RX3000

Programmable matrix for sound system management and control

The RX 3000 matrix has been designed by RCF to satisfy the requirements of sophisticated technological systems for managing modern commercial, industrial, and civil complexes such as airports, shopping centres, hotels, office buildings, railway stations, etc.

The RX 3000 is a total access matrix, completely programmable and expandable up to 32 inputs and 128 outputs; each input can be directed to one or more outputs according to the configuration and the priority levels defined.

Thanks to its modular structure, the RX 3000 system can be assembled according to the functions requested and subsequently expanded for any future system requirements not forecast at the time of installation.

The CP 3100 control unit (3 rack units) controls all the components of the RX 3000 system. It is easily configured and programmed using either the keyboard on the front panel in conjunction with the large backlighted LCD display, or by means of an external PC (RS 232 serial interface) using the configuration software for Windows® 95 / 98 / 2000 (optional).

In the RX 3000 system, selective calls can be made to 128 zones, preceded by a pre-announcement signal (or other alarm signals) with priority over the up to eight background music inputs (which, where present, is maintained in the zones not involved in the announcement). For this purpose, the BM 3616 digital microphone console (up to 16) or the more simple BM 3604 stand can be used, with personalized handling of any priority conflict situations. 24 lines of analogue microphone stands can be used for access to a limited number of zones.

The motherboard of each MB 3200 unit (4 rack units) can hold up to four IB 3210 or IB 3280 input boards and up to eight boards including OB 3230 output boards and IO 3250 switching boards. LEDs on the front panel of the unit indicate the status of each board installed.

The CP 3100 has a built-in loudspeaker for selective or successive monitoring of each point of the audio chain, on the inputs and outputs of the matrix and the constant voltage outputs of the amplifiers.

The system also enables recording and complete handling of max 99 pre-recorded messages and the creation of personalized pre-announcement tones and alarm signals.
Using the BM 3616 digital microphone console, in the event that the system is engaged (conflict of priority between one or more zones called simultaneously), a vocal message can be recorded locally and then sent automatically when the system becomes disengaged again.

A parallel port is available for connecting a printer for printing out configuration and alarm reports.
The peripheral equipment (BM 3616 digital microphone consoles, auxiliary boards for amplifier control, etc.) is connected to the central control unit by means of two RS 485 serial ports.

The IB 3210 and OB 3230 audio boards have eight inputs and outputs, respectively; the input board is also available with balanced inputs by means of the IB 3280 transformer.
Programmable voice-activation inputs are also available for connecting sound sources and external systems not equipped with control elements.

The IO 3250 is a special board which provides 16 programmable inputs for managing the same number of commands used for connecting analogue microphone stands, transmitting pre-recorded messages, or interfacing the RX 3000 with an external system. This board also has 24 output relays for handling programmed events.

Using dedicated boards, (RB 3300 + SB 3320) the power amplifiers and speaker lines can be completely monitored thanks to the low frequency diagnostic system. In the event of an amplifier failure, the matrix automatically activates the backup amplifier (where present).

The design of the RX 3000 system has given the utmost priority to the concepts of reliability and functionality, which are probably the most important features for an industrial system.

For this reason, RCF has created an exclusive communication system called "DCI" (Data Communication Interface) which acts as the interface among all the system components, including the system configurations stored on "flash" memories (continuously updated by the CP 3100 control unit) and the power supply protection circuits present on every board. Reciprocal interactions between the single hardware components are practically nil, and any malfunctions remain restricted to the damaged peripheral (single boards, microphone stands, etc.). When a failure is signalled, you can check the display of the CP 3100 for all the details of the problem which has occurred. Thanks to the easy access and quick connections, all the components of the RX 3000 system can be easily and quickly substituted.
The RX 3000 has been designed as a tool at the service of the operator; i.e. system management and maintenance are highly streamlined. The system can self-diagnose any malfunction and alert the operator of the cause in detail.

System installation is simplified by the self-configuration of the boards with automatic testing and a configuration report, and by the easy-access removable screw terminals on the large rear panel supplied which is installed on the back of the rack unit in correspondence with the frame of the MB 3200.

