm. The second level is the setup-level. If this level is password-protected, the setup-mode is not accessible while unlimited 'normal' operation is possible.

Level 1 and 2 passwords are assigned and transferred to the individual paging stations during the PC-configuration procedure. As factory preset the level 1 password is set to '111' and the level 2 password is '2222'; level 2 (setup-mode) is password-protected (factory pre-set).

To prevent a paging station from unwanted access, you have to enter setup-mode and select parameter 2 "password". Depending on which function of the paging console you want to protect, by using the selection keys you have to enter either the 3-digit level 1 password or the 4-digit level 2 password. Protection is now activated and operation (1st level) and/or programming (2nd level) are not possible anymore. The blinking PROGRAM LED indicates this status.

The protection is canceled by re-entering the correct password while being in setup-mode.

3 Pre-Gong Signal

It is possible to program a pre-gong signal that is heard before an announcement. The pre-gong signal is transmitted into the selected areas when pressing the TALK-button. You can begin with your announcement during the transmission of the pre-gong signal; you can talk "into" the pre-gong.

Using the arrow keys (<>) first select parameter 3. Now, you can ignite the pre-gong signal with the '∧' key or cancel it by using the '∨' key. The pre-gong function can also be activated or deactivated during PC-configuration.

4 Buzzer

The integrated buzzer can be programmed as acoustic alert signal. During failure, malfunction, or as general alert a buzzing sound is heard. When an alarm has been launched, the buzzing can be heard for the whole period of the alarm.

First, select parameter 4 using the arrow keys (<>). Now, you can activate the buzzer by pressing the '∧' key. Pressing the '∨' key deactivates the buzzer. The buzzer function can also be activated during PC-configuration.

5 Compressor

The paging stations' microphone pre-amplifier incorporates compressor / limiter circuitry. While the limiter is constantly activated, the compressor can be switched ON or OFF. When the compressor is engaged, low-level signals are amplified to a higher degree, which results in constant talking levels although the distance between the announcer and the microphone varies. Besides, you have to keep in mind that also environmental noise is amplified. Thus, on-site testing with and without compressor will reveal which results in the better performance.

First, by using the arrow keys (<>), select parameter 5. Pressing the '∧' key activates the compressor. Pressing the '∨' key deactivates the compressor. It is also possible to activate the compressor during the PC-configuration procedure.

6 Time / Date (does not apply to paging consoles without selection keys)

The connected paging stations allow setting the date and time of the PROANNOUNCE system.

First, by using the arrow keys (<>), select parameter 6. Using the selection keys 1 to 10 – with the 10-key representing the "0" – you can enter the correct time. Date and time are indicated in the following format: tt.mm.yy hh:mm. They have to be entered in that sequence

7 LCD-Contrast

Paging consoles with display allow the user to individually adjust LCD-contrast and viewing angle. This allows optimum legibility from the user's location.

First, by using the arrow keys (<>), select parameter 7. Now, you can adjust the LCD-contrast via the '∧' or '∨' keys.

5.2.8   Indications

The following table provides you with an overview of the most important LED-indications.

LED	Status	Description
Selection LED (not with DPC 4106)	OFF	No group or area selected
	Lights green	Area or group selected / special function activated / direct call activated
ALLE LED (not with DPC 4106)	OFF	No collective call selected
	Lights green	Collective call pre-selected / direct collective call activated
BUSY LED	OFF	System not busy, clear for call
	Lights green	During own message
	Slow blinking, green	Low priority paging station launches a call in selected areas; interruption on cost of the momentary microphone terminal is possible
	Fast blinking, green	System is busy with a higher priority transmission (message, gong, alarm), interruption is not possible, already launched call is interrupted by events with higher priority setting
GONG LED	OFF	No gong signal started
	Lights green	Gong signal in progress; manually started or pre-programmed pre-gong signal
	Lights green	Gong signal in progress, ignited from another source or time-controlled
ON LED	OFF	System is OFF (stand-by mode)
	Lights green	System is ON and ready for operation
	Blinks green	System has been turned on and is booting (initialization)
PROGRAMM LED	OFF	Paging console is in message-mode
	Lights green	Paging console is in program assign mode
	Slow blinking, green	Paging console is password-protected
	Fast blinking, green	Paging console is in setup-mode
TEXT LED	OFF	No text message launched
	Lights green	Text message in progress, manually launched
	Blinks green	Text message in progress, launched from another source or time-controlled
ALARM	OFF	No alarm signal launched
	Lights red	Alarm signal has been launched from any source
	Blinks red	Alarm signal has already been stopped, but keeps running until signal-end

5.2.9   Priorities

The PROANNOUNCE system allows setting 10 priority levels (highest priority = 10, lowest priority = 1) that include announcements, as well as alarm and gong signals, and vocal message reproduction. A higher prioritized event principally interrupts any other event with a lower priority setting. For events with equal priority the earlier launched signal is continued; has priority over the latter.

Priority level	Assigned	Description
10	Directing station	Highest priority; can ignite any type of events and interrupt all other signals.
7 - 9	Alarm signal	Can only be interrupted from the directing station; but interrupts all other signals that have not been launched from the directing terminal.
6 - 7	Gong signal (manual / time-controlled)	Interrupts all signals that are not coming from the directing terminal. Time-controlled gong signals can be delayed/pre-delayed by a pre-defined period of time.
2 - 8	Recorded message	These priorities can be freely assigned to text messages during the configuration procedure.
2 - 6	Message from a paging console without / with pre-gong signal	These priorities can be freely assigned to any 'normal' paging console. A pre-gong signal has the priority of the launching microphone terminal.
1	Program	Background music always has the lowest priority level.

5.2.10 DPC 4350 Paging Station Extension

The DPC 4350 paging station extension provides selection keys only. It is employed whenever a higher amount than 50 lines need to be accessed or when an installation's requirement of group and special function keys exceeds the existing amount of selection keys. The DPC 4350 can be easily combined with any other paging station model. The following list shows the amounts of maximally accessible lines for various combinations:

Combination	Maximum amount of lines
DPC 4106 + DPC 4350	50
DPC 4510 + DPC 4350	60
DPC 4520 + DPC 4350	70
DPC 4530 + DPC 4350	80
DPC 4550 + DPC 4350	100

The extension unit is directly connected to the extension interface of the main paging station using the supplied 8-pole RJ-45 cable and plugging it into the EXT-socket. A single paging station then consists of two devices that report to a common address. Therefore the central unit recognizes them as one single microphone terminal with an increased amount of selection keys. Also from the viewpoint of the user the two devices act as only one paging station; i.e. the selection keys of the main and the slave paging station provide equal access to their assigned areas, groups and special functions.

Note:	During the configuration of the system using the PROANNOUNCE Designer software, it is important that the main paging station's EXT-socket is configured for the connection of a DPC 4350 extension.
	The extension unit can only be operated together with DPC 45.. or DPC 40.. Series paging console models!

5.2.11 Factory Presets

When shipped, the selection keys 1 – n are assigned to the corresponding areas 1 – n offering real plug 'n' play; the paging station is ready for operation directly after connection and switching the system power ON.

CAUTION:	When operating several paging consoles within one installation, setting every single one to its individual, exclusive address (1 - 16) is of major importance.

The paging stations provide the following factory pre-set functions and characteristics:

Parameter		Setting / Description
Address		OFF
Priority		5 (priority for messages)
Name		Untitled DPC4xxx (Type)
Password		Level 1 not protected Default password level 1: 111 Level 2 password-protected Default password level 2: 2222
Pre-gong signal		OFF
Buzzer		ON (acoustic alert signal)
Compressor		OFF
Extension socket	**EXT**	OFF
Options	2nd alarm key	Not programmed
	Key-lock switch	Not programmed
	PTT-microphone	Call in pre-selected areas, priority 5
Key-assignment	Selection keys 1 – n	Selecting areas 1 – n (key 1 → area 1, key 2 → area 2, ..) (not with DPC 4106)
	TALK	Call in pre-selected areas, priority 5 (DPC 4106: calls in all areas)
	TEXT	Text message in pre-selected areas; text 1, priority 2 (DPC 4106: text message transmission in all areas)
	GONG	4-stroke gong signal in pre-selected areas, priority 8 (DPC 4106: gong signal transmission in all areas)
	ALL	Selecting collective call
	CANCEL	Cancel selection / call-pattern (not with DPC 4106)
	ON	Switching the system ON / OFF, priority 5
	STOP	Terminates any locally launched signal (gong, text, alarm)
	PROGRAM	Assigns a program to pre-selected areas (not with DPC 4106)
	ALARM	DIN-alarm in all areas, priority 9 (not with DPC 4106)
Special functions		Not programmed

5.2.12 Specifications

	DPC 4106	DPC 4510	DPC 4520	DPC 4530	DPC 4550	DPC 4350
Operation voltage	24 V DC (21,6 V – 31,2 V)					
Power consumption (24 V)	80 mA	80 mA	85 mA	90 mA	90 mA	90 mA
Min. operation voltage	15 V DC					
Max. power consumption (15 V)	120 mA	120 mA	120 mA	120 mA	135 mA	95 mA
NF - input external						
Line (default)	0 dBu					-
PTT – microphone (A & B bridged)	-52 dBu					-
NF-output (electrically balanced)	+6 dBu					-
Covered alarm key, sealable	Option	Yes				-
DPC 4350 extension connection provided	Yes					-
Connections	RJ-45					
Supplied connection cord	3 m					0,5 m
LC-display	2 x 16 characters	2 x 16 characters	2 x 16 characters	2 x 16 characters	2 x 16 characters	-
Environmental temperature	5 ... 40° C					
Enclosure dimensions (W x D x H, in mm)	170x160x65	225x160x65	270x160x65	320x160x65	405x160x65	335x160x65
Gooseneck	∅ 8 x 200 mm					-
Weight	1,0 kg	1,5 kg	1,7 kg	1,8 kg	2,5 kg	1,9 kg
Finish	Grey-white RAL 9002, micro-structure					
Accessories						
Monitor speaker	-	NRS 90209				-
Pushbutton / switch Selectable, ∅18 mm	NRS 90230					-
Key-lock switch ∅ 18 mm	NRS 90231					-
Transformer balanced	NRS 90232					-

5.2.13 Optionally Available Accessories

**Optional Alarm Key (NRS 90230)**

The paging stations employ two empty slots for retrofitting optional alarm keys or key-lock switches (also refer to chapter *5.2.3 Control Panel DPC 4550).* For installing an additional alarm key you should only use the NRS 90230 extension kit.

Brief description: optional pushbutton or switch for retrofitting DPC 4xxx-type paging stations to work as idling current-controlled opener. The pushbutton - switch function can be configured on the hardware.

