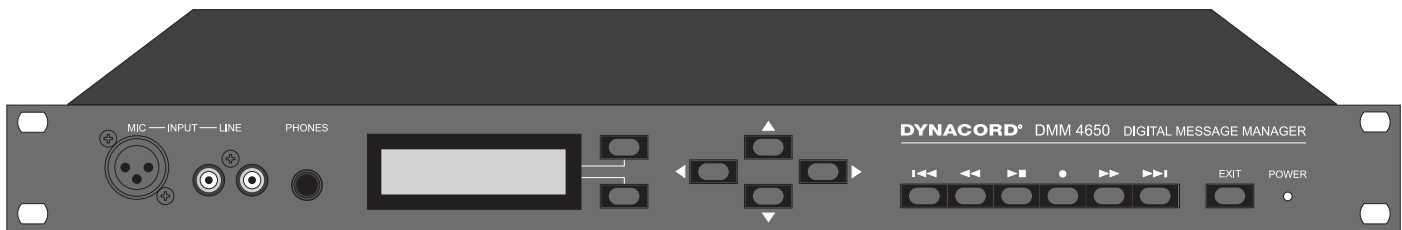


## DMM 4650 DIGITAL MESSAGE MANAGER



### Description

The DMM 4650 is a signal processor which allows for an universal generation and control of audio signals. Its main purpose is the installation in electro-acoustic rack systems, but stand-alone applications are possible as well. The audio signals can consist of alarm, gong, voice messages but also of random combinations of these sources. The programs were created by Dynacord (preset). Anyway, it is possible for the user (consulting company, etc.) to modify those programs and store them as user-programs. The audio input can be mixed with the DMM 4650 internally generated audio signals (e.g. gong signals with announcements), or given out as priority at the audio output (programmable).

The audio quality of the messages can be selected, depending on memory extension and different user requirements. With maximum memory extension, a total recording time of 16 minutes is possible. Password protection for various operation levels is provided. For "EASY-USER", the provided operation features are similar to those known from cassette recorders or CD players. The control of the programs is performed via floating inputs and floating outputs provide status messages. The priorities and functions of these lines can be programmed individually (Setup). A computer interface facilitates saving and loading of the unit's configuration and its message data.

In order to ensure functional reliability, self-surveillance and audio data verification are employed. The alarm is ignited via internal fault-output while all warnings are logged. The DMM 4650 is maintenance-free since no serviceable parts, batteries or accumulators are to be found inside the appliance.

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## IMPORTANT SAFETY INSTRUCTIONS



**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.

**WARNING:** CONNECT ONLY TO MAINS SOCKET WITH PROTECTIVE EARTHING CONNECTION.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended 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 exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
15. To completely disconnect this equipment from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
16. The mains plug of the power supply cord shall remain readily operable.

## IMPORTANT SERVICE INSTRUCTIONS

**CAUTION:** These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

1. Security regulations as stated in the EN 60065 (VDE 0860 / IEC 65) and the CSA E65 - 94 have to be obeyed when servicing the appliance.
2. Use of a mains separator transformer is mandatory during maintenance while the appliance is opened, needs to be operated and is connected to the mains.
3. Switch off the power before retrofitting any extensions, changing the mains voltage or the output voltage.
4. The minimum distance between parts carrying mains voltage and any accessible metal piece (metal enclosure), respectively between the mains poles has to be 3 mm and needs to be minded at all times. The minimum distance between parts carrying mains voltage and any switches or breakers that are not connected to the mains (secondary parts) has to be 6 mm and needs to be minded at all times.
5. Replacing special components that are marked in the circuit diagram using the security symbol (Note) is only permissible when using original parts.
6. Altering the circuitry without prior consent or advice is not legitimate.
7. Any work security regulations that are applicable at the location where the appliance is being serviced have to be strictly obeyed. This applies also to any regulations about the work place itself.
8. All instructions concerning the handling of MOS - circuits have to be observed.

**NOTE:**



**SAFETY COMPONENT ( MUST BE REPLACED BY ORIGINAL PART )**



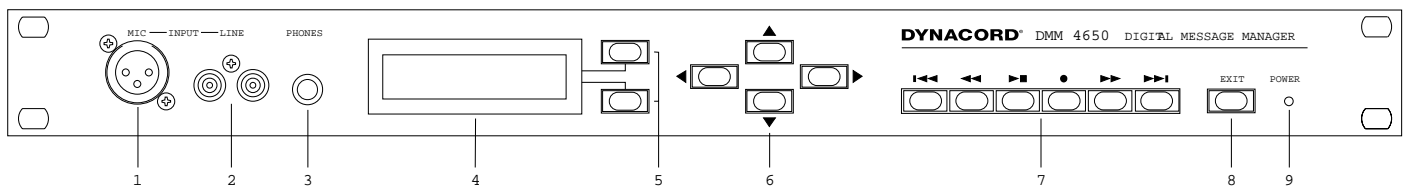
**FOR RECYCLING  
INFORMATION  
CONTACT YOUR  
DISTRIBUTOR OR  
VISIT OUR WEBSITE**

**WWW.EVIAUDIO.COM**

### WEEE Recycling/Disposal Instructions

The Wheelie Bin symbol found on the product or in the manual indicates that this product must not be disposed of with other waste. It is in our category the manufacturer's responsibility to properly dispose of their waste electrical and electronic equipment (WEEE) at the end of its life. Due to the differences in each EU country's management of WEEE, please contact your local distributor. We are committed to facilitate our own electronic-waste-management-system, for the free of charge return of all EVI Audio GmbH products: Telex, Dynacord, Electro-Voice, Midas Consoles, KlarkTeknik and RTS. Arrangements are made with the dealer where you purchased the equipment from, for the returning of all unusable equipment **at no cost**, to the factory in Straubing, for environmental protective disposal.

## Frontpanel



### 1. INPUT MIC

XLR-socket for the connection of a microphone when recording a message. By using a short test-sample, the level is automatically adjusted and the setting is saved.

This input can also be used for making announcements.

### 2. INPUT LINE

RCA-type sockets for the connection of stereo or mono-audio signal sources (tape deck, CD player) when recording a message. A wired in parallel 0dBu socket on the rear panel is also provided. By using a short test-sample, the level is automatically adjusted and the setting is saved.

This input can also be used for making announcements.

### 3. PHONES

Stereo phone jack 1/4" (6.3 mm) to pre-listen to messages, gong and alarm signals via headphones. Wired in parallel, a 0dBu socket is provided on the rear panel.

### 4. Multi-function Display

Back-lit LC display, 2 lines with 16 characters, each.

The display lights up by pressing any key.

The display is dimmed whenever the EXIT-key gets pressed or no key is pressed for at all within a short while.

### 5. SOFT KEY

Depending on the selected operation mode, the soft keys are used in various ways. The according function is indicated on the display.

### 6. CURSOR

CURSOR-keys to control the cursor on the display and for modifying data.

### 7. RECORDER

Keys for ...

TITLE skip back, REWIND, PLAY/STOP, REC, FAST FORWARD, TITLE skip forward.

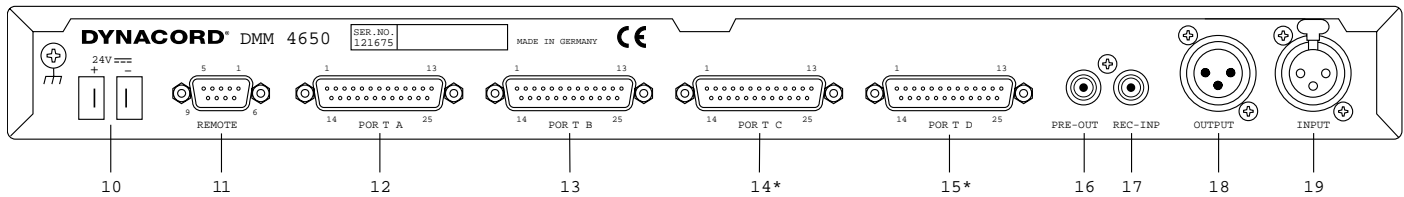
### 8. EXIT

Key for exiting the edit mode in order to prevent unauthorized operation. Each pressing of the key switches back one menu stage.

### 9. POWER

The LED lights whenever the DMM 4650 is ready for operation. In case the LED BLINKS you should contact a DYNACORD service center.

## Rearpanel



### 10. 24 V DC power supply

2 flat-pin plugs 1/4" (6.3 mm) for connection to emergency power supply (battery) or other external power sources. Please mind the correct polarity (+-).

### 11. REMOTE

The 9-pole D-SUB connector "Remote-Control RS-232" is a serial computer interface for data transfer and service functions.

### PORT A-D

All inputs and outputs are provided in 2-pole floating design and isolated from the DMM 4650 circuitry and adjacent lines.

Each input is realized as an AC opto-coupler (AC floating polarity).

Each output has a floating relay contact.

Each port connector (DB 25) has 4 inputs, 4 outputs, and per port +24 V line and ground potential conductors.

By means of the 24 V DC voltage, it is possible to connect external floating control keys as well as contacts directly.

All inputs and outputs and their corresponding functions can be freely assigned or a factory preset can be recalled instead.

### 12. PORT A

4 control inputs and 4 trigger outputs  
1 fault output (alarm on defect of the appliance)  
1  $\pm 24$  V DC, 90 mA power source

### 13. PORT B

Control inputs, trigger outputs and  $\pm 24$  V DC

### 14. PORT C

Control inputs, trigger outputs and  $\pm 24$  V DC  
\* optionally retrofitted

### 15. PORT D

Control inputs, trigger outputs and  $\pm 24$  V DC  
\* optionally retrofitted

### 16. PRE-OUT

RCA-type socket, pre-listen

### 17. REC-INP

RCA-type socket, recording, announcement

### 18. OUTPUT

3-pole XLR-type connector (audio output) electronically balanced (transformer can be retrofitted).

### 19. INPUT

3-pole XLR-type connector (audio input) electronically balanced (transformer can be retrofitted).

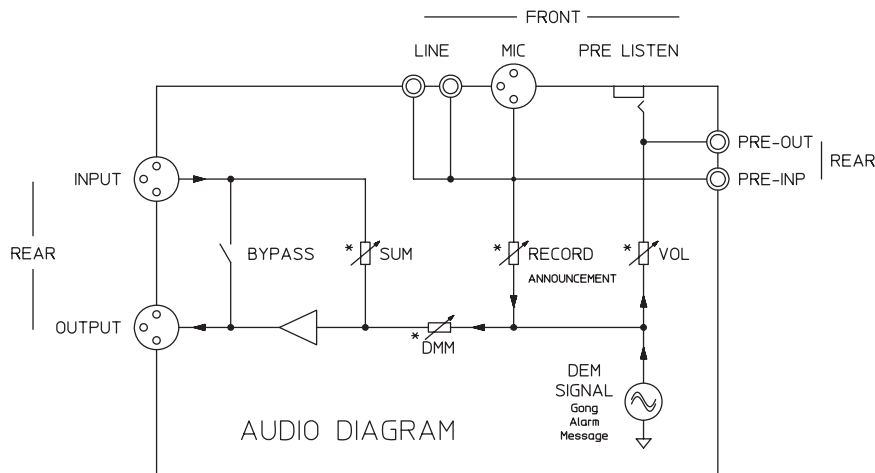
## Use of the DMM 4650

The DMM 4650 can be used in both, incorporated in a rack shelf system or as stand-alone unit. The installer should automate the daily sequences by external control keys, sensors, contacts and the corresponding unit settings. This applies for gongs, alarms, messages and their combinations, as well as for recordings of variable announcements. This contributes to a considerable advantage in the ease of use since manually operating the appliance is not necessary anymore.

Often used functions of the DMM 4650 are directly implemented as factory presets and can be utilized without any additional programming effort. By editing the default values and storing them into a user preset a customer-optimized configuration is quickly developed.

### Audio function

The audio signals of the electro-acoustic sound reinforcement system are looped via INPUT and OUTPUT to the power amplifier. The SUM control can be programmed for this stand-by position. In case of failure a stand-by relay takes over the connection. When starting a sequence via control line, the desired audio signal gets generated (DMM SIGNAL) and fed to the OUTPUT via the programmable DMM-control. The controls (DMM, SUM) defined within the sequence determine, whether the two audio signals are merged or the one gains priority over the other.

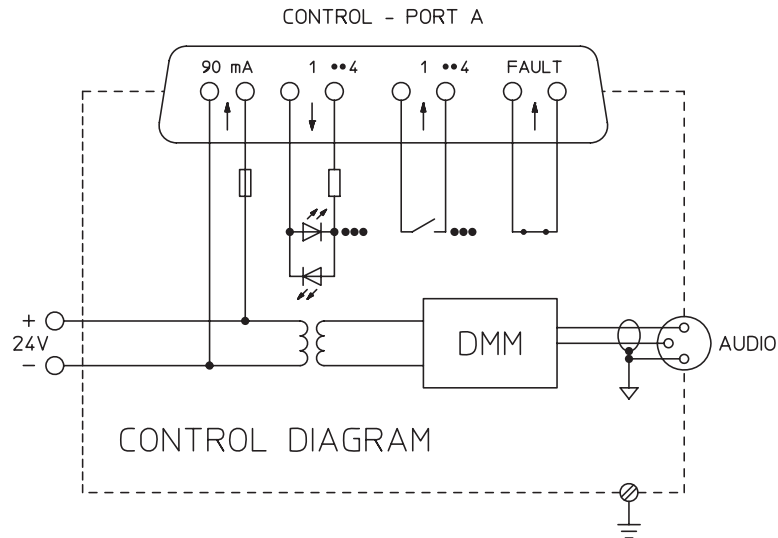


\* Programmable Level

The MIC, LINE input is used for recording a message and can also be used for announcement purposes. The headphones outputs PRE-LISTEN and PRE-OUT are for monitoring the DMM signals without actually starting a transmission.

### Control function

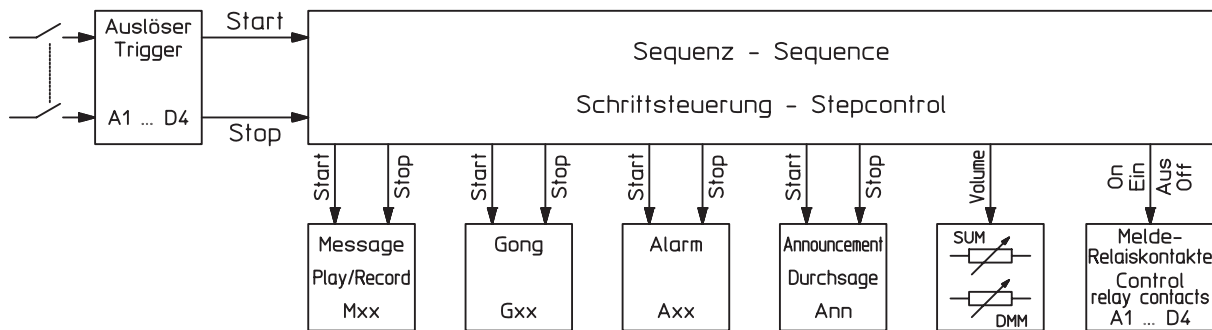
A maximum of 16 floating inputs are provided for integration into a sound reinforcement installation. Their use and polarity can be freely programmed. A maximum of 16 floating relay contacts are provided to be used as control outputs. The inputs and outputs are divided into 4 Ports (A, B, C, D); where Port A also contains a fault contact.



Each of the 4 ports also supplies a power source in order to facilitate the connection of floating contacts. The ground and earthing conditions are shown in the above diagram. The strict separation of control and audio signals guarantees the trouble-free installation.