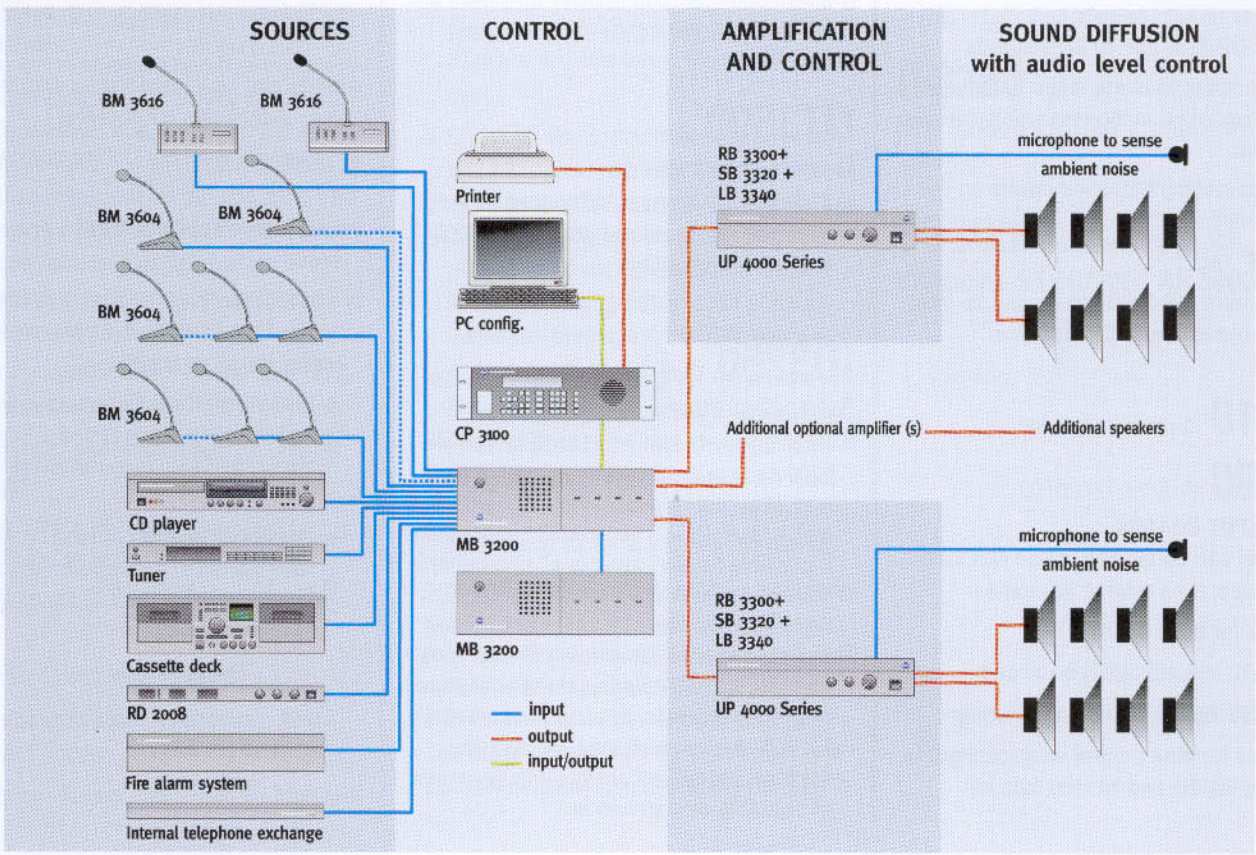
System programming from the CP 3100 is carried out by means of simple menus (which make it possible to assign abbreviations or names to each source, input, output, peripheral, microphone console, and pre-recorded message); or by means of a PC operating in Windows®, which makes programming even faster and easier.

RX 3000 List of components

- CP 3100 *Control unit*
- MB 3200 *Modular board-holder mainframe*
- IB 3210 *Audio input board*
- IB 3280 *Audio input board*
- OB 3230 *Audio output board*
- OT 3500 *Output transformer*
- IO 3250 *Switching board*
- BM 3632/128 *Back-amplifier board*
- BM 3616 *Digital microphone console*
- BM 3604 *Microphone stand*
- RB 3300 *Accessory board*
- SB 3320 *Accessory board*
- LB 3340 *Power supplier*
- PS 3400 *Unità di alimentazione*
- IF 3260 *MB 3200 auxiliary connection support*
- ES 3000 *ES 3000 Window® 95/98 RX 3000 setup software*