Supplied with the NRS 90230:   1 switch – pushbutton, complete with label field and cover
1 connection cord, 4-pole
1 resistor 10 k ohms
1 lamp 6 volts
1 selable cover

installation instructions:

1. Disconnect the paging console from the power supply.

2. Detach the bottom plate (6 to 8 screws, depending on the paging console model).

3. Prepare the installation site for the insertion:

   - Use a sharp, pinpoint tool (thick needle, pointed rat-tailed file, knife, etc.) to carefully pierce the pre-punched holes through – from the enclosure's outside to the inside.

   - Configure the switch to operate as switch or pushbutton.

   - CAUTION: Install the switch so that the gap for changing the switch's operation points towards the TALK key. This allows for easy changing its function even after it has been inserted.
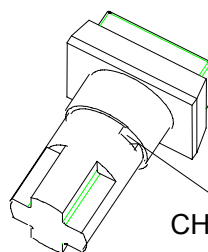
CHANGE FROM:
SWITCH to PUSHBUTTON

figure 5.38   optional pushbutton/ switch

Note:	Please make sure to solder the cables after the switch has been installed. Otherwise it is virtually impossible to slide the counter-nut over the body of the switch!

4. Adjust the switch and tighten it using the supplied milled nut.

5. Connect the cables and the resistor according to the circuit diagram on this page.

6. Please mind the sequence in which you connect the flat wire cables. The two outside wires 1(rt) and 4(gr) need to be soldered to the contacts of the lamp. The two inner wires 2(gr) and 3(gr) need to be soldered to contacts 1 and 2 of the switch. Polarity of either pair of wires is not critical.

7. Afterwards, you have to connect the 4-pole female plug to the corresponding OPTION 1 or OPTION 2 - terminal strip on the basic printed board assembly.

8. Re-attach the bottom plate.

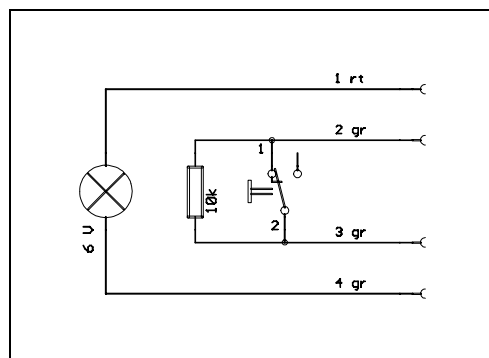9. Software configuration with the PROANNOUNCE Designer

figure 5.39   circuit diagram pushbutton / switch

Optional Key-lock Switch (NRS 90231)

The paging consoles employ two empty slots for the incorporation of optional alarm keys or key-locked switches (also refer to chapter 5.*2.3 Control Panel DPC 4550)*. For retrofitting an additional key-lock switch you should only use the NRS 90231 extension kit.

Brief description: optional key-lock switch for retrofitting DPC 4xxx-type paging stations to work as idling current-controlled opener.

Supplied with the NRS 90231: 1 key-lock switch, complete with front frame and 2 keys
1 connection cord, 4-pole
1 resistor 10 k ohms

Installation instruction:

1. Disconnect the paging console from the power supply.

2. Detach the bottom plate (6 to 8 screws, depending on the paging station model).

3. Prepare the installation site for the insertion:

    • Use a sharp, pinpoint tool (needle, pointed rat-tailed file, knife etc.) to carefully pierce the pre-punched holes through – from the front panel's outside to the inside.

Note:	Please make sure to solder the cables after the switch has been installed. Otherwise it is virtually impossible to slide the milled nut over the body of the switch!

4. Adjust the switch and tighten it using the supplied milled nut.

5. Please refer to the circuit diagram on this page when connecting the supplied 4-pole wire and the resistor.

6. Please mind the sequence in which you connect the flat wire cables. The two outside wires 1(rt) and 4(gr) have to be cut off as short as possible and need to be insulated. The two inner wires 2(gr) and 3(gr) need to be soldered to contacts 1 and 2 of the switch. Polarity is not a critical factor.

7. Afterwards, you have to connect the 4-pole female plug to the corresponding OPTION 1 or OPTION 2 - terminal strip on the basic printed board assembly.

8. Re-attach the bottom plate.

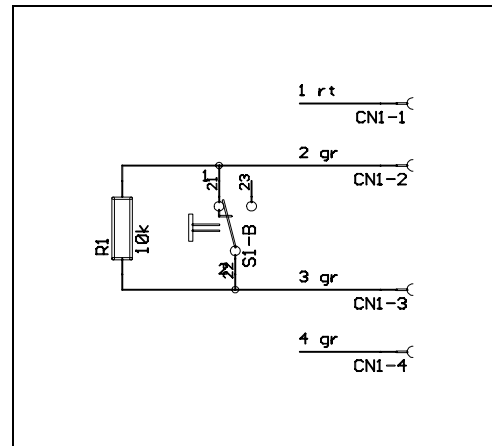9. Software configuration with the PROANNOUNCE Designer

figure 5.40 circuit diagram key-lock switch

Input / Output Transformer (NRS 90232)

If need is, the paging consoles provide the possibility for with either an input transformer – in case you would like to connect audio devices to the EXT-socket – or an output transformer. For retrofitting transformers, please only use the NRS 90232 extension kit.

Brief description: optional Audiotransformer for alternative integration to serve as input or output transformer in DPC 4xxx Series paging consoles.

Supplied with the NRS 90232:   1 transformer DCN-337387
                                 1 cable binder with a length of 142mm

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CAUTION: Using the device as an input transformer is only permissible for external devices (CD-Player, cassette tape deck etc.) with an output level >= 775 mV. The NRS 90232 extension cannot be used as a microphone input transformer.

Installation instructions:

1. Disconnect the paging console from the power supply.

2. Detach the bottom plate (6 to 8 screws, depending on the paging station model).

3. Installing the transformer on the output socket printed board assembly:

    - When utilized as input transformer

      Prior to installing you have to disconnect the bridges that are marked with an "X" in the diagram on this page.

      The transformer has to be inserted at the position marked as T1 (1a, 6a, 3a, 4a) and fixed in place using the supplied cable binder. The yellow point on the transformer marks pin 1.

figure 5.40   retrofitting input transformers

    - When utilized as output transformer

      Prior to installing you have to remove the bridges that are marked with an "X" in the diagram on this page.

      The transformer has to be inserted at the position marked as T2 (1, 6, 3, 4) and fixed in place using the supplied cable binder. The yellow point on the transformer marks pin 1.
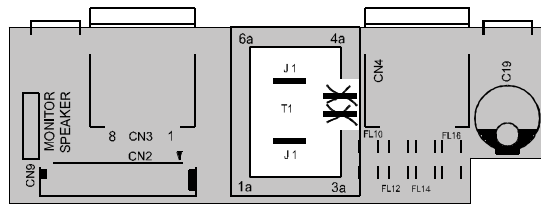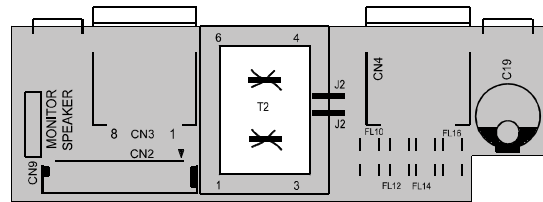

figure 5.41   retrofitting output transformers

4. Re-attach the bottom plate.

Optional Monitor Loudspeaker (NRS 90209)

Brief description: Installing the extension-kit NRS 90209, each DPC 4000 paging console (excluding the DPC 4106) can be retrofitted with a monitor loudspeaker. To prevent acoustic feedback between speaker and microphone, the first is muted whenever the TALK key is pressed. Also included is a 100V-transformer that is installed inside of a wall outlet and is used for low-impedance operation of the loudspeaker.

Supplied parts: 1 prepared printed board assembly 89022 including 100V transformer and connection cords
1 bottom plate with printed board assembly 89021; connection cords and loudspeaker are pre-mounted

Note: For being able to ship the correct bottom plate, please specify your paging console model in which the extension is going to be installed when ordering the NRS 90209!

Installation instructions:

1. Disconnect the paging console from the power supply.

2. Detach the bottom plate (6 to 8 screws, depending on the paging station model).

3. Slide the 4 rubber feet off the side of the bottom plate and attach them to the new bottom plate with the pre-mounted printed board assembly 89021.

4. Connect the plug of the printed board assembly 89021 to the terminal strip CN9 (on the little connection printed board) – refer to figure 5.42:
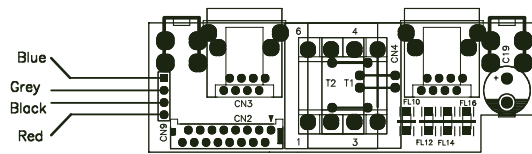
figure 5.42   connecting the NRS 90209 in a paging console

5. Attach the new bottom plate.

6. Reconnect the paging station to the LAN.

7. Mount the printed board assembly 89022 (including 100V transformer) inside of a standard wall outlet and connect it between the 100V line and the RJ45-wall junction box, refer to the circuit diagram. 100V loudspeaker cabling needs to be kept separated from all other paging console wiring!

figure 5.43   circuit diagram for the monitor loudspeaker extension-kit (NRS 90209)

Connecting A PTT-Microphone

Connecting an external PTT-microphone to the EXT-socket is possible using a special purpose cable (not supplied) and in accordance to the diagram on this page.

Therefore, it is necessary to change the input sensitivity to microphone level, as described below, by closing the two soldering-bridges "A" and "B".