### Sequence function

The following example shows in sequence the necessary steps from closing the contact of an external switch to listening to the audio signal:



A switch is connected to one of the DMM 4650's control inputs (A1 - D4). The desired input is selected in the trigger menu. Logic level (high, low), delay, and function (dyn, stc, latch) can be set. The desired sequence (Sxx) gets chosen here as well.

For this sequence, the actions of the DMM 4650 are programmed step by step. Standard sequences are provided as factory presets. They can be modified as need arises and stored as user presets.

Example of a sequence: set output (lamp indicator), audio control SUM off, audio control DMM -3 dB, wait for input release, after release start alarm, delay 10 sec. (alarm duration), end.

This sequence is entered line-by-line with special commands (list page 25) and - including name and priority - stored as a preset. If an appliance uses unaltered functions on a regular basis, it is also possible to save these sequences via the RS 232 interface.

## OPERATING THE DMM 4650

### General

All adjustments carried out at the appliance remain in memory even if the appliance is not connected to a power source (EPROM). Pressing the EXIT-key lets you step back and forth through the levels of the operation menu tree (page 11). The stand-by mode is entered by pressing the EXIT-key when in the "main menu". If no key is pressed within a period longer than 5 minutes, the appliance enters the stand-by mode automatically (except during recording and restore).

### Stand-by

When the DMM 4650 is connected to a power source, the green POWER-LED lights, the display is dimmed, and the relay outputs are set to their pre-programmed states according to the system's configuration. This stand-by status is remained until a control input starts a sequence. The display shows the sequence's name and number for the duration of the sequence. After completion of the sequence, the DMM 4650 re-enters stand-by mode. The states of the control "outputs", the audio relay "bypass", and the "sum level" setting during stand-by operation are set in the operation menu "System setup" (page 26).

### Password

Password-protection prevents the DMM 4650 from unauthorized operation. Three distinct user levels are available which can be accessed by entering the respective password. As factory defaults, "1111" is programmed for Level 1 (easy operation), "2222" for Level 2 and "3333" for Level 3 (installer). Individual modification for each user is possible. The menu tree diagram (page 11) shows which access is assigned to the respective user level.

### Password entry, operation end

Pressing any key on the DMM 4650's front panel, "Password ?" appears on the display. Using the cursor keys you have to enter a 4-digit number and confirm it with the menu key ok. After entering the correct 4-digit password, the display shows the number of your user level. Using the cursor keys you are able to select the desired menu. The EXIT-key cancels the operation and the appliance is protected against unauthorized use.

### Priority function

With the DMM 4650 provides the opportunity to set priorities from 0 to 99; where 99 represents the highest priority level. Setting the priority level leads in different results.

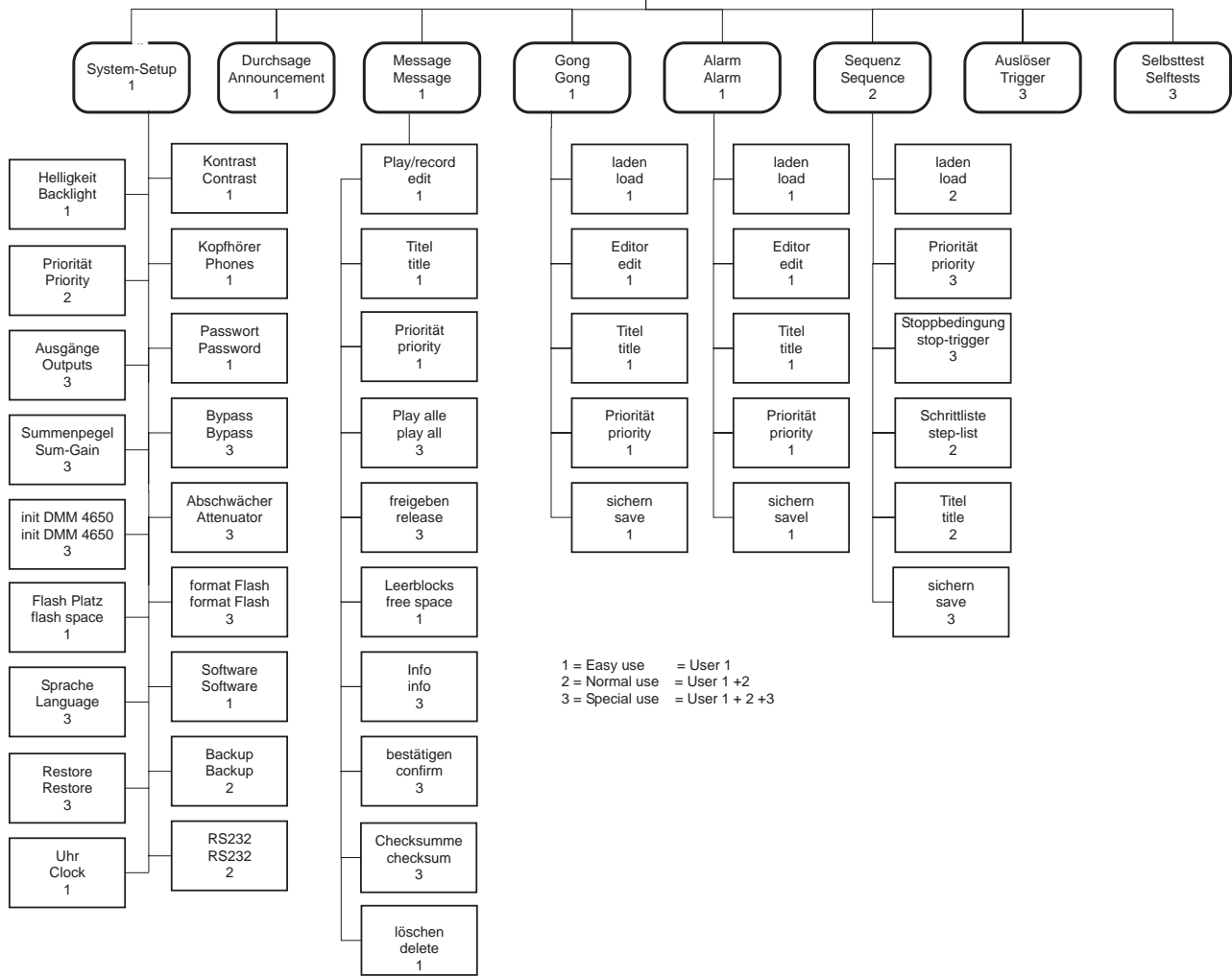
The priority of a sequence is defined by its free programmable priority setting (menu "sequence" "priority"). This determines, whether e.g. a fire alarm sequence cancels a gong control sequence. Not the control line of an input, but the priority number of the triggered sequence determines its priority. With equal priorities, the sequence that had been started first remains valid.

The selected user level states the priority for the operation on the appliance. User level 1 = priority no. 33, user level 2 = priority no. 66, and user level 3 = priority no. 99. Modifying the default for lower user levels is performed within the menu "System setup" "priority". The setting of the user priority controls, whether an operator gets interrupted by an important sequences (sequence priority).

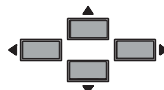
Users are able to modify messages, gongs, and alarms and save them as user presets. Depending on the actual user level, the programs are automatically provided with the corresponding user priority numbers (see above). They are maintained for the case that the original preset's priority is lower. In this way it is guaranteed that user 1 cannot modify the presets of user 2. In order to allow access for other users, the priority allocation can be modified downwards (lower priority) by the respective user before storing a preset (menu: "message > priority", "gong" > "priority", "alarm" > "priority"). If recording a message via remote recording, the priority number of the recording sequence is transferred to the message.

# Passwort

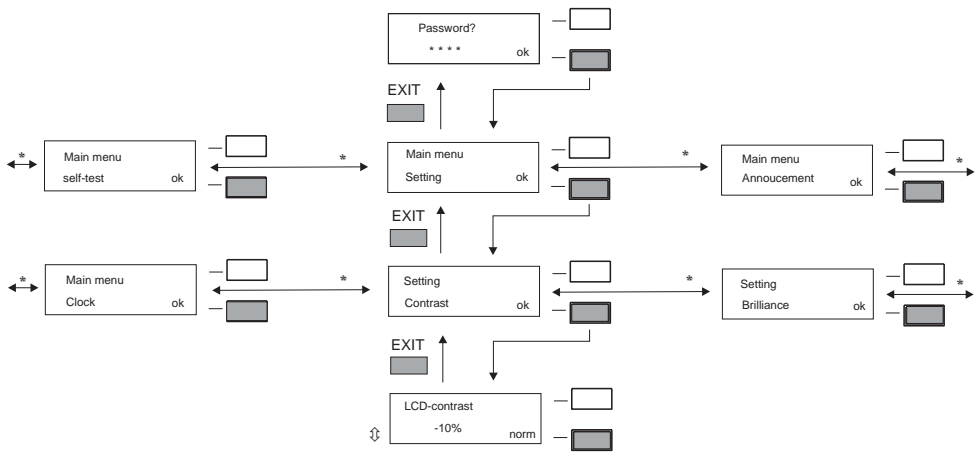
## Hauptmenue Main-Menue



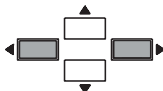
### Menue tree structure



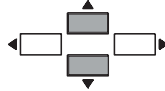
Use the cursor keys to enter your password



\* Use the two cursor keys to select the desired menu



⇅ Use the two cursor keys to center and alter values



## MESSAGE

### General:

Messages are audio signals, stored in the DMM 4650 as information, alarm announcements or other often used texts. Recording a message can be performed directly at the DMM 4650 or by means of remote recording. Playback via sum output is achieved by starting a message (Mxx) within a suitable sequence (see "Trigger", "Sequence"). For test purposes the message can be listened to via the Pre-listen outputs using the recorder keys PLAY/STOP. The functions are similar to a cassette recorder, with the difference that the audio data is saved digitally in maintenance-free flash memories. Depending on individual needs, different audio qualities are selectable. The maximum recording time depends on the selected audio quality and the installed memory (see table, page 14). A backup of all message audio data is possible through analog recording (cassette deck, DAT recorder) or as a digital backup on a computer via the remote interface (RS 232).








### Message number,

Preset Up to 100 distinct messages (M00 to M99) including title, name, and priority can be saved. The DMM 4650 is shipped without any pre-recorded messages, since - depending on individual user requirements and custom applications - variations would be numerous. Some factory preset sequences use M00, M01, and M02 (see list of preset sequences). Thus, they have to be recorded for incorporating them in the respective applications. Some text examples are to be found at the end of this manual.

### Operation menu "message"

Confirming the menu selection "message" by using the soft key "ok", the number of the message appears in the display together with its title and playback time (hours : minutes . seconds). The DMM 4650 is now in the recording/playback mode and can be operated using the transport-keys as follows:

Note: This mode only allows playback via the PRE-listen/Phone outputs!

-  Title skip backwards, selects the previous actually recorded message. During playback the selected message starts playing immediately.
-  Rewind, skips back one message, during playback fast rewind enables the user to listen to a specific part several times.
-  Play/Stop starts or stops the playback of the selected message. Recording is stopped by pressing the stop key.
-  Recording, pressing this key once switches the selected message into recording stand-by. In case a previously recorded message exists, the question "delete?" is displayed and leaving you the choice to record a new message with "Y=Yes" or cancel the command with "N=No". If you choose delete, the record key has to be pressed again after completion of the procedure. If this message is not supposed to be deleted, you have to select an empty location. The items "Recording type" and "Recording level" are explained later. The display now shows "record Mxx" and "pause" with a bargraph, indicating the current signal level. Pressing the record key again starts the recording and "play time" replaces "pause". Pressing the Stop/Play-key terminates the recording.
-  Fast forward, skips to the next message, forwarding during playback enables the user to listen to parts of a longer message.
-  Title skip forward, selects the next actually recorded message, during playback this next message is immediately audible.
-  Using the cursor keys lets you select the previous or next message number.

Soft key "vl" accesses the volume setting dialog for the phone and pre-listen outputs using the cursor keys.

Soft key "edt" accesses the menu level for title editing, etc. (see following paragraph).

**Soft key “edt”**

Using the “edt” key in playback mode provides the opportunity to edit and manage your message structure. The keys are used to select the following menu items.

**Title**

Confirming “Title” with the soft key “ok” the selected message’s current name appears on the display. Using the cursor keys lets you enter a name which can consist of up to 8 characters. The soft keys “A-a” are used to toggle between between the upper and the lower letter case while “spc” inserts a blank. After pressing “EXIT” (one menu level down) the question “store y, n” appears, in order to prevent any inadvertent alteration of the name.

**Priority**

Confirming “Priority” with the soft key “ok”, the priority number of the selected message appears on the display and, by using the cursor keys, providing the user with the possibility to alter the number from 00 up to the his/her priority level. A higher priority prevents unauthorized alteration of this preset by users with lower priority. After pressing “EXIT” (one menu level down) you have to choose on the appearance of the question “store y, n”, whether you want to make your changes permanent.

**Play all**

Confirming “Play all” with the soft key “ok”, the name of the first message gets displayed. Using the PLAY/STOP-key lets you start or stop the playback of all recorded messages. Mostly, this menu item serves for transferring all recorded messages onto an analog audio tape deck or DAT recorder via the phone/pre-listen outputs.

**Release**

Confirming “Release” with the soft key “ok”, the display shows that the search for lost blocks in the flash memory (sound memory) has been engaged. Whenever such blocks are found, the memory structure gets repaired which is also indicated on the display. This menu’s operation is used to release memory that has been mistakenly reserved.

**Free space**

Confirming “Free space ” with the soft key “ok”, the number of available flash memory chips and the overall free sound memory capacity are displayed in %.

**Info**

Confirming “Info” with the soft key “ok”, shows the audio quality setting and the used space for the previously selected message.

**Confirm**

The audio data of a message is constantly monitored. In case an inaccurate data structure (see also self-surveillance page 29) is detected, the corresponding message is marked with an asterisk (\*). Anyway, if the erroneous data does not affect the audible result of the sound reproduction, “confirming” with the soft key “ok” omits the marking (\*). From now on, the actual data is utilized as test pattern and you are given the possibility to acknowledge the fault indication (Power-LED blinks) within the menu “self-test” (page 29).

**Check sum**

Confirming “Check sum” with the soft key “ok”, the check sum of the previously selected message appears on the display. In case of fault, this value is used as a reference for erroneous messages.

**Delete**

Confirming “delete” with the soft key “ok”, shows the question “delete?” on the display. Using the soft keys “y=yes, n=no” lets you erase the previously selected message.

### Recording level

An integrated, electronic control automatically adjusts the input sensitivity of the DMM 4650's (Mic, Line, Rec. Inp) inputs. This level setting remains unchanged, until the question "Select new recording level?" is answered by using the soft key "y=yes" before starting a new recording. By using a short test signal marks the new setting of the control which is automatically stored. Pressing the soft key "ok" exits the recording level menu.

Adjusting the recording level only becomes necessary when the connected signal source is changed or major level changes occur.

### Remote recording

It is possible to activate a recording via one of the control inputs (ports A.. D). An example given in the list of factory sequences (S29, S30) on the pages 40-41. The message defined within the sequence is automatically erased before the new recording starts. The example employs an indication lamp for start recording (= deleting end) and the maximum recording time is set to 10 seconds.

Adjusting the recording level corresponds to the description in the previous paragraph. The message's audio quality setting stays unaltered as well. The priority number of the sequence gets copied to the priority of the message.

### Audio quality, recording duration

Prior to recording a message, "recording type" is shown on the display. The cursor keys are used to alter the audio cutoff frequency (16 kHz, 8 kHz, 4 kHz) and the signal quality (CD = 16 bit linear, long = 8 bit,  $\mu$ -Law). The factory default setting is "8 kHz long" for all messages. The newly set audio quality is maintained and individual adjustment for each message is possible.

Table for recording time (minutes) versus audio quality and installed sound memory extension (NR 90205).