Main Features

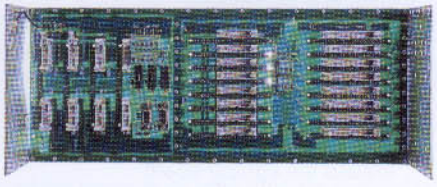
- Total access matrix
- 32 modular inputs
- 64 modular outputs (expandable to 128)
- opto inputs / outputs with programmable relays for controls and switching
- audio monitoring bus for matrix inputs and outputs and power amplifier outputs
- Recording / Transmission of announcements and alarm signals (9 pre-recorded tones)
- input for digital message recording (CD quality) with dedicated output for transmission
- RS 232C serial port
- two RS 485 ports (digital consoles + back-amplifier boards)
- Parallel port for connecting a printer for configuration and diagnostic reports
  - Minimum hardware interaction among the various components of the system, thanks to the exclusive "DCI" protocol developed by RCF for the RX 3000 system. Any malfunctions are limited exclusively to the damaged components.
  - Each board and peripheral unit is equipped with a hardware watch-dog for immediate recovery of normal operating conditions in the event of induced interference.
  - Complete diagnosis of the power amplifiers and loudspeaker lines with check on earth dispersion using the same connection cables of the 100V audio line.
  - Automatic control of the ambient signal/noise ratio by means of a digital system
- direct connection of sixteen BM 3616 digi tal consoles or 2 to 8 BM 3632/128
- direct connection of 120 RB 3300 back-amplifier boards
- built-in power supply for CPU
- external power supply for peripheral units (microphone consoles, back-amplifier boards, input and output boards, switching boards) by means of the PS 3400 rack unit
- standard software supplied:
  - supervisor configuration with passwo-clock-timer-printer configuration
  - complete configuration of consoles (priority, pushbuttons, etc.
  - input configuration (priority, levels, tones, etc.)
  - configuration for complete management of conflict situations due to different levels of programmable priority (events with absolute priority and precedence, events with defined priority, events with standard priority over the background music but interlocked with other events of equal priority, etc.).
  - output configuration (levels, etc.
  - amplifier configuration (main, backup, etc.)
  - audio monitoring configuration (input, output, amplif.)
  - configuration, recording, and transmission of digitalized tones and messages, including alarm signals (peripherals involved: PC monitor, display, printer, digital consoles, etc.).
- The tones and messages recorded in the internal memory with CD quality can be sent to predefined zones in different ways:
  - once at a preset time
  - repeatedly at preset intervals (e.g. every hour)
  - by means of an external contact closing toward the control board
  - using the microphone stands
  - Optional software for external configuration PC (operating in Windows®, connection via RS 232C)



CP3100 *Code no. 171.20.001*

CPU

- front panel with keys for configuration and diagnosis
- backlit alphanumerical display, 4 lines x 40 characters
- hard disk and digital audio board
- built-in power supply unit
- monitor speaker
- Connection to the MB 3200 mainframe
- Standard 3U 19" rack



MB3200 *Code no. 171.20.003*

Mainframe

- connectors and guides for standard DIN 41612 boards
  - Each MB 3200 can hold up to four IB 3210 or IB 3280 boards and a total of eight OB 3230 and IO 3250 boards
- all the connections are made on the dedicated rear panel using removable screw terminals
- board operating status indicators on the front panel
  - 4U 19" rack
- two or more MB 3200 panels can be interconnected with one CP 3100 unit

IB3210 *Code no. 171.20.008*

IB3280 *Code no. 171.20.009*

Audio input boards

- 4 boards can be housed in one MB 3200 mainframe, for a total of 32 inputs
- 8 inputs for each board:
  - IB 3210: electronically balanced
  - IB 3280: balanced with transformer
- trimmers for tone control on each input (± 12 dB at 100 Hz and 10 kHz), can be software activated
- level control of each input by means of software from 0 to +20 dB (1 dB steps)
- impedance: 47 Ω
  - Frequency response: 20 Hz - 20 kHz
  - S/N ratio: > 85 dB
- audio input monitoring, selectable by means of software
- self-configuration of the boards installed
- board configuration and set-up stored on E2PROM for immediate system restart

OB3230 *Code no. 171.20.013*

Audio output board

- up to 8 boards can be housed in one MB 3200 for a total of 64 outputs
  - 8 balanced outputs per board
  - 8 inputs configurable with voice activation on one or more outputs for each board
- 600 Ω low impedance outputs
- output level control by software: 0-30 dB (1 dB steps)
  - Frequency response: 20 Hz - 20 kHz
  - S/N ratio: > 85 dB
  - audio output monitoring, selectable by means of software
- self-configuration of the boards installed
- board configuration and set-up stored on E2PROM for immediate system restart

OT3500 *Code no. 171.20.056*

Output transformer

- 0 dB line transformer to be used for long distance connections between OB 3230 and power amplifiers.

IO3250 *Code no. 171.20.048*

Switching board

- up to 8 boards can be housed in one MB 3200 each with 16 opto-insulated inputs and 24 output relays, completely programmable from CPU. The IO 3250 board makes it possible to use "analogue" microphone stands (e.g. BM 3604) for simple operations such as activation of pre-recorded announcements, forwarding of microphone messages to a limited number of zones or groups of zones, interconnection of the RX 3000 system with external systems such as alarm/fire control units by means of contacts or commands.
  - Opto input level from 12 to 48 Vdc
  - Relay capacity: 48 Vdc, 0.5A
- configuration and set-up stored on E2PROM for immediate system restart