The PTT-function of the corresponding paging station has to be configured during system configuration via the PROANNOUNCE Designer software.
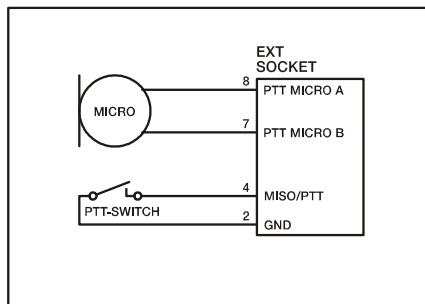
figure 5.44   connecting a PTT-microphone

Connecting External Audio Signal Sources

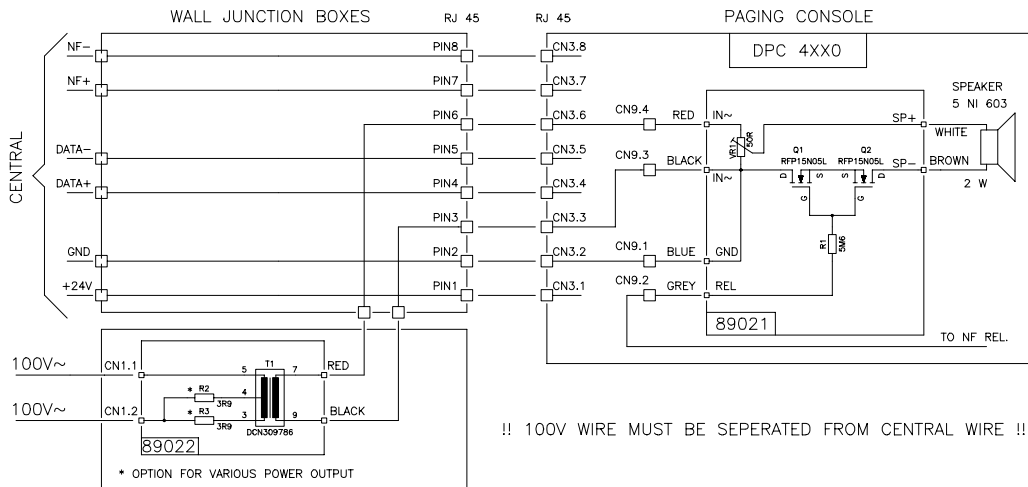Connecting CD-Players, tape decks, etc. to the EXT-socket is possible using a special purpose cable (not supplied) and in accordance to the diagram on this page.

The input sensitivity is factory pre-set to a level of 0 dBu.

The corresponding paging console has to be configured during system configuration for the "external audio signal source"-function using the PROANNOUNCE Designer software.
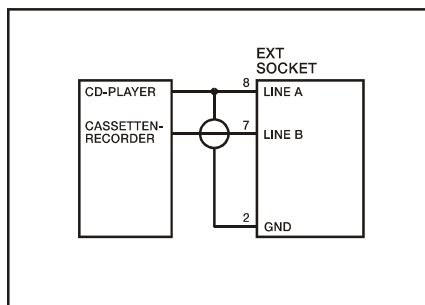
figure 5.45 connecting external audio signal sources

External MIC / LINE Input (EXT socket)

As shipped, the external MIC / LINE input is set to a sensitivity of 0 dBu. Switching the input sensitivity to –45 dBu for the connection of a PTT-microphone is only possible by closing two internal soldering-bridges. Therefore, you have to perform the following steps:

1. Disconnect the paging console from the power supply.

2. Detach the bottom plate (6 to 8 screws, depending on the paging station model).

3. Close the soldering-bridges "A" and "B" according to the diagram on this page.

4. Re-attach the bottom plate.
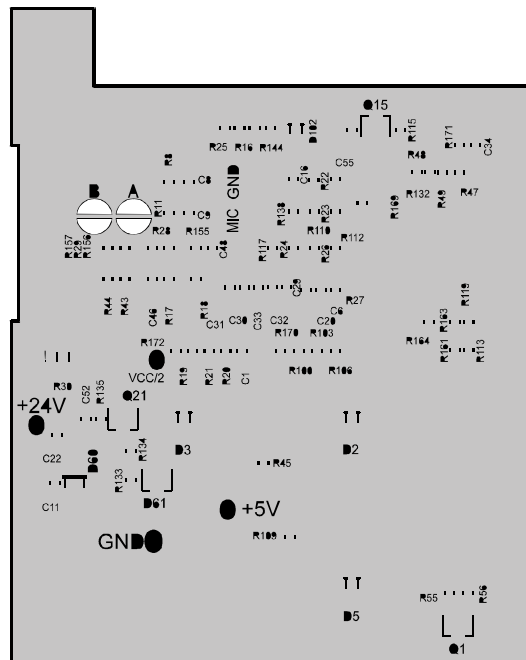
figure 5.46   setting the input sensitivity

5.2.14 Cable Length

Depending on the utilized paging station model and amount, and in relation to minimal supply voltage and cable-diameter, different maximum cable lengths are possible. The following tabulations show some examples for cable-diameters of 0.6 mm and 0.8 mm and with supply voltages of 24 V, respectively of 21.6 V in emergency supply operation. For precise calculation, a calculation-chart running under MS-EXCEL 97 is provided.

A Single Paging Station On A Single DPM-Line:

Cable type	Paging console model	Cable length (m) 21.6 V emergency supply	Cable length (m) 24 V
JY(St)Y 4x2x0,6	DPC4510/4106	230	395
	DPC4520	225	385
	DPC4550	220	375
JY(St)Y 4x2x0,8	DPC4510/4106	410	700
	DPC4520	400	690
	DPC4550	390	670

A Single Paging Station + Extension On A Single DPM-Line:

Cable type	Paging console model	Cable length (m) 21.6 V emergency supply	Cable length(m) 24 V
JY(St)Y 4x2x0,6	DPC4510 + DPC4350	150	260
	DPC4520 + DPC4350	150	255
	DPC4550 + DPC4350	145	250
JY(St)Y 4x2x0,8	DPC4510 + DPC4350	270	460
	DPC4520 + DPC4350	265	455
	DPC4550 + DPC4350	260	450

Four Paging Stations DPC4550 (+ Extensions) On A Single DPM-Line:

Cable type	Paging console model	Cable length (m) 21.6 V emergency supply	Cable length (m) 24 V
JY(St)Y 4x2x0,6	4 x DPC 4550	55	95
	4 x DPC4550 + 4 x DPC4350	25	40
JY(St)Y 4x2x0,8	4 x DPC 4550	95	165
	4 x DPC4550 + 4 x DPC4350	40	75

5.3　DPA 4000 PROANNOUNCE Power Amplifier

5.3.1　Characteristics

The PROANNOUNCE system includes four DPA 4000 Series power amplifiers, offering common features as listed below:

- 4 models:　　DPA 4410　　4 x 100 W
　　　　　　　DPA 4411　　4 x 100 W Remote Control
　　　　　　　DPA 4120　　1 x 200 W
　　　　　　　DPA 4140　　1 x 400 W

- floating 100 V power outputs (internally configurable to 70 V / 50 V or 4 Ω)

- outputs are protected against idling and short-circuit

- mains operation at 115 / 230 V AC and 24 V DC (emergency power supply)

- mains and battery remote on/off

- electronically balanced inputs, transformers are optionally available

- input level controls

- monitor outputs

- temperature-controlled operation

- pilot tone and ground fault surveillance (optionally available)

- fault indication and fault messaging via floating READY-contact

- remote control module for DPA 4120 / DPA 4140 (optionally available)

Note:	Detailed description of individual characteristics, features, functions, and specifications of these power amps are provided in the corresponding owner's manual supplied with the appliance.

5.3.2 Instructions For Using Remote-Power Amps:

1.   Each power amplifier has to be set to the exact address as it is specified in the PROANNOUNCE Designer software (A=low value part, B=high value part). Address setting is performed using hexadecimal code.

2.   An RS-485 connection needs to be established between the DPM 4000 (remote socket) and maximally eight DCS 401, and maximally 64 amplifiers (DPA 4411 counts as a single unit). The RS-485 bus may not exceed a maximum length of 1,000m and must follow a line-structure with stub cables being as short as possible. When including more than 30 amplifiers, both ends of the bus have to be terminated with 120 ohms resistors. This bus is also used for monitor signal transmission.

3.   Connect the amplifier(s) to an operation voltage source.

4.   Perform a Netscan procedure via the PROANNOUNCE Designer software. In 'normal' operation the status-LED's on the rear panel of the amplifiers have to light periodically, depending on the number of participants on the bus (communication with the DPM 4000).

5.   Within the communication window of the PROANNOUNCE Designer software checking which addresses are registered as participants is possible using the command "/AMP/AVLBL ?".

6.   Once a participant on the bus had been disconnected from the DPM 4000 for a short term (e.g. because the RS-485 line had temporarily been disconnected), it is included again in the query sequence after 10 sec.

5.3.3   Remote Module for Single-Channel-Amplifiers DPA 4120 and DPA 4140 NRS 90222
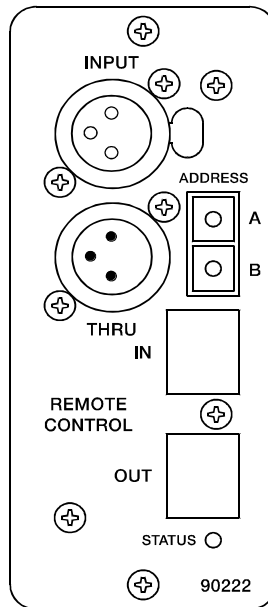
This single-channel input module provides DPA 4120 or DPA 4140 power amplifiers with remote functionality.

(For detailed information on DPA 4120 and DPA 4140 power amplifiers, please refer to the owner's manual 355768.)

The module allows connecting balanced XLR-input and XLR-thru lines as well as connection to the remote control bus of the DPM 4000 (RS-485). Prior to connecting the amplifier to the operating voltage, the unit's address has to be set using the switches "A" and "B" (A=low value part)

The following remote functions are available:

Control:

- Level control, Mute

- Monitor activation (Input / Output)

- Mains operation ON/OFF

- Battery operation ON/OFF

- Pilot tone ON/OFF (optionally available)

Messages:

- Output level

- Pilot tone detection

- Ground fault detection

- Thermal overload amplifier / mains transformer

- Configuration

- Measured values of current and voltage at the power output

- Extension-kits

5.3.4 Four-Channel Power Amplifier DPA 4411

Features:

- Power amplifier with 4x100 W output power capacity according to IEC 283-3, 19" - Chassis (3 HU)

- Mains operation 115/230 V AC and emergency power supply operation 24 V DC

- Output transformers for balanced, floating 100 V speaker networks; 70 V, 50 V or 4 ohms low impedance operation selectable

- All outputs are protected against idling and short-circuit

- Integrated remote module for control and surveillance via the PROANNOUNCE Manager DPM 4000

- Electronic level controls, electronically balanced inputs and electronically balanced MONITOR output

- Input transformers for balanced, floating operation are optionally available

- Monitor output transformer offering a balanced, floating MONITOR output is optionally available

- Routing-switch for parallel input operation of amplifiers

- Integrated standby-power supply

- Mains function switch POWER

- Ground-lift switch

- Remote start in mains and battery operation with initial inrush current limiter

- Switching noise suppression

- Status-LED indication: operation (READY), STANDBY, thermal overload (PROTECT), and GROUND FAULT at the power output

- Fault-messaging according to DIN EN 60849 via the PROANNOUNCE Manager DPM 4000

- TEST-button for installations with emergency switching, RESET for ground fault

- LED-meter instrument; indication in the range of –13 dB to 0 dB and CLIP

- Mains voltage selector switch 115/230 V AC

- Active, temperature-controlled fans

- Modules for pilot tone surveillance and ground fault surveillance according to DIN VDE 0800 (optionally available)

The appliance allows connecting four balanced XLR-type input lines as well as connection to the remote control bus of the DPM 4000 (RS-485). Prior to connecting the amplifier to the operating voltage, the unit's address has to be set using the switches "A" and "B" (A=low value part).