Accuracy	CD			long*		
	4 kHz	8 kHz	16 kHz	4 kHz	8 kHz	16 kHz
without NR 90205	2 min	1min	0,5 min	4 min	2 min	1 min
1x NR 90205	4 min	2 min	1 min	8 min	4 min	2 min
2x NR 90205	6 min	3 min	1,5 min	12 min	6 min	3 min
3x NR 902058	8 min	4 min	2 min	16 min	8 min	4 min

\* The specified times for the "long" recording mode are minimum values since the active data reduction recognizes pauses in the audio signal. Pauses are defined as passages where the signal level drops -70 dBu below full modulation.

### Message memory extension

It is possible to extend the sound memory capacity of the appliance by incorporating up to three additional plug-in boards (extension kit NR 90205). The corresponding recording times are specified in the table above. The flash memories have to be formatted after insertion (see menu "system setup" > "format flash").

### Asterisk (\*) behind message duration

An asterisk \* behind the message recording time display signals that the corresponding data has been corrupted. The error is shown by the blinking Power-LED. In case you decide that the audio quality is sufficient, after listening to the recording, you have to enter the menu "confirming" (page 13) to delete the \*-sign. If the result is not tolerable, the only solution is re-recording the message. To omit the blinking Power-LED you have to acknowledge error no. 14 in the "self-test" menu (page 29).

# GONG

## General:

Gong Presets are audio signals that can be started within a sequence. Order and parameters of a gong sequence can be edited. For test purposes the sound can be started in the “gong >editor” menu by use of the PLAY/STOP keys. It is audible via the Pre-Listen outputs.

## Gong Presets

20 freely programmable presets (user preset) are available; from G00 - G19. Starting with G20 and going to G26 factory preset gong sequences are programmed. The corresponding functions are explained in the table on page 45. Erasing the factory presets is not possible. Creating your own gong sequence is easiest accomplished by modifying an existing, possibly similar gong (user or factory preset) and storing it under a new number together with its new title and priority.

## Operation menu gong

Confirming the menu selection “gong” with the soft key “ok”, the cursor keys < > allow selecting the following sub menus.

## Load

Confirming “load” with the soft key “ok”, “Gxx ‘Title ‘ and the soft keys “yes, no” appear on the display. Using the cursor keys the gong number xx is modified while the corresponding name is being displayed. “y” lets you load the selected gong into memory and modification is performed in the “editor” menu.

## Editor

The “editor” menu allows modification of gong sequences, envelopes, repetition amounts and several other parameters (see parameter listing). Testing the gong’s sound properties is possible by starting the gong sequence, using the PLAY/STOP key. The audio signal is presented at the pre-listen outputs. Parameter modifications are audible after performing a restart. Pressing the RECORD key stops the gong. After pressing the “EXIT” key (previous menu level), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Title

Confirming “Title” with the soft key “ok”, the name of the currently loaded gong sequence appears on the display. Using the cursor keys you are able to enter a new name that consists of up to 8 characters. The soft keys “A-a” are used to shift between the upper and the lower character case while “spc” inserts a blank character. After pressing the “EXIT” key (previous menu level), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Priority

Confirming “Priority” with the soft key “ok”, the priority number of the selected gong preset gets displayed. Using the cursor keys, the priority number can be set starting from 00 up to the user priority. A higher priority protects against unauthorized alteration of this preset by users with lower priority level. All factory presets are provided with a priority of 00, because they cannot be overwritten, anyway. This offers any user the possibility to use them as prototype sequences. After pressing the “EXIT” key (one menu level down), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Save

Confirming “save” with the soft key “ok”, the currently selected gong number gets displayed. Using the cursor keys, the desired gong number can be entered. Storing a preset has to be confirmed with the soft key “y = yes”. With “save” all modifications in the above mentioned menu items are saved into the selected user preset. Thus, individually saving the parameters is not necessary, since they remain in memory until another gong is being loaded.

## List of available gong parameters

### Type four-stroke, three-stroke

bar1: first gong stroke, A highest sound, B, C, to D deepest sound  
attack1: attack rate from 00ms (hard) to 99ms (soft)  
release1: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

start 2: start delay of the second gong stroke in seconds. (min 00.0s, max 99.9s)  
bar2: second gong stroke, A highest sound, B, C, to D deepest sound  
attack2: attack rate from 00ms (hard) to 99ms (soft)  
release2: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

start 3: start delay between second and third gong stroke in seconds. (min 00.0s, max 99.9s)  
bar3: third gong stroke, A highest sound, B, C, to D deepest sound  
attack3: attack rate from 00ms (hard) to 99ms (soft)  
release3: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

start 4: start delay between third and fourth gong stroke in seconds. (min 00.0s, max 99.9s)  
bar4: fourth gong stroke, A highest sound, B, C, to D deepest sound  
attack4: attack rate from 00ms (hard) to 99ms (soft)  
release4: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

### Type two-stroke, one-stroke

bar1: first gong stroke, A highest sound, B, C, to D deepest sound  
attack1: attack rate from 00ms (hard) to 99ms (soft)  
release1: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

start 2: start delay of the second gong stroke in seconds. (min 00.0s, max 99.9s)  
bar2: second gong stroke, A highest sound, B, C, to D deepest sound  
attack2: attack rate from 00ms (hard) to 99ms (soft)  
release2: fading sound from XXL (long, several seconds.), XL, L, M, S, XS, XXS (short, approx. 1sec)

repetition: number of repetitions of the gong sequence (min 1x, max 9999x), 0000 corresponds to infinite repetition.

rep-del: time between two gong sequences in seconds (min 00.1s, max 99.9s).

### Remarks regarding parameter setting:

Although the above mentioned parameters are extensively variable, the gained results not always represent a good sound. E. g.: attacks for low frequency bar strokes are acoustically quite different from the gong A sound.

Since a maximum of 2 gong strokes can be simultaneously processed, starting the third gong too early will abruptly end the first one and lead to unpleasant sound cut-off knacks. Effects like these resulting from extreme parameter settings are of physical reason and should be optimized by listening tests, first.

# ALARM

## General:

Alarms are audio signals that can be started within a sequence. The alarms are square wave forms providing the possibility for various parameters to be adjusted. For test purposes, it is possible to start the alarms signals in the “alarm editor” menu using the PLAY/STOP key. They are present on the pre-listen outputs.

## Alarm Presets

20 freely programmable presets (user presets) are available; from A00 to A19. The factory presets are pre-programmed on the preset numbers A20 - A34. The corresponding functions are explained in the table on page 46. Erasing these presets is not possible. In order to create your own alarm preset, modifying an existing, possibly similar alarm (user or factory preset) and storing it under a new number together with its new title and priority, is the easiest way to accomplish this task.

## Operation menu alarm

Confirming the menu selection “Alarm” with the soft key “ok” lets you select the following sub menus using the cursor < > keys .

## Load

Confirming “load” with the soft key “ok”, Axx ‘Title’ and the soft keys “yes, no” appear on the display. Using the cursor keys lets you edit the alarm number xx while the corresponding name is displayed. “Y” loads the selected alarm into memory while further editing is performed in the “editor” menu.

## Editor

The menu “editor” allows modification of audio frequencies, envelopes, duty-factors and several other parameters (see parameter listing). Testing the alarm’s sound properties is possible by starting the alarm sequence using the PLAY/STOP key. The sound is presented via the pre-listen outputs. Parameter modifications are audible after performing a restart. The RECORD-key stops the alarm. After pressing the “EXIT” key (previous menu level), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Title

Confirming “Title” with the soft key “ok”, the name of the currently loaded alarm is displayed. Using the cursor keys lets you enter a name of up to 8 characters. The soft keys “A-a” shifts between the upper and the lower character case while “spc” inserts a blank character. After pressing the “EXIT” key (previous menu level), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Priority

Confirming “Priority” with the soft key “ok”, the priority number of the selected alarm preset appears on the display. Using the cursor keys, the priority number can be set starting from 00 up to the user priority. A higher priority protects against unauthorized alteration of this preset by users with lower priority level. All factory presets are provided with a priority of 00, because they cannot be overwritten, anyway. This offers any user the possibility to use them as prototype sequences. After pressing the “EXIT” key (one menu level down), the question “store yes, no?” appears on the display. Acknowledging this question lets you save your new settings in a user preset.

## Save

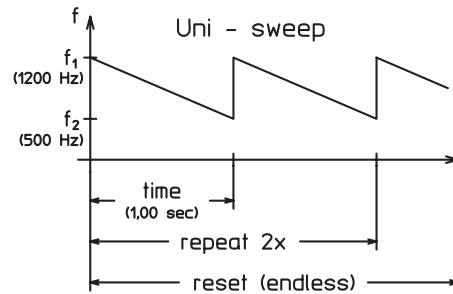
Confirming “save” with the soft key “ok”, the currently selected alarm number is displayed. Using the cursor keys, you are able to enter the number of the desired alarm. Storing a preset has to be confirmed with the soft key “y = yes”. With “save”, all modifications in the above mentioned menu items are saved into the selected user preset. Thus, individually saving the parameters is not necessary, since they remain in memory until another gong is being loaded.

## List of available alarm parameters

### Typ Uni-sweep

- frequency1: pitch at sound-start in Hz (min 40Hz, max 9999Hz) is swept until frequency2 is reached.  
 frequency2: pitch at sound-stop in Hz (min 40Hz, max 9999Hz).  
 time: duration of the sweep - Freq1 to Freq2 - in seconds., (min 0.01s, max 99.99s).  
 ratio: duty-cycle of the square wave in percent, (min 1%, max 50%)  
 repeat: number of repetitions of the sweep Freq1. > Freq2 (min 1x, max 9999x).  
 0000 corresponds to infinite repetition.

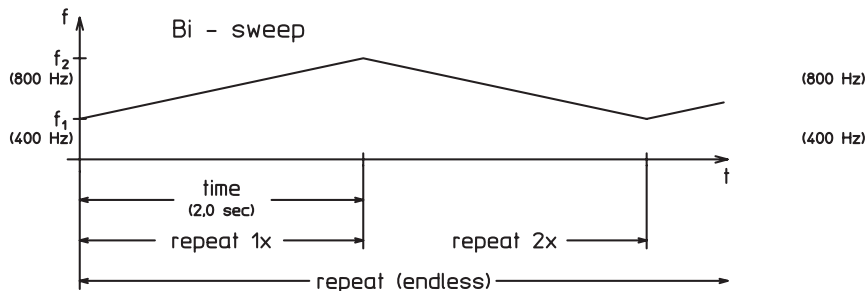
Values in parenthesis ( ), example DIN alarm, A20



### Type Bi-sweep

- frequency1: pitch at sound-start in Hz (min 40Hz, max 9999 Hz) is swept until frequency2 is reached.  
 frequency2: reverse frequency of the sound in Hz (min 40Hz, max 9999Hz) is swept until frequency1 is reached.  
 time: sweep duration from freq1 to inversion point in sec., (min 0.01s, max 99.99s).  
 The duration of the sweep  $\text{freq1} > \text{inversion point} > \text{freq1}$  is symmetrical.  
 ratio: duty-cycle of the square wave in percent, (min 1%, max 50%)  
 repeat: number of repetitions of the sweep  $\text{Freq1} > \text{inversion point}$  (min 1x, max 9999x).  
 0000 corresponds to infinite repetition.

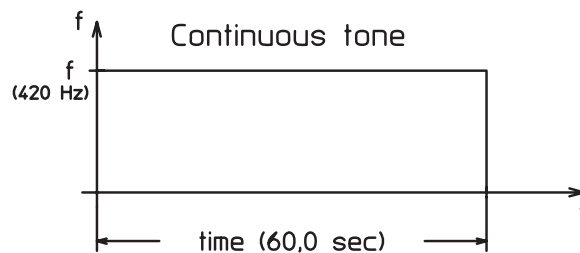
Values in parenthesis ( ), example siren, A22



### Type continuous sound

- frequency: pitch of the sound in Hz (min 40Hz, max 9999Hz)  
 ratio: duty-cycle of the square wave in percent, (min 1%, max 50%)  
 time: duration in sec., (min 0.01s, max 99.99s). 0.00s corresponds to infinite duration.

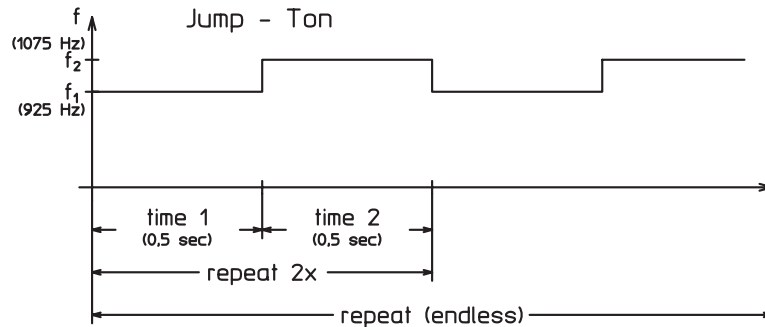
Values in parenthesis ( ), example BZB all clear signal, A25



### Typ Jump-sound

- frequency1: pitch at sound-start in Hz (min 40Hz, max 9999Hz) jumps after time1 to frequency2
- time1: duration for which freq1 is heard in sec., (min 0.01s, max 99.99s).
- frequency2: pitch of the sound in Hz (min 40Hz, max 9999Hz) jumps after time2 to frequency1
- time2: duration for which freq2 is heard in sec., (min 0.01s, max 99.99s).
- ratio: duty-cycle of the square wave in percent, (min 1%, max 50%)
- repeat: number of repetitions of one frequency (min 1x, max 9999x).  
0000 corresponds to infinite repetition.

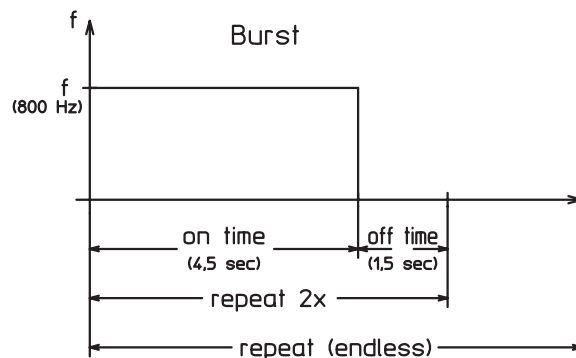
Values in parenthesis ( ), example Post, A23



### Typ burst

- Frequency: pitch of the sound in Hz (min 40Hz, max 9999Hz)
- on-time: duration for which the sound is heard in sec., (min 00.01s, max 99.99s).
- off-time: duration of the pause in sec., (min 00.01s, max 99.99s).
- Ratio: duty-cycle of the square wave in percent, (min. 1%, max. 50%)
- repeat: number of repetitions of the sound (min 1x, max 9999x).  
0000 corresponds to infinite repetition.

Values in parenthesis ( ), example ship2, A31



## Announcement

### General:

Using the announcement function provides the possibility to assign incoming audio signals from the recording inputs (Mic, line, Rec-Inp) directly to the sum output. Especially in stand-alone applications this option is particularly useful, since it will possibly save one microphone amplifier. Starting the function is either performed in the DMM 4650's operation menu or remotely controlled via a control line. For external operation a sequence is provided as factory preset S32 (page 42) which is easily adapted according to individual requirements.

### Operation menu announcement

Confirming the menu selection "announcement" with the soft key "ok", "select new input level?" and the soft keys "yes, no" are displayed. Adjusting the electronic input level control is performed here. After recording a short test signal, the control's new setting is automatically stored and stays. This value is independent of the recording level in Message recording. Pressing the soft key "ok" cancels the level adjustment menu and the DMM 4650 returns into announcement mode.

The display shows the message "Announcement" and a bargraph for optical control of the correct input level setting. The soft key "vl" allows modifying the pre-listen outputs' volume setting while "end" closes the announcement function.