BM3604 *Code no. 171.20.050*

Analogue microphone with stand

- 4 programmable keys for selecting single zones or groups of zones
  - Key for general announcement in all the zones configured
- built-in pre-announcement signal generator
  - Programmable auxiliary key for activating a pre-recorded message or an auxiliary relay of the IO 3250 board. LED indicator for the event in progress.
- LED indicators for each key
  - Electret microphone with lighted ring indicating microphone activation
- balanced high level output with transformer. Adjustable output level.
- automatic level control for constant audio volume
- LED indicators for selection and operating mode
- audio/control/power supply connections to the RX 3000 system by means of removable screw terminals
  - Preamplified auxiliary output with activation key for connecting a local amplifier (active also in general call condition)
  - Possibility to interconnect multiple BM 3604 stands in cascade on the same line (up to a maximum of 20 for each line).

BM3616 *Code no. 171.20.049*
BM3632/128 *Code no. 171.20.060*
DIGITAL MICROPHONE CONSOLE

- digital backlit alphanumerical LCD display 16x1 for message display (diagnosis, operating status, alarm, etc.)
- 16 programmable keys (32 with BM 3632/128) for selecting single zones or groups of zones, each with LED indicator for "free", "engaged", and "selected"
  - Key for general announcement
  - Key for alarm
- selected announcement on any system zone (up to 128), via extended mode access key (only on BM 3632/128)
- 3 completely programmable keys (5 with BM 3632/128) for other functions (pre-recorded announcement transmission, command forwarding, etc.)
  - In the event of engagement of one or more zones of the system to which an announcement is to be made, it is possible to proceed in any case by recording the announcement on the BM 3616. The announcement will be transmitted automatically as soon as the system is disengaged, respecting the priority of the console being used.
- pre-announcement chime generator (1, 2, or 3 tones pre-selectable)
- electret microphone with lighted ring on gooseneck
- configuration and set-up stored on E2PROM for immediate system restart
- hi-level balanced audio output with transformer
- automatic output level control
- LED status indicators for the main functions, with buzzer
  - password for activation can be inserted
- connections for audio, RS 485 and power supply
  - Output for listening to the message recorded on the static memory of the console

RB3300 *Code no. 171.20.051*
BACK AMPLIFIER BOARD AND
SB3320 *Code no. 171.20.052*
LB3340 *Code no. 171.20.053*
BOARDS:

- This peripheral unit is mounted in the rack in correspondence with the rear panel of the amplifier to be controlled. It is connected to the CP 3100 unit by means of a digital bus and an audio monitor bus of the MB 3200 mainframe for that which regards the zone audio signals.

This enables:

- audio monitoring of the interconnected amplifier by means of the loudspeaker on the CP 3100 unit
- automatic switching to a backup amplifier to replace one with a failure, following a predefined programme.
- Can be controlled by means of the closing contact available from the protection circuit board of the RCF 4000 series amplifiers (or the additional SB 3320 board).
  - Modulated low frequency diagnosis of the power amplifier (with additional SB 3320 board), also when the signal is present.
  - Check on the speaker line impedance and relative earth dispersions by means of modulated low frequency signal. The system is reliable also in the event of particularly long connection lines or lines made using cables with mineral insulation (additional SB 3320 board).
  - Direct input on the power amplifier controlled, handled by the CP 3100 control unit, for connecting systems with the highest priority and security (with additional SB 3320 board). The system is active also when the signal is present.
- automatic digital control of the sound level depending on the ambient noise. Up to four omnidirectional microphones or loudspeakers equipped with line transformer can be used to detect the ambient noise. The noise level is digitally processed and suitably filtered and used to maintain a constant relationship between the signal and the background noise in the area being controlled (with additional LB 3340 board).
  - Possibility to switch the amplifier controlled to a preselected output level which is lower than that defined by the system, at a time set on the central control unit; e.g. nighttime sound level lower by 15 dB than the daytime level (additional LB 3340 board).

The RB 3300, SB 3320, and LB 3340 control boards can also be used independently from the RX 3000 system, with the same basic functions (amplifier-line diagnosis, automatic switch-on of the emergency amplifier, control of the ambient signal/noise ratio). Any emergency condition can be signalled from a distance using the specific output command.

PS3400 *Code no. 171.30.006*
POWER SUPPLIER

- Dedicated power supplier for the RX 3000 system components.
- Stabilized multi-voltage power supplier for powering input, output and switching boards, consoles and back-amplifier board.
- Electronic protection circuits for voltage, current, and temperature.
- Dimensions: one 19" rack unit.

IF3260 *Code no. 171.30.007*
MB 3200 AUXILIARY CONNECTION SUPPORT

ES3000 *Code no. 171.20.054*
WINDOWS 95/98/2000 RX 3000 P.C. SETUP SOFTWARE