For detailed information on the four-channel power amplifier DPA 4411, please refer to the owner's manual 356810.

The following remote functions are available:

Control:

- Level controls, Mute of all channels

- Monitor activation (Input / Output) for all channels

- Mains operation ON/OFF

- Battery operation ON/OFF

- Pilot tone ON/OFF (optionally available)

Messages:

- Output level (all channels)

- Pilot tone detection (all channels)

- Ground fault detection (all channels)

- Thermal overload amplifier / mains transformer

- Configuration

- Measured values of current and voltage at the power outputs

- Extension-kits

5.4   DCS 400 Control System

5.4.1   Characteristics

DCS 400 Series modules increase the PROANNOUNCE system's control functionality in miscellaneous ways. These printed board assemblies in the Europe standard format are usually inserted at the rear of a PA-system rack-shelf or installed in suitable distribution boxes. The DCS 400 system consists of five different modules and additional extensions:

- DCS 401   control module for controlling relays, logic inputs, analog inputs and outputs, and rotary encoders

- DCS 408   relay module with 5 line relays for 100 V systems

- DCS 409   relay module with 5 NF or control relays

- DCS 412   logic input module with 12 floating, bi-polar inputs that are linked via opto-couplers

- DCS 416   analog I/O module offering 8 inputs and 8 outputs for 0 V DC to 10 V DC

- DCS 420   monitor module with 7-segment display, meter instrument and monitor loudspeaker

- NRS 90240   rotary encoder

A PROANNOUNCE installation allows integrating a maximum of up to 8 DCS 401 control modules. A single control module can host up to 12 relay boards of the types DCS 408 / DCS 409 in any sequence. Besides, it is possible to connect up to 5 logic input modules, 2 analog I/O modules, and 2 rotary encoders.

The PROANNOUNCE operating system defines the total amount of supported control inputs and outputs. The PROANNOUNCE system can manage following amounts of different cards:

- Control module DCS 401   max. 8 boards   = 16 rotary encoders

- Relays modules DCS 408 / DCS 409   max. 48 boards   = 240 relays

- Logic input module DCS 412   max. 10 boards   = 120 logic inputs

- Analog I/O module DCS 416   max. 8 boards   = 128 analog inputs / outputs

- Monitor module   max. 1 per DCS 401

Note:	The power supply of individual boards can be provided either via RJ-45 connection (DCS 401), flat-wire cables (DCS 408, DCS 409, DCS 412, DCS 416) or via 2 binding posts (±24 V) that are located on each board. The current that runs through the RJ-45 connection or the flat-wire cables has not to exceed **1 A max.** The current for modules that are connected to the DCS 401 via flat-wire cables may not exceed **700 mA max.** The connectors CN7, CN8, CN9 share an electronic fuse. For higher currents, it is important that under all circumstances the binding posts are used instead. When cascading several modules, it is necessary to provide the power supply anew via binding post connection. Directly cascading up to 7 or 10 modules is admissible while taking power consumption features of the different types of incorporated modules into consideration. All modules need to be fed from a single power source! Data inter-exchange amongst modules has to be established via flat-wire cabling.

CAUTION:	For safety reasons, DCS 400 modules may only be installed in rack-shelf systems or enclosures that are locked and may only be opened by means of a tool (e.g. screw-driver, special key, etc.).
	When installing modules, make sure to follow all requirements of the EN60065:1993 regulation.
	Obeying the regulations for interference-emission (EN55022, class B) and interference-stability (EN50082-2), DCS 400 module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

5.4.2   DCS 401 CONTROL MODULE

The module is to be mounted on the rear of a PA-system rack-shelf or inside of a suitable distribution box. It serves as an interface for the connection of relay boards, logic input boards, analog I/O boards, and rotary encoders. The module is controlled via the RS-485 remote port of the DPM 4000.

A single DCS 401 control module can host a maximum of 12 relay modules DCS 408 / DCS 409, five logic input modules DCS 412, two analog input / output modules DCS 416, and two rotary encoders. Relay modules are connected to the CN7 connector using the supplied flat-wire cable. DCS 408 or DCS 409 boards can be installed in any order. Logic input modules are connected to the CN8 connector while analog I/O modules have to be connected to CN9. The CN12 connector allows the connection of two rotary encoders.

Features

• Two RJ-45 connectors for connecting the DPM 4000 and for cascading several DCS 401 control modules

• Galvanic separation of the RS-485 interface port

• One connector each for relay modules, logic input modules and analog signal modules

• One connector for two rotary encoders

• Internal monitoring via watchdog circuitry

• Line surveillance via polling

• Two binding posts for the connection of an external supply voltage source

• Service functions and testing software for all connected modules

• Binary switch for address setting (0 - 7)

CAUTION:	Each participant connected to the DPM 4000 remote port has to have an exclusive address. Each address can be used only once.

Installation Note

Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

DCS 401 module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

Specifications:

Description	DCS 401 control module
Operating voltage	24 V DC, -10 / +30 %
Operating current	25 mA .. 65 mA
Operating current at 24 V	35 mA
Operating temperature range	+5° C .. +40° C
Dimensions (W x H x D)	160 x 25 x 100 mm
Weight	135 g

DCS 401

2 Rotary Encoder | DCS 408/9 Chain | DCS 412 Chain | DCS 416 Chain

Dimensions of the DCS 401 module

Size in mm
Module height 25 mm
The distance between the soldered surface and an electrical conductive mounting base has to be at least 5 mm

∅ 4,2

Mounting insulators
max ∅ 7,5

Maximally 8 DCS 401 modules can be cascaded.
Use jumpers CN3 and CN5 to select the supply voltage source connector (CN1/CN2 or CN4).
S1 sets the address for each DCS 401.
The modules are initialized by pressing the pushbutton S2

BLOCKDIAGRAM DCS 401
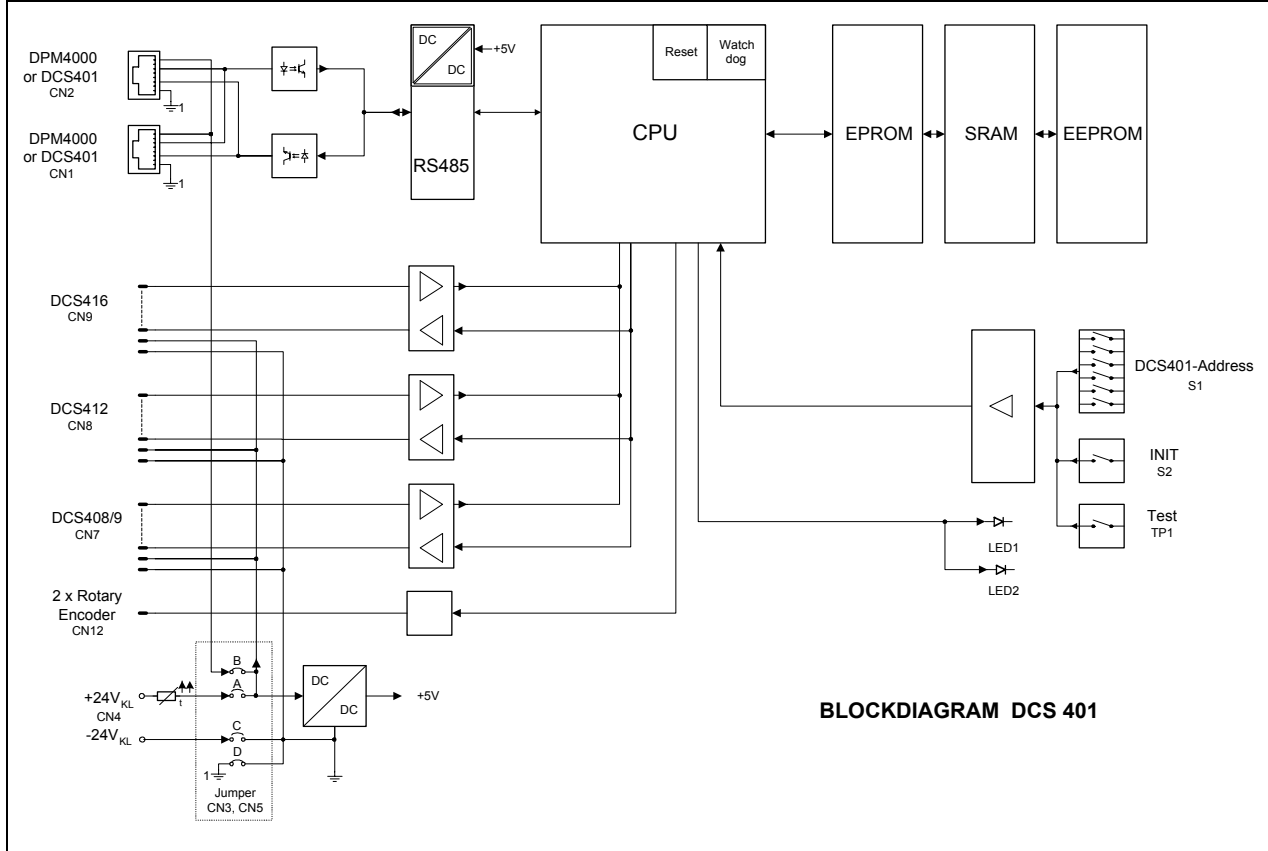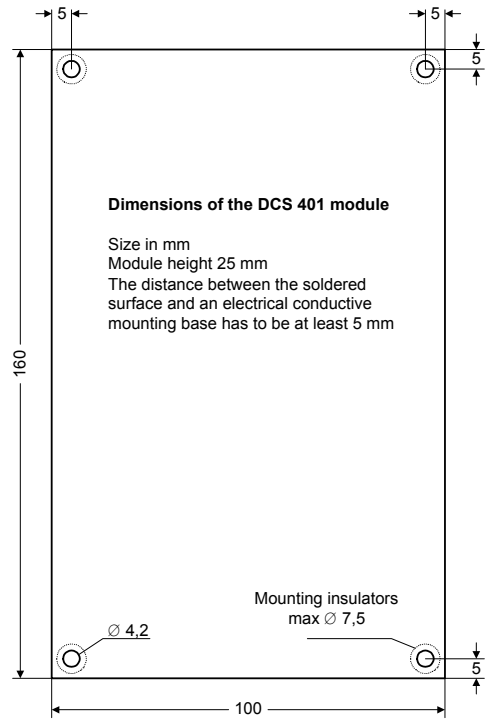
5.4.3   DCS 408 RELAY MODULE 100 V

The module is to be mounted on the rear of a PA-system rack-shelf or inside of a suitable distribution box. It is primarily used for switching 100 V loudspeaker lines. The relays can also be used for collective calls, obligatory reception, as E-relays and D-relays, or for general control purposes.