Setting the recording level a new is required only when the connected signal source is changed or any other large scale alterations of the input level take place.

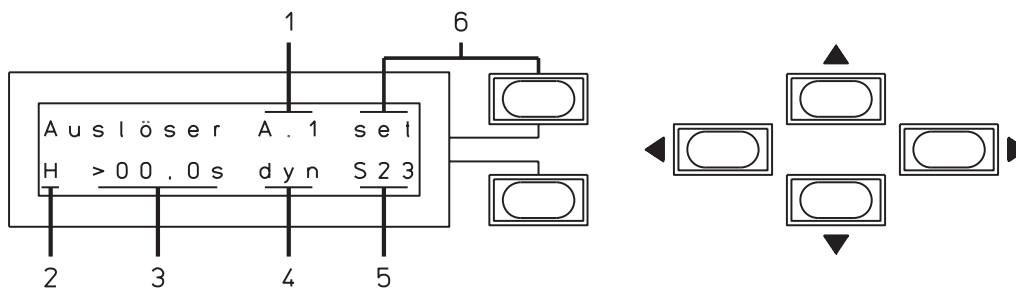
# Trigger

## General

The menu trigger allows to assign the connection of a control input to a function of the DMM 4650 (sequence start) while various control inputs can initiate a single sequence. The separate logic control settings for each input provide the possibility to optimally match the requirements of an installation. Pressing the soft key “set” stores the new trigger and it remains in memory even during periods when the mains or battery power is missing. The control inputs’ technical specifications are to be found in the chapter CONNECTIONS as well as in the APPENDIX.

## Operation menu trigger

Confirming the menu selection “trigger” with the soft key “ok”, using the cursor keys provides the possibility to make the following settings:



- 1 Using the cursor keys selects a control input. Possible selections are the Ports A, B, C, D and their corresponding input numbers 1, 2, 3, 4.
- 2 The logic control level gets also selected using the cursor keys: H=high (flowing current), L=low (no current), X=H or L (variable currents) and selecting “off” switches the sequence start of the selected line off.
- 3 Using the cursor keys sets a bounce time between 0.0 and 25.0 seconds. The logic control level selected in point 2 has to be present (stable) at the control input at least for this time value, so that the prerequisite for a sequence start is fulfilled.
- 4 The cursor keys provide the possibility to choose of a selection of three distinct conditions for a sequence to be started. A valid start attempt is initiated only, if the conditions 2 and 3 are fulfilled.

The switch “dyn” = dynamic tries to start the stated sequence and simultaneously deletes the start command. A currently running sequence with equal or higher priority prevents the sequence start command from being initiated.

The switch “stc” = static tries to start the selected sequence as long as the conditions 2 and 3 deliver a true result. This allows the periodic repetition of a sequence, as long as the conditions are fulfilled (e.g. a key is kept depressed). In case a sequence with equal or higher priority is currently running, the start of a new sequence is only possible after completion of the first sequence and, if the trigger conditions at this moment are still fulfilled.

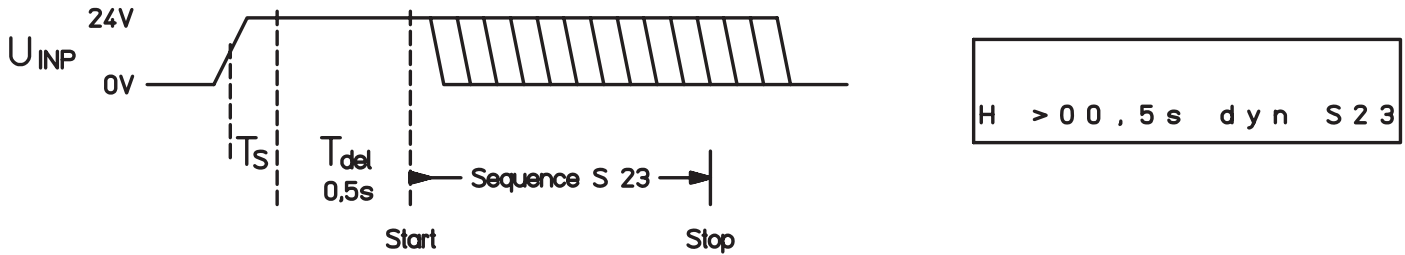
The switch “lat” = latched stores the start command and tries to initiate the selected sequence continuously until its launch has been successful. A new triggering of this input is stored only after completion of the sequence. All 16 control inputs are separately stored and the sequences are launched in the succession of their priorities.

- 5 The sequence which is supposed to be started with this control line can be selected with the cursor keys.
- 6 Pressing the soft key “set” stores the above mentioned settings and activates them immediately.

### Trigger recognition

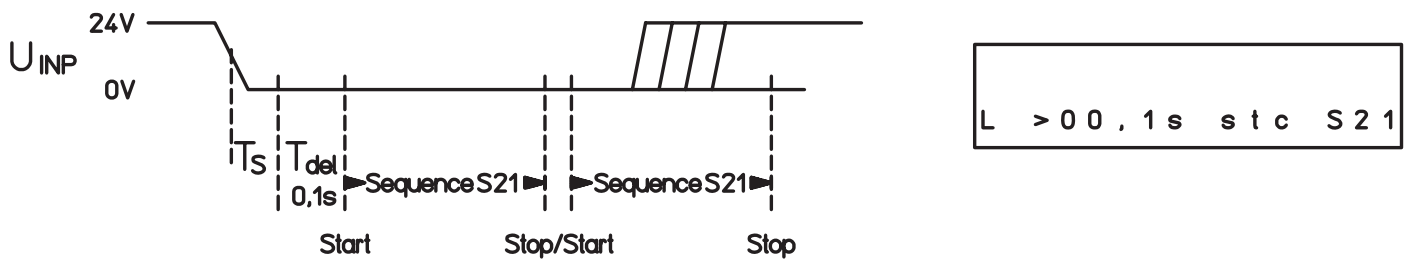
The level of the control inputs are periodically monitored by the processor. The sampling time ( $T_s$  = sample rate) is typically  $T_s \text{ typ} = 30 \text{ msec}$ . The maximum monitor interval can be set to  $T_s \text{ max} = 100 \text{ msec}$ . Thus, shorter impulses, spikes or quick AC voltages are recognized inaccurate or with a delay (undersampling). The bi-polar control inputs evaluate both half-waves of AC voltages.

### Examples for trigger settings

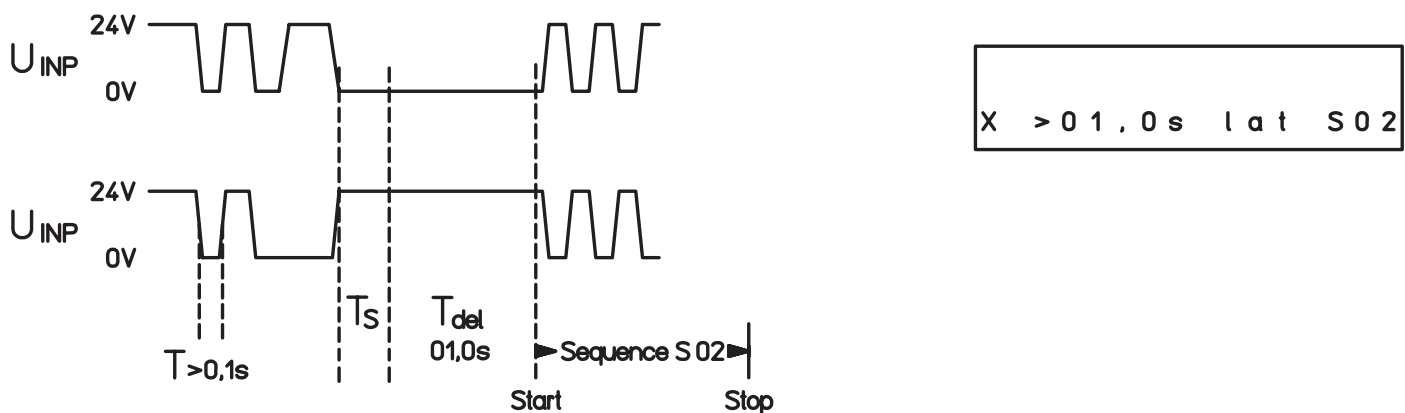


$T_s$  = sample Delay,  $T_s \text{ typ} = 30 \text{ msec}$ ,  $T_s \text{ min} = 0 \text{ msec}$ ,  $T_s \text{ max} = 100 \text{ msec}$

If the control input is ON for at least 0.6 seconds ( $T_{del} + T_s \text{ max}$ ) and no other sequence with a higher priority is currently running, the sequence 23 is started once. The end of the starting impulse is arbitrary.



Sequence 21 is initiated when the control input is without power for at least 0.2 seconds and no other sequence with a higher priority is currently running. Since the control input is still low at the end of the sequence, S21 starts once again.



If this control line's (watchdog) level is not altered for a period longer than 1.0 seconds, the sequence 02 is launched. If a sequence with a higher priority is currently running, the newly selected sequence will only be initiated after completion of the sequence with the higher priority. Please be aware of the fact, that the truthful recognition of level alterations is only possible when they are applied for a longer period than 100 msec (see trigger recognition).

## SEQUENCES

### General:

Sequences are a series of single steps, determining the functions of the DMM 4650 step by step. Thus, providing the possibility to define signal sequences, volume levels, trigger outputs, time sequences, loops, etc. Triggering an input ("trigger") normally starts a sequence. However, for test purposes it is possible to start a sequence via menu command. A sequence preset can consist of maximally 50 single steps.

### Sequence Presets

20 freely programmable presets (user presets) from S00 - S19 are provided. The functions of the factory presets S20-S37 are explained in tables on the pages 36 - 44. Erasing the factory presets is not possible. Probably the easiest way to create your own sequences is to modify already existing, possibly similar sequences (user or factory presets) and store them under different numbers together with their new titles and priorities.

### Operation menu sequence

Confirming the menu selection "sequence" with the soft key "ok", using the cursor keys lets you select the following sub menu:

### Load

Confirming "load" with the soft key "ok", "Sxx 'title 'and the soft keys "yes, no" appear on the display. Modifying the sequence number xx is possible by use of the cursor keys; the corresponding name is displayed. The selected sequence is loaded into memory with "y" offering the possibility for editing in other menus.

### Priority

Confirming "Priority" with the soft key "ok", the display shows the priority number of the selected sequence. Using the cursor keys it can be altered in the range of 00 up to 99. After pressing the "EXIT" key (previous menu level), the question "store yes, no?" appears on the display. Acknowledging this question lets you save your new settings in a user preset.

### Stop trigger

When confirming "stop trigger" with the soft key "ok", a menu is displayed which allows trigger settings for an input control line. Possible choices are described in the chapter "trigger". The stop trigger function is only available when the sequence commands "if stop" or "wt stop" are included. After pressing the "EXIT" key (previous menu level), the question "store yes, no?" appears on the display. Acknowledging this question lets you save your new settings in a user preset.

### Step list

When confirming "step list" with the soft key "ok", a menu is displayed which allows the indication of all individual steps of a sequence. In case the listing of a certain sequence is supposed to be edited, the sequence has to be loaded into memory, first (menu "load"). The cursor keys are used to modify the step number and its corresponding function (see list of available step functions). The soft keys "d = delete" and "i = insert" simplify the editing of step listings by deleting or inserting complete rows of steps at the currently displayed step number. In order to test the functionality of a sequence before the actual storing process is performed, it is possible to launch the sequence including all audio signal and control line results by pressing the PLAY/STOP and RECORD-(stop trigger) keys. Pressing the EXIT key immediately cancels the test function. After pressing the "EXIT" key (previous menu level), the question "store yes, no?" appears on the display. Acknowledging this question lets you save your new settings in a user preset.

**Title**

Confirming "title" with the soft key "ok", the name of the currently loaded sequence appears on the display. Using the cursor keys offers the possibility to enter a name of maximally 8 characters. The soft keys "A-a" and "spc" shift between the upper and the lower character case or enter a blank character, respectively.

After pressing the "EXIT" key (previous menu level), the question "store yes, no?" appears on the display. Acknowledging this question lets you save your new settings in a user preset.

**Save**

Confirming "save" with the soft key "ok" displays the number of the currently selected sequence. The cursor keys are used to enter the desired sequence number. Saving has to be confirmed using the soft key "y= yes". Choosing "save" stores all modifications made in the above mentioned menu items into the selected user preset. Thus, individual saving the parameters is not necessary, since they remain in memory until another sequence is loaded.

If a factory preset sequence (S20, S21,...) is chosen for saving, only the 'stop trigger' is stored.

**Sequence example**

Via "sequence" >"load" >S28 >"step list" the step function listing of sequence S28 with the name 'Message 2' is being selected, which shall serve as a simple example. The purpose of this sequence is the indication of a lamp signal and the playback of a previously recorded message to its end.

Step number	command	parameter	Function
1:	Out	C.1 set	indication lamp ON (relay C1)
2:	Sum=	off	input signal off
3:	DMM=	-2dB	volume DMM signal -2 dB
4:	Start	M02	start message M02
5:	wt	Audio	wait until message end
6:	End		Ende sequenz > stand-by

<b>List of available step functions in sequences</b>		
<b>Command</b>	<b>parameter</b>	<b>Function</b>
Nop		-no operation
End		-ending the running sequence
Out	X.Y set X.Y clr X.Y inv	-Output Y (1..4) des I/O Modul X (A..D) is set to 1 (contact closed) -Output Y (1..4) des I/O Modul X (A..D) is set to 0 (contact open) -Output Y (1..4) des I/O Modul X (A..D) is inverted
Start	Axx Gxx Mxx Ann.	-ends a currently running audio signal immediately and starts the alarm preset xx -ends a currently running audio signal immediately and starts the gong preset xx -ends a currently running audio signal immediately and starts the message xx -ends a currently running audio signal immediately and starts the announcement
Break		-ends a currently running audio signal immediately
Finish		-requests the end of the running audio signal. Gong, alarm fade out, messages and announcements are finished, recording is stopped.
DMM=	-xx dB	-controls of the DMM 4650 audio signal is set to -xx dB (*0 dB default)
Sum=	-xx dB	-control of the input - output XLR connection is set to -xx dB
Bypass	set clr inv	-analog bypass relay, direct connection XLR input - output closed -analog bypass relay, no relay connection XLR input - output -inverted analog bypass relay
Audio	prl sum	-switches the started DMM audio signals to pre-listen outputs (Pre-Listen only) -switches the started DMM audio signals to pre-listen and sum outputs (*default)
Record	Mxx	-ends a currently running audio signal immediately and starts the recording of the message xx. At first this message is being erased and then recording starts at the last adjusted recording level. Audio quality and name of this message stay unchanged. The message priority is identical with the sequence priority. The execution time lasts until End Delete Message (start of recording).
Dly=	ttt,t s	-sets a timer to ttt,t seconds and starts measuring this time (sand glass).
Count=	xxxx	-sets a counter (event counter) to a starting value xxxx. With every "if count"-command the counter is decremented by 1 until 0 is reached.
Jump	xx	-resumes the sequence at step number xx.
if	Delay Count Audio In X,Y Z Stop	-only executes the next step number if the delay time has elapsed (see command Dly). Otherwise the next step number is being skipped. -the counter is decremented by 1. The next step number is executed only if the counter has reached 0 (see command Count). If the counter value is greater than 0, the next step number is being skipped. -executes the next step number only if the audio signal started at last is finished (see command start), otherwise the next step number is being skipped. -executes the next step number only if the desired level Z (H or L) is applied at input Y (1 ..4) of the I/O module X (A..D). If this condition is not fulfilled, the next step number is being skipped. -executes the next step number only if the stop trigger condition of this sequence is fulfilled. Otherwise the next step number is being skipped.
wt	Delay Audio In X,Y Z Stop	-waits until the delay time is elapsed -waits until the last started audio signal is finished -waits until the desired level Z (H or L) is applied at input Y (1 ..4) of the I/O module X (A..D). -waits until the stop trigger condition of this sequence is fulfilled.