Features

- Five 100 V line relays, 2 switching contacts each, binding post per contact

- 5 output binding posts, each with 3 screws and label fields

- 5 relay control-LED's

- Configuration of the output distributor is performed through opening wire bridges

- 2 connectors for cascading up to 12 modules

- 2 binding posts for the connection of an external supply voltage source

---

Installation Note

For safety reasons, DCS 400 modules may only be installed in rack-shelf systems or enclosures that are locked and may only be opened by means of a tool (e.g. screw-driver, special key, etc.).
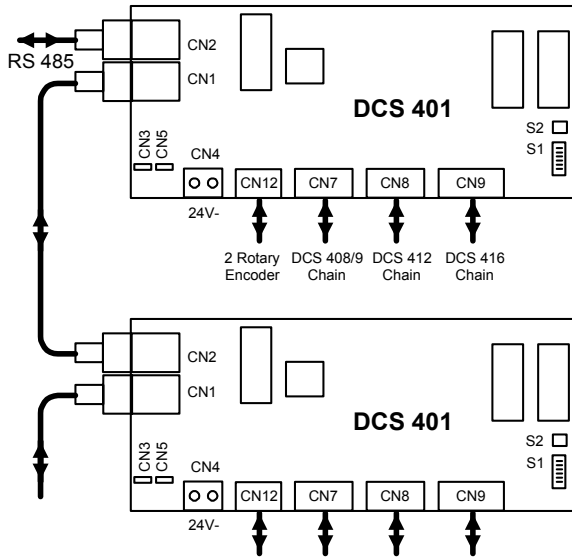
Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

DCS 408 relay module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

The module has to be protected against dropping or splashing water.

Specifications:

Description	DCS 408 relay module 100 V
Operating voltage	24 V DC, -10 / +30 %
Operating current, relay dropped	5.2 mA .. 7,8 mA
Operating current, relay dropped, at 24 V	5.5 mA
Operating current, all relays pulled	87 mA .. 130 mA
Operating current, all rel. pulled, at 24 V	96 mA
Relay contacts:	
Contact components	2 changers/ 2 SPDT
Contact material	AgNi 90/10
Contact load (ohmic load)	2000 VA
Contact current	8 A
Contact voltage	100 V AC
Operating temperature range	+5° C .. +40° C
Dimensions (W x H x D)	160 x 20 x 100 mm
Weight	200 g

RS 485

DCS 401

CN4
24V-

| CN12 | CN7 | CN8 | CN9 |

24V-
CN15
CN3
CN1

DCS 408 / 409

CN2

24V-
CN15
CN3
CN1

CN2

DCS 408 / 409

Maximally 12 DCS 408 / DCS 409 modules can be cascaded. Using the insertion bridge CN3, select the connection of the supply voltage (CN1/CN15).

Dimensions of the DCS 408 module

Size in mm
Module height 20 mm
The distance between the soldered surface and an electrical conductive mounting base has to be at least 5 mm

160

100

5

5

5

5

$\varnothing$ 4,2

Mounting insulators
max $\varnothing$ 7,5

**BLOCK DIAGRAM
DCS 408**

100V Input 5 CN13
100V Output 5 CN12
100V Input 4 CN11
100V Output 4 CN10
100V Input 3 CN9
100V Output 3 CN8
100V Input 2 CN6
100V Output 2 CN7
100V Input 1 CN5
100V Output 1 CN4

ID

P/S

S/P

Relay Driver

DC DC

+5V

+24V

Jumper CN3

A
B

CN15

+24V

RESET
EN P/S
EN S/P
DATA
DATA
CLK
+24V

RESET
EN P/S
EN S/P
DATA
DATA
CLK

+24V$_{CN}$

OUTPUT CN2

INPUT CN1

+24V$_{KL}$ -24V$_{KL}$

5.4.4 DCS 409 CONTROL RELAY MODULE

The module is for mounting on the rear of PA-system rack-shelves or inside of suitable distribution boxes. It is utilized for switching audio signals (at line level) or for control outputs.

Features

- 5 LF-relays, 2 switching contacts each, binding post for each contact

- Gold-plated contacts

- Additional ground potential binding posts for each relay's primary and secondary end

- 5 relay control-LED's

- Configuration of the output distributor is performed through opening wire bridges

- 2 connectors for cascading up to 12 modules

- 2 binding posts for the connection of an external supply voltage source

---

Installation Note

Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

DCS 409 control relay module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

Specifications:

Description	DCS 409 control relay module
Operating voltage	24 V DC, -10 / +30 %
Operating current, relay dropped	5.2 mA .. 7.8 mA
Operating current, relay dropped, at 24 V	5.5 mA
Operating current, all relays pulled	55 mA .. 80 mA
Operating current, all relays pulled, at 24 V	60 mA
Relay contacts:	
Contact components	2 changers/ 2 SPDT
Contact material	AgPd + 10µ Au
Contact load (ohmic load)	1 A / 24 V DC
Contact current, maximum	2 A
Operating temperature range	+5° C .. +40° C
Dimensions (W x H x D)	160 x 17 x 100 mm
Weight	155 g

RS 485

DCS 401

CN4
24V-
CN12 CN7 CN8 CN9

24V-
CN15
CN3
CN1

DCS 408 / 409

CN2

24V-
CN15
CN3
CN1

DCS 408 / 409

CN2

Maximally 12 DCS 408 / DCS 409 modules can be cascaded. Using the insertion bridge CN3, select the connection of the supply voltage (CN1/CN15).

Dimensions of the DCS 409 module

Size in mm
Module height 17 mm
The distance between the soldered surface and an electrical conductive mounting base has to be at least 5 mm

5
5
5
160
∅ 4,2
Mounting insulators
max ∅ 7,5
5
100

Input 5 CN13
Output 5 CN12
Input 4 CN11
Output 4 CN10
Input 3 CN9
Output 3 CN8
Input 2 CN6
Output 2 CN7
Input 1 CN5
Output 1 CN4

ID

Relay Driver

P/S

S/P

DC / DC

+5V

+24V

A
B
Jumper CN3

+24V

CN15

**BLOCK DIAGRAM
DCS 409**

RESET
EN P/S
EN S/P
DATA
DATA
CLK
+24V

RESET
EN P/S
EN S/P
DATA
DATA
CLK
+24V_CN

OUTPUT CN2

5.4.5   DCS 412 LOGIC INPUT MODULE

The module is to be mounted on the rear of PA-system rack-shelves or inside of suitable distribution boxes. It is for the connection of control lines, pushbuttons, switches and sensors to be able to evaluate their individual status (ON, OFF) within the PROANNOUNCE system.

Features

- 12 inputs with 2 binding posts each

- Polarity of each input is freely acceptable

- Each input can be used as floating input by disconnecting wire-bridges

- 2 binding posts provide the voltage source for supplying pushbuttons, contacts and sensors

- 2 connectors for cascading up to 5 modules

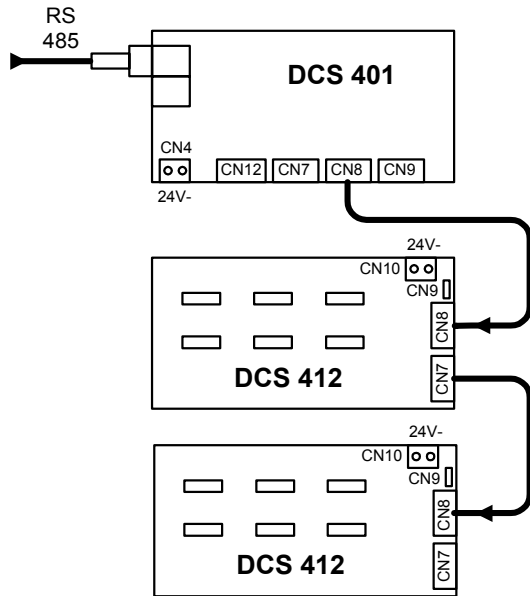- 2 binding posts for the connection of an external supply voltage source

Installation Note

Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

DCS 412 logic input module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

Specifications:

Description	DCS 412 logic input module
Operating voltage	24 V DC, -10 / +30 %
Operating current, all inputs open	2.6 mA .. 8.2 mA
Operating current, all inputs at 24V	60 mA .. 83 mA
Input level:	
Voltage with the input being LOW	$U_{IN} < \pm 5$ V
Voltage with the input being High	$U_{IN} > \pm 10$ V
Input current at U_{IN} = 24 V	4.8 mA
Maximum input voltage	$U_{IN\,max} = \pm 31$ V
Power source 24V (CN6):	
Maximum output current	90 mA
Operating temperature range	+5° C .. +40° C
Dimensions (W x H x D)	160 x 17 x 100 mm
Weight	110 g

Dimensions of the DCS 412 module

Size in mm
Module height 17 mm
The distance between the soldered
surface and an electrical conductive
mounting base has to be at least 5 mm

Maximally 5 DCS 412 modules can be cascaded.
Using the insertion bridge CN9, select the connection
of the supply voltage (CN8/CN10).

**BLOCK DIAGRAM
DCS 412**
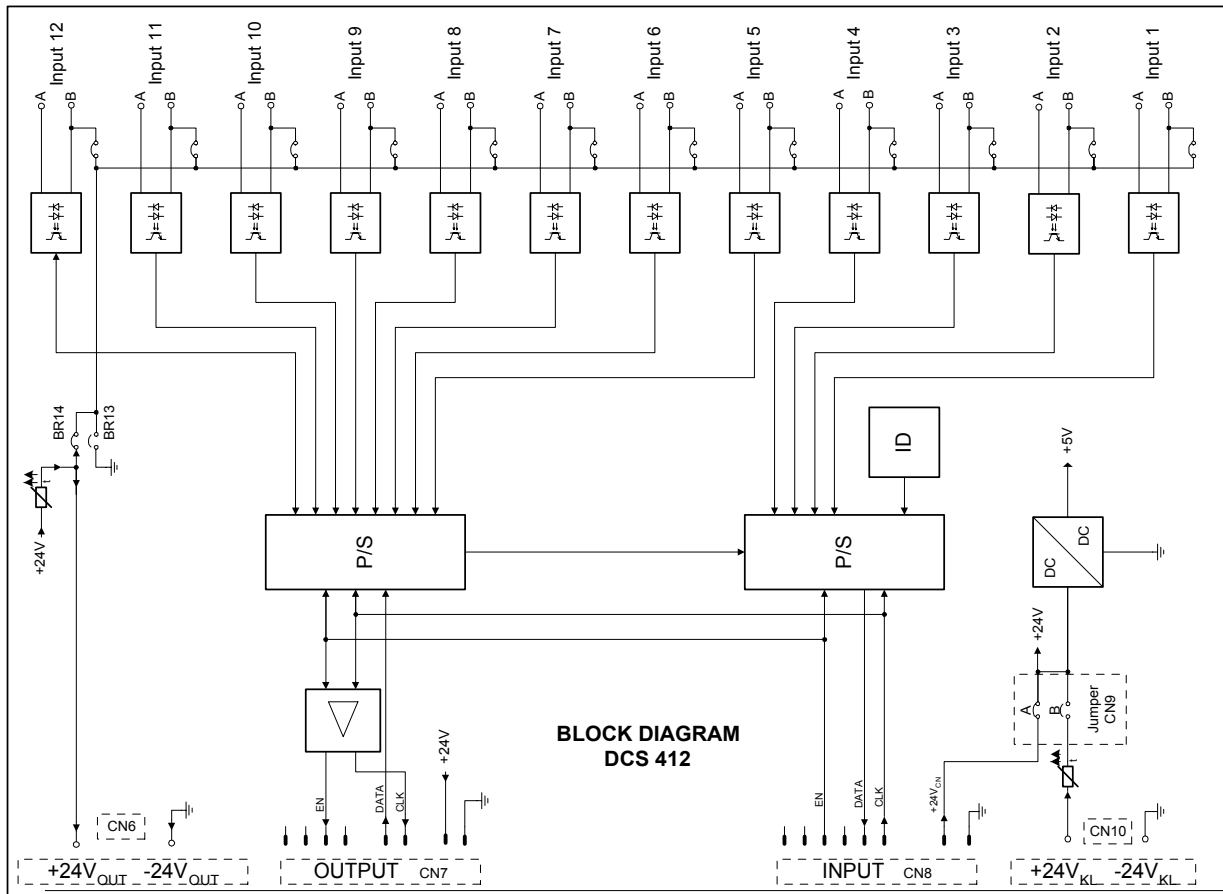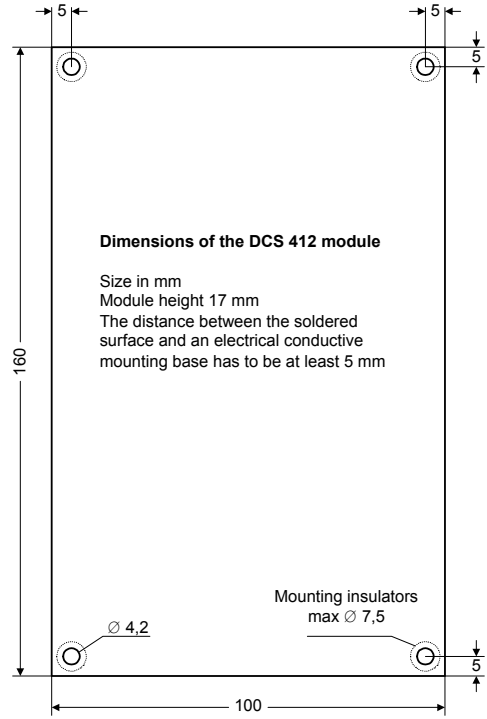
5.4.6   DCS 416 ANALOG INPUT / OUTPUT MODULE

The module can be mounted on the rear of PA-system rack-shelves or inside of suitable distribution boxes. For once, it serves for connecting analog control lines and potentiometers, with their levels being utilized within the PROANNOUNCE system installation to control volume controls or other continuous parameters. Additionally, it allows controlling external devices with analog inputs.

Features

- 8 analog inputs with 2 binding posts each

- Voltages of 0 V to 10 V or potentiometers can be connected to each input

- Reference voltage 10V - binding post

- 8 analog outputs with 2 binding posts each

- Two DCS 416 modules can be cascaded

- 2 binding posts for the connection of an external supply voltage source or galvanic separation of inputs, outputs and the PA-system

---

Installation Note

Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

DCS 416 analog I/O module printed board assemblies need to be grounded at their fixing points (e.g. using a metal bolt).

Specifications:

	DCS 416 analog I/O module
Description	
Operating voltage	24 V DC, -10 / +30 %
Operating current (max.)	160 mA
Operating current, all inputs at 24V	72 mA
Inputs:	
Voltage range (min. .. max.)	0 V .. 10 V
Impedance range ext. (min. .. max.)	0 Ω .. 10 kΩ
Maximum input voltage	50 V
Outputs:	
Voltage range(min. .. max.)	0 V .. 10 V
Output impedance	47 Ω
Minimum load impedance	2 kΩ
Reference voltage source:	
Output voltage	10 V
Maximum output current	30 mA
Accuracy of I/O signals	8 Bit
Operating temperature range	+5° C .. +40° C
Dimensions (W x H x D)	160 x 25 x 100 mm
Weight	140 g
Retrofit kits	
NRS 90245 Potentiometer	10 kOhms

RS
485

DCS 401

CN4
24V-

CN12 | CN7 | CN8 | CN9

24V-
CN10

DCS 416

CN8 CN9

CN7

CN13

24V-
CN10

DCS 416

CN8 CN9

CN7

CN13
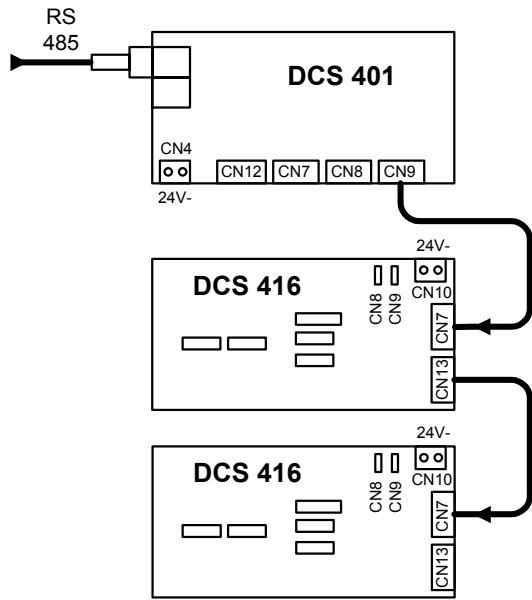
Maximally 2 DCS 416 modules can be cascaded.
Using the insertion bridge CN8, CN9, select the
connection of the supply voltage (CN7/CN10).

5
5
5
160

Dimensions of the DCS 416 module

Size in mm
Module height 25 mm
The distance between the soldered
surface and an electrical conductive
mounting base has to be at least 5 mm

∅ 4,2

Mounting insulators
max ∅ 7,5

5
100

Output
$10V_{Ref}$

Output 1
0...10V

Output 8
0...10V

Input 1
0...10V

Input 8
0...10V

$+18V_A$
$+18V_A$
$+18V_A$
$+18V_A$

$+5V_A$
$+5V_A$

DAC

ADC

Ident

$+18V_A$

$+5V_A$

$+5V_B$

$+18V_A$

DC DC

DC DC

DC DC

DC DC

Board select

$+5V_A$

$+5V_B$

$+24V_{CN}$

$+24V_{CN}$

C D
A B

Jumper
CN8, CN9

$+24V_{CN}$
$+24V_{CN}$
$-24V_{CN}$

DATA ADC
EN ADC
CLK
DATA AD/DA
EN DAC
RES PCB SEL
DAT PCB SEL
EN PCB SEL
EN MONITOR

$+5V_B$

EN MONITOR
EN PCB SEL
DAT PCB SEL
RES PCB SEL
EN DAC
DATA AD/DA
CLK
EN ADC
DATA ADC

CN10

OUTPUT   CN13

INPUT   CN7

$+24V_{KL}$ $-24V_{KL}$

5.4.7 DCS 420 PROANNOUNCE MONITOR MANAGER

This monitor module (2 HU) is for mounting in PA-system rack-shelves. It is used for acoustically and optically monitoring power amplifier outputs (monitoring) as well as for pre-listening to DPM 4000 input signals in a PROANNOUNCE system installation. The DCS 401 controller controls the DCS 420.
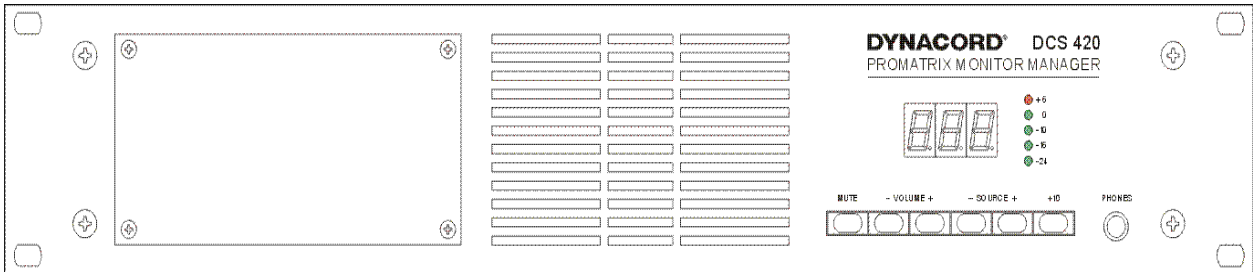
Features

- Loudspeaker 1W

- 6.3 mm stereo phone-type headphones jack

- 3-digit 7-segment display for source selection and volume setting

- LED-bar graph meter instrument for monitoring and setting audio levels

- Input transformers allow galvanic separation of the audio signal path

- Detachable mounting plate for installing different connectors of the PA-central unit

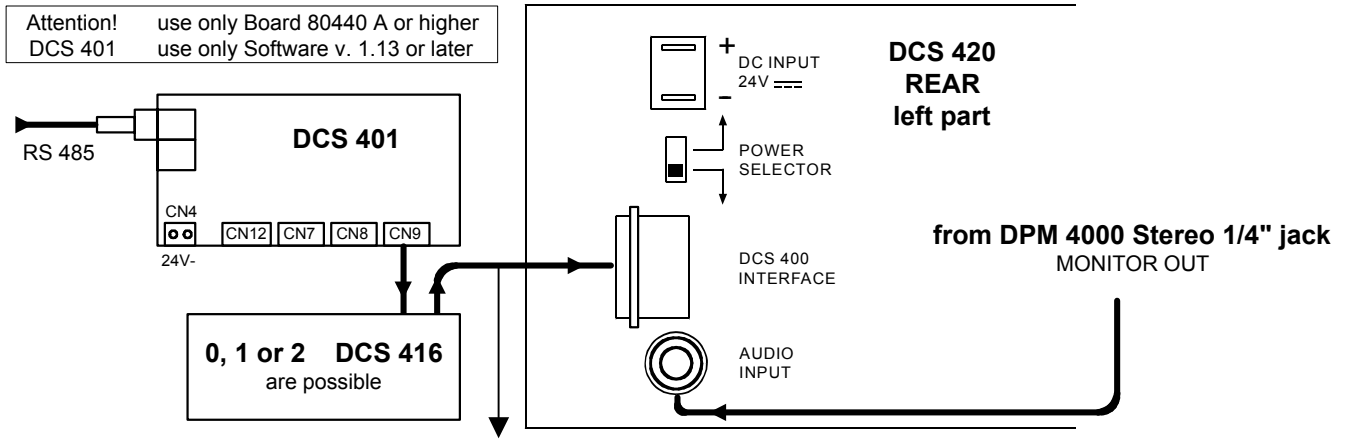- Selector switch for selecting external or internal (from the DCS401) supply voltage sources

Installation Note

Mounting the module and establishing the connections are solely admissible when performed in accordance to VDE 0100 and EN 60065 regulations.