\* setting which is utilized, if a command is not used

## System setup

### General

Basic functions are defined in the menu system setup. Examples are: behaviour during stand-by, language, data backup, etc. The factory defaults are explained in the table on page 36. Modifications are automatically saved and remain in memory even without supply voltage.

### Operation menu system setup

Confirming the menu selection "system setup" with the soft key "ok", the following sub menus can be selected using the < > cursor keys .

### Contrast

Confirming "contrast" with the soft key "ok", the display shows "LCD contrast" and the soft key "norm". The display's contrast is adjusted in +/-% using the cursor keys while "norm" sets the value to 0%. The EXIT key switches to the prior menu level.

### Backlight

Confirming "backlight" with the soft key "ok", the display shows "LCD backlight" and the soft key "norm". Using the cursor keys, the display's backlight intensity can be set in a range of 0 % to 100%. The EXIT key switches to the prior menu level.

### Headphones

Confirming "headphones" with the soft key "ok", the display shows "headphones" and the soft key "norm". Using the cursor keys, the value for the volume of the Phone/Pre-Listen outputs can be set in a range of 0 % to 100 % while "norm" sets it to 75%. This setting can also be modified with the soft key "vl" in the menus "Message, Gong, and Alarm". The EXIT key switches to the prior menu level.

### Priority

Confirming "priority" with the soft key "ok", the display shows "Change User prio" and the soft key "ok". This menu allows fixing user priorities, that are lower than the current user level. The cursor keys are used to assign a user number and its priority. The new setting is only effective after confirming the entry with the soft key "ok" ("new priority stored"). The EXIT key switches to the prior menu level.

### Password

Confirming "password" with the soft key "ok", the display shows "password change" and the soft key "ok". This menu provides the possibility to change all user passwords, that are lower than the current user level; including your own password. A user number and its password is set with the cursor keys (4 numbers, each from 0-9). The new setting is only effective after confirming the entry with the soft key "ok" ("new password stored"). The EXIT key switches to the prior menu level.

### Outputs

Confirming "outputs" with the soft key "ok", the name of a control output (relay contact) is displayed. This menu allows the settings of all 16 outputs, which are valid in the stand-by mode (no sequence running). With the cursor keys one output (A1 to D4) is selected and set to "low" (contact open) or "high" (contact closed) depending on the application. This modification is effective immediately. This menu item can also be used to test the functions of the DMM 4650's outputs during the installation. The EXIT key switches to the prior menu level.

### Bypass

Confirming "bypass" with the soft key "ok", the message "bypass is off" or on appears on the display. This menu item allows the setting of the audio relay's state (input > output) when in the stand-by mode (no sequence running). The cursor keys are used to change the status. This change is immediately effective. The EXIT key switches to the prior menu level.

### **Sum level**

Confirming "sum level" with the soft key "ok", enables the setting of the digital audio control "SUM" (see audio functions). Using the cursor keys this value in "dB"-steps can be changed and is effective at the audio output in stand-by mode (no sequence running); presuming that the bypass relay is off. A currently running sequence can change the SUM setting. Anyway, when this sequence is finished (stand-by status), the level that was selected previously in this menu is automatically reestablished. The EXIT key switches to the prior menu level.

### **Attenuation**

Confirming "attenuation" with the soft key "ok", provides the possibility to set an attenuation level in the range of 0 dB to 10dB for the following audio signals: "Alarms", "Gongs", and "Announcements". The setting effects all audio signals of the corresponding group. This menu provides the opportunity to match the DMM 4650's output level to different amplifiers and loudspeaker systems. The EXIT key switches to the prior menu level.

### **init DMM 4650**

Confirming "init DMM 4650" with the soft key "ok", the message "DMM 4650 init sure?" and the soft keys "y=yes, n=no" appear on the display. If this menu item is confirmed with "yes", the safety query "sure?" appears again, before a complete initialization of the DMM 4650 to its factory default is performed. All user settings are lost!!! Important user presets, stored in the unit, should be transferred into a PC in advance, as described in the menu "backup". The contents of preset memory (EPROM) and message memory (Flash) are deleted or reset to their factory pre-set defaults (see list Factory presets). The number of sound memories is detected automatically. At the end of this procedure the number of bad flash memory blocks is indicated. Afterwards the display shows "Soft Reset" together with soft key "ok". After pressing this soft key the initialization process is complete. The start "init DMM 4650" is reserved for basic software updates and for applications where the unit is used differently.

### **format Flash**

Confirming "format Flash" with the soft key "ok", the message "format Flash, bank X" and the soft key "ok" appear on the display. A bank number can be selected using the cursor keys and "ok", together with the question "sure?", are displayed in order to avoid inadvertent formatting. Formatting deletes all the audio data of the selected memory chip!!! Important message data that is stored in the unit, should be saved in advance ("message edit play all", or "System setup back up"). After starting the procedure with the soft key "ok", the memory chip passes different tests. Faulty blocks are marked and upon conclusion of the tests their number is indicated on the display. This menu item is necessary for the installation of memory extensions (NR 90205) into the DMM 4650 and updating the internal message management. The sound memory bank 0 is firmly soldered at the circuit board (Pos. U135). Bank 1 is the retrofit pcb at position CN110, bank 2 = CN111, and bank 3 = CN112. After inserting the board and starting the "format Flash" procedure, the newly installed message memory is accessible. In case several extensions are installed, it is necessary to individually format each one them.

### **Flash space**

Confirming "Flash space" with the soft key "ok", the number of available flash memory chips and the free space of the sound memory in % appear in the display.

### **Software**

Confirming "software" with the soft key "ok", the display shows "Dynacord DMM 4650" and the actual software revision number.

### **Language**

Confirming "language" with the soft key "ok", using the cursor keys provides the possibility to choose between "German" and "English". The EXIT key switches to the prior menu level.

### **Backup**

Confirming "Backup" with the soft key "ok" displays "Backup, excl. Msg" and the soft key "send". The cursor keys are used to select "Exclusive message" (= device status + gong preset + alarm preset + sequence preset), "update" (equivalent to exclusive message + message management) or "inclusive message" (equivalent to update + audio data). The soft key "send" starts the data output via the REMOTE/RS232 connector.

**Restore**

Confirming "Restore" with the soft key "ok", the display shows "Restore release". This mode provides the possibility to restore preset data which previously had been saved using the "Backup" procedure via the REMOTE/RS232 interface. Since only user 3 has access to the "Restore" command, unauthorized modification of the DMM 4650 via the remote interface and other sequences (priority) interrupting a "Restore" process in progress is impossible.

A precise description of the necessary control steps and data formats is to be found on the pages 33 - 35. The EXIT key terminates this mode (returning to the prior menu level).

**RS232**

Confirming "RS232" with the soft key "ok", displays the current baud rate of the REMOTE/RS232 interface. With the cursor keys the desired data rate can be set and is effective immediately. Normally, this adjustment is necessary before "Backup" or "Restore" and remains in memory. This function can also be executed via command at the RS232 interface. A precise description of the necessary control steps and data formats is to be found on the pages 33 - 35. The EXIT key switches to the prior menu level.

**Clock**

Confirming "clock" with the soft key "ok", date and time together with soft key "set" appear on the display. After pressing "set", date and time are set anew using the cursor keys. The clock has no power reserve at missing supply voltage and is necessary only for the error log in "self test". With Power-ON the clock always starts from the same value.

Setting date and time is also be achieved via command at the RS232 interface. A precise description of the necessary control steps and data formats is to be found on the pages 33 -35. The EXIT key switches to the prior menu level.

## Self test

### General

In stand-by mode the DMM 4650 runs a number of test routines in order to detect device faults at an early stage. Errors are indicated by the flashing of the green POWER LED. On fatal errors or on a higher occurrence of errors, the flashing gets faster and the fault relay drops. At the same time the audio input is connected directly to the output via the bypass relay. This menu allows to locate the cause for a device break-down.

### Operation menu self test

Confirming the menu selection "self test" with the soft key "ok" displays an error number ("Er#xx"), the amount and a scrolling text in the lower line on the display. Using the cursor keys lets you select individual error numbers. The actual meaning of these numbers is explained in the table on page 47. The number shows how often a specific error has occurred. The scrolling text records the first and last occurrence of the error (see "setting clock"). The EXIT key terminates this menu (return to the prior menu level).

Note: Error no.1 only counts the switching "on" and "off" of the DMM 4650, but does not lead to an external error display (Power On Reset).

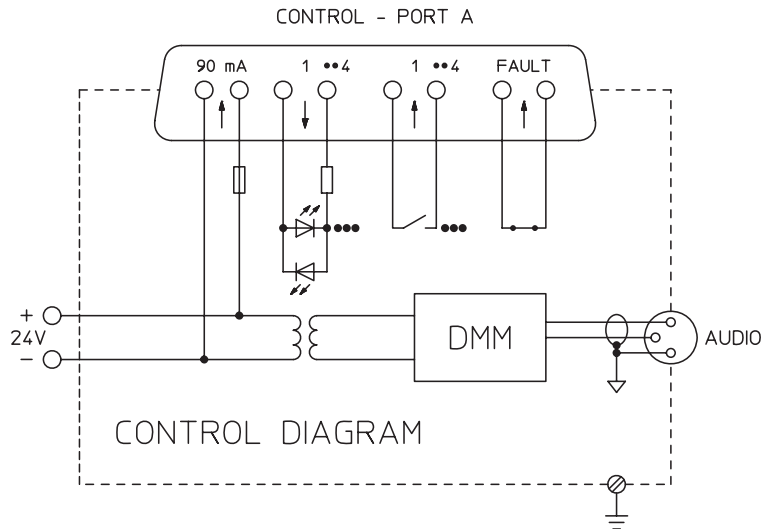
In case that error no.14 leads to the blinking of the green POWER LED, the data of one or more messages has been corrupted. The corresponding message(s) is(are) marked with an asterisk (\*) (see also page 14).

## CONNECTIONS

### CONTROL INPUTS AND CONTROL OUTPUTS PORTS A - D

**General:**

Operation see page 21(PORTS C, D are optional)Each of the 4 ports (A, B, C, D) have 4 inputs and 4 outputs and a power source for supplying floating control keys or contacts.The inputs and outputs are galvanic insulated from the DMM 4650 and the adjacent control lines.Port A has an additional fault output (relay contact) which, during normal operation, is always closed.



The DMM 4650 provides port connection through 25-pole sub-D connectors (male).

Pin assignment for ports A, B, C, D:@ corresponds to A, B, C, D

PIN	NAME	PIN	NAME
1	- Batt.	7-20	OUT @1
14	- Batt.	8-21	OUT @2
2-15	INP @1	9-22	OUT @3
3-16	INP @2	10-23	OUT @4
4-17	INP @3	11	- Batt.
5-18	INP @4	24	- Batt.
6	- Batt.	12-25	Fault Out !!Only PORT A
19	- Batt.	13	+ Batt. (max. 90 mA)

**Control levels and currents:**

Power source -Batt. / +Batt. corresponds to a supply voltage of (20V - 31V) of the DMM 4650. For current limitation (fuse), a PTC resistor (positive temperature coefficient resistor) is provided at the +Batt connection of each port.

**Inputs:**

The polarity of the control inputs is random.

L	=	low corresponds to	UINP	< ± 5V (0-5V)	IINP	< 1mA (0-1mA)
H	=	high corresponds to	UINP	> ± 10V (10-31V)	IINP	> 1.8mA (1.8-7mA)
		max. Uinp = ±31V				

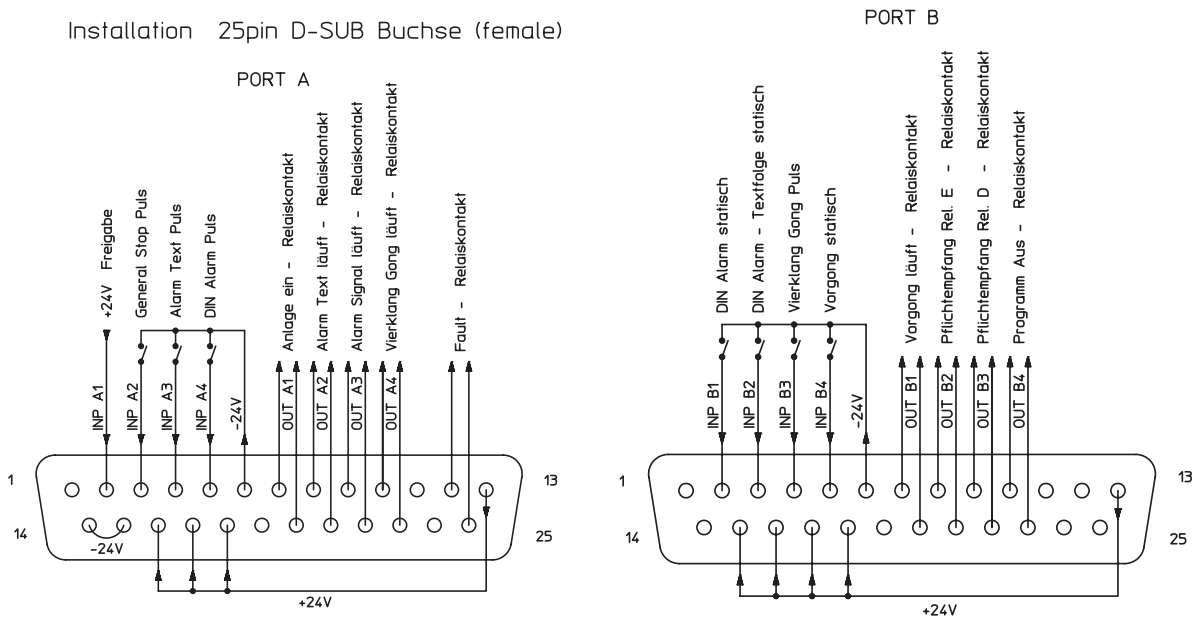
## Outputs:

Max. output current (relay contacts):

1A at 24VDC  
0.5A 50VDC

## Installation example:

Installation example with factory presets: see also "Factory preset sequences" page 36 - 44



## INPUTS:

All input signals must be applied longer than 200 msec. in order to be securely recognized. Modifying this default is possible in the menu "Trigger".

- |    |                 |  |
|----|-----------------|--|
| A1 | Release signal: | Input for re-confirmation signal, whether the unit (power amplifiers) is ready   |
| A2 | General Stop:   | Input (impulse); interrupts all currently running sequences  |
| A3 | Alarm text:     | Input (impulse) for playback alarm message (M00)   |
| A4 | DIN alarm:      | Input (impulse) for infinite DIN alarm (siren 1200 Hz - 500 Hz).   |
| B1 | DIN alarm:      | Key pressed for DIN alarm on, key released terminates the alarm  |
| B2 | DIN alarm text: | Key pressed starts sequence, DIN alarm, 1 sec pause, alarm text (M00), 1 sec pause, DIN alarm, etc., key released terminates the sequence. |
| B3 | 4-tone gong:    | Input (impulse) starts a 4-tone gong (G20).  |
| B4 | Pre-gong:       | Input (static), key pressed starts pre-gong and enables announcement via DMM 4650, key released terminates the sequence.                   |

## OUTPUTS:

All outputs are floating relay contacts.

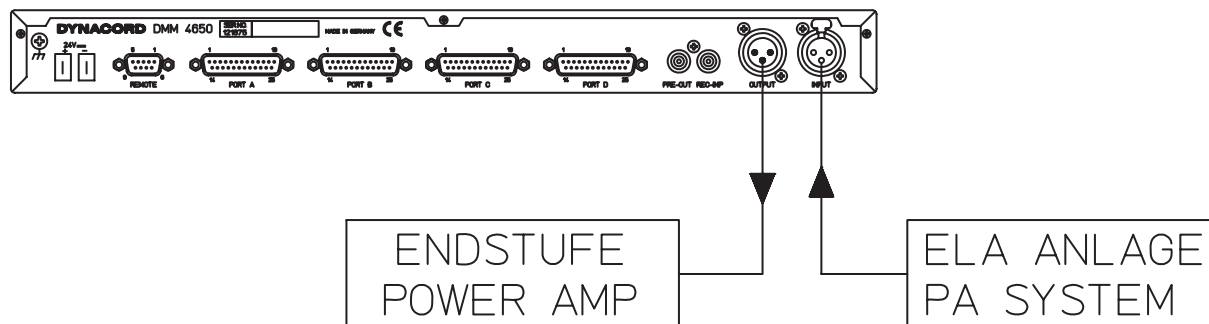
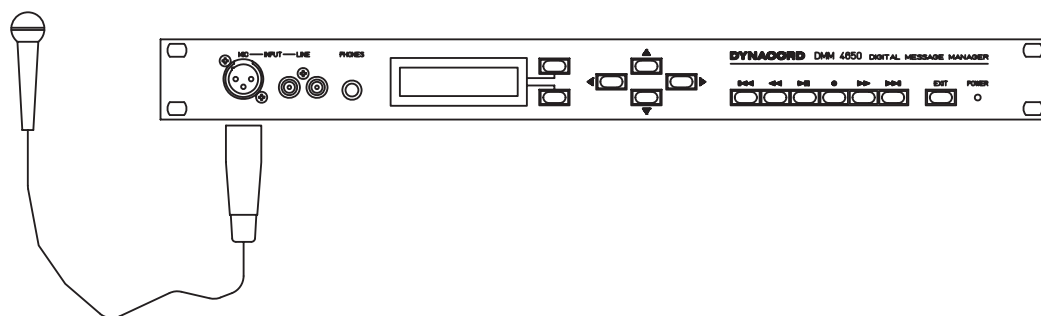
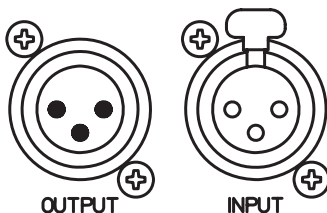
- |    |                       |   |
|----|-----------------------|---|
| A1 | System on:            | Switches on the electro acoustics sound reinforcement system.       |
| A2 | Alarm text running:   | Signaling contact for alarm text active.                            |
| A3 | Alarm signal running: | Signaling contact for alarm signal active.                          |
| A4 | 4-tone gong running:  | Signaling contact for 4-tone gong active.                           |
| B1 | Pre-gong running:     | Signaling contact for pre-gong active.                              |
| B2 | Mandatory relay E:    | Switches the sound reinforcement system to mandatory reception (E). |
| B3 | Mandatory relay D:    | Switches the sound reinforcement system to mandatory reception (D). |
| B4 | Program off:          | Switches current music program off.                                 |

## Audio inputs and outputs

The XLR inputs and outputs are electronically balanced and wired according to the IEC 268 standards. If unbalanced XLR connection is desired, PIN1 and PIN3 have to be bridged using a jumper. Specifications are to be found in the appendix on page 53.

If balanced, floating connection is necessary, the extension kit NR 90211 has to be installed for the INPUT and NR 90210 for the OUTPUT.

- PIN 1: SHIELD
- PIN 2: a, +
- PIN 3: b, -

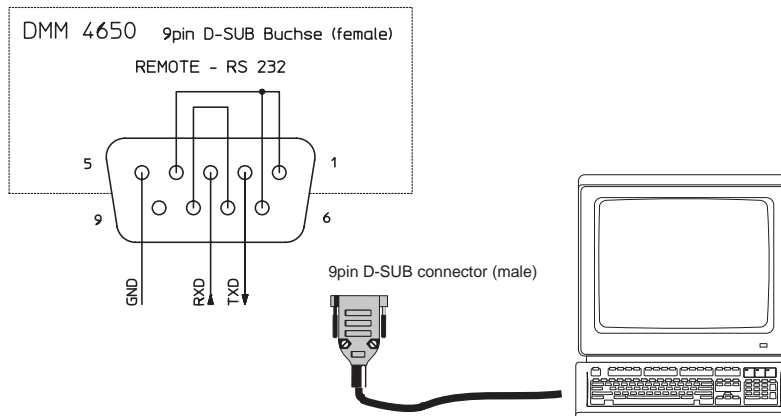


## Remote, RS 232 interface, data backup

### General

Data backup should be performed prior to new installations and programming modifications of the DMM 4650. This ensures that replacing an appliance for service purposes takes the least effort, immediately providing identical functions on the replacement unit. When setting-up systems with similar functions more often, the programming data can be copied using a ready-made data carrier. For data backup a PC with serial interface and a terminal program is necessary. Please note that the guidelines of the manufacturer of data media (disks, tapes etc.) are to be observed for maximum data safety, since they guarantee data integrity for a limited period of time only. Using a medium transfer baud rate, the backup of a device status including its gong, alarm, sequences and trigger ("backup") presets lasts about 10 seconds. If the audio data of the message memory ("backup message") is supposed to be saved additionally, the duration depends on the length of the recorded messages and can last several minutes (short message) up to some hours (memory completely used). Thus, it is recommended to perform an audio data backup via the menu "message edit Play all" onto a DAT recorder or tape deck.

### Connection REMOTE/RS 232



### Interface settings

Baud rate	300 to 38400	The baud rate can be set at the DMM 4650 ("System setup >RS232"), as well as via the interface with command (see list REMOTE commands).
Data bits	8	
Parity	none	After pressing the Return key on the PC (Line Feed), the unit returns "DMM 4650" (communication test).
Stop bit	1	
Protocol	Xon/Xoff	The baud rate is factory preset to 9600 baud

### Backup, Restore commands, Priority

The "backup" command can be given both, from the DMM 4650 menu "System setup >backup", as well as via the REMOTE interface. After starting the backup procedure, the desired data is transmitted in the previously determined format via the REMOTE interface. The PC's terminal program receives the data and creates a corresponding file. The terminal program's configuration is not to be set for any conversion of the received data.

Part of backup file:

```
RESTORE A00:Daten
RESTORE G00:Daten
: RESTORE s20:Daten
RESTORE TA.1:Daten
RESTORE U:Daten
```

RESTORE is needed for data re-storing, A00 = alarm preset 00, G=gong, S=sequences, s=stop trigger, TA.1 =trigger PortA Input1, M=message and U=basic settings. This text file can be altered using an editor, e.g. by altering A00 into A05 or deleting whole presets including all data belonging to them. Data consist of the character string which belongs to the preset and which may not be altered. (! word processor software like WORD or Word Pad should not be used to perform the described alterations, since they add their own format strings to the text.)

The Backing-up process runs with lowest priority and can be interrupted by other sequences at any time. If this is supposed to be avoided, interrupting sequences are blocked by entering the user3 password (high priority). If the backup is expected to take very long ("backup message"), start "System setup > Restore >ok" after entering the password, in order to prevent the time-dependent switching-off of the operation.

RESTORE stores the data received via the DMM 4650's REMOTE interface into the stated preset memory. In order to prevent the current memory from being inadvertently overwritten, it is necessary to previously allow this mode in the menu "System setup >Restore >ok". The DMM 4650 confirms the successful restoration by displaying the message "Preset xx restored".

### List REMOTE - commands

Separation command - parameters are separated by a blank character.

The execution takes place after a line feed command (Return) at the end of a line.

Parameter in [ ] are optional

Bold characters describe factory default settings

Cancel the data transfer with Strg+C

Command	Parameter	Function
backup	[ ] [status]	The DMM 4650 sends device status (System setup), preset gong, alarm, sequences, stop trigger, trigger
backup	message	The DMM 4650 sends device status (System setup), preset gong, alarm, sequences, stop trigger, trigger and the audio data stored in the message memory (flash memory)
baud	[ ] [ nnnnn]	shows current baud rate, or sets the DMM 4650's baud rate to a new value
date	[ ] [TT.MM.JJ]	shows the current date, or sets the date to a new value
list	Axx Gxx ...	The DMM 4650 transfers the selected presets' data to the PC in plain text. For documentation, it is possible to print the presets' contents via the PC for further information see help command
Restore	Axx ccccccc Gxx ccccccc	The DMM 4650 stores the data into the stated memory (the correct format is determined by the backup) for further information see help command
time	[ ] [hh:mm:ss]	shows current time, or sets the time to a new value
ver		The DMM 4650 transmits the the software revision number
*		ubsequent characters are ignored by the DMM 4650 (comment)
answer	[ ] [on] [off]	the answer of the DMM 4650 is switched on or off, or the current status is being displayed
echo	[ ] [on] [off]	the output of the received characters is switched on (echo) or off, or the current status is-being displayed
linefeed	[ ] [on] [off]	the output of an "empty line" after command execution is switched on or off, or the current status is being displayed
prompt	[ ] [on] [off]	tthe output of the character string "**DMM 4650" after command execution is switched on or off, or the current status is being displayed
?		Help function, displays a listing of the commands
Help		Help function, displays a listing of the commands

### Definitions:

nnnnn      300 in steps up to 38400  
DD.MM.YY    day.month.year  
xx          preset number  
cccccc      data  
hh:mm:ss    hours : minutes : seconds

## Terminal programs

The utilized terminal software has to be configured for data transfers (send and receive) with a word length set to 8-Bit and no data conversion.

Setting examples for the program "Terminal", coming together with Windows 3.1x package:

Start the terminal software, click the window 'configuration' 'data transmission', set the values for the configuration as described in the paragraph interface settings (see above), and confirm your settings with 'ok'. Select 'conversions no' in window 'configuration' 'terminal settings' and conclude your settings with acknowledging the 'ok' key.

Enter command backup (do not hit the return key yet), then select the menu 'transmission' 'receive text file'. Activate 'receive control character' in this window and, after entering the desired file name, confirm with 'ok'. The terminal program is now waiting for data that is going to be stored in the selected file.

The data transmission starts after pressing the "return" key. The received data is displayed on the PC's screen. After the transmission is finished, select "Cancel" on the lower left-hand side to terminate the data transfer.

Upon completion of the data backup, the contents of the file can be checked using the "read text file" command or any text editor. If necessary, the later allows to change the data (only inserting or deleting whole text lines, see backup, Restore commands above). The text editor should not decode and re-code any characters.

If the backup data is supposed to be loaded back into the DMM 4650, the function Restore has to be activated first (see backup, Restore commands).

After configuring the PC's interface settings (configuration' 'data transfer'), the filename has to be entered in the window 'transmission' 'send text file'. Upon conclusion confirming with "ok" starts the transmission. The DMM 4650's echo gets displayed on the PC screen and upon reception of a complete preset "restored" appears on the screen.

## FACTORY PRESETS

The installed software v 1.2 provides pre-stored factory presets for sequences, alarms and gongs. Also defined are basic settings (menu "System setup") as well as input and output lines. For direct use of these presets, installation examples are to be found on page 31.

### Factory settings, defaults

The user can edit these defaults according to individual requirements.

The data of the menus "outputs" "standby" and "sum level" determines the status of the DMM 4650 in stand-by mode (no sequence running). A running sequence could lead to a modification of the outputs. Upon completion of the sequence, the outputs are switched back to their previous status (stand-by mode).

Menu	Parameter 1	Parameter 2	Parameter 3	Parameter 4
Contrast	0%			
Backlight	50%			
Phones	75%			
Priority	Prio1 33	Prio2 66	Prio3 99	
Password	Prio1 1111	Prio2 2222	Prio3 3333	
Outputs	all Low (relay open)	except B4 = High		
Bypass	off (relay open)			
Sum Gain	0 dB			
Attenuation	alarms 0dB	gongs 0dB	messages 0dB	announcements 0dB
Language	German			
RS 232	9600 Baud			

### List of trigger signals

Input	Level	Delay-sec.	Trigger type	starts sequence	utilization Function (see sequence)
A1	Off				release, S21 to S25, S31 and S33 to S37 wait for High at A1, return message for system ready, upon release the signal output starts
A2	High	>00,1	dyn	S20	stops each running sequence
A3	High	>00,1	dyn	S21	start alarm message M00
A4	High	>00,1	dyn	S22	start DIN alarm, pulse trigger
B1	High	>00,1	dyn	S23	start DIN alarm, high = start, low = stop,
B2	High	>00,1	dyn	S24	start alarm text sequence, high = start, low = stop,
B3	High	>00,1	dyn	S25	4-tone gong, pulse trigger
B4	High	>00,1	dyn	S26	Pre-gong (2-tone), pulse trigger
C1	High	>00,1	dyn	S27	start message M01, pulse trigger
C2	High	>00,1	dyn	S28	start message M02, pulse trigger
C3	High	>00,1	dyn	S29	remote recording M01, pulse trigger, first pulse = start, second pulse = stop
C4	High	>00,1	dyn	S30	remote recording M02, pulse trigger, first pulse = start, second pulse = stop
D1	High	>00,1	dyn	S31	start DIN alarm with announcement key at D2, pulse trigger
D2	Off				announcement in S31, high = announcement, low = alarm
D3	High	>00,1	dyn	S32	start announcement DMM 4650 Mic, high = start, low = stop
D4	High	>00,1	dyn	S36	Morse key

## List of factory preset sequences

<b>Sequence Nummer</b> <b>S 20</b>	<b>Title</b> <b>“stop all”</b>	<b>Priority</b> <b>99</b>	<b>Stopp trigger</b> <b>off</b>
---------------------------------------	-----------------------------------	------------------------------	------------------------------------

Step	Command	Parameter
1:	Break	
2:	End	

### Stops all running sequences

Description: Stops all running sequences with low priorities (all factory presets). Upon completion the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 21</b>	<b>Title</b> <b>“Alarmtxt”</b>	<b>Priority</b> <b>97</b>	<b>Stopp trigger</b> <b>off</b>
---------------------------------------	-----------------------------------	------------------------------	------------------------------------

Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A2 set
7:	Sum=	off
8:	DMM=	-2dB
9:	Start	M 00
10:	wt	Audio
11:	End	

### Start alarm text (message 00) once

Description: Turns the sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is closed. After closing the signaling contact (A2 = alarm text running) the audio controls are set to alarm text priority. The alarm text (M00) is given out. After the transmission of the message is completed, the sequence is finished and the device returns to the stand-by mode, i. e. all line and relay contact settings re-enter the status, prior to the start of the sequence.