Specifications:

Operating voltage	24V DC, -10 / +30%
Operating current	250 mA (max)
Standby operating current (dark)	75 mA
Operating temperature range	+5° C ... +40° C
Dimensions (W x H x D) 19" 2HU	483 x 88 x 103 mm
Weight	2.1 kg
Audio input:	
Input voltage (0 dB LED)	650 mV / -1.5 dBu
Max. input voltage	5.0 V / +16 dBu
Input impedance	2 k ohms
Audio output:	
Monitor loudspeaker	1 W
Output voltage, phones max.	2 V / 8.2 dBu
Output impedance, phones	10 Ohm
Frequency response, phones jack	20Hz ... 20kHz, -3dB
S/N ratio	> 80 dB
Distortion	1% (1kHz)

Attention!	use only Board 80440 A or higher
DCS 401	use only Software v. 1.13 or later

DCS 401

RS 485

CN4

CN12 CN7 CN8 CN9

24V-

0, 1 or 2   DCS 416
are possible

+
DC INPUT
24V ⎓
–

**DCS 420
REAR
left part**

POWER
SELECTOR

DCS 400
INTERFACE

from DPM 4000 Stereo 1/4" jack
MONITOR OUT

AUDIO
INPUT

The connection has to be established using flat-wire cables with a maximum length of 4m!

Operation keys	Function
MUTE	Loudspeaker of headphones ON/OFF
-VOLUME+	10-step loudspeaker / headphones volume setting
-SOURCE+	1-step monitor source selection
+10	10-step monitor source selection

+ 24 V -   INTERFACE DCS 400   AUDIO INPUT

+24 V
-24 V

DATA KEYS / ID
EN KEYS / ID

CLOCK
EN PCB SELECT
DATA PCB SELECT
RESET PCB SELECT

EN DISPLAY / VOLUME
DATA DISPLAY / VOLUME

t

DC
DC

+8 V

DC
DC

+5 V

P / S

ID

S / P

BOARD SELECT

S / P

Meter

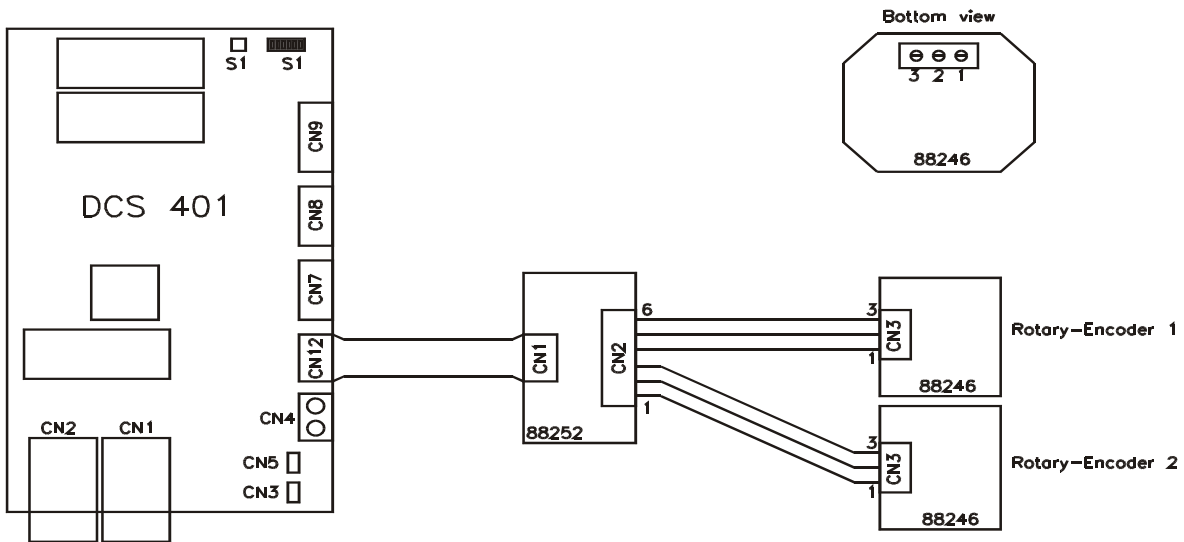**KEYS**   **DISPLAY**   **SPEAKER   PHONES   LEVEL**
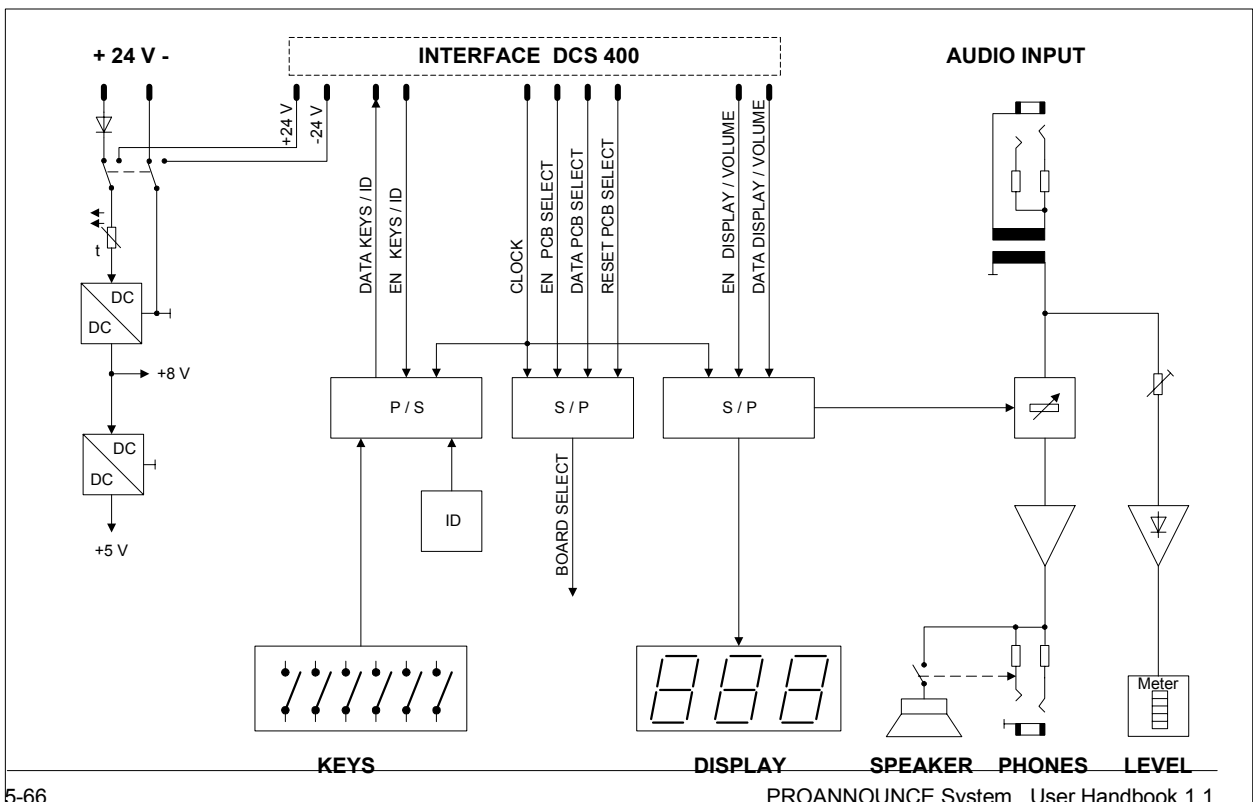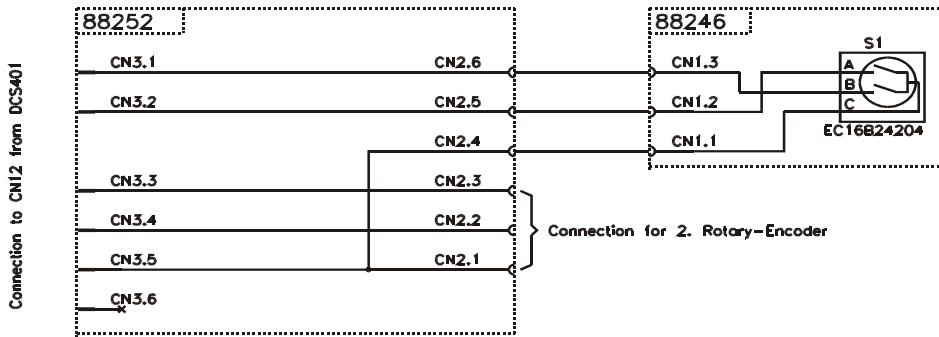
5.4.8 NRS 90240 ROTARY ENCODER

Description:

The NRS 90240 includes a rotary encoder and connection board with mounting accessories for remotely controlling level controls, delays, and control voltages of a PROANNOUNCE system.

Features:

Rotary encoder

Connection board

Mounting accessories

Knob

Note: The cover frame needs to be ordered separately.

6. Appendix

6.1 PROANNOUNCE Hardware Configuration

6.1.1 DCS 400

When configuring and initially operating the DCS 400 system, please proceed as follows:

1. Cabling

➡ Use the supplied flat-wire cable for connecting the relay modules DCS 408, DCS 409 in the desired order to the control module DCS 401. Mixed installation of relay modules is possible; numbering the relays is type-specific and has to be performed according to their sequence.

example:

Sequence	Module	Line relay No.	Control relay No.
1	DCS 408	1 - 5	
2	DCS 408	6 - 10	
3	DCS 409		1 - 5
4	DCS 408	11 - 15	
5	DCS 409		6 - 10
6	DCS 408	16 - 20	
...	...	...	...

➡ Use the supplied flat-wire cable for connecting the logic input module DCS 412 to the control module DCS 401. Numbering the logic inputs has to be performed according to their sequence.

example:

Sequence	Module	Logic input No.
1	DCS 412	1 - 12
2	DCS 412	13 - 24
3	DCS 412	25 - 36
...	...	...