<b>Sequence Nummer</b> <b>S 22</b>	<b>Title</b> <b>“DIN-Alarm”</b>	<b>Priority</b> <b>93</b>	<b>Stopp trigger</b> <b>off</b>
---------------------------------------	------------------------------------	------------------------------	------------------------------------

Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A2 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Start	A 20
10:	wt	Audio
11:	End	

### Start continuous DIN alarm (siren 1200 Hz - 500 Hz, per second)

Description: Turns the sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is closed. After closing the signaling contact (A3 = alarm signal running) the audio controls are set to alarm text priority. The alarm signal (A20) is outputted and runs continuously until it is stopped by a sequence with a higher priority (e.g. S20). The control of the settings and relay contacts is taken over by the stop sequence and upon completion the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S 23</b>	<b>Title</b> <b>“DIN-Alarm”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>B1 Low &gt; 00,1s stc</b>
---------------------------------------	------------------------------------	------------------------------	--

Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A2 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Start	A 20
10:	wt	Stop
11:	End	

**Start DIN alarm (key B1 ON), Stop with key B1 OFF**

Description: Turns the sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) gets closed. After closing the signaling contact (A3 = alarm signal running) the audio controls are set to alarm text priority. The output of the alarm signal (A20) is started. This sequence is terminated when the input B1 is Low (no current). Upon completion, the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S 24</b>	<b>Title</b> <b>“Alarm-Txt”</b>	<b>Priority</b> <b>91</b>	<b>Stopp trigger</b> <b>B2 Low &gt; 00,1s stc</b>
---------------------------------------	------------------------------------	------------------------------	--

Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Out	A2 set
8:	Sum=	off
9:	DMM=	-5dB
10:	Start	A 34
11:	wt	Audio
12:	Dly=	001,0s
13:	wt	Delay
14:	DMM=	-2dB
15:	Start	M 00
16:	wt	Audio
17:	Dly=	001,0s
18:	wt	Delay
19:	if	Stop
20:	End	
21:	Jump	09
22:	End	

**DIN alarm > alarm text >DIN alarm sequence, (start key B2 ON), Stop with key B2 OFF**

Description: Turns the sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is being opened and B2, B3 (mandatory reception E, D) gets closed. After closing the signaling contacts (A3 = alarm signal, A2 = alarm text) the audio controls are set to alarm priority. The output in sequence is: alarm signal 5 sec (A34) 1 sec. pause alarm text (M00) 1 sec. pause alarm signal 5 sec. (A34) 1 sec. pause, etc. until the input B2 = Low (no current) terminates the sequence. Upon termination the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S 25</b>	<b>Title</b> <b>“VierKlng”</b>	<b>Priority</b> <b>89</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A4 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Start	G 20
10:	wt	Audio
11:	End	

#### 4-tone gong

Description: Turns the sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is being opened and B2, B3 (mandatory reception E, D) gets closed. After closing the signaling contact (A4 = gong runs) the audio controls are set to gong priority. The gong signal is being output and fades. After the fade-out the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S 26</b>	<b>Title</b> <b>“Vorgong”</b>	<b>Priority</b> <b>87</b>	<b>Stopp trigger</b> <b>B4 Low &gt;00,1s stc</b>
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Step	Command	Parameter
1:	Out	B4 clr
2:	Out	B2 set
3:	Out	B1 set
4:	Sum=	-3dB
5:	DMM=	-5dB
6:	Start	G 24
7:	Dly=	004,0 s
8:	wt	Delay
9:	Out	B1 clr
10:	wt	Audio
11:	wt	Stop
12:	End	

#### Start Pre-gong (key B4 on), end of announcement with key B4 off

Description: The output B4 (music program off) is opened and in succession B2 (mandatory reception E) is being closed. After closing the signaling contact (B1 = pre-gong runs) the audio controls are set to audio input/pre-gong mix. After 4 seconds the signaling contact (B1, ready for announcement) is being opened. The audio controls remain unchanged until control input B4 terminates the sequence. Afterwards, the DMM 4650 re-enters the stand-by mode.

<b>Sequence Nummer</b> <b>27</b>	<b>Title</b> <b>“Message1”</b>	<b>Priority</b> <b>80</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	C1 set
2:	Sum=	off
3:	DMM=	-2dB
4:	Start	M 01
5:	wt	Audio
6:	End	

#### Start Message 1

Description: After closing the signaling contact (C1 = message runs) the audio controls are set to prioritize this message. After the message is finished the DMM 4650 re-enters the stand-by mode.

<b>Sequence Nummer</b> <b>S 28</b>	<b>Title</b> <b>“Message2”</b>	<b>Priority</b> <b>80</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	C1 set
2:	Sum=	off
3:	DMM=	-2dB
4:	Start	M 02
5:	wt	Audio
6:	End	

### Start Message 2

Description: Closing the signaling contact (C1 = message runs) switches the audio controls to the priority of the message. After the message is finished the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 29</b>	<b>Title</b> <b>“EasyRec1”</b>	<b>Priority</b> <b>80</b>	<b>Stopp trigger</b> <b>C3 High &gt;00,1s lat</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	Record	M 01
3:	Out	C2 set
4:	Dly=	010,0 s
5:	if	Stop
6:	Nop	
7:	if	Stop
8:	Jump	14
9:	if	Delay
10:	Jump	14
11:	if	Audio
12:	End	
13:	Jump	07
14:	Finish	
15:	Out	C2 clr
16:	Jump	11

### Starts the recording of Message 01 (remote recording), starts by briefly pressing the input C3 button (menu trigger), stops by pressing the input C3 button again

Description: Closing the signaling contact (C3 = remote recording runs) starts erasing the message. After successful erasing the signaling contact C2 (=start recording) is being closed. The recording is terminated by switching the control input C3 (current input C3 on). If the termination of the recording mode is not recognized, the maximum duration is limited to 10 sec. Name and priority of the message stay unaltered and the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 30</b>	<b>Title</b> <b>“EasyRec2“</b>	<b>Priority</b> <b>80</b>	<b>Stopp trigger</b> <b>C4 High &gt;00,1s lat</b>
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Step	Command	Parameter
1:	Out	C3 set
2:	Record	M 02
3:	Out	C2 set
4:	Dly=	010,0 s
5:	if	Stop
6:	Nop	
7:	if	Stop
8:	Jump	14
9:	if	Delay
10:	Jump	14
11:	if	Audio
12:	End	
13:	Jump	07
14:	Finish	
15:	Out	C2 clr
16:	Jump	11

**Starts the recording of Message 02 (remote recording), starts by briefly pressing the input C4 button (menu trigger), stops by pressing the input C4 again**

Description: Closing the signaling contact (C3 = remote recording runs) starts erasing the message. After successful erasing the signal contact C2 (=start recording) is being closed. The recording is terminated by switching the control input C4 (current input C4 on). If the termination of the recording mode is not recognized, the maximum duration is limited to 10 sec. Name and priority of the message stay unaltered and the DMM 4650 re-enters the stand-by mode.

<b>Sequence Nummer</b> <b>S 31</b>	<b>Title</b> <b>“Fire-Mic“</b>	<b>Priority</b> <b>98</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	DMM=	-5dB
8:	Sum=	off
9:	Start	A 20
10:	wt	In D2 High
11:	Break	
12:	Sum=	0 dB
13:	wt	In D2 Low
14:	Jump	07
15:	End	

**Starts a continuous DIN-alarm, pressing the key “fire microphone” allows for an announcement via audio input, after the key is being released the alarm is continued.**

Description: Turns the power of the electro-acoustics sound reinforcement system on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) gets closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to priority for the alarm signal. The alarm signal (A20) is being outputted and runs continuously until the alarm is interrupted by a high signal (=current) at the control input D2 (=fire announcement). As long as the high potential is present at D2, priority is given to the audio input. The alarm continues (infinitely) as long as the D2 potential is low. A sequence with a higher priority (e. g. S 20) stops this sequence. The control over settings and relay contacts is taken over by the stop sequence. After the stop sequence ends the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 32</b>	<b>Title</b> <b>“Ansage”</b>	<b>Priority</b> <b>80</b>	<b>Stopp trigger</b> <b>D3 Low &gt;00,1s stc</b>
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Step	Command	Parameter
1:	Out	D3 set
2:	Sum=	-20dB
3:	DMM=	-3dB
4:	Start	Ann.
5:	wt	Stop
6:	End	

**Announcement via recording input DMM 4650 as long as the key is being pressed (System input -20 dB).**

Description: Closing the signaling contact (D3 = announcement running) switches the audio controls of the sum input to -20 dB and the controls of the announcement to -3dB. After the correct level was set once in the operation menu (announcement), the announcement is made via one of the DMM 4650's recording inputs. When the message has ended the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 33</b>	<b>Title</b> <b>“BZB-ABC”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>off</b>
---------------------------------------	----------------------------------	------------------------------	------------------------------------

Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Count=	0003
10:	Start	A 27
11:	wt	Audio
12:	Dly=	012,0s
13:	wt	Delay
14:	if	Count
15:	Jump	17
16:	Jump	10
17:	Dly=	006,0s
18:	wt	Delay
19:	Count=	0003
20:	Dly=	012.0s
21:	wt	Delay
22:	Start	A 27
23:	wt	Audio
24:	if	Count
25:	End	
26:	Jump	20
27:	End	

**BZB ABC alarm**

Description: Turns the sound reinforcement system's power on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to the alarm signal's priority. The signal sequence is defined as follows: 1 minute siren interrupted by two breaks (=5 \* 12sec, siren = 330 - 420 Hz), break 30 seconds and repeating of the signal sequence (total duration 150 sec.); the utilized alarm preset is A 27 = 12 sec. siren. Afterwards the DMM 4650 returns to the stand-by mode.

<b>Sequence Nummer</b> <b>S 34</b>	<b>Title</b> <b>“gen-emgc”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Start	A 30
10:	wt	Audio
11:	Start	A 31
12:	wt	Audio
13:	Jump	09
14:	End	

### Ship alarm “General Emergency”

Description: Turns the sound reinforcement system’s power on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) gets closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to the alarm signal’s priority. The signal sequence is defined as follows: 7 packages 1.5 sec. 800 Hz tone with 1.5 sec. break (A30) followed by a 4.5 sec. tone with 1.5 sec. break (A31). The sequence runs continuously until it is stopped by a sequence with a higher priority (e. g. S 20). The control of settings and relay contacts is taken over by the stop sequence. After the stop sequence ends, the DMM 4650 returns to stand-by mode

<b>Sequence Nummer</b> <b>S 35</b>	<b>Title</b> <b>“fireship”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Start	A 32
10:	wt	Audio
11:	Start	A 31
12:	wt	Audio
13:	Jump	09
14:	End	

### Ship alarm “Fire”

Description: Turns the sound reinforcement system’s power on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to the alarm signal’s priority. The signal sequence is defined as follows: 1 package 1.5 sec. 800 Hz tone with 1.5 sec. break (A32) followed by a 4.5 sec. tone with 1.5 sec. break (A31). The sequence runs continuously until it is stopped by a sequence with a higher priority (e. g. S 20). The control of settings and relay contacts is taken over by the stop sequence. When the stop sequence ends, the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S 36</b>	<b>Title</b> <b>“fireship”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Sum=	off
8:	DMM=	-5dB
9:	wt	In D4 High
10:	Start	A 33
11:	wt	In D4 Low
12:	Break	
13:	Jump	09
14:	End	

### Ship alarm “Manual Morse key”

Description: Turns the sound reinforcement system’s power on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is being closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to the alarm signal’s priority. A continuous tone (800 Hz = A33) starts when a current is present at the control input D4 and stops after releasing the key. The sequence runs continuously until it is stopped by a sequence with a higher priority (e. g. S 20). The control of settings and relay contacts is taken over by the stop sequence. After the stop sequence ends, the DMM 4650 returns to stand-by mode.

<b>Sequence Nummer</b> <b>S37</b>	<b>Title</b> <b>“fireship”</b>	<b>Priority</b> <b>95</b>	<b>Stopp trigger</b> <b>off</b>
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Step	Command	Parameter
1:	Out	A1 set
2:	wt	In A1 High
3:	Out	B4 clr
4:	Out	B2 set
5:	Out	B3 set
6:	Out	A3 set
7:	Sum=	off
8:	DMM=	-5dB
9:	Count	0005
10:	Start	A 28
11:	wt	Audio
12:	Dly=	004,0s
13:	wt	Delay
14:	if	Count
15:	End	
16:	Jump	10
17:	End	

### Telephone bell

Description: Turns the sound reinforcement system’s power on (relay A1) and waits for acknowledgment (input A1 = system ready). When the system is ready, the output B4 (music program off) is opened and B2, B3 (mandatory reception E, D) is closed. Closing the signaling contact (A3 = alarm signal running) switches the audio controls to the alarm signal’s priority. The signal sequence is defined as follows: 1 sec. signal (A28), 4 sec. break. It is being repeated five times. Using different signal periods offers the opportunity to realize a code call system. When the call signal ends, the DMM 4650 returns to stand-by mode.

## List of factory preset gong signals

gong no.	title	prior.	type	bar	attack	release	start	repeat cnt	rep-del
G20	Vierkling	00	fourtone	1 = A 2 = B 3 = C 4 = D	04 ms 06 ms 07 ms 10 ms	XL XL XL XL	no 1,5 sec 1,5 sec 1,5 sec	no	no
G21	Dreikling	00	threetone	1 = A 2 = B 3 = C	04 ms 06 ms 07 ms	XL XL XL	no 1,5 sec 1,5 sec	no	no
G22	Zweikling	00	twotone	1 = A 2 = B	04 ms 06 ms	XL XL	no 1,5 sec	0001	8,0 sec
G23	Einklang	00	onetone	1 = A	04 ms	XL	no	0001	8,0 sec
G24	Vorgong	00	twotone	1 = A 2 = B	04 ms 06 ms	XL XL	no 0,5 sec	0001	9,0 sec
G25	Türgong	00	fourtone	1 = A 2 = B 3 = A 4 = B	04 ms 06 ms 07 ms 10 ms	M M XL XL	no 0,5 sec 0,5 sec 0,5 sec	no	no
G26	Alrmgong	00	twotone	1 = A 2 = B	04 ms 06 ms	M M	no 0,5 sec	endless	0,5 sec

Definitions for the "gong table":

bar A = high frequency, bar D = low frequency

no = parameter not available

attack = bar attack (ms)

release = bar release (XXS = short, M = middle to XXL = long)

start = time (sec.) to bar x attack counting from previous bar

repeat cnt = counter of how many times the gong period gets repeated

rep-del = time between two gong periods

## List of factory preset alarm signals

Alarm-number	Title	Priority	Type	Freq. 1Hz	Freq. 2Hz	time sec	Ratio	repeat
A20	DIN-Alarm	00	Uni-Sweep	1200	500	1,00	14%	endless
A21	slow Whp	00	Uni-Sweep	500	1200	1,00	14%	endless
A22	Sirene	00	Bi-sweep	400	800	2,00	14%	endless
A24	BZB-Luft	00	Bi-sweep	330	420	2,00	14%	30x
A27	BZB-ABC	00	Bi-sweep	330	420	2,00	14%	6x
A34	DIN-Alarm	00	Uni-Sweep	1200	500	1,00	14%	5x

Alarm-number	Title	Priority	Type	Freq. 1Hz	time 1sec	Freq. 2Hz	time 2 sec	Ratio	repeat
A23	Post	00	jumptone	925	0,50	1075	0,50	14%	endless
A28	Telefon	00	jumptone	440	0,0	5494	0,05	50%	20x

Alarm-number	Title	Priority	Type	Frequency Hz	ontime sec	offtime sec	Ratio	Number
A26	BZB-Fire	00	Burst	420	12,00	12,00	14%	5x
A29	AbndnShp	00	Burst	800	12,00	1,50	14%	endless
A30	Schiff1	00	Burst	800	1,50	1,50	14%	14x
A31	Schiff2	00	Burst	800	4,50	1,50	14%	2x
A32	Schiff3	00	Burst	800	1,50	1,50	14%	2x

Alarmnumber	Title	Priority	Type	Frequency in Hz	time in sec	Ratio
A25	BZB-Entw	00	Dauerton	420	60,00	14%
A33	800Hertz	00	Dauerton	800	endless	14%

## APPENDIX

### Troubleshooting

In stand-by mode the DMM 4650 runs a number of test routines in order to detect device faults at an early stage. Errors are indicated by the flashing of the green POWER LED. With fatal errors or when errors start to appear more often the blinking of the LED gets faster and the fault relay drops. At the same time, the audio input is connected directly to the output via the bypass relay.

The menu "self test" provides a listing of error numbers and occurrence of the following messages:

No:	Error Name	Function test
1	Reset	Power-On counter, no message displayed
2	Software	faulty micro processor interrupt
3	Modul-ID	changing number and activity of control ports (A-D) during power-on
4	+/- 15V	tests internal supply-voltage $\pm 15V$
5	Bypass	function of audio bypass relay (hardware and software)
6	Fault	function of fault relay (hardware and software)
7	User-mem	data error of passwords and their priorities
8	Trig-mem	data error in trigger settings
9	Sequ-mem	data error in user presets of sequences
10	Stop-mem	data error in user settings of stop triggers
11	Alrm-mem	data error in alarm user presets
12	Gong-mem	data error in gong user presets
13	Msg-dir	data error in message file management
14	Msg-chsu	data error in message audio data (see also "message" on page 14 "**")
15	ARS-RAM	communication error in DSP processor
16	ARS-mod	software error in DSP processor
17	Flash	tests for a changed number of flash memory cards
18	Block	faulty blocks in flash memory has been occurred later
19	EEPROM	error at writing into EEPROM
20	ROM	data modification of the microprocessor's EPROM

## User questions, hints

This chapter tries to explain some of the DMM 4650's functions that first may seem somewhat surprising for the user and to provide the amended solution.

- Question:** Recording a message is suddenly interrupted by the DMM 4650?  
**Explanation: a)** An external contact initiated a sequence with a higher priority (e. g. alarm) than the one of current user. This reaction is necessary and intended, since no user with a priority level 1 or 2 should be able to block the alarm functions.  
**Solution: a)** Record the message with the same number (delete? = yes) after the priority sequence ends.  
**Explanation: b)** Audio memory overrun.  
**Solution: b)** Deleting message numbers that are no longer needed re-provides memory, or install additional audio memory (user 3) in case of need.  
**Explanation: c)** During recording the DMM 4650 has recognized a defect memory address, which is marked as bad and is no longer available for future recordings (bad block).  
**Solution: c)** Start a new recording using the same message number (delete? = yes).
- Question:** The message number xx cannot be recorded. The message "access denied" is displayed.  
**Explanation: a)** The number has been assigned to a user with higher priority. You cannot delete this message.  
**Solution: a)** Select another message number.  
**Explanation: b)** This also happens during a remote recording, if the desired sequence for the message mistakenly has been recorded by the installer, without programming access for users with a lower priority.  
**Solution: b)** User 3 has to delete this message.
- Question:** How can I test a sequence (only user 3), without audio transmission?  
**Explanation:** The "System setup" >"Bypass" menu provides the possibility to switch the audio bypass relay to direct connection (input >output) for the duration of the test. This procedure interrupts the audio connection DMM signals >output; except when the test sequence itself switches off the relay again.
- Question:** What happens when the operation voltage of 24 volts drops for several seconds during the transmission of an alarm sequence?  
**Solution:** In case one of the factory preset alarm signals (trigger A3, A4, B1, or B2) was used re-starts the sequence as long as the alarm button is still pressed.
- Question:** What do I have to do when the green POWER LED on the front panel blinks?  
**Solution:** The flashing LED is caused by the DMM 4650's self-test routine. The LED blinks whenever an error is being detected. Detailed information on the cause of the error are only available to the service provider (user 3) (see also on page 29). Enter the user 3's password in the "self-test" menu, write down the displayed error messages, and using the soft key "quit" you have to delete all errors one by one. If the LED starts blinking again, this shows that the error is still present. Look for the cause that generates the problem and try to solve it - otherwise send the appliance to the manufacturer for servicing.

**Question:** How do I replace a 4-tone gong signal by a 3-tone gong? In accordance to the factory presets, the trigger is connected to the control input B3 and it should stay that way.

**Solution:** Performing the following changes is only possible for user 3!

The sequence S 25 which initiates the 4-tone gong signal G 20 is being started using the input B3. The selected 4-tone gong signal G 20 has to be changed to the 3-tone gong signal G21 by altering line 9 of sequence S 25 (see also on page 39). After selecting an unused user program memory number (e. g. S 05), the displayed question "store?" has to be answered with "yes" to store the new settings. Select the trigger B3 in the "trigger" menu and change the start sequence from S 25 to S 05. Using the soft key "set" activates the new trigger setting.

**Question:** I would like to use the start/stop function of the factory presets S 28, S 30 for playback and remote recording of the message M 02 ( see also on page 36, 40/41). My installation should include the inputs B3 and B4 instead of the inputs C3 and C4 reserved in the preset. The indication lamps are not needed which makes retrofitting the port C not necessary.

**Solution:** Performing the following changes is only possible for user 3!

For when the indication signals are not needed, the steps of the sequences S 28 (play message M 02) and S 30 (record M 02) stay unaltered. Only the button C4's stop operation is altered into B4 in the sequence S 30. The new setting is re-stored under S 30. The trigger B3 is selected in the "trigger" menu and the start sequence is changed from S 25 into S 28. Confirming the soft key "set" activates this new setting (play M 02). Now, you have to select the trigger B4 and change the start sequence S 26 into S 30. Afterwards confirm your settings (record M 02) using the soft key "set".

## EXAMPLES FOR ALARM TEXTS

**Caution:** The following examples are not programmed in the message memory. They only serve as examples.

### **Technical malfunction 1**

“Ladies and gentlemen, unfortunately we are experiencing a technical problem. There is no reason to be concerned. Please stay calm, we are working on the solution.”

### **Technical malfunction 2**

“Ladies and gentlemen, we are experiencing a technical malfunction. For the sake of safety we ask you to please leave the hall using the marked exits.”

### **Technical malfunction 3**

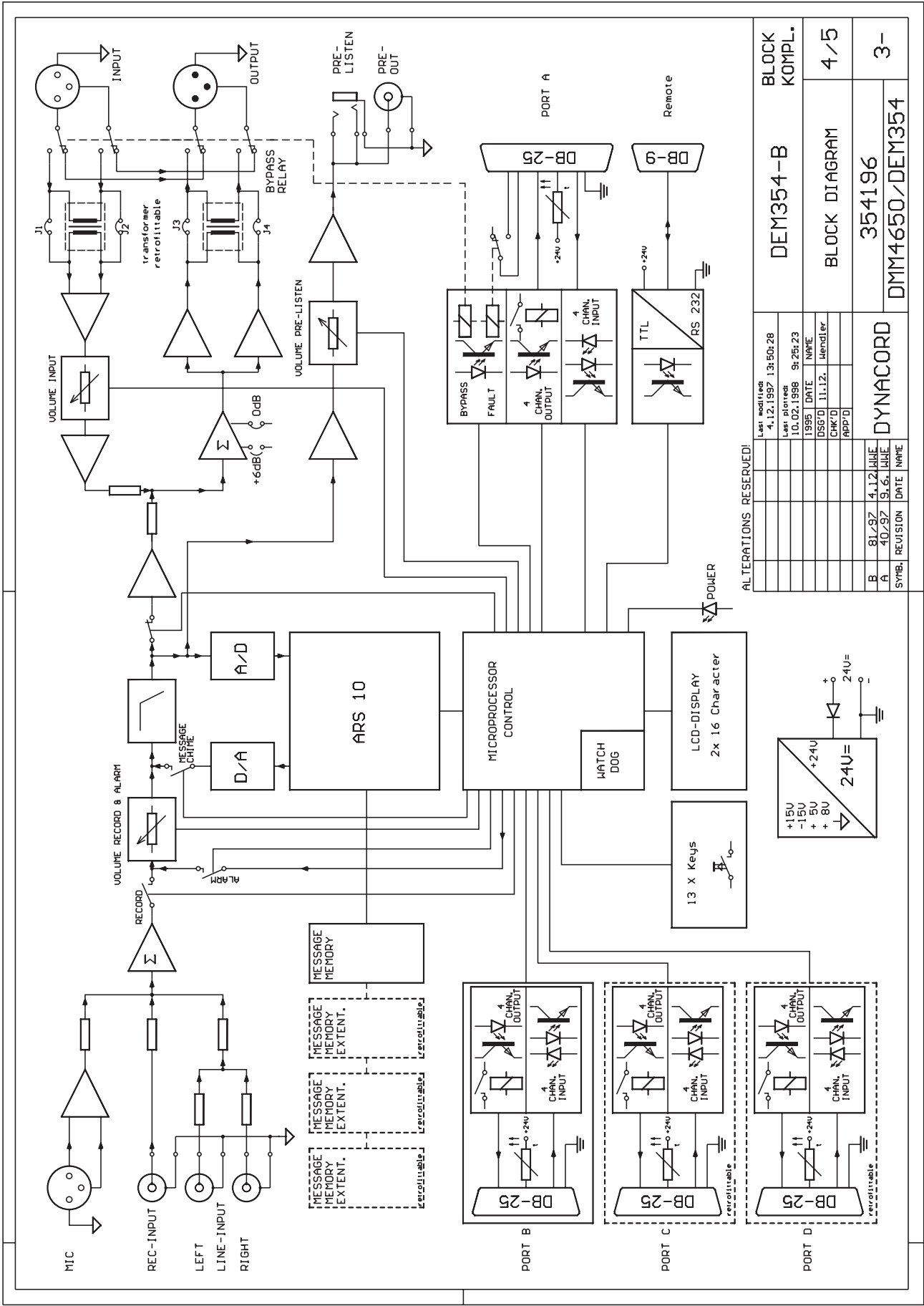
“Ladies and gentlemen, may we have your attention, please. Because we are experiencing some technical difficulties we kindly ask you, to leave the hall immediately using the marked exits. Please remain calm and follow the instructions of the authorized personal.”

### **Fire**

“Attention, fire alarm. Please use the marked exits to leave the hall immediately. Follow the instructions of the authorized personal. “Attention, fire alarm: please remain calm.”

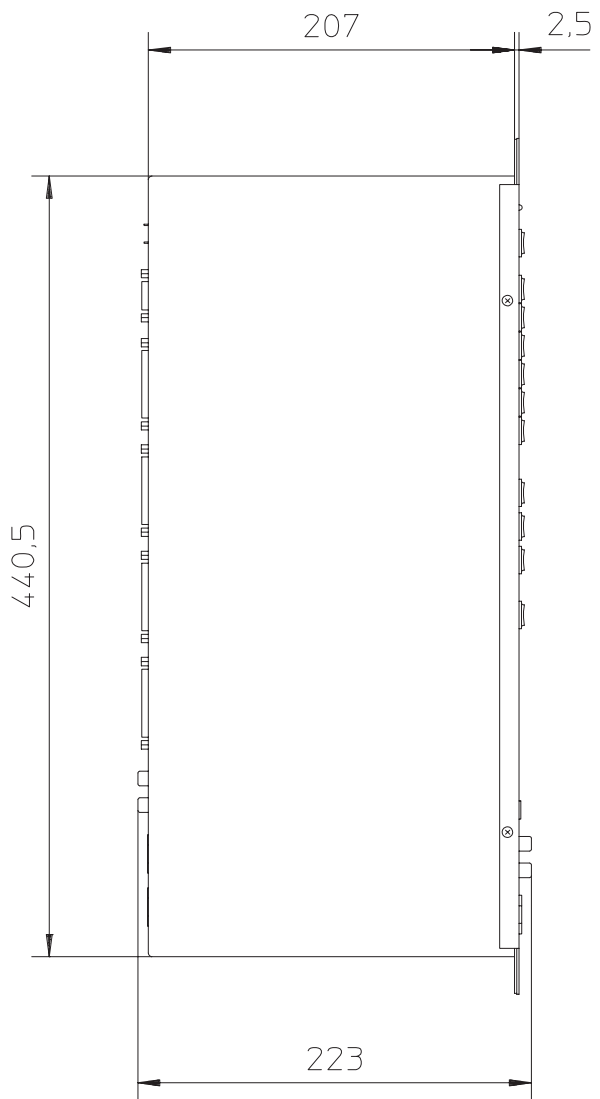
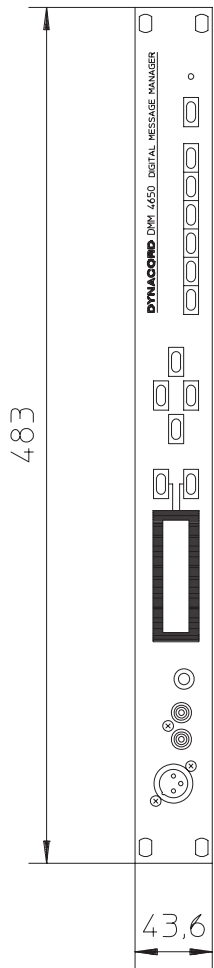
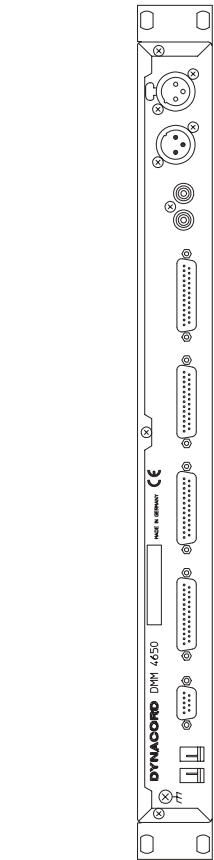
### **End of the performance**

“Ladies and gentlemen, today’s convention is coming to its end. The exits will soon be closed for the public. We sincerely hope you had a pleasant stay and are looking forward to your return.”



ALTERATIONS RESERVED!

Last modified	4.12.1997	13:50:28
Last planned	10.02.1998	9:25:23
1995 DATE	NAME	
DSE/D	11.12.	Wendler
CHK'D		
APP'D		
<b>DYNACORD</b>		
B	8/92	4.12
A	40/92	9.6.
SYMB.	REVISION	DATE NAME
DEM354-B		BLOCK KOMPL.
BLOCK DIAGRAM		4/5
354196		3-
DMM4650/DEM354		



## Specifications DMM 4650

Operating Voltage	21.6 - 31.2VDC	
Power consumption	max. 18 watts (without retrofitting kits 90204)	
Input voltage	Input	0.775V/0dBu
	*Line Input	0.775V/0dBu
	*Rec Input	0.775V/0dBu
	*Mic Input	1.4mV/ -54dBu at 600 ohms
Max. Input voltage	Input	3.8V/+14dBu
	*Line INPUT	30V/+32dBu
	*Rec INPUT	30V/+32dBu
	*Mic INPUT	50mV/ -24dBu at 600 ohms
* Using several inputs simultaneously results in a change of the stated voltages.		
Input impedance	Input(bal.)	20kOhm
	Input (unbal.)	10kOhm
	Line Input	20kOhm
	REC Input	20kOhm
	Mic INPUT	1,4kOhm
Output voltage	Output	0.775V/0dBu
	Pre-Output	3.2V/+12dBu
	Phones	3.2V/+12dBu
Max. Output voltage	Output	3.8V/+14dBu
	Pre-Output	9V/+21dBu
	Phones	9V/+21dBu
Output impedance	Output (bal.)	136 Ohm
	Output (unbal.)	68 Ohm
	Pre-Output	220 Ohm
	Phones	220 Ohm
Frequency response	Input >Output	20Hz-20kHz -3/0dB
	Mic Input	20Hz-16kHz -18/3dB
	Others	20Hz-16kHz +0/-3dB
Signal-to-noise ratio	Input >Output	> 108dB (A-weighted)
	Message	> 90dB (A-weighted)
THD	Input >Output	< 0.03% (at 1kHz)
	Message	< 0.05% (at 1kHz)
Data format	AD/DA converter	16 bit linear
	DSP internal	24 bit
Sampling rate	35kHz	
Control inputs	Ein < ±5V = Low Ein > ±10V = High	
Control outputs	floating relay contacts 1A at 24VDC	
Dimensions	483 X 43.6 X 225 (W x H x D) 19in, 1HU	
Weight	4kg	
Retrofitting kits Port C or D	NRS 90204 4 control inputs and outputs	
Memory extension	NRS 90205 message memory extension	
Output transformer	NRS 90210	
Input transformer	NRS 90211	

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