➡ Use the supplied flat-wire cable for connecting the analog input / output modules DCS 416 to the control module DCS 401. Numbering the analog inputs and outputs has to be performed according to their sequence.

example:

Sequence	Module	Analog input No.	Analog output No.
1	DCS 416	1 - 8	1 - 8
2	DCS 416	9 - 16	9 - 16

➡ Connect the control module DCS 401 via RJ-45 cable to the REMOTE CONTROL socket on the DPM 4000.

2. Voltage Supply

➡ Insert bridges serve to select the voltage supply connector of different modules. Please refer to the corresponding description of individual modules or to their block diagrams.

CAUTION:	The maximum current handling capacity of RJ-45 connections and flat-wire cables has to be observed under all circumstances!

3. DCS 401 Addresses

➡ Using the Dip switch S1, the addresses of all connected control modules DCS 401 have to be set to different numbers (addresses 0 - 7).

| Dip switch S1						Address
1	2	3	4	5	6	
OFF	OFF	OFF	OFF	OFF	OFF	0
ON	OFF	OFF	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	OFF	OFF	2
ON	ON	OFF	OFF	OFF	OFF	3
OFF	OFF	ON	OFF	OFF	OFF	4
ON	OFF	ON	OFF	OFF	OFF	5
OFF	ON	ON	OFF	OFF	OFF	6
ON	ON	ON	OFF	OFF	OFF	7

4. Before initial operation

➡ Connect a 24V source. Now, each DCS 401 control module verifies whether any local modules (DCS 408, DCS 409, DCS 412, DCS 416) are connected, and if so, how many. The red LED blinks when the initialization process has not been performed yet.

➡ Only for DCS 401 control modules with software version previous to V1.1:   Each DCS 401 control module is initialized by pressing the S2 button for approximately 3 seconds. Afterwards, the red LED has to light continuously signaling that initialization was successfully completed.

➡ Launch netscan (menu communication / netscan within the PROANNOUNCE Designer software). Now, the DCS 401 modules are being initialized. Afterwards, the DPM 4000 runs a test verifying all addresses and recognizes the amount of DCS 401 control modules installed in the system. All components sharing the network are listed in the component list. This procedure takes approximately 20 seconds. Afterwards, the system is ready for operation.

6.2 DMM 4650 Interconnection

Interconnecting the DMM 4650 is established through control inputs and outputs on the DPM 4000 or on the DCS 400 monitoring system (DCS 408, DCS 409, DCS 412).

Every single sequence needs a control output for the start / stop command and a control input for the transmission of the return signal. The control output starts the DMM 4650 sequence with a positive slope and stops it with a negative slope. The return signal's control input reacts to the negative slope and activates the macro "Message Stop". Additionally, in most cases a control input is needed for the DMM 4650 READY / FAULT signal. The following cabling example offers a possibility for controlling three different sequences including fault recognition. This is accomplished by utilizing Port A on the DMM 4650 and the 8 I/O control module (IN 5 - 8 and OUT 5 - 8) of the DPM 4000.
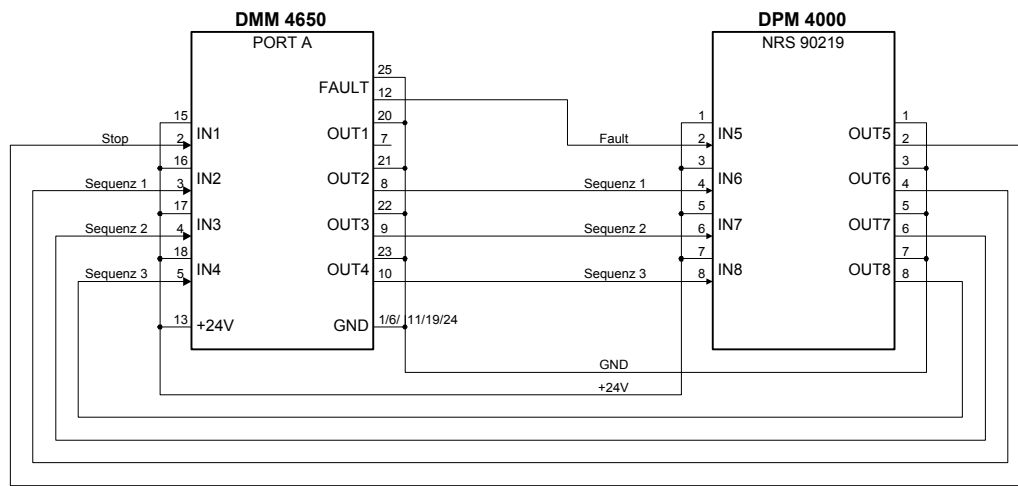
Using an adapter cable (2 x RJ-45 to 25-pole D-Sub), the shown cabling is established with relative little effort.

For a larger amount of sequences, it is necessary to additionally utilize Ports B, C, and D on the DMM 4650. Triggering the sequence start / stop is accomplished through additional control outputs on the DPM 4000 control module (OUT 2 - 4) or via relay contacts on the DCS 408 respectively on the DCS 409 modules. The return signal is present at the control inputs IN 1 - 4 of the DPM 4000 control module; additional control inputs can be provided via DCS 412 modules.

For controlling a DMM 4650 sequence, first you have to assign the start / stop and return message lines in the PROANNOUNCE Designer software. Afterwards, defining the audio signals in the window "External Audio Signals DMM 4650" is possible (the window opens when double-clicking onto the DMM 4650 symbol), where start / stop and return message lines are assigned to individual audio signals. When this is done, starting a DMM 4650 sequence from a paging console is already possible. Individual zones are assigned in the paging console dialog (key-assignment).

Defining additional triggers and zones is possible for the case that different events than a paging station keystroke (external triggers, timer) are used to start a DMM 4650 sequence. Displaying text on the LCD during the output of a DMM 4650 sequence is possible as well.

Programming examples for interconnecting the DMM 4650 are provided in the file **Demo99_2.pmx**, which is installed during the installation of the PROANNOUNCE Designer software within the following directory: /proannounce/examples/.

6.3 NRS 90226 Adapter Printed Board Assembly

Adapter printed board assembly for connecting RJ45 lines and single conductors to be used with paging consoles, I/O-lines (slot 5), remote lines (DCS), and monitoring.

characteristics: 2 x RJ-45 sockets, 8-pole binding post.
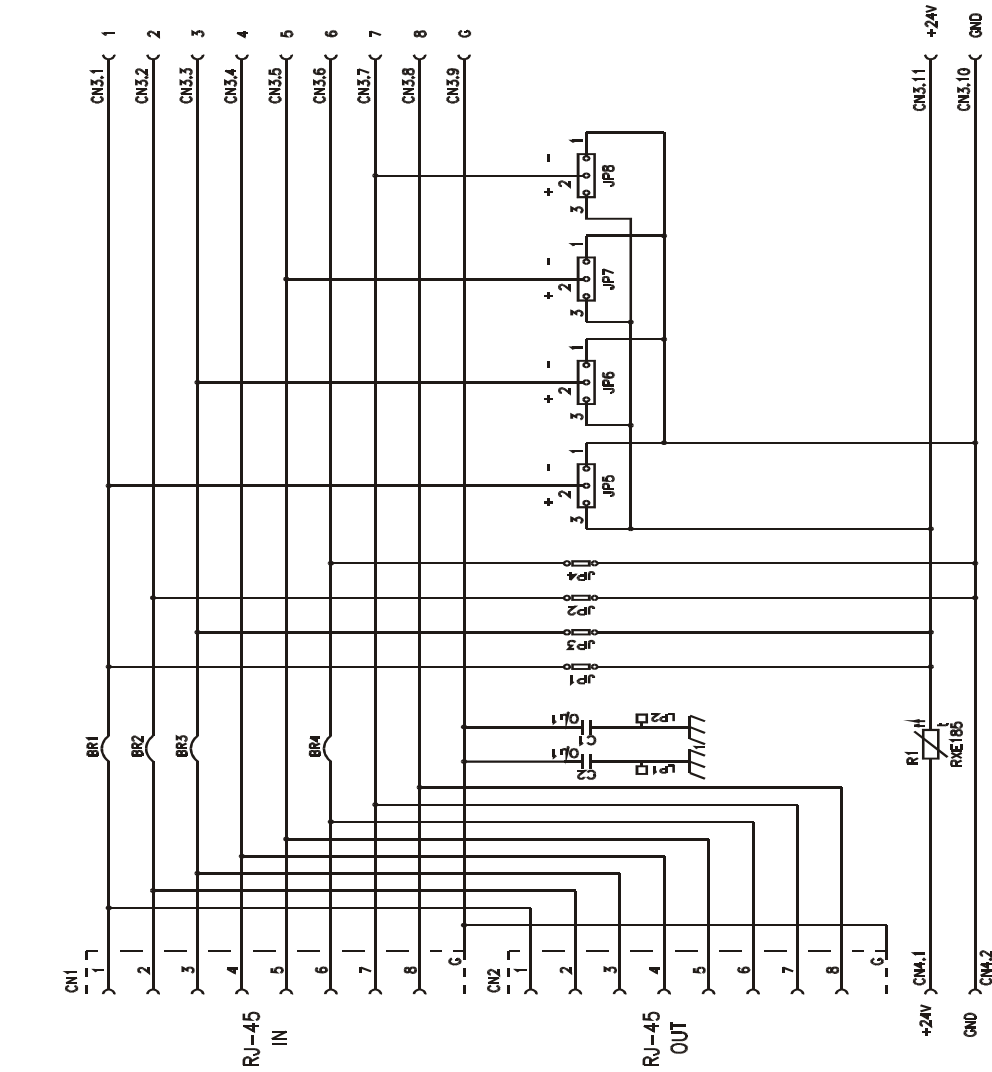
PIN ASSIGNMENT				
CPA2000 EPS205	LOGIC OUTPUTS	LOGIC INPUTS	REMOTE INTERFACE	DPC INTERFACE
+24V	OUT1a	IN1a	+24V	+24V
GND	OUT1b	IN1b	GND	GND
SP_IN	OUT2a	IN2a	(+24V)	(+24V)
RS485+	OUT2b	IN2b	RS485+	RS485+
RS485-	OUT3a	IN3a	RS485-	RS485-
PTT	OUT3b	IN3b	(GND)	(GND)
AUDIO+	OUT4a	IN4a	AUDIO+	AUDIO+
AUDIO-	OUT4b	IN4b	AUDIO-	AUDIO-

If power supply via CN4:
BR1-4 open
JP1 - JP4 closed

JP5 - JP8 only used for logic inputs